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Flood Management Regulations for State Agencies

Sec. 25-68h-1. Connecticut floodplain management regulations for state agencies

(a) **Definitions.**

(1) As used in Sections 25-68h-1, 25-68h-2 and 25-68h-3:

“Hurricane wave wash” means the effect of wave action in a coastal flood hazard zone.

“Significant impact” means any activity that would create:

- (A) A five percent increase in peak flow rates at any downstream point;
- (B) A twenty percent increase in flow velocities or a change that allows a stable condition to become unstable;
- (C) An activity that contributes to an unacceptable cumulative impact;
- (D) Any activity that causes flooding on developed property not currently subject to flooding;
- (E) An activity that could cause a downstream dam to become unsafe.

“Velocity waters” means the effect of moving water in a coastal flood hazard zone.

(2) As used in Sections 25-68h-1, 25-68h-2 and 25-68h-3, the definitions of the following terms shall be the same as the definitions in Section 25-68b of the General Statutes: activity; base flood; base flood for a critical activity; Commissioner; critical activity; floodplain; flood-proofing; freeboard.

(b) **Program Certification.**

Not later than one year from the effective date of these regulations any state agencies responsible for a program regulating flood flows within a floodplain shall certify in writing to the Commissioner that all such program(s) within its jurisdiction are being implemented consistent with the criteria in Section 25-68h-1, 25-68h-2 and 25-68h-3 of these regulations. The agency shall specifically describe:

(1) The procedures that will insure that prior to granting a permit or approval for any state activity subject to the regulatory jurisdiction of this program are in compliance with Section 25-68d of the General Statutes and these regulations.

(2) The procedures that will insure that the review and approval of applications for activities subject to the regulatory jurisdiction of this program are generally consistent with Section 25-68d of the General Statutes and these regulations.

(c) **Certification of State Agency Activities.**

(1) Any state agency proposing or undertaking any activity within or affecting a floodplain shall, as early as possible, but in no event later than 90 days prior to the date of initiating the activity, certify to the Commissioner that the activity is consistent with all applicable standards and criteria in Section 25-68d of the General Statutes and Sections 25-68h-1 through 25-68h-3, inclusive, of these regulations. Certification shall be made on a form prescribed by the Commissioner and the level of detail of the certification shall be commensurate with the size, complexity and probable impact of the activity. Certification shall include, but not be limited to, a description of the proposed activity, an affirmation that the activity is consistent with all applicable standards and criteria, and, where applicable, certifications from a registered architect or engineer. Any agency providing grants or loans for an activity shall also demonstrate its ability to guarantee that all requirements of Section 25-68d of the General Statutes and Section 25-68h-1 through 25-68h-3, inclusive, of these regulations will be complied with by the person or persons receiving the grant or loan. Unless requested by the Commissioner, the background materials

supporting the certification, including but not limited to plans, analyses and engineering calculations, need not be submitted along with the certification. Such background materials shall be retained by the agency proposing or undertaking any activity and shall be available for inspection by the Commissioner for a period of five years following completion of construction. The certification shall be signed by the head of the agency or his or her designated agent.

(2) Where two or more state agencies cooperate in proposing or undertaking an activity one agency may be designated to prepare the certification and to serve as a point of contact, however, the head of each agency shall sign the certification and each agency shall share the responsibility for the scope and content of the documents prepared pursuant to these regulations.

(d) Rendering a Decision.

The Commissioner shall make a decision either approving or rejecting a certification within ninety days of its receipt and shall notify the agency or agencies in writing of the decision. In the event that a certification is rejected, the Commissioner shall provide the reasons for the rejection and where possible suggestions for modifications or additional information which would make the certification acceptable. If a certification is rejected the agency or agencies having submitted it may request a hearing pursuant to Section 4-177 of the General Statutes.

(e) Revocation.

If the Commissioner determines after approving a certification for an activity, critical activity or program that the agency or agencies which submitted the certification failed to comply with the provisions of Section 25-68d of the General Statutes or these regulations, then the Commissioner may revoke approval of the certification. Such revocation shall be in writing and provide the reasons for the revocation and where possible suggestions for modifications or additional information which would make the certification acceptable.

