



Orient Water Management Plan

May 27, 2023

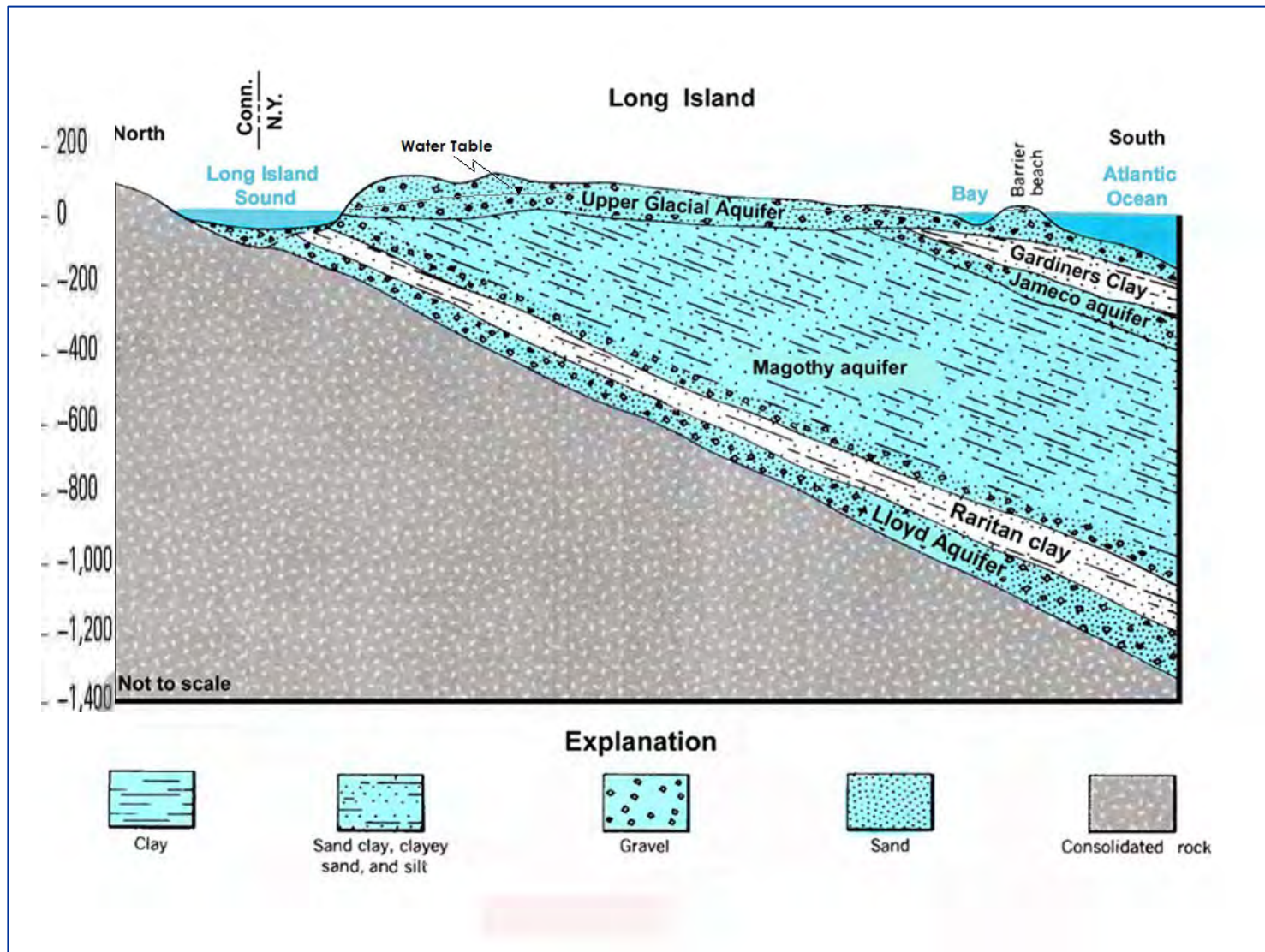
Agenda

- Orient's Water Supply
- Groundwater Quantity
- Groundwater Quality
- Climate Change Considerations
- Wrap-up and Questions

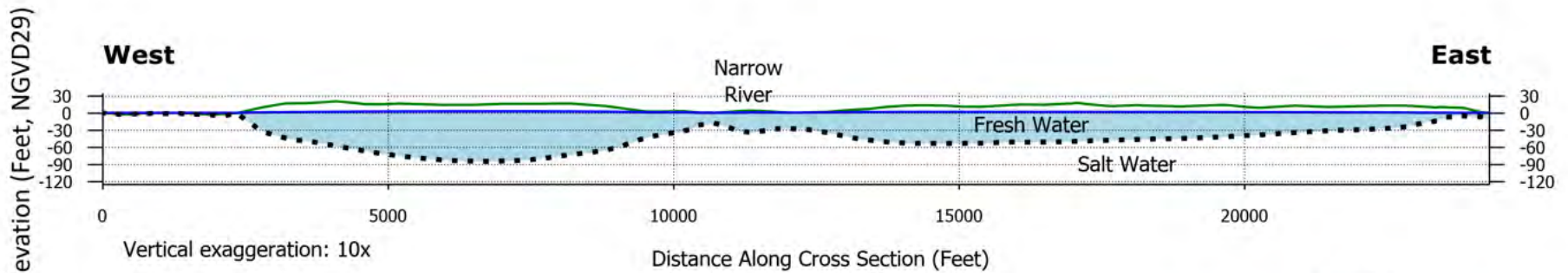


Orient's Water Supply

Groundwater – Long Island's Water Supply



Groundwater – Orient’s Water Supply



Legend

- Ground Surface
- 2020 Simulated Water Table
- - - 2020 Simulated Salt Water Interface

