



State of Vermont

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**STATE OF VERMONT
AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

STORMWATER MANAGEMENT PROCEDURES

EFFECTIVE DECEMBER 15, 1997

Adopted:

Canute E. Dalmasse, Commissioner
Department of Environmental Conservation

11/25/97

Date

**STATE OF VERMONT
AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

STORMWATER MANAGEMENT PROCEDURES**

CHAPTER ONE

STORMWATER DISCHARGE PERMIT REQUIREMENT

A. PURPOSE

It is the purpose of these Stormwater Management Procedures (“Procedures”) to:

1. Define those discharges of stormwater runoff which are required to obtain a stormwater discharge permit; and
2. Define those treatment and control requirements designed to minimize the adverse impacts of stormwater runoff, taking into account that stormwater runoff is inherently different from sanitary and industrial wastewater; and
3. To manage stormwater discharges in a manner that meets the requirements of the Vermont Water Quality Standards and 10 V.S.A. Section 1264.

It is not the purpose of these Procedures to establish requirements designed to achieve a quality of stormwater runoff characteristic of background or natural state conditions except where statute, the Vermont Water Quality Standards, and the assigned water quality classification require the maintenance of such conditions.

B. AUTHORITY

10 V.S.A. Section 1263(a) requires any person who intends to discharge waste to waters of the State to make application to the Secretary for a discharge permit. 10 V.S.A. Section 1264(a) defines stormwater runoff as collected discharges from large scale developments to sensitive water quality areas. 10 V.S.A. Section 1264(b) recognizes the inherent differences between stormwater and other discharges and directs the Secretary to manage stormwater runoff in a manner that is cost effective and that will minimize the adverse impact of stormwater runoff.

C. APPLICABILITY TO POINT SOURCES

Requirements for point sources (as defined in 40 CFR § 122.2) of stormwater discharges are contained in 40 CFR § 122.26 and in NPDES general permits issued for point sources of stormwater discharges. Certain provisions of these procedures may be incorporated into NPDES general permits for point sources of stormwater discharges where appropriate.

D. DEFINITIONS

Applicant - the person who owns the existing or proposed development.

Application - the forms prescribed by the Secretary for use in applying for a stormwater discharge permit.

Background conditions - conditions that exist in the absence of human or cultural influences or conditions due to human or cultural influences that are not subject to regulation under the Vermont Water Pollution Act, 10 V.S.A. Chapter 47; or under 6 V.S.A Chapter 215.

Collected stormwater runoff - natural precipitation that does not infiltrate into the soil and which is collected and discharged to waters of the State via a discrete conveyance including but not limited to any pipe, ditch, swale, channel, tunnel or culvert.

Development - the construction of improvements on a tract or tracts of land, owned or controlled by a person.

Discharge - as defined by 10 V.S.A. Chapter 47, is the placing, depositing, or emission of any wastes directly or indirectly, into an injection well or into waters of the State.

Discharge Permit- a permit issued pursuant to 10 V.S.A., Section 1263.

Existing Development - a development which was built, or from which the discharge of stormwater runoff was authorized pursuant to 10 V.S.A. Section 1263 or 1265, prior to the effective date of these Procedures.

Impervious Surfaces - those man made surfaces, including, but not limited to, paved and unpaved roads and parking areas, roofs, and walkways, from which precipitation runs off rather than infiltrates.

New Development - a development from which the discharge of stormwater runoff was authorized pursuant to 10 V.S.A. Section 1263 on or after the effective date of these Procedures, including any subsequent expansion or alteration of an existing development that was authorized on or after the effective date of these Procedures.

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Person - an individual, partnership, public or private corporation, municipality, institution or agency of the state or federal government and includes any officer or governing or managing body of a partnership, association, firm, or corporation.

Phased Development - developments completed in two or more stages, or which are completed as part of a larger common plan of development.

Stormwater Runoff - natural precipitation that does not infiltrate into the soil, including any material dissolved or suspended in such water. Stormwater runoff does not include wastes from combined sewer overflows.

Vermont Water Quality Standards - the Vermont Water Quality Standards adopted January 23, 1996, or the most currently adopted version of the Vermont Water Quality Standards.

Waters and Waters of the State - any river, stream, creek, brook, reservoir, pond, lake, spring and any body of surface water, artificial or natural which is contained within, flows through or borders upon the State of Vermont or any portion thereof. 10 V.S.A. Section 125 1(13)

E. REQUIREMENT TO OBTAIN A STORMWATER DISCHARGE PERMIT

Proposed discharges of collected stormwater runoff that meet any of the following criteria are required to obtain a stormwater discharge permit.

