

*Chapter 1*  
*Submission of Public Water System Designs, Plans, and Reports*

**1.0 GENERAL .....2**

1.0.1 ALL SUBMITTALS .....2

1.0.2 ELECTRONIC AND HARD COPY SUBMITTALS .....2

**1.1 PERMIT APPLICATION SUBMITTALS .....2**

1.1.1 APPLICABILITY .....2

1.1.2 TRANSMITTAL FORM .....3

1.1.3 PERMIT APPLICATION PACKAGE.....3

1.1.4 REVIEW AND APPROVAL TIMELINE .....4

1.1.5 STATE REVOLVING FUND APPLICATION SUBMITTALS .....4

1.1.6 DESIGN/BUILD CONSTRUCTION CONCEPT .....4

**1.2 ENGINEERING REPORTS.....4**

1.2.1 GENERAL INFORMATION .....5

1.2.2 WATER USE DATA.....5

1.2.3 FIRE FLOW REQUIREMENTS.....5

1.2.4 SEWAGE SYSTEM.....6

1.2.5 SOURCE OF WATER SUPPLY .....6

1.2.6 PROPOSED TREATMENT PROCESSES .....6

1.2.7 WASTE DISPOSAL .....6

1.2.8 AUTOMATION .....6

1.2.9 PROJECT SITE .....6

1.2.10 ENERGY EFFICIENCY ENCOURAGED .....7

1.2.11 FINANCING .....7

1.2.12 SIMULTANEOUS COMPLIANCE .....7

1.2.13 FUTURE EXTENSIONS .....8

**1.3 PLANS.....8**

1.3.1 GENERAL LAYOUT .....8

1.3.2 DETAILED PLANS.....9

**1.4 SPECIFICATIONS .....10**

**1.5 MODIFICATIONS TO PREVIOUSLY APPROVED PLANS .....10**

**1.6 DEED RESTRICTION .....11**

**1.7 CONSECUTIVE SYSTEMS .....11**

**Acronyms used in this chapter:**

DMS: Division of Municipal Services	MEPA: Massachusetts Environmental Policy Act
DWSRF: Drinking Water State Revolving Fund	MGL: MA General Laws
DWP: Drinking Water Program	NFPA: National Fire Protection Association
EPA: US Environmental Protection Agency	PDF: portable document file
HVAC: heating, ventilating, air conditioning	PWS: public water system
ISO: Insurance Services Office, Inc.	VFD: variable frequency drive
MassDEP: MA Dept. of Environmental Protection	

# ***Chapter 1 Submission of Public Water System Designs, Plans, and Reports***

## **1.0 General**

### **1.0.1 All Submittals**

All documents submitted to MassDEP must be prepared in a legible scale and font size and shall at a minimum include the following information:

1. Identification of the municipality or area served and public water system (PWS) name and identification number (when available)
2. Name, mailing address, phone number, and e-mail address of the owner or official custodian
3. Name, mailing address, phone number, and e-mail address of the party responsible for document preparation
4. Document submittal date and appropriate status (draft, preliminary, final, as-built etc.)

### **1.0.2 Electronic and Hard Copy Submittals**

1. Unless specifically requested by MassDEP, no more than one hard copy of any document, report, or design document should be submitted.
2. Where feasible, hard copy documents should be printed on two-sided letter-sized paper and the submittal of 3-ring binders should be avoided.
3. When requested, electronic documents shall be in PDF format and submitted on a compact disk or other acceptable media.

## **1.1 Permit Application Submittals**

### **1.1.1 Applicability**

All entities seeking to develop a new public water system, install new treatment, or implement substantial modifications to an existing public water system are required to apply to the MassDEP Drinking Water Program for a permit.

1. Permit application forms can be located on the MassDEP website by selecting the appropriate category listed at: <http://www.mass.gov/dep/service/online/gettings.htm>.
2. “Substantial Modifications to a Public Water System that Require a Permit” (DWP/Policy 08-01) describes which public water system modifications require permit submittal and approval and is available at: <http://www.mass.gov/dep/water/laws/dwpp0801.doc>.

### 1.1.2 Transmittal Form

1. A *Transmittal Form for Permit Application* and payment with unique 7-digit transmittal number must be filled out and submitted with the appropriate permit application form and supporting documentation. Go to <http://www.mass.gov/dep/service/online/trasmfrm.shtml> where the permit application package can be found.
2. One copy of the transmittal form must accompany the permit application package submitted to the Regional Drinking Water Program for review and one copy must accompany the application fee payment (when applicable), which is sent to a post office box address indicated on the form.

