



March 11, 2020

To Whom It May Concern;

I submit here my assessment of the nature of the soils in proposed Rapp Road Development Sites 1, 2, and 3 adjacent to Crossgates Mall (EIS, 2020). On the basis of my experience with teaching Forest Soils and Environmental Geology courses as Professor of Natural Sciences at Paul Smith's College, in addition to four decades of experience working with sediments worldwide in the context of my paleoecological research, I have found the soils at those sites to be typical of the Albany Pine Bush.

According to the USDA Soil Conservation Service survey for Albany County (USDA, 1992), the soils on Sites 1-3 mostly belong to the Colonie (sandy loam) and Elnora (loamy fine sand) Series along with closely related types such as Granby and Stafford that differ more in their degrees of hydrological drainage than the composition of their parent materials. All are fine-grained, sandy deposits that were well sorted through water and wind transport and deposited on the bed of former de-glacial Lake Albany after the last ice age. Microscopic examination of samples collected from the roadside edge of Site 1 shows the sand to be primarily composed of well-rounded grains of quartz, a silica-rich parent material that accounts for the acidic nature and relatively poor nutritional content of pine bush soils.

All of these soil types are widespread in the Albany Pine Bush and are capable of supporting a variety of vegetational assemblages including the classic community of pitch pine and scrub oak (PPSO), as well as the lupines necessary to support Karner Blue populations. For example, Figure 8 in the Albany soil survey document is a photo of pitch pines and brush growing on Colonie sand, one of the soil types found on Site 1. The survey also notes that the Elnora Series is typical of the pine bush and occurs in a diversity of woodland, brushland, residential, and industrial settings (pp. 45-46).

The secondary growth woodland and open meadow vegetation that is currently present on Site 1, including white pines and various hardwoods, is not there because of any soil conditions that differ markedly from adjacent pine bush soils, but rather because of the legacy of human activities on the site. The property was formerly cleared and occupied by a pig farm and associated buildings, as the environmental impact statement (EIS, 2020) and aerial photos taken during the 1950s attest. In the absence of frequent fires or active management, this type of vegetation often sprouts up elsewhere in formerly disturbed areas of the Albany Pine Bush.

A report by B. Laing Associates (2019) concluded on page 7 that "whatever qualities the original soils had, especially in comparison to the Albany Pine Bush, have been lost/disturbed since at least the 1960's." That statement, which specifically suggested that the soils in Site 1 should not be considered part of the surrounding Albany Pine Bush, was absent from the same section in a previous report (Laing 2018) but referenced indirectly in the EIS (2020). It is incorrect. The dry, fine-grained, highly siliceous soils are still classified as standard Colonie, Elnora, and other typical pine bush series by the USDA, and



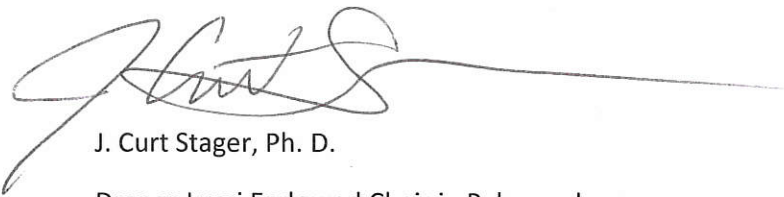
their basic composition is still predominantly paleo-Lake Albany sand mixed with small amounts of silt and organic matter.

The Laing reports also stated (page 7; Laing 2018, 2019) that erosion and rooting or gouging by pigs significantly disturbed the soils in Site 1. The draft environmental impact statement (EIS 2020; page 46) repeats the text of the Laing reports, and again seems to imply that such disturbances disqualify Site 1 from classification as potential pine bush habitat. In fact, such physical disturbances do not at all preclude development of PPSO communities on these kinds of soils.

The presence of formerly plowed and bulldozed sands beneath what is now classic Albany Pine Bush vegetation is well documented. For example, Gebauer *et al.* (1996) stated that "...the existence of plow layers in many Pitch Pine - Scrub Oak Forest stands and the tendency of successional hardwoods to occur on severely disturbed sites suggest that land-use activities ... played an important, if not primary, role in determining the distribution of modern plant communities." Their canonical correspondence analyses of the pine bush ecosystem showed that vegetation community composition there is not solely a product of soil type, but more often due to the legacy of human activities on any given site. In their study, 5 out of 7 sites with PPSO vegetation were formerly plowed. These findings are not unique to their study. Invasions of formerly plowed lands with pitch pine have long been documented in Massachusetts, Vermont, and the Connecticut River Valley (Thoreau, 1993; Howe, 1910; Patterson and Stevens, 1995; Gebauer *et al.*, 1996). Tellingly, pitch pines are also common alongside white pines and other Site 1 successional species on the heavily disturbed sandy soils surrounding Crossgates Mall and in adjacent residential neighborhoods, including Sites 2 and 3.

In other words, the current vegetation on Sites 1-3 is not primarily due to some quality of the soils that would be inappropriate for PPSO and other pine bush assemblages, but is instead due to how they have been managed, neglected, or otherwise affected by human activity. Restoration of heavily disturbed sand barren ecosystems is widespread and often successful despite former land use and soil disruptions of the sorts experienced on Sites 1-3 (Raleigh *et al.*, 2003). For example, previous research on restoration of pine bush habitat on the Rome Sand Plains, NY, has shown that even simple removal of white pines allows lupine-friendly habitat to re-establish on the same soils (Pfitsch and Williams, 2009).

In my professional opinion, and in light of the well-documented facts regarding local soils and vegetation, the sandy soils beneath Sites 1-3 are typical of the surrounding Albany Pine Bush and are potentially capable of supporting PPSO and other pine bush vegetation assemblages under suitable restoration and management regimes.



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