Commonwealth of Virginia

CAPACITY DEVELOPMENT STRATEGY

Office of Drinking Water
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VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment
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Office of Drinking Water
Safe Drinking Water for a Healthy Virginia

TABLE OF CONTENTS

Executive Summary

Safe, reliable, drinking water is fundamental to protecting the public health of Virginians. To achieve this level of protection, public water systems in the Commonwealth of Virginia, called "waterworks", must be prepared to face an array of challenges in meeting public health protection standards aimed at ensuring safe drinking water. This preparedness includes proper rate setting and good financial planning. The Virginia Capacity Development Program is designed to focus available resources toward assisting waterworks in obtaining and maintaining the technical, managerial, and financial (TMF) capacity to meet these challenges.

The Virginia Department of Health – Office of Drinking Water (VDH-ODW), as the *SDWA* Primacy Agency in the Commonwealth of Virginia, developed a comprehensive Capacity Development Strategy that includes all of the *SDWA* required elements:

1. Obtain authority to prevent the creation of new nonviable community and non-transient noncommunity waterworks,
2. Develop a strategy to address the capacity of all existing waterworks; and,
3. Ensure that Drinking Water State Revolving Fund (DWSRF) applicants have sufficient TMF capacity prior to funding (or that the funds will allow them to receive the capacity they require).

VDH-ODW, through its Capacity Development Program, will support and assist EPA's goals by:

1. *Using Virginia's operation permitting process to ensure that all new water system applicants demonstrate technical, managerial, and financial capacity.*
2. *Operating an effective Capacity Development Program in Virginia which assists public waterworks in acquiring and maintaining technical, managerial, and financial capacity.*
3. *Ensuring that all DWSRF loan assistance applicants have TMF capacity or will achieve TMF capacity over the long term.*
4. *Providing technical assistance through the use of State Revolving Loan Fund set-asides.*
5. *Communicating and educating the Commonwealth and its citizens continually and proactively as to the importance and need for sustainable waterworks infrastructure.*

Financing water programs is an objective stated in the U.S. Environmental Protection Agency's (EPA) Strategic Plan. Virginia's Capacity Development Strategy supports that objective through programs designed to assist the DWSRF's construction activities. The fiscal year 2020-2021 *National Water Program Guidance* further defines their core measures as strengthening the TMF capacity of waterworks. In response, the Virginia Capacity Development Strategy has been revised to further identify how the Capacity Development Program supports the ODW's goal to improve waterworks' performance. Furthermore, this strategy explains how the Capacity Development Program provides, promotes, and protects public health through safe, affordable, reliable drinking water. Through proactive communication and outreach, in collaboration with municipalities, communities, waterworks, partners, and other stakeholders, VDH-ODW will seek innovative approaches and new technologies to ensure Virginia's waterworks have the TMF capacity to demonstrate long-term sustainability.

This Strategy discusses in detail the VDH-ODW programs or activities related to each element. The Virginia Board of Health and VDH-ODW, have sufficient authority related to TMF capacity at waterworks via the *Code of Virginia* §§ 32.1-169 and 32.1-172 B, which deals with VDH-ODW's control over waterworks. The *Code* further identifies financial capacity specifically as a Comprehensive Business Plan, which VDH-ODW has formalized into the Waterworks Business Operations Plan (WBOP) for individual waterworks. This Strategy further discusses the pertinent *Code* sections and the Virginia *Waterworks Regulations* adopted under the *Code*.

SECTION 1
Introduction

In its Strategic Plan for 2018–2022, the U.S. EPA identified Providing Clean and Safe Water as Objective 1.2, which includes Long Term Performance Goal 1.2.2: "To increase by $40 billion the non-federal dollars leveraged by EPA water infrastructure finance programs (CWSRF, DWSRF, and WIFIA)." VDH-ODW continues to develop and revise the Virginia Capacity Development Strategy to support EPA Goals and Objectives as they relate to federal drinking water priorities for infrastructure, staff and financial considerations.

The EPA's National Capacity Development Program consists of three major components:

1. Safe Drinking Water Act § 1420(a). (42 U.S.C. § 300g-9(a)) New Systems
Under penalty of DWSRF withholding, States must have a program established to: "ensure that all new community water systems and non-transient, noncommunity water systems commencing operations after October 1, 1999 demonstrate technical, managerial, and financial capacity with respect to each national primary drinking water regulation in effect or likely to be in effect, on the date of commencement of operations."

2. Section 1420(c) State Capacity Development Strategies
Under penalty of DWSRF withholding, the State must develop and implement a: "strategy to assist public water systems in acquiring and maintaining technical, managerial, and financial capacity."

3. Section 1452(a)(3) Assessment of Capacity
States may not provide DWSRF loan assistance to waterworks which lack the technical, managerial, and financial capability to ensure compliance; or if the system is in significant noncompliance with any drinking water standard or variance. However, States may provide assistance if the use of such assistance will ensure compliance; and the system has agreed to make the necessary changes in operation to ensure that it has the technical, managerial, and financial capacity to comply over the long term.

The VDH-ODW**,** the Commonwealth of Virginia's state primacy agency, developed a comprehensive Capacity Development Strategy that includes all of the *SDWA* required elements listed below.

1. Methods or criteria to prioritize waterworks. [§1420(c)(2)(A)] These include methods or criteria that could be used to identify and prioritize waterworks most in need of improving TMF capacity.

2. Factors that encourage or impair capacity development. [§1420(c)(2)(B)] These include the "institutional, regulatory, financial, tax, or legal factors" that exist at the federal, state, or local level that encourage or impair capacity development.

3. How the State will use the authority and resources of the *Safe Drinking Water Act*.
[§1420(c)(2)(C)] States should describe how they will use the authority and resources of the *SDWA* or other means to:

a. Assist waterworks in complying with *National Primary Drinking Water Regulations*.
b. Enhance TMF capacity by encouraging the development of partnerships between waterworks.
c. Assist waterworks in the training and certification of their operators.

4. How the State will establish the baseline and measure improvements.

[§1420(c)(2)(D)] States should describe how they will establish a baseline and measure improvements in the capacity of waterworks under their jurisdiction. This potential programmatic element provides the tools that State primacy agencies must have to produce and submit a report to their Governors on the efficacy of their capacity development strategy and progress made toward improving the TMF capacity of waterworks in their State.

5. Procedures to identify interested persons. [§1420(c)(2)(E)] States should identify and involve stakeholders in the creation and implementation of their capacity development strategy. This section highlights the overall VDH-ODW program or activity related to the stated element. Sections 2 through 8 detail the Capacity Development program activities.

6. America's Water Infrastructure Act of 2018 (AWIA). AWIA amends 42 U.S.C. 300g–9 providing a description of how States will:

(i) encourage waterworks to develop asset management plans that include best practices; and
(ii) assist waterworks with staff training (including operators) on methods to implement asset management plans.

Table 4.1 and Section 6.1 describes how VDH-ODW plans to encourage and assist public waterworks in the planning for and implementation of asset management plans.

1.1 *SDWA* §1420(a): State Authority for New Waterworks

The Commonwealth of Virginia's Board of Health, and VDH-ODW have sufficient authority via the *Code of Virginia* §§ 32.1-169 and 32.1-172 B to control waterworks' activity specifically related to TMF and operational capacity, which is codified into a comprehensive business plan for each waterworks in the Commonwealth. The pertinent Commonwealth of Virginia *Code* sections are located on https://law.lis.virginia.gov/vacode/. Virginia adopted the *Virginia Waterworks Regulations* under this *Code*.

The VDH-ODW Project Review and Permit Procedures, Working Memo 784, provides guidance on permitting new waterworks. The VDH-ODW plans to replace Working Memo 784 with the Waterworks Permit Application Manual, which is currently under revision. The Project Review and Permit Procedures is located at https://townhall.virginia.gov/L/ViewGDoc.cfm?gdid=4993.

1.2 *SDWA* §1420(c)(2)(A): Methods to Identify/Prioritize Waterworks Capacity

VDH-ODW prioritizes assistance to waterworks using two methods. VDH-ODW staff or technical assistance providers (TAPs) engage with waterworks staff through various means to provide assistance. TAPs are typically nongovernmental organizations that provide assistance to waterworks as part of their mission. First, all waterworks targeted to receive DWSRF funding will be assessed by VDH-ODW DWSRF staff to determine if the waterworks has sufficient TMF capacity. Waterworks that do not have sufficient TMF capacity will be required to prepare a WBOP. Secondly, ODW staff will routinely assess existing community and non-transient noncommunity waterworks for TMF capacity. Staff will identify, prioritize and refer waterworks needing assistance to the TAPs, or will provide the required assistance.

Section 4.3 describes the process for identification and prioritization of waterworks.

1.3 *SDWA* §1420(c)(2)(B): Factors that Encourage or Impair Capacity

VDH-ODW has many programs already in place that enhance system capacity. There will be additional programs added as need arises that comply with the Capacity Development Strategy that will also enhance capacity. Table 4-1 identifies the existing programs that enhance waterworks capacity.

VDH-ODW classifies impediments to capacity development as structural, legal and regulatory, and economic and demographic. There are specific factors that negatively affect capacity under each of these categories. Section 6 addresses impediments and possible mitigation strategies.

1.4 *SDWA* §1420(c)(2)(C): Description of how the State will use its Authorities and Resources

1.4.1 To Assist Public Waterworks in Complying with Regulations

VDH-ODW has designed programs and activities that assist waterworks' compliance with regulations. A list of existing programs and activities are contained in Table 4-1. The use of DWSRF set-aside funds allows expansion of programs to provide more assistance. Section 4.4 describes more types of assistance.

1.4.2 To Encourage the Development of Partnerships

VDH-ODW uses DWSRF set-aside funds to develop and implement various programs that establish partnerships within the waterworks industry. These programs include:

1.4.2.1 Leak Detection

VDH-ODW provides grants for equipment purchases. These grants have included funding provided to Virginia Rural Water Association (VRWA) and South East Rural Community Assistance Project (SERCAP). These organizations use the equipment for leak detection technical assistance, and VRWA and SERCAP report the technical assist hours to VDH-ODW for inclusion in the Annual Capacity Development Report to EPA.

1.4.2.2 Financial Training

VDH-ODW collaborates with the Environmental Finance Center Network (EFCN) and with SERCAP, as well as other government agencies to provide waterworks staff and other interested parties with financial and funding opportunity training across the Commonwealth.

1.4.2.3 Operator Certification and Licensure

VDH-ODW contracts Virginia Tech (VT), Mountain Empire Community College, and the Virginia Section of American Water Works Association (AWWA) to provide training sessions for waterworks operators. VDH-ODW collaborates with the Virginia Department of Professional and Occupational Regulation (DPOR) and the Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals (WWWOOSSP) to license and review licenses of waterworks operators and provide licensing testing.

1.4.2.4 Source Water Protection

The Interstate Commission on the Potomac River Basin partners with VDH-ODW on source water protection in the Potomac River basin, which includes much of Virginia's upper Shenandoah Valley.

