Developing a Sterling Wellhead Protection Overlay District Local Law

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New York Rural Water Association (NYRWA)

October 24, 2022

Zoning Commission

Purpose of Presentation

- Provide an update on the progress of drafting a Wellhead Protection Overlay District to protect the Fair Haven water supply.
- Offer an opportunity for the Zoning Commission to receive your preliminary thoughts and suggestions before a draft is finalized and formally presented.

Protection Efforts

- Fair Haven reached out to NYRWA in early-2021 for help with protecting the Village water source.
- Sterling Town Board tasked the Town's Zoning Commission to create the Wellhead Protection Overlay District (WHPOD) in Feb. 2022 since the wells are in the Town of Sterling outside of the Village.

Typical Local Drinking Water Source Protection Measures

- Land acquisition or easements
- Physical improvements
- Monitoring
- Education
- Best management practices (BMPs)
- Local laws

Many of these measures will be in a local Drinking Water Source Protection Program (DWSP2) Plan that is being developed.

Reasons For Local Law

- Importance of protecting Fair Haven's well supply:

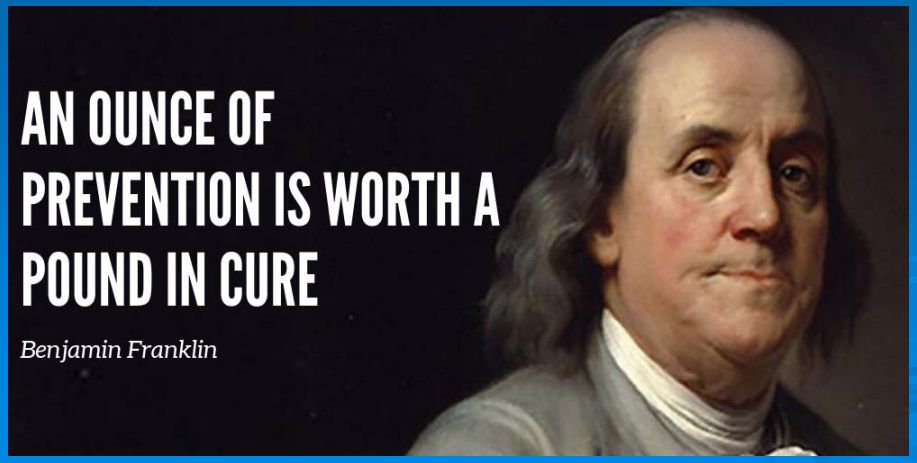
  - This groundwater supply is a regional resource that not only supplies a population of 1,000 in Fair Haven, but also approximately 80 Town residents within Sterling Water District No. 3, 114 residents in the Ingersoll Water District within the Town of Wolcott, and an average 273,000 annual visitors to Fair Haven Beach State Park. Future users could include Sterling Water District No. 2 and Wolcott's Blind Sodus Bay Water District.

Reasons For a Local Law

- The depth of the sand and gravel aquifer in the vicinity of the Fair Haven well field is relatively shallow, in the range of only 20 to 50 feet from the land surface.
- In some areas, the highly permeable sand and gravel deposits are at or near the land surface.
- Chemical spills, discharges of toxic and hazardous materials, certain land uses, and high-volume water withdrawals can threaten the quality and/or quantity of water resources that are available to recharge the aquifer.

Reasons For a Local Law

- Groundwater contamination can and does occur. Numerous historical incidences in NY include the Cayuga Groundwater Contamination site from Auburn to Union Springs, the Village of Hoosick Falls in the eastern NY that revealed the widespread presence of PFAS (forever chemicals), and the former Smith Corona Facility in Cortlandville.



Taking positive actions now can yield tremendous savings later (the damages associated with depletion or contamination).

Local Drinking Water Protection Laws Are Not New!

From the Jamestown Proclamation, 1610:

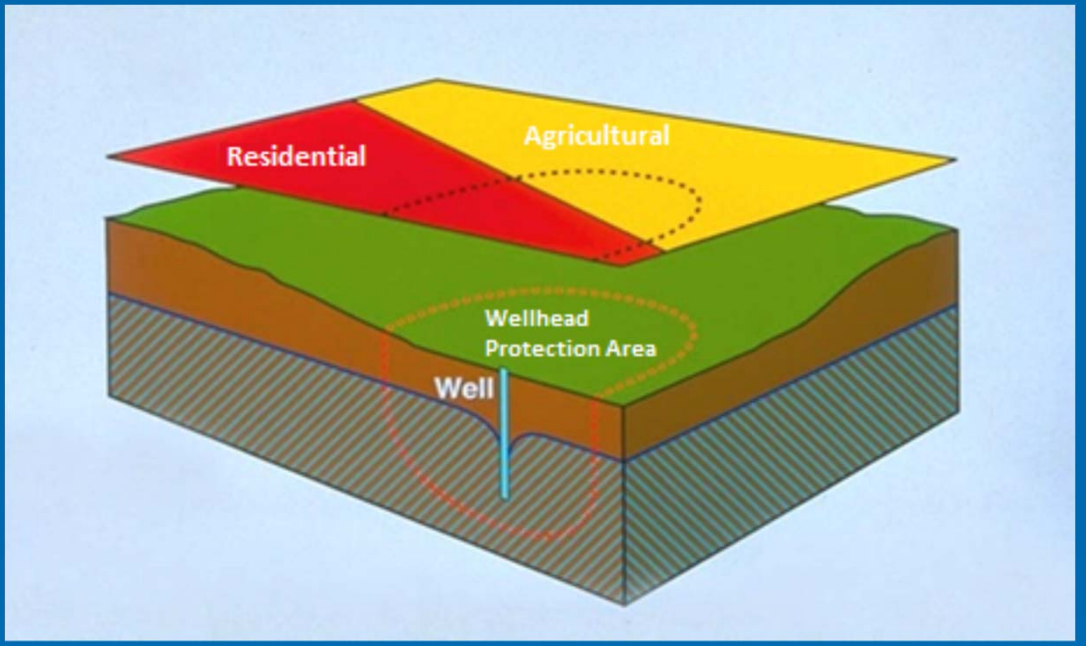
"There shall be no man or woman dare to wash any unclean linen, wash clothes, … nor rinse or make clean any kettle, pot or pan, or any such suchlike vessel within twenty feet of the old well or new pump. Nor shall anyone aforesaid within less than a quarter mile of the fort, dare to do the necessities of nature, since by these unmanly, slothful, and loathsome immodesties, the whole for may be choked and poisoned."

