

EPA 2007 Vermont Regulations Summary (DCN 43057)

This summary was prepared based on publicly available information at the time of collection, and may differ from actual requirements currently in place. See the Summary of State Construction and Development Requirements Memorandum (DCN 43066 in Section 1 of the record) for documentation of the state construction site requirements that were used in modeling baseline construction costs and pollutant loads.

Vermont

Regulations Summary

The Vermont Department of Environmental Conservation (DEC) Stormwater Program issues separate permits for runoff from impervious (i.e. hard) surfaces post-construction and active construction sites. Vermont Statutes Annotated (VSA) Title 10 § 1264 authorizes the creation of state stormwater and construction stormwater permits. Chapters 18 and 22 of the Environment Protection Rules regulate the discharge of post-construction stormwater.

The State Construction Stormwater Permit addresses stormwater runoff from construction activity that disturbs one or more acres of land. The State Stormwater Permit (sometimes referred to as the “operational,” “post-construction” or “stormwater” permit) addresses runoff from impervious surfaces (rooftops, paved and non-paved parking/roads etc.) based on the amount of impervious surface.

Construction projects in Vermont are categorized as either low-, moderate-, or high-risk. Low-risk construction activities are required to submit a NOI and apply DEC's *Low Risk Site Handbook for Erosion Prevention and Sediment Control* during construction. Moderate risk construction activities are required to prepare and submit a NOI and a site specific Erosion Prevention and Sediment Control Plan (EPSC Plan). High risk projects are not eligible for general permit coverage and must apply for an individual permit.

State erosion and sediment controls standards are specified in General Permit 3-9020 (2006) For Stormwater Runoff From Construction Sites. This permit does not regulate post-construction storm water management.

State Erosion and Sediment Control Requirements

Numeric Pollutant Removal Standard

None specified.

Erosion and Sediment Control Plan

(p.2)

Construction projects in Vermont are categorized as either low-, moderate-, or high-risk. Low-risk construction activities are required to submit a NOI and apply DEC's *Low Risk Site Handbook for Erosion Prevention and Sediment Control* during construction. Moderate risk construction activities are required to prepare and submit a NOI and a site specific Erosion Prevention and Sediment Control Plan (EPSC Plan). EPSC Plans will be reviewed by DEC to ensure compliance with the terms and conditions of this permit prior to the issuance of an authorization to discharge.

Moderate risk is determined by using Appendix A – Risk Evaluation of the General Permit 3-9020. Risk is generally based on project size, location, site conditions, buffers, and stabilization measure to be utilized.

The requirements for EPSC Plan development are on p. 13 of the permit.

Sediment Traps/Basins

None specified.

Stabilization Requirements

(p. 9)

B. For low risk construction activities, all areas of disturbance must have temporary or final stabilization within 21 days of the initial disturbance, unless a shorter duration is selected in the completion of Appendix A. After this time, any disturbance in the area must be stabilized at the end of each work day. The following exceptions apply:

- 1. Stabilization is not required if work is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours.
- 2. Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation, utility trenches).

(p. 12)

B. For moderate risk construction activities, all areas of disturbance must have temporary or final stabilization within 21 days of the initial disturbance, unless a shorter duration is selected in the completion of Appendix A. After this time, any disturbance in the area must be stabilized at the end of each work day. The following exceptions apply:

- 1. Stabilization is not required if work is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours.
- 2. Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation, utility trenches)."

Monitoring Requirements

None specified.

Stormwater Management Requirements

Not addressed.

Low-risk construction activities are required to submit a NOI and apply DEC's *Low Risk Site Handbook for Erosion Prevention and Sediment Control* during construction.

State Erosion and Sediment Control Requirements

Numeric Pollutant Removal Standard

None specified.

Erosion and Sediment Control Plan

The standards in this handbook serve as the required Erosion Prevention and Sediment Control Plan for construction sites determined to be "Low Risk" under GP-3-9020.

Sediment Traps/Basins

None specified.

Stabilization Requirements

(p. 25)

All areas of disturbance must have temporary or permanent stabilization within 7, 14, or 21 days of initial disturbance, as stated in the project authorization. After this time, any disturbance in the area must be stabilized at the end of each work day.

The following exceptions apply:

- Stabilization is not required if earthwork is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours.
- Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation, utility trenches).
- All areas of disturbance must have permanent stabilization within 48 hours of reaching final grade (See page 33).

(p. 33)

Within 48 hours of final grading, the exposed soil must be seeded and mulched or covered with erosion control matting.

Monitoring Requirements

None specified.

Stormwater Management Requirements

Not addressed.

Moderate risk construction activities are required to prepare and submit a NOI and a site specific EPSC Plan based on the specifications contained in *The Vermont Standards & Specifications for Erosion Prevention & Sediment Control* (2006). The standards and specifications provide criteria on minimizing erosion and sediment impacts from construction activity involving soil disturbance.

State Erosion and Sediment Control Requirements

Numeric Pollutant Removal Standard

None specified.

