



13 January 2005

Mr. Rocky Swingle
C/O Save Hamilton Open Space
PO Box 2594
Hamilton, NJ 08690

Princeton Hydro, LLC
Suite 1, 1108 Old York Rd.
P.O. Box 720
Ringoes, NJ 08551
p - 908-237-5660
f - 908-237-5666
www.princetonhydro.com

Re: Sawmill Estates, Block 2730, Lot 9, Hamilton, NJ

Dear Mr. Swingle:

We have reviewed the following materials for Sawmill Estates located on Block 2730, Lot 9, in Hamilton Township, Mercer County, New Jersey:

1. "Drainage Report for Sawmill Estates," dated March 2004, as prepared by Challoner & Magno Engineering, LLC.
2. Plans entitled "Sawmill Estates – Preliminary Major Subdivision," 33 sheets, dated March 24, 2004, last revised October 27, 2004, as prepared by Challoner & Associates, LLC.
3. Plans entitled "Tree Removal Plan – Preliminary & Final Major Subdivision Sawmill Estates," five (5) sheets, dated March 24, 2004, last revised June 18, 2004, as prepared by Challoner & Magno Engineering, LLC
4. Plans entitled, "Existing and Proposed Drainage Area Maps – Preliminary & Final Major Subdivision Sawmill Estates," two (2) sheets, dated March 15, 2004, as prepared by Challoner & Magno Engineering, LLC.

Our review of these materials concentrated on the assessment of the potential short-term and long-term impacts to the Township's surface water, groundwater and wetland resources and the adequacy of the proposed development mitigation measures. Assisting me in the preparation of this report was Ms. Mary Paist-Goldman, EIT. The project involves a 27 building lot residential subdivision to be served by individual septic systems and private wells. The site is currently farmed with a partially wooded area. An existing frame garage and silo will be removed upon development. The major comments can be summarized as follows:

General Comments:

1. This project's stormwater management plan will be subject to NJDEP review due to the need for a wetland encroachment, a transition area encroachment and the construction of the new headwall and discharge to Crosswicks Creek. The floodplain line shown on the plans is not in compliance with the Flood Hazard Area Control Act. Crosswicks Creek is not State delineated in Hamilton or Chesterfield and FEMA Flood Insurance Studies are not acceptable under the NJDEP Stream Encroachment applications unless they were conducted using full build-out in the watershed. NJDEP will require modification of the stormwater management plan or at least additional supporting data.
2. The site layout shows that the project has not been designed in accordance with the NJDEP LID approach. There is no attempt to manage runoff on a lot specific basis or to make use of non-structural techniques to reduce runoff (e.g., the use of dry wells to

intercept and recharge roof top runoff). There is a reference on the plans to seepage pits on each individual lot, however, no details or calculations on these seepage pits were provided.

3. No details of the infiltration basin bottom were provided. The plans indicate that the bottom layer will be a K5 sand, however, no information regarding depth to seasonal high groundwater and bedrock at the basin location is provided. The depth from the bottom of the sand layer to the seasonal high groundwater table must be no less than two (2) feet. No soil testing in the immediate vicinity of the basin for permeability was conducted.

Stormwater Management Report:

The Stormwater Management Report is significantly lacking. The report does not provide vital information pertaining to:

1. No Low Impact Development (LID) / Non-Structural BMP Checklist (a requirement of the new stormwater management regulations and RSIS) was prepared. This is a 12-page form that must be completed as part of any new residential subdivision.
2. Although the report and the plans refer to the use of an infiltration basin, the report does not include the pre – post-development recharge analysis. The new rules require that a GSR-32 annual recharge analysis be conducted or the applicant must demonstrate that the volume difference between the 2-year pre- and post-developed storms is infiltrated. Therefore there is no way of determining whether the “no-net change in recharge” requirement of the new stormwater regulations has been satisfied.
3. Infiltration basin sizing must be based on site-specific soil permeability and texture data (with that sample being collected from the center of the basin itself). A safety factor of 2 must be applied to the field data when designing the basin. The design permeability can be no less than 0.5"/hour.
4. There are no calculations, as required by the regulations, showing that Darcy’s Law was used in the sizing of the infiltration basin and in the analysis of its performance. By regulation, the infiltration basin is to be designed for the water quality storm and it must exfiltrate in full within 72 hours. This has ramifications not only with regard to the basin’s performance but also with regard to mosquito breeding.
5. The summary table shows that the design DOES NOT meet the peak flow reduction requirement for the 2-year storm (required 1.50 cfs, proposed 1.53 cfs).
6. This is a large basin. One of the biggest problems with infiltration basins is the compaction of the basin bottom during construction. This leads to the inability of the detained runoff to exfiltrate, thereby resulting in the failure of the basin or its inability to meet recharge and pollutant removal specifications. The construction sequence must address this. Quoting from the NJDEP BMP Manual... “As discussed in *Considerations* below, construction of an infiltration basin must be done without compacting the basin’s subgrade soils. As such, all excavation must be performed by equipment placed outside the basin whenever possible. This requirement should be considered when designing the dimensions and total storage volume of an infiltration basin”.
7. In addition, if this basin is going to be used as a sedimentation basin during construction, it must be “mucked out” prior to the installation of the sand layer and its conversion into an infiltration basin. In other words, the basin must either be non-operational during the site construction and stabilization phase (which I do not recommend), or it will need to be cleaned out prior to its final development as an infiltration basin. If not, the basin could clog with fine sediments transported to and retained in the basin during the construction

