

CARVER BOARD OF HEALTH

Regulations for Storm Water and Runoff Management

PURPOSE

The goal of the Carver Stormwater Management Regulation is to improve water quality and address water quantity problems by the implementation of performance standards for stormwater management. Urban runoff and discharges from stormwater outfalls are the single largest source responsible for water quality problems in the Commonwealth's rivers, lakes, ponds, and marine waters. The Massachusetts Department of Environmental Protection Stormwater Management Standards establishes clear and consistent guidelines for stormwater management in Massachusetts. The Standards are designed for use under multiple statutory and regulatory authorities of the Department of Environmental Protection, including the Wetlands Protection Act, as amended by the Rivers Protection Act, and the Clean Water Act.

Stormwater discharges occur as rainfall and snowmelt carry pollutants to surface and groundwater. New and existing development increases impervious surfaces, which alters natural drainage features, increases peak discharge rates and volumes, and reduces recharge to maintain wetlands and base flows in streams. Development also results in corresponding increases in the concentration and types of pollutant loadings, including thermal impacts to streams, nutrient, solids, metals, salt, pathogens, pesticides, and hydrocarbons. Best Management Practices (BMPs) reduce or prevent pollutants from reaching water bodies and control the quantity of runoff from a site. The Stormwater Management Standards address both water quality (pollutants) and water quantity (flood control) problems by establishing the level of required controls through the use of BMPs.

The Carver Stormwater Management Regulations are intended to be applied during routine project review by issuing authorities. Use of standards should prevent or minimize adverse environmental impacts due to unmanaged stormwater while limiting undue costs and recognizing site constraints. These regulations for stormwater management are intended to protect the public and environmental health by providing adequate protection against pollutants, flooding, siltation, and other drainage problems.

REGULATION

- I. The storm water management design shall include a control strategy and plan for Source Control and Best Management Practice (BMP) for any particular development or project and shall accomplish the following goals:
 - A. Reproduce, as nearly as possible, the hydrological conditions in the ground and surface waters prior to a development.
 - B. Reduce storm water pollution to the “Maximum Extent Practicable” (MEP) using Best Management Practices (BMPs).
 - C. Have an acceptable future maintenance burden as determined by the Town of Carver Department of Public Works for roadways to be accepted as Town Ways.
 - D. Have an acceptable operation and management plan for all private development.
 - E. Have a neutral effect on the natural and human environment.
 - F. Be appropriate for the site, given physical restraints.
 - G. Provide a sufficient level of health and environmental protection during the construction phase.

- II. An acceptable storm water management plan shall:
 - A. Capture and treat the “First Flush” of a storm, usually the runoff from the first one inch of precipitation for the total impervious area of the development site or a value as may be designated by the Carver Board of Health.
 - B. Not cause an increase or decrease in either the total volume of runoff discharged offsite, or total rate of runoff discharged offsite, as compared with the respective discharge offsite prior to the development. Such condition shall be required for storms of 1, 10, 25, 50 and 100-year frequency events.
 - C. Include source controls and design of BMPs and Infiltration and Detention structures in accordance with the procedures acceptable to the Carver Board of Health such as required in the following publications and regulations:
 - a. Department of Environmental Protection, Surface Water Discharge Permit Program; 314 CMR 3.00
 - b. Department of Environmental Protection, Wetland Protection Act Regulations; 310 CMR 10.00
 - c. Department of Environmental Protection, Stormwater Regulations; 314 CMR 5.0
 - d. Department of Environmental Protection, Groundwater Discharge; 314 CMR 5.0
 - e. Department of Environmental Protection, Groundwater Quality Standards; 314 CMR 5.0
 - f. Department of Environmental Protection, Water Quality Certification; 314 CMR 5.0 (401)

- g. Department of Environmental Protection, Rivers Protection Act Regulations; 310 CMR 10.00
- h. Department of Environmental Protection, Dam Safety; 302 CMR 10.0
- i. United States Environmental Protection Agency, Clean Water Act; National Pollutant Discharge Elimination System (NPDES), Stormwater Phase 1 Rule (55 FR 47990) for MS4s
- j. United States Environmental Protection Agency, Clean Water Act; National Pollutant Discharge Elimination System (NPDES), Stormwater Phase 2 Draft for MS4s

D. In cases where runoff infiltration cannot, in the opinion of the Carver Board of Health, be appropriately implemented because of the possibility of contamination of water supply, or because of extremely poor infiltration and permeability characteristics of the soil, the requirement as regards volume may be waived by the Carver Board of Health provided the applicant provides such additional preventive measures to prevent any increase in elevation or duration of downstream flood elevations. Such additional measures may be, but are not restricted to, the construction of compensatory flood storage facilities and/or the creation of additional wetlands.

