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March 11, 2018

To: The Honorable Ted Kennedy, Co-chair Environment Committee
The Honorable Craig Miner, Co-chair Environment Committee
The Honorable Mike Demicco, Co-chair Environment Committee
All Members of the Environment Committee

From: Denise Savageau, Environmental Planner

Re: SB 427 An Act Concerning Public Trust Components of the State Water Plan
Strongly Oppose – Vote No

I am writing today to ask you, the members of the Environment Committee, to vote no and show strong opposition to Raised SB 427. This bill seeks to undermine protection of Connecticut's water resources through the exception of private wells from the public trust. As a most precious natural resource, water needs to be protected by policy that is rooted in sound science. Separating out private wells from our water resources is contrary to our understanding of water as a single hydrologic system and the interconnection of ground and surface waters.

As an environmental planner for the past 30 years, I have been active in the protection of the water resources across our state, most recently as Conservation Director for the Town of Greenwich. This includes extensive work on drinking water supply protection in coordination with our water utility and director of health and included both public surface supply and private wells. I presently serve on the Water Planning Council Advisory Group, where I co-chaired the Drought Management Plan workgroup, and Connecticut's Source Water Collaborative (CT Source Water). It is through this lens that I strongly oppose removing private wells from the public trust.

One of the biggest challenges facing any planner working on water supply is the general misperception by the public that ground water and surface water are not connected. Although there is a general understanding of the water cycle, many do not understand the role of ground water in this cycle or the complexities of how water moves through this system. We need to think of water as one system and not separate out ground water, and therefore private wells, from this system. Once you understand that this is one resource, it is difficult to even conceive of removing private wells from the public trust.

It is important that science be part of this public record and I have attached Exhibits A and B taken from the United States Geological Survey (USGS) website. Exhibit A is a simple diagram showing water as one, continuous resource. This is further explained in Exhibit B that discusses

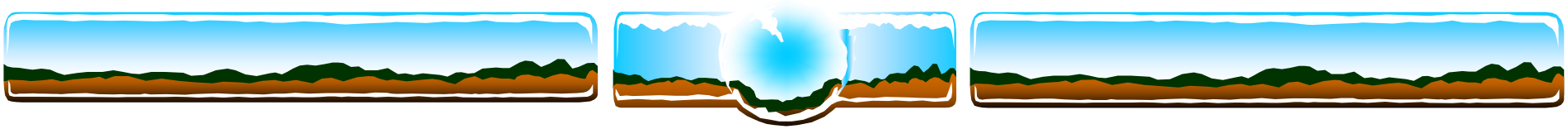
impact of ground water withdrawals to surface water. It should also be noted that this interconnection also allows for transport of pollutants. Keeping water, including private wells, in the public trust ensures that we have the tools to protect both the quantity and quality of this resource.

