

## **12. Criterion 4 (erosion and capacity of soil to hold water)**

### **I. Requirements for Issuance of Permit**

Under Criterion 4, the Commission cannot issue a permit unless it finds that the Project “will not cause unreasonable soil erosion or reduction in the capacity of the land to hold water so that a dangerous or unhealthy condition may result.” 10 V.S.A. § 6086(a)(4). In evaluating the project under Criterion 4, it is appropriate to review impacts of construction as *well as long-term impacts* of the project.

### **II. Burden of Proof; Permits and approvals**

The burden of proof under Criterion 4 is on the applicant. 10 V.S.A. § 6088(a); *In re Wildlife Wonderland, Inc.*, 133 Vt. 507, 511 (1975); *Re: Times and Seasons, LLC and Hubert K. Benoit, #3W0839 -2-EB* (Altered), Findings of Fact, Conclusions of Law, and Order at 35 (Nov. 4, 2005).

### **III. Analysis**

#### **Presumptions of Compliance**

Under Act 250 Rule 19(E)(6)(a), ANR stormwater discharge permits can serve as presumptions of compliance with Criterion 4. Any technical determination ANR makes in issuing a permit subject to a Rule 19(E) presumption is entitled to substantial deference. 10 V.S.A. §6086(d).

The three ANR stormwater discharge permits are commonly offered as presumptions of compliance in the Act 250 process:

#### *CGP #3-9020 – Construction General Permit*

This permit authorizes discharges from construction sites that disturb more than one acre, focuses on erosion prevention, and *remains in effect during the construction phase only*; after construction, the CGP is terminated and is not in effect; this permit should not be relied on for long-term permanent erosion prevention because the technical review is generally limited to the construction phase (focusing more on *how* projects are constructed than on *what* is constructed) and because the permit will not be in effect following completion of construction and permit termination.

Website: [http://www.vtwaterquality.org/stormwater/html/sw\\_cgp.htm](http://www.vtwaterquality.org/stormwater/html/sw_cgp.htm)

#### *General Permit #3-9015, otherwise known as the Operational Stormwater Discharge Permit*

This permit authorizes stormwater discharges from developed areas, including impervious surfaces; in general, if a project involves creation of one acre (or more) of impervious surface, then this permit is required. Impervious surface includes building roofs, gravel, and paved surfaces. This permit remains in effect

during the post-construction (“operational”) phase of the project. Although this permit does not specifically emphasize erosion prevention, the very detailed technical requirements include a standard specifically for long term maintenance of water quality (design for treatment of the 0.9 inch “water quality” storm) and involve utilization of non-eroding stormwater collection / conveyance systems.

Website: [http://www.vtwaterquality.org/stormwater/html/sw\\_3-9015.htm](http://www.vtwaterquality.org/stormwater/html/sw_3-9015.htm)

#### *Multisector General Permit (MSGP) for Stormwater Discharges from Industrial Activities*

This permit is required for certain industrial projects, based on SIC (Standard Industrial Classification) Codes. This permit remains in effect during the post-construction (“operational”) phase of the project. This permit involves the preparation and implementation of a project-specific Stormwater Pollution Prevention Plan (SWPPP), which includes detailed monitoring and inspection protocols, implementation of industry-specific Best Management Practices, and routine *water quality sampling*, towards preventing industrial wastes from entering receiving waters via stormwater. The technical emphasis is on long term maintenance of water quality. Prevention of soil erosion is not necessarily emphasized (or addressed at all), but may be considered for certain types of projects (e.g. gravel pits).

Website: [http://www.vtwaterquality.org/stormwater/html/sw\\_msgp.htm](http://www.vtwaterquality.org/stormwater/html/sw_msgp.htm)

### **Discussion**

It is important to note that an ANR stormwater discharge permit provides a presumption of compliance under Rule 19E) *only to the extent that the permit addresses the specific requirements of Criterion 4*. Because the Construction General Permit (CGP #3-9020) deals only with erosion potential during construction, and not during the longer-term completed “operational” project, *the CGP alone should not be used as a presumption*; when a CGP is presented, the Commission should also consider what other evidence is available to support a positive finding under Criterion 4, e.g., does the project design include other good permanent design elements for conveyance of stormwater such that erosion will not be a problem? Examples of typical related features are stone outfalls, stone energy dissipators, ditches or swales suitably lined (e.g., with stone, vegetation and or geotextile), piped conveyances across steep slopes, etc.

If a project does not require an ANR stormwater discharge permit, the applicant must provide suitable evidence and/or testimony that the project will not cause unreasonable soil erosion or create runoff and drainage problems.

