

**TO: MARIA TRANGUCH, DIRECTOR OF PLANNING & ZONING
TOWNSHIP OF FERGUSON, CENTRE CO., PA**

**FROM: GWIN, DOBSON & FOREMAN, INC.
CONSULTING ENGINEERS, ALTOONA, PA**

DATE: APRIL 21, 2015

**RE: THE COTTAGES AT STATE COLLEGE
FINAL PLANNED RESIDENTIAL DEVELOPMENT (PRD) PLAN REVIEW
STATE COLLEGE BOROUGH WATER AUTHORITY TECHNICAL REVIEW COMMENTS**

TECHNICAL REVIEW COMMENTS

1. A contingency plan for the repair of any sinkholes formed during construction (or discovered after construction), increased sediment transport, failure of the onsite SWM devices, etc. shall be provided for review and approval to the SCBWA prior to the approval of the Final PRD. After approval, the contingency plan is to become an integral part of the recorded PCSM O&M agreement.
2. Note No. 11 of the Stormwater Facilities Maintenance Program shown on Sheet 2 states that the Township Engineer and the surrounding property owners are to be notified if a sinkhole begins to form. The SCBWA shall also be notified immediately.
3. Material Safety Data Sheets (MSDS) for all herbicides, pesticides, fertilizers, etc. that are to be placed or stored on The Cottages at State College grounds shall be reviewed and approved by SCBWA prior to application. It is noted that the consultant has placed a note regarding the need to notify the SCBWA (Landscape Note No. 3, Sheet 14), but this note should also be included in the PCSM O&M agreement mentioned above.
4. It appears that orange safety fencing is proposed for protection of the riparian areas adjacent to the floodway. The construction of both Extended Detention Basin A and Infiltration Basin B is listed very early in the construction sequence and may be subject to construction traffic.

It is imperative that the bottom of Infiltration Basins be protected from construction traffic compaction as well. Orange construction fence should be provided along the entire perimeter of the infiltration basins to prevent site disturbance during construction activities. The sequence of construction should be adjusted accordingly.

5. The inlet grate skimmers must be maintained as specified in the Stormwater Facilities Maintenance Program. This requirement must also be specifically mentioned in the recorded PCSM O&M agreement.

6. The storm sewer outfall line to Infiltration Basin B shown on the submitted Final PRD differs from that presented to the SCBWA by Penn Terra on April 9, 2015. The outfall presented incorporated a level spreading device that should be shown on the Final PRD plans that will be approved by Ferguson Township.
7. Based on the cross-section shown through Infiltration Basin B (Sheet 27), there appears to be fractured bedrock in the vicinity of the basin bottom. This needs to be verified prior to construction and factored in the final design to ensure basin integrity.
8. The SCBWA requests that subsurface geophysical surveys exploration of the area utilizing electrical resistivity tomography (ERT) in the detention basin areas to determine the location of possible subsurface voids, fractures and soil thickness prior to construction. A minimum of two resistivity surveys shall occur in each basin area to characterize subsurface conditions under the supervision of a Professional Geologist, licensed to practice in the Commonwealth of Pennsylvania, with a summary support submitted to the SCBWA and all other interested parties.
9. The proposed infiltration rate for the bottom of Infiltration Basin B is listed as being designed to be between 0.8 and 10 inches / hour. If the higher rate is used in the basin, the increased infiltration will allow for more rapid transport of pollutants to enter the groundwater. This is of particular concern considering the fractured rock mentioned above. It is recommended that the soil mixture be designed to provide an infiltration rate of no greater than 5 inches/hour.
10. There is no cutoff trench or key trench located in the constructed embankment of Extended Detention Basin A or Infiltration Basin B. Basin A is to be lined with a 20-mil PVC liner, however, Basin B will have 550 feet of constructed embankment with no impervious core. Cutoff and key trenches to prevent embankment seepage (and possible breaching shall be provided.
11. No anti-seep collar is provided for the primary outfall of Infiltration Basin B. Provide an adequately sized collar to prevent piping of the soil adjacent to the outside of the discharge barrel.
12. There appears to be less than one (1) foot of freeboard from the 100-year storm elevation and the top of the embankment for both Extended Detention Basin A and Infiltration Basin B. One foot of freeboard is required for basins with an emergency spillway, assuming that the primary outfall (riser structure) is clogged. Provide adequate freeboard in these areas.
13. There are no details for Infiltration Basins C & D. Provide details incorporating the above mentioned basin comments into the design of these basins.

