Water appropriation and use permits are approved based of the reasonableness of the amounts requested, the impacts to the resources, and impacts to other users of the resource.

Reasonableness of Amount Requested (Water Demand)

Amounts requested for municipal water supplies are based on estimated water demand. Poolesville has repeatedly requested and MDE has approved amounts that substantially exceeded the water used during maximum 12-year permit periods

In 1986, the permitted annual average use (gpd avg) was increased from 260,000 gpd avg to 580,000 gpd avg and appeared to be based on the estimated yield of well #6 (225 gpm). The use was to meet the needs from some undefined future growth at the time. The maximum reported use under that permit was 453,000 gpd avg in 1998, or 127,000 gpd avg less than the permitted use. A slight adjustment to the permit was made reducing the use to 550,000 gpd avg at 100 gpdpc in about 2000 to supply a future total population of 5500 people from the town's comprehensive plan. The period of these plans are usually 20 years, which should have been considered when issuing the 12-year permit.

In about 2008-2009, the total appropriation from multiple permits was increased to 650,000 gpd avg to supply a population of 6500 people. The town had identified future growth in the 2006 Capacity Management Plan to consist of 415 new connections at the proposed developments of: Winchester (98 homes), Brightwell Crossing (177 homes), Jamison (19 townhomes and 60 single-family homes), 59 residential infill lots, and three commercial properties (24.55 EDUs). The maximum reported use under those permits was 548,000 gpd avg in 2020, or 102,000 gpd avg less than the permitted use. It was also less than the permitted use from 45 years ago by 32,000 gpd avg.

Reasonableness of Impacts to the Resource (Water Balance)

The applicant was advised on May 11, 1999 that a preliminary water balance analysis indicated that there was not enough ground water available to the applicant for the proposed uses in the Horsepen Branch watershed. The applicant was, however, advised that permittees have been allowed to over-appropriate waters in a watershed, where public health and safety is an issue, as long as it causes no unreasonable impacts and the permittee is prepared to adjust its use to accommodate future users.

That water balance analysis indicated that 159,000 gpd avg of groundwater in the Horsepen Branch watershed was available for the town's use; however, a permit of 293,000 gpd avg from wells 2, 4, 6 and 8 was issued to support existing water demand and reflected the reported water use in 2000. SSP & A recalculated the water balance indicating that 132,000 gpd avg was available for the town's use. Likely due to the additions of wells 9-14, the water use from the Horsepen Branch watershed only equaled an average of 185,000 gpd avg during the permit period (2008-2020) or 108,000 gpd avg less than the permitted amounts.

Ahmed et al. (2013) calculated the Potomac River basin-wide averages of annual precipitation, evapotranspiration, stormflow, and baseflow for the base scenario and 18 climate scenarios. The average precipitation increases in the Potomac River basin in nine out of the 18 climate change scenarios, and evapotranspiration increases in all climate change scenarios due to elevated temperatures. The average annual baseflow decreases (by 3% to 33%) within the basin in 16 out of the 18 scenarios. For those seven scenarios where precipitation increases, as suggested by most other studies of northeast USA, the precipitation then largely cancels out losses due to evapotranspiration, with average baseflow or effective recharge changing by 88% to 104% in 2040 due to climate change relative to the base period of 1988-1999. Since climate change will cause a multi decade stress of the groundwater system, then the baseflow will be reduced by nearly twice as much or by up to 24% during a 10-year drought. This decline in baseflow (effective recharge) could substantially reduce the yields of town's well and water balance within the four watersheds.

Hammond (2022) indicated that the upper portion of Horsepen Branch (site A, 774 acres, 0.3 mi west of the junction of Budd and Hughes Roads) was biologically impaired due to groundwater withdrawals (reducing flow by about 50%) and development (20.3% urban land use) within the town's boundaries. As the over-allocation in Horsepen Branch is no longer needed to meet existing demand and there is not a public health issue, the permitted use for the watershed can be reduced to some value between the water balance of 132,000 gpd avg derived by SSP & A in 2021 and the average reported use of 185,000 gpd avg during the permit period of 2008 to 2020, and potentially adjusted for the effects of climate change. The reduction could be counter-balanced by increased appropriations in the Broad Run and Seneca Creek watersheds. One last issue that has not been addressed is the potential impacts on nontidal wetlands due to groundwater withdrawals in the individual watersheds.

Reasonableness of Impacts to Other Users of the Resource (Well Interference)

Poolesville has a relatively long history of interference with private wells by withdrawals from its public supply wells. Early instants of impacts to the private wells are poorly documented. MDE files have a newspaper article indicating that two wells (probably #1 and #2) caused domestic wells to go dry in the early 1970s. MDE memos indicated that well 4 might cause nearly house wells to be impacted and those homeowners could pay to be hooked up to the public water supply, although there is no known record of any actions taken in the matter. There were drawdowns of 70 ft and 82 ft in two domestic wells 1600 ft from well 6 during that 1985 test. No record could be found about actions taken to mitigate those potential impacts. Comprehensive monitoring of private wells has been required since the completion of wells 9 and 10, which led to the town having to replace about a ½ dozen wells in Sugarland Forest due to impacts caused by pumping of wells 9 and 10, and another ½ dozen wells were replaced due to withdrawals from well 12. It is not known if any impacts to private wells were caused by well 13; however, there was a complaint of impacts to wetlands and a stream on a neighboring farm, the disposition which is unknown. Potential impacts caused by wells 11 and 14 cannot be determined, since those wells have not been placed in service.