1.4.2.5 Asset Management

SERCAP and VRWA collaborate with VDH-ODW on many aspects of technical assistance to waterworks related to AMPs.

1.4.2.6 Emergency Planning / Training

The VDH-ODW Emergency Services Coordinator collaborates with the Virginia Department of Emergency Services (VDEM) and other governmental and non-governmental organizations to provide Emergency Management training. The Emergency Services Coordinator also acts as the lead for VDH-ODW at the Emergency Operations Center (EOC) in the Virginia Emergency Support Function (ESF) – 3 (Public Works and Engineering) during declared emergencies.

1.4.3 To Assist Public Waterworks in the Training and Certification of Operators

Table 4-1 describes VDH-ODW programs that address training assistance and certification.

1.5 *SDWA* §1420(c)(2)(D): Description of how the State will Establish a Baseline and Measure Improvements in Capacity.

VDH-ODW will use compliance data, sanitary survey data, and managerial and financial capacity data to assess the overall TMF capabilities of community and non-transient noncommunity waterworks. Selected VDH-ODW indicators of TMF capacity will assess waterworks every three (3) years to measure improvements over time. Section 4 describes this triennial assessment, the measurement of the baseline, and improvement tracking.

1.6 *SDWA* §1420(c)(2)(E): Identification of Persons who have an Interest in or are Involved in Development and Implementation of the Strategy

Virginia has an ongoing, active Waterworks Advisory Committee (WAC) that consists of a diverse group of waterworks stakeholders. ODW provides the WAC with opportunities to provide input on the capacity development process and consultation regarding the strategy implementation. Furthermore, ODW holds an annual meeting with Capacity Development and Operator Certification technical assistance providers, known as the CapDev/OpCert Group. This Group includes organizations with a mission to provide direct technical assistance and training to waterworks owners and operators in Virginia. ODW solicits this Group for feedback during the year on Capacity Development and Operator Certification initiatives. Additionally, they provided input on this Strategy revision. Section 5 provides an overview of stakeholder involvement.

SECTION 2
Elements for New Waterworks

The 1996 *SDWA* amendments to the *SDWA* adopted significant changes to the *SDWA*. Of particular importance are the amendments requiring States to adopt and implement programs that ensure waterworks have the capability to comply with existing and anticipated drinking water regulations. These new provisions known as "capacity development," marked the first time that the federal government explicitly required States to take actions that ensured waterworks have the resources required to provide safe and reliable water service to the public.

Section 1420(a) of the *SDWA*, requires each State to obtain "the legal authority or other means to ensure that all new community waterworks and new non-transient noncommunity waterworks commencing operation after October 1, 1999, demonstrate technical, managerial, and financial TMF capacity with respect to each national primary drinking water regulation in effect, or likely to be in effect, on the date of commencement of operations". In other words, this Section of the *SDWA* requires Virginia to have the ability to prevent a new waterworks from beginning operation unless the waterworks has the TMF capacity to provide safe and reliable service, both at present and in the future. This provision applies to both community and non-transient noncommunity waterworks.

In Virginia, all proposals to create a new waterworks (including community waterworks, non-transient noncommunity waterworks, and transient noncommunity waterworks) must meet certain statutory and regulatory requirements.

Section 32.1-172 of the *Code of Virginia* states that "No owner shall establish, conduct or operate any waterworks … without a written permit …" and that "an application for a permit shall include a comprehensive business plan detailing the technical, managerial and financial commitments to be made by the owner in order to assure that the waterworks' performance requirements for providing the water supply will be met over the long term."

The VDH-ODW requires owners of new waterworks, first-time owners of existing waterworks (acquired through purchase or other transfer of ownership), and owners with poor compliance history under the *Waterworks Regulations* to develop and submit a WBOP as part of the permitting process. Appendix A details this process.

In addition, prior to receiving a permit to construct or modify a waterworks, VDH-ODW reviews and approves plans and specifications to ensure they meet design and operating requirements in the *Waterworks Regulations*. Part III of the *Waterworks Regulations*, 12VAC5-590-640 et seq, is the Manual of Practice for Waterworks Design. All new construction at waterworks must comply with the requirements in Part III.

SECTION 3
Elements for Waterworks Seeking State Revolving Funds Assistance

3.1 *SDWA* REQUIREMENTS FOR DWSRF APPLICANTS

The *SDWA* includes a provision for the federal government to provide capitalization grants to each state to initiate a DWSRF dedicated to funding drinking water projects. The DWSRF has the requirement to ensure that waterworks receiving DWSRF funds have sufficient TMF capacity.

- *SDWA* §1452 states " … no assistance under this section shall be provided to a public water system that: (*i*) does not have the technical, managerial and financial capability to ensure compliance with the requirements of this title or (*ii*) is in significant noncompliance with any requirement of a national primary drinking water regulation or variance." However, a waterworks owner may receive assistance if use of the funds will ensure compliance or if the waterworks owner agrees to undertake appropriate changes in operations (including ownership, management, accounting, rates, maintenance, consolidation, alternative water supply, or other procedures) to assure compliance with SDWA §1452 (3)(A).

- In Virginia, to satisfy the requirement in *SDWA* § 1452, Capacity Development staff will assess the TMF capacity of each waterworks selected to receive DWSRF funding. This assessment considers matters such as whether the project will resolve the health issues, if the project includes regionalization, the project's readiness to proceed, and other TMF factors. This assessment evaluates the project's cash flow, asking if the project be operationally sustainable. Staff reviews the annual audits submitted with the construction application to check financial strength. Field Office staff and/or the Capacity Development staff will require waterworks that do not have sufficient TMF capacity to complete and obtain acceptance of a WBOP prior to receiving funds. The requirements of the WBOP shall include such information as is necessary to insure that the waterworks owner analyzes the critical components of their operations. To further the initiative of having owners analyze their waterworks for weaknesses, Financial and Construction Assistance Program (FCAP) staff modified scoring on the DWSRF Application to award points for engineering planning, distribution system leakage reporting, and asset management.

- Staff may refer waterworks owners that require assistance in developing plans in conformance with the *Waterworks Regulations* to their local Field Office for technical assistance. If additional managerial assistance is required, staff refers the waterworks to the Capacity Development Supervisor. In certain conditions (*e.g.*, DWSRF funding, significant financial stress, approved set-aside suggestions), a TAP may be provided.

SECTION 4
Elements for Existing Waterworks

4.1 EXISTING VDH-ODW ACTIVITIES THAT ADDRESS CAPACITY DEVELOPMENT

Prior to the 1996 *SDWA* amendments, VDH-ODW conducted activities that related to waterworks' capacity development. These were not typically considered "capacity building" activities, and were not packaged as part of an overall capacity development program. The 1996 SDWA amendments required states to develop a Capacity Development Strategy.

The VDH-ODW Capacity Development Strategy includes the current strategic activities' impact on waterworks' TMF capacity. VDH-ODW assesses how to coordinate those activities.

Table 4-1 presents activities that deal with waterworks capacity development and how those activities relate to *SDWA* capacity development requirements. This table identifies existing activities that apply to community, non-transient noncommunity and transient noncommunity waterworks. This list is not exhaustive of all of the activities within VDH-ODW, but rather reflects a sample of those activities that relate in some manner to capacity development. These activities assist in the establishment of a baseline and continued measurement of progress.

4.2 CAPACITY ASSESSMENT PROCESS

4.2.1 Introduction

As part of the process of determining basic TMF capacity needs, prioritizing technical assistance, and measuring improvement over time, the Capacity Development Program must establish an assessment baseline. The baseline is an initial assessment that includes new information obtained as a part of the capacity development process. This assessment establishes the baseline for TMF indicators. A baseline assessment will be re-set every 3 cycles, or once every nine years as required by sound statistical analysis. For the purposes of clarity and statistical accuracy, VDH-ODW uses only the Triennial Assessment data for this baseline. The Capacity Development program uses other tools (Enforcement Targeting Tool, DWSRF construction applications, State violations, etc.), data, information and recommendations from staff on an ongoing basis to refine, revise and develop capacity assessments for waterworks needing technical assistance.

4.2.2 Baseline Assessment Using Existing and New Information

VDH-ODW reset the baseline during the Triennial Assessment conducted in 2016. Capacity Development staff will compare future triennial assessment data to this baseline assessment data on community and non-transient noncommunity waterworks. The approach links compliance monitoring data, sanitary survey data, and capacity assessment data to determine the general TMF capacity. The information obtained from this type of comprehensive assessment is multi-purposed. The intent is to: 1) establish a baseline; 2) provide a means of monitoring improvement over time; 3) establish a prioritization list of waterworks for TMF capacity assistance; and, 4) assist VDH-ODW's allocation of personnel and finances effectively.

This assessment approach takes into account three factors: (1) a technical factor, (2) a managerial factor and (3) a financial factor. The following equation describes Figure 4-1 on page 4-8:

T + M + F = Overall Capacity Assessment

Where: T = technical factor
M = managerial factor
F = financial factor

The sum of the factors' scores represents the overall waterworks capacity assessment. Described below are the basic types of information and the source of information for each factor. Figure 4-2 illustrates the general process and use of the waterworks capacity assessment. Appendix B contains the 18 factors, or questions, used to assess the waterworks during this past triennial assessment.

Transient noncommunity waterworks (TNC) are not assessed in the triennial assessment due to their specific exclusion from the DWSRF Capacity Development/Source Water set-aside. TNCs represent a relatively low public health impact associated with a lack of capacity. However, ODW staff or technical assistance providers may refer TNCs requiring technical assistance to the VDH-ODW noncommunity sustainability coordinator. Though VDH-ODW does not provide technical assistance to TNCs under the Capitalization Grant, VDH-ODW staffs a non-community sustainability coordinator whose responsibilities are to provide TNCs and for-profit NTNC waterworks assistance through the routine surveillance program (see 4.4.1), and with technical, managerial and financial assistance.

4.2.2.1 Technical Factor ("T")

This factor evaluates a waterworks' ability to meet current construction criteria for source, treatment, distribution, and storage. Further, this factor measures the waterworks ability to stay within its permitted capacity, and provide drinking water that meets SDWA water quality requirements as well as the customers' level of service (few customer complaints). This measurement quantifies the waterworks' ability to design, construct and operate drinking water facilities that consistently protect public health and achieve not only compliance, but also the level of service expected by its customers.

Data for this component of the assessment will come from the existing State Drinking Water Information System (SDWIS) database and other existing reporting systems that VDH-ODW utilizes to track waterworks performance. These databases contain basic waterworks information and are available to all waterworks through Drinking Water Watch, which is available on the ODW's webpages. The technical factor inherently addresses components of technical and operational capacity.

4.2.2.2 Managerial Factor ("M")

VDH-ODW conducts a sanitary survey at each waterworks in the state every one to three years based on the type of waterworks and population served. The survey collects and compiles basic information regarding the waterworks condition, including operation and maintenance data. The waterworks' response to sanitary survey recommendations is a measure of management capacity. Sanitary survey data inherently addresses managerial and technical capacity. The SDWIS database contains basic waterworks information as well as the compliance history of the waterworks. SDWIS data supports the scoring for this factor. Other managerial measures include *SDWA* violations related to treatment technique, monitoring and reporting, the Consumer Confidence Report, and Cross Connection Control. Additionally, this factor measures a waterworks' understanding of current and future *SDWA* regulations and rules.