Erosion and Sediment Control Plan

Same as indicated in the general permit.

Sediment Traps/Basins

(p. 5-21)

The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 3,600 cubic feet per acre of drainage area. The volume of a constructed trap shall be calculated using standard mathematical procedures. The volume of a natural sediment trap may be approximated by the equation: Volume (cu.ft.) = 0.4 x surface area (sq.ft.) x maximum depth (ft.)

(p. 5-39)

Size and Shape of the Basin

The minimum sediment storage volume of the basin, as measured from the bottom of the basin to the elevation of the crest of the principal spillway shall be at least 3,600 cubic feet per acre draining to the basin. This 3,600 cubic feet is equivalent to one inch of sediment per acre of drainage area. The entire drainage area is used for this computation, rather than the disturbed area above, to maximize trapping efficiency. The length to width ratio shall be greater than 2:1, where length is the distance between the inlet and outlet. A wedge shape shall be used with the inlet located at the narrow end.

Surface Area

The following relationship between surface area and peak inflow rate gives a trapping efficiency of 75% for silt loam soils, and greater than 90% for loamy sand soils:

$$A = 0.01 Q_p \text{ or, } A = 0.015 \times \text{D.A. (whichever is greater)}$$

where,

A = the basin surface area, acres, measured at the service spillway crest; and

Q_p = the peak inflow rate for the design storm.

(The minimum design storm will be a 10 year, 24 hour storm under construction conditions).

D.A. = contributing drainage area.

One half of the design sediment storage volume (67 cubic yards per acre drainage area) shall be in the form of a permanent pool, and the remaining half as drawdown volume.

Stabilization Requirements

No timing specifications for stabilization practices included.

Monitoring Requirements

None specified.

Stormwater Management Requirements

Not addressed.

State post-construction stormwater standards are specified in one of two general permits depending upon the condition of the receiving water – General Permit 3-9010 Amended Previously Permitted Stormwater Discharges To Waters That Are Not Principally Impaired By Regulated Stormwater Runoff and General Permit 3-9015 New Stormwater Discharges To Waters That Are Not Principally Impaired By Collected Stormwater Runoff.

Applicable provisions for General Permit 3-9010 are as follows:

State Erosion and Sediment Control Requirements

Not addressed.

Stormwater Management Requirements

Unified Stormwater Criteria/New Development Requirements

(p. 9)

Part III specifies that either existing or new stormwater treatment practices be built to specifications required in the *Volume I – Vermont Stormwater Treatment Standards*. (See following section for language contained in this document)

A. Treatment Standards for Previous Permittees

1. General Treatment Standards

a. Subject to subparts 2.a. and 2.b. below, a Previous Permittee shall comply with the requirements set forth in the most recent previously issued stormwater discharge permit or temporary pollution control permit.

2. Other Treatment Standards

- a. If the previously authorized stormwater management system was built prior to the effective date of this general permit and has substantially deteriorated, then the Previous Permittee shall upgrade the system or build a new system in accordance with the procedure set forth in Appendix B in order to meet the treatment standards for water quality and channel protection set forth in Section 1.1.1 and Section 1.1.2 of the Vermont Stormwater Management Manual; and.
- b. If the project was built, but the previously authorized stormwater management system was not built prior to the effective date of this general permit, then the Previous Permittee shall construct a stormwater management system in accordance with the procedure set forth in Appendix B in order to meet the treatment standards for water quality and channel protection set forth in Section.

3. Enhanced Treatment Standards

Any Previous Permittee not covered by Part III.A.2.a. and b. above, may voluntarily elect to bring its previously permitted stormwater management system into compliance with the treatment standards in Section 1.1.1 (water quality) and Section 1.1.2 (channel protection) of the Vermont Stormwater Management Manual. If a Previous Permittee so chooses, it shall submit an application tailored to meet the treatment standards for water quality and channel protection in Sections 1.1.1 and 1.1.2 of the Vermont Stormwater Management Manual and shall construct and operate its stormwater management system in accordance with the Vermont Stormwater Management Manual and this general permit. For good cause shown, the Secretary may grant the Previous Permittee until November 15, 2004 to construct such an enhanced stormwater management system.

B. Available STPs

A Previous Permittee subject to Part III.A.2.a or b. above shall use the STPs listed in Tables 2.1 and 2.2 in Section 2 of the Vermont Stormwater Management Manual, alone or in combination, in order to meet the applicable treatment standards.

C. STP Required Design Elements

A Previous Permittee subject to Part III.A.2.a. or b. above shall comply with the required design elements in Section 2.7 of the Vermont Stormwater Management Manual for the chosen STPs.

D. Alternative STPs

A Previous Permittee subject to Part III.A.2.a. or b. above may use an alternative STP to meet the applicable treatment standards if it is approved by the Secretary pursuant to Section 2.5 of the Vermont Stormwater Management Manual. However, as provided in Part I.C.7 of this general permit, a Previous Permittee must obtain an individual permit

Monitoring Requirements

None specified.

