



## State of New Jersey

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August 5, 2019

Mr. Angelo Caruso  
Manager  
Bergen County Soil Conservation District  
700 Kinderkamack Road, Suite 106  
Oradell, NJ 07649

Re: Trip Report to Apple Ridge Family of Project Sites, Mahwah & Upper Saddle River

Dear Mr. Caruso:

At your request both I and Mr. Frank Minch, Executive Secretary of the State Soil Conservation Committee (SSCC) accompanied you and Mr. Roy Otto, Assistant District Manager to a meeting held at the Upper Saddle River (USR) Municipal building to discuss the ongoing efforts for soil erosion control at the "Apple Ridge" group of sites with municipal officials representing USR. After the meeting with township officials we inspected the sites with Mr. Minch, Mr. Otto, yourself, and representatives from Boswell Engineering representing USR. Mr. Keith Diorio representing Toll Brothers, the developer, walked the sites with us.

I should note from the outset that, many participants in the meeting stated that 'mud' was being discharged downstream. I made a point in stating that the colloidal suspension being discharged from time to time is not 'mud', which is a non-scientific term which generally means very saturated, solid soil. To be clear, that is not the material finding its way into Pleasant Brook. The tan-colored water which has been periodically discharged is a 'colloid'. The term 'colloid' refers to extremely small particles of any material which become suspended in a liquid such that they "float" almost indefinitely. The particles can be so small that they easily pass through even a very fine filter. Examples of non-soil colloids which most people are familiar with are milk and even paint.

Soil colloids tend to be the clay or silt fraction of the soil which become suspended in water. Even a very small amount of the clay/silt fraction can disperse in a body of water and completely discolor it. Under ideal circumstances it might takes weeks for the particles to settle out of

water. If the water is in any way agitated, the particles will remain suspended.

The soils in the “Apple Ridge” sites are characterized as ‘silty sands’ and have a fairly high fraction of “fines” (clay or silt) ranging from about 30% to 40%<sup>1</sup>. There is very little loss of soil mass or volume so that if deposition does eventually occur, the depositional depth is usually extremely small, on the order of fractions of an inch. However even the slightest movement of water containing colloidal soil will be sufficient to prevent deposition. The presence of colloidal soil downstream in Pleasant Brook is due to this phenomenon.

In order to reduce the amount of colloidal material discharged offsite, Toll Brothers, Inc., is utilizing flocculants in the Apple Ridge sediment basins along with skimmers on the outfall structures. Flocculants cause the finely suspended soil particles to ‘clump’ together, making them heavy enough to settle out. The skimmer floats on the surface and drains water at a very shallow depth at the top where it is the cleanest.

An additional problem faced by these sites is the numerous, high-intensity rainfall events which have been occurring since the fall of 2017 when the site was first cleared for soil remediation. These rain events have often dumped several inches of rain (2-4”)<sup>2</sup> in a matter of a few hours. The high intensity rain events overwhelm the numerous control measures such as temporary stabilization, sediment barriers and inlet filters and ultimately the sediment basins. These practices are intended to control rain events that are on the order of a few inches of rain occurring over a 24 hour period<sup>3</sup>. Sediment barriers like silt fence are intended to treat ‘sheet’ flow from surface areas resulting from small storm events. High intensity rain events can produce channelized flow such as rills and small gullies which then defeat the silt fence.

In the case of the sediment basins, the use of skimmers (as discussed above) is effective in limiting colloidal discharge due to their long draw down time. Normally this is not a problem. However, the Apple Ridge sites have also been experiencing numerous high intensity rain events at a high frequency of occurrence such that the basins do not have time to safely draw down before the next rain event hits. When this occurs, the developer has conducted emergency dewatering (it is my understanding this is being done under the supervision of the municipal engineer) with mechanical pumps to make room for the next storm, in order to prevent the basins from overtopping. While the pumps discharge through filter bags prior to discharge offsite, the nature of the fine soils as I mentioned above allows much fine soil to pass through the bag material.