Poor infiltrative and permeability conditions are defined as Hydrologic Soil Group "D" as published by the USDA NRCS Soil Service and may be confirmed by "insitu" permeability testing resulting in a permeability of less than 1×10^{-4} centimeters per second. Unless, in the opinion of the Carver Board of Health, such testing is not applicable for a particular site, all permeability tests shall be in site field bore hole tests for permeabilities in the acceptable range as specified above. If permeability testing is desired to be performed in soils of lesser permeability, laboratory tests for hydraulic conductivity shall be performed on undisturbed samples by the Falling Head Permeability using flexible membrane triaxial test cells with backpressure (Army Corps of Engineering Manual EM 1110-2-1906 Appendix VII).

E. If detention or retention ponds are utilized, slopes shall be no steeper than four horizontal to one vertical. Maximum design water depth shall not exceed three (3) feet except in permanent ponds. Minimum bottom slope for "wet and dry" detention areas shall be two (2) percent, and infiltration ponds shall be graded flat. A safety bench, a minimum of ten (10) feet wide shall be provided. Detention or retention areas shall not be constructed within existing stream bed or wetland areas.

- F. Not result in channelization of surface runoff offsite without the written consent of the owner of the land affected, in the form of a permanent grant of easement, recorded at the Registry of Deeds.
- G. Include all hydrologic and hydraulic calculations and data to support the proposed design for the stormwater runoff drainage system. Both volume and flow rate of runoff before and after proposed development must be clearly stated and shall be in accordance with the specifications previously designated herein. Calculations shall be performed based on the most recent Atlas of Precipitation published by Cornell University (attached) as well as the most recent procedures of the U.S.D.A. Soil Conservation Service such as are described in the National Engineering Handbook - Section 4 - Hydrology (SCS 1985), TR - 20 "Computer Program of Project Formulation Hydrology" (SCS 1983), and Technical Release No. #55 "Urban Hydrology for Small Watersheds" (SCS 1986). Additional design guidelines may be on file With the Carver Board of Health.
- H. The Carver Board of Health reserves its rights to grant variances to the above requirements should they deem the variances to be in the best interest of public health and safety.

III. The Carver Board of Health, Commonwealth of Massachusetts acting in accordance with Chapter 111, Section 31 of the Massachusetts General Laws and amendments and additions thereto, and by any other power thereto enabling, and acting thereunder have adopted STORMWATER AND RUNOFF MANAGEMENT REGULATIONS for the preservation of public and environmental health.

- A. Voted on:
- B. Effective on:

STORMWATER GUIDANCE ATTACHMENT

24 HOUR RAINFALL

This Atlas of Precipitation has been published by the Northeast Regional Climate Center at Cornell University. It provides accurate data for the 24 hour Rainfall and precipitation of storm events. This atlas should be used to calculate the 24 hour Rainfall, as it is scientifically sound and up to date. Otherwise, structures for stormwater infiltration, retention, detention, and other BMP's may be incorrectly and /or undersized for real storm events.

This Atlas:

1. Utilizes the advances in statistics methodology and computing power since 1961.
2. Provides results determined from data of stations having an average length of record of 51.3 years as compared to the data of TP-40, which had an average length of record of 22.6 years.
3. Recognizes that the frequency of heavy rain events has increased since 1961. TP-40 encompasses a relatively dry period compared to the past 40 years.
4. Provides empirical adjustment factors to transform precipitation amounts pertaining to calendar day observations to maximum precipitation regardless of time of observation.

Analysis of the 1993 Northeast Regional Climate Center Atlas for Plymouth County, corrected for the 24-Hour Storm, result in the following rainfall values.

<u>24-Hour Storm</u>	<u>Rainfall (inches)</u>
1	2.82
2	3.39
5	4.24
10	5.08
25	6.22
50	7.34
100	9.04

The title of this atlas is *Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada*, Cornell University, Ithaca, New York, Publication No. RR 93-5, September 1993. A second publication entitled *Atlas of Short-Duration Precipitation Extremes for the Northeastern United States and Southwestern Canada*, Publication No. RR 95-1, March 1995, is also available