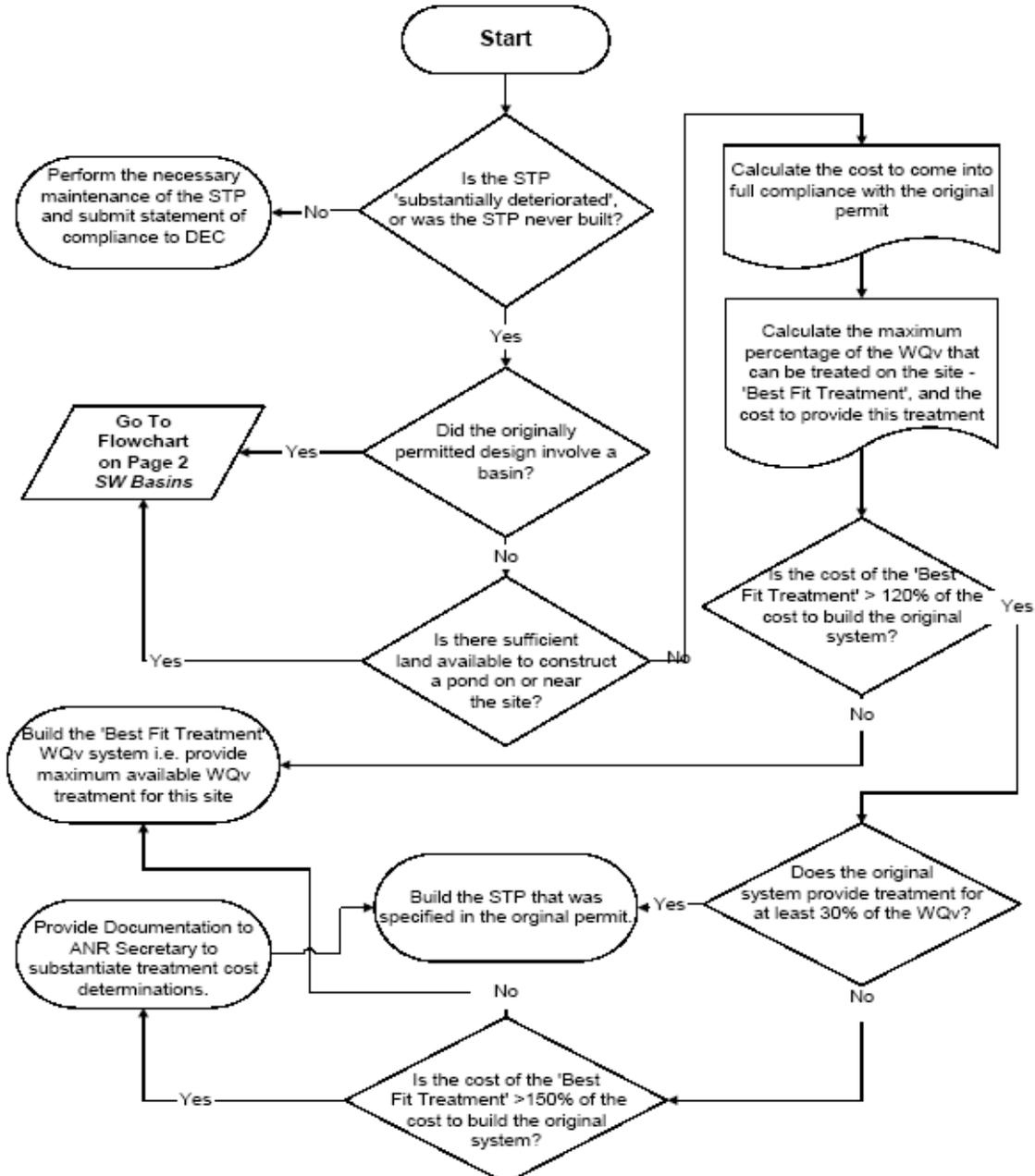
Regional Variations

None specified.