4.2.2.3 Financial Factor ("F")

This factor evaluates a waterworks' financial capacity. Currently, VDH-ODW collects limited data for this type of information. However, in order to evaluate financial capacity adequately, the WBOP provides additional information. Similar to the managerial factor, the financial factor measures the waterworks' ability to plan and budget for financial impacts resulting from new regulatory and rule changes.

4.3 PRIORITIZATION OF WATERWORKS TO RECEIVE TECHNICAL ASSISTANCE

VDH-ODW staff prioritize waterworks for targeted on-site assistance using a two-component approach of DWSRF prioritization, and waterworks referral by the capacity assessment process that includes triennial assessments. These components will yield a prioritized list of waterworks requiring assistance. The list will funnel to the Capacity Development Supervisor, who will determine the need for and type of assistance. A diagram illustrating the flow of prioritization is contained in Figure 4-3, Process for Referral for Assistance. Below is a description of each component.

4.3.1 State Revolving Fund Priority Waterworks

Prior to receiving DWSRF funds, the waterworks must demonstrate that it has sufficient TMF capacity, or it must demonstrate that DWSRF funding will result in improvement in one or more of the TMF capacity categories. Section 3 described the process of assessing whether or not these waterworks have sufficient capacity. Staff assesses the waterworks prioritized for DWSRF funding in the Annual Intended Use Plan.

Based on the DWSRF targeted waterworks assessment, staff refer waterworks with assistance needs to the Capacity Development Supervisor. Additionally, they add the waterworks to the assistance list. Staff prioritize the list to include waterworks ranked on the DWSRF project priority list. The Capacity Development Supervisor has the discretion to alter the order, based on circumstance such as waterworks unwillingness, historic lack of meeting targets, etc.

4.3.2 Referrals from Capacity Assessment Process

Based on the process described in Section 4.2, staff assess waterworks for TMF capacity. Capacity Development staff prepare and prioritize a list of waterworks with TMF assistance needs. The choice of technical assistance relates to TMF or a combination of capacity deficiencies. The Capacity Development program has the discretion of altering the order, if there are circumstances or issues of acute public health consequence that justify the alteration.

Other sources of information utilized to prioritize waterworks for technical assistance are:

- Enforcement Targeting Tool,
- Virginia *Waterworks Regulations* significant deficiencies, and
- Concurrence from Field Office staff.

4.4 TECHNICAL ASSISTANCE

VDH-ODW provides technical assistance to the waterworks directly by Capacity Development staff or referral to a technical assistance provider or contractor. VDH-ODW assistance is a continuation of any existing assistance provided through routine contact with the waterworks. Contractor assistance may include VDH-ODW contract agreements which provide more resources for a greater number of visits and more services, or may include specific assistance from contractors retained as part of a specifically requested set-aside or as part of a planning grant. The Capacity Development Supervisor will determine which waterworks receive assistance from a contractor using the prioritized assistance list described above. A distinction exists

between technical assistance (which may include TMF aspects) provided without visiting the waterworks and an on-site assistance visit where the service provider physically visits waterworks to provide assistance.

4.4.1 VDH-ODW

Currently, VDH-ODW provides assistance in many ways. Assistance may come from Field Office or Central Office personnel. The assistance may be very simple, such as answering a question via telephone or e-mail, to intricate assistance such as providing information to complete a WBOP. Assistance includes all factors: technical, managerial, and financial. VDH-ODW becomes aware of the need for assistance through a waterworks owner's request for assistance, data gathering efforts, customer complaints, and other means. VDH-ODW will maintain its assistance activities as part of the Capacity Development Strategy. VDH-ODW provides on-site assistance primarily through the Sanitary Survey program. Waterworks receive an on-site visit at established frequencies.

4.4.2 Technical Assistance Providers

The *SDWA* allows states to use funds from the DWSRF 15% set-aside for various program activities, including technical assistance under the Capacity Development Program, 42 U.S.C. § 300j-12 (k)(1)(B). VDH-ODW may choose to utilize funds to contract with technical assistance providers.

One such provider is the Virginia Resources Authority (VRA). The VRA can provide technical assistance to waterworks who apply for DWSRF funds. They spend time with waterworks on unique financial capacity problems related to obtaining, or fulfilling, a DWSRF Loan. VRA has conducted annual loan monitoring reporting for VDH-ODW since 2009. The VRA can leverage Technical Defaults on the terms of its DWSRF loans to waterworks to require capacity buidling activities at waterworks with DWSRF loans.

Technical assistance providers may perform on-site activities for waterworks, provide engineering services, assist waterworks with developing WBOPs, assist with Asset Management Planning, as well as many other services. After EPA approved the 2014 Capacity Development Strategy revision, VDH-ODW began increased activities with Asset Management Planning. This includes an increase in training, providing points on the DWSRF construction application for having an Asset Management Plan, and including Asset Management Planning as a fundable activity through the Planning and Design Grants and Small Project Engineering Services program. In 2016, VDH-ODW, SERCAP, and VRWA planned and attended a "Train the Trainer" course conducted by Draper Aden and Associates. This kicked off a small workgroup to collaborate on AMPs and training throughout the Commonwealth. This revision of the Strategy incorporates those existing activities.

4.5 MEASUREMENT OF PROGRESS AND IMPROVEMENT IN WATERWORKS CAPACITY

After the baseline assessment, VDH-ODW collects updated data for the assessments in subsequent years at an interval of every three years for community and non-transient noncommunity waterworks. VDH-ODW chose three-year increments with the intent of allowing improvements from prior assistance, and other VDH-ODW programs related to Capacity Development, to have time to benefit the waterworks. Analysis will indicate whether waterworks achieve significant improvements. In this manner, VDH-ODW will be able to target additional assistance in areas that have not improved.

In addition to measuring improvement by analyzing overall waterworks assessment data, VDH-ODW will be able to measure improvement by examining the results of its assistance programs. VDH-ODW will develop data on the number of waterworks helped and the progress made in improving the capacity of those waterworks.

Table 4-1
Existing VDH-ODW Activity and the Relationship to 1996 SDWA Amendments and AWIA

Existing VDH-ODW Activity	Requirements in 1996 SDWA Amendments and AWIA								
	State Authority for New Systems	Identifying and Prioritizing Systems in Need of T, M & F Assistance	Factors That Encourage Capacity	**How the State Will Use Its Resources to:**			Establish Baseline and Measure Improvement	Identify Persons who are interested in Developing Capacity Development Strategy	Methods to Ensure Systems Eligible to Receive DWSRF Funding Have Sufficient T, M & F Capacity
				Assist Waterworks in Complying w/Regulations	Encourage the Development of Waterworks Partnerships	Assist Systems in Training and Certification of Operators			
Sanitary Survey Program (C, NTNC, TNC)		√	√	√		√	√		√
Plan Reviews/Permits (C, NTNC, TNC)	√	√	√	√	√				√
Compliance Monitoring (Water Quality) (C, NTNC, TNC)		√	√	√			√		√
Phase II/V Vulnerability Assessments (C, NTNC)		√	√	√			√		
Compliance/ Enforcement Program (C, NTNC, TNC)		√			√		√		

Existing VDH-ODW Activity	Requirements in 1996 SDWA Amendments and AWIA								
	State Authority for New Systems	Identifying and Prioritizing Systems in Need of T, M & F Assistance	Factors That Encourage Capacity	How the State Will Use Its Resources to:			Establish Baseline and Measure Improvement	Identify Persons who are interested in Developing Capacity Development Strategy	Methods to Ensure Systems Eligible to Receive DWSRF Funding Have Sufficient T, M & F Capacity
				Assist Waterworks in Complying w/Regulations	Encourage the Development of Waterworks Partnerships	Assist Systems in Training and Certification of Operators			
Safe Drinking Water Information System (C, NTNC, TNC)		√					√		
Waterworks Advisory Committee (C, NTNC, TNC)								√	
Technical Assistance from Non-Governmental Organizations and Third Parties (C, NTNC)		√	√	√	√				
Technical Assistance Related to Comprehensive Business Plan Contract (C, NTNC)		√	√						√
Technical Assistance Related to Compliance Issues Contract (C, NTNC)		√	√	√	√		√		√

Existing VDH-ODW Activity	Requirements in 1996 SDWA Amendments and AWIA								
	State Authority for New Systems	Identifying and Prioritizing Systems in Need of T, M & F Assistance	Factors That Encourage Capacity	How the State Will Use Its Resources to:			Establish Baseline and Measure Improvement	Identify Persons who are interested in Developing Capacity Development Strategy	Methods to Ensure Systems Eligible to Receive DWSRF Funding Have Sufficient T, M & F Capacity
				Assist Waterworks in Complying w/Regulations	Encourage the Development of Waterworks Partnerships	Assist Systems in Training and Certification of Operators			
Operator Certification (C, NTNC)		√				√			√
Operator Training By Contract (C, NTNC, TNC)			√	√		√			
Source Water Protection Contract (C, NTNC)			√	√		√			
Source Water Assessment Program (C, NTNC, TNC)			√ (completed by VDH-ODW)	√	√ (Joint SWAs)				
Asset Management (C, NTNC)		√	√			√			√