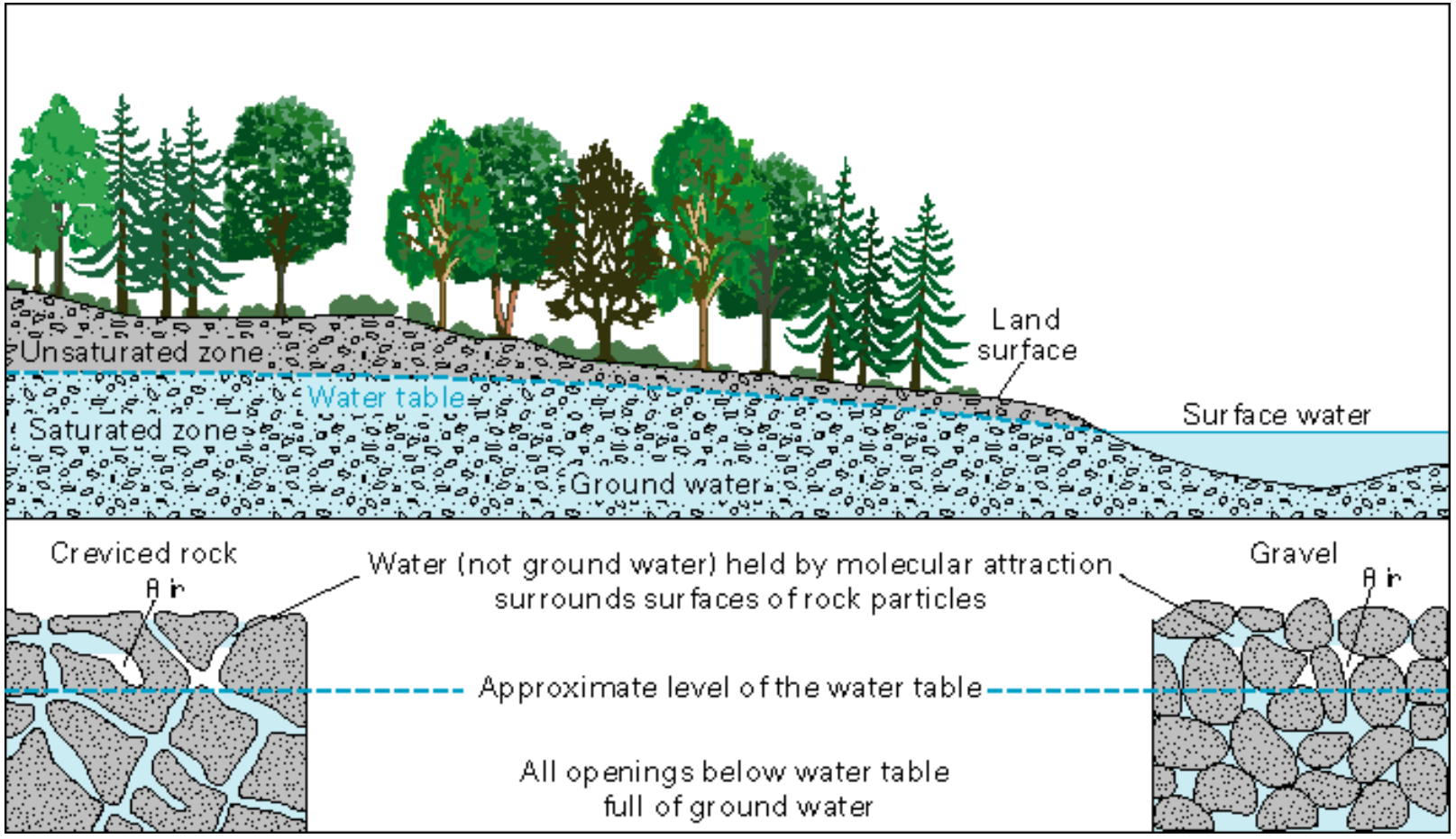
According to the 20110 census, there are approximately 322,578 private residential wells in Connecticut that serve approximately 23% (822,575 people) of our population. As identified in both the State Water Plan and the draft Drought Management Plan, we are doing little to protect this drinking water source from droughts, over pumping, lack of infiltration, or pollutions. Although regulated by local health departments and districts during construction, on a state level private wells have been generally out-of-sight and out-of-mind. With growing concerns related to climate change including changes in precipitation and temperatures, we can no longer afford to ignore private wells as they are an important part of our water supply infrastructure. I meet regularly with neighborhood associations where residents are served by private wells. The question I am most often asked is what is being done to protect their water supply from these growing concerns. Removing private wells, and by doing so removing ground water, from the public trust is not in the best interest of any resident served by a private well.

In 2004, USGS released a report entitled *Water Use, Ground-Water Recharge and Availability, and Quality of Water in the Greenwich Area (USGS-Greenwich Report)*. This study was done in at the request of the Town's Conservation Commission because of concerns surrounding the availability of ground water given the challenges posed by both water supply and demand. The modeling done for this report indicates that more water is being drawn out of the ground water in the watersheds served by private wells, then is being recharged. This is important information not only for those served by wells but for the water utility since the reservoir system is also located in in this area. It also stressed the importance of keeping ground water in the public trust. The Town is now working with the CT Dept. of Public Health and USGS to develop a proposal to update this study and to include the towns in southwest Connecticut that have been dealing with water shortages. This update will add climate change data into the modeling.

In closing, I want to thank you for all of your work protecting the resources of our state. Please continue this good work and oppose the removal of private wells from the public trust. This will ensure that all of our water is protected as a public good and that Connecticut has a sustainable future with clean and adequate water supplies.

Attachments:
Exhibit A – USGS diagram on water resources
Exhibit B – Except for USGS Circular 1139





Source: USGS website

Exhibit A

Excerpt from USGS Circular 1139
https://pubs.usgs.gov/circ/circ1139/

The Effect of Ground-Water Withdrawals on Surface Water

Withdrawing water from shallow aquifers that are directly connected to surface-water bodies can have a significant effect on the movement of water between these two water bodies. The effects of pumping a single well or a small group of wells on the hydrologic regime are local in scale. However, the effects of many wells withdrawing water from an aquifer over large areas may be regional in scale.

Withdrawing water from shallow aquifers for public and domestic water supply, irrigation, and industrial uses is widespread. Withdrawing water from shallow aquifers near surface-water bodies can diminish the available surface-water supply by capturing some of the ground-water flow that otherwise would have discharged to surface water or by inducing flow from surface water into the surrounding aquifer system. An analysis of the sources of water to a pumping well in a shallow aquifer that discharges to a stream is provided here to gain insight into how a pumping well can change the quantity and direction of flow between the shallow aquifer and the stream. Furthermore, changes in the direction of flow between the two water bodies can affect transport of contaminants associated with the moving water. Although a stream is used in the example, the results apply to all surface-water bodies, including lakes and wetlands.