Redevelopment Requirements

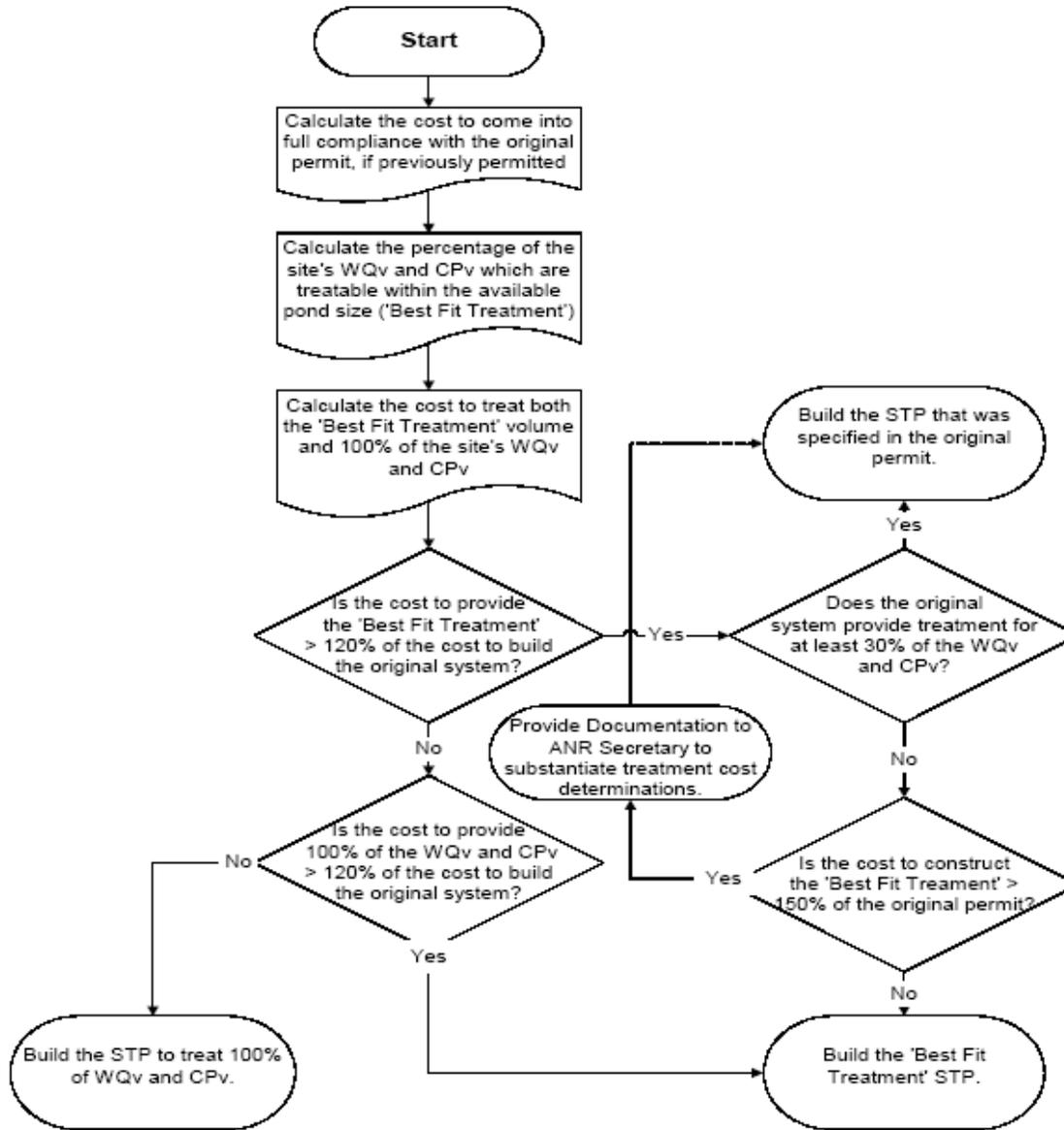
Appendix B of the permit provides a method for upgrading an existing system or installing a new system for a project already completed prior to the effective date of the permit.

Appendix B
Stormwater Treatment Practice (STP) - Evaluation Flowchart
For Previously Permitted Systems



Appendix B (cont.)

Stormwater Treatment Practice (STP) - Evaluation Flowchart
For Projects Involving Stormwater Basins



Receiving Stream Conditions
None specified.

State post-construction stormwater standards are specified in one of two general permits depending upon the condition of the receiving water – *General Permit 3-9010 Amended Previously Permitted Stormwater Discharges To Waters That Are Not Principally Impaired By Regulated Stormwater Runoff* and *General Permit 3-9015 New Stormwater Discharges To Waters That Are Not Principally Impaired By Collected Stormwater Runoff*.

Project designers are required to assess the applicability of the stormwater permits using the Stormwater Permit Worksheet.