(f) Exemption.

Any state agency or agencies proposing or undertaking an activity within or affecting the floodplain may apply to the Commissioner for exemption from the provisions of subsection (b) of Section 25-68d of the General Statutes and Sections 25-68h-1 through 25-68h-3, inclusive of these regulations in accordance with subsection (d) of Section 25-68d of the General Statutes.

(Effective April 30, 1987)

Sec. 25-68h-2. Floodplain management standards

(a) All state activities shall conform to the Federal Emergency Management Agency National Flood Insurance Program requirements, specifically Part 60 - Criteria For Land Management and Use, Subpart A Sections 60.3, 60.4 and 60.5.

(b) The following restrictions shall pertain to all new and substantially improved structures located within the floodplain.

(1) Structures shall not be designed for human habitation unless elevated with the lowest floor one foot above the level of the base flood.

(2) Structures and all stored materials which may result in damage to other structures, restriction of bridge openings or other narrow sections of the stream or river shall be anchored or restrained to prevent them from floating away.

(3) Service facilities such as electrical and heating equipment shall be constructed at or above the elevation of the base flood or floodproofed with a passive system.

(4) Structures located within a "coastal high hazard area" as defined in 44 CFR Part 59 shall be elevated on adequately anchored pilings or columns and securely

anchored to such piles or columns such that the lowest portion of the structural members of the lowest floor (excluding the pilings or columns) is elevated to one foot above the base flood and certified by a registered professional engineer or architect that the structure is securely anchored to piling or columns in order to withstand velocity waters and hurricane wave wash.

(5) No new structures shall be permitted on undeveloped coastal barrier beaches as designated by the Federal Emergency Management Agency (FEMA).

(6) All water supply equipment shall be designed to prevent flood waters from entering and contaminating the system.

(7) All sanitary sewer collection systems located in the floodplain must have watertight manhole covers and if equipped with vents, shall extend above the elevation of the base flood.

(c) The following restrictions shall pertain to all filling, dumping, construction, excavating, and other activities which change the topography within the floodplain.

(1) No filling, dumping or construction or other activity shall be allowed which would increase the elevation of the base flood by more than one foot or adversely affect the hydraulic characteristics of the floodplain unless the proposed filling is fully compensated for by excavation in or contiguous to the filled area.

(2) No filling, dumping, construction or excavation will be allowed if these changes will result in a concentration of the natural flow of water such as to cause or increase drainage, erosion or sediment problems.

(3) Any fill placed in the floodplain shall not be greater than that which is necessary to achieve the intended purpose as demonstrated by a plan showing the uses to which the filled land will be put and the final dimensions of the proposed fill or other materials.

(4) Such fill or other material shall be protected against erosion as discussed in the Connecticut Guidelines for Soil Erosion and Sediment Control (1985), as may be amended.

(5) Any activity within a floodway designated by FEMA which would result in an increase of the elevation of the base flood or ten year flood profile is prohibited.

(6) The placement of fill in areas of high velocity flow or at the outside edge of a migrating river bend is discouraged.

(d) The following restrictions shall pertain to the storage of materials and equipment within the floodplain.

(1) The storage of materials that are buoyant, hazardous, flammable, explosive, soluble, expansive radioactive or which could be injurious to human, animal or plant life is prohibited below the elevation of the base flood for a critical activity.

(2) Other material or equipment may be stored below the elevation of the base flood for a critical activity provided that such material or equipment is not subject to major damage by floods, and provided that such material or equipment is firmly anchored, restrained or enclosed to prevent it from floating away.

(Effective April 30, 1987)

Sec. 25-68h-3. Stormwater management standards

(a) On-site stormwater management.

(1) The stormwater management plans for state activities shall be prepared so as to minimize any adverse increases to the peak flow rate, the timing of runoff and the volume of runoff. Hydrology studies shall be conducted at a level of detail commensurate with the probable impact of the project.