Local Laws

- The most effective local law protection technique has been the use of overlay districts.
  - Creates a “layer” of regulations over existing land use districts.

Protection Overlay District

- Additional requirements in the protection area that “overlay” existing land use districts.



The Town of Sterling Already Has Natural Resource Overlay Districts

- Steep Slope Overlay District
- Flood Hazard Area Overlay District
- Freshwater Wetlands Overlay District
- Coastal Erosion Hazard Overlay District
- Unconsolidated Aquifer Protection Overlay

Proposed Local Law Would Amend Land Use Regulations (LUR) to Create

- Wellhead Protection Overlay District (WHPOD)

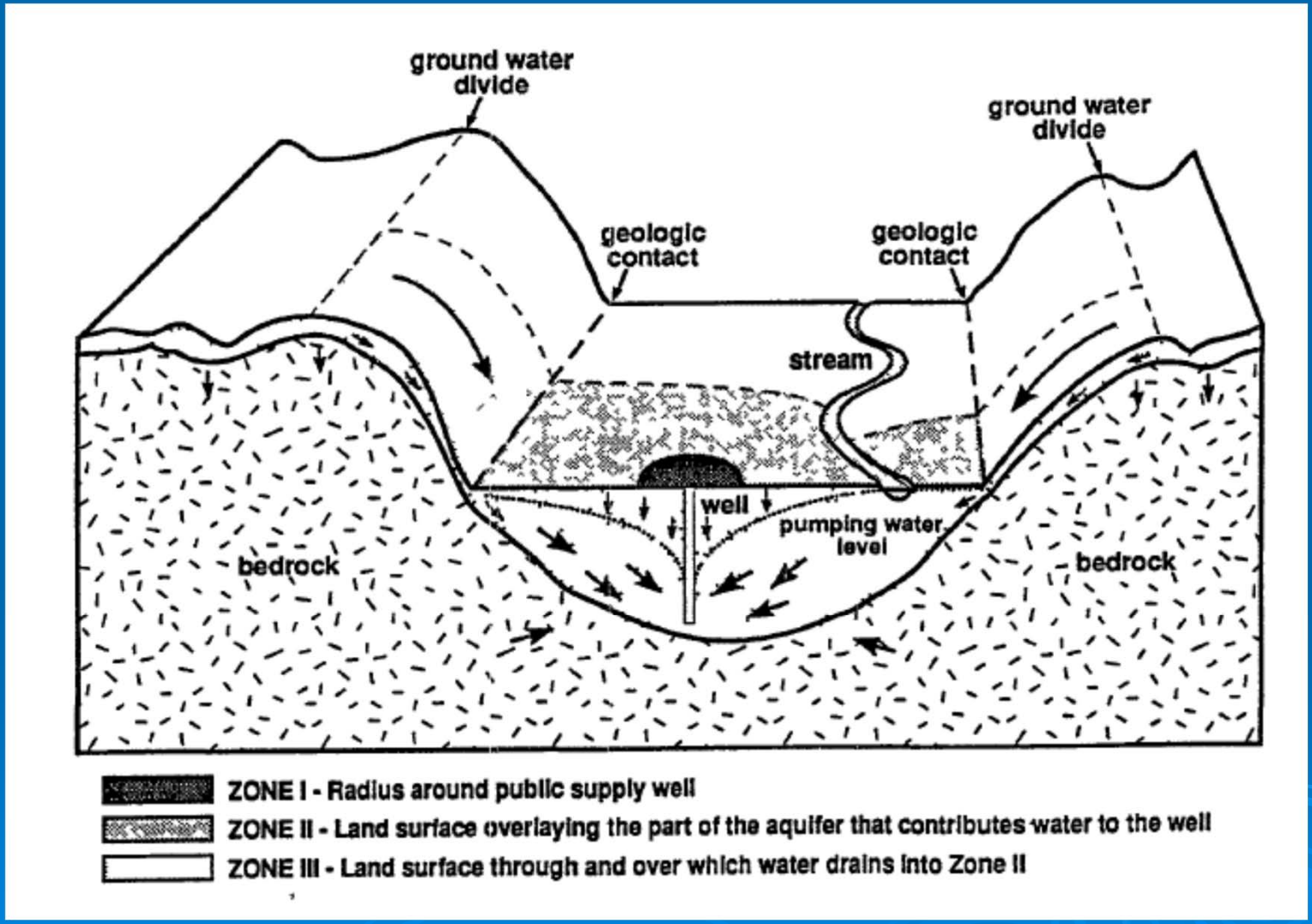
Legalities

- The intent of the Wellhead Protection Overlay District is to protect public health, safety, and welfare and this is a fundamental power given to local municipalities.
- The district regulations would only apply to new land uses and would allow existing land uses to continue.
- Groundwater is a shared public natural resource. Legal opinions indicate that "*groundwater does not belong to the owners of real property, but is a natural resource entrusted to the state by and for its citizens*" (Ivory v. Int'l Bus. Machines Corp., 2014).
- In New York, case law adopts the reasonable use rule (Forbell v. City of New York, 1900). Landowners are only entitled to reasonable uses of groundwater that do not cause injury to others (does not interfere with the groundwater uses of neighboring landowners).

How Did We Define the Area of the Proposed Wellhead Protection Overlay District?

- The wellhead protection area is the surface and subsurface area surrounding a water well(s) supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well.
- Mapping watersheds for surface water is relatively easy. It is more difficult to define the protection (recharge) area for a well source.
- Methods for delineating wellhead protection areas range widely in complexity and cost. The choice of delineation method often depends upon the amount of hydrogeologic information available and the purpose of the delineation.