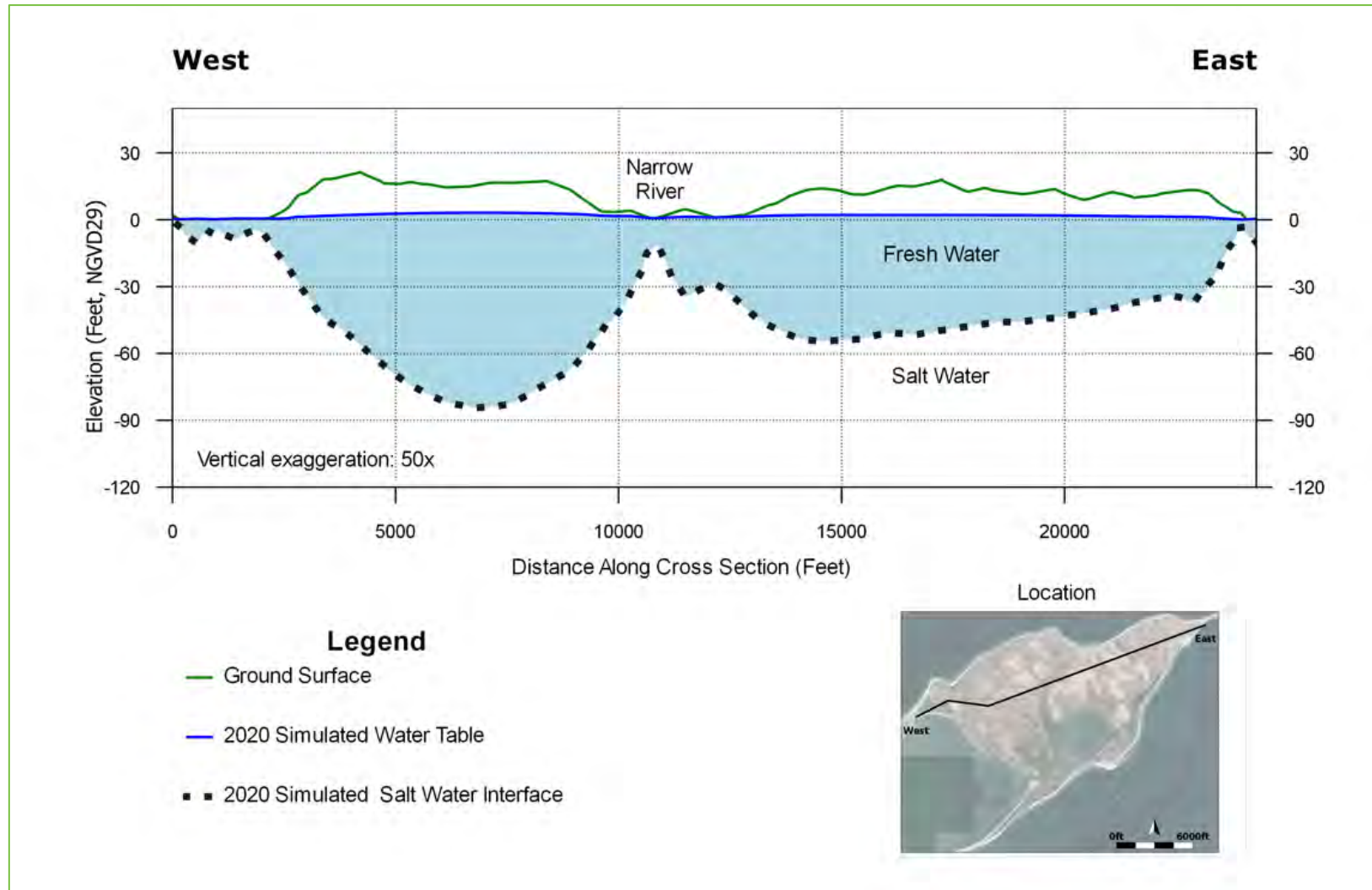
Location

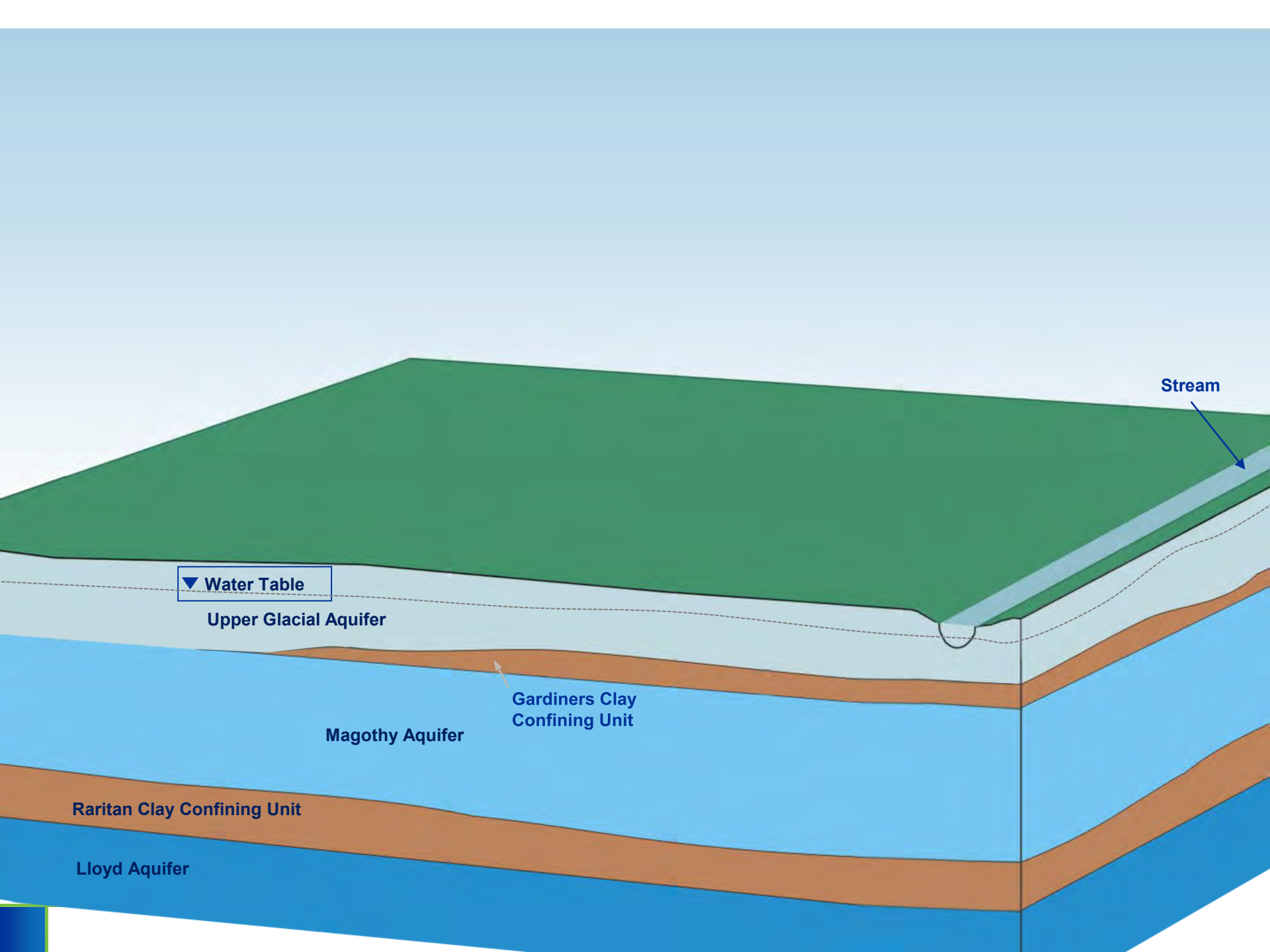


Orient's Groundwater Supply

Groundwater Visualization Orient, NY

Groundwater – Orient’s Water Supply





Stream

▼ Water Table

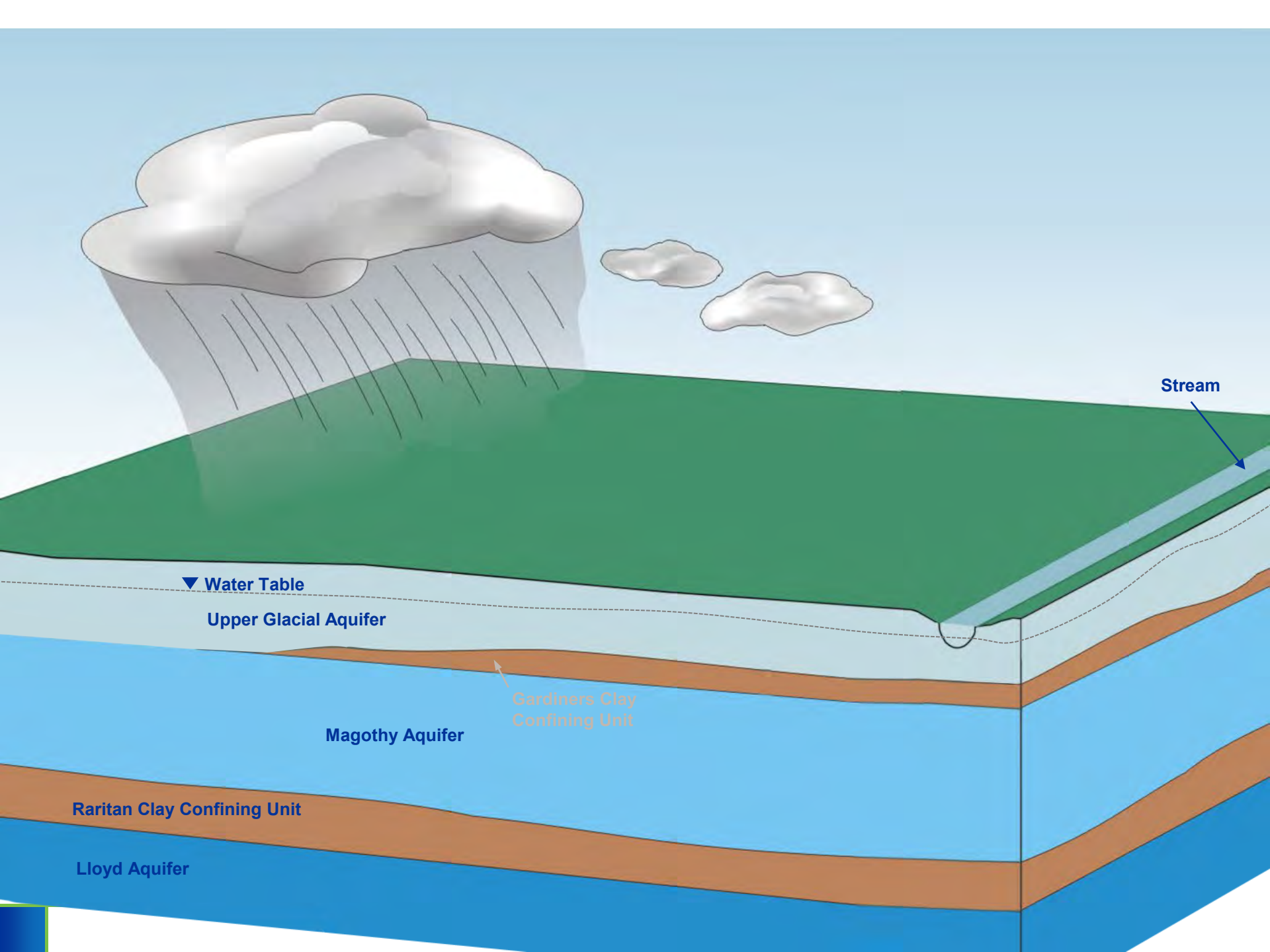
Upper Glacial Aquifer

Gardiners Clay Confining Unit

Magothy Aquifer

Raritan Clay Confining Unit

Lloyd Aquifer