(C): Community
(NTNC): Non-transient Noncommunity
(TNC): Transient Noncommunity

Figure 4-1

Waterworks Capacity Development Baseline Assessment

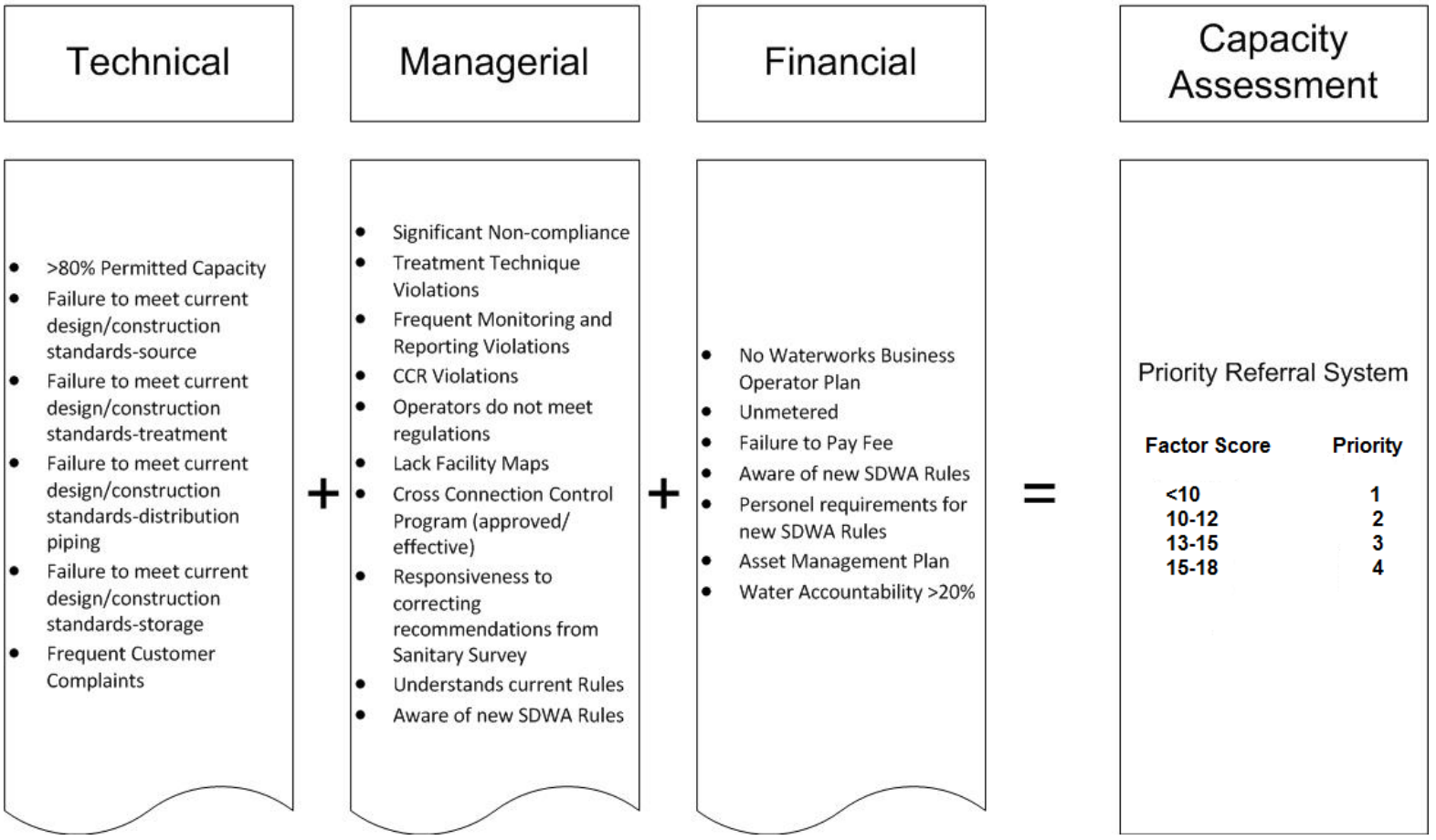


Figure 4-2

General Process and Use of Waterworks Assessment Information

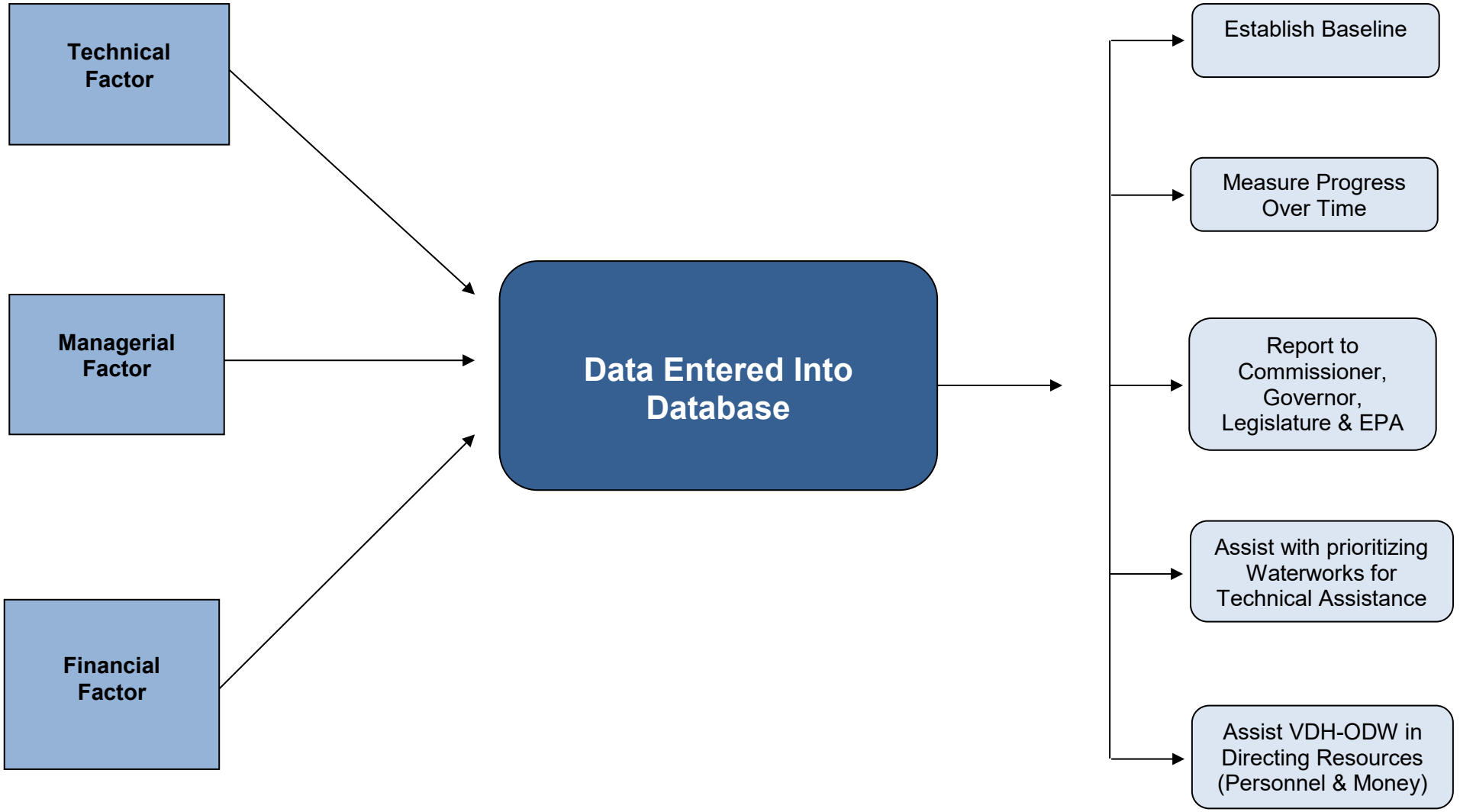
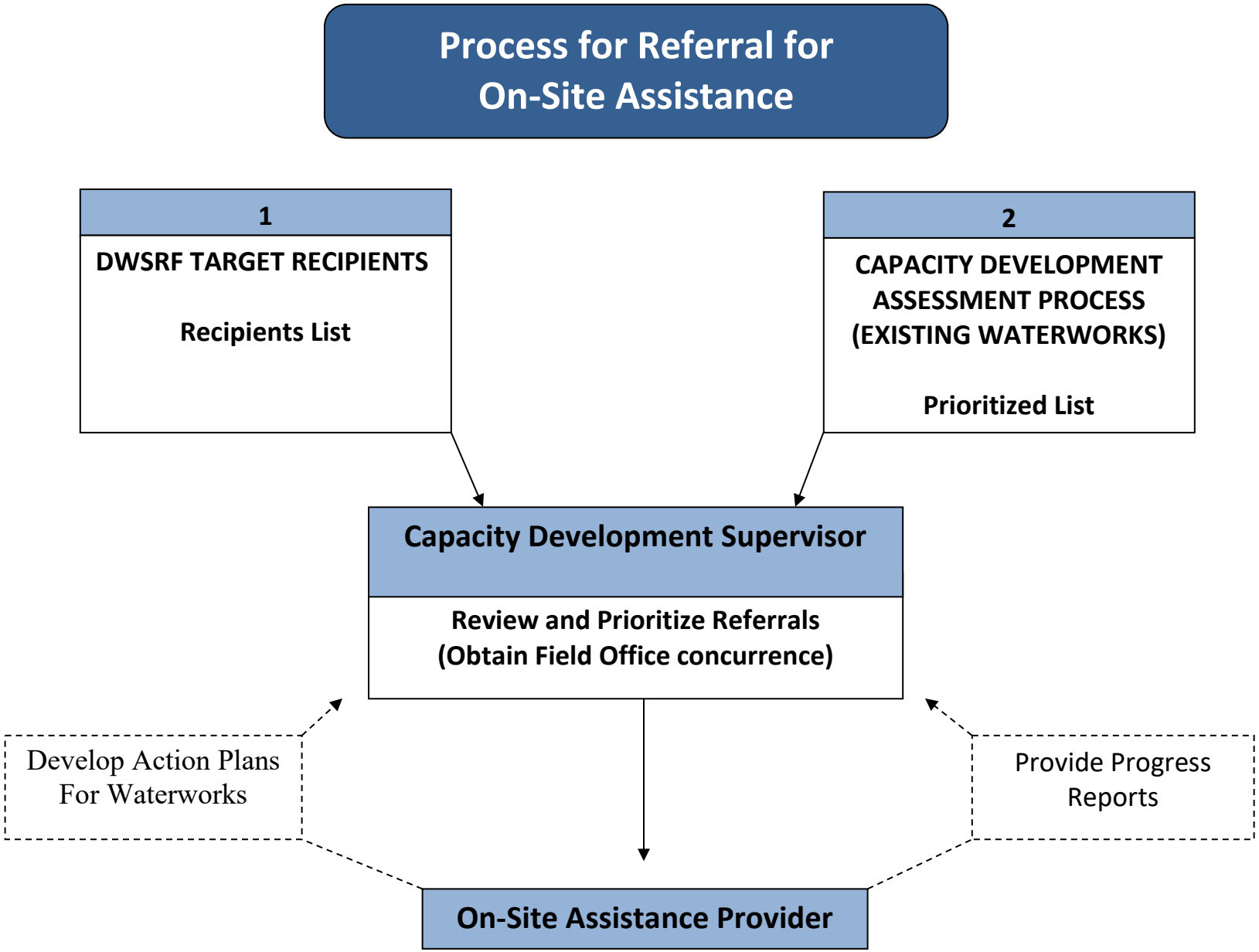


Figure 4-3


Process for Referral for On-Site Assistance
1
DWSRF TARGET RECIPIENTS
Recipients List
2
CAPACITY DEVELOPMENT ASSESSMENT PROCESS (EXISTING WATERWORKS)
Prioritized List
Capacity Development Supervisor
Review and Prioritize Referrals (Obtain Field Office concurrence)
Develop Action Plans For Waterworks
Provide Progress Reports
On-Site Assistance Provider

SECTION 5
Stakeholder Involvement in the Development of the Strategy

5.1 THE STAKEHOLDER PROCESS

Stakeholder involvement is important for several reasons. Participation in the strategy development process by groups and individuals who own, manage, operate, design, or finance waterworks, can improve the quality of the Capacity Development Strategy. Decision-making improves through utilizing additional information and diverse perspectives, as well as understanding sensitive key issues. As a group, the stakeholders can assist in identifying common goals and developing strategies to meet those goals. Equally important to implementation is stakeholder "buy-in." To work long-term and be successful, a strategy must have support from the personnel implementing the activities. A strategy developed through consensus can mitigate problems.