Stormwater Permit Worksheet

Please evaluate your project for both Section A and B

Project Name: _____

Section A: State Stormwater Discharge Permit Jurisdictional Determination

Line #		Response
1	Total amount of new* impervious surface* (acres)	
2	Total amount of redeveloped* impervious surface (acres)	
3	Total amount of existing* impervious surface related to project (acres)	
4	Is line 1 greater than or equal to 1 acre? (yes/ no)	
5	If yes to line 4, permit required for the new impervious.	Go to line 17
6	If no to line 4, add lines 1 + 2+ 3 (acres)	
7	Is line 6 is greater than or equal to 1 acre? (yes/no)	
8	If no to line 7, no permit is required for the new impervious.	Go to line 17
9	If yes to line 7, multiply line 1 (acres of new impervious) by 43,560 to obtain new impervious in units of square feet? (sq. ft.)	
10	Is line 9 greater than 5000 square feet? (yes/no)	
11	If yes to line 10, permit is required for the new impervious.	Go to line 17
12	If no to line 10, enter the total area (in square feet) of any expansions related to this project that have occurred since July 1, 2005 for unimpaired* waters or January 16, 2006 for impaired* waters. (sq. ft.)	
13	Add line 12 to line 9. (sq. ft.)	
14	Is line 13 greater than 5000 sq.ft.? (yes/no)	
15	If yes to line 14, permit is required for the new impervious	Go to line 17
16	If no to line 14, no permit is required for the new impervious.	Go to line 17
17	Is the amount in line 2 greater than or equal to 1 acre? (yes/no)	
18	If no to line 17, no permit for redevelopment is required for the redeveloped impervious. However, be aware that if this redeveloped area, no matter how small, is covered by an existing valid* permit, you must maintain treatment in compliance with that original permit. Contact the stormwater program at 802-241-3770.	Go to B, line 1
19	If yes to line 17, then is the surface you are redeveloping currently covered by a valid* stormwater permit? (yes/no)	
20	If yes to line 19, no new permit is required for the redevelopment, but the treatment specified in the existing permit must be maintained for in this area. Contact the stormwater program at 802-241-3770.	Go to B, line 1
21	If no to line 19, then a permit is required for the redeveloped area in addition to any permits required for the new impervious area.	Go to B, line 1

You must proceed to Section B to determine whether or not you require a construction discharge permit

Section A Worksheet results summary

If you said yes to lines 4, 10 or 14, then you will require a State stormwater discharge permit for your new impervious surface. In addition, if you said yes to line 19, then you must also permit your redeveloped area in addition to the new impervious surface. One permit may be obtained for both types of surfaces. Review the Vermont State Stormwater Manual for guidance on the differing treatment required for these two types of surfaces.

Applicable provisions for General Permit 3-9015 are as follows:

State Erosion and Sediment Control Requirements

Not addressed.

Stormwater Management Requirements

Unified Stormwater Criteria/New Development Requirements

(p. 7)

Part III specifies that either existing or new stormwater treatment practices be built to specifications required in the *Volume I – Vermont Stormwater Treatment Standards*. (See following section for language contained in this document)

A. Treatment Standards and STPs for New Development and Expansion

1. General Treatment Standards A permittee for new development or expansion of existing development shall comply with the treatment standards for water quality, groundwater recharge, channel protection, overbank flood protection and extreme flood control set forth in Section 1.1 of the Vermont Stormwater Management Manual.

2. STPs Available for Use in Meeting Treatment Standards A permittee for new development or expansion of existing development shall use the STPs in the Vermont Stormwater Management Manual, alone or in combination, in order to meet the applicable treatment standards. An alternative STP may be used to meet the applicable treatment standards if the alternative is accepted by the Secretary pursuant to Section 2.5 of the Vermont Stormwater Management Manual.

3. STP Required Design Elements A permittee for new development or expansion of existing development shall comply with the required design elements in Section 2.7 of the Vermont Stormwater Management Manual for the chosen STPs.

B. Treatment Standards and STPs for Redevelopment

1. General Treatment Standards A permittee for redevelopment of existing impervious surfaces shall comply with the treatment performance standard for water quality set forth in Section 1.1.1.2 of the Vermont Stormwater Management Manual.

2. STPs Available for Use in Meeting Treatment Standards A permittee for redevelopment shall use the STPs in the Vermont Stormwater Management Manual, alone or in combination, in order to meet the applicable water quality treatment standard. An alternative STP may be used to meet the applicable water quality treatment standard if it is accepted by the Secretary pursuant to Section 2.5 of the Vermont Stormwater Management Manual.

3. STP Required Design Elements A permittee for redevelopment shall comply with the required design elements in Section 2.7 of the Vermont Stormwater Management Manual for the chosen STPs.

C. STP Required Design Elements

A Previous Permittee subject to Part III.A.2.a. or b. above shall comply with the required design elements in Section 2.7 of the Vermont Stormwater Management Manual for the chosen STPs.

D. Alternative STPs

A Previous Permittee subject to Part III.A.2.a. or b. above may use an alternative STP to meet the applicable treatment standards if it is approved by the Secretary pursuant to Section 2.5 of the Vermont Stormwater Management Manual. However, as provided in Part I.C.7 of this general permit, a Previous Permittee must obtain an individual permit for stormwater discharges that will be managed and treated by an alternative STP design.

Monitoring Requirements

None specified.

Regional Variations

None specified.

Redevelopment Requirements

Appendix B of the permit provides a method for upgrading an existing system or installing a new system for a project already completed prior to the effective date of the permit.

See discussion of General Permit 3-9010 for Appendix B graphics.

Receiving Stream Conditions

None specified.

The Vermont Stormwater Management Manual consists of two volumes, *Volume I – Vermont Stormwater Treatment Standards*; and *Volume II – Vermont Stormwater Management Manual*. Volume I contains the regulatory requirements for the management of stormwater, and Volume II consists primarily of technical guidance to assist in the design of stormwater treatment practices. Erosion and sediment control is not addressed by these volumes. The following discusses the contents of Volume I.

