

Report on the Study of Further Streamlining of Dam Removal in North Carolina

To fulfill the requirements of S.L. 2017-145, Section 3

Pursuant to Session Law 2017-145 Section 3: The Department of Environmental Quality (DEQ) and the Department of Public Safety (DPS) shall jointly study the dam removal process in North Carolina and recommend further changes in statutes or rules to reduce regulatory barriers to the removal of obsolete and unwanted dams and consolidate duplicative permit processes. As part of its study, the Departments shall review the dam removal permitting processes in New Hampshire, Massachusetts, and Pennsylvania.

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A. Background

DEQ appreciates the opportunity to study the process of dam removal in North Carolina as a result of the passage of SL 2017-145. This law came about as a result and initiative of the General Assembly to facilitate the removal of safety hazards and to restore North Carolina's natural riverine resources by facilitating the removal of obsolete and unwanted dams. In practice, this law reduced the regulatory burden of dam owners of Low and Intermediate Hazard Class structures that are defined as either Mill dams or Run-of-river dams by removing the requirement of submitting a full design plan for review and approval by DEQ's Dam Safety

Program as long as the work is designed and professionally supervised by a qualified engineer per Chapter 89C of the General Statutes.

This report will summarize North Carolina's current Dam Safety Law's regulatory requirements for dam removal, compare them to those of New Hampshire, Massachusetts, and Pennsylvania and provide recommendations for further changes, if feasible, to statutes or rules to reduce regulatory barriers to the removal of obsolete and unwanted dams.

B. North Carolina Dam Removal Requirements per Dam Safety Law

Prior to S.L 2017-145, the North Carolina Dam Safety Law, NCGS 143-215.27, required that all owners of dams regulated* by the State, if they wish to remove their dam, submit an application for removal of their dam. That application was required to receive written approval by the DEQ prior to commencement of work. The requirements for that application included the name and address of the applicant and a description of the proposed changes accompanied by engineered maps, plans and specifications providing appropriate detail required by the Department in order to complete a full review of the dam and reservoir for the protection of life, health and safety. The application was also required to give the proposed time of commencement and completion of the work. For complete details of all submittal requirements and conditions for dam removal, reference 15A NCAC 02K .0201 (Appendix A)

Under specified conditions, S.L. 2017-145 amended the Dam Safety Law by providing an exception and removing the burden on certain Low and Intermediate Hazard dam owners to go through the application submittal and plan approval process prior to commencement of work. Those conditions include:

- 1) the exception only applies to Mill or Run-of-river dams;
- 2) the owner employs a qualified engineer to supervise the process;
- 3) the qualified engineer determines that the removal of the dam can be accomplished safely, certifying that the dam is a low or intermediate hazard dam, and that his removal plan reflects the geomorphology of the streambed upriver and downriver from the dam site and the most desirable longitudinal profile for the post-removal stream channel that will minimize physical impacts on riparian landowners;
- 4) the owner notifies the director of the Division of Energy, Mineral, and Land Resources no less than 60 days prior to removal (notice shall include information identifying the dam, stream and county where the dam is located, the dam's height and impoundment capacity, a map showing the dam location and vicinity, the qualified engineer's name and North Carolina license number, and a notarized certification from the owner of the dam that the dam is a low or intermediate hazard dam not currently operated for the purposes of flood control or hydroelectric power generation; and
- 5) the owner notifies the North Carolina Floodplain Mapping Program of the

* For reference throughout this document, dams that are regulated by North Carolina include all dams that are 25 feet tall and impound 50 Acre-Feet volume of water or are classified as High Hazard regardless of height or impoundment capacity, except those owned, operated, designed & built or regulated by the US Army Corps of Engineers, Natural Resource Conservation Service, Federal Energy Regulatory Commission, TVA or Nuclear Energy Regulatory Commission.

Department of Public Safety, the North Carolina Department of Transportation, adjacent property owners of the dam and reservoir, and all impacted local governments of the proposed removal no less than 60 days prior to removal (notice shall include a qualified engineer's determination that (a) the removal plan for the dam meets the requirements of this exception and (b) the removal will lower or maintain water levels above the location of the dam and will not cause an increase in the risk of flood damage or impacts to downstream bridges or road crossings. This new process for Mill and Run-of-river dams does not receive any technical review by DEQ Dam Safety Program, only concurrence with the jurisdictional determination of Low or Intermediate Hazard classification of the dam is required. A final check off is required to make sure all conditions are met for the exception during that 60 period prior to removal.

It should be noted that this session law only addressed reducing the burden of regulatory approval on Low and Intermediate Hazard, Mill and Run-of-river dams. These dams are typically low-head (small) dams with minimal expected impact to life, property and the environment should they fail during removal. These dams tend to be built in low areas or completely within the banks of a river or stream section which may only cause threatening conditions downstream when they are under load from a design storm or flood flow. Hence removal during non-threatening weather, site or flood conditions was the logic used providing this relief from the review and approval process. Removal of these dams also provided the benefit of restoring natural riverine resources and improving aquatic habitat.

C. Dam Safety Law Removal Processes in New Hampshire, Massachusetts and Pennsylvania.

To compare and contrast North Carolina's requirements, we reviewed the Dam Safety Laws of New Hampshire, Massachusetts and Pennsylvania to determine if other states with similar Dam Safety Programs have addressed similar objectives in their jurisdictions. If these states have, it would be prudent to consider adopting similar language from their laws into the North Carolina's Dam Safety Law.

New Hampshire

The overall standard for regulating dams in New Hampshire is more restrictive than NC. Their thresholds for regulatory size and impoundment are much lower than NC's which are 25 feet tall and 50 Acre-Feet volume. Dams regulated in NH are any artificial barrier which impounds or diverts water, and which has a height of 6 feet or more, or is located at the outlet of a great pond or is a storm water basin with a height of 10 feet or greater or its maximum storage is 6 acre-feet or greater. In reviewing NH's regulations (Appendix B), it can be found that they do have a dam removal process to address river restoration similar to NC's SL 2017-145. New Hampshire's rules, **Env-Wr 601.01 Purpose**, specify the procedures to be followed when proposing to remove a dam under the auspices of NH's river restoration program and the criteria that will be applied in reviewing such proposals. However, upon more detailed review, the requirements in **Env-Wr 602-604** appear to be as restrictive as NC's updated Dam Safety

Law. New Hampshire requires an application to be submitted for full review and approval prior to commencement of work. A fully designed plan with specifications and all accompanying information regarding the identity, classification, and status is required, along with a description of the proposed methods to remove the dam, including construction sequence and purpose for removal. The difference here is that if the applicants follow these rules for dam removal, the application is managed by NH's wetlands group within their Water Quality Program. The application is routed through the NH Dam Safety Program for verbal approval only prior to written approval from their wetlands group which also coordinates all other US Army Corps and State Water Quality Permits. This program is popular with dam owners in NH that want to remove their dams as it also oversees a grant program that provides cost-share to the dam owner for dam removal. The issue here is that this removal and grant process still take between 3 and 10 years to plan, obtain resources and remove the dam per these rules with the grant funding. If a dam owner elects not to follow these rules they must go through the formal application process with the NH Dam Safety Program.

Massachusetts

Massachusetts' thresholds for regulating dams are almost identical to NC's, but they are slightly more restrictive. Dams regulated in Massachusetts include any artificial barrier, including appurtenant works, which impounds or diverts water, and which is 25 feet or more in height or has an impounding capacity at maximum water storage elevation of 50 acre-feet or more or any other artificial barrier if breached could endanger property or safety. North Carolina's threshold, provided previously, requires both conditions to be met in 25 feet or more in height and 50 acre-feet in volume. Further review of MA's permitting and dam removal regulations, 302 CMR: DEPARTMENT OF CONSERVATION AND RECREATION, Section 10 (Appendix C), reveals that they too are also more restrictive than NC's current Dam Safety Law and Administrative Code. MA's regulations more similarly match those of NC prior to the amendments from SL 2017-145. Similar application processes, design and specification information, reports, and initial and final approvals, are required prior to any work being conducted or completed.