(A) A complete runoff hydrograph evaluation is required for (i) Basin Stormwater Management Plans pursuant to Section 25-68h-3 (h), (ii) Stormwater management plans for project sites resulting in significant impacts, and (iii) other state activities and critical activities as determined by the Commissioner. Hydrograph evaluations shall be conducted for existing and anticipated land use conditions for storms with average return frequencies of 2, 10 and 100 years. Where appropriate, the hydrograph analysis shall include determination of runoff for each subwatershed and routing runoff through storage impoundments and floodplain storage areas. The timing sequence of the runoff must be fully developed.

(B) Where suitable records exist, hydrographs should be developed from historic gauged flood data. For other watercourses, the hydrographs shall be developed from deterministic rainfall-runoff techniques and compared with flood flows of similar gauged watersheds and an assessment made as to the need to calibrate the hydrograph based on this comparison.

(2) Stormwater management plans for project sites shall be coordinated with Basin Stormwater Management Plans, where available.

(b) **Stormwater detention facilities**

Facilities to temporarily store excess storm runoff shall be subject to the following requirements:

(1) Any detention facility whose failure could cause significant damage or loss of life shall be regulated as a dam pursuant to Sections 22a-401 through 22a-409 of the General Statutes.

(2) All detention facilities serving a watershed larger than 10 acres in size shall be analyzed with hydrograph and storage routing techniques.

(3) The release rates from detention facilities shall be consistent with the Basin Stormwater Management Plan for the watershed in which it is located, or comply with items 4, 5 and 6 below if there is no Basin Stormwater Management Plan.

(4) The release rate shall consider the existing and proposed flow rates at the site and downstream channels or structures, and the timing of runoff from other subwatersheds within the basin for the base flood.

(5) The waters released from a detention facility shall not increase the peak flow rate at offsite downstream points unless they have adequate flow capacity for the base flood.

(6) Extended duration detention facility discharges directly into alluvial or eroding channels shall not exceed the bankfull capacity or the 2 year flood frequency flow, whichever is less, unless it is determined said channel will be stable.

(7) Section 8E of the "Connecticut Guidelines for Erosion and Sediment Control" (1985) as may be amended, shall be used as a guide to construction details and materials.

(8) An operation and maintenance schedule shall be prepared for every detention facility identifying responsibilities and items of routine maintenance, after use and emergency operations in the event of a flood.

(c) **Storm Drainage Systems.**

All subsurface storm drainage systems shall be designed in accordance with the methods and procedures defined in the Connecticut Department of Transportation Drainage Manual prepared by the Division of Design, Bureau of Highway, as may be amended and shall meet the following requirements:

(1) Storm drainage systems for parking lots, driveways, and roads shall be designed for a ten year frequency storm without closing use of the facility.

(2) The design of storm drainage systems for depressed roads and driveways shall comply with the DOT Drainage Manual.

(3) Use of curbing shall be minimized in order to encourage overland disburshed flow through stable vegetated areas.

(4) The hydrology and hydraulic design of catch basins, gutters, and storm drain pipes shall comply with the DOT Drainage Manual.

(5) Design computations shall be prepared on the appropriate forms contained in the DOT Drainage Manual.

(6) The foundation drains and floor drains of buildings connected into storm drainage systems shall be designed to prevent backflow for the 100 year frequency flood into the building.

(7) Surface runoff shall be directed through vegetated filter strips or grass swales wherever possible prior to storm drain inlets.

(8) The design of the storm drainage system should be coordinated with the soil erosion and sediment control plan.

(9) Storm drainage discharges shall be coordinated with the National Pollution Discharge Elimination System permit program administered by the Water Compliance Unit of DEP.

(10) Storm drainage systems discharging into watercourses tributary to public water supply reservoirs shall be in compliance with the Public Health Code.

(11) Storm drains shall be extended to a suitable discharge point into a watercourse or public drainage system, or to where drainage rights have been secured.

(d) Open Channels.