State Erosion and Sediment Control Requirements

Not addressed.

Stormwater Management Requirements

Unified Stormwater Criteria/New Development Requirements

(p. 1-1)

Unified Sizing Criteria Storms

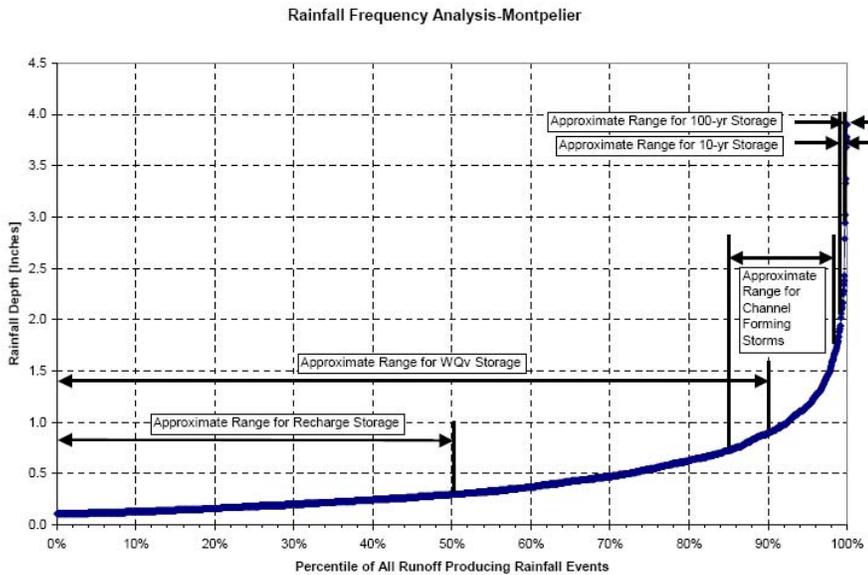


Figure 1.1 Approximate Ranges for Storms Comprising Unified Sizing Criteria

(p. 1-2)
 Summary of treatment standards

Table 1.1 Required Stormwater Treatment Standards and Sizing Criteria

Criteria	Sizing Requirement
Water Quality (WQ _v)	90% Rule: $WQ_v = [(P)(R_v)(A)] / 12$ expressed in acre-feet when A has units of acres where: P = 0.9 inches R _v = Runoff Coefficient = [0.05+0.009(I)] I = Impervious Cover (whole number percent) A = Site (area in acres) Note: Minimum WQ _v = 0.2 inches (0.0167 ac-ft.)
Recharge (Re _v)	Hydrologic Soil Group ¹ Recharge Requirement A 0.40 inches x impervious area B 0.25 inches x impervious area C 0.10 inches x impervious area D waived
Channel Protection (CP _v)	Default Criterion: CP _v = 12 hours extended detention of post-developed 1-year, 24-hour rainfall event in coldwater fish habitats (24 hr. detention in warmwater fish habitats).
Overbank Flood (Q _{p10})	Control the post-developed ² peak discharge from the 10-year storm to 10-year pre-development ³ rates.
Extreme Storm (Q _{p100})	Control the peak discharge from the 100-year storm to 100-year pre-development rates.

(p. 1-3)
 Water Quality Treatment Standard

The State of Vermont has a comprehensive stormwater management manual which requires that stormwater quality BMPs be designed to remove 80% of the total suspended solids (TSS) and 40% of the total phosphorus (TP) on an annual basis. In addition, the manual provides specific design requirements for many types of stormwater BMPs.

1. For new development and expansion of existing impervious surfaces, employment of the practices presented in Table 2.1, will meet the water quality objective.
2. For redevelopment, either:
 - a. the existing impervious surface shall be reduced by 20%; or
 - b. a STP shall be designed to capture and treat 20% of the water quality volume from the existing impervious area; or
 - c. a combination of a. or b. that when combined equal a minimum 20% reduction/treatment.

The following equation shall be used to determine the water quality storage volume (WQ_v) (in acrefeet of storage):

$$WQ_v = \frac{(P)(R_v)(A)}{12}$$

where:

- WQ_v = water quality volume (in acre-feet)
- P = 90% Rainfall Event (0.9 inches across Vermont)
- R_v = volumetric runoff coefficient equal to: [0.05 + 0.009(I)], where I is a whole number percent impervious cover at the site (ex. 25, not .25)
- A = site area (in acres)

(p. 1-10)

Extreme Flooding Protection Treatment Standard

The post-development peak discharge rate shall not exceed the pre-development peak discharge rate for the 100-year, 24-hour storm event. The purpose of this treatment standard is to prevent flood damage from infrequent but very large storm events, maintain the boundaries of the pre-development 100-year floodplain, and protect the physical integrity of a STP.