Pennsylvania

Pennsylvania, as compared to NC, considers several more conditions in its determination of regulated status and appears to also be more restrictive. Dams regulated in PA include those with a contributory drainage area that exceeds 100 acres; or the greatest depth of water at maximum storage elevation exceeds 15 feet; or the impounding capacity at maximum storage elevation exceeds 50 acre-feet; or all dams used for the storage of water not located on a watercourse and which have no contributory drainage, where the greatest depth of water at maximum storage elevation exceeds 15 feet and the impounding capacity at maximum storage elevation exceeds 50 acre-feet; or all dams used for the storage of fluids or semifluids other than water, the escape of which may result in air, water or land pollution, or may result in danger to persons or property. We found that its pertinent Dam safety law (Act 325 of 1978,

Section 5) and regulations (25 PA 105) (Appendix D) address application requirements very similar to NC. For dams requiring approvals and permitting, the owners, as in NC, are required to submit for full review, approval and permitting prior to commencement of work. Fully designed plans with specifications and all accompanying information regarding the identity, location, classification, status, and a description of the proposed methods to remove the dam are required.

Although PA does not have language specific to dam removal for Run-of-river and Mill dams, as in NC's § 143-215.27(c), which statutorily removes the requirement for plan approval prior to removal of Intermediate and Low Hazard classes of these types of dams if certain conditions are met, it does have in its code, 25 PA 105.12(a)(11), a waiver of permit requirements. This specifically allows the removal of abandoned dams if their Dam Safety Program determines in writing, on the basis of data and information or plans submitted by the owner, that the removal of the abandoned dam cannot imperil life or property, have significant effect on coastal resources or have an adverse impact on the environment, and the plans provide for restoration and stabilization of the project area. This, in effect, acts very similarly to the amended requirements in S.L. 2017-145, except that PA's Dam Safety Program makes that determination on a site-by-site basis whereas in NC decisions are now made categorically by law per S.L. 2017-145. Although in practice, both States' programs can act very much alike in regard to removal of dams, PA's regulations allow them to be more conservative on the basis of preservation of life, property, coastal resources and environmental impact.

D. Summary Conclusions and Recommendations

In comparison with the Dam Safety Laws and Regulations of New Hampshire, Massachusetts and Pennsylvania, North Carolina's law, on the face appears to be on par with many of the same requirements for submittal of application, requirements of a complete plan, processes in review, inspections, emergency action plans, professional engineering credentials for applicants, and approvals for dam construction, repair, modification and removal. When looking closer, we find differences between the laws which include but are not limited to jurisdictional thresholds for regulation, financial responsibility and insurance requirements, environmental and social assessment requirements, operation and maintenance fees and dam removal procedures. As noted in Section C above, all three states, when compared to North Carolina have laws and accompanying regulations that appear to be more conservative and administratively as, and in some cases, more restrictive in regard to removal of regulated dams. The first observation made is that all three states in the comparison have set lower thresholds for size and impoundment capacity. In practice, this results in the regulation of dams that are smaller in height and/or impoundment capacity than what is regulated in NC. The second observation is that although their collective regulations for dam removal are very much like those in NC, they do not include exemptions for application and approval which SL 2017-145 established for NC for Mill and Run-of-river dams with Low and Intermediate Hazard

classifications. Pennsylvania does, however, have regulations that allow them to grant a waiver from the application and approval process. This is performed on a case-by-case basis determined by the regulating authority which does allow similar outcomes for applicants. This can reduce the regulatory burden as with SL 2017-145. However, case-by-case determinations are inherently more restrictive than NC's categorical exemption.

This comparative study did not yield any language contained in laws, regulations, or processes to suggest or develop additional relief from the regulatory burden of dam removal. The goals for the dam safety laws in all states is to protect life, property, health, environment and safety. Given that North Carolina's Dam Safety Program has the same goals, the Department of Environmental Quality does not recommend any changes to the law or administrative code that would further reduce regulatory burden on dam removal. Dam removal needs to be planned and implemented with all the same safeguards (proper design, application, review and approval of proper design to verify adequacy) as are required for construction, repair and modification of dams. Dam removal can be more dangerous than construction if executed improperly causing impacts to lives, property and the environment. We do recommend the creation of a permanent dam safety emergency fund to address draining, breach, and removal to be used by the Department of Environmental Quality as needed in emergency situations or to avoid an imminent emergency situation. Currently, NC has nearly 6,000 inventoried dams about 3,000 regulated dams, and all are subject to change in hazard classification or reconstruction that may put them in the regulated category.

It should be noted that this study only addressed dam removal on the basis of plan approval and permitting requirements for dam removal based on North Carolina's State Dam Safety Law and those of New Hampshire, Massachusetts and Pennsylvania. Federal regulations and permitting requirements by the United States Army Corps of Engineers and the Federal Emergency Management Agency were not a part of this study.

Appendix A: North Carolina Rules

SECTION .0200 - OBTAINING APPROVAL FOR DAM CONSTRUCTION: REPAIR:OR REMOVAL 15A NCAC 02K .0201 APPLICATIONS

(a) Any person(s) who proposes to construct, repair, alter or remove a dam must file with the Director a statement concerning the location of the dam, including the name of the stream and county, height, purpose, and impoundment capacity, 10 days before start of construction. If the Director determines that the proposed dam is exempt from the law, the applicant will be notified and he may then proceed with the construction.

(b) If the Director determines that the proposed dam is not exempt from the Dam Safety Law of 1967, the applicant will be so notified within 10 days of receipt of the statement described in (a) of this Rule and construction may not commence until a full and complete application has been filed and approved. This application must be filed at least 60 days before the proposed start of construction:

(1) When an application to construct a dam has been completed pursuant to Subsection (a) of this Rule, the department shall refer copies of the completed application papers to the Department of Human Resources, the Wildlife Resources Commission, the Department of Transportation, and such other state and local agencies as it deems appropriate for review and comment.

(2) Before commencing the repair, alteration, or removal of a dam, application shall be made for written approval by the department, except as otherwise provided by this Subchapter or in accordance with G.S. 143-215.27(b). The application shall state the name and address of the applicant; shall adequately detail the changes it proposes to effect; and shall be accompanied by maps, plans, and specifications setting forth such details and dimensions as the department requires. The department may waive such requirements in accordance with G.S. 143-215.27(a). The application shall give such other information concerning the dam and reservoir required by the department concerning the safety of any change as it may require, and shall state the proposed time of commencement and completion of the work. When an application has been completed, it may be referred by the department for agency review and report as provided by G.S. 143-215.26(b) in the case of original construction.

(c) The application for any dam shall include a preliminary report. (Filing of the preliminary report prior to filing the final design report, early in the site investigation and design schedule, is encouraged to assure the state's concurrence with the hazard classification, site investigation, and design concept. This is especially encouraged for class C dams.) The preliminary report shall be filed with the application and shall include the following information:

- (1) a general description of the dam and appurtenances and a proposed classification as set forth in Rule .0105 of this Subchapter; The description shall include a statement of the purpose for which the dam is to be used;
 - (2) a description of properties located below the dam including number of homes, buildings, roads, utilities, and other property that, as determined by the engineer, would be endangered should failure of the dam occur;
 - (3) maps showing the location of the proposed structure that include the county, location of state roads, access to site, and outline of the reservoir; aerial photographs or USGS maps may be used;
 - (4) preliminary drawings or sketches that include cross-sections, plans and profiles of the dam, proposed pool levels, and types of all spillways;
 - (5) preliminary design criteria and basis for selection including a description of the size, ground cover conditions, and extent of development of the watershed, drainage area, spillway design storm, geology and geotechnical engineering, assumptions for the foundation and embankment materials, and type of materials to be used in the principal spillways(s).
- (d) The Final Design Report. A "Certificate of Approval" to construct will not be issued until the final design report is received and approved. The preliminary report as described in (c) of this Rule and the final design report may be submitted as one document. The final design report shall include:
- (1) a report of the investigation of the foundation soils or bedrock and the borrow materials, including the location of borrow areas, that are to be used to construct the dam;
 - (2) criteria to indicate that the dam will be stable during construction and filling and under all conditions of reservoir operations;
 - (3) computations indicating that the dam is safe against overtopping during occurrence of the inflow design flood and wave action; Wave action need not be considered when the design flood is based on the probable maximum precipitation (pmp);
 - (4) criteria, design data or references to indicate that seepage flow through the embankment, foundation, and abutments will be controlled so that no internal erosion will take place and so there will be no sloughing in the area where the seepage emerges;
 - (5) calculations and assumptions relative to design of the spillway(s);
 - (6) provision to protect the upstream slope, crest, and downstream slope of earth embankments and abutments from erosion due to wind and rain;
 - (7) other design data, assumptions, and analysis data pertinent to individual dams and site conditions;
 - (8) a proposed construction schedule;
 - (9) a proposed filling schedule for the reservoir;
 - (10) a maintenance and operation plan;
 - (11) the estimated design life of the dam and the reservoir;
 - (12) provision for maintaining minimum stream flow requirements.