Stream

▼ Water Table

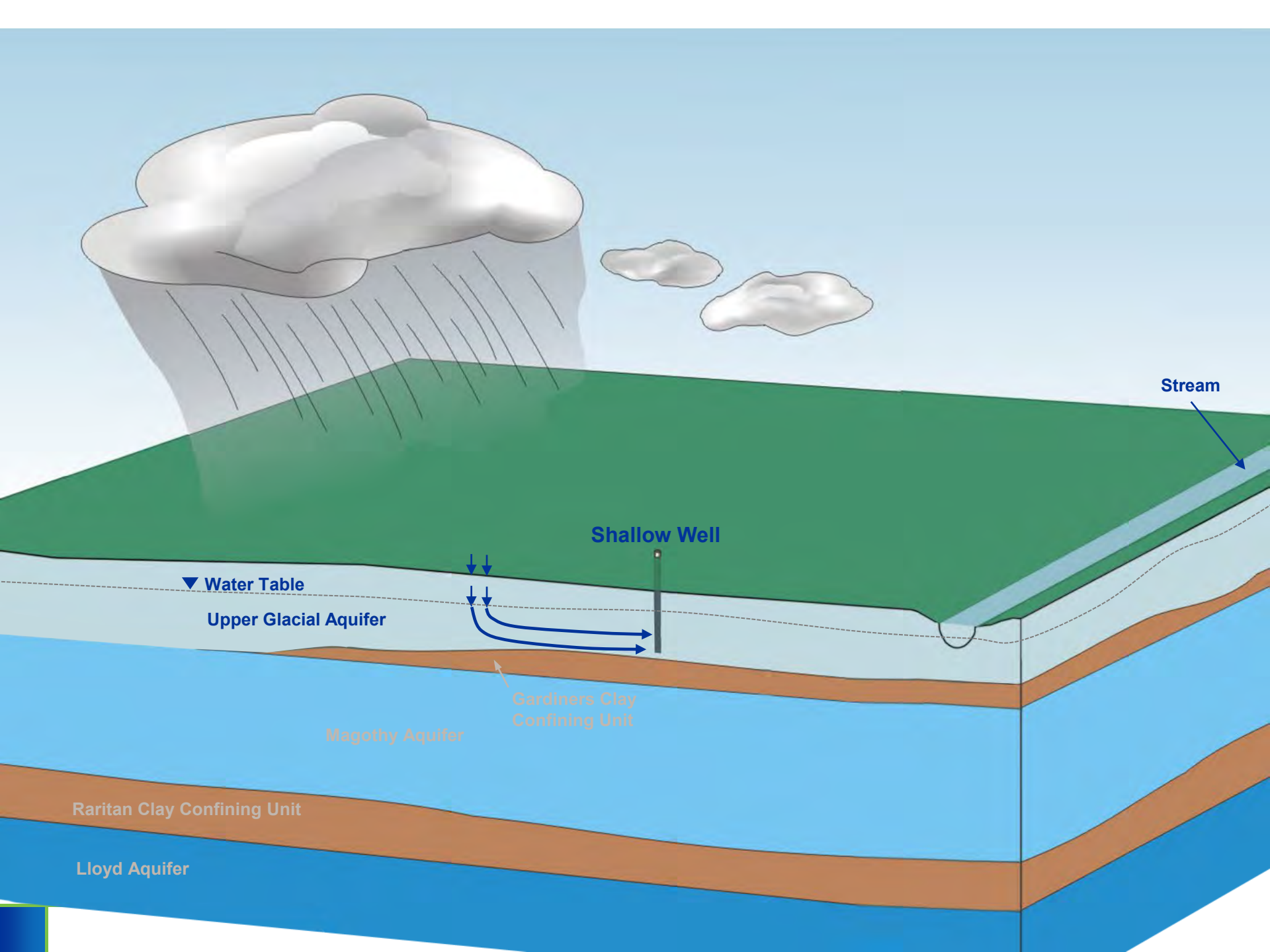
Upper Glacial Aquifer

Magothy Aquifer

Gardiners Clay Confining Unit

Raritan Clay Confining Unit

Lloyd Aquifer



Stream

Shallow Well

▼ Water Table

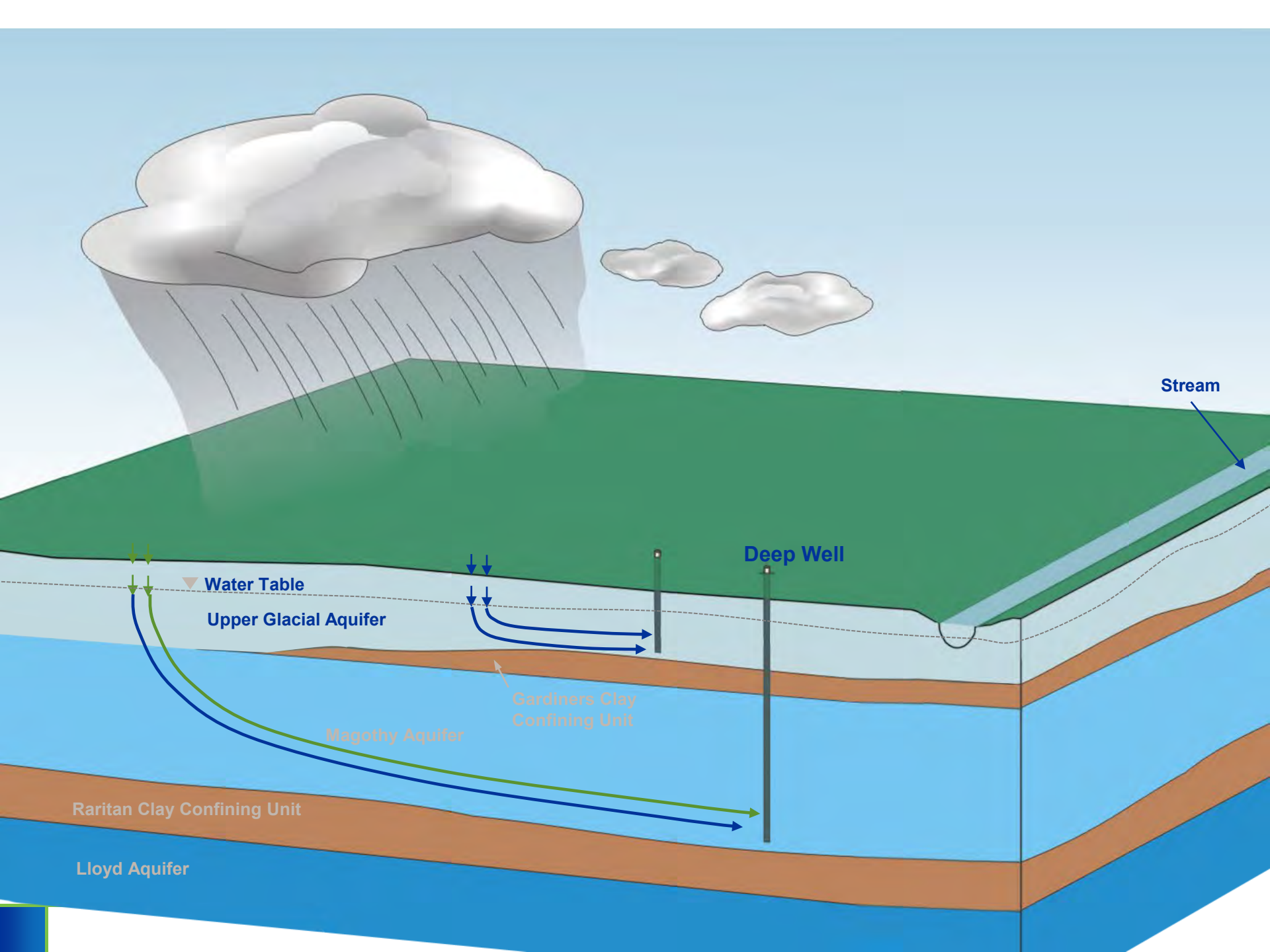
Upper Glacial Aquifer

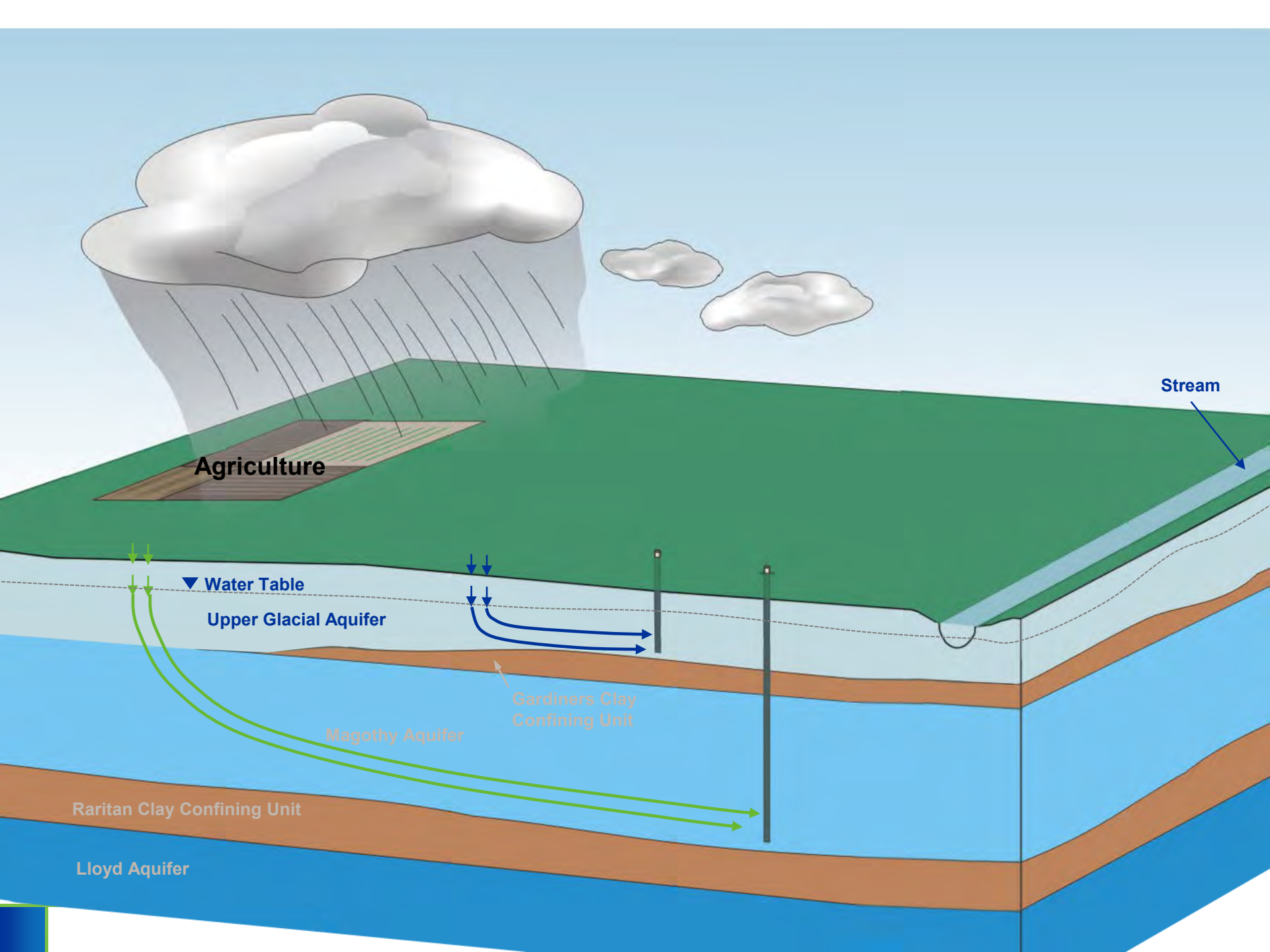
Magothy Aquifer

Gardiners Clay Confining Unit