(p. 1-12)

This section presents a modified version of the TR-55 (NRCS, 1986) short cut sizing approach. The method was modified by Harrington (1987) for applications where the peak discharge is very small compared with the uncontrolled discharge. This often occurs in the 1-year, 24-hour detention sizing. Using TR-55 guidance, the unit peak discharge (qu) can be determined based on the Curve Number and Time of Concentration (Figure 1.4). Knowing qu and T (extended detention time), qO/qi (peak outflow discharge/peak inflow discharge) can be estimated from Figure 1.5.

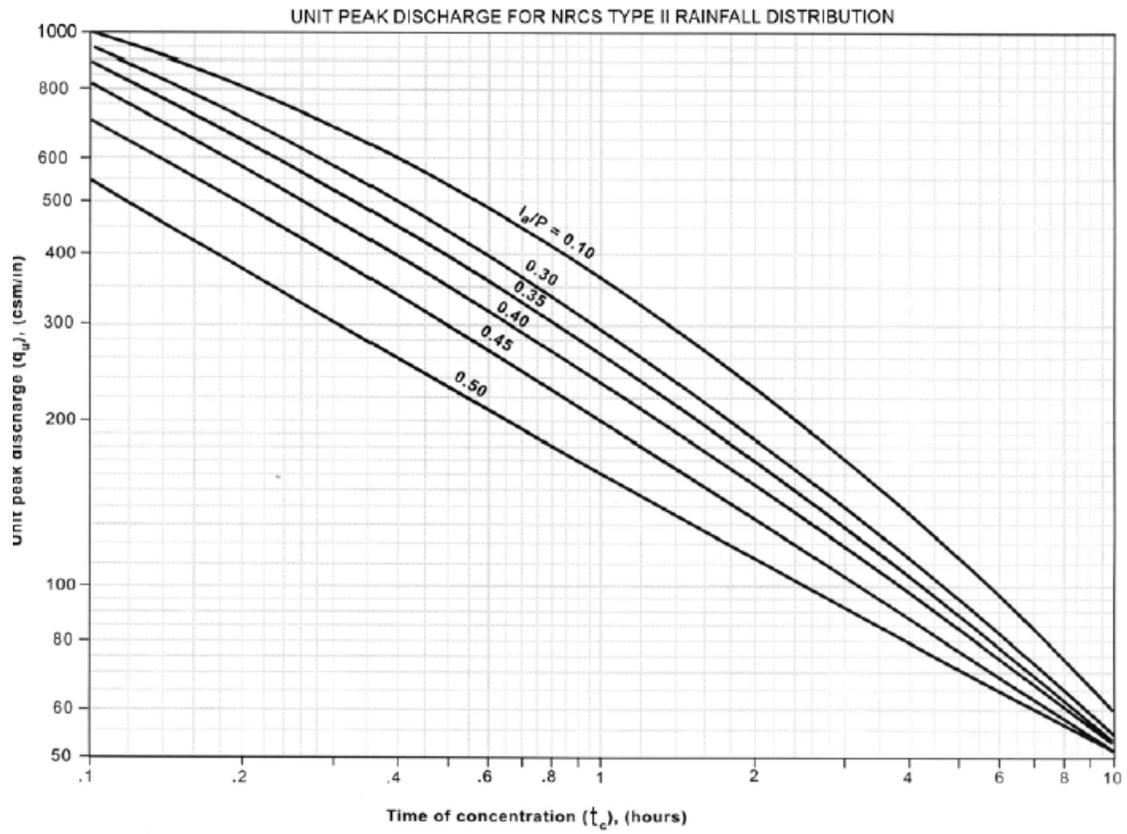


Figure 1.4 Unit Peak Discharge for Type II Rainfall Distribution (Source: NRCS, 1986)