A vested stakeholder group improves communication between different organizations. The group can also improve communications within the organizations. The Capacity Development Program will include educating waterworks management, operators, engineering consultants, state agencies, and consumers. The Capacity Development stakeholder group has access to their membership through newsletters and other marketing approaches. These efforts will enhance the success of the Program. A continuous dialogue between stakeholders, funding agencies, and regulators is important to understand which Capacity Development elements are working and which are not. A stakeholder group can work collaboratively to meet the common goal of increasing capacity to provide safe, reliable and affordable drinking water for all Virginia residents.

5.2 IDENTIFICATION OF STAKEHOLDER GROUP

The Waterworks Advisory Committee (WAC), established by the Waterworks Regulations, 12VAC5-590-40, formed the core for the first stakeholder group. The WAC is a well-established body and has been meeting regularly since 1974. At the WAC's March 18, 1999 meeting, VDH-ODW presented the framework for the development of the original Capacity Development Strategy.

The current WAC membership includes representatives from the following: Virginia Section of American Water Works Association, Southeast Rural Community Assistance Project, Virginia Manufacturers Association, Virginia Water Well Association, Virginia Association of Counties, Virginia Society of Professional Engineers, Virginia Tech, American Council of Engineering Companies of Virginia, Waterworks Operator - Class 1, Waterworks Owner – Community (Class 5 & 6), Virginia Rural Water Association, Virginia Municipal League, Virginia Division of Consolidated Laboratory Services, Virginia Department of Environmental Quality, Virginia Department of Housing and Community Development, Virginia State Corporation Commission, and Virginia Water Environment Association. The Department of Environmental Quality (DEQ) and the State Corporation Commission (SCC) are involved in aspects of the Capacity Development Program; these agencies attend the WAC meetings, but are not named members of the WAC in the *Waterworks Regulations*.

For the current revision of the Strategy, specific members from the TAP community and from within ODW were requested to comment on this revision, whose major intent was the addition of specific language regarding the asset management initiatives and programs that are available through the Virginia Capacity Development Program.

SECTION 6
Factors that Encourage or Impair Capacity Development

6.1 FACTORS THAT ENCOURAGE CAPACITY DEVELOPMENT

Several positive factors in Virginia increase waterworks' capacity to provide consistent, reliable, and affordable drinking water to consumers while meeting water quality standards. This includes generating revenues sufficient for the waterworks to meet current operational costs, as well as setting aside adequate resources for future investment in the waterworks. An important factor of capacity success is the consolidation of regulatory functions regarding waterworks within VDH-ODW, coupled with adequate legal authority for VDH-ODW to perform those functions. In addition, a strong relationship with DPOR is required as it is the agency with oversight of licensing waterworks operators.

VDH-ODW has the ability to restrict the formation of new waterworks that cannot demonstrate the capability to provide safe and reliable drinking water. The effective use of this authority can prevent the establishment of waterworks that cannot attain or demonstrate adequate TMF capacity.

In addition, VDH-ODW has a comprehensive program for providing technical assistance to existing waterworks to help them develop the capabilities that are lacking. As detailed in an earlier section of the strategy, VDH-ODW developed ways to identify waterworks that are in need of assistance and target the provision of technical assistance to them. This program, coupled with VDH-ODW's goal of conducting sanitary surveys annually at surface water source waterworks, and every two years for groundwater source waterworks (without treatment), provides a high level of oversight of Virginia's waterworks.

Another positive factor in Virginia is that a high percentage of the population connects to a drinking water system owned by local government agencies. This virtually ensures that a minimum level of planning, management, and financial viability exists. Virginia requires elected bodies to have "Board Training", which enumerates their responsibilities. If customers do not like the quality of service provided, they can replace elected officials through the local election process. Appointed officials are typically responsive to their elected officials, and must therefore be responsive to waterworks customers.

Additionally, regulatory authority over land use rests with local government. They use comprehensive plans, master plans, zoning restrictions, and other local land use ordinances to ensure that waterworks utilize viable water supplies. This multi-barrier approach ensures that waterworks with capacity are successful throughout the process.

New privately owned noncommunity and non-transient noncommunity waterworks are most often associated with a larger commercial enterprise. These businesses often seek financing through lending institutions. Lenders ensure adequate financial and managerial controls exist for the business and associated waterworks.

Virginia is fortunate to have an abundant supply of water that is readily available and suitable for drinking water use with appropriate treatment in most areas of the State. There are localized areas within the State where naturally occurring compounds make the water quality less suitable. Regulatory structure through the State Water Control Board and the Department of Environmental Quality is in place and continuously improved upon in order to protect these resources.

Privately owned waterworks serving (or proposing to serve) fifty or more connections also fall under the regulatory jurisdiction of the SCC. SCC regulations ensure that privately owned waterworks provide safe and reliable drinking water at reasonable rates. These regulations can be found in the Code of Virginia § 56-234. Responsibilities of the SCC include making administrative interpretations and rulings relating to waterworks' rates and business operations, investigating customer complaints regarding both rates and

quality of service, maintaining service territory maps, and conducting formal rate increase and quality of service proceedings. The SCC may require revision of a waterworks' rates and service improvements if such changes are necessary to protect the public interest.

Through DWSRF funding, VDH-ODW provides technical assistance to waterworks by means of several industry specialists' services.

6.1.1 Assistance Providers – VDH-ODW has hired four Capacity Development Program Coordinators (called Sustainability Coordinators), dividing the state geographically into thirds, in order to conduct on-site technical assistance to waterworks that serve populations less than 10,001 persons. This will supplement the Field Office staff that currently provides technical assistance to all waterworks. Additionally, VDH-ODW is continuing to work more closely with Southeast Rural Community Assistance Project and Virginia Rural Water Association regarding technical assistance, including water accountability and asset management.

6.1.2 Source Water Assessment – With the use of Geographical Information Systems (GIS), VDH-ODW is continuing to assess all new waterworks' sources. VDH-ODW periodically updates the Source Water Assessments (SWAs). VDH-ODW contractors, technical assistance providers, and waterworks use SWAs as the basis for Source Water Protection Plans, utilize supplemental SWA information during sanitary surveys, and create Synthetic Organic Compound Waiver determinations by referencing SWA data.

6.1.3 Planning and Design Grants – VDH-ODW provides grants for the planning of construction projects, for the completion of required engineering reports, and to manage documents such as Waterworks Business Operation Plans and Asset Management Plans. VDH-ODW accepts Planning and Design Grant applications on a year-round basis. Scoring gives priority to Acute and Chronic health needs. The Capacity Development Program considers other projects based on the availability of funds. Applications for eligible projects that are received early in the year and not funded will be held until on or around September 1, when all applications that have not previously been selected for funding will be reconsidered. The maximum award for this funding cycle is $35,000 and no local match is required.

6.1.4 Small Project Engineering Services Program – The Small Project Engineering Services (SPES) program funds engineering services at waterworks that may not otherwise be able to afford services. Eligible waterworks include community and non-profit, non-transient noncommunity systems serving a population of 10,000 persons or less. VDH-ODW designed this program to supplement the Office of Drinking Water's technical assistance services. SPES does not take the place of the Planning and Design Grant process, and projects typically cost less than $15,000.

6.1.5 Source Water Protection – Independent contractors continue providing guidance to waterworks in developing and implementing Source Water Protection Programs. VDH-ODW provides this assistance to ground water and surface water community waterworks with populations of less than 10,001 persons.

6.1.6 Asset Management Plan – VDH-ODW will encourage and provide funding mechanisms for waterworks to develop Asset Management Plans (AMPs) that include the five core components of Asset Inventory, Life Cycle Costs, Level of Service, Criticality, and Long-term Funding. VDH-ODW will fund AMPs through the Planning and Design Fund Program, as well as the Small Project Engineering Services Program. The completion of Asset Management Plans are now required as part of DWSRF construction projects if a waterworks does not already have one, or if the current AMP is older than 5 years. To encourage asset planning and replacement, VDH-ODW will make available the lesser of the actual cost of an AMP or $15,000 as principal forgiveness. Additionally, VDH-ODW will seek out opportunities to present AMP training to operators and waterworks staff

at conferences, seminars, webinars, and through other means. VDH-ODW will provide all-day AMP training to waterworks personnel as funding allow.

6.1.7 Waterworks Business Operations Plan – VDH-ODW may use service providers to provide hands-on guidance and assistance to waterworks in developing a WBOP that conforms to VDH-ODW guidelines.

6.1.8 Security Technical Assistance to Waterworks – On an as-requested basis, VDH-ODW's Emergency Services Coordinator (ERC) will conduct on-site security assessments. These assessments will increase technical and managerial capacity through recommending processes and infrastructure improvements. Further, the ERC will develop and provide training on security, emergency preparedness, and all hazards (including terrorist threats). The ERC will also provide technical assistance for developing Emergency Response Plans and other security related plans/programs. Previously, this included Cyber-security workshops and training made available to waterworks through EPA contractors.

6.1.9 Energy Audits – With the assistance of the Department of Mines, Minerals and Energy, and in conjunction with the DWSRF application process, VDH-ODW promotes Energy Audits at waterworks.

6.1.10 Management, Methods, and Money: Understanding Concepts in Capacity Development - This 3-1/2 day course focuses on the issues associated with capacity development in the waterworks industry. Capacity development is a broad term, encompassing many areas, including the managerial, technical, regulatory, and financial aspects of operating and maintaining a waterworks.

6.1.11 Establishing a Successful and Sustainable Waterworks: Revenues, Rates and Funding – A 4-day educational program to provide waterworks, owners, and supervisors intensive training on revenues, rates, and funding.

6.1.12 Specialty Seminars and Training Events – Training developed for waterworks staff, to include topics such as emerging technology, regulatory compliance, new rules implementation, compliance, and business plan development.

6.1.13 Training Subsidies – Awarded to waterworks operators to attend the *Waterworks Operators Short Course* at Virginia Tech.

6.1.14 Operator Certification and Training – A "Distance Education" program using video tele-courses to assist operators in obtaining certification.

6.1.15 Innovative Technology Study – Pilot study of new and innovative water treatment equipment and/or processes used at small waterworks.

6.2 FACTORS THAT IMPAIR CAPACITY DEVELOPMENT

Several factors work against VDH-ODW's goal of insuring that every waterworks has the TMF capacity to provide safe and reliable drinking water, now and into the future. Issues that impair waterworks capacity will arise regardless of the effort made to ensure capacity. Presented below are a few factors that can impair a waterworks' capacity to provide quality drinking water. This is not an all-inclusive list of factors.

In February 1999, VDH-ODW mailed an 85-question survey to each of the 3,781 small water system permit holders in Virginia. The resulting report "Developing Guidelines for Sustainable Small Drinking Water Systems in Virginia," provided insight into factors that impair capacity development at small waterworks. These findings are as true today as they were 20 years ago.