1. Stormwater runoff from a development in which the area of all impervious surfaces contributing runoff to one or more stormwater discharge points exceeds 2.0 acres.
2. Stormwater runoff from a development in which the area of all impervious surfaces contributing runoff to one or more stormwater discharge points exceeds 1.0 acre, and the ratio of the area of the watershed at the point of discharge furthest downstream measured in square miles and the area of all impervious surfaces measured in acres is less than 3.0.
3. Stormwater runoff from a development in which the area of all impervious surfaces contributing runoff to one or more stormwater discharge points exceeds 1.0 acre and the discharge is to:
 - a. a Class I wetland; or
 - b. lakes and ponds that have drainage areas of less than 40 square miles and a drainage area to surface area ratio of less than 500, or tributaries of those lakes and ponds.

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4. Stormwater runoff which is discharged to Class A waters.
5. Stormwater runoff which is discharged to an Outstanding Resource Water as designated by the Vermont Water Resources Board because of its pristine physical and chemical water quality value (10 V.S.A. Section 1424a(d)(1)).
6. Discharges of stormwater runoff which the Secretary determines contribute to a violation of the Vermont Water Quality Standards or could be a significant contributor of pollutants to waters of the State.
7. Discharges of stormwater runoff defined in basin plans (as required by §303e of the federal Clean Water Act) as part of a strategy to achieve compliance with the Vermont Water Quality Standards and the State water quality policy (10 V.S.A. Section 1250).

F. EXISTING DEVELOPMENTS

1. The Secretary will not require the implementation of additional treatment and control practices at existing developments except under the following conditions:
 - a. The discharge of stormwater runoff from an existing development is causing or contributing to a violation of the Vermont Water Quality Standards; or
 - b. The Agency adopts a basin plan which contains a strategy for the management of stormwater runoff from existing developments within the designated basin and the development is inconsistent with that plan; or
 - c. The Agency adopts, by procedure, rule, or general permit, statewide treatment and control practices for stormwater runoff from existing developments which are consistent with 10 V.S.A. Section 1264(a) and (b).

These Procedures do not affect the responsibility of permittees to comply with the terms and conditions of existing stormwater discharge permits.

2. The new or expanded portion of an existing development which is required to obtain a stormwater discharge permit as described in Section E1 through E7 will be subject to the treatment and control requirements specified in Chapter Two of these Procedures. If the Secretary determines the stormwater runoff from the existing development contributes to a violation of the Vermont Water Quality Standards or could be a significant contributor of pollutants to waters of the State, then a stormwater discharge PERMIT for the entire development may be required.

G. PHASED DEVELOPMENTS

Proposed developments which do not meet the requirements described in Section E1 through E7 above, but which are part of a phased development, or which are part of a larger common plan of development that meet the requirements described in Section E1 through E7 will be required to obtain a stormwater discharge permit.

Upon PERMIT renewal, those phases of previously permitted developments which have not been constructed during the term of the originally issued stormwater discharge PERMIT are subject to the treatment and control requirements in Chapter Two, or an applicable basin plan.

H. AGRICULTURAL EXEMPTION

The term “stormwater runoff”, as used in these Procedures, does not include discharges from undisturbed natural terrain and does not include ditching, tiling or the creation of grassed waterways within agricultural lands. No PERMIT is required for stormwater runoff from fields used for normal agricultural activities. See 10 V.S.A. Section 1264.

I. COMPLIANCE WITH THE VERMONT WATER QUALITY STANDARDS

The Agency recognizes that the effluent monitoring requirements traditionally used to determine compliance with the Vermont Water Quality Standards are neither a feasible nor cost effective method for determining compliance when applied on an individual basis to stormwater runoff. This is due to the inherent differences in stormwater runoff including the large and rapid fluctuations in stormwater runoff quantity and quality, the large and rapid fluctuations in stream quantity and quality, and the intermittent nature of stormwater runoff.

For the purposes of demonstrating compliance with the Vermont Water Quality Standards and receiving a stormwater discharge permit, the applicant shall demonstrate that the design of the development incorporates the treatment and control practices specified in Chapter Two of these Procedures, or an applicable basin plan. The Agency’s determination of continued compliance with the Vermont Water Quality Standards will be based on the Permittee’s compliance with the terms and conditions of the stormwater discharge PERMIT, and evaluation of the receiving water.

Where the Agency adopts a basin plan or statewide procedure which identifies stormwater runoff as causing or contributing to violations of Vermont Water Quality Standards, the Secretary may develop a strategy as part of the basin plan which is designed to restore compliance with the Vermont Water Quality Standards. The strategy will act as a guide for the management and permitting of stormwater runoff within the basin and may contain management practices which are different from or are in addition to management practices specified in these Procedures.