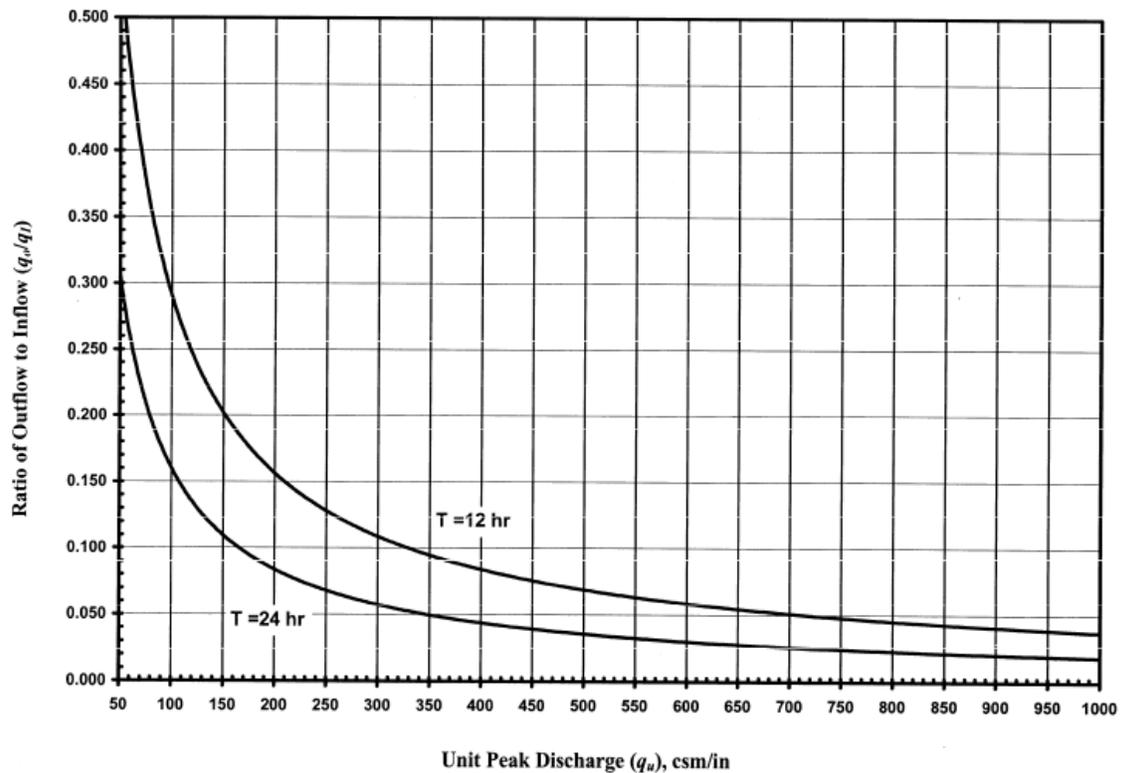


Figure 1.5 Detention Time vs. Discharge Ratios (Source: adopted from Harrington, 1987)

Then using q_o/q_i , Figure 1.6 can be used to estimate V_s/V_r . For a Type II or Type III rainfall distribution, V_s/V_r can also be calculated using the following equation:

$$V_s/V_r = 0.682 - 1.43 (q_o/q_i) + 1.64 (q_o/q_i)^2 - 0.804 (q_o/q_i)^3$$

Where:

- V_s = required storage volume (acre-feet)
- V_r = runoff volume (acre-feet)
- q_o = peak outflow discharge (cfs)
- Q_i = peak inflow discharge (cfs)

The required storage volume can then be calculated by:

$$V_s = \frac{(V_s/V_r)(Q_d)(A)}{12}$$

Where:

- Q_d = the developed runoff for the design storm (inches)
- A = total drainage area (acres)

Using the water quality volume (WQ_V), a corresponding Curve Number (CN) is computed utilizing the following equation:

$$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25 Q_a P)^{1/2}]$$

where P = rainfall, in inches (use the Water Quality Storm depth)
 Q_a = runoff volume, in inches (equal to WQ_V ÷ area)

Once a CN is computed, the time of concentration (t_c) is computed (based on the methods identified in TR-55 and section 1 of this Manual).

Using the computed CN, t_c and drainage area (A), in acres; the peak discharge (Q_{wq}) for the water quality storm event is computed as follows.

Read initial abstraction (I_a), compute I_a/P

Read the unit peak discharge (q_u) for appropriate t_c

Using the water quality volume (WQ_V), compute the peak discharge (Q_{wq})

$$Q_{wq} = q_u * A * WQ_V$$

where Q_{wq} = the peak discharge, in cfs
 q_u = the unit peak discharge, in cfs/mi²/inch
 A = drainage area, in square miles
 WQ_V = Water Quality Volume, in watershed inches

Monitoring Requirements
 (p. 2-5)

2.5.1 Existing Alternative Systems

If an existing-alternative STP is proposed, the permit applicant shall include independent scientific verification of its ability to meet the applicable treatment standards specified in section 1.1 and a proven record of longevity in the field. For an existing alternative STP to be considered by to the Agency, the following monitoring criteria shall be included in supporting studies or a plan of study:

- At least five storm events must be sampled.
- Concentrations reported in the study must be flow-weighted.
- The study may be independently verified by the Agency.
- The study must be conducted in the field, as opposed to laboratory testing.
- The practice must have been in the ground for at least one year at the time of monitoring.

2.5.2 New-Design Alternative Systems

The performance standard for STPs shall meet the applicable treatment standards specified in section 1.1, and shall have the capability to achieve long-term performance in the field. For an alternative STP to be submitted to the Agency for consideration, a designer’s certification of compliance, including pertinent design information must be provided. This certification must provide details, with a reasonable level of surety, on how the system will achieve the requisite performance standards. In addition, a plan of study to obtain the following should be provided:

- At least five storm events must be sampled.

- Storm events must be sampled under a varying and representative range of precipitation intensities and antecedent conditions.
- Concentrations reported in the study must be flow-weighted.
- The study and/or design may be independently verified by the Agency.
- The study must be conducted in the field, as opposed to laboratory testing.
- The practice must have been in the ground for at least one year at the time of monitoring.
- The study must be completed within three years of construction.

Regional Variations

None specified.

Redevelopment Requirements

See discussion in general stormwater permits sections.

Receiving Stream Conditions

None specified.