**The Stormwater Drain Policy for The Settings of Black Mountain**

**Introduction**

The storm drainage system for The Settings of Black Mountain is a complicated system, consisting of drains, drain lines, catch basins, rockfalls, multiple streams and a pond. The system is designed to transport storm water runoff in a controlled manner, so that erosion is prevented, and the water is discharged from The Settings with minimal entrained silt.

The importance of maintaining the system can be illustrated by calculating the amount of rainfall during a typical rain event. Assume that a typical heavy rain is 1”. A 1” rainfall produces 27,159 gallons of water per acre. The Settings of Black Mountain has approximately 370 acres. Therefore, the total amount of water that falls on The Settings property is approximately 10 million gallons of water, per 1” rain event!

Several factors need to be evaluated to determine the impact of a 1” rainfall on the stormwater drain system. First, how much of the water is absorbed into the ground compared to the quantity of water that must be transported by the drain system. Obviously, dry land will absorb more rainfall, than saturated land. Streets and hard surfaces absorb no water, and that water must eventually go to the drains. As The Settings is built out, houses and driveways will increasingly contribute to the amount of water carried to the drains.

Secondly, the time-period that the rainfall occurs will dramatically impact the amount of water entering the stormwater drains. A 1” rain over twenty-four (24) hours, compared to a 1” rain over 1-2 hours will be significantly different. A 1” rainfall in one hour will not have sufficient time to be absorbed, while 1” over a twenty-four (24) hour period will be more efficiently absorbed. One must also factor in the moisture level of the soil at the onset of the rain event.

Third, how well is the system maintained? The system was designed to transport clean water, down the mountain to a primary discharge point at the intersection of Cottage Settings Lane and Old Lafayette Lane. Entrained silt is partially removed as the water runs into discharge cisterns, over discharge rockfalls, through the ground into streams, and weirs to settle the silt, and partially into the pond at the entrance of The Settings, and help clear the discharge water.

**System Description**

The author has reviewed a multiple page map of the stormwater system and has developed the following tabulation for the system:

* Thirty-nine (39) Drain Lines
* Two Hundred and Forty-Nine (249) Drains
* Twenty-Five (25) Rockfalls
* Numerous Upstream Catch Basins
* Six (6) Streams
* One (1) Pond

**Why Does The Settings Need to Be Concerned About Entrained Silt and Water Clarity?**

The Stormwater System was designed so that stormwater will flow in a controlled manner to be discharged into a stream that eventually flows into the Swannanoa River. The Settings’ owners wish to preserve the environment, and be good neighbors. Therefore, it is our responsibility to discharge clean stormwater that eventually goes into the Swannanoa River

What’s changed? In the early days of The Settings, the number of homes being constructed were 2-4 per year. The amount of silt, mud and gravel that may have run into the drains was minimal and manageable. Today there are twenty-one (21) homes that are currently active construction sites. Additionally, many of the sites are on steeper lots, which have a tendency to deposit more silt, mud and gravel into the stormwater system.

As more homes are completed, the amount of impermeable surface area increases, which reduces the amount of land surface that can absorb rainwater, and more water inevitably must be handled by the stormwater system.

The stormwater system performed with little or no maintenance for many years. However, in the previous two years (2020 & 2021), approximately $17,000 was spent to clean out a number of the drain cisterns and rockfalls to remove accumulated dirt and mud. Basically, it is a combination of accumulation dating back to the beginning of development and an accelerated pace of construction impacting the system.

Recently, Marty Kocot of Land Engineering, the Stormwater System designer toured The Settings, and made a number of observations regarding the active building sites. He advised that The Settings should be more aggressive in preventing mud, silt and gravel into the system, so that optimum performance is maintained.

More importantly, every pound of silt, mud and gravel will eventually need to be removed, so that clear water is discharged. If you don’t put it in the drain, you don’t have to pay to get it out! Eventually, the system will need periodic scheduled maintenance, but the old saying “an ounce of prevention is worth a pound of cure” applies.

**Requirements to Minimize Silt Infiltration into the Stormwater System**

Required Silt Control Devices

1. All driveway entrances should have railway ballast (coarse gravel 1” -2.5” in size) with a bump (a 1”-2” high ridge parallel to the existing curb) at the end to divert runoff from draining into the roadway
2. Heavy duty silt fences with heavy duty metal posts are required to keep erosion of soil and rocks on the construction site
3. Diversion ditches shall be installed as needed to keep runoff from exiting the construction site.
4. Sediment traps as needed shall be installed to prevent migration of mud or soil.
5. Downstream drains shall be protected with booms (protective spill devices) to ensure silt and mud will not enter the drain. Each impacted drain must have a protective boom.
6. Each construction site may require some or all of the above devices, and further measures may be required to prevent erosion and construction debris from migrating to the stormwater drains.

**Required Maintenance**

1. Mud, silt, gravel, and construction debris shall be swept off the roadway and curbs so that water is free to drain. This should be considered a daily requirement.
2. Remove mud and silt in any downstream protective boom. Booms should be checked after any rain event, and accumulated material removed from the boom area and deposited back at the construction site.
3. Remove any build-up of silt and mud at silt fences. It is imperative to prevent the splitting of any fence, that could release significant silt into the drains. Silt fences should be checked especially after any rain event
4. Cover disturbed areas with mulch to prevent migration of soil and mud.
5. Maintain all other erosion prevention devices, and check for mud and silt migrating off the construction site.
6. Following any major rain event, all erosion controls shall be checked, remediation and clean-up caused by a rain event shall be completed within 48 hours after the rain event has ended.

**Stormwater Drain System – Inspection and Enforcement of Silt Control Measures**

**Inspection**

The DRB shall be responsible during the construction process for the inspection of the recommended stormwater control devices and their maintenance. Builders and/or homeowners will be advised of minimum requirements to prevent silt/mud infiltration. Following completion of construction, the Head of the Infrastructure Committee of the HOA Board will be responsible for enforcement of guidelines impacting the stormwater drain system.

During the construction process, if additional measures are required, the DRB will advise the builder/homeowner of additional requirements to maintain the integrity of the stormwater drain cleanliness.

**Enforcement**

The DRB will provide written notification of violations. Upon completion of the construction process, the HOA Infrastructure Head shall assume responsibility for enforcement of the guidelines and enforcement activities. The builder/homeowner will be advised of the necessary corrective and/or additional steps to put the project back into compliance. In addition to the corrective steps required, a timeline will be established for compliance.

Failure to comply with recommended control measures and/or significant erosion events impacting the drainage system will result in fines to the builder/homeowner.

As a last resort, the HOA reserves the right to correct any significant erosion problem and bill the builder/homeowner for corrective actions.

**Fines**

It is the intent of this policy to have the DRB and Builder to develop a plan to minimize the impact of construction activities on the stormwater system. The plan should be in place at the time construction begins. It is the responsibility of the Builder to instruct and monitor each of his subcontractors regarding the Stormwater policy

Fines for not following the agreed upon plan shall be:

* First Event – Written Warning
* Second Event - $500 fine
* Third Event - $2,500 fine
* Subsequent Events - $2,500 fine

The Stormwater Drain Policy for the Settings of Black Mountain was authored by James Schorr –Infrastructure Chair, dated and approved by the HOA board on 12/21,2023.