Raritan Clay Confining Unit

Lloyd Aquifer





Agriculture

Stream

▼ **Water Table**

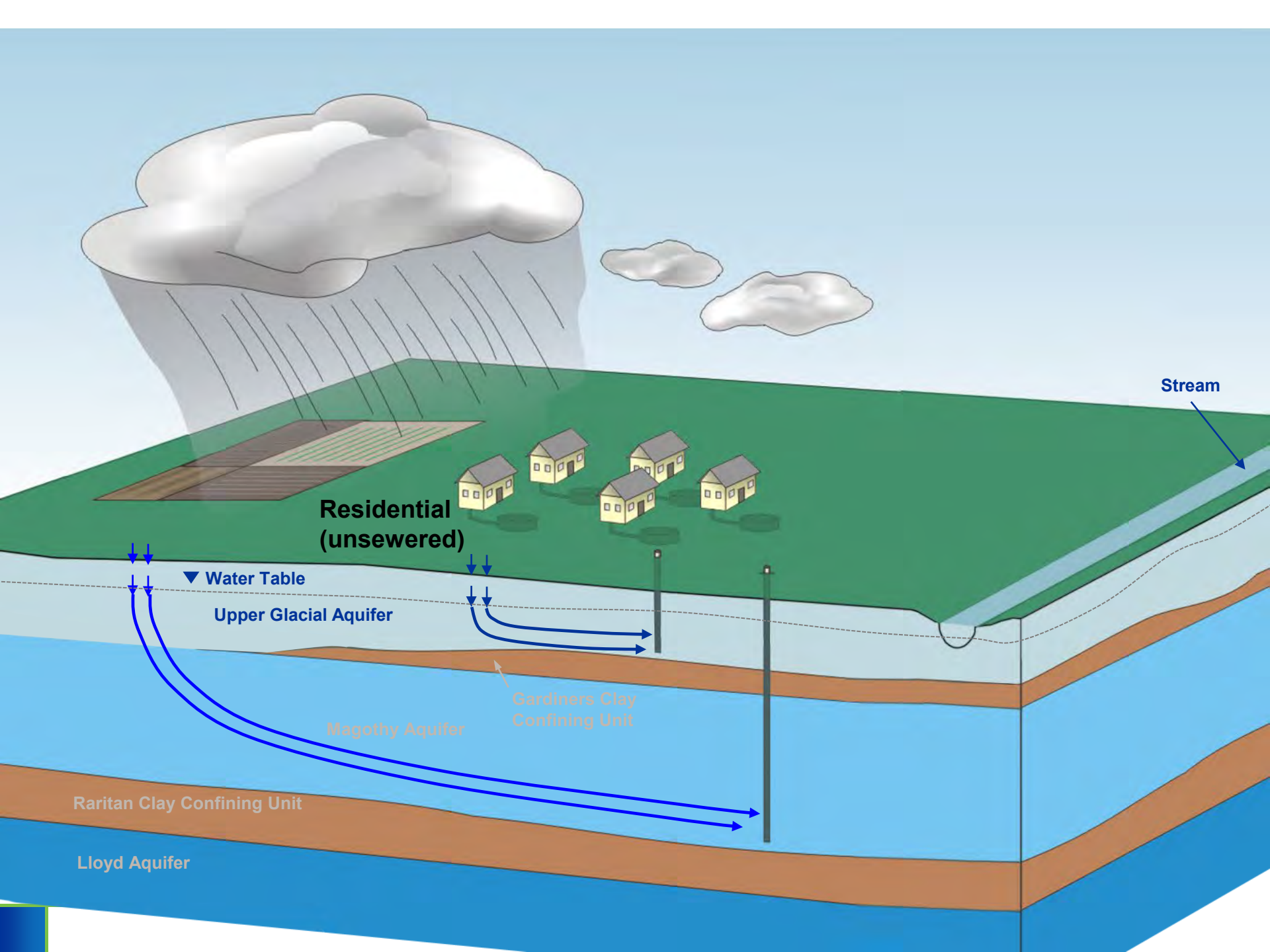
Upper Glacial Aquifer

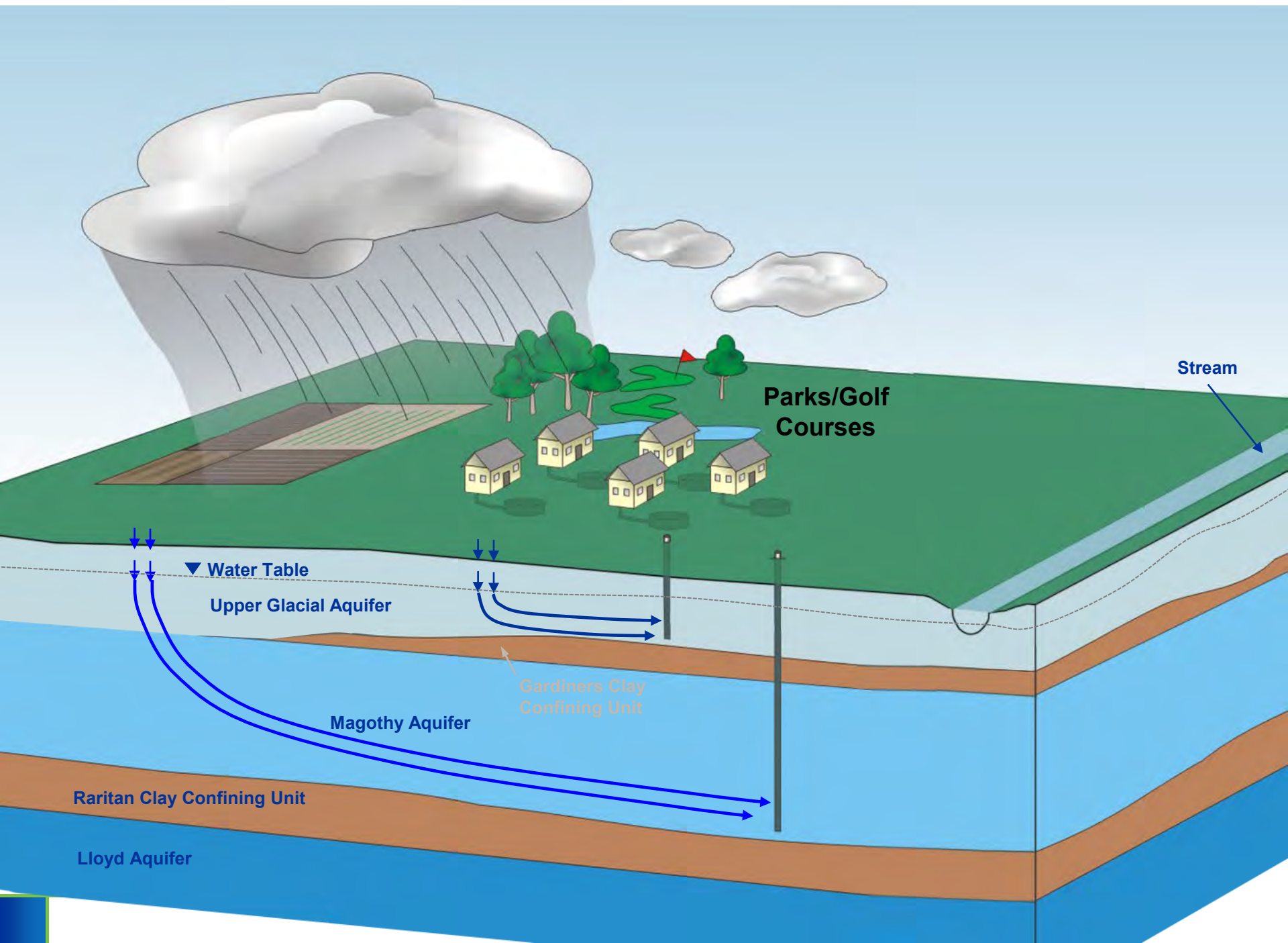
Gardiners Clay
Confining Unit

Magothy Aquifer

Raritan Clay Confining Unit

Lloyd Aquifer





Stream

Parks/Golf Courses

▼ Water Table

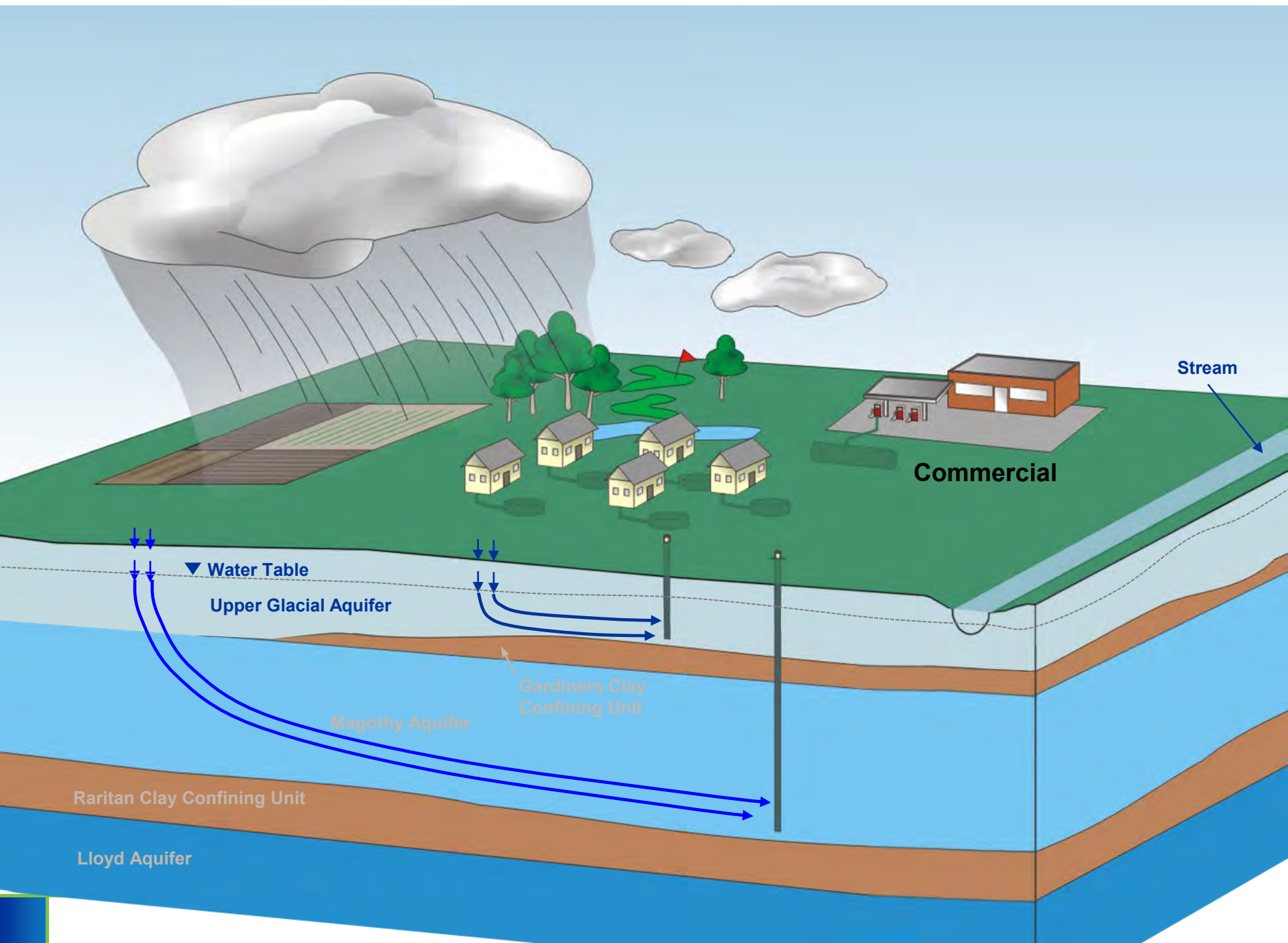
Upper Glacial Aquifer

