



851 Chemung Street
Horseheads, New York 14845

November 22, 2016

Mr. Patrick Hinman, Code Enforcement Officer
Village of Horseheads
202 South Main Street
Horseheads, New York 14845

**Re: Villas at Gardner Road
Gardner Road, Village of Horseheads
Review of Stormwater Pollution Prevention Plan**

Mr. Hinman:

I have completed a review of the following submitted items for the above-referenced project regarding the proposed stormwater management system for that project.

- Stormwater Pollution Prevention Plan (SWPPP) for Villas at Gardner Road - Horseheads, NY, Stamped by a NYS Licensed Professional Engineer, Prepared by Fagan Engineers, Prepared for Barrington Associates, Revision dated October 2016, Received October 7, 2016
- Site Plan Drawings for Villas at Gardner Road, Village of Horseheads, Chemung County, NY, Stamped by a NYS Licensed Professional Engineer, Prepared by Fagan Engineers, Revision dated October 5, 2016, Received October 7, 2016
- Response letter to the Stormwater Coalition's August 4, 2016 drainage review letter, Prepared by Fagan Engineers, Dated October 7, 2016

My review comments and questions regarding the SWPPP and stormwater management system for the above-referenced project, based upon the submitted information, are as follows.

I. STORMWATER MODELING

1. It appears that the Times of Concentration (Tc) values for Post-Developed Sub-Areas A3, A4, A5, and A9 are too high, given the nature of the proposed development within those sub-areas. These high Tc values are attributed, in part, to an extremely high roughness coefficient (n value) for the proposed channels that was selected by the applicant's engineer and utilized for hydrologic modeling. An n value of 0.15 was selected and utilized. For a channel with short grass (as per Chow, 1959), a n value of 0.022 to 0.033 is more appropriate.

The use of a lower n value would act to decrease estimated Tc values and increased predicted peak stormwater flow rates. Furthermore, the use of a lower n value would act to increase the estimated flow velocities within the channel, possibly necessitating the need for erosion control for the channel (such as Turf Reinforcement Mats or rock lining).

II. STORMWATER MANAGEMENT

1. As per Test Pit # Probe 1 (Site 1), well graded sand and gravel is located at an approximate depth of 3 feet, with a silt/clay layer above. Furthermore, as per the Infiltration Test Data Log for Site 1, the test hole depth for the infiltration tests was 54 inches. As per the grading plan, the bottom of the proposed infiltration basin shall be roughly 3 to 4 feet below the existing grade.

Accordingly, given the above considerations, the following

- o The soil layer that was tested for infiltration rates should be exposed at the bottom of the basin, better ensuring the long-term performance of the basin.
- o Alternately, additional soil testing should be completed for the silty/clay soil layer, if that layer is to remain at the bottom of the basin, and that data utilized in the modeling of the performance of the basin.

In regards to the proposed low flow channel, I believe that it would act to improve the performance of the basin, but would also be prone to clogging over time.

III. STORMWATER COLLECTION & CONVEYANCE

Hydraulic Sizing

1. The hydraulic calculations justifying the sizing of the proposed storm sewers (including inlet grates), culverts, and swales shall be reviewed, after the post-developed Tc values have been reviewed/corrected and revised peak stormwater flow rates provided. It is recommended that the sizing of the inlet grates consider the potential of partial plugging (such as by leaves and other debris). The sizing of culverts should consider inlet and outlet control conditions.

Storm Sewer & Culvert System

1. The proposed culvert between End-sections #2 and #3 is noted as being 24-inch diameter, while the downstream storm sewer is proposed to be only 15-inch diameter. Ordinarily, downstream storm sewers are not smaller than the upstream storm pipes.
2. The specific type of storm sewer pipe should be clearly noted on the plans, such as "HDPE with smooth-bore interior".
3. In regards to the "Basin to CB-4 Profile" on Sheet C8, it appears that extraneous information regarding 8-inch diameter piping is inadvertently included.