(e) The Plans and Specifications. Five sets of plans and specifications must be submitted. The plans shall be a detailed engineering design that consists of drawings and specifications and that include the following as a minimum:

(1) Sheet one shall show the name of the project; name of owner; hazard classification of the dam; designated access to the project; and location with respect to highways, roads, streams, and any dam(s) that would affect or be affected by the proposed structure;

(2) Maps shall be included showing the drainage area and outline of the reservoir and the ownership of properties covered by the reservoir or flood pool;

(3) Geologic investigation, cross-section, profiles, logs of borings, location of borrow areas, drawings of principal and emergency spillways, and other additional sheets shall be included and drawn in sufficient detail to clearly indicate the extent and complexity of the work to be performed; The degree of detail required shall be determined by the applicable provisions of Rules .0204 through .0212 of this Section;

(4) The technical provisions, as may be required, to describe the method of construction and quality control for the project;

(5) Special provisions, as may be required, to describe technical provision needed to ensure that the dam is installed according to the approved plans and specifications;

(6) General provisions that specify the rights, duties, and responsibilities of the applicant, applicant's engineer and builder and the prescribed order of work.

(f) The Director, within 60 days following receipt of a completed application, shall notify the applicant, by mail, that the application is either approved or disapproved. An approved application shall conform to the requirements of Rule .0202 of this Section.

History Note: Authority G.S. 143-215.26, 143-215-2; 143-215.31;

Eff. June 15, 1980;

Pursuant to G.S. 150B-21.3A, rule is necessary without substantive public interest Eff. December 23, 2017.

N.C.G.S. § 143-215.27. Repair, alteration, or removal of dam. (as amended by S.L. 2017-145)

(a) Before commencing the repair, alteration or removal of a dam, application shall be made for written approval by the Department, except as otherwise provided by this Part. The application shall state the name and address of the applicant, shall adequately detail the changes it proposes to effect and shall be accompanied by maps, plans and specifications setting forth such details and dimensions as the Department requires. The Department may waive any such requirements. The application shall give such other information concerning the dam and reservoir required by the Department, such information concerning the safety of any change as it may require, and shall state the proposed time of commencement and completion of the work. When an application has been completed it may be referred by the Department for agency review and report, as provided by subsection (b) of G.S. 143-215.26 in the case of original construction. This subsection shall not apply to a professionally supervised dam removal.

...

- (c) A professionally supervised dam removal is not subject to the procedures set forth in subsection (a) of this section, provided that the dam removal complies with all of the following:
- (1) A qualified engineer determines, based on good engineering practices, that the removal of the dam can be accomplished safely, certifies that the dam is a low or intermediate hazard dam, and the removal plan reflects (i) the geomorphology of the streambed upriver and downriver from the dam site and (ii) the most desirable longitudinal profile for the post-removal stream channel that will minimize physical impacts on riparian landowners.
- (2) The person who proposes to remove the dam notifies the director of the Division of Energy, Mineral, and Land Resources of the Department of the proposed removal no less than 60 days prior to removal. The notice shall include information identifying the dam, including the stream and county where the dam is located, the dam's height and impoundment capacity, a map showing the dam location and vicinity, the qualified engineer's name and North Carolina license number, and a notarized certification from the owner of the dam that the dam is a low or intermediate hazard dam not currently operated for the purposes of flood control or hydroelectric power generation. The notification and certification required by this subdivision may be provided electronically.
- (3) The person who proposes to remove the dam notifies the North Carolina Floodplain Mapping Program of the Department of Public Safety, the North Carolina Department of Transportation, adjacent property owners of the dam and reservoir, and all impacted local governments of the proposed removal no less than 60 days prior to removal. The notice shall include a qualified engineer's determination that (i) the removal plan for the dam is based on the criteria set forth in subdivision (1) of this subsection and (ii) the removal will lower or maintain water levels above the location of the dam and will not cause an increase in the risk of flood damage or impacts to downstream bridges or road crossings. For purposes of the notice required by this subdivision, an "impacted local government" shall mean any unit of local government that could experience changes to its base floodplain, as defined in G.S. 143-215.52, as a result of the dam removal."

Appendix B: New Hampshire Statutes and Rules

CHAPTER Env-Wr 600 REMOVAL OF DAMS

PART Env-Wr 601 PURPOSE AND APPLICABILITY

Env-Wr 601.01 Purpose. The purpose of the rules in this chapter is to specify the procedures to be followed when proposing to remove a dam under the auspices of the department's river restoration program and the criteria that will be applied in reviewing such proposals.

Source. #1716, eff 2-20-81; ss by #2207, eff 12-13-82; ss by #2900, eff 11-7-84, EXPIRED 11-7-90

New. #8414, eff 8-20-05; ss by #10510, eff 1-22-14

Env-Wr 601.02 Applicability. The requirements of this part shall apply to any person who seeks to remove a dam under the auspices of the department's river restoration program.

Source. #8414, eff 8-20-05; ss by #10510, eff 1-22-14

PART Env-Wr 602 DAM REMOVAL PROPOSALS

Env-Wr 602.01 Qualifying Removals.

- (a) In order to qualify as a dam removal under this chapter, the structure shall be removed:
 - (1) To at least the depth of the natural streambed elevation; and
 - (2) Subject to (b) and (c), below, to the width of the free-flowing ordinary high water mark of the river or stream in the area of the footprint of the dam from bank to bank.
- (b) The person seeking to remove a dam pursuant to this chapter may request the department to approve a narrower opening by submitting the request in writing with the following:
 - (1) The width of the free-flowing ordinary high water mark of the river or stream in the area of the footprint of the dam from bank to bank, in feet;
 - (2) The width of the proposed opening, in feet, at:
 - a. The natural streambed elevation;
 - b. The ordinary high water mark; and
 - c. The widest point of the opening, if other than the natural streambed elevation or ordinary high water mark;
 - (3) The shape of the proposed opening; and
 - (4) An explanation of how the narrower opening will meet the criteria specified in (c), below.
- (c) The department shall approve the request for a narrower opening if the department determines that:
 - (1) The structure will no longer be considered a dam as defined in RSA 482:2, II;
 - (2) The remains of the dam between the ordinary high water marks on both sides of the river will not create a safety hazard to the public when using the river;
 - (3) The natural flow of sediment and nutrients will not be impeded; and
 - (4) The passage of fish and other aquatic species will not be impeded.

Source. #1716, eff 2-20-81; ss by #2207, eff 12-13-82; ss by #2900, eff 11-7-84, EXPIRED 11-7-90
. #8414, eff 8-20-05; ss by #10510, eff 1-22-14

Env-Wr 602.02 Dam Removal Proposal. The person seeking to remove a dam shall submit:
(a) An application for a permit as required under RSA 482-A and Env-Wt 100 et seq., including the plans and specifications required for that application; and
(b) An attachment to the application for dam removal projects as specified in Env-Wr 602.03.

Source. #1716, eff 2-20-81; ss by #2207, eff 12-13-82; ss by #2900, eff 11-7-84, EXPIRED 11-7-90
New. #8414, eff 8-20-05; ss by #10510, eff 1-22-14

Env-Wr 602.03 Attachment for Dam Removal Projects. The information provided on the attachment to the application for dam removal projects shall include the following:
(a) The name, mailing address, and daytime telephone number of the applicant and, if the applicant is not the owner, the name and mailing address of the owner;
(b) The state dam identification number;
(c) The hazard classification of the dam;
(d) The current use of the dam;
(e) The height and length of the dam, in feet;
(f) The type of construction of the dam;
(g) The approximate surface area of the impoundment, in acres;
(h) The name(s), mailing address(es), and daytime telephone number(s) of the person(s) proposed to remove the dam;
(i) A description of the proposed methods to remove the dam, including construction sequence, so as to meet the criteria of Env-Wr 602.01 and Env-Wr 604.01(a); and
(j) An explanation of the purpose for removing the dam.