Gardiners Clay Confining Unit

Magothy Aquifer

Raritan Clay Confining Unit

Lloyd Aquifer



Stream

Commercial

▼ Water Table

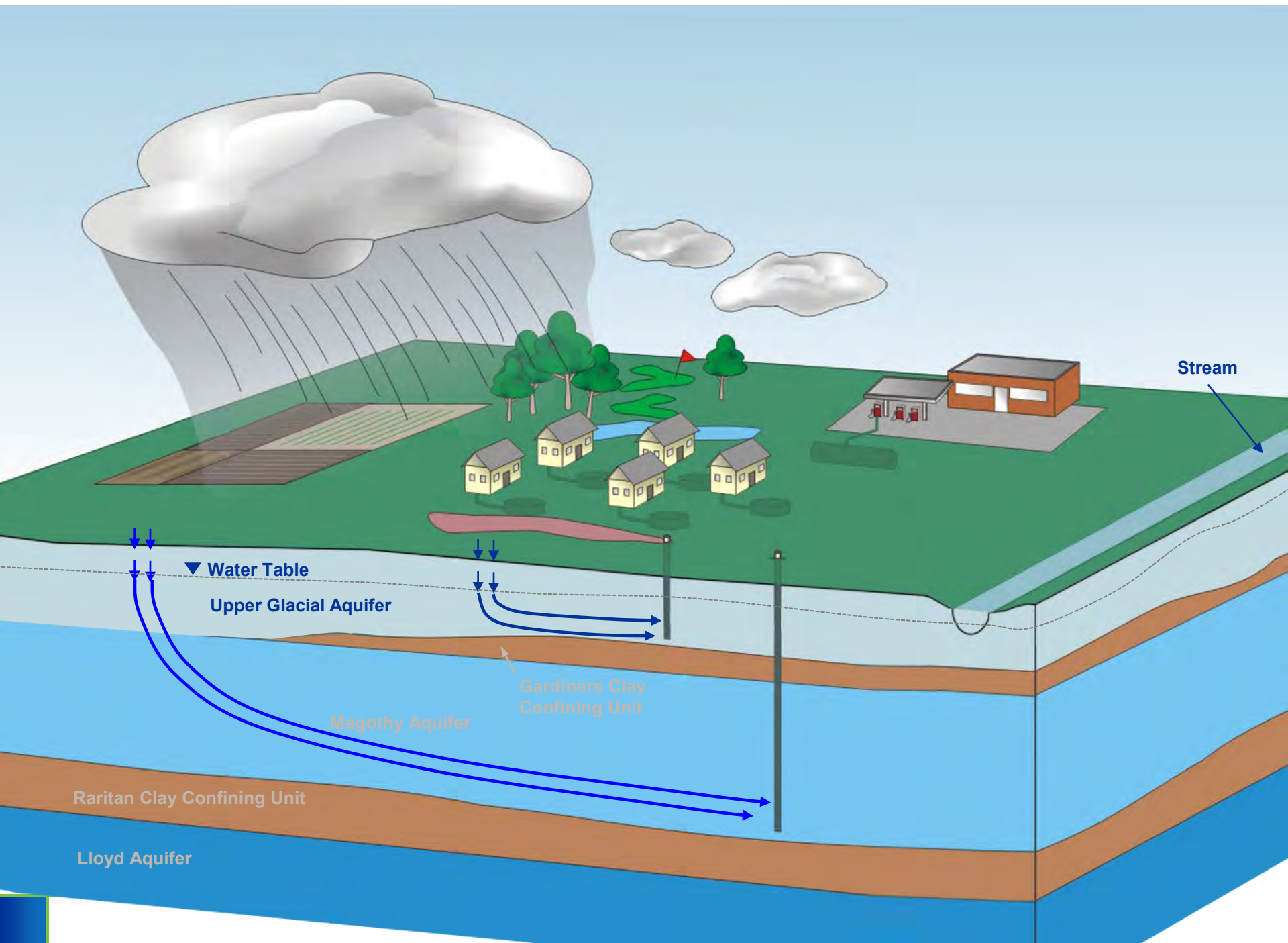
Upper Glacial Aquifer

Magothy Aquifer

Gardiners Clay Confining Unit

Raritan Clay Confining Unit

Lloyd Aquifer



Stream

▼ Water Table

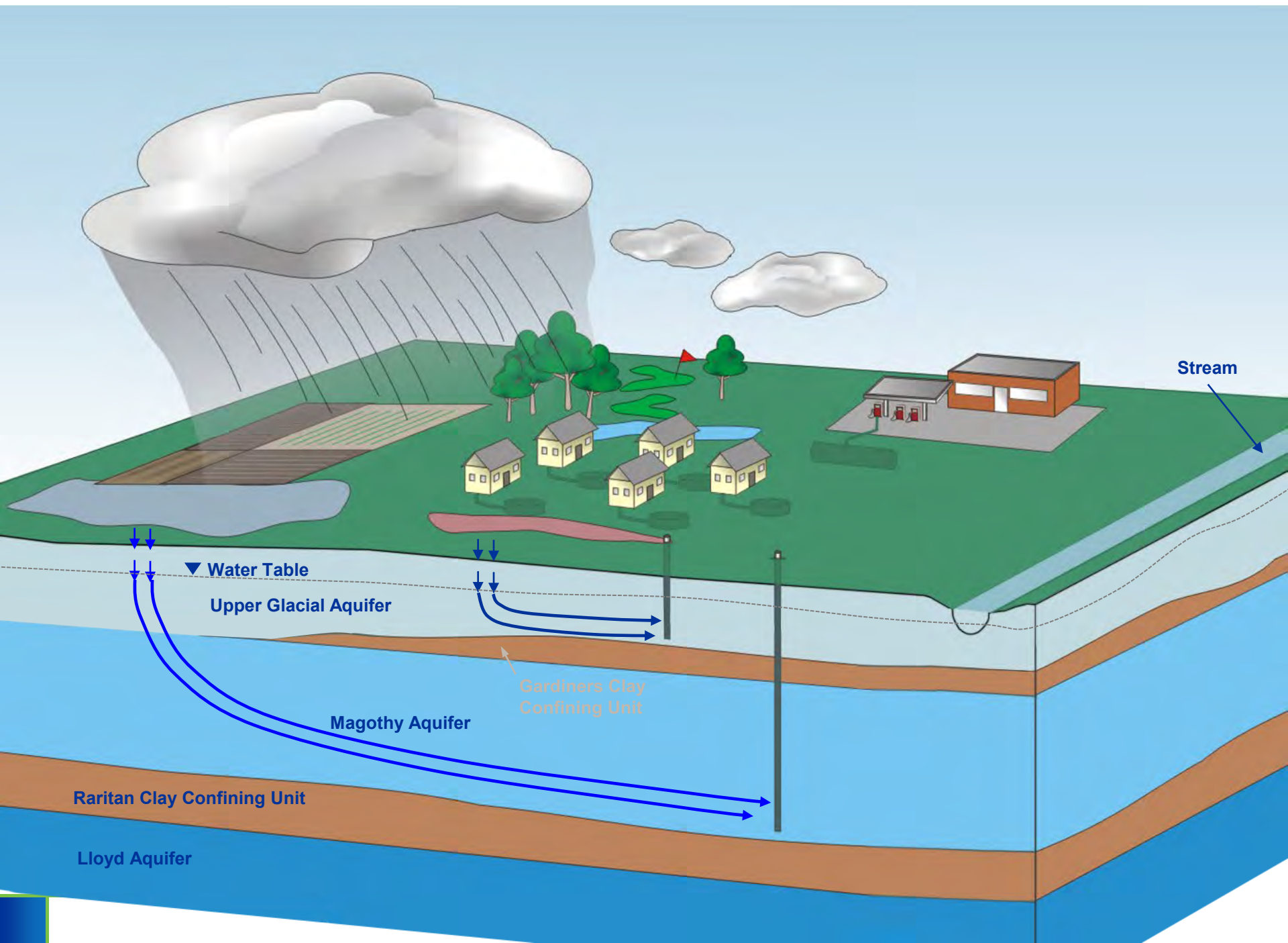
Upper Glacial Aquifer