Waterworks staff lack basic understanding of capacity issues. Many waterworks do not provide annual training to their operators to update their knowledge. Most waterworks personnel are still unable to state the life expectancy of their assets. Without this knowledge, financial and physical planning for replacement of the facilities is almost impossible. Often times, waterworks' managers are unable to project water demand or service population over the next 10 years, making waterworks expansion planning difficult if not impossible.

Most waterworks that VDH-ODW Sustainability Coordinators work with are not setting aside the appropriate funds to upgrade or replace their infrastructure when its life cycle is complete. Many, when asked, will confirm that they are not putting aside money for capital improvements, while others have no operating cash or reserve fund.

Owners are hesitant to relinquish control over their waterworks, frequently expressing disinterest in physically or managerially consolidating facilities with another waterworks system.

6.2.1 Structural Factors

There are a large number of independently owned and operated waterworks within the Commonwealth of Virginia. These waterworks are often very small, serving fewer than 100 homes, and not actively operated or managed. These waterworks typically do not have full-time employees (*i.e.*, professional staff or full-time operators), emergency response plans, or capital reserves. Their access to engineering, accounting, and legal expertise is also limited. Under normal conditions, many of these very small waterworks are able to provide safe water to their customers. However, under stress (*e.g.,* equipment failures, main breaks, extreme weather conditions), these waterworks may not be capable of an appropriate response, potentially resulting in a public health risk.

The lack of operational profit motive is another factor that makes it difficult to improve the capacity of waterworks. Virginia waterworks owners include municipal waterworks, water authorities, schools, homeowners associations, and others who do not expect the waterworks to be profit centers. While owners are concerned about public service, protection of the public health and welfare, their financial needs are often in competition with other public services. When owners establish a waterworks as a nonprofit organization, volunteers can perform key functions ranging from serving on the Board of Directors to assisting in the operations and maintenance of the waterworks. Nonprofit waterworks owners often have little incentive to authorize new investments, improve the level of service, or provide a high quality product.

Finally, a waterworks' location can compromise its ability to develop the required capacity. Waterworks located in sparsely populated areas are less likely to rely on a regional water provider or service company. Similarly, waterworks without access to high quality raw water have higher operational costs and increased technical challenges.

6.2.2 Legal and Regulatory Factors

VDH-ODW regulates waterworks in Virginia through a permitting system that ensures they meet minimum standards for design, construction and operation. However, there is no legal mechanism to require consolidation of waterworks. Prospective new or non-complying waterworks owners are free to choose any ownership option to assure compliance with the *Waterworks Regulations* and the *Code of Virginia*.

Current Virginia legal and regulatory framework does not discourage the establishment of small, stand-alone waterworks**.** Such waterworks are not likely to generate substantial capital reserves, aggressively invest in new equipment or technology, or engage professional services.

Non-municipal waterworks do not have the legal or regulatory authority for zoning or land use controls (source water protection), nor condemnation powers (land for facilities). Without these tools, a waterworks' ability to control the quality of resources and the extent of services is limited.

6.2.3 Economic and Demographic Factors

Any discussion of factors that can impair a waterworks' capacity must recognize the economic and demographic factors that affect a waterworks ability to provide safe and reliable drinking water. With unlimited funding, there would be fewer impediments to a higher level of service. However, there are limits to a waterworks' ability to raise rates in order to generate adequate funding. The majority of low interest government funding programs available for waterworks improvements remain unavailable to private owners, with the exception of the DWSRF Program that makes loans eligible to privately owned waterworks.

Waterworks with challenges related to demographics such small population, low income, high percentage of incomes below the poverty level, high unemployment, and high percentage of elderly, are likely to face capacity development challenges. The root cause of some community waterworks' problems lies within these demographic considerations, and are therefore outside of the intent, purpose and scope of this strategy.

6.3 MECHANISMS TO ADDRESS CAPACITY IMPAIRMENT

The list below enumerates some methods to address barriers to capacity development.

Methods to Eliminate Structural Impairment

- VDH-ODW, through the DWSRF Program, provides loans and principal forgiveness funding which enables waterworks to improve their infrastructure.
- DWSRF application criterion provides enhanced scoring for projects that incorporate the creation or expansion of regional water suppliers.

Methods to Eliminate Legal and Regulatory Impairment

- Require waterworks submitting a DWSRF application to document or develop financial capacity by preparing a WBOP, as needed.
- Encourage waterworks consolidation through compliance actions.
- Develop a Receivership program as outlined in Section 6.3.1, below.

Methods to Eliminate Economic and Demographic Impairment

- Develop incentives for regionalization in areas that face economic and demographic challenges.
- Develop training and education programs to assist economically stressed waterworks.

6.3.1 Receivership of Significantly Non-compliant Waterworks

There are situations where, after VDH-ODW makes a best effort utilizing all the Capacity Development tools described within this strategy, waterworks and owners cannot provide safe drinking water to their customers. In these situations, a dire lack of capacity creates an urgent condition. One tool that § 32.1-174.3 of the *Code of Virginia* authorizes is Receivership. Although the *Code* authorizes the process, there are currently no existing state funds for this program. VDH-ODW's intent is to utilize DWSRF 15% set-aside funds to meet the needs of the Receivership Program. VDH-ODW will request funds to pay third-party service providers to manage the receivership of the waterworks as ordered by the Court system. This management will constitute direct technical assistance under the 15% set-aside provisions of the DWSRF.

Assistance will be limited to a specified time-period not to exceed 24 months. Technical assistance will address TMF factors throughout the waterworks organization. The receiver must not utilize funds for the renovation, expansion or maintenance of the waterworks. VDH-ODW anticipates conducting emergency procurements for technical assistance to specific waterworks.

6.4 ONGOING DETERMINATION OF FACTORS THAT IMPAIR AND ENHANCE CAPACITY

Part of the technical assistance provider's responsibilities is to communicate a description of their activities. Staff will add any newly identified factors that enhance or impair the waterworks ability to attain capacity to those already listed. VDH-ODW thereby has an ongoing mechanism to identify multiple factors that impair or enhance capacity.

SECTION 7
Implementation Plan

7.1 IMPLEMENTATION WITHIN THE AGENCY

VDH-ODW utilizes its Waterworks Advisory Committee (WAC), comprised of interested industry representatives, non-profit organization representatives, non-governmental organizations, and VDH-ODW staff to review Strategy updates. This newly updated version of Virginia's Capacity Development Strategy contains all of the goals, objectives, and procedures necessary to achieve implementation.

VDH-ODW will solicit the assistance of WAC members in order to communicate the Capacity Development Strategy to all interested parties across the Commonwealth.

7.2 REPORTING REQUIREMENTS

Table 7-1 shows reporting requirements related to the Capacity Development portion of the 1996 SDWA Amendments.

7.3 ACTION PLAN

7.3.1 Action Plan for Evaluating New Waterworks

The federal deadline for having a comprehensive program ensuring new waterworks have the requisite TMF capacity was October 1, 1999. EPA determined that VDH-ODW met EPA guidance and statutory requirements and communicated that in a letter dated May 5, 1999.

VDH-ODW Working Memo 784 dated February 10, 1997 (revised April 26, 2012), formally established this action plan. Originally issued in May 2000, the current strategy document is the result of the latest revision of the Capacity Development Strategy (first revised in May 2014).

7.3.2 Action Plan for Evaluating DWSRF Applications

Section 3 describes this established procedure. Additional information located on http://www.vdh.virginia.gov/drinking-water/financial-construction-assistance-programs/

7.3.3 Action Plan for Evaluating Existing Waterworks

As previously stated, Virginia had a capacity development strategy for existing waterworks that were not DWSRF applicants prior to the October 1, 2000 deadline.

VDH-ODW implemented the baseline assessment described in Section 4.2.2 prior to July 1, 2001. Staff has completed an update of the baseline assessment on a three-year cycle since 2001 to measure system improvements over time. See Table 7-2.

Table 7-1
1996 SDWA Capacity Development Reporting Requirements

Section	When	To Whom	By Whom	Description
1420(c)(3)	No later than 2 years after the date on which a State adopts a capacity development strategy and every 3 years thereafter.	Governor of the Commonwealth of Virginia; also available to the public.	Agency Head; VDH-ODW is the state agency.	Report shall be on the efficacy of the strategy and progress made toward improving the TMF capacity of waterworks in the Commonwealth. Reports filed every three years, with the last submitted in 2017.
1420(b)(2)	Not later than 5 years after the date of enactment of this section and as part of the capacity development strategy of the State.	The EPA Administrator.	State Agency; VDH-ODW.	Each State shall report on the success of enforcement mechanisms and initial capacity development efforts in assisting the waterworks listed under paragraph (1) to improve TMF capacity. Annual reports have been provided to EPA, next report due November 30, 2020
1420(b) (relates to above 1420(b)(2)).	August 6, 1997 (and periodically update)—or— Beginning not later than 1 year after the date of enactment of this section.	The EPA Administrator.	State Agency; VDH-ODW	List of community waterworks and non-transient noncommunity waterworks that have a history of significant noncompliance, and the reasons for their noncompliance. Included in the annual report to EPA, above.

Table 7-2
Capacity Development Strategy – Timeline for Action

Action	Date
Baseline Assessment	Completed 2001, revised 2017
Adopt Strategy to prevent losing 10% DWSRF grant	Completed 2000
1420(b) Last report to EPA	October 2019
1420(c) Last report to Governor/Public	November 2017
Last Reassessment	March 2020
1420(c) Next report to Governor/Public	November 2020
Last Revision to Capacity Development Strategy	May 2014
Revision to Strategy based on AWIA	July 2020

SECTION 8
Communication Strategy

8.1 GOVERNMENTAL AGENCY COMMUNICATION

Implementation of the Capacity Development Strategy requires VDH-ODW to communicate with other governmental agencies. This includes annual reporting to EPA and triennial reporting to the Governor. These reports provide information regarding the success of the strategy and the overall improvement to the waterworks in the Commonwealth. VDH-ODW staff will communicate regularly on DWSRF application reviews and technical assistance efforts related to DWSRF recipients. VDH-ODW personnel will communicate with other funding agencies (*e.g.*, Rural Development, Community Development Block Grant Program, the Virginia Tobacco Commission, and the Virginia Coalfield Economic Development Authority).

8.2 STAKEHOLDER COMMUNICATION

As discussed in Section 5, the WAC will review this revision of the Strategy. The CapDev/OpCert Group will then review the strategy once a year. Each of the members of the CapDev/OpCert Group may pass information on to their constituents and report feedback to VDH-ODW's Training, Capacity Development and Outreach Director. In addition, VDH-ODW may mail any additional information to the members.

Furthermore, VDH-ODW will periodically conduct surveys of stakeholders in an effort to gather and evaluate data, as well as seek input to improve technical assistance and training options.

8.3 WATERWORKS COMMUNICATION

An important component of the overall strategy is ensuring that waterworks staff are aware of the Capacity Development Program, and that waterworks owners know TMF assistance is available. There are many methods available to inform the waterworks. As described below, VDH-ODW will:

- Announce available technical assistance via mass mailings, e-mails, or other means. Interested waterworks can contact some service providers directly, where appropriate

- Direct waterworks owners and operators to the VDH-ODW Capacity Development webpage. VDH-ODW regularly updates these webpages with relevant information for waterworks. Published materials include a webpage address for waterworks personnel to access this information.