### Other Considerations

ANR has published “The Vermont Standards & Specifications for Erosion Prevention & Sediment Control” (2006). The introduction to this publication states:

On many construction sites, relatively large areas of soil can be exposed to the erosive effects of wind and rain due to extensive earthwork. Eroded sediment may be easily transported by stormwater runoff to streams, lakes, ponds and wetlands. Rates of erosion on an uncontrolled construction site can be over 500 times that of the same land under a natural vegetative cover, meaning that the sediment generated over many years from forest or pasture could be produced in a single season on a poorly managed construction site.

The water quality of streams, lakes, and wetlands can be negatively impacted by the input of eroded sediment. Sediment entering streams can directly cause a harmful alteration or destruction of habitats of fish and other aquatic organisms, and can reduce the productivity of aquatic plants. In addition, sediment serves as a vehicle for the transport of chemicals that diminish water quality. Phosphorus, for example, which can contribute to excessive algae growth, is commonly transported by being bound to mobile sediment.

Excessive sediment loading can also contribute to stream channel instability and streambank erosion, escalating sediment build-up in streams and loss of storage in lakes, ponds, and reservoirs. The physical, chemical, and biological impacts of eroded sediment in turn decrease the recreational value and our enjoyment of Vermont’s waters.

ANR has developed technical manuals/standards as a component of its CGP permit process. The Commission may wish to compare the applicant’s evidence with the ANR manuals. ANR applies one of two manuals, depending on the risk to water quality that the project presents.

The *low risk* manual is applied by ANR to smaller lower risk sites such as a small to moderately sized single family home construction site. The criteria (risk evaluation) used by ANR to determine if a project meets the requirements for *low risk* (Portion of Appendix A from CGP 9020-2006) and a copy of the low risk manual are attached.

The *moderate risk* manual is applied by ANR to sites that do not meet the requirements for *low risk*. The moderate risk manual and additional detailed information, including the actual CGP permit (29 pages plus appendices) can be found on the ANR Water Quality Division website: [http://www.vtwaterquality.org/stormwater/htm/sw\\_cgp.htm](http://www.vtwaterquality.org/stormwater/htm/sw_cgp.htm)

Erosion prevention and sediment control plans used to satisfy Criterion 4 should reflect site-specific (project-specific) conditions. To further assist the Commission when reviewing an erosion-prevention plan when there are no ANR stormwater discharge permit(s), here are five primary factors for determining erosion potential:

1. *Flow Velocity* - The potential ability to cause erosion, or erosivity, of moving water is directly related to its velocity, and there are several corresponding types of erosion depending on the velocity of the water when it comes into contact with the soil (Figure 2.1). *Splash erosion* occurs when raindrops, which can reach the ground with a velocity of 25- 30 feet per second, dislodge sediment particles on exposed soil. *Sheet erosion* occurs when water flows on the soil surface in a thin, broad layer or sheet, shearing off sediment particles at the surface of the soil interface. As flow velocity increases, additional scour can occur, leading to fine channels of higher velocity flow. When these channels are several inches deep, the process is referred to as *rill erosion*. *Gully erosion* is the scouring of still deeper channels with generally greater flow velocities, while in-stream scouring of soil is known as *channel erosion*.
2. *Soil Characteristics* - In reviewing the ability of a site to hold water, the Commission should look at the drainage characteristics of the soil and whether water will generally absorb quickly and sufficiently. Pertinent characteristics are the size and gradation of soil particles, percentage of organic content, soil structure, and soil permeability.
3. *Vegetation* - The potential for soil erosion can be greatly decreased by limiting the removal of existing vegetation. Where natural vegetation cannot be maintained, a plan utilizing stages of removal will decrease the duration of exposure of unprotected areas. Plant growth holds sediment in place, and prevents sediment reaching streams. Tall vegetation shields the soil surface from the impacts of falling rain. Low vegetation slows the velocity of runoff and acts as a filter to catch sediment being transported by runoff. Vegetation draws water into its leaves and roots.
4. *Topography* - The size and steepness of the slopes within a watershed influence the amount and rate of runoff. As the length and gradient (steepness) of a slope increase, the amount and rate of runoff increases and the potential for erosion is magnified. The disturbance of steep slopes should be minimized.
5. *Climate* - It is important to schedule the time of soil disturbance so that as little disruption as possible occurs between October 15 and April 15. Winter erosion and sediment control must combat the

intense runoff caused by midwinter thaws, rainstorms, and the spring melt. In some cases construction in the winter months may not be advisable.

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