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September 25, 2006

Herb Schech, Chairman
Town of Patterson Planning Board
P.O. Box 470, 1142 Route 311
Patterson, NY 12563

Re: Patterson Crossing DEIS; Mounding Study
File #RP060340

Dear Mr. Schech:

I have reviewed the Draft Environmental Impact Statement (DEIS) for the Patterson Crossing Retail Center Prepared by Tim Miller Associates, Inc. in association with Insite Engineering, with particular attention to Appendix E – Hydrogeology Investigation (Mounding Analysis), prepared by GeoDesign, Inc. and dated August 2005. My comments follow.

MOUNDING ANALYIS

p. 1 Section 1.10 states that bedrock was encountered at depths ranging from 16 to 47 feet. This appears to conflict with Section 4.1 of the DEIS, which reports a till thickness of 90 feet.

p. 1 Section 1.10 states that 1.5 to 2 feet of fine silty sand subsoil overlies a dense to very dense glacial till deposit comprised of a heterogeneous mixture of sand, silt, gravel, cobbles and boulders.

- Such dense, thick deposits of low-permeability till are not conducive to infiltration and recharge. This appears to conflict with statements in the DEIS that precipitation and on-site disposal sewage will contribute to aquifer recharge.

- The DEIS states that 566,500 yd^3 of soil and rock will be cut, and that all of this material will be used on site (no export of fill). Of this volume, 119,000 yd^3 will consist of bedrock rubble and 447,000 yd^3 will consist of unconsolidated soil. Will any of this soil or bedrock fill be used within the 8.7-acre sewage treatment area? If so, how will the properties of this fill compare to the soil properties assumed for the mounding analysis?

- To what extent would this disturbance (cutting and filling) affect shallow groundwater movement and recharge?

p. 2 Test pit data and soil percolation data used by Insite Engineering in their design of the actual subsurface disposal system was not used in the groundwater mounding analysis, and was not included in GeoDesign's mounding analysis. This raises several questions:

- How did GeoDesign's permeability assessment compare to Insite's test pit data and percolation assessment? Were the two sets of results corroborative?

- If the Insite data had been incorporated into the mounding analysis and model, how would the mounding analysis results been affected?

- How does GeoDesign justify excluding the Insite test pit and percolation data generated by Insite?

p. 4 In Section 3.30 (In-Situ Permeability Tests), GeoDesign reports permeabilities in unconsolidated soils ranging from 0.008 feet per day to 0.2 feet per day, with an average permeability of 0.06 feet per day, which are reported to be "primarily horizontal permeabilities." This section further states that, "...the gradation and the density of the unconsolidated material are highly variable at the site, thus impacting the soil's ability to transport water."

- This discussion of permeability test results is too vague to be meaningful. This section should include a clearer and more in-depth explanation of how the estimated soil permeabilities, and their variability, will impact the subsurface sewage treatment system (SSTS) design and function.

- What, specifically, is meant by the conclusion that "...the gradation and the density of the unconsolidated material are highly variable at the site, thus impacting the soil's ability to transport water." This could be taken to mean that on-site soils are unsuitable for on-site sewage disposal, as proposed.

- The DEIS characterizes on-site soils as follows: 1.5 to 2 feet of fine silty sand subsoil overlies a dense to very dense glacial till deposit comprised of a heterogeneous mixture of sand, silt, gravel, cobbles and boulders. Is it feasible for such soils to adequately transmit and filter sewage wastewater flows of 10,740 gpd, as proposed?

p. 4 In Section 3.40 (Groundwater Levels), it states that stabilized groundwater levels were measured in May and June 2005.

- These measurements do not by themselves reflect the seasonable variability of groundwater levels on the subject property. How can such a narrow window of groundwater levels suffice, when it can generally be assumed that a much wider range of groundwater levels will occur from season-to-season and year-to-year?

p. 4 In Section 4.20 (Geologic Materials) Rock Quality Density (RQD), a measure of fracture density, is reported to range from 12% to 77%.

- How will the variable RQD affect the SSTS design and function?
- This section should discuss in more detail the pattern and pervasiveness of bedrock fracturing underlying the proposed 8.7-acre SSTS treatment area.

p. 6 This section should discuss how the period May & June 2005 compares to historical averages and ranges of precipitation.

- Although historical precipitation data are appended, such tables are not a substitute for discussion and comparison within the report itself.

p. 7 Section 7.10 (Model Description) indicates that the simulation was performed using a "confined" layer option, and that neither variation in water levels over time nor aquifer storage coefficient were accounted for.

- What is the justification for the confined layer assumption when the proposed SSTS system will operate under unconfined conditions?
- What is the justification for omitting variation in water levels and storage coefficient?

p. 9 Section 7.20 (Model Results, Calibration and Limitation) states that modeled groundwater elevation match actual groundwater elevations within plus or minus 1 foot. Groundwater levels recorded in May and June 2005 were used to calibrate the groundwater model. Groundwater was not encountered in certain locations within the proposed leaching field, so approximate levels were substituted for calibration purposes. Depth to groundwater is highly variable, owing at least partly to a variable surface topography; and hydraulic gradients are highly variable in this area.

- The calibration range of plus or minus 1 foot may be of limited validity if actual groundwater levels were measured only in May and June 2005, and if actual groundwater levels were not measured in some wells.

- The calibration range of plus or minus 1 foot is suspect given the complexities of surface topography and variable hydraulic gradients.

p. 11 The post-construction model predicts leachate breakout within certain areas of the leaching field, and there is a recommendation to add two feet of fill material to prevent breakout in those areas.

- Given the above-stated uncertainties and complexities in the model assumptions, and the assumed accuracy of plus or minus 1 foot, is the model accurate enough to rule out the need for breakthrough mitigation in other areas of the leaching field?

- If leachate is within 2 feet of the surface in certain areas where breakout areas are mitigated with 2 feet of clean fill, what will prevent leachate from freezing during the winter months?

p. 12 Section 8 (Conclusions) estimates a 3-year travel time for leachate to reach the property line 175 feet, and states that, "this travel time is sufficient to provide adequate treatment of the septic effluent."

- What is the quantitative basis for the conclusion that the travel time is sufficient to provide adequate treatment?

- What is meant by "adequate treatment?"

Sincerely,

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