During our site inspection at the Apple Ridge sites on August 2, we examined erosion control measures on both the Mahwah and Upper Saddle River sites as well as the restoration efforts on

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<sup>1</sup> Melic-Tully Associates, PC Soil Sample Gradation Results

<sup>2</sup> NJ State Climatology Website Weather Station Tabular Data

<sup>3</sup> NJ Standards for Soil Erosion and Sediment Control, Chpt. 24 Sediment Basin Design.

Pleasant Brook. Our observations and recommendations for erosion control were as follows:

1. Discharge to Pleasant Brook at the southern end of the site was clear from several points including the stream by-pass, the primary sediment basin in USR and the small temporary basin.
2. USR Sediment basin.
  - a. The floating skimmer was upgraded to a larger size, and, was connected to the outlet structure several feet lower which allows for a greater draw down of the volume. We requested that the original, smaller skimmer be reinstalled in addition to the new unit to aid in draw down. The basin water level was extremely low at the time of inspection offering a great amount of volume for future storm events. Only clear groundwater was draining from beneath the basin riprap apron.
  - b. An underdrain pipe is still installed in the basin and should be used to dewater the basin in emergency conditions as it pulls clean water from below the basin floor.
  - c. A pipe outlet on the south-east corner of the basin requires rip rap installation to prevent minor erosion occurring at that location. Additional minor erosion is occurring above the same pipe and should be stabilized.
  - d. Toll stated the now exposed internal banks of the sediment basin are to be immediately stabilized with vegetation.
3. Pleasant Brook Restoration.
  - a. The remaining section at the south end of the brook will be undergoing restoration shortly, to be completed before the fall.
  - b. Upper reaches of the restored brook are well vegetated and newer restoration areas are heavily stabilized with plant materials, mulch, blankets etc. Newly planted vegetation is being irrigated during hot weather.
4. USR Project site.
  - a. A temporary diversion channel has been constructed to prevent excess runoff from flowing toward Carlough Road. The channel will direct runoff to the USR sediment basin. We requested this be shown on a revised plan as a temporary diversion.
  - b. Additional (possibly temporary) yard inlets are being installed along roadways as backup drains to protect Carlough Road in the event of another high-intensity rain/clogged drain. These inlets may be shown on the plan if the municipality decides they should be permanent structures.
  - c. Street inlets have been modified with cuts to pavement allowing curb drainage to get into inlets since the inlet grates are still above grade. Asphalt 'berms' on the downstream side of street inlets will be added to force curb drainage into inlets. We directed Toll to remove any internal inlet filters to avoid potential street flooding. Runoff will be unrestricted in its pathway to the basin.
  - d. Undeveloped lots are being stabilized with seed and straw mulch and a mulch

blanket along the curb to minimize movement of loose straw into the street in the event of a severe rain event. We suggested that a barrier, either silt fence or filter soxx be installed along the curb line to capture loose hay in the event of heavy rain.

5. Mahwah Project:

- a. The south sediment basin was fairly well stabilized and contained little water (no discharge during inspection). A floating skimmer is installed.
- b. A few locations in the areas adjacent to the basin have silt fence which requires repair.
- c. An area recently graded and stabilized to the north of the basin had insufficient straw mulch covering. The method used to anchor the mulch (crimping) was not deep enough to retain the mulch. It should be consistent with the mulch application and anchoring which is being done on the USR site which was quite good.
- d. A yard inlet encircled with haybales is scheduled to be cleaned and haybales replaced with a stone perimeter barrier.
- e. A large embankment on the west perimeter has several gullies however the entire embankment is scheduled to be used as construction material for the northern most basin and will be utilized in a week or two. No sediment was leaving the lots in this area.
- f. The northern basin is partially constructed and stabilized but does have a functioning floating skimmer. A large manufactured treatment device is also installed at this basin.

Toll Brothers is continuing to ensure routine maintenance of temporary controls is being implemented and regularly communicates with both the Bergen County Soil Conservation District and this office.

Please feel free to contact our office if you have any questions regarding my trip report or any other matters related to erosion control at these sites.

Sincerely,



John E. Showler, P.E.

State Erosion Control Engineer

C: Roy Otto, Assistant Manager, Bergen SCD  
Frank Minch, Executive Secretary, NJDA-SSCC  
Elizabeth Dragon, Chief, Bureau of Coastal and Land Use Compliance, NJDEP