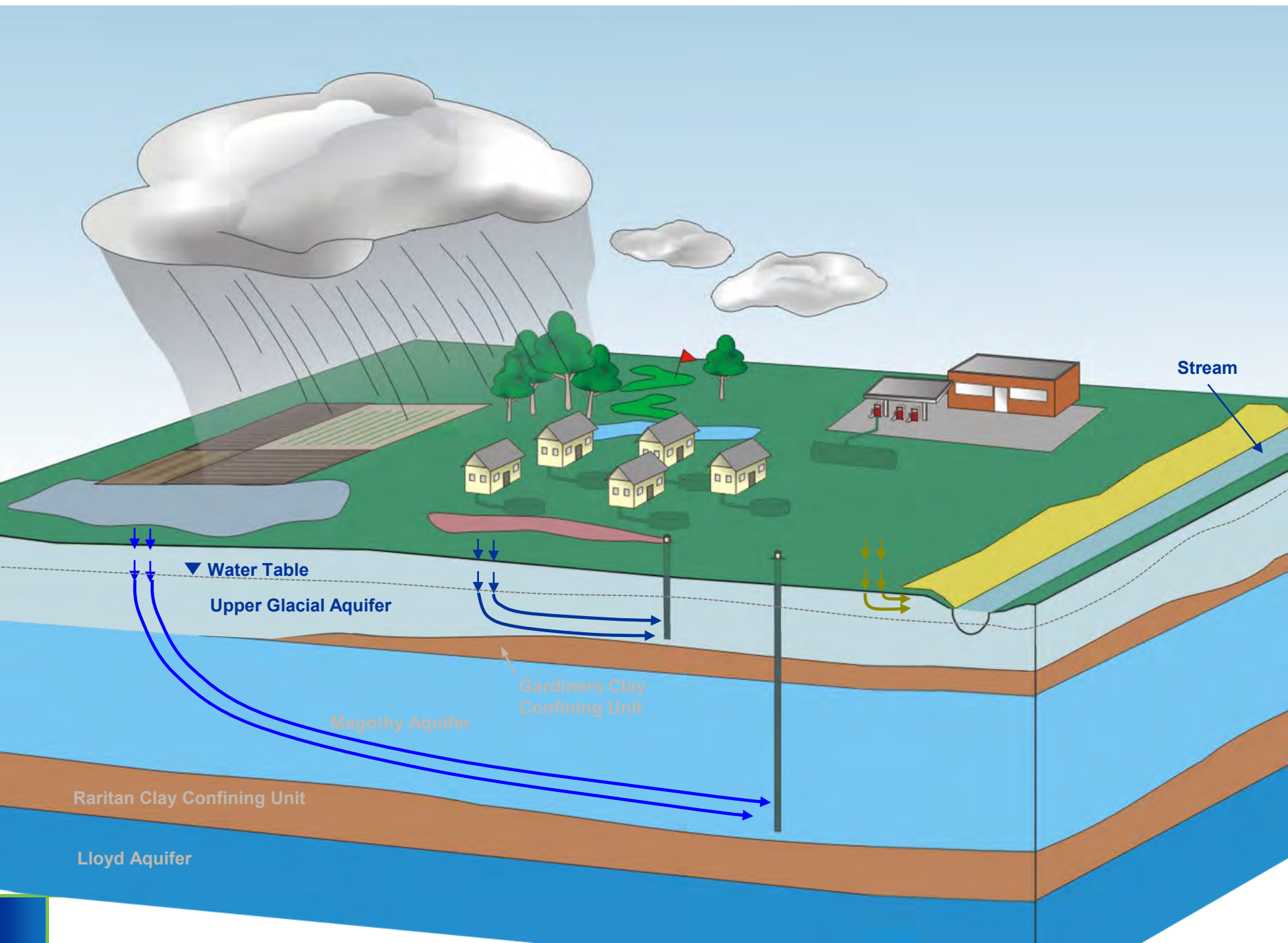
Gardiners Clay Confining Unit

Magothy Aquifer

Raritan Clay Confining Unit

Lloyd Aquifer





Stream

▼ Water Table

Upper Glacial Aquifer

Gardiners Clay Confining Unit

Magothy Aquifer

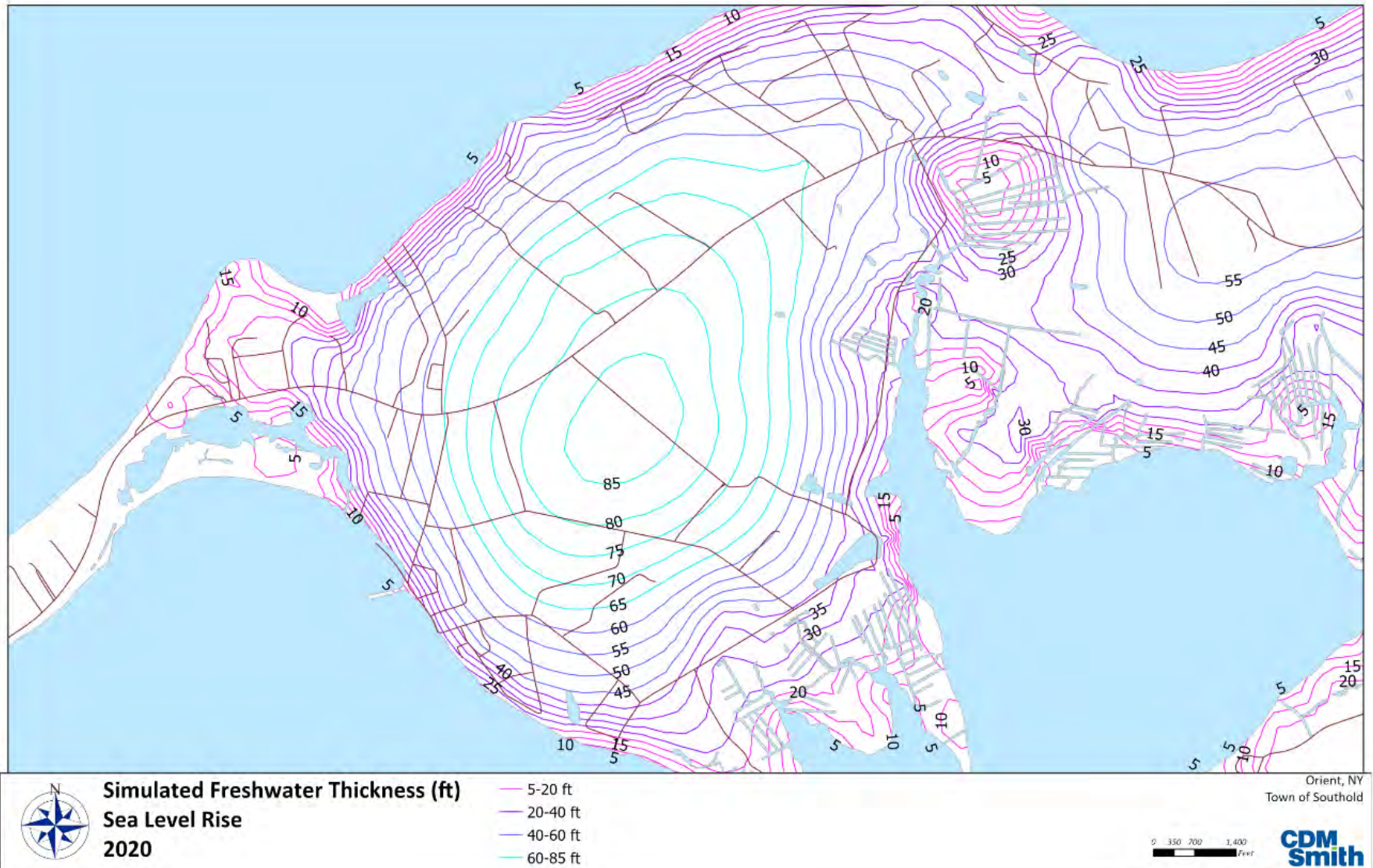
Raritan Clay Confining Unit

Lloyd Aquifer

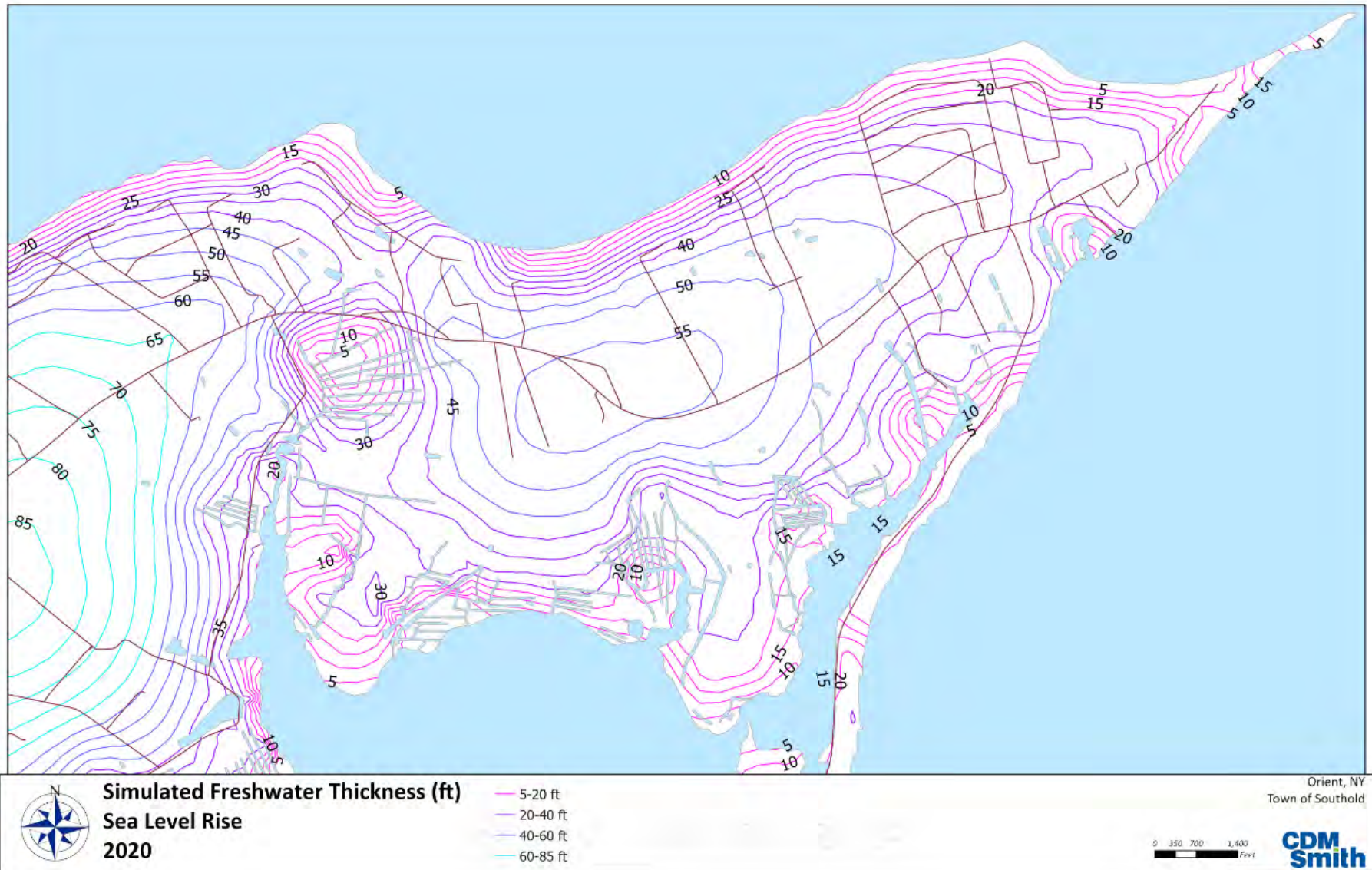


Does Orient Have Enough Water?