Wellhead Protection Area

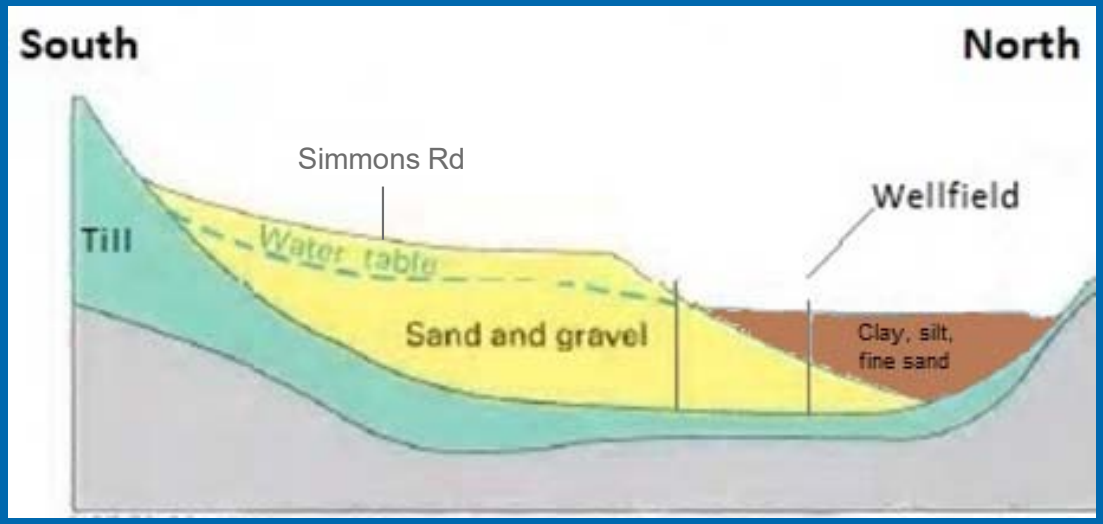


The Area Contributing Water to a Public Supply Well or Wellfield

Groundwater Misconceptions

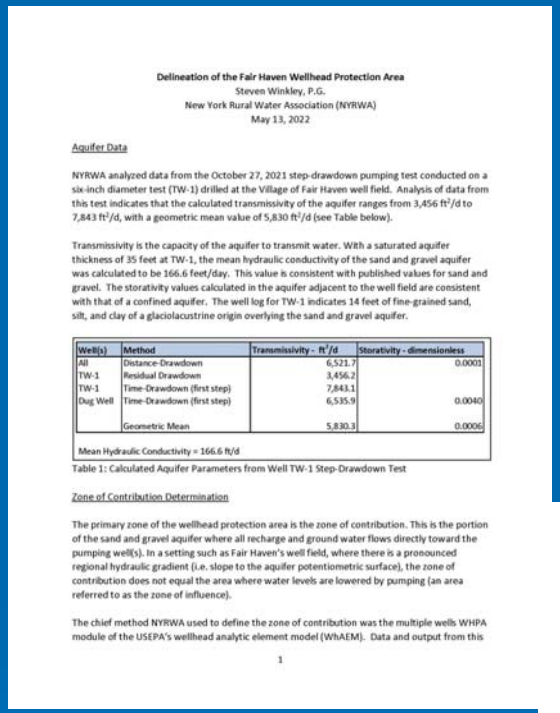
Groundwater is “out of sight, out of mind”

- There are no local underground streams. Underground streams rarely occur, but if they do occur, they would be in karst bedrock and no such bedrock underlies Sterling.
- There is also no hydraulic connection between the local sand and gravel aquifer, Skaneateles Lake, or any similar water body. The aquifer is like the one pictured to the right.



Identification of the Fair Haven Wellhead Protection Area

- Data from the October 2021 step-drawdown test on the 6” test well was sufficient to calculate key aquifer parameters (transmissivity, hydraulic conductivity, etc.).
- Using these aquifer parameters, aquifer boundary data (well data, mapping, resistivity, etc.), and permitted withdrawal rates, the EPA’s wellhead protection computer model was applied to define the primary recharge area for the Fair Haven supply wells.



Delineation of the Fair Haven Wellhead Protection Area
Steven Winkley, P.G.
New York Rural Water Association (NYRWA)
May 13, 2022

Aquifer Data

NYRWA analyzed data from the October 27, 2021 step-drawdown pumping test conducted on a six-inch diameter test (TW-1) drilled at the Village of Fair Haven well field. Analysis of data from this test indicates that the calculated transmissivity of the aquifer ranges from 3,456 ft^2/d to 7,843 ft^2/d, with a geometric mean value of 5,830 ft^2/d (see Table below).

Transmissivity is the capacity of the aquifer to transmit water. With a saturated aquifer thickness of 35 feet at TW-1, the mean hydraulic conductivity of the sand and gravel aquifer was calculated to be 166.6 feet/day. This value is consistent with published values for sand and gravel. The storativity values calculated in the aquifer adjacent to the well field are consistent with that of a confined aquifer. The well log for TW-1 indicates 14 feet of fine-grained sand, silt, and clay of a glaciolacustrine origin overlying the sand and gravel aquifer.

Well(s)	Method	Transmissivity - ft^2/d	Storativity - dimensionless
All	Distance-Drawdown	6,521.7	0.0001
TW-1	Residual Drawdown	3,456.2	
TW-1	Time-Drawdown (first step)	7,843.1	
Dug Well	Time-Drawdown (first step)	6,535.9	0.0040
	Geometric Mean	5,830.3	0.0006

Mean Hydraulic Conductivity = 166.6 ft/d

Table 1: Calculated Aquifer Parameters from Well TW-1 Step-Drawdown Test

Zone of Contribution Determination

The primary zone of the wellhead protection area is the zone of contribution. This is the portion of the sand and gravel aquifer where all recharge and ground water flows directly toward the pumping well(s). In a setting such as Fair Haven’s well field, where there is a pronounced regional hydraulic gradient (i.e. slope to the aquifer potentiometric surface), the zone of contribution does not equal the area where water levels are lowered by pumping (an area referred to as the zone of influence).

The chief method NYRWA used to define the zone of contribution was the multiple wells WHPA module of the USEPA’s wellhead analytic element model (WhAEM). Data and output from this

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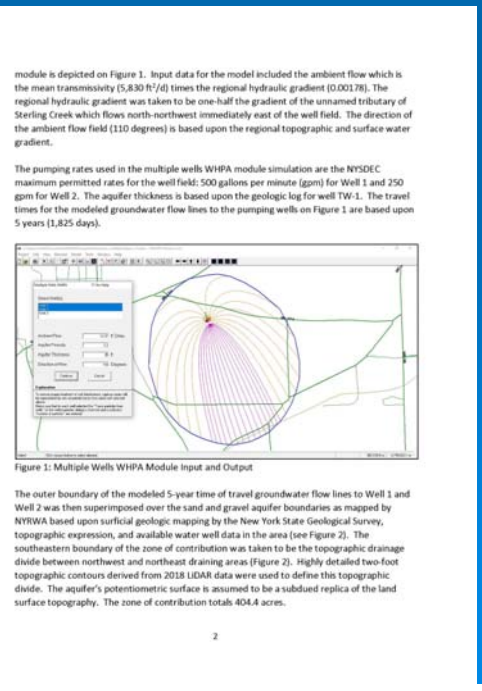
NYRWA 5/13/22 Wellhead Protection Area Delineation Report



module is depicted on Figure 1. Input data for the model included the ambient flow which is the mean transmissivity (5,830 ft^2/d) times the regional hydraulic gradient (0.00178). The regional hydraulic gradient was taken to be one-half the gradient of the unnamed tributary of Sterling Creek which flows north-northwest immediately east of the well field. The direction of the ambient flow field (110 degrees) is based upon the regional topographic and surface water gradient.

