

## Summary of Drainage problems presented at Land Court

AvalonBay retained the engineering firm of Vanasse, Haugen and Bruggen (VHB) to help design Avalon-at-Great-Meadows. A peer review of their proposed plan was conducted for Bedford by the engineering firm of Camp Dresser and McKee. Our attorneys disclosed the many problems with the drainage plan to the Land Court judge through cross-examination. Matt Goldstein of VHB represented AvalonBay at Zoning Board of Appeals and Conservation Commission meetings, but a more senior VHB engineer, Bryan Lynch, testified on behalf of AvalonBay at the trial. Attorney Tillotson cross-examined Mr. Lynch for five hours on Thursday, October 24. As described below, Attorney Tillotson discovered the plan was largely generated from published regional soil data with limited on-site analysis, did not comply in several respects with the Storm Water Management guidelines published by the Department of Environmental Protection, will require fastidious maintenance to function even from the beginning, and establishes new breeding grounds for mosquitoes not now present on the site.

The site is surrounded on one side by the Atlantic White Cedar Swamp, and on other sides by a wetlands which is contiguous with the Great Meadows National Wildlife Refuge. The same wetlands penetrates into the site, dividing it into a southeasterly uplands peninsula of approximately two acres and a northwesterly uplands body of approximately nine acres. The two uplands parcels are connected by a wetlands crossing which requires replication. The smaller peninsula contains one Retention Basin (#13) adjacent to the wetlands, and the larger body contains two Retention Basins, one immediately adjacent to the White Cedar Swamp (#11) and the other adjacent to both the White Cedar Swamp and the surrounding wetlands (#12).

Run-off from roofs will be directed into Catch Basins which will discharge directly into the ground because such run-off is considered "clean." Five additional Catch Basins will collect runoff from the roadway connecting to Concord Road and the wetlands crossover bridge. Those Catch Basins will drain into grassy swales created on the wetland to upland slope. Attorney Tillotson pointed out that because the roofs are probably asphalt tile, the run-off will not be "clean" for the first few years, and also that in a heavy rainstorm, the Catch Basins and the grassy swales will likely exceed capacity, directing run-off onto the surrounding area. In addition, they will have standing water for a few days because over-all, the upland area is within approximately two- to three-feet of the high-water table.

Run-off from roadways, sidewalks and other impervious surfaces will be directed into the three Retention Basins via Fore-bays. The Fore-Bay to

Retention Basin #13 is actually located in the middle of the turn-around on the distal end of the peninsula (see aerial photo) and connects with Retention Basin #13 by a 40 foot long drainage pipe which, as pointed out by Attorney Tillotson, is likely to fail because the inlet is less than three inches higher than the outlet. Over a 40 foot distance, this is a slope of less than one tenth of an inch per foot. Even if the pipe is not clogged, in a heavy rain or snow melt, water will run freely across the circular turn-around and into the surrounding properties. Basin #13 is designed to hold water for up to 24 to 48 hours, discharging most of it to the wetlands through a drainage pipe, and a small amount through percolation through the bottom. Importantly, no percolation tests were completed for this basin and the only soil samples obtained were not from the bottom of the basin.

The Fore-Bays to Retention Basins #11 and #12 connect directly to the basins. Retention Basin #12 is designed to hold water similar to Basin #13, but will discharge half of it to the surrounding wetlands through drainage pipes and the remainder by percolation through the bottom of the basin itself. Retention Basin #11, immediately adjacent to the White Cedar Swamp, is designed to discharge water over the side in addition to through a pipe and the bottom of the basin. The reason for the difference in the design of this basin was not explained. Soil samples were not obtained for the bottoms of each of these basins.

The drainage characteristics of the Basins were, therefore, based on computer designs according to known soil characteristics for the region. Because of the proximity of the water table, the basins do not meet the minimum two foot separation guidelines. For this reason, the design plan calls for removing the top layers of soil and replacing them with up to two feet of "pervious sand and gravel." The longevity of basins created on top of such fill was not clearly stated.

Snow storage on the site remains highly problematic and will most likely involve trucking it offsite. How such a plan will be enforced long term is not known.

Attorney Tillotson carefully pointed out the numerous discrepancies between the drainage plan and the StormWater Guidelines published by the DEP. Many of the concerns raised by the Camp Dresser and McKee peer review were incompletely addressed. The opposing attorneys voiced repeated Objections to her cross-examination, citing the Guidelines were not Regulations. The problems she raised were, however, for the most part not refuted. The drainage plan appears highly likely to fail in the long term, if not in the short term.