J. STORMWATER DISCHARGE PERMIT APPLICATIONS

A complete application for a stormwater discharge PERMIT includes:

1. A completed Vermont Department of Environmental Conservation (DEC) form WR82 “Application for Permit to Discharge Wastes”.
2. Vermont DEC form WR-82-D “Schedule D - Drainage Discharges”. A Schedule D must be completed for each discharge point from the development to waters of the State.
3. Location Map - a copy of a topographic map clearly indicating the location of the proposed development.
4. Watershed Maps - a copy of a topographic map clearly delineating the upstream watershed of the receiving water above the development’s discharge point(s) and the development’s contributing watershed area.
5. Existing stormwater management - where applicable, an evaluation of the condition and effectiveness of the existing stormwater treatment, control and conveyance systems in place.
6. Site plan - detailed plans which indicate on-site drainage and contour information, and all stormwater conveyances, treatment, and control structures including appropriate details.
7. Calculations of the pre-development and post-development peak flow for the development using *TR-55* calculation sheets. Pre-development calculations shall be based on natural site conditions unless otherwise warranted.
8. Narrative - a discussion of the watershed areas and characteristics, proposed stormwater runoff discharge points, and existing pre-development site conditions that could affect stormwater runoff management (unstable areas, erosion, evidence of stream channel widening and cutting, etc.). The stormwater conveyances, treatment, and control method to be utilized on the proposed development, including statements detailing compliance with these Procedures must also be discussed.
9. Application Fee - as established by rule or statute.

Incomplete applications will be returned to the applicant in accordance with the DEC’s “Permit Application Review Procedures”, adopted May 22, 1996.

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CHAPTER TWO

STORMWATER TREATMENT AND CONTROL REQUIREMENTS

A. GENERAL REQUIREMENTS

1. The design of stormwater control structures shall be based upon a 2-year, 24-hour storm event.
2. Developments subject to these Procedures shall be designed to maximize the stormwater infiltration capabilities of the site.
3. Stormwater runoff from all roads and parking areas shall be treated, through the use of the best management practices described in Section D, to minimize the discharge of pollutants to waters of the State.
4. Developments resulting in the creation of greater than five acres of impervious surface may make use of the vegetative best management practices described in Section D3 and D4 (vegetated filter strips, grassed swales), but not as the primary means of treatment.
5. All stormwater runoff flows shall be managed, and appropriate control structures shall be provided when necessary, to minimize the potential for stream bank erosion due to changes in the volume and peak rate of runoff from site development.
6. Control of stormwater runoff flows shall be required when stormwater runoff from a development in which the ratio of the area of the watershed at the point of discharge furthest downstream measured in square miles and the area of all impervious surfaces measured in acres is less than 3.0. See Section E.
7. All stormwater treatment and control structures shall be sited to provide adequate vegetated buffers to waters of the State.

B. INFILTRATION

1. Stormwater infiltration systems should be utilized on sites that are physically suitable (on the basis of soil infiltration rates, depth to bedrock and depth to seasonal high water table) to feasibly dispose of runoff in this manner.
2. Infiltration systems shall conform with the requirements of the Vermont Underground Injection Control Program.

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3. Stormwater runoff from roads and parking areas shall be pre-treated, by means of vegetated filter strips, grassed swales and other appropriate best management practices, prior to entering an infiltration system.
4. Subsurface infiltration systems shall not receive runoff until the entire contributory drainage area to the infiltration system has been fully stabilized, including the establishment of a proper vegetative cover.

C. TREATMENT - GENERAL REQUIREMENTS

1. Runoff from roads and parking areas shall be treated through the use of one or more of the best management practices described in Section D.
2. Developments resulting in the creation of greater than five acres of impervious surface may make use of the vegetative best management practices described in Section D3 and D4 (vegetated filter strips, grassed swales), but not as the primary means of treatment.
3. Treatment shall be incorporated as an integral part of the site design and shall consider topography, watershed properties, receiving water qualities, and the size and nature of the proposed development.
4. Treatment of stormwater runoff must occur on the development site and prior to discharge to waters of the State.

D. TREATMENT - BEST MANAGEMENT PRACTICES

1. Extended Detention Ponds - Extended detention ponds are highly effective in treating stormwater and are recommended whenever site conditions allow.
 - a. A minimum of the first *inch of storm water runoff* shall be collected in the pond and released over a period of 24 hours or more.
 - b. When site conditions are favorable, a wet pond with a permanent pool is recommended. The pond should include a shallow marsh or vegetated area to enhance pollutant removal.
 - c. Ponds shall have side slopes no steeper than 3H: 1V.
 - d. A minimum of an 18 inch sump shall be included for sediment collection and storage.