The pumping rates used in the multiple wells WHPA module simulation are the NYSDEC maximum permitted rates for the well field: 500 gallons per minute (gpm) for Well 1 and 250 gpm for Well 2. The aquifer thickness is based upon the geologic log for well TW-1. The travel times for the modeled groundwater flow lines to the pumping wells on Figure 1 are based upon 5 years (1,825 days).

Figure 1: Multiple Wells WHPA Module Input and Output

The outer boundary of the modeled 5-year time of travel groundwater flow lines to Well 1 and Well 2 was then superimposed over the sand and gravel aquifer boundaries as mapped by NYRWA based upon surficial geologic mapping by the New York State Geological Survey, topographic expression, and available water well data in the area (see Figure 2). The southeastern boundary of the zone of contribution was taken to be the topographic drainage divide between northwest and northeast draining areas (Figure 2). Highly detailed two-foot topographic contours derived from 2018 LiDAR data were used to define this topographic divide. The aquifer’s potentiometric surface is assumed to be a subdued replica of the land surface topography. The zone of contribution totals 404.4 acres.

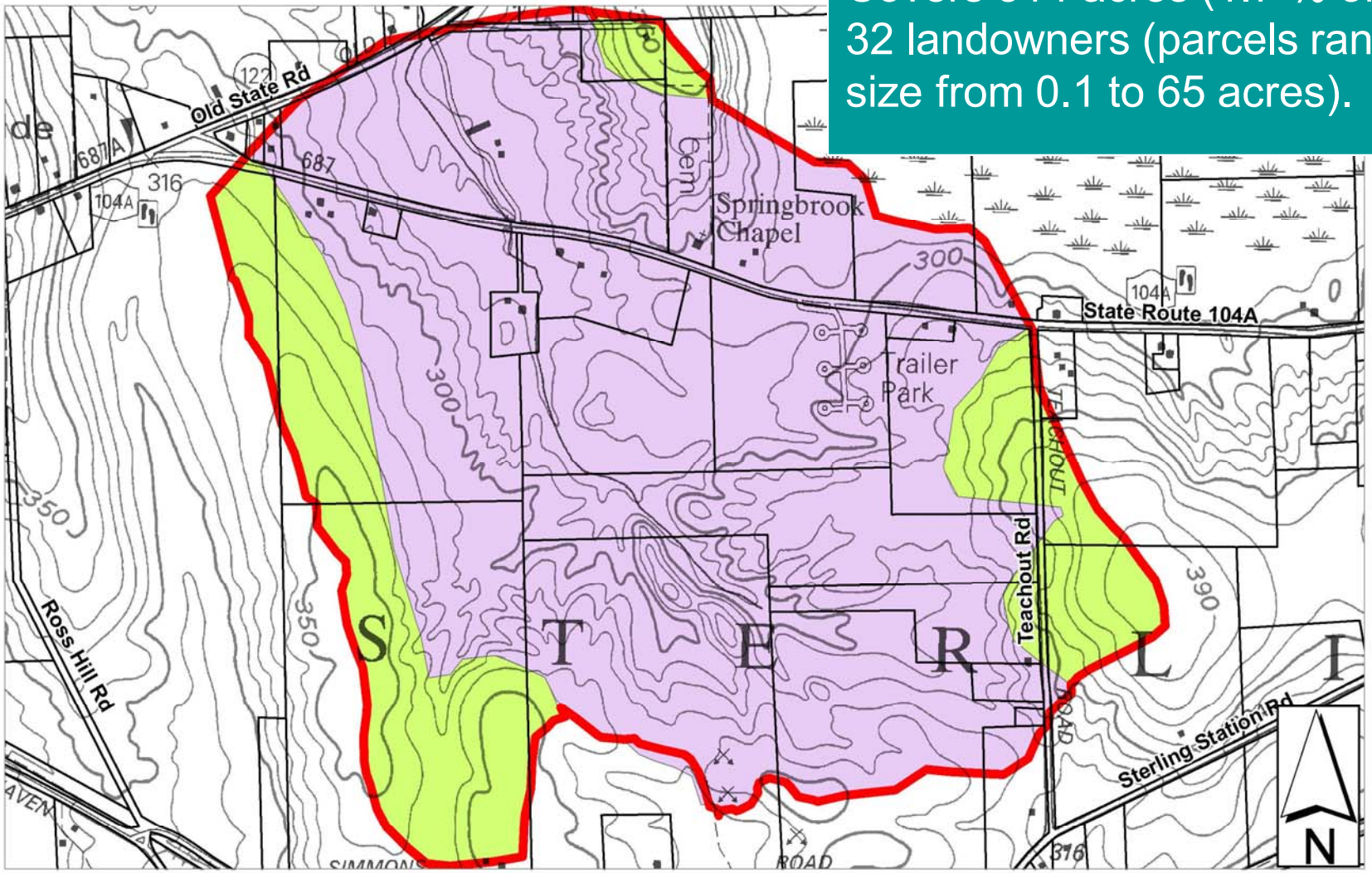
2

Identification of the Wellhead Protection Area

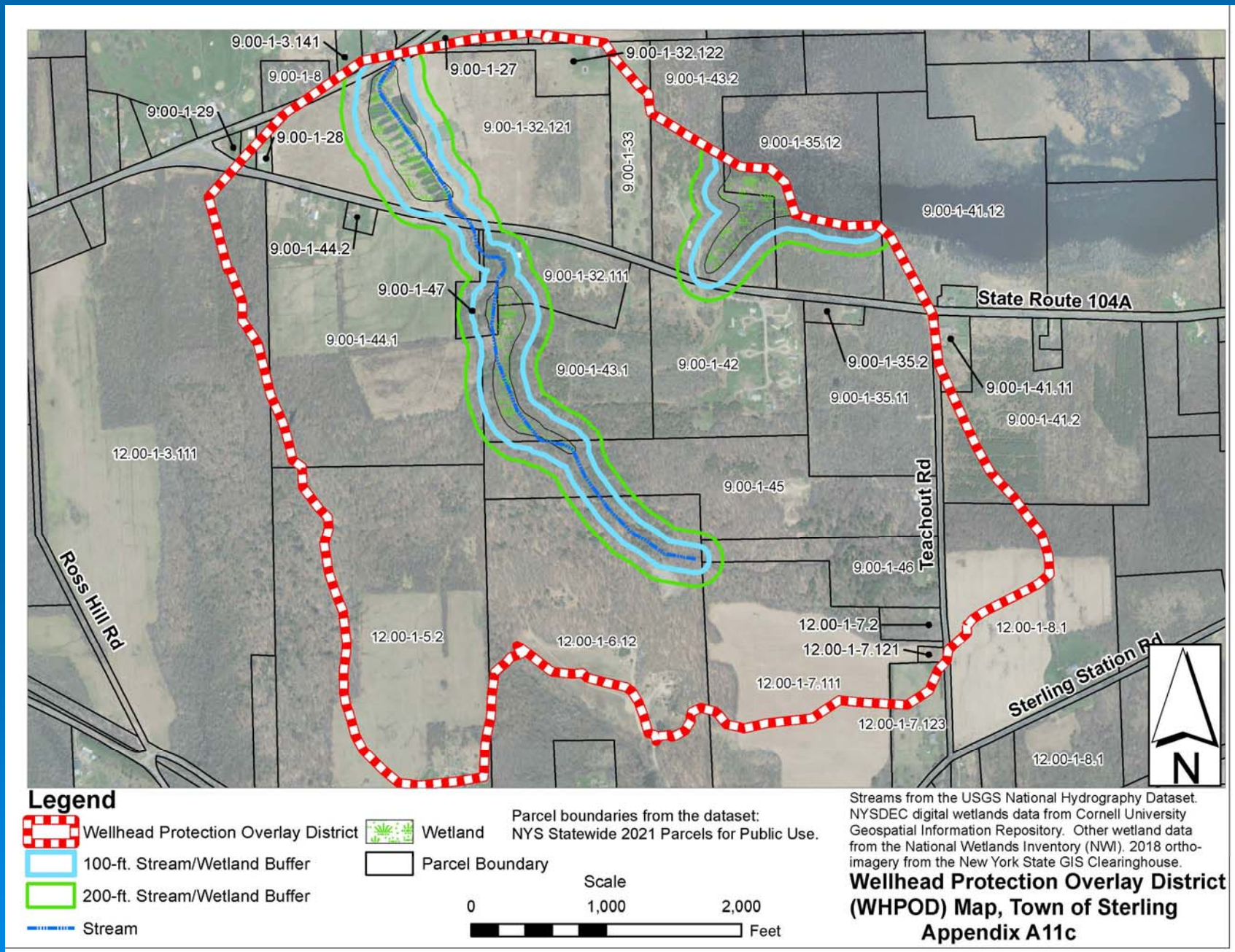
- The approach to define the protection area follows widely-accepted hydrogeologic practices.
- Further hydrogeologic information is not necessary to adequately protect the Fair Haven water supply.
- Results from a 72-hour pumping test are essential to define the long-term capacity of a new supply well and the existing wells for permitting purposes but are not necessary to define the wellhead protection area.

Wellhead Protection Area

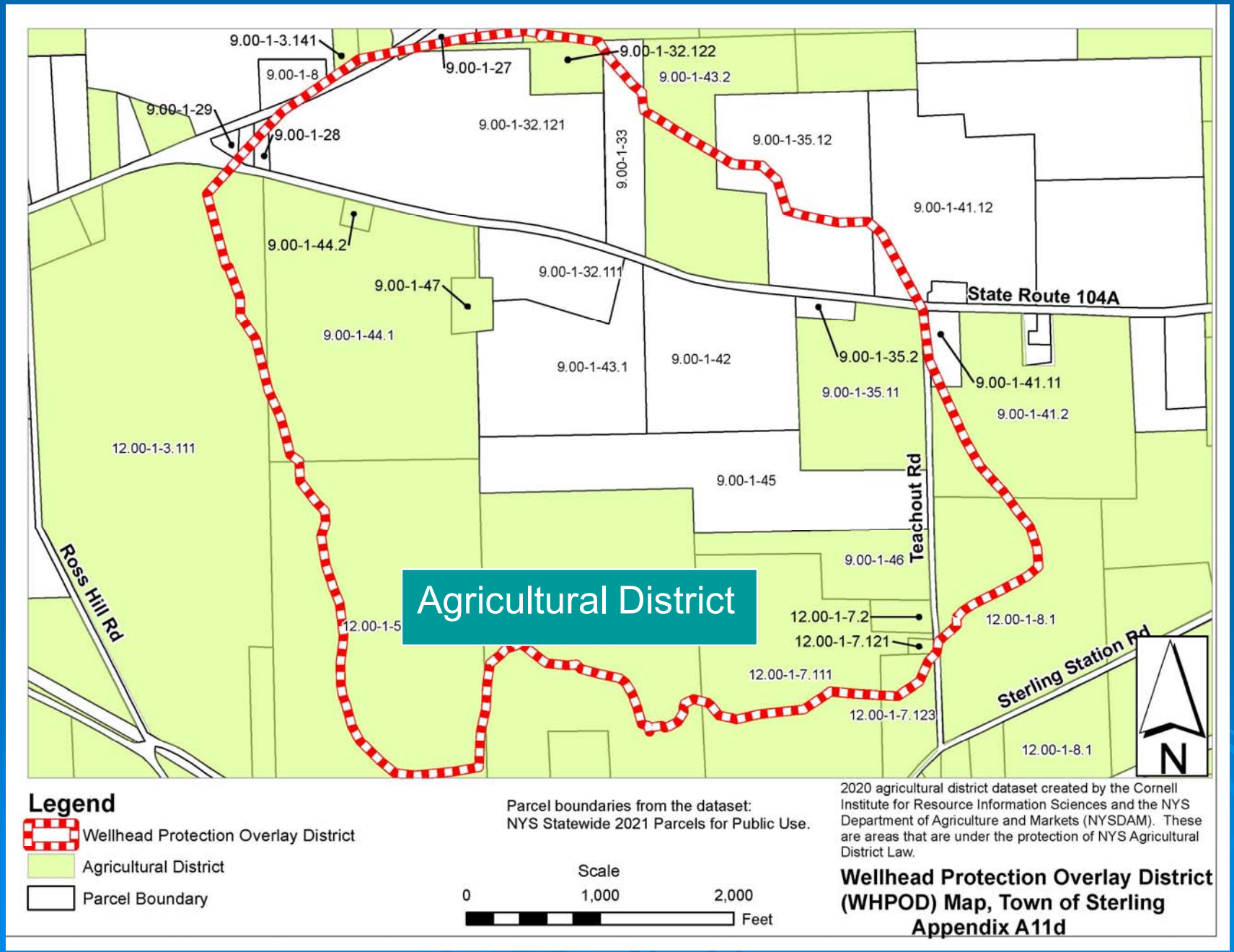
Covers 514 acres (1.7 % of Town)
32 landowners (parcels ranging in size from 0.1 to 65 acres).