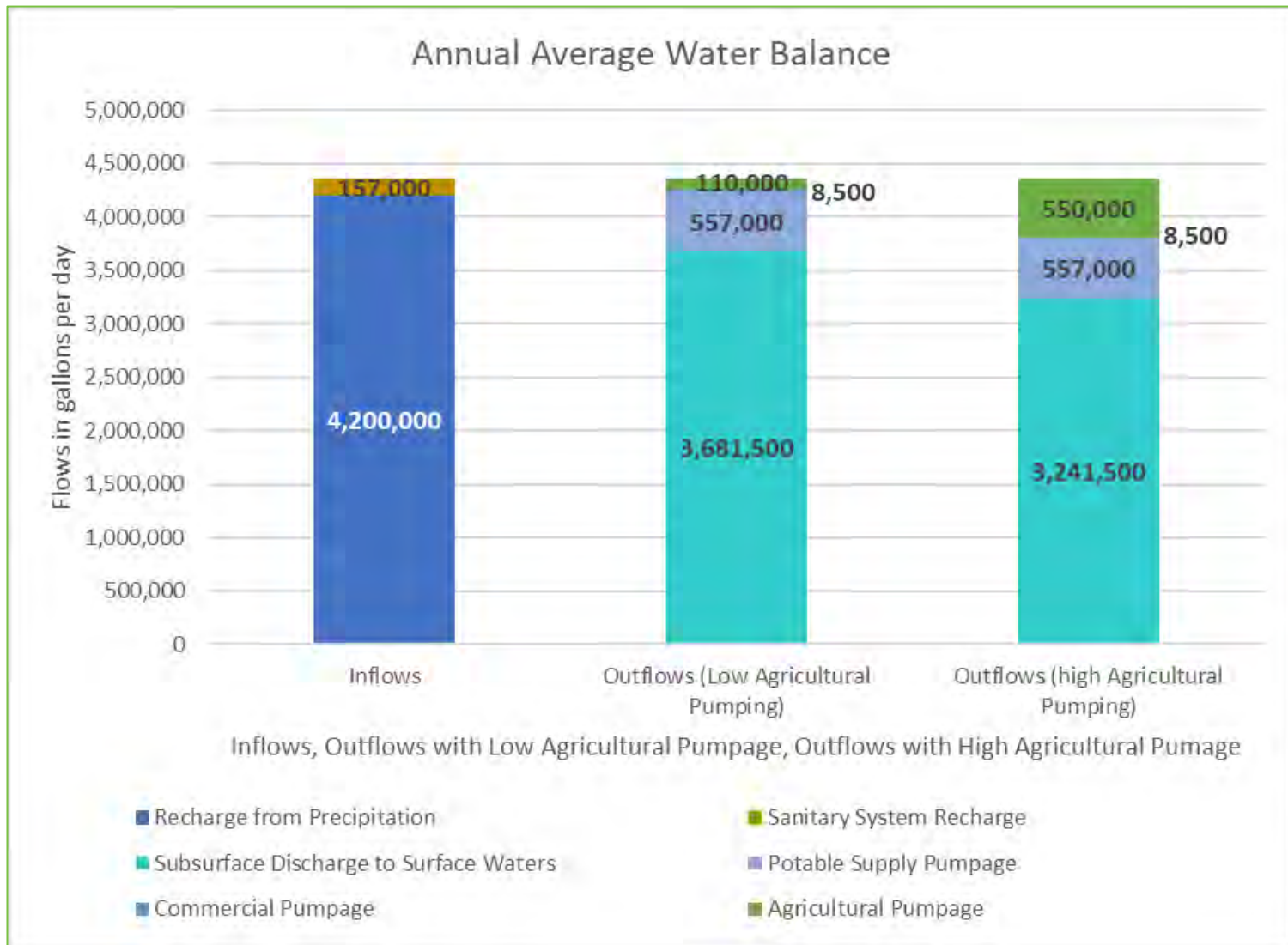
Orient (West) Aquifer Thickness - 2020



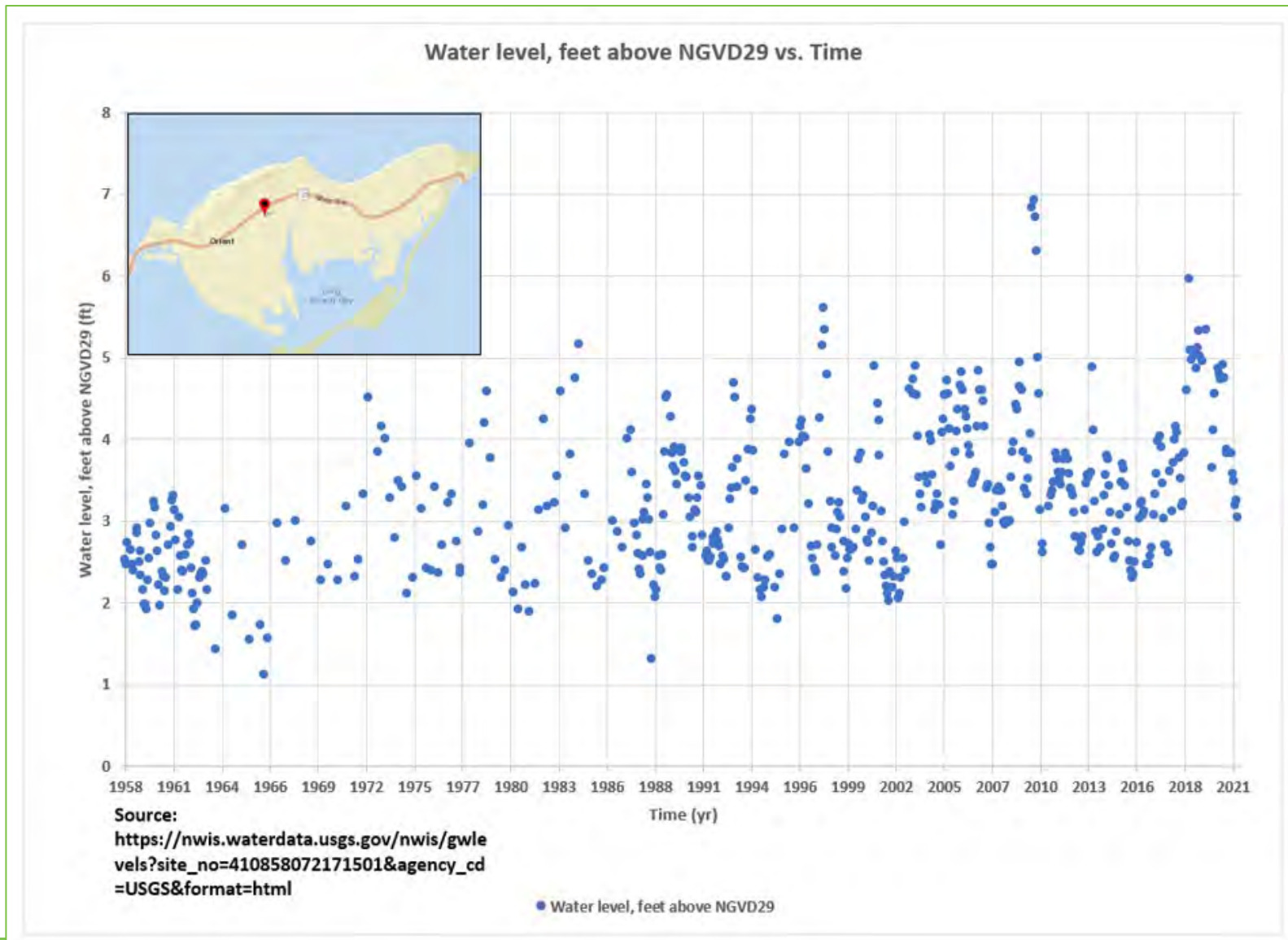
Orient (East) Aquifer Thickness - 2020



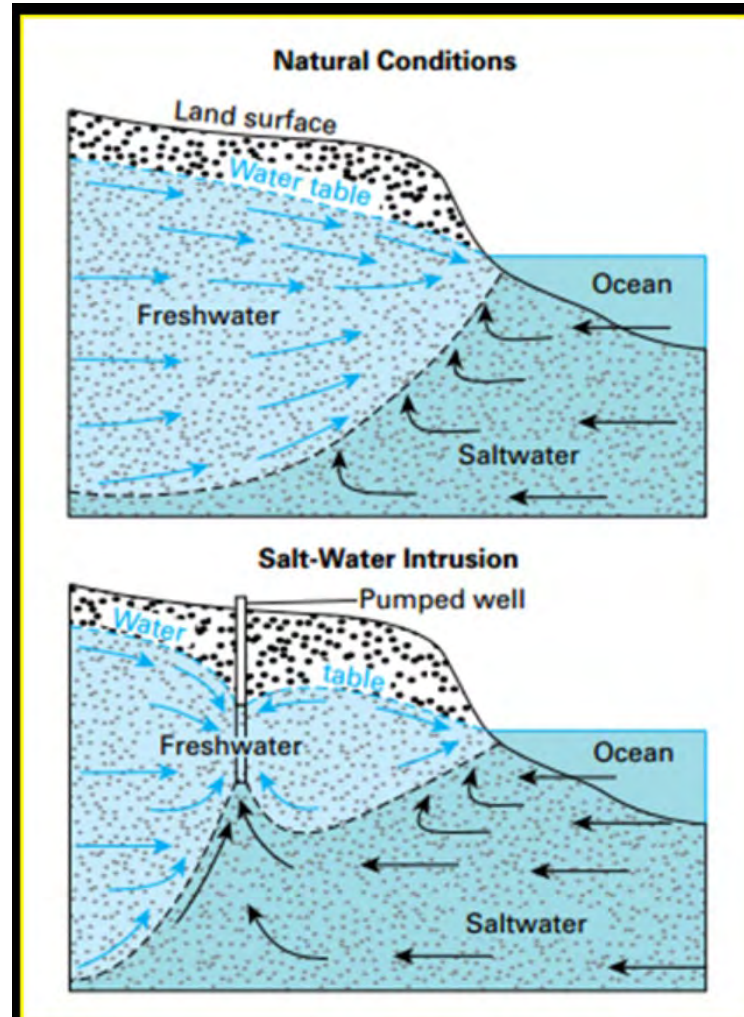
Does Orient Have Enough Water?



Water Table Stable



Potential for Salt Water Intrusion



Groundwater Quantity

- As a community, Orient has sufficient water to supply current and future projected demands, however:
- Coastal wells are likely to be impacted from salt water intrusion, particularly during the summer months, and in the future as a result of sea level rise
- High pumpage from inland wells may also cause salt water upconing



Groundwater Quality

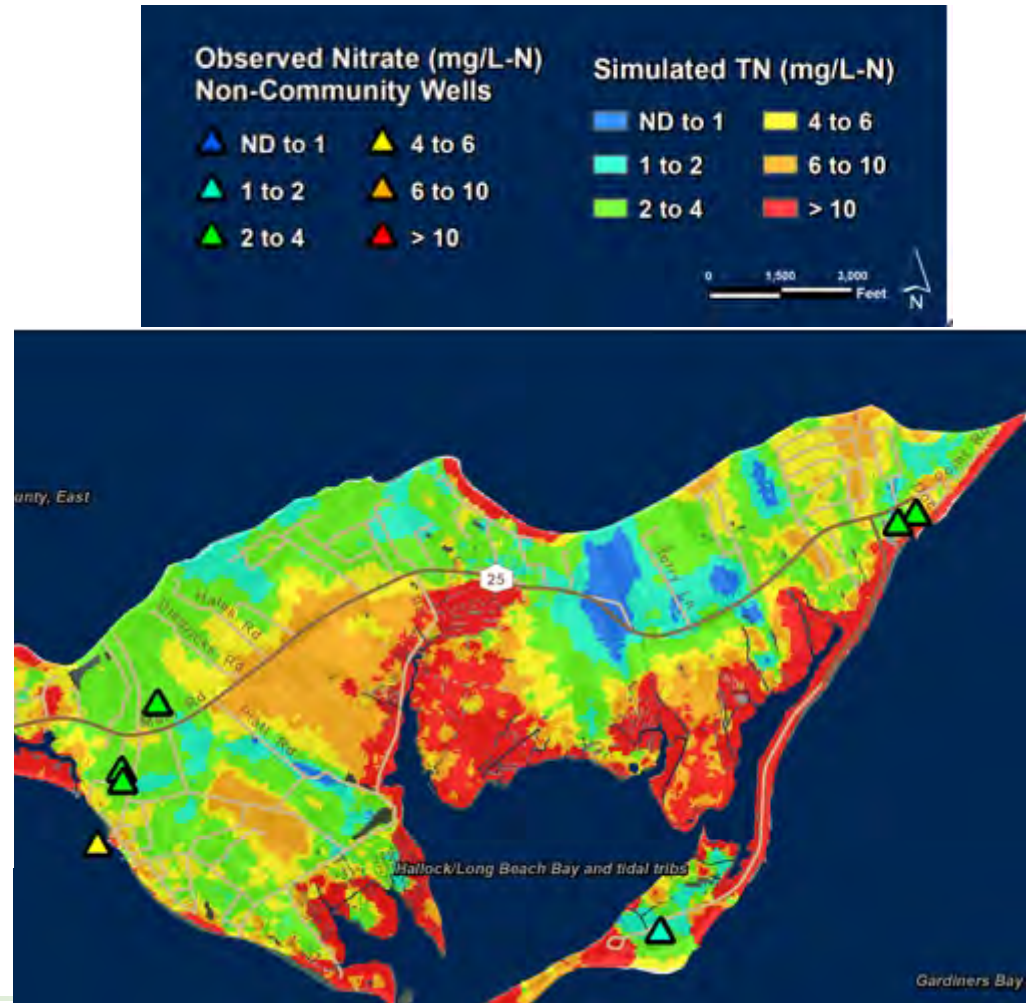
Drinking Water Quality Standards

- Drinking water criteria (called Maximum Contaminant Levels or MCLs) established by USEPA and by New York State
- Contaminants Considered:
 - Nitrate
 - Chlorides
 - Pesticides
 - Pathogen Indicators
 - Emerging Contaminants – e.g., PFAS