Source. #1716, eff 2-20-81; ss by #2207, eff 12-13-82; ss by #2900, eff 11-7-84, EXPIRED 11-7-90
New. #8414, eff 8-20-05; ss by #10510, eff 1-22-14

PART Env-Wr 603 REVIEW PROCEDURES

Env-Wr 603.01 Notification.

(a) The person proposing to remove a dam shall notify the local governing body of the municipality or municipalities in which the dam or the water body formed by the dam is located in accordance with RSA 482:13, I.
(b) The person proposing to remove the dam shall provide a copy of the notice sent pursuant to (a), above, to the department.

Source. #1716, eff 2-20-81; ss by #2207, eff 12-13-82; ss by #2900, eff 11-7-84, EXPIRED 11-7-90
New. #8414, eff 8-20-05; ss by #10510, eff 1-22-14

Env-Wr 603.02 Review.

(a) Upon receiving an application to remove a dam, the department shall review the application to determine whether it is complete.
(b) If the department determines that all of the information required by Env-Wr 602.02 or the notice required by Env-Wr 603.01(b) has not been submitted, the department shall notify the person proposing to remove the dam of what is needed to complete the application.

(c) After receiving a complete application and after the meeting required by RSA 482:13, II has been held, the department shall review the application.

Source. #1716, eff 2-20-81; ss by #2207, eff 12-13-82; ss by #2900, eff 11-7-84, EXPIRED 11-7-90
New. #8414, eff 8-20-05; ss by #10510, eff 1-22-14

PART Env-Wr 604 APPROVAL; REPORT

Env-Wr 604.01 Dam Removal Approval.

- (a) The department shall approve the removal of the dam if the applicant:
- (1) Proposes a dam removal project that meets the criteria of Env-Wr 602.01; and
 - (2) Demonstrates that the dam removal will be performed in a manner that:
 - a. Will not cause damage to structures downstream of the dam; and
 - b. Will not cause environmental damage that cannot self-restore within one year.
- (b) The department shall notify the applicant and the owner, if the applicant is not the owner, in writing of its decision.

Source. #1716, eff 2-20-81; ss by #2207, eff 12-13-82; ss by #2900, eff 11-7-84, EXPIRED 11-7-90
New. #8414, eff 8-20-05; ss by #10510, eff 1-22-14

Env-Wr 604.02 Post-Removal Report. Upon completion of the removal, the person removing the dam shall file with the department a written statement certifying that the removal was completed in accordance with the approved plans and specifications.

Source. #1716, eff 2-20-81; ss by #2207, eff 12-13-82; ss by #2900, eff 11-7-84, EXPIRED 11-7-90
New. #8414, eff 8-20-05; ss by #10510, eff 1-22-14

Appendix C: Massachusetts Statutes and Rules

302 CMR: DEPARTMENT OF CONSERVATION AND RECREATION

10.09: Dam Construction, Repair, Alteration, Breach or Removal Permit

(1) General Application. Any person(s) who proposes to construct, repair, materially alter, breach or remove a dam, pursuant to M.G.L. c. 253, must file with the Commissioner a permit application to determine whether or not a Chapter 253 Dam Safety Permit is required. Routine maintenance-related work such as mowing, brush cutting, spillway debris removal and other site maintenance does not require a Chapter 253 Dam Safety Permit. Approved permits issued by the Commissioner do not relieve the applicant from required compliance with M.G.L. c. 131, § 40, and, where applicable, M.G.L. c. 131, §§ 5C and 19. Applications shall be sent by certified mail, return receipt requested. All permit applications must comply with DCR's standard design and construction criteria (see 302 CMR 10.14). If the Commissioner determines that the proposed dam falls within the jurisdiction of 302 CMR 10.00, the owner must complete the construction, repair, alteration, breach or removal permit application as follows:

(a) Preliminary Report. The Permit application for any dam shall include a preliminary report. (Filing of the preliminary report prior to filing the final report, early in the site investigation and design schedule, is encouraged to assure the Commissioner's concurrence with the hazard potential classification, site investigations, design concept and required design analysis and supporting data.) The preliminary report shall be filed with the permit application and shall include, but not be limited to, the following information:

- completion of all required information on the application;
 - maps showing the location of the proposed structure that include the county, location of state roads, access to site, and outline of the reservoir (aerial photographs or U.S. Geological Survey may be used);
 - preliminary drawings or sketches that include cross sections, plans and profiles of the dam, proposed pool levels, and type of all spillways;
 - preliminary design criteria and basis for selection including a description of the size, ground cover conditions, and extent of development of the watershed, drainage area, spillway design storm, geology and geotechnical engineering assumptions for the foundation and embankment materials, and type of materials used in the principal spillway(s); and
 - book and page number of location of the dam as recorded in the Registry of Deeds with the name of the Registry.
- (b) Final Design Report. Approval or denial of a permit to construct, repair, alter, breach or remove a dam will be issued within 60 days from the time the final design report and permit application is received. The final design report shall include, but may not be limited to, the following information:

- A report of the investigation of the foundation soils or bedrock and the borrow materials, including the location of borrow areas, that are to be used to construct or repair the dam;
- Analysis and/or criteria to indicate that the dam will be stable during construction and filling and under all conditions of reservoir operations;
- Computations indicating that the dam is safe against overtopping during occurrence of the inflow design flood and wave action; however, wave action need not be considered when the design flood is based on the full probable maximum precipitation (PMP);
- Criteria, design data or references to indicate that seepage flow through the embankment, foundation, and abutments will be controlled to limit internal erosion and sloughing in the area where the seepage occurs;
- Calculations and assumptions relative to design of the spillway(s);
- Provisions to protect the upstream slope, crest, and downstream slope of earth embankments and abutments from erosion due to wind and rain;
- Other design data, assumptions and analysis data pertinent to individual dams and site conditions as needed;
- A proposed construction schedule;
- A proposed filling schedule for the reservoir;
- A maintenance and operation plan; and
- For all new high and significant hazard potential dams, an emergency action plan to be implemented in the event of a dam failure. The preliminary report and the final design report may be submitted as one document.

(2) Construction Documents. Two sets of plans and specifications must be submitted along with the Final Design Report. The documents shall be detailed engineering design drawings and specifications that include the following at a minimum:

- (a) A cover sheet one showing the name of the project; name of owner; hazard potential classification of the dam; designated access to the project; and location with respect to highways, roads, streams, and any dam(s) that would affect or be affected by the proposed structure;
- (b) Maps showing the drainage area and outline of the reservoir and the ownership of properties covered by the reservoir or flood pools;
- (c) Geologic investigation, cross section, profiles, logs of borings, location of borrow areas, drawing of principal and emergency spillways, drawn in sufficient detail to clearly indicate the extent and complexity of the work performed;
- (d) The technical provisions, as may be required, to describe the method of construction and quality control for the project; and
- (e) Special provisions, as may be required, to describe technical provisions and requirements needed to ensure that the dam is modified and repaired according to the approved plans and specifications.

(3) Notification. The Commissioner shall notify the applicant in writing within 60 days following the receipt of the completed application and all required technical design submittals if the application is approved or disapproved. If the application is disapproved an explanation will be provided.

(4) Permit. Approval of construction, drawdown, repair, alteration, breach or removal of a dam will be contained in a Chapter 253 Permit to be issued by the Commissioner. A permit may be subject to written general stipulations and/or written specific stipulations deemed necessary by the Commissioner. No construction shall be performed until the permit is issued and recorded in the Registry of Deeds for the county within which the dam lies. The permit shall be valid for the construction schedule specified in the approved final design report and application. Construction must commence within two years after the permit is issued. If construction does not commence

within two years after the permit is issued, the permit shall expire and a new application shall be submitted unless prior to the permit expiration date, upon written application and for good cause shown, the Commissioner extends the time for commencing construction.

(5) Recording a Chapter 253 Permit. A permit to construct, drawdown, repair, alter, breach or remove a dam shall be recorded at the Registry of Deeds in the county where the dam lies. Recording must be done prior to the commencement of construction and a copy of the recorded permit filed with the Commissioner.