The analysis and design of open channels shall be consistent with the type of channel and its intended purpose. Channels shall be classified as local drainage channels or as watercourse channels, depending on use, and shall be classified as alluvial or non-alluvial based upon their geologic characteristics.

(1) Type A open channels are local drainage channels with a primary purpose of conveying urban, parking lot and road runoff from small watersheds, frequently with intermittent flow and limited ecological value and are intended to convey their design flow within their banks. They shall be designed in accordance with Section 12.02, 12.03, and 12.04 of the DOT Drainage Manual and:

(A) Freeboard allowances shall be provided in proportion to the potential damages that could occur in the event of overtopping;

(B) The use of impervious linings is discouraged except for very high velocity flow and steep slopes;

(2) Type B open channels are natural perennial watercourses or man made channels planned to simulate a natural watercourse. They shall be designed in accordance with Section 12.05 of the DOT Drainage Manual and the following where appropriate:

(A) Shall have minimum flow capacity of a flood equal to at least 25 year frequency flood.

(B) Shall have an inner channel to concentrate low flows with a capacity of a 2 year frequency flood.

(C) Shall have water surface profiles prepared for the 2, 25, and 100 year frequency floods.

(D) Shall consider the hydraulic capacity of floodplains.

(E) Shall have a sediment transport capacity similar to upstream and downstream channels.

(F) Shall be designed to minimize the use of artificial linings for flows in excess of the two year frequency flood.

(G) Shall encourage ecological productivity and variety.

(H) Shall be visually compatible with its surroundings.

(I) The alignment and slope shall be compatible with natural channels in similar site conditions.

(J) Variations in width, depth, invert evaluations, and side slopes are encouraged for aquatic and visual diversity.

(K) Straightening channels and decreasing their length is discouraged.

(L) The cross sections used to define the channel and floodplain geometry for water surface profile computations shall be located upstream and downstream of hydraulic structures, at changes in bed slope or cross section shape, and generally at intervals of not more than ten times the width of the 100 year floodplain.

(M) The friction coefficients used in the hydraulic analysis are to assume maximum seasonal vegetation conditions, and should be adjusted to the depth of flow.

(3) Channel restoration plans shall be prepared for all open channel work. The plan shall help restore and/or create an aquatic habitats suitable for fisheries, while maintaining or improving water quality, recreation, aesthetics and flow capacity. Coordination with the Fisheries and Wildlife Units of DEP is recommended. The channel restoration plan shall include, as appropriate:

(A) Avoidance of barriers to fish movement;

(B) Formation of pools and riffles;

(C) Provision for areas of sheltered flow with use of deflectors, boulders, low check dams;

(D) Preservation of stream bank vegetation and establishment of new vegetation;

(E) Use of clean natural bed materials of a suitable size;

(F) Schedule work to minimize conflicts with spawning, stocking, and fishing seasons; and

(G) Removal of excess debris.

(4) The design of rock riprap in channels with uniform flow shall be based upon the tractive force methods defined in both the DOT Drainage Manual and the Connecticut Guidelines for Erosion and Sediment Control.

(5) The hydraulic analysis and modification of watercourses prone to ice jams or floods due to ice should be coordinated directly with the Department of Environmental Protection.

(6) The watersurface profiles of open channels in coastal areas shall consider the potential combined occurrence of tides, storm surges, and peak runoff. The starting water elevation for the base flood in watersheds with time of concentrations of over 6 hours shall be the ten year frequency tidal surge level.

(e) Culverts and Bridges.

All drainage culverts and bridges shall be designed in accordance to the methods and procedures defined in the DOT Drainage Manual and shall meet the following requirements:

(1) Culverts and bridges will be designed for flood frequencies and underclearances stipulated in the DOT Drainage Manual, except that on local (not state highways) roads and driveways with low traffic volumes and where alternate routes are available, lower design criteria is acceptable when:

(A) Flood discharges may be allowed to cross over roads that are at or close to the floodplain grade.

(B) Water surface elevations shall not be increased by more than one foot, nor allowed to cause damage to upstream properties.