A ground-water system under predevelopment conditions is in a state of dynamic equilibrium-for example, recharge at the water table is equal to ground-water discharge to a stream (Figure C-1*A*). Assume a well is installed and is pumped continually at a rate, Q_1. After a new state of dynamic equilibrium is achieved, inflow to the ground-water system from recharge will equal outflow to the stream plus the withdrawal from the well. In this new equilibrium, some of the ground water that would have discharged to the stream is intercepted by the well, and a ground-water divide, which is a line separating directions of flow, is established locally between the well and the stream (Figure C-1*B*). If the well is pumped at a higher rate, Q_2, at a later time a new equilibrium is reached. Under this condition, the ground-water divide between the well and the stream is no longer present and withdrawals from the well induce movement of water from the stream into the aquifer (Figure C-1*C*). Thus, pumpage reverses the hydrologic condition of the stream in this reach from a ground-water discharge feature to a ground-water recharge feature.

In the hydrologic system depicted in Figures C-1*A* and C-1*B*, the quality of the stream water generally will have little effect on the quality of the shallow ground water. However, in the case of the well pumping at the higher rate, Q_2 (Figure C-1*C*), the quality of the stream water, which locally recharges the shallow aquifer, can affect the quality of ground water between the well and the stream as well as the quality of the ground water withdrawn from the well.

This hypothetical withdrawal of water from a shallow aquifer that discharges to a nearby surface-water body is a simplified but compelling illustration of the concept that ground water and surface water are one resource. In the long term, the quantity of ground water withdrawn is approximately equal to the reduction in streamflow that is potentially available to downstream users.

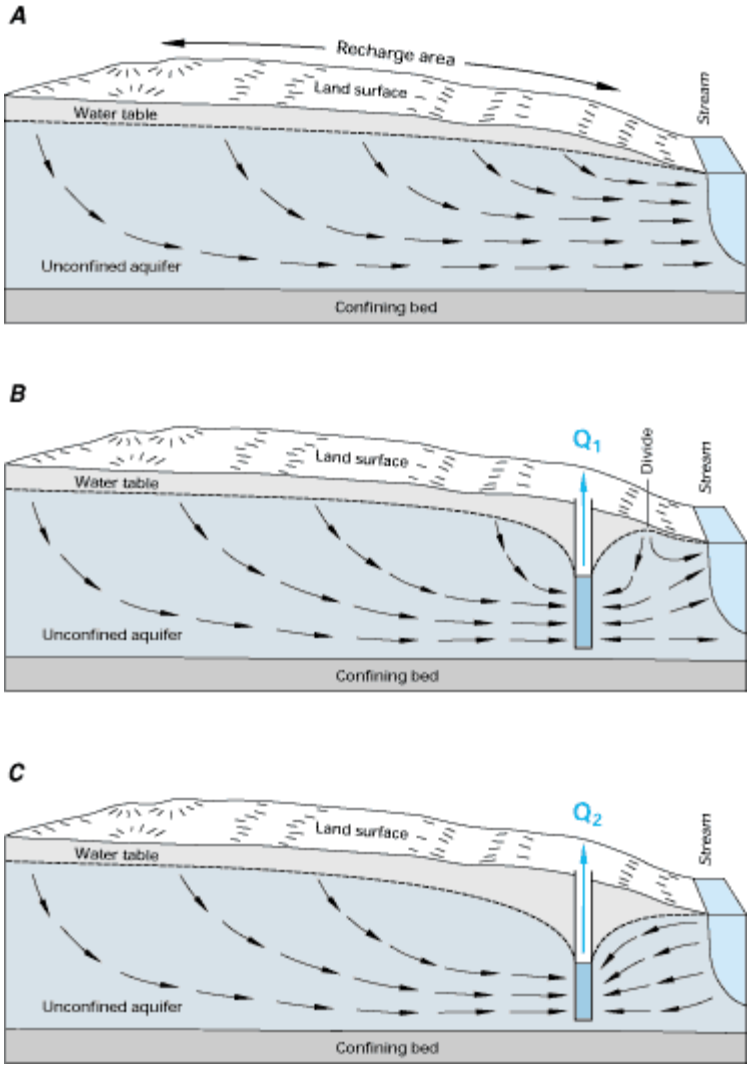


Figure C-1: In a schematic hydrologic setting where ground water discharges to a stream under natural conditions (A), placement of a well pumping at a rate (Q_1) near the stream will intercept part of the ground water that would have discharged to the stream (B). If the well is pumped at an even greater rate (Q_2), it can intercept additional water that would have discharged to the stream in the vicinity of the well and can draw water from the stream to the well (C).