(6) Notice of Construction and Drawdown Notification.

- (a) For dam safety permitted projects, at least 21 days before construction and/or controlled drawdown is commenced, the owner shall provide notice by certified and/or registered mail to the Commissioner, the local Conservation Commission and to the Commonwealth Division of Fish and Wildlife, Field Headquarters, 1 Rabbit Hill Road, Westborough, MA 01581 attn: Natural Heritage and Endangered Species Section. 302 CMR: DEPARTMENT OF CONSERVATION AND RECREATION
- (b) In cases of emergency conditions, when repairs are necessary to safeguard life and property, they may be started under the provisions of M.G.L. c. 253, § 47 upon notification by the Commissioner that an emergency condition exists. The owner shall assign a registered professional engineer to monitor any drawdown for the first four hours after its commencement, observing conditions at least on an hourly basis. Thereafter, the owner or his or her registered professional engineer shall monitor the drawdown at least once each 24 hours, or as otherwise determined by the Commissioner, until drawdown has been completed. Except for emergency drawdowns in accordance with an order issued by the Commissioner, to meet standards established by the Commonwealth Division of Fisheries and Wildlife, drawdown rates should not exceed four cubic feet per second per square mile of drainage area (CFSM), as measured at the outlet structure. During re-impoundment, 0.5 cfs/m should be maintained at the outflow.

(7) Entry. During construction, the Commissioner or his or her designee may enter upon the property to inspect without prior notice and may direct any additional testing or actions as required.

(8) Removal of Dams. If it is desirable to remove a dam due to new construction, abandonment or unsafe conditions, the owner shall be required to comply with 302 CMR 10.09 regarding the construction and repair of dams. Upon complete removal of the dam, the Commissioner will issue a Certificate of Approval stating that the removal has been in accordance with the approved plans and specifications, or any approved revisions thereof.

10.14: Design and Construction Criteria for New and Existing Dams

(1) General. Design and construction of dams shall comply with 302 CMR 10.14. Design and construction standards that are not included in 302 CMR 10.14, shall conform to design procedures established by: The U.S Army Corps of Engineers, the U.S. Bureau of Reclamation, the U.S. Natural Resources Conservation Service and other generally accepted engineering practices and principles. Where specific site conditions may exist which warrant appropriate changes in the following design and construction criteria, the Commissioner shall review and approve the design.

(2) Foundations and Abutments. The foundations and abutments investigation shall consist of borings, test pits, and other subsurface exploration necessary to assess the soil, rock, and groundwater conditions.

(3) Construction Materials. Specifications for construction materials shall establish minimum acceptance criteria so that anticipated design properties are achieved. If the use of onsite borrow materials is specified, exploration, testing, and calculations shall be performed to indicate that there are sufficient quantities of material available that meet the design criteria.

(4) Surveys. Surveys shall be made with sufficient accuracy and scale to locate the proposed construction and to define the volume of the storage in the reservoir. The downstream area shall be investigated in order to delineate the area of potential damage in case of failure. Locations of centerlines, and other horizontal and vertical control points, shall be shown on a map of the site.

(5) Hydrologic Investigation. The drainage area shall be determined. Present land use shall be considered in determining the runoff characteristics of the drainage area. All hydrologic assumptions and design calculations shall be included in the report.

(6) Spillway Design.

(a) The spillway system shall have a capacity to pass a flow resulting from a design storm, as indicated in the following table, unless the applicant provides calculations, designs and plans to show that the design flow can be stored, passed through, or passed over the dam without failure occurring.

SPILLWAY DESIGN FLOOD DESIGN STORM Hazard Potential	Size	Existing Dams	New Dams
Low	small intermediate large	50 year 50 year 100 year	100 year 100 year 100 year
Significant	small intermediate large	100 year 100 year 500 year	500 year 500 year ½ PMF
High	small intermediate large	500 year ½ PMF ½ PMF	PMF PMF PMF

(b) Vegetated earth or unlined emergency spillway(s) will be approved when computations indicate that it will pass the design flood without jeopardizing the safety of the structure. The risk of recurring storms, excessive erosion, and inadequate vegetative cover will be considered acceptable in such a spillway when its average frequency of use is predicted to be no more than indicated in the following table.

10.14: continued

EMERGENCY SPILLWAY FREQUENCY TABLE Hazard Potential	Size	Existing Dams	New Dams
Low	small intermediate large	25 years 25 years 25 years	25 years 25 years 25 years
Significant	small intermediate large	25 years 25 years 50 years	50 years 50 years 50 years
High	small intermediate large	50 years 50 years 100 years	100 years 100 years 100 years

(c) The Department recognizes that the relationships between valley slope and width, total reservoir storage, drainage area, and other hydrologic factors have a critical bearing on determining the safe spillway design flood. Rational selection of a safe spillway design flood for specific site conditions based on quantitative and relative impact analysis is acceptable. The spillway may be sized so that the increased downstream damage resulting from an overtopping failure of the dam (*i.e.*, the selected spillway design capacity has been exceeded) would not be significant when as compared with the damage caused by the flood in the absence of dam overtopping failure. In *lieu* of quantitative and relative impact analysis, the preceding table shall be used as spillway design criteria.

(d) Lined Spillways and Channels. The design report shall include design data criteria for open channel, drop, ogee, and chute spillways and other spillway types that include crest structures, walls, channel linings, and miscellaneous details. All masonry or concrete structures shall have joints that are relatively water tight and shall be placed on foundations capable of sustaining applied loads without undue deformation. Provisions must be made for handling leakage from the channel or under seepage from the foundation which might cause saturation of underlying materials or uplift against the undersurfaces.

(7) Conduits. A gate or controlled conduit shall be provided to drain each reservoir.

(a) Any new and/or existing conduit design shall include the computation of the minimum time required to drain the reservoir.

(b) All pipe conduits shall convey water at the design velocity without damage to the interior surface.

(c) Protection shall be provided to prohibit unsafe seepage along conduits through the dam, abutments, and foundations. The specific design for seepage protection along conduits shall be shown in the drawings and specifications.

(d) Adequate allowances shall be incorporated in the design to compensate for differential settlement and possible elongation of the pipe conduit.

(e) Trash racks shall be installed at the intake of conduits to prevent clogging the conduit.

(f) Pipe Conduit Materials.

1. Pipe conduits shall be designed to support the total external loads in addition to the total internal hydraulic pressure without leakage.

2. Reinforced or Prestressed Concrete Pipe Conduits.

- a. All conduits shall be designed and constructed to remain watertight under maximum anticipated hydraulic pressure and maximum probable joint opening, including the effects of joint rotation and extensibility.
- b. Provisions for safe movement of the barrel shall be provided at each joint in the barrel and at the junction of the barrel and riser or inlet. Cradles shall be articulated if constructed on a yielding foundation.
- c. The owner's engineer shall submit the final design details of the proposed pipe to be used for all significant and high hazard potential dams.

3. Corrugated Metal Pipe Conduits.

- a. Corrugated metal pipe shall not be used in any dam, except for special cases where the design engineer can adequately demonstrate satisfactory performance. Any exemption which allows their use must be issued in writing by the Commissioner.

4. Dissipating Devices. All gates, valves, conduits and concrete channel outlets shall be provided with an energy dissipater designed and constructed to control erosion and prevent damage to the embankment or the downstream outlet or channel.

(g) In the case when an alternative method(s) of drawdown is requested, the proponent shall submit with the permit application reasons why a waiver should be granted (*i.e.*, contaminated sediment, funding issues, complexity of construction). The request for waiver shall demonstrate that the water in storage can be moved out of the reservoir by mechanical means. The project design report shall include a detailed description of the pumps, siphons, *etc.* that would be necessary to remove the stored water in a reasonable period of time and maintain the reservoir in a dry state if necessary. A detailed drawdown plan must be included in the design, that identifies the volume of water in storage, the rate of inflow under average inflow conditions, identification of pump equipment, or other means necessary to remove stored water and maintain a drawdown condition, the time it will take to lower the water level, *etc.* The alternative drawdown plan shall be included in the required Operation and Maintenance Manual (O&MM) and in the Emergency Action Plan (EAP), if required.