### 1.1.3 Permit Application Package

Unless otherwise requested by MassDEP in writing, it is only necessary to submit engineering reports, plans, and specifications for the equipment and materials directly related to proposed water system installation/modification. All permit application submittals shall be one (1) hard copy and when requested one (1) electronic copy. Supporting documents required for specific types of proposals are detailed in the applicable chapters of this guidance document. The required supporting documents should include, but are not limited to:

1. A written summary of the basis of design and/or reference to previously submitted design documents (for example any applicable engineering reports);
2. Operation and control plans, where applicable;
3. General layout;
4. Detailed plans;
5. Specifications;
6. Locus map;
7. MassDEP Checklist, where applicable  
(see <http://www.mass.gov/dep/water/approvals/dwsforms.htm#wtp>);
8. Simultaneous compliance issues;
9. Discussion of Massachusetts Environmental Policy Act (MEPA) regulations;
10. Discussion of Wetlands Protection Act requirements;

11. Discussion of water pollution control (waste disposal regulations);
12. Discussion of Water Management Act Requirements; Refer to Chapter 10.0 *Water Management Act Requirements*;
13. Other information as required by MassDEP.

Applicants are encouraged to contact their regional MassDEP office for guidance prior to submitting the application package.

#### **1.1.4 Review and Approval Timeline**

MassDEP has category-specific timelines for reviewing permit applications. If the permit application package has administrative or technical deficiencies, a second review period will be required in each case, thereby extending the timeline for a final decision. The category-specific fees and timelines are available at: <http://www.mass.gov/dep/service/approvals/fy10fees.xls>, or by contacting the appropriate MassDEP Regional Office.

#### **1.1.5 State Revolving Fund Application Submittals**

Complete application package(s), including plans and specifications, need to be submitted to MassDEP Division of Municipal Services (DMS) in accordance with their program-specific requirements. Plans and specifications, including the applicable permit application(s), and the preliminary engineering report, are to be submitted to the appropriate regional office for review and approval. More information regarding Drinking Water State Revolving Fund (DWSRF) procedures can be found at <http://www.mass.gov/dep/water/approvals/srfforms.htm>.

#### **1.1.6 Design/Build Construction Concept**

Where the design/build construction concept is to be utilized, special consideration must be given to: designation of a project coordinator; close coordination of design concepts and submission of plans at certain intervals of completion (for example, 30%, 60%, 90%, and 100% stamped final) and necessary supporting information to MassDEP; allowance for project changes that may be required by MassDEP; and reasonable time for project review by MassDEP.

## **1.2 Engineering Reports**

Engineering reports may be required by MassDEP to document pertinent technical background, alternatives analysis, feasibility studies, pilot studies, basis of design, etc. as part of a proposed water system development, modification, or construction project. Engineering reports may include, as applicable:

### 1.2.1 General Information

1. An executive summary.
2. A description of the existing public water system and the purpose and objective for preparing the engineering report.
3. If the report is prepared as part of a MassDEP enforcement action, then an opening summary of the enforcement with timelines shall be included.
4. A summary of regulations pertinent to the engineering report (see instructions in appropriate permit application forms and <http://www.mass.gov/dep/water/laws/regulati.htm>).
5. A description of the nature and extent of the area to be served.
6. Provisions for extending the public water system to include additional areas or neighboring towns to demonstrate compliance with MGL Chapter 40.
7. An appraisal of the future requirements for service, including existing and potential industrial, commercial, institutional, and other water needs.
8. A discussion of the technical, financial, and managerial considerations used to evaluate alternate plans and summary of reasons for selecting the one recommended, including an analysis.

### 1.2.2 Water Use Data

1. Description of population trends as indicated by available records and the estimated population that will be served by the proposed water supply system or expanded system 20 years in the future in five-year intervals or over the useful life of critical structures or equipment.
2. Present water consumption and the projected average maximum daily demands used as the basis of design (total and gallons per capita per day (GPCD) for both present and projected using estimated populations); refer to Chapter 11.4 *Capacity Development (Water System Planning)*.
3. Present and/or estimated yield of the sources of supply.
4. Compare GPCD to demand projections from the Department of Conservation and Recreation [http://www.mass.gov/dcr/watersupply/policy\\_meth\\_08update.pdf](http://www.mass.gov/dcr/watersupply/policy_meth_08update.pdf).

### 1.2.3 Fire Flow Requirements

1. Requirements of the National Fire Protection Association (NFPA), Insurance Services Office, Inc. (ISO) or other similar agency on fire flows required or recommended in the service area involved. Refer to Chapter 9 *Distribution System Piping and Appurtenances*.
2. Fire flows that will be made available by the proposed or expanded system.

#### **1.2.4 Sewage System**

Describe existing sewage collection system and sewage treatment works, with special reference to existing or proposed public water system structures which may affect the operation of the water supply system, or which may affect the quality of the supply.

