

AQUALITH TECHNOLOGIES, LLC

October 31, 2014

Ms. Maria Tranguch
Ferguson Township
Director of Planning & Zoning
3147 Research Drive
State College, PA 16801

Re: Groundwater Protection Considerations for The Cottages at State College
Housing Development proposed by Toll Brothers, Ferguson Township

Dear Maria:

On behalf of the State College Borough Water Authority (SCBWA), AquaLith Technologies has reviewed the proposed development plan prepared by PennTerra Engineering for The Cottages at State College Development proposed by Toll Brothers. This project would be located south of the Blue Course Drive and Whitehall Road intersection, approximately 1 mile west of SCBWA Wellfield 1 and 1.5 miles from Wellfield 3.

The proposed project area is upgradient and within the delineated Zone 2 wellhead protection areas for both SCBWA wellfields. Accordingly this project is contained within the ground water recharge area of these primary regional public water supplies and raises concern for potential ground water resource impacts. The surface drainage that would be routed via a large natural swale (noted as a floodplain in the development plan) from the proposed project area would be ultimately directed toward Slab Cabin Run and Wellfields 1 and 3. A fracture trace was previously mapped to be coincident with a portion of this swale, therefore the swale's subsurface is interpreted to be a zone of increased bedrock fracturing and therefore a zone of enhanced ground water recharge and flow. Previous dye trace testing demonstrated that Wellfields 1 and 3 receive at least some surface recharge from Slab Cabin Run, therefore any contaminants in surface runoff from the housing project could potentially have adverse impacts on regional



drinking water quality. Potential contaminants of concern in the surface runoff would consist of oil, grease, fuels, glycol, and de-icing agents from the site parking lots, fertilizers used on site vegetation, as well as waterborne pathogens such as coliform bacteria.

Based upon review of the current development plan two large infiltration basins (noted as Infiltrations Basins A and B) are proposed for the managing much of the project area's stormwater. These infiltration basins are located within close proximity of the mapped floodplain that ultimately drains toward Slab Cabin Run and Wellfields 1 and 3. Infiltration Basin A is shown to discharge into Infiltration Basin B, which then discharges into the floodplain. An additional stormwater discharge point is located on the down gradient side of where the proposed roadway crosses the floodplain. Each of these discharge points represent an area of focused stormwater flow and therefore would increase the potential for sinkhole formation. A sinkhole represents a direct conduit in to the aquifer which in turn could have direct adverse impacts on regional drinking water quality if significant volumes of surface runoff are channeled into a sinkhole. Based on the recent site walkover with the project engineers on October 23, 2014, and the site inspection by PaDEP personnel (Kipp Starks, December 3, 2013) there are sinkholes in proximity to the project and therefore they do represent a risk. It is acknowledged that the current use of the land for farming also could allow fertilizers, pesticides, or excessively turbid runoff to reach Slab Cabin Run, however this historic land use does not significantly increase the potential for sinkholes to form on this tract. The significant grading, landscape alteration, increase in impervious surfaces, and channeling of stormwater involved with this project does increase the risk of sinkhole formation and therefore does increase the potential to degrade ground water quality.

Given the relatively thin existing soil cover (five feet or less) and shallow depth to bedrock (mapped as Nittany dolomite, a regional target aquifer) the proposed stormwater facilities could compromise ground water quality by allowing any surface contaminants

to quickly reach karst bedrock with only minimal natural filtration through site soils. Dye trace testing in the Slab Cabin Run Basin has demonstrated that contaminants have the potential travel at rates of 300 or more feet per day through the fractured, carbonate bedrock aquifer. Therefore any contaminants introduced into the aquifer could reach Wellfields 1 and 3 in a relatively short time frame.

We feel it would be appropriate to have a better understanding of site subsurface conditions (ie soil thickness and depth the bedrock) prior to site construction activities in key areas and offer the following suggestions. A thorough subsurface investigation should be conducted in proximity to Infiltration Basins A and B, stormwater discharge points, and the center of the floodplain course. Electrical resistivity surveys should be conducted initially to map soil thickness and the presence of any subsurface voids or other features that could compromise the integrity of the basins or floodplain. Any identified subsurface features that may represent a hazard should be investigated through geotechnical drilling and remedied if necessary using accepted engineering methods. The flood plain should be planted with appropriate vegetation to promote infiltration of stormwater runoff and minimize erosion issues.

We greatly appreciate your consideration of these comments and hope that you understand our concerns. Please feel free to contact me at your convenience via email (voxtheimer.dave@gmail.com) or phone (814-280-6433).

Sincerely,



David Yoxtheimer, P.G.
Principal Hydrogeologist