(h) In the case where an existing conduit is in poor condition (*i.e.*, severely deteriorated, structurally compromised, leaky) and the condition could compromise the structural stability of the existing dam, the design report shall address the compromised conduit condition (relining, slip lining, grouting or other feasible means) and bring the existing conduit to safe and good condition.

(8) Seepage Control.

(a) All dams shall be designed and constructed to prevent the development of instability due to excessive seepage forces, uplift forces, or loss of materials in the embankment, abutments, spillway areas, or foundation. Seepage analyses for design shall identify areas having high internal uplift or exit gradients.

(b) The design shall include an embankment internal drainage system, a zoned embankment, a foundation cut-off, an upstream blanket, a sufficiently wide homogeneous section, or other methods to protect against instability from excessive seepage forces or high hydraulic gradients.

(c) For high hazard potential dams, a flow net analysis shall be made to determine the location of the phreatic surface, flow lines, and equipotential lines within the embankment and its foundation. These analyses may be based on graphical construction, electrical or

liquid analogs, soil prototype methods, or other generally accepted methods. The flow net and stability analysis shall be the maximum water storage elevation. Possible fluctuations in tail water elevation shall be included in the analysis. The flow net and seepage analysis shall be included in the final design report.

(d) Piezometers for confirming the location of the phreatic surface assumed for seepage and slope stability analyses shall be considered by the design engineer for low and significant hazard potential dams and shall be required for high hazard potential dams. Where piezometers are required, their design, depths and locations shall be provided in the final design report.

(9) Structural Stability and Slope Protection.

(a) Design and construction of dams to assure structural stability shall be consistent with accepted engineering practice. The scope and degree of precision that will be required for a specific project will depend on the conditions of the site and the damage potential of the proposed structure. Consideration in design for structural stability shall include, but are not necessarily limited to, the following:

1. The hazard potential of the dam under present downstream conditions and under conditions which would likely develop during the life of the reservoir;
2. Foundation bearing capacity, compressibility, and permeability; the extent and reliability of the site investigation; and the predictability of the site and foundation conditions;
3. The reliability of construction materials, such as borrow soils, in terms of sufficient volume to complete construction without unanticipated interruption and in terms of predictability of physical properties such as strength, permeability, and compressibility;
4. Durability of construction materials;
5. Construction conditions at the site;
6. The degree of quality control to be exercised during construction;
7. Pore pressure build-up during construction;
8. The rate of filling the reservoir and the rate of possible reservoir drawdown;
9. Tailwater conditions and the impact of drawdown;
10. Possible effects of landslides and subsurface solution activity on the structural stability of the dam and spillway structures; and
11. The extent of the proposed use of piezometers and other devices which will be used to monitor the completed dam and the means of access for inspections.

(b) Slope stability analysis shall be considered by the design engineer for all embankment dams, or as required by the Commissioner, and is required for high hazard potential dams. Where slope stability analysis is required, documentation in the final design report, such analysis shall include the design cross section(s) showing the soil parameters assumed for analysis, the location of the phreatic surface assumed for analysis, stability computations, and the location and computed safety factor(s) for the most critical circle(s) or failure wedge(s).

(c) Minimum factors of safety are listed in the following table. Final accepted factors of safety may depend upon the degree of confidence in the engineering data available. In selecting a minimum acceptable factor of safety, an evaluation should be made on both the degree of conservatism with which assumptions were made in choosing soil strength parameters and pore water pressures, and the influence of the method of analysis used.

- . 302 CMR 10.14(8)(c) shall not be applicable to embankments on clay shale foundations, soft sensitive clays, or materials with large strength loss under stresses.
- . For embankments over 50 ft. high on relatively weak foundations, a minimum factor of safety of 1.4 shall be used.

Appendix D: Pennsylvania Statutes and Rules

Act 325 of 1978

Section 5. Regulations and standards.

(a) The Environmental Quality Board shall have the power, and its duty shall be, to adopt such regulations and standards for the design, construction, operation, monitoring, maintenance, modification, repair and removal of dams and reservoirs, water obstructions and encroachments as are necessary and proper to carry out the purposes of this act. The regulations shall include, but are not limited to, rules establishing:

- (1) Standards and criteria for the siting and design of dams, water obstructions and encroachments considering both existing and projected conditions which may affect the safety of a project during its construction and operational life.
- (2) Requirements for operation of dams including operational plans to be prepared and implemented by owners.
- (3) Requirements for monitoring, inspection and reporting of conditions affecting the safety of dams, water obstructions and encroachments.
- (4) Requirements for emergency warning and action plans to be prepared and implemented by owners, in cooperation with civil authorities.
- (5) Reasonable fees for the processing of applications and periodic inspections, for the purpose of reimbursing the Commonwealth for the costs of administration of this act.

(b) In promulgating regulations pursuant to this act applicable to dams, and to water obstructions and encroachments which may present a substantial potential risk to life or property, the Environmental Quality Board shall consider:

- (1) the inclusion of the best available preventative measures necessary to assure protection of life, health, property and the environment with an adequate margin of safety;
- (2) water management and the impacts of development in watersheds as a whole;
- (3) the state of scientific and technological knowledge at the time the regulations are adopted; and
- (4) the immediate and long-range economic impact upon the Commonwealth and its citizens.

(c) In promulgating regulations pursuant to this act applicable to water obstructions and encroachments which do not present substantial potential risks to life or property, the

Environmental Quality Board shall consider:

- (1) the state of scientific and technological knowledge and good engineering practice relating to various types of water obstructions and encroachments;
- (2) the economic impact upon the Commonwealth and its citizens;
- (3) the relationship of water obstructions and encroachments to hydrologic management in the watershed as a whole; and
- (4) the impacts of water obstructions and encroachments upon water quality and the environment.

(5 amended Oct. 23, 1979, P.L.204, No.70)

Compiler's Note: Section 502(c) of Act 18 of 1995, which created the Department of Conservation and Natural Resources and renamed the Department of Environmental Resources as the Department of Environmental Protection, provided that the Environmental Quality Board shall have the powers and duties currently vested in it, except as vested in the Department of Conservation and Natural Resources by Act 18 of 1995, which powers and duties include those set forth in section 5.

Section 6. Permit requirement.

- (a) No person shall construct, operate, maintain, modify, enlarge or abandon any dam, water obstruction or encroachment without the prior written permit of the department.
- (b) Any existing dam, water obstruction or encroachment constructed pursuant to a license or permit issued in compliance with the provisions of the act of June 8, 1907 (P.L.496, No.322), entitled "An act to establish a Board of Commissioners of Navigation for the river Delaware and its navigable tributaries; regulating their jurisdiction over ships, vessels, and boats, and wharves, piers, bulkheads, docks, slips and basins; and exempting cities of the first class from certain of its provisions; and making an appropriation therefor," or the act of June 25, 1913 (P.L.555, No.355), entitled "An act providing for the regulation of dams, or other structures or obstructions, as defined herein, in, along, across, or projecting into all streams and bodies of water wholly or partly within, or forming part of the boundary of, this Commonwealth; vesting certain powers and duties in the Water Supply Commission of Pennsylvania, for this purpose; and providing penalties for the violation of the provisions hereof," shall be deemed to comply with the construction and operating permit requirements of this section. All such projects shall hereafter comply with the operating, maintenance, monitoring and other requirements of this act.
- (c) The owner of any existing dam, water obstruction or encroachment who does not hold a permit issued pursuant to the Act of June 8, 1907 (P.L.496, No.322), or the act of June 25, 1913 (P.L.555, No.355) shall apply for and receive a permit pursuant to this act on or before January 1, 1981. After the effective date of this act, all such projects shall comply with the operating, maintenance, monitoring and other requirements of this act.
- (d) Any permit issued by the department after the effective date of this act for the construction and operation of a water obstruction or encroachment shall incorporate authorization for normal repairs and maintenance of permitted structures conducted within the original specifications for the water obstruction or encroachment. Any repairs or maintenance involving modification of the water obstruction or encroachment from its original specifications and any repairs or reconstruction involving a substantial portion of the structure, shall require the prior written permit of the department pursuant to subsection (a).

(6 amended Oct. 23, 1979, P.L.204, No.70)

Section 7. General permits and waiver of permit requirements.

- (a) The Environmental Quality Board may, by regulation, waive the permit requirements for any category of dam, water obstruction or encroachment which it determines has insignificant effect upon the safety and protection of life, health, property and the environment.