Wellhead Protection Area



Wellhead Protection Area and NYSDAM Agricultural District



New York State Department of Agriculture & Markets (NYSDAM)

- Section 305-a of NYS Agricultural Districts Law protects farmers against local laws which unreasonably restrict farm operations located within an agricultural district unless it can be shown that the public health or safety is threatened.

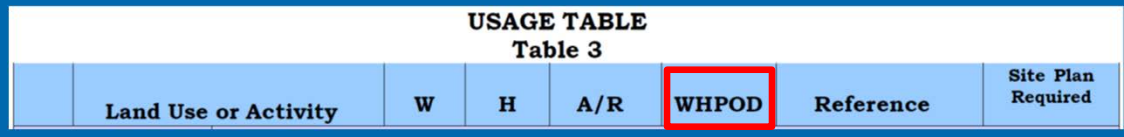
Draft Wellhead Protection Overlay District (WHPOD) Local Law

CURRENTLY A WORKING DRAFT

- Developed over the past 6 months by representatives of the Sterling Zoning Commission with assistance of NYRWA.
- Tries to balance land uses with the overarching purpose of protecting the critical groundwater resources in this key area.
- Agriculture would not be impacted by the proposed regulations, nor would the development of single-family homes. Very minimal changes would be felt for other residential uses. Many commercial uses would still be permissible assuming they met certain water use and site considerations.

Draft Wellhead Protection Overlay District (WHPOD) Local Law

- Would amend Sterling's Land Use Regulations
  - The Usage Table (Table 3) would be amended to include a new column specific to the Wellhead Protection Overlay District (WHPOD).



USAGE TABLE
Table 3

	Land Use or Activity	W	H	A/R	WHPOD	Reference	Site Plan Required

Draft Wellhead Protection Overlay District (WHPOD) Local Law

- In the amended Usage Table, there would be some uses that are prohibited within the WHPOD in order to protect water quality/quantity.
  - These include uses that could directly impact groundwater quality (e.g., auto garages, gasoline stations, etc.).
  - Also includes uses that could directly affect groundwater quantity (e.g., large water users).

Draft Wellhead Protection Overlay District (WHPOD) Local Law

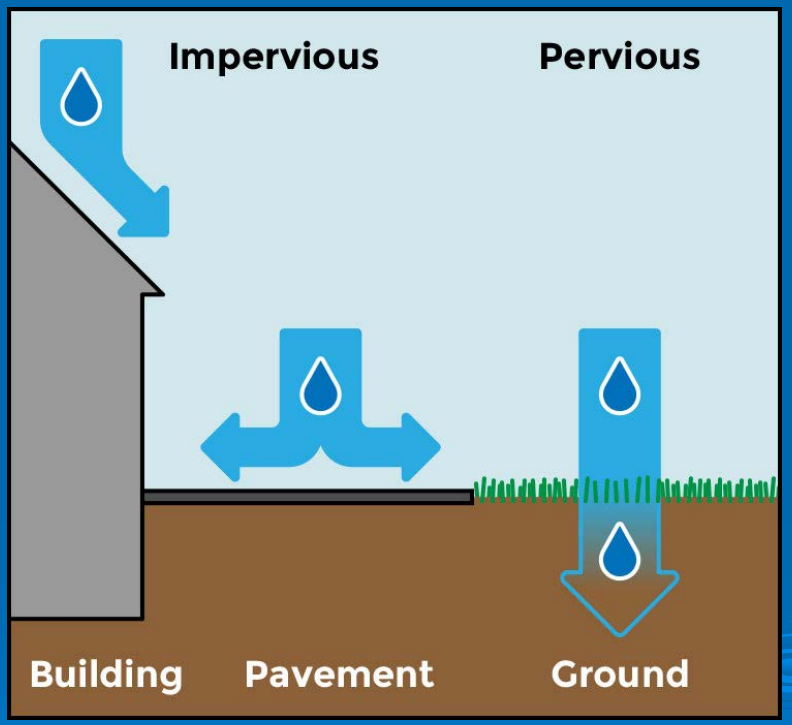
- In addition to the uses not permitted in the WHPOD according to Table 3, there are other uses and activities that would be prohibited in the WHPOD since they pose a significant threat to the quality or quantity of groundwater resources (e.g., solid waste management facility, hazardous waste facility, municipal or industrial sewage treatment facility, etc.).

Draft Wellhead Protection Overlay District (WHPOD) Local Law

- In the amended Usage Table (Table 3), some special use permits for larger water users would be permissible within the WHPOD if the use connects to a public water system and sewer system.
  - Such uses could include townhouses, condominiums, apartments, day care centers, schools, clubs, restaurants, offices, etc.

Impervious Surfaces

- Impervious means that water cannot penetrate the ground surface (pavement, buildings, etc.).
- Within the WHPOD, it is proposed that only a certain percentage of a parcel could be rendered impervious (except for the construction of a single-family dwelling or farm operations within an agricultural district).
- The purpose is to ensure that aquifer recharge is preserved.