- Produce simple one-page handouts listing different programs and activities and distribute them through conferences and meetings. They are available to hand out at sanitary surveys and when waterworks owners stop into VDH-ODW offices.

- Train sanitary survey personnel on the requirements of the WBOP and the Capacity Development Strategy and inform waterworks personnel about the program during sanitary surveys. Request stakeholders on the CapDev/OpCert Group inform waterworks regarding the requirements.

- Provide technical assistance for WBOP development, inform waterworks of the revised Strategy and publish available technical assistance.

Glossary of Abbreviations
(In order of use)

T	Technical Capacity
M	Managerial Capacity
F	Financial Capacity
TMF	Technical, Managerial and Financial Capacity
VDH	Virginia Department of Health
ODW	Office of Drinking Water
DWSRF	Drinking Water State Revolving Fund
EPA	Environmental Protection Agency
WBOP	Waterworks Business Operations Plan
CWSRF	Clean Water State Revolving Fund
WIFIA	Water Infrastructure Finance and Innovation Act
AWIA	America's Water Infrastructure Act
TAP	Technical Assistance Provider
VRWA	Virginia Rural Water Association
SERCAP	South East Rural Community Assistance Project
EFCN	Environmental Finance Center Network
VT	Virginia Polytechnic Institute and State University (Virginia Tech)
DPOR	Department of Professional and Occupational Regulations
WAC	Waterworks Advisory Committee
FCAP	Financial and Construction Assistance Program (Division of the Office of Drinking Water)
TNC	Transient Non-Community Waterworks
SDWIS	State Drinking Water Information System
VRA	Virginia Resource Authority
C	Community Waterworks
NTNC	Non-transient Non-Community Waterworks
DEQ	Department of Environmental Quality
SCC	State Corporation Commission
GIS	Geographical Information System
SWA	Source Water Assessment
SPES	Small Project Engineering Services
AM	Asset Management
WAC	Waterworks Advisory Committee

APPENDIX A

Waterworks Permit Application Process

Project Review & Permit Procedures Manual

Version 4.0

September 30, 2020

ODW-2020-01-Project Review & Permit Procedures Manual-9/30/20

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

Office of Drinking Water
Safe Drinking Water for a Healthy Virginia

Project Review & Permit Procedures Manual

Table of Contents

Summary

This manual provides procedural guidance to the Office of Drinking Water (ODW) staff for the review and approval of design engineering documents and the issuance of all permits, as prescribed in the Waterworks Regulations. It does not include the following subjects, which are covered in these Working Memos[1]:

WM 813 – Well Development

WM 896 – Policy for Issuing Operation Permits

WM 902 – Exceptions to Surface Water Treatment Plant Loading Rates

WM 906 – Procedures for Arsenic Removal Treatment Systems

Disclaimer

The purpose of this manual is to provide consolidated guidance on the project review program and permit procedures administered by the Office of Drinking Water as authorized in the Waterworks Regulations. It does not replace the requirements of the Regulations. The Project Review and Permit Procedures Manual is intended for ODW staff use, and should not be provided to the waterworks or consultants in lieu of technical assistance from ODW staff.

Revisions Summary

DATE	DESCRIPTION OF CHANGES
April 4, 2012 (Version 2.0)	Original Issuance
July 16, 2012 (Version 2.1)	1. Added APPENDIX 4 – Document Management Process 2. Added standard language to the engineering description sheet (EDS) for DEQ withdrawal permits.
July 18, 2014 (Version 3.0)	1. Revised Section 1. Introduction: Eastern Groundwater Management Area has expanded to include new cities and counties. 2. Revised Section 2. Preliminary Engineer Conference & Report: Engineers are to submit electronic copies of final PER. 3. Revised Section 3. Waterworks Business Operations Plan: Qualifications, Resources and Procedures modified. 4. Revised Section 4. Project Review: Added plan review time expectations, electronic plan submittal requirement, and provided clarification for record drawing review requirements. 5. Revised Section 5. Construction Permit: Engineers are to submit electronic copies of final plans. "Engineering Description Sheet" has been renamed "Description Sheet of Proposed Construction". Added new subsection "5.4. Well Data for DEQ".

[1] These Working Memos will be incorporated into future versions of the Permit Manual.

	6. Revised Section 6. New or Nonconventional Methods, Processes, and Equipment: Temporary Permits will be issued in place of the former Provisional Permits. 7. Revised Section 7. General Permits and Standard Specifications: Additional guidance and templates provided. 8. Revised Section 8. Operation Permit: Temporary Permits will be issued in place of Provisional Permits. EDS will no longer be an attachment to Operation Permits. The EDS has been replaced with "Operation Permit Conditions", attached to the Permit. A separate "Waterworks Description Sheet" will be issued. 9. Revised Section 9. Capacity Evaluation of Waterworks: ERCs will no longer be utilized in calculations. Additional guidance for estimating water demand provided. Removed alternate 24-hour well yield test procedures. Removed Q=11.4N^0.544 peak hour equation. Replaced example calculations in subsection 9.11. 10. Deleted Appendix 1 – MOU with DEQ 11. Revised Appendix 4 (now Appendix 3) – Document Management Process 12. Revised Attachment organization and numbering. Revised content of the following Attachments: • PER Approval Letter • Operation Permit Transmittal Letter to Owner • Design Exception Memo • Construction Permit • Description Sheet of Proposed Construction • Operation Permit Waterworks Description Sheet (formerly EDS) • Transmittal Checklist – Central Office Files • Transmittal Checklist – Central Office Project Approval • Standard Operation Permit • Memorandum of Understanding for General Permit • Transmittal Checklist Operation Permit • Temporary Operation Permit Requirements 13. Added the following new Attachments: • Central Office Plan Approval Transmittal Checklist • Temporary Operation Permit • Operation Permit Conditions • Estimated Maximum Daily Water Demand • General Permit & Local Review Audit • General Permit Annual Report • General Permit - Project Summary Report • PEC Meeting Minutes Template

April 6, 2015 (Version 3.1)	1. Revised Attachment organization and numbering. Revised content of the following Attachments: • PER Approval Letter • Scope and Detail Checklist • Design Exception Memo • Record Drawings Approval Letter • Change Order / Addenda Approval Letter • Construction Permit • Transmittal – Central Office Approved Plans • Transmittal – Field Office Approved Plans • General Permit MOU • Operation Permit Conditions • Waterworks Description Sheet • Operation Permit Transmittal Letter 2. Added the following new Attachments • Summary of Final Inspection 3. Revised the following: • Figure 2 • Figure 4 • Appendix 3. ODW will no longer be scanning engineering plans 4. Revised Section 3. Waterworks Business Operations Plan: Applicability, Qualifications, Resources and Procedures 5. Added Section 5.7 Expired Construction Permits 6. Added Section 5.8 Completed Construction Projects 7. Revised Section 7.6 to provide additional guidance for processing General Permits 8. Revised 8.5 to clarify voluntary treatment specified in Operation Permit Conditions 9. Revised 8.11 to clarify that Temporary Permit Requirements are not to be issued to TNCs for failure to submit a WBOP 10. Revised 8.12 to provide additional guidance for processing Permit Revocations 11. Revised Section 9. Capacity Evaluation of Waterworks as follows: a) permit capacity may be limited by Office of Environmental Health Services permit limits, b) removed the 1.8 Safety Factor for wells within 2 GWMAs, c) provided clarification on DEQ's VWP permits, safe yield, and waterworks source capacity, d) revised format of multiple well capacity table, e) added capacity evaluation calculation examples, and f) provided a table of standard calculation units.
January 5, 2016 (Version 3.2)	1. Revised Section 4.8.3 to include field office approval of exceptions for noncommunity well lot plats and dedication documents 2. Revised Section 5.4 to include GW-2 form and "VA Hydro" database/ web portal

	3. Added Section 5.10 Alternate Project Delivery 4. Revised Section 8.12 for electronic processing of Permit Revocations 5. Added Attachment A.18 Example Noncommunity Well Lot Plat & Dedication Document Exception 6. Added Attachment A.19 Example of Alternate Delivery Project Construction Permit with Conditions 7. Revised Attachment C.3 Operation Permit Conditions (revised LT1 & LT2 treatment requirements, added treatment options, clarified VDH Sewage Disposal permit inclusion and added Sewage Disposal permit capacity option) 8. Revised Attachment C.5 Waterworks Description Sheet to include options for other VDH permits
September 30, 2020	1. Formatted to conform to 2019 Technical Manual format 2. A short list of PER contents has been added. 3. Procedures for Project Returns have been modified. 4. Field offices have been authorized to issue design exceptions for bentonite grout in lieu of neat cement in wells serving noncommunity waterworks. 5. Procedures for Change Orders and Addenda have been modified. 6. Field offices have been authorized to approve distribution system storage tanks > 1 million gallons capacity. 7. General Permit limits have been extended to 10 years, if after the initial issuance and program audit, the waterworks is found to be in compliance with the MOU. 8. Waterworks Description Sheet content and capacity evaluation requirements clarified. 9. Operation permit revocation procedures have been changed. A "Change of ownership" agreement form and transmittal letter have been added. 10. All permit processing procedures have been updated to reflect field office delegation of authority. 11. Replaced single Waterworks Permit Application with separate Waterworks Construction Permit Application and Waterworks Operation Permit Application for Existing Facilities.