#### **1.2.5 Source of Water Supply**

Describe the proposed source(s) of water supply to be developed, the reasons for selection, and provide information as discussed in Chapter 3, *Surface Water Supply Development*, and Chapter 4, *Groundwater Supply Development and the Source Approval Process*.

#### **1.2.6 Proposed Treatment Processes**

List and describe the proposed treatment processes to be installed or modified and provide the design calculations related to the sizing of all equipment and appurtenances (i.e. pumps, tanks, pipes, meters, etc.).

Any treatment process not specifically covered in Chapter 5.0, *Treatment*, is likely considered new technology and must follow the New Technology Approval Process (310 CMR 22.04(8) and DWP Policy 89-01).

#### **1.2.7 Waste Disposal**

Discuss the various wastes from the water treatment plant, their volume, proposed treatment, points of discharge, and/or ultimate disposal location. Refer to Chapter 5.10, *Waste Handling and Disposal*.

#### **1.2.8 Automation**

Provide supporting data justifying automatic equipment, including the servicing and operator training to be provided. Manual override must be provided for any automatic controls. Highly sophisticated automation may put proper maintenance beyond the capability of the plant operator, leading to equipment breakdowns or expensive servicing.

#### **1.2.9 Project Site**

1. Discussion of the various sites considered and advantages of the recommended ones.
2. The proximity of residences, industries, and other establishments.
3. Discuss potential sources of pollution, within Zones I, II, and III or Zones A, B, and C as defined, that may influence the operation of the public water system, such as sewage absorption systems, septic tanks, privies, cesspools, sink holes, sanitary landfill, refuse and garbage dumps.

### **1.2.10 Energy Efficiency Encouraged**

Energy efficiency must be addressed in any new or revised public water system proposal, and is strongly recommended for every existing public water system proposal.

1. Discuss the proposed energy efficiency initiatives.
2. Include a discussion of the following:
  - a. HVAC (heating, ventilation, and air-conditioning);
  - b. Inside and outside lighting;
  - c. Motors (variable frequency drives -VFD);
  - d. Unit operations;
  - e. Controls;
  - f. Energy Star as defined by US Environmental Protection Agency and US Dept. of Energy;
  - g. Any other energy related topics as required by MassDEP.

### **1.2.11 Financing**

1. Estimated cost of integral parts of the system, life expectancy, and replacement cost.
2. Detailed estimated annual cost of operation, maintenance, and operating personnel.
3. Proposed methods to finance both capital charges and operating expenses.
4. Refer to Chapter 11.0, *Capacity Development and Standard Operation Procedures*.
5. Adequate funding must be assured for maintenance of automatic equipment.

### **1.2.12 Simultaneous Compliance**

1. Simultaneous compliance with MA Drinking Water Regulations refers to a situation where addressing one regulation threatens compliance with a different MA Drinking Water Regulation.
2. With respect to simultaneous compliance, there are three areas of regulations that cause the most concern:
  - a. Disinfection by-products rules (Total Trihalomethanes Rule, Stage 1 and Stage Disinfection By-Products Rules);
  - b. Surface water treatment rules (Interim Enhanced Surface Water Treatment Rule, Long Term 1 and Long Term 2 Enhanced Surface Water Treatment Rules);
  - c. Other rules: Lead and Copper Rule, Total Coliform Rule, etc. Complying with any of these regulations can create the potential to conflict with one or more of the others.

3. In the planning and design phase, all public water systems shall identify all potential simultaneous compliance issue(s) that may occur, report all conclusions and provide a pre- (base line) and post- (12 month) water quality sampling plan. The public water system shall implement the sampling plan and report to MassDEP as required. An example of potential simultaneous compliance issues is the new addition of any acidic chemical compound which may increase the lead and copper content in the finished water without any other further operational changes.
4. For more information and guidance, refer to EPA Guidance Manual EPA 815-R-99-015, dated August 1999, titled: *Microbial and Disinfection Byproduct Rules Simultaneous Compliance Guidance Manual*.  
<http://www.epa.gov/OGWDW/mdbp/mdbptg.html>  
<http://www.epa.gov/OGWDW/mdbp/simult.pdf>

### 1.2.13 Future Extensions

Summarize planning for future needs and services.

## 1.3 Plans

Plans for public water system improvements shall show the imprint of professional engineer's seal and signature of engineer showing current registration in Massachusetts in the appropriate engineering field and, where pertinent, provide the following:

### 1.3.1 General Layout

1. Suitable title;
2. Name of municipality, or other entity/person responsible for the water supply;
3. Area or institution to be served and locus;
4. Graphic scale, in feet;
5. North arrow;
6. Datum used and local bench mark;
7. Date plans were prepared, including all revision dates;
8. Location and size of existing water mains;
9. Location and nature of existing public water system structures and appurtenances affecting the proposed improvements, noted on one sheet.