(b) The department may, in accordance with rules adopted by the Environmental Quality Board, issue general permits on a regional or Statewide basis for any category of dam, water obstruction or encroachment if the department determines that the projects in such category are similar in nature, and can be adequately regulated utilizing standardized specifications and conditions.

(c) General permits shall specify such design, operating and monitoring conditions as are necessary to adequately protect life, health, property and the environment, under which such projects may be constructed and maintained without applying for and obtaining individual permits. The department may require the registration of any project constructed pursuant to a general permit.

(d) All general permits shall be published in the Pennsylvania Bulletin at least 30 days prior to the effective date of the permit.

(7 amended Oct. 23, 1979, P.L.204, No.70)

Compiler's Note: Section 502(c) of Act 18 of 1995, which created the Department of Conservation and Natural Resources and renamed the Department of Environmental Resources as the Department of Environmental Protection, provided that the Environmental Quality Board shall have the powers and duties currently vested in it, except as vested in the Department of Conservation and Natural Resources by Act 18 of 1995, which powers and duties include those set forth in section 7.

Pennsylvania Code: 25 Pa Ch.105

§ 105.11. Permit requirements.

(a) A person may not construct, operate, maintain, modify, enlarge or abandon a dam, water obstruction or encroachment without first obtaining a written permit from the Department.

(b) An existing dam, water obstruction or encroachment constructed under a license or permit issued in compliance with the act of June 8, 1907 (P. L. 496, No. 322) (53 P. S. § 16834 note and 55 P. S. §§ 332.1 and 332.2) or the Water Obstructions Act, shall be deemed to comply with the construction and operating permit requirements of this section. These projects shall, after September 27, 1980, comply with the operating, maintenance, monitoring and other requirements of this chapter.

(c) The owner of an existing dam, water obstruction or encroachment who does not hold a permit issued under the act of June 8, 1907 (P. L. 496, No. 322) or the Water Obstructions Act shall apply for and receive a permit to operate and maintain the facility under the act on or before January 1, 1981. For purposes of this subsection, a limited power permit issued under the Limited Power and Water Supply Act will be deemed to have been issued under the Water Obstructions Act. These projects shall comply with the operating, maintenance, monitoring and other requirements established under the act.

(d) A permit issued by the Department after July 1, 1979, for the construction and operation of a water obstruction or encroachment will incorporate authorization for normal repairs and maintenance of permitted structures conducted within the original specifications for the water obstruction or encroachment. A repair or maintenance involving modification of the water obstruction or encroachment from its original specifications and a repair or reconstruction involving a substantial portion of the structure shall require the prior written permit of the Department under subsection (a).

(e) A water obstruction or encroachment or modification thereof, constructed or authorized pursuant to the terms of a permit issued under this chapter prior to October 12, 1991, will be deemed to comply with the construction permit requirements of this subchapter. These projects must, after October 12, 1991, comply with the operating, maintenance, monitoring and other requirements of this chapter.

(f) A dam or modification thereof, constructed or authorized pursuant to the terms of a permit issued under this chapter prior to January 8, 2011, will be deemed to comply with the construction permit requirements of this subchapter. These projects must, after January 8, 2011, comply with the operating, maintenance, monitoring and other requirements of this chapter.

§ 105.12. Waiver of permit requirements.

(a) Under section 7 of the act (32 P. S. § 693.7), the requirements for a permit are waived for the following structures or activities, regardless of when commenced. If the Department upon complaint or investigation finds that a structure or activity which is eligible for a waiver, has a significant effect upon safety or the protection of life, health, property or the environment, the Department may require the owner of the structure to apply for and obtain a permit under this chapter.

(11) The removal of abandoned dams, water obstructions and encroachments if the Department determines in writing on the basis of data, information or plans submitted by the applicant that the removal of the abandoned dam water obstruction or encroachment cannot imperil life or property, have significant effect on coastal resources or have an adverse impact on the environment, and the plans provide for restoration and stabilization of the project area.

§ 105.13a. Complete applications.

(a) An application for a permit is complete when the necessary information is provided and requirements under the act and this chapter have been satisfied by the applicant.

(b) When the Department determines that an application is incomplete or contains insufficient information, it will notify the applicant in writing. The applicant shall have 60 days from the date of the Department's letter to complete the application or the Department will consider the application to be withdrawn. Requests for a specific extension shall be submitted by the applicant in writing. The applicant will be notified in writing when an application is considered withdrawn. If the applicant chooses to reapply for a permit, a new complete application and fee will be required.

§ 105.13b. Proof of financial responsibility.

For continued operation and maintenance of all existing Hazard Potential Category 1 or Category 2 dams, as classified in § 105.91 (relating to classification of dams and reservoirs), and water obstructions or encroachments which present a substantial potential risk to life or property; and as a requirement for approval of a permit under this chapter for a Hazard Potential Category 1 or Category 2 dam, and water obstruction or encroachment which presents a substantial potential risk to life or property, the Department will require proof of financial responsibility or security assuring the proper construction, repair, operation and maintenance, inspection and monitoring and removal, if necessary, of the facility.

(1) As proof of responsibility or security, the Department may require one or more of the following:

(i) A certificate of public convenience from the Public Utility Commission if the owner of the proposed facility is subject to regulation under 66 Pa.C.S. (relating to Public Utility Code).

(ii) Ownership or management of the facility by an agency of the Federal, State, county or municipal government or of an interstate compact.

(iii) A bond or other legal device of a form acceptable to the Department, payable to the Commonwealth, which guarantees proper construction, repair, operation and maintenance, inspection and monitoring, and removal, if necessary, of the facility. The amount of bond or legal device must be sufficient to cover the costs of entry, repair, correction, operation, maintenance, inspection, monitoring or removal of the facility by the Commonwealth in the event of failure of the owner to comply with orders of the Department, terms and conditions of the permit, this chapter and the act and section 302 of the Flood Plain Management Act (32 P. S. § 679.302).

(2) The Department may, upon review, request an increase in the amount of the bond or other legal device noted in paragraph (1)(iii) as necessary to ensure that sufficient funds are available. The Department may not increase this amount more than once every 10 years unless the facility is being modified by permit.

(3) This chapter applies to already existing permits issued for a Hazard Potential Category 1 or Category 2 dam. The owner of an already existing permitted Hazard Potential Category 1 or Category 2 dam shall satisfy the requirements of this section by January 8, 2016.

§ 105.14. Review of applications.

(a) An application will be reviewed to determine the proposed project's effect on health, safety and the environment, in accordance with prevailing practices in the engineering profession and in accordance with current environmental principles.

(b) In reviewing a permit application under this chapter, the Department will use the following factors to make a determination of impact:

(1) Potential threats to life or property created by the dam, water obstruction or encroachment.

- (2) Potential threats to safe navigation created by the dam, water obstruction or encroachment.
- (3) The effect of the dam, water obstruction or encroachment on the property or riparian rights of owners upstream, downstream or adjacent to the project.
- (4) The effect of the dam, water obstruction or encroachment on regimen and ecology of the watercourse or other body of water, water quality, stream flow, fish and wildlife, aquatic habitat, instream and downstream uses and other significant environmental factors.
- (5) The impacts of the dam, water obstruction or encroachment on nearby natural areas, wildlife sanctuaries, public water supplies, other geographical or physical features including cultural, archaeological and historical landmarks, National wildlife refuges, National natural landmarks, National, State or local parks or recreation areas or National, State or local historical sites.
- (6) Compliance by the dam, water obstruction or encroachment with applicable laws administered by the Department, the Fish and Boat Commission and river basin commissions created by interstate compact.
- (7) The extent to which a project is water dependent and thereby requires access or proximity to or siting within water to fulfill the basic purposes of the project. The dependency must be based on the demonstrated unavailability of any alternative location, route or design and the use of location, route or design to avoid or minimize the adverse impact of the dam, water obstruction or encroachment upon the environment and protect the public natural resources of this Commonwealth.
- (8) Present conditions and the effects of reasonably foreseeable future development within the affected watershed upstream and downstream of the dam, water obstruction or encroachment:
- (i) A dam, water obstruction or encroachment shall be designed, constructed and operated to assure adequacy and compliance with this chapter, taking into account reasonably foreseeable development within the watershed.
 - (ii) In assessing the impact of future development upon a dam, water obstruction or encroachment, the Department may require the applicant to submit data regarding estimated development potentials and municipal, county and regional planning related to the affected watershed.
- (9) Consistency with State and local floodplain and stormwater management programs, the State Water Plan and the Coastal Zone Management Plan.
- (10) Consistency with the designations of wild, scenic and recreational streams under the Wild and Scenic Rivers Act of 1968 (16 U.S.C.A. § § 1271—1287) or the Pennsylvania Scenic Rivers Act (32 P. S. § § 820.21—820.29), including identified 1-A candidates.