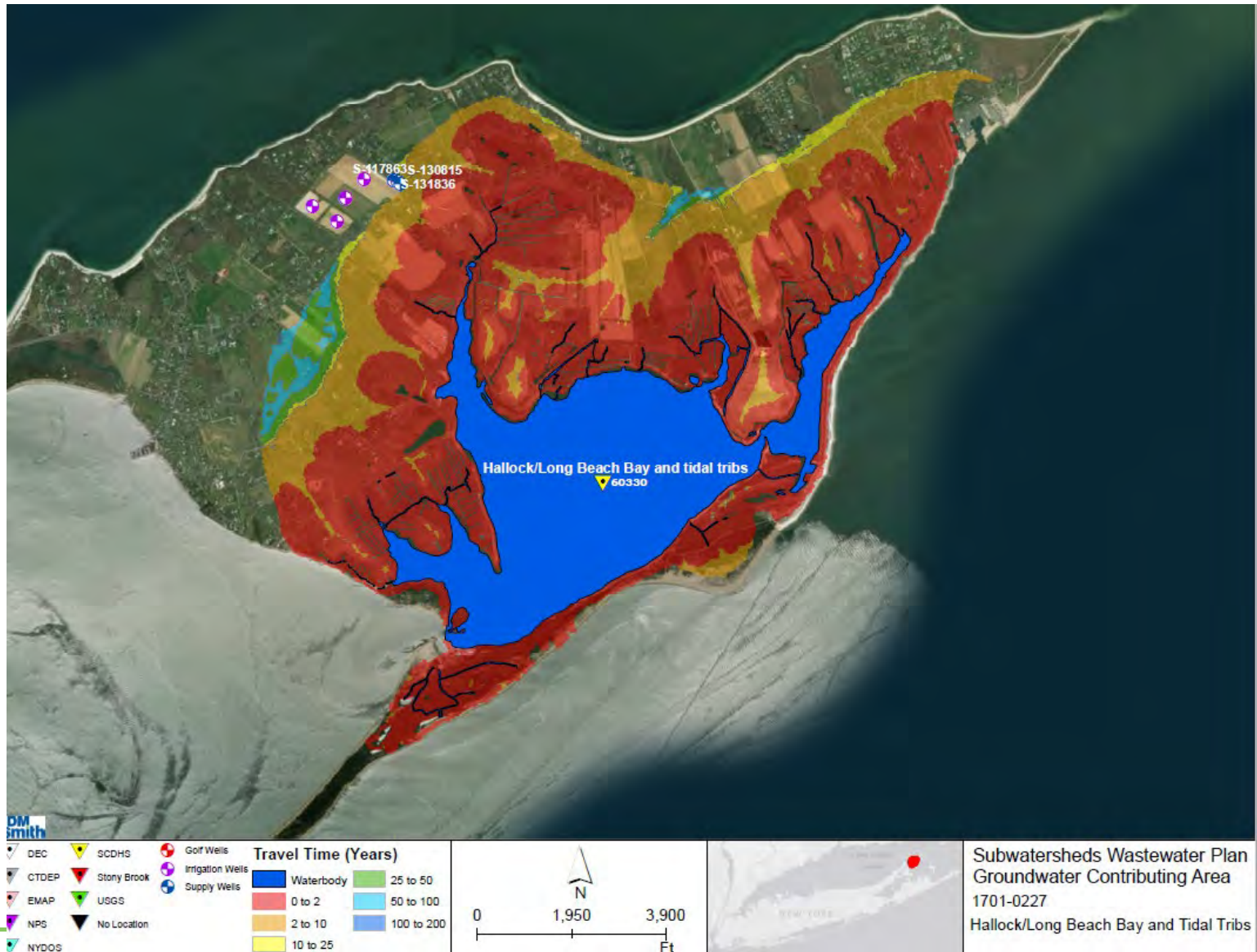


Nitrogen in Orient Groundwater

- Suffolk County Department of Health Services (SCDHS) Tests Private Wells
- 137 Samples Collected between 2014 and 2021
- 18% > 10 mg/L MCL
- 54% > 6 mg/L GMZ IV Criterion
- Arithmetic Average = 6.2 mg/L



Why is Nitrogen Important?



Chloride Levels in Groundwater



Data Sources: SCDHS Peconic Marine Data (2016-2021), NCOMs Orient Data (2014-2021), Private Wells Orient (2014-2021) Data, SCWA Browns Hills Road Wellfield Data (2014-2021), SCDHS Orient Groundwater Data (2011-2021)

Groundwater Quality

- Orient's shallow aquifer is very vulnerable to contamination
- Septic systems are a source of contamination
- Fertilization and pesticide application are also potential sources of contamination
- Pathogen indicator contamination will be of greater concern in coastal areas in the future as sea level rises to the elevation of septic system discharges
- PFAS is being investigated by SCDHS
- [Identify Greener Products and Services | US EPA](#)
- Have Your Water Tested - SCDHS

EPA's Ecolabel Programs



Climate Change Considerations



New York State Projections of Sea Level Rise

- Climate Change Projections

(c) Long Island Region

Time Interval	Low Projection	Low-Medium Projection	Medium Projection	High-Medium Projection	High Projection
2020s	2 inches	4 inches	6 inches	8 inches	10 inches
2050s	8 inches	11 inches	16 inches	21 inches	30 inches
2080s	13 inches	18 inches	29 inches	39 inches	58 inches
2100	15 inches	21 inches	34 inches	47 inches	72 inches

Note: The New York State High-Medium projection (2017) is consistent with the NOAA 2022 Intermediate Projection

Predicted Inundation from Sea Level Rise 2050



Blue – connected to surface water, Green – not necessarily connected, but floods

Source: NOAA [Sea Level Rise and Coastal Flooding Impacts \(noaa.gov\)](https://www.noaa.gov/sea-level-rise)

Predicted Inundation from Sea Level Rise 2100



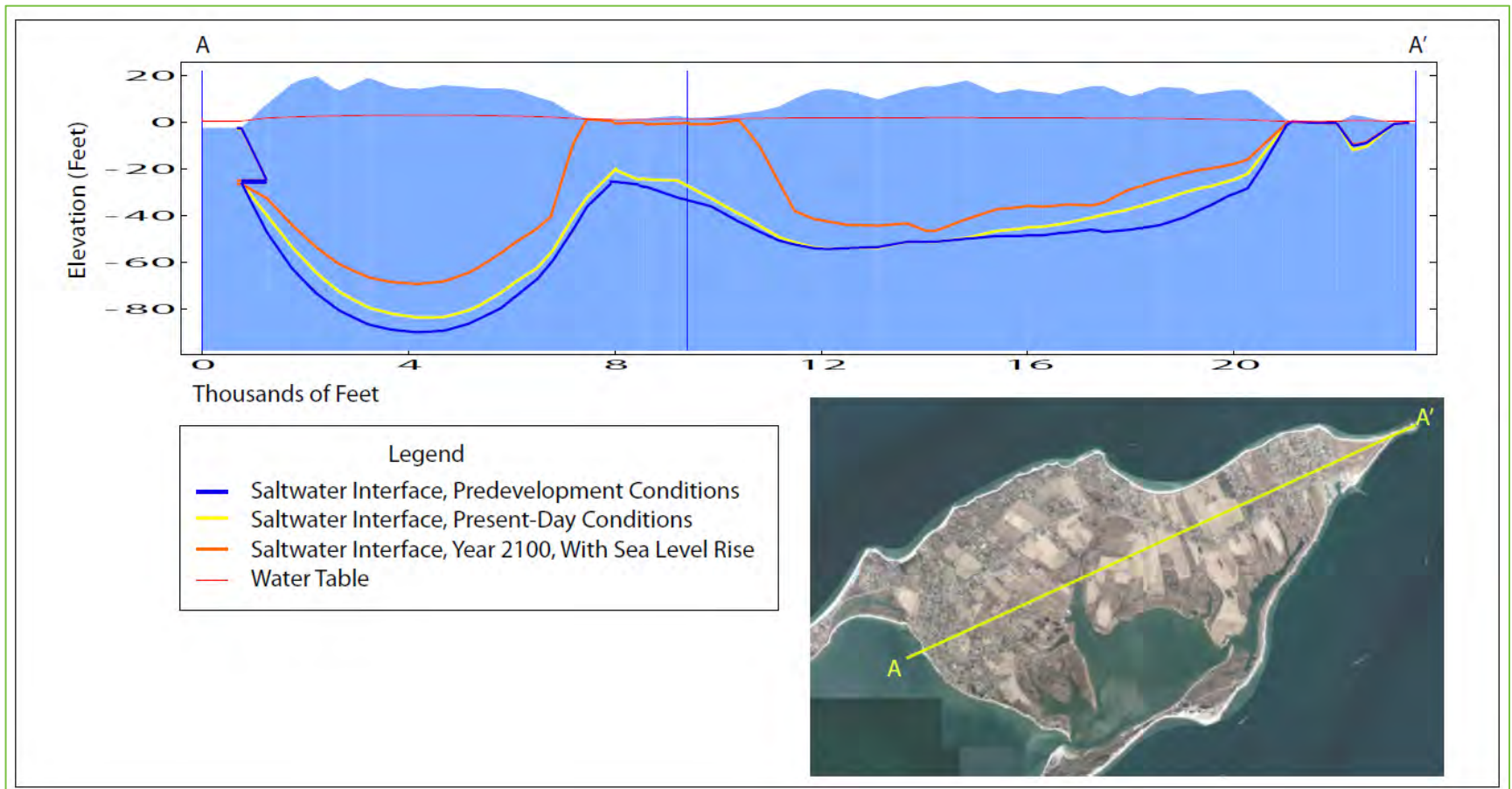
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Source: NOAA [Sea Level Rise and Coastal Flooding Impacts \(noaa.gov\)](https://www.noaa.gov/sea-level-rise-and-coastal-flooding-impacts)

Areas Currently Vulnerable to High-Tide Flooding



Sea Level Rise Will Reduce Orient Aquifer Thickness



Climate Change

- Climate change is projected to:
- Increase Precipitation and Intense Storm Events
- Increase Temperature
- Accelerate Sea Level Rise



Wrap-up and Questions

Preliminary Conclusions

- The Orient community has sufficient groundwater to supply current community needs, however coastal areas are vulnerable to salt water intrusion
- Orient groundwater quality has been impacted and must be protected
- Climate change will have significant impacts on Orient, particularly in coastal areas