### 1.3.2 Detailed Plans

1. Stream crossings, providing profiles with elevations of the stream bed and the normal and extreme high and low water levels.
2. Location and area of the property to be used for the groundwater development with respect to known references such as street intersections and streams.
3. Topography and location(s) of present or planned wells or structures with contour intervals appropriate to indicate drainage.
4. Geologic cross-sections as required in Chapter 4, *Groundwater Supply Development and the Source Approval Process*.
5. Elevations of the highest known flood level, floor of the structure, upper terminal of protective casing and outside surrounding grade, using United States Coast and Geodetic Survey, United States Geological Survey or equivalent elevations, where applicable, as reference. Refer to Chapter 4, *Groundwater Supply Development and the Source Approval Process*.
6. Drawings of well construction, showing diameter and depth of drill holes, casing and liner diameters and depths, grouting depths, elevations and designation of geological formations, water levels, and other details to describe the proposed well completely.
7. Location of all existing and potential sources of pollution within Zones A, B, C and Zones I, II, III. Refer to Chapter 3, *Surface Water Supply Development*, and Chapter 4, *Groundwater Supply Development and the Source Approval Process*.
8. Size, length, and identity of sewers, drains, and water mains, and their locations relative to plant structures.
9. Schematic flow diagrams and hydraulic profiles (having a horizontal scale of not more than 100 feet to the inch and a vertical scale of not more than 10 feet to the inch with both scales clearly indicated) showing the flow through various plant units.
10. Piping in sufficient detail to show flow through the plant, including waste lines
11. Locations of all chemical feeding equipment and points of chemical application (refer to *Chapter 6.0, Chemical Application*).
12. All appurtenances, specific structures, equipment, water treatment plant waste disposal units, and points of discharge having any relationship to the plans for water mains and/or public water system structures.
13. Locations of sanitary or other facilities, such as lavatories, showers, and toilets, where applicable or required in MA Uniform State Plumbing Code (248 CMR 1.00-11.00) (see section 10.10, Plumbing Fixtures).
14. Locations, dimensions, and elevations of all proposed plant facilities.
15. Locations of all sampling taps.
16. Adequate description of any features not otherwise covered by the specification.

17. New and modified facilities shall address all actual and potential cross-connections. (Refer to Chapter 9.10, *Cross Connections*.)
18. Depiction and description of infrastructure security measures intended to reduce risks of any intentional acts of vandalism, sabotage, and terrorism.
19. MassDEP requests one hard copy and one electronic copy of the appropriate specifications and plans. The electronic copy must be submitted on a compact disk or other acceptable media and must be in PDF format.

## 1.4 Specifications

Where pertinent, complete and detailed technical specifications shall be supplied for the proposed project, including:

1. A table of contents or index for easy reference;
2. A program for keeping existing public water systems facilities in operation during construction of additional facilities so as to minimize interruption of service;
3. Testing, monitoring, and instrument controls;
4. All equipment including chemical feeders, tanks, etc. (refer to *Chapter 6.1 Facility Design*);
5. Materials or proprietary equipment for sanitary or other facilities, including any necessary backflow or back-siphonage protection;
6. Procedures for flushing, disinfection, and testing, as needed, prior to placing the project in service.

## 1.5 Modifications to Previously Approved Plans

Any substantial deviations or modifications from approved plans or specifications affecting the capacity, hydraulic conditions, operating units, functioning of water treatment processes, or quality of water to be delivered must be approved by MassDEP. Refer to DWP Policy 08-01 (*Substantial Modifications to a Public Water System that Requires a Permit*). Appropriate permit modification application, MassDEP transmittal form and fee (if applicable), and revised plans and specifications shall be submitted to MassDEP for review and approval. MassDEP approval must be obtained before beginning any construction work that will be affected by such changes.

## 1.6 Deed Restriction

The owner of a transient non-community public water system source or any other public water system source, if deemed necessary by MassDEP, shall complete an affidavit containing the same information as that found in Appendix B of the guidelines, <http://www.mass.gov/dep/water/laws/goneappb.pdf>. The person shall record a notarized copy of the same in the appropriate registry of deeds. Said recorded affidavit shall be referenced in the margin of the deed holder's deed referencing the book and page number of the recorded affidavit. The public water system must provide MassDEP with a copy of the completed notarized and recorded affidavit.

## 1.7 Consecutive Systems

Consecutive systems must have a written agreement between the consecutive system and the supplying system. It shall address the status and responsibilities of the parties for the ownership, operation, and maintenance of the combined system, including but not limited to drinking water sources, treatment facilities, distribution systems, storage, and water quality sampling.