- phase. These fines (silts and clays) will clog the native soils underlying the basin, or the sand media used in the construction of the infiltration basin, leading to the failure of the basin or its inability to meet recharge and pollutant removal specifications.
8. The report, again as required by the regulations, does not include an Operation and Maintenance Plan for the stormwater features proposed, nor does it identify the entity that will be responsible for upkeep of these features.
 9. I also have questions concerning the basin's landscaping and planting, which cannot be answered without the grading or the landscaping details. I am curious of the types of grasses or plant materials proposed for the basin. This affects the performance and the stability of the basin. If the plantings require frequent mowing, this increases the opportunity for the compaction of the basin bottom.
 10. A hydrograph discharge table for the water quality storm (1.25"/2-hour event) was included for the pervious and impervious portions of the site under developed conditions, however, no information regarding how this volume was utilized for design purposes is included.
 11. There is no discussion of TSS removal or whether the design meets the 80% TSS reduction requirements of the new regulations. The Applicant will likely argue that the project does conform because they are proposing the use of an infiltration basin, which according to the BMP Manual, has an 80% TSS removal efficiency.
 12. The basin will be, at a minimum, classified by NJDEP as a Class IV dam. If the Applicant is seeking Class IV classification, the spillway design must be for the 100 yr. +50% design storm. Although essentially the same in function and size, a Class III dam requires a greater level of inspection and reporting as opposed to a Class IV structure. Many design engineers will pursue the Class IV classification to avoid the long-term costs and responsibilities associated with inspection and reporting. However, NJDEP requires over design of the outlet control in such cases. This will increase the dimensions of the berm and possibly the footprint of the basin itself. This could affect the wetland and transition area permits.
 13. By excavating the detention basin a significant embankment is being created that has a elevation difference from the top of the proposed embankment to the floodplain floor of 23 feet. The applicant has not provided any detail or information to eliminate seepage through this potentially Class IV or Class III dam. Of specific concern is the fact that infiltration is being promoted through the bottom of the basin. Such a configuration of the detention basin could lead to piping failure of the created embankment. In addition, NJDEP Dam Safety would not approve such a configuration of a detention basin without an adequate impermeable core and keyway.
 14. Sizing data is provided for the anti-scour protection provided at the discharge of the basin into Crosswicks Creek.

Environmental Impact Statement:

1. The EIS is incorrect when it states that there will be no increase in runoff (page 3-3). The project has been designed to result in no increase in peak flow (CFS), but the volume of runoff is increased, especially for the larger storms (2 year event and greater).
2. The EIS makes mention of Threatened and Endangered species, but concludes that there are none on-site. The Applicant should be required to request an assessment of the occurrence of State and Federally Listed Species and habitat for said species, through the NJDEP Natural Heritage Program. This amounts essentially to NJDEP's review of the State's T&E database for any sightings of listed species on, or adjacent to, the project site

- and their review of the State's Landscape Project database for the occurrence of habitat utilized by State and Federally listed species on, or adjacent to, the site.
3. The plans and EIS show that the Applicant will be requesting a transition area waiver (permission to disturb wetland buffers) and will be filing a transition area averaging plan (the addition of buffer width to the existing buffers to compensate for the disturbed buffers). The table on page 5.3 does not identify the status of either permit/approval.
 4. Page 3-11 states that the stormwater management system has been designed for the 1-year water quality storm. This is not the correct design storm (it should be the 1.25"/2-hour storm). As noted above, there are no data included in the copy of the Stormwater Report made available for my review documenting that such a routing analysis was in fact conducted.
 5. The EIS states that "no threatened or endangered species were identified during the numerous field inspections" conducted as part of this project. The occurrence of some species is limited to certain times or year or certain times of day. The Applicant should therefore supply a log of the dates, times and duration of each inspection. In reviewing Ms. Dix's credentials, I did not note any certifications or training specifically for the identification of T&E species.
 6. The Surface Water section of the EIS is lacking. It does not refer to Crosswicks Creek or the NJAC 7:9a designation of the stream, whether it has been nominated for C1 status, or any data pertaining to its existing water quality or impairments.
 7. Keep in mind that because the LOI is pending, the identified wetlands line is subject to change. However, in reviewing the plans and the wetland's limits, I do not feel that a modification of the line would have serious impacts on the project.
 8. Page 3-15 states that no stream encroachments are part of this project. This is technically incorrect as the construction of the basin's outlet structure within the floodplain and corridor of Crosswicks Creek constitutes a stream encroachment. This regulated activity will require approval from the NJDEP in the form of a Stream Encroachment Permit. This permit's status is not identified in the table on page 5-3.
 9. The EIS fails to address the impacts and alternatives to the clearing of almost 1.5 acres of forest to accommodate the detention basin.
 10. Not having a copy of the Township regulations, I cannot comment on the appropriateness of a tree replacement plan to compensate for the loss of trees occurring throughout the site, but in particular within the footprint of the basin.

This concludes our review of this application. Because of the need for NJDEP approval of the stormwater management plan, I anticipate changes will be required of this application.

Sincerely,



Stephen J. Souza, Ph.D.
President, Princeton Hydro, LLC



Geoffrey M. Goll, P.E.
Vice President, Princeton Hydro, LLC

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