14. The sinkhole repair detail shown on Sheet ES-6 should be made a part of the PCSM O&M agreement as well as the Erosion and Sediment Control Plan. This will allow expedited repair of sinkhole formation after construction has been completed.
15. SCBWA shall be given the opportunity to review and approve the seed mixtures to be applied to the bottom of the detention basins prior to application to ensure that tall grass stands with well-developed rooting systems will be provided. This provision should be included in the Conditions of Approval document.
16. SCBWA shall be given the opportunity to review and approve the amended soil layers to be applied to channels, swales, detention basins, etc., where shown on the plans to ensure a proper mixture of sand, clay and organic material that achieves the necessary filtering capacity when properly applied and maintained. This provision should be included in the Conditions of Approval document.
17. Developer shall make provision for a monitoring well to be installed on the Developer's property at a location to be determined in consultation with SCBWA and its hydrogeological consultant. The size, depth and well installation details shall be coordinated with SCBWA and hydrogeological consultant and shown on the Drawings. The purpose of the monitoring well is to allow periodic ground water quality sampling for testing of potential contaminants that may impact the SCBWA well fields.
18. Extended Basin "A" and Infiltration Basin "B" appear to be sited in areas (Opequon soils) with shallow bedrock with the potential for significant rock excavation and fracturing. SCBWA requests copies of the infiltration test pit logs noted on the drawings to confirm this condition. If so, SCBWA requests the reconfiguration of the basins to avoid, where practicable, excessive rock excavation.
19. It is the preference of the SCBWA that any rock excavation be performed using pneumatic hammers or other similar measures. Any drilling or blasting required for the construction of the site should be thoroughly coordinated with Ferguson Township and the SCBWA to determine if any impacts to existing rock or the formation of sinkholes may occur as a direct result of blasting activities.
20. If drilling and blasting is permitting by the Township, the following performance and monitoring protocols should be included in the Conditions of Approval document:
 - a. All blasting shall be monitored in the field by a Professional Geologist or Professional Engineer currently licensed to practice in the Commonwealth of Pennsylvania.
 - b. Before any blasting is performed, the Professional Geologist or Professional Engineer shall submit a report containing specific recommendations for blasting. The report shall review amount of charge, firing times, ground velocities, accelerations and

displacements, effects on groundwater aquifer system and field monitoring program. Should the report conclude that damage to the aquifer system will result, the Contractor will not be permitted to do drilling and blasting.

- c. All blasting shall be field monitored using seismographic type equipment and shall be performed under the supervision of the Professional Geologist or Professional Engineer.
- d. Accurate records shall be maintained of each blast. The record shall show the general location of the blast, the depth and number of drill holes, the kind and quantity of explosive used, ground velocity and displacements, and other data required for a complete record. A complete record of drilling and blasting operations shall be provided to SCBWA for review.
- e. All operations involving explosives shall be conducted by experienced personnel possessing valid Pennsylvania Blaster's Licenses. Blasting operations shall be done only with such quantities and charges of explosives and in a manner that will break the rock to the intended lines and grades and yet will leave remaining rock in an unshattered condition. Remedial measures, as approved by SCBWA, shall be provided if excessive subsurface fracturing results.

21. The following provisions relate to the construction inspection, post-construction operation and maintenance inspections and sampling/testing of the on-site monitoring well related to the stormwater management facilities.

- a. The State College Borough Water Authority and its duly appointed representatives and delegates shall have the same duty and authority to enter the premises to monitor, inspect or test the project's stormwater management facilities, including but not limited to, channels, infiltration basins, stormwater management basins, control structures and foundation excavations to determine whether they are being constructed in accordance with the approved Final Planned Residential Development Plan and the approved Stormwater Management Plan as the Township of Ferguson and its duly appointed representatives and delegates shall have. The State College Borough Water Authority shall advise Ferguson Township and the owner of the premises whenever it determines that any such facilities, controls or foundation excavations are not in compliance with such plans and shall have the duty and authority to stop any such work in an area where impacts to source waters are being generated until such impacts are properly mitigated.
- b. The State College Borough Water Authority and its duly appointed representatives and delegates shall have the same duty and authority to enter the premises to monitor and / or to inspect or test the project's stormwater management facilities, including but not limited to, channels, infiltration basins, stormwater management

basins, control structures and outfalls, vegetative establishment, chemical and fuel storage and the operation and maintenance of these facilities to determine whether such facilities and procedures are in accordance with the approved Stormwater Management Plan/Stormwater Operation & Management Plan/Stormwater Facilities Maintenance Program and Post Construction Stormwater Management Plan as the Pennsylvania Department of Environmental Protection Resources and Ferguson Township and their representatives and delegates shall have.

- c. The State College Borough Water Authority and its duly appointed representatives and delegates shall have the duty and authority to enter the premises to inspect, test, maintain and remove samples from any monitoring well installed on the premises.