Special Conditions – Code Enforcement Officer Review

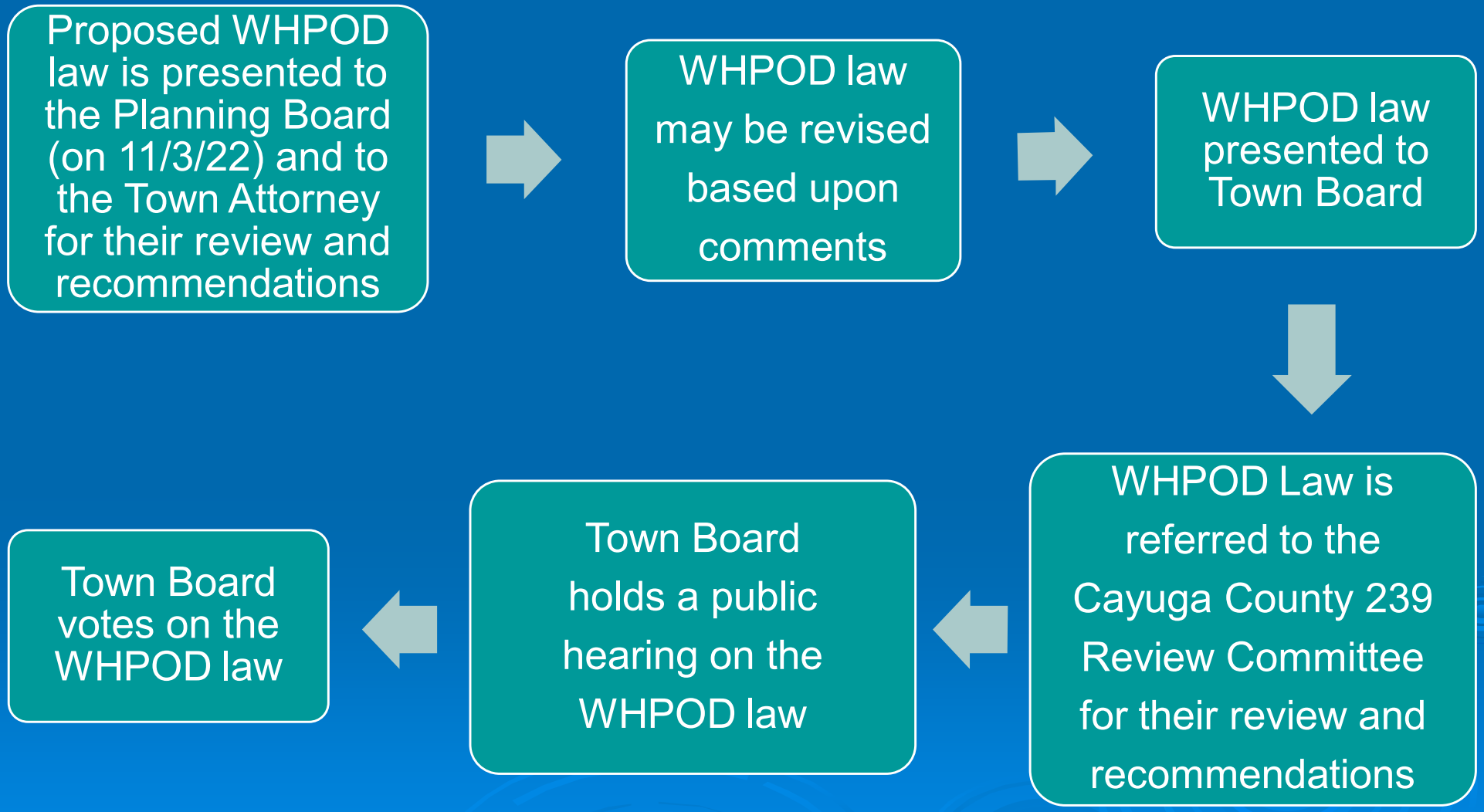
- Sterling's Code Enforcement Officer (CEO) issues a Zoning/Building Permit for certain uses only after certain Special Conditions are met (these are for proposed uses not going before the Planning Board).

- The WHPOD would require some additional special conditions for timber harvesting and soil disturbances (best management practices).