(C) Provisions are made to barricade the road when overtopped.

(D) The road or driveway is posted as being subject to flooding.

(2) Bridges and culverts along stocked watercourses and watercourses which may support fish shall be designed to allow passage of fish as may be recommended by the Department of Environmental Protection Fisheries and Wildlife Units.

(3) The location of new bridges and culverts shall minimize the relocation of watercourses.

(4) Where applicable, rigid structural floors at bridges and culverts should be depressed below the normal streambed, to allow an alluvial streambed to form over them, and shall anticipate if the streambed is degrading.

(5) The use of solid parapet walls at bridges and culverts located in the sag part of vertical curves is discouraged.

(6) Debris barriers shall be used upstream of structures prone to blockage by debris.

(7) The use of a single large culvert or bridge opening is preferred over use of multiple small openings.

(8) The underclearances and maximum headwaters stipulated in the DOT Drainage Manual may be waived when decreasing the headwater depth at existing structures could increase downstream peak flows.

(f) **Standard Conditions for Approval.**

(1) All construction work shall incorporate best management practices to minimize soil erosion and sedimentation and conform with the "Connecticut Guidelines for Soil Erosion and Sediment Control."

(2) All fill shall be clean, material free of stumps, rubbish, hazardous, and toxic material.

(3) Contractor shall remove equipment and materials from the floodplain during periods when flood warnings have been issued or are anticipated by a responsible federal, state or local agency. It shall be the contractors responsibility to obtain such warnings when flooding is anticipated.

(4) Contractor shall notify the Commissioner seven days prior to starting work on-site.

(5) Once work is initiated, it shall proceed rapidly and steadily until completed and stabilized in order to minimize use of temporary structures and to minimize soil erosion.

(6) Work shall not be conducted in or adjacent to watercourses and reservoirs used as public drinking water supply sources without further coordination with the water supply utility and Department of Health Services.

(7) All temporary structures, cofferdams, and fill shall not impede the movement of flood flows and shall be removed at the completion of their use. The design of such temporary structure, cofferdams and fill shall be based on Chapter 18 of the DOT Drainage Manual, where applicable.

(8) The applicant or his agent shall permanently maintain the proposed facility.

(g) **Basin Stormwater Management Plans.**

Basin stormwater management plans shall be prepared at the scale of the subregional drainage basins as defined on the map entitled "Natural Drainage Basins of Connecticut" prepared by the Department of Environmental Protection dated 1981 or as amended. Basin stormwater management plans shall include:

(1) Watershed identification, surficial geology, and land use.

(2) Inventory of flood hazard areas as identified by Flood Insurance Studies or the Commissioner, plus historic floods and damages.

(3) An evaluation of watercourses, including areas of limited flow capacity, bank or bed erosion, sediment deposition, water quality, principle water uses and users, recreation areas, morphology classification, and channel stability.

(4) An inventory and evaluation of hydraulic structures, including culverts, bridges, dams and dikes with information on their flow capacity and physical condition.

(5) An inventory of significant flood water storage areas, including principle impoundments, floodplains, and wetlands.

(6) A runoff hydrograph analysis of the watershed for floods of an appropriate duration, including a 24 hour event, with average return frequencies of 2, 10 and 100 years for existing and future land uses.

(7) The relationship between the computed peak flow rates and gauging station data, with modification or calibration of the hydrographs to obtain a reasonable fit where necessary.

(8) Identification of the peak rate of runoff at various key points in the watershed, and the relative timing of the peak flow rates.

(9) Identification of points in the watershed where hydraulic structures or watercourses are inadequate under existing or anticipated future conditions.

(10) Recommendations on how the subwatersheds runoff can be managed to minimize any harmful downstream impacts.

(11) Generalized recommendations for physical improvements for existing or anticipated future problem areas.

(12) A copy of each Basin Stormwater Management Plan shall be filed with the DEP.

(13) Stormwater management plans for Public Water Supply watersheds shall be coordinated with the Connecticut Department of Health Services and any affected water utility company.

(Effective April 30, 1987)