2. Detention Basins

- a. A minimum of the first inch of stormwater runoff shall be collected in the pond or basin for treatment.
- b. A minimum of 254 square feet of basin area at the design water surface per cubic foot per second (cfs) of peak outflow shall be provided for sediment removal or a minimum of 3,600 cubic feet of volume per contributing acre shall be provided for sediment removal.
- c. Side slopes shall be no steeper than 3H:1V.
- d. Length to width ratio shall be no less than 2:1
- e. At a minimum perforated riser pipes or comparable designs shall be used for outlet structures. Gravel jacket perforated riser pipes are recommended to achieve higher pollutant removal.
- f. Inlet and outlet structures shall be located to prevent short circuiting and ensure that the entire basin is available for treatment.
- g. A minimum of an 18 inch sump shall be included for sediment collection and sediment storage.

3. Vegetated Filter Strips

- a. Runoff from the adjacent impervious area must be evenly distributed across the filter strip to promote sheet flow and prevent channel formation.
- b. A dense cover of erosion resistant plant species shall be established and maintained.
- c. Filter strips shall be graded to a uniform, relatively low slope, not exceeding 15 %. Areas with moderate to high erosion potential may preclude the use of filter strips or require reduced slopes.
- d. Filter strips shall be a minimum of 25 feet wide. Additional width may be required by the Secretary if site-specific considerations warrant greater protection of the receiving water.
- e. The length of the filter strip may vary, but must be designed so that the runoff velocity through the filter strip does not exceed 2.5 feet per second (fps).

4. Grassed Swales

- a. Swales shall be of parabolic or trapezoidal shape with a side slope of no steeper than 3H:1V.
- b. Swales shall be designed to minimize the velocity in the channel to less than 1.5 feet per second (fps) for the runoff from a 2-year, 24-hour storm. Swales shall be graded as close to zero slope as conditions will allow while still enabling conveyance of stormwater. Slopes greater than five percent are not acceptable for use as a stormwater treatment device.
- c. A dense cover of a water tolerant, erosion resistant grass shall be established and maintained. In densely developed urban areas or from developments that have a higher potential of hydrocarbons entering and being transported by stormwater runoff, swales should be underlined with appropriate compost or peat to achieve a higher removal of hydrocarbons.
- d. The installation of log, "railroad tie", or stone check dams in swales is highly recommended to promote additional infiltration and reduce the velocity of runoff.
- e. Swales shall remain linear to the extent feasible and shall be designed to avoid sharp curves or bends.

5. Other Best Management Practices

- a. Sand filters, constructed wetlands, or other best management practices may be used to treat runoff from a development if the applicant presents sufficient evidence that the proposed design provides a level of treatment equivalent to the practices specified in this section.
 - i. Grit oil water separators are not considered sufficient treatment to meet the requirements of these Procedures, however they may be used in conjunction with other acceptable best management practices to achieve higher pollutant removal in areas of dense development or for discharges to sensitive water quality areas.
 - ii. The use of underground sedimentation tanks, chambers, etc. are not recommended by the Agency and are not considered sufficient to meet the requirements of these Procedures. They may be used in conjunction with other acceptable best management practices to improve pollutant removal or assist in flow control.

- b. Proper controls shall be included in all stormwater systems to ensure long term erosion and sediment control and site stability. These controls include but are not limited to:
 - i. Stone lining all swales with a slope of 5% or greater or with velocities of 4 feet per second (fps) or greater.
 - ii. The use of energy dissipaters, level spreaders, or plunge pools at the outlets of culverts, swales, or other discharge structures. These controls shall be designed to reduce the discharge velocity from a 2-year 24-hour storm event to less than 1.5 fps.
 - iii. Establishing vegetation on disturbed areas as soon as possible.
 - iv. The use of erosion control matting to stabilize exposed soils and promote establishing vegetation.

E. CONTROL OF STORMWATER RUNOFF FLOWS

- 1. Control of stormwater runoff flows from all impervious surfaces shall be accomplished by limiting the post-development peak discharge rate from the site so that it does not exceed the pre-development peak discharge rate from the site for a 2-year, 24-hour storm event.
- 2. Wetlands, lakes, and ponds may be used in their natural state to assist in the control of treated stormwater, in accordance with the Vermont Wetland Rules.
- 3. Additional control of treated stormwater (e.g. for a 10-year, 24-hour storm event) may be required if site-specific considerations warrant the attenuation of larger storm events.

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