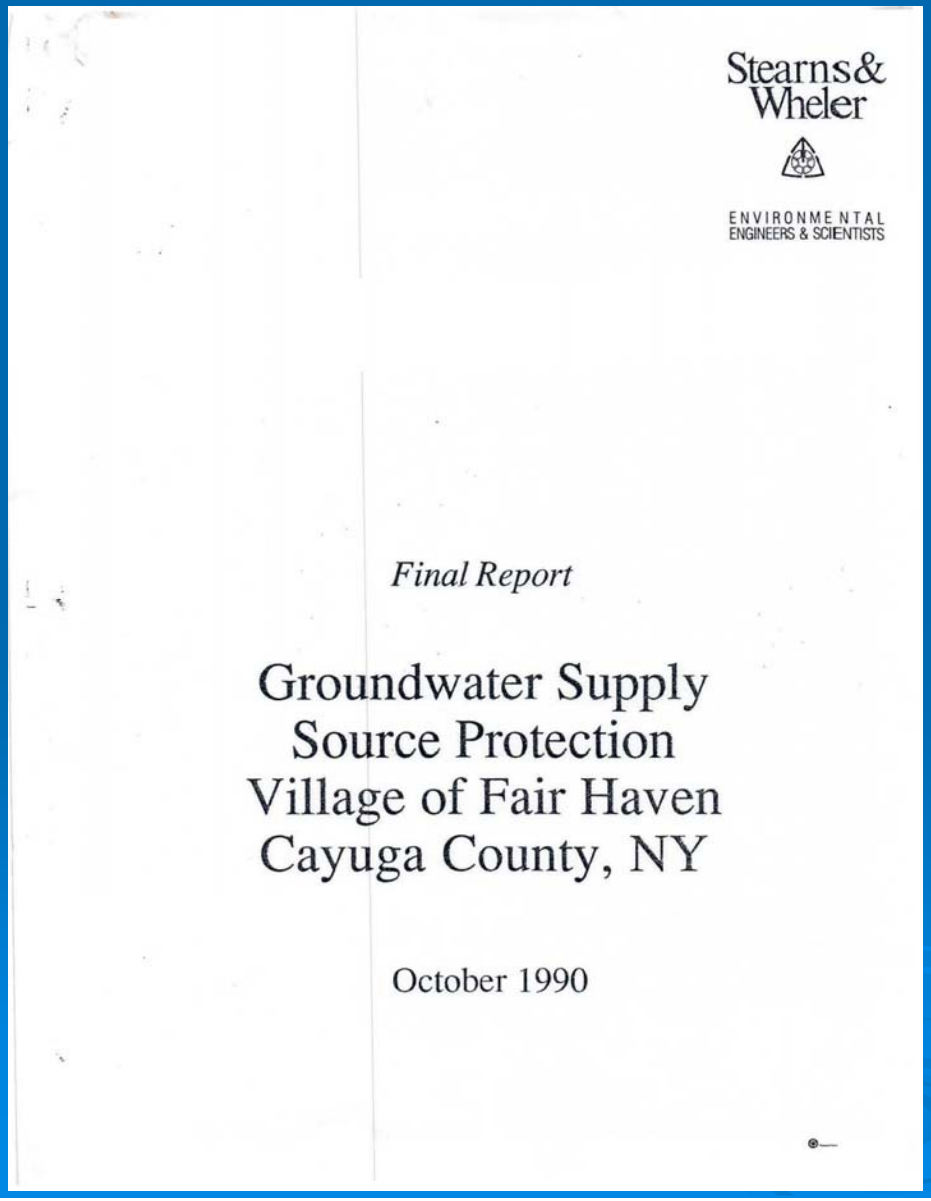
Site Plans Within the WHPOD

- Additional information would be provided for a proposed use or activity located partially or wholly within the WHPOD.
- The Planning Board would have some additional considerations when reviewing and approving a site plan within the WHPOD.

What's Next ?


Proposed WHPOD law is presented to the Planning Board (on 11/3/22) and to the Town Attorney for their review and recommendations
WHPOD law may be revised based upon comments
WHPOD law presented to Town Board
WHPOD Law is referred to the Cayuga County 239 Review Committee for their review and recommendations
Town Board holds a public hearing on the WHPOD law
Town Board votes on the WHPOD law

Reminder:
Protection of the Fair Haven Water Supply Has Been Proposed Since 1990



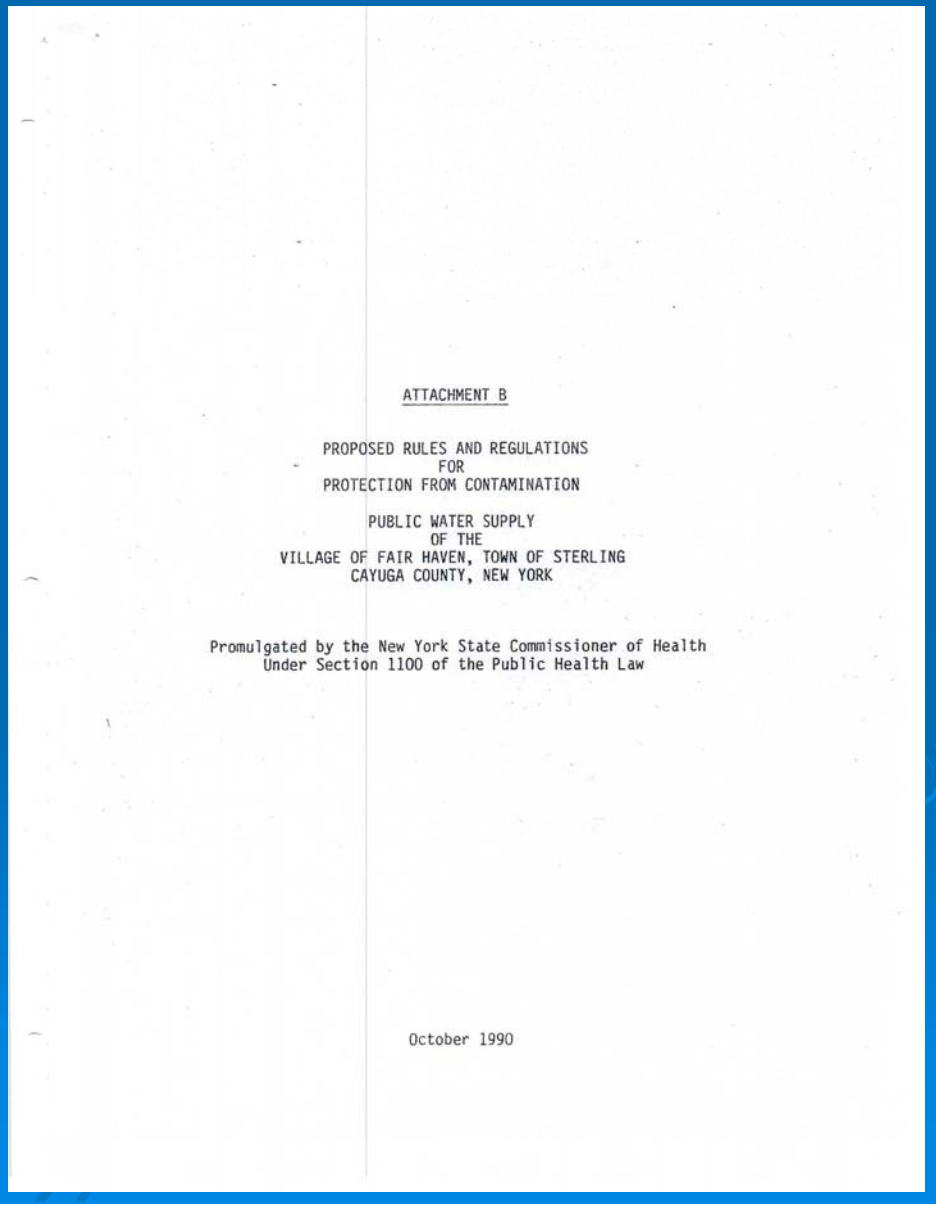
Stearns & Wheler

ENVIRONMENTAL ENGINEERS & SCIENTISTS

Final Report

Groundwater Supply
Source Protection
Village of Fair Haven
Cayuga County, NY

October 1990



ATTACHMENT B

PROPOSED RULES AND REGULATIONS
FOR
PROTECTION FROM CONTAMINATION

PUBLIC WATER SUPPLY
OF THE
VILLAGE OF FAIR HAVEN, TOWN OF STERLING
CAYUGA COUNTY, NEW YORK

Promulgated by the New York State Commissioner of Health
Under Section 1100 of the Public Health Law

October 1990

Questions??