Roof Runoff

1. It is unclear from the submitted plans how roof runoff is proposed to be collected and conveyed. In the SWPPP, it is stated that roof drains will be directed to a perforated perimeter underdrain, although the plans do not include information regarding this. As such, detailed information on how roof runoff is proposed to be managed should be provided on the plans and in the SWPPP.

Drainage Swales

1. A proposed drainage swale is shown passing through a corner of the proposed building on Lot #12.
2. A proposed drainage swale is shown passing through the proposed building on Lot #20.
3. As per the Grading Plan, the topographic definition of the proposed drainage swale near Lot #6 appears to be lost.
4. Refer to Comment #1 under Stormwater Modeling.
5. The plans should clearly indicate what measures are proposed to prevent the proposed drainage swales (shown in green on Sheet C9) from eroding.
6. A number of steep slopes are proposed on the project site some of which appear vulnerable to erosion. For example, the steep slopes that would receive runoff from the proposed cul-de-sac on the west side of the project site would be prone to erosion. Appropriate measures to prevent erosion of these steep slopes should be detailed on the plans.
7. Is rock outlet protection required for the discharge of the proposed northern swale into the proposed forebay?
8. Does sufficient freeboard exist for the proposed drainage swales near Building 17/18 and near Building 19/20 to contain stormwater within the swale? For example, in regards to the proposed swale near Building 19/20, could stormwater flows reach the adjacent Lot #10?

IV. EROSION & SEDIMENT CONTROL

1. In regards to Phase 2, it is unclear why silt fence (or other perimeter control) is not proposed to be utilized down-gradient of the proposed earthwork. Furthermore, it is unclear why silt fence is not proposed between the proposed earthwork and the proposed swales.
2. Is a concrete wash-out area need for Phase 2?
3. Phase 2 of the proposed project is not included in the proposed Construction Sequence.
4. Detailed information regarding the proposed rock for the proposed Rip-Rap Outlet Apron Detail is not included on this detail.
5. In regards to the construction of the individual homes, the following items are recommended.
 - a. It is recommended that a specific Erosion & Sediment Control Plan be developed by the applicant for each building site and submitted to the Town for their review and acceptance, as part of the building permit process. These plans should include the locations of proposed erosion and sediment control practices, as well as concrete wash-outs.
 - b. The Sequence of Construction should make note of the development of a specific Erosion & Sediment Control Plan for each individual building site.

VII. MISCELLANEOUS

1. Who shall be responsible for the maintenance of the stormwater collection and management system?
2. In accordance with the Village's Stormwater Management and Erosion and Sediment Ordinance, a formal, signed enforceable operation and maintenance agreement for the stormwater collection and management system shall be provided by the Applicant. Furthermore, this agreement must reference and include an approved Operation & Maintenance Plan that are specific to the proposed stormwater management practices. It is recommended that the O & M Plan outline steps and measures to be implemented if operational/performance issues are encountered with the proposed stormwater infiltration system.

This agreement shall be binding on all subsequent landowners and recorded in the office of the County Clerk as a deed restriction on the property. Also, the Applicant shall convey to the Village easements and/or rights-of-way to assure access for periodic inspections by the Village or their representatives (and for maintenance if required). These agreements, as well as the Operation & Maintenance Plan, shall be subject to the review and approval of the Village of Horseheads, their attorney, and Chemung County Stormwater Coalition. A technical review of the O & M Plan will be completed, after receiving a detailed O & M Plan that is specific to this proposed project.

3. Given that the individual lots may be owned by different owners, easements should be provided over the proposed drainage swales/ditches.
4. How will vehicular access be provided for the maintenance of the proposed stormwater forebay and infiltration basin?

If you have any questions or comments regarding this letter, please do not hesitate to contact me. Furthermore, I would be happy to meet to discuss this project in greater detail.

Sincerely,



Jimmie Joe Carl, P.E.

Cc: Fagan Engineers