(11) Consistency with State antidegradation requirements contained in Chapters 93, 95 and 102 (relating to water quality standards; wastewater treatment requirements; and erosion and sediment control) and the Clean Water Act (33 U.S.C.A. § § 1251—1376).

(12) Secondary impacts associated with but not the direct result of the construction or substantial modification of the dam or reservoir, water obstruction or encroachment in the area of the project and in areas adjacent thereto and future impacts associated with dams, water obstructions or encroachments, the construction of which would result in the need for additional dams, water obstructions or encroachments to fulfill the project purpose.

(13) For dams, water obstructions or encroachments in, along, across or projecting into a wetland, as defined in § 105.1 (relating to definitions), the Department will also consider the impact on the wetlands values and functions in making a determination of adverse impact.

(14) The cumulative impact of this project and other potential or existing projects. In evaluating the cumulative impact, the Department will consider whether numerous piecemeal changes may result in a major impairment of the wetland resources. The Department will evaluate a particular wetland site for which an application is made with the recognition that it is part of a complete and interrelated wetland area.

(c) In reviewing a permit application under § 105.11(c) (relating to permit requirements) and section 6(c) of the act (32 P. S. § 693.6(c)) for the operation and maintenance of an existing dam, water obstruction or encroachment, the Department will use the following factors:

(1) Potential threats to life, property or safe navigation created by the continuing operation or maintenance of the project.

(2) Adverse impact on stream flow, water quality or the environment which might be reduced or mitigated by reasonable changes in the operation of the project.

(3) Compliance of the operation and maintenance of the project with applicable laws administered by the Department, the Fish and Boat Commission and river basin commissions created by interstate compact.

(d) The Department may review a permit application for the operation and maintenance of existing projects without regard to the design criteria and construction requirements in Subchapters B—J. If the Department finds that an existing dam, water obstruction or encroachment is unsafe or adversely affects property or the environment, it may consider application of criteria and requirements reasonably necessary to correct the conditions.

§ 105.15. Environmental assessment.

(a) A person may not construct, operate, maintain, modify, enlarge or abandon the following categories of structures or activities until an Environmental Assessment has been approved in writing by the Department. The Environmental Assessment must be on a form provided by the Department and include the following information:

(1) For dams, water obstructions or encroachments permitted under this chapter, the Department will base its evaluation on the information required by § 105.13 (relating to permit

applications—information and fees) and the factors included in § 105.14(b) (relating to review of applications) and this section.

(2) For dams, water obstructions or encroachments located in, along or projecting into a wetland for which a permit is not otherwise required under this chapter, the Department will base its evaluation on the information required by § 105.13(d) and the factors included in § 105.14(b) and this section.

(3) For dams located in, along or projecting into an exceptional value water as defined in Chapter 93 (relating to water quality standards) for which a permit is not otherwise required under this chapter, the Department will base its evaluation on the information required by the factors included in Chapter 93 and § § 105.13(d) and 105.14(b) and the following information submitted by the applicant:

- (i) The surface area of the impoundment.
- (ii) The height of the dam.
- (iii) The mean depth and maximum depth of the stream at the location of the dam.
- (iv) A description of the release structure.
- (v) The rate of a conservation release.
- (vi) The design of bypass structures.
- (vii) The use of the dam.
- (viii) The material used for construction of the dam.

(b) For structures or activities where water quality certification is required under section 401 of the Clean Water Act (33 U.S.C.A. § 1341), an applicant requesting water quality certification under section 401 shall prepare and submit to the Department for review, an environmental assessment containing the information required by subsection (a) for every dam, water obstruction or encroachment located in, along, across or projecting into the regulated water of this Commonwealth.

(c) Based on the results of the environmental assessment required under subsection (a), the Department may require the applicant to undertake further studies and submit additional information, analyses and reports as found necessary by the Department.

(d) The environmental assessment has been conducted by the Department for all general permits, categories of structures and activities listed in § 105.12(a)(1)—(10) and (12)—(15) (relating to waiver of permit requirements). The environmental assessment has also been conducted for the structures or activities listed in § 105.12(b) or for which water quality certification has been granted for a Nationwide permit regulating the structure or activity and the environmental assessment requirements have been deemed satisfied.

§ 105.21. Criteria for permit issuance and denial.

(a) In addition to the other requirements of this chapter, a permit application will not be approved unless the applicant demonstrates that the following conditions are met:

(1) The application is complete and accurate.

(2) The proposed project or action complies with the standards and criteria of this title and with other laws administered by the Department, the Fish and Boat Commission and river basin commissions created by interstate compact.

(3) The proposed project or action will adequately protect public health, safety and the environment.

(4) The proposed project or action is consistent with the environmental rights and values secured by Pa. Const. Art. I, § 27 and with the duties of the Commonwealth as trustee to conserve and maintain public natural resources of this Commonwealth.

(5) The applicant has not been found to be in continuing violation of this title or other laws administered by the Department, the Fish and Boat Commission, or a river basin commission created by interstate compact, including, but not limited to, a violation of an adjudication and order, agreement, consent order or decree, whether or not the applicant's violation resulted in an order or civil penalty assessment.

(6) The applicant has submitted adequate proof of financial responsibility, if required under § 105.13b (relating to proof of financial responsibility).

(b) A permit issued under this chapter shall be subject to the general and special conditions regarding construction, operation, maintenance, inspection and monitoring of a project or action that the Department may deem necessary to assure compliance with the requirements and purposes of this chapter, the act, the Flood Plain Management Act (32 P. S. § § 679.101—679.601) and other laws administered by the Department, the Fish and Boat Commission and river basin commissions created by interstate compact.

(c) The Department may not issue a permit to operate and maintain a dam, water obstruction or encroachment constructed without a permit unless one of the following is met:

(1) The Department determines that the structure or activity complies with the standards and criteria of this title, including replacement in accordance with § 105.20a (relating to wetland replacement criteria), and with other laws administered by the Department, the Fish and Boat Commission and river basin commissions created by interstate compact.

(2) The Department determines that the structure or activity does not comply with the standards and criteria of this title and with other laws administered by the Department, the Fish and Boat Commission and river basin commissions created by interstate compact, that the effect on wetlands will be mitigated, and at least one of the following is met:

(i) Restoration would cause destruction of a dwelling occupied by a person who had no role in the planning or construction of the project.

(ii) Restoration may result in more long term damage than would be caused by allowing the project to remain in place.

(iii) Restoration would be unsuccessful due to material changes in the condition of the site and its surrounding area.

(iv) There are extraordinary circumstances which preclude restoration.

(d) The reason for denial of a permit application and appeal procedures will be communicated in writing to the applicant.

(e) In an appeal from a Department action concerning a permit application to operate and maintain a dam, water obstruction or encroachment, the applicant has the burden of proving that there is no reasonable basis for the Department's action.

§ 105.47. Removal of dams and removal or abandonment of water obstructions and encroachments.

(a) If construction work has not been completed within the time specified in the permit or other Department approval and the time limit specified in the permit has not been extended in writing by the Department or if a permit has been revoked for any reason, the permittee or owner shall, at his own expense and in a manner that the Department may prescribe, remove all or any portion of the work as the Department requires and restore the regulated waters of this Commonwealth to their former condition.

(b) Prior to discontinuing use or abandonment, the permittee or owner of a water obstruction or encroachment covered by this chapter, shall remove all or part of the facility and take other actions as necessary to protect safety and the environment in accordance with a permit or other approval issued by the Department.

(c) The owner of a dam covered by this chapter, shall remove all or part of the facility and take other actions as necessary to protect safety and the environment in accordance with a permit or other approval issued by the Department.