List of Abbreviations

AWWA	American Water Works Association
Board	State Board of Health
Commissioner	State Health Commissioner
DCLS	Virginia Department of General Services, Division of Consolidated Laboratory Services,
DEQ	Virginia Department of Environmental Quality
DPOR	Virginia Department of Professional and Occupational Regulation
DWSRF	Drinking Water State Revolving Loan Fund
EPA	Environmental Protection Agency
FO	Field Office
GUDI	Groundwater Under the Direct Influence of Surface Water
GWMA	Groundwater Management Area
MOU	Memorandum of Understanding
NTNC	Nontransient, Noncommunity Waterworks
ODW	Office of Drinking Water
PDF	Portable Document Format
PE	Licensed Professional Engineer
PEC	Preliminary Engineering Conference
PER	Preliminary Engineering Report
PF	Peaking Factor
PWS	Public Water System
PWSID	Public Water System Identification Number
Regulations	*Waterworks Regulations*, 12VAC5-590-10 *et seq.*
S&D	Scope and Detail Review
SDWIS	Safe Drinking Water Information System
SF	Safety Factor
TNC	Transient Noncommunity Waterworks
VAC	Virginia Administrative Code
Va. Code	*Code of Virginia*
VDH	Virginia Department of Health
VWP	Virginia Water Protection (Permit)
WBOP	Waterworks Business Operations Plan
WDS	Waterworks Description Sheet
WM	Working Memo

Glossary of Terms

Community Waterworks	Defined in the Regulations as "…a waterworks that serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents."
Consecutive Waterworks	A waterworks that has no water production or source facility of its own and that obtains all of its water from another permitted waterworks or receives some or all of its finished water from one or more wholesale waterworks. Delivery may be through a direct connection or through the distribution system of one or more consecutive waterworks. 12VAC5-590-10.
Exception	Defined in the Regulations as "…an approved deviation from a "shall" criteria contained in Part III (12VAC5-590-640 et seq.) of this chapter."
Design Engineer	For the purposes of this document, the term "design engineer" is used to describe an agent of the waterworks, or proposed waterworks, owner responsible for the engineering of the waterworks or modifications of the waterworks.
Nontransient Noncommunity Waterworks	Defined in the Regulations as "…a waterworks that is not a community waterworks and that regularly serves at least 25 of the same persons over six months out of the year. When used in the context of an NTNC, "regularly serves" means four or more hours per day, for four or more days per week, for 26 or more weeks per year."
Owner	Defined by Va. Code § 32.1-167 and 12VAC5-590-10. as "an individual, group of individuals, partnerships, firm, association, institution, corporations, governmental entity, or the federal government, that supplies or proposes to supply water to any person within [the] Commonwealth from or by means of any waterworks."
Transient Noncommunity Waterworks (TNC)	Defined in the Regulations as "a noncommunity waterworks that is not a nontransient noncommunity waterworks. A TNC serves at least 25 persons daily for at least 60 days out of the year."
Wholesale Waterworks	A waterworks that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another waterworks. Delivery may be through a direct connection or through the distribution system of one or more consecutive waterworks. 12VAC5-590-10.
Waterworks	In Virginia, a "waterworks" is defined in the Public Water Supplies Law as "a system that serves piped water for human consumption to at least 15 service connections or 25 or more individuals for at least 60 days out of the year." Va. Code § 32.1-167. The definition includes "all structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of pure water except the piping and fixtures inside the building where such water is delivered."

Chapter 1 - Introduction

1. Permit Process Overview

In Virginia, the Public Water Supplies Law, *Code of Virginia* (Va. Code) §§ 32.1-167 through 32.1-176, defines a "waterworks" as "a system that serves piped water for human consumption to at least 15 service connections or 25 or more individuals for at least 60 days out of the year." The definition includes "all structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of pure water except the piping and fixtures inside the building where such water is delivered." Va. Code § 32.1-167. All waterworks are required to have a written permit from the State Health Commissioner (Commissioner)(Va. Code § 32.1-172, 12VAC5-590-190) unless exempted because a waterworks meets all four of the conditions specified in Va. Code § 32.1-168, or construction involves the extension of water distribution piping having a diameter of 8 inches or less and serving less than 15 equivalent residential connections. Va. Code § 32.1-172 A.

The *Waterworks Regulations* (Regulations), 12VAC5-590-10 *et seq.*, include requirements and procedures for the issuance of permits required by the Public Water Supplies Law. 12VAC5-590-200, requires an owner or authorized agent to submit an application for a permit from the Virginia Department of Health (VDH) to establish, construct, expand, modify, and/or operate a waterworks or water supply. The permitting process includes the following steps:

1. Completion of a Preliminary Engineering Conference (PEC)
2. Submittal and approval of a Waterworks Business Operations Plan (WBOP)
3. Submittal and approval of a Preliminary Engineering Report (PER)
4. Submittal of a Permit Application
5. Submittal, review and approval of Final Plans, Specifications, and Design Criteria
6. Issuance of a Construction Permit
7. Final inspection of construction by ODW
8. Issuance of a new or amended Operation Permit

However, not every applicant will be required to go through each of the eight steps identified above to receive an Operation Permit.

There is a permit application form for construction of a new waterworks or the modification of an existing waterworks (See PM-C5-Attachment 7).

There is a separate permit application form for change of ownership of an existing waterworks (See PM-C8-Attachment 13). The application form and instructions, which are posted on the Office of Drinking Water's (ODW) external webpage, can be filled out on-line and printed, signed, and submitted to VDH. VDH requires a signed copy of the application for a waterworks' official file at the appropriate ODW field office. A printout or digitally signed PDF file of a completed electronic application satisfies this requirement.

There is also a separate permit application form for existing facilities to apply for an Operation Permit (See PM-C8-Attachment 15). This application includes questions that will aid field staff in determining whether the facility meets the definition of a waterworks.

2. New Wells

If a new well source is proposed, the field office[1] will require the following two steps in addition to those listed above (see 12VAC5-590-280, -840 and Working Memo 813):

1. Well Site Approval
2. Well Construction

Field office staff should refer owners or engineers considering the construction of a new well to ODW's "Handbook for Developing a Public Water Supply Well" located at: http://www.vdh.virginia.gov/content/uploads/sites/14/2016/07/Attachment-1-Well-Development-Handbook.rev-8-23-16.pdf

The Department of Environmental Quality (DEQ) manages groundwater through a program regulating the withdrawals of groundwater in certain areas called Groundwater Management Areas (GWMA). See Va. Code §§ 62.1-254 to 270. In a designated GWMA, 9 VAC25-610-40 specifies that no person shall withdraw, attempt to withdraw, or allow the withdrawal of groundwater, except as authorized pursuant to a groundwater withdrawal permit, or as excluded in 9VAC25-610-50. Withdrawals of less than 300,000 gallons per month do not require a Groundwater Withdrawal Permit. 9VAC25-610-50. There are presently two Groundwater Management Areas in Virginia, per 9VAC25-600-20:

1. Eastern Shore: Counties of Accomack and Northampton;
2. Eastern Virginia: Counties of Charles City, Essex, Gloucester, Isle of Wight, James City, King George, King and Queen, King William, Lancaster, Mathews, Middlesex, New Kent, Northumberland, Prince George, Richmond, Southampton, Surry, Sussex, Westmoreland, and York; the areas of Caroline, Chesterfield, Fairfax, Hanover, Henrico, Prince William, Spotsylvania, and Stafford counties east of Interstate 95; and the cities of Chesapeake, Franklin, Hampton, Hopewell, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg.

A "withdrawal system" is defined in DEQ's Groundwater Withdrawal Regulations (9VAC5-25-610-10) as follows:

> "Withdrawal system" means (i) one or more wells or withdrawal points located on the same or contiguous properties under common ownership for which the withdrawal is applied to the same beneficial use or (ii) two or more connected wells or withdrawal points which are under common ownership but are not necessarily located on contiguous properties."

If a Groundwater Withdrawal Permit is required, the waterworks owner should obtain a draft permit from DEQ *prior to* constructing the well. DEQ may require specific construction features if a well is drilled through multiple aquifers (typical of the Coastal Plain region). Also, DEQ's

[1] Unless specified otherwise, references to the "central office" or "field office" refer to ODW's central office in Richmond Virginia and six regional field offices in Norfolk, Richmond, Culpeper, Lexington, Danville, and Abingdon.

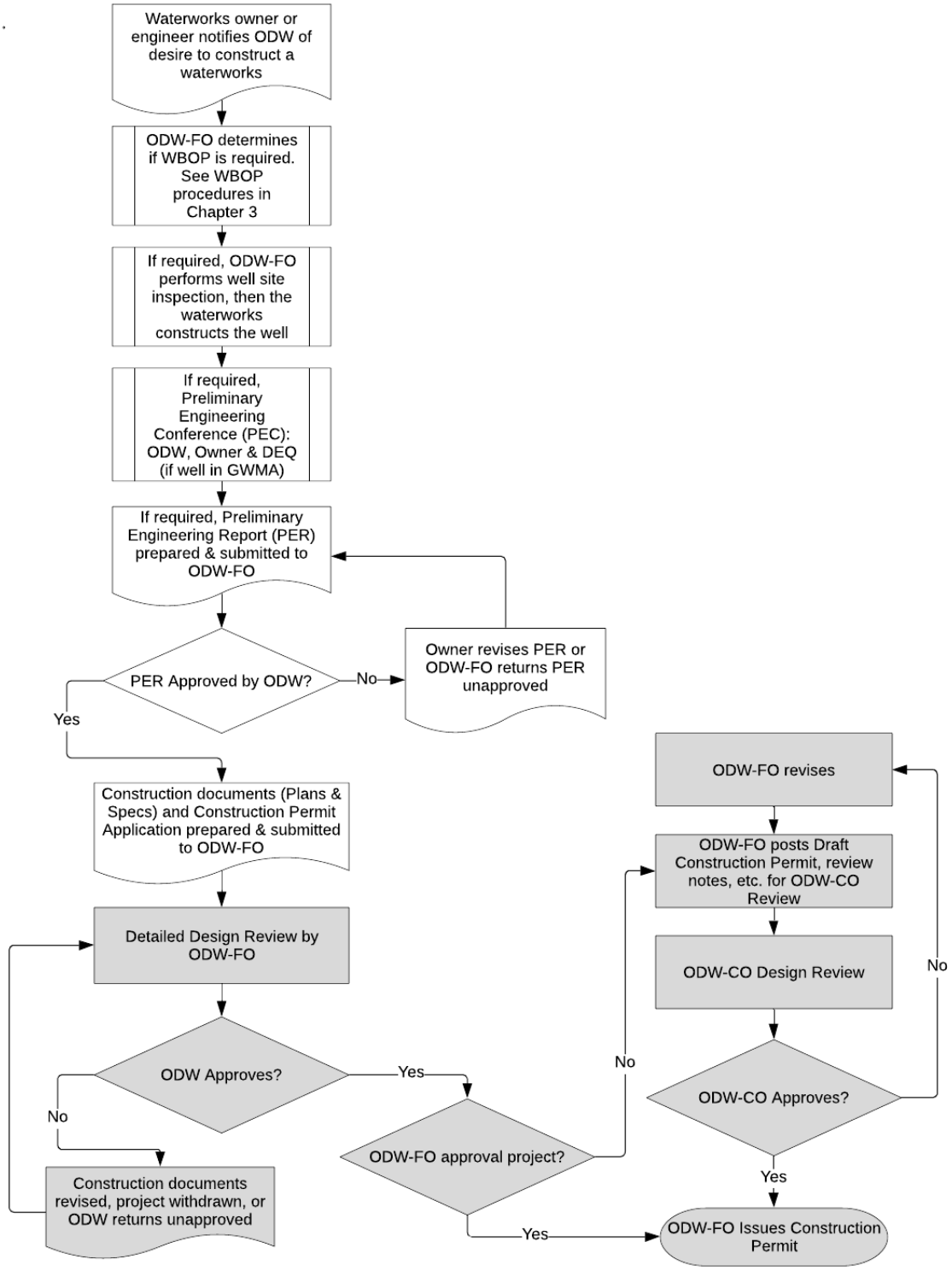
Aquifer Test Plan differs from the well yield and drawdown testing typically required by ODW. The waterworks should consult DEQ to determine what construction and testing requirements will apply before drilling and developing a public water supply well.

More information on DEQ water withdrawal permitting and Groundwater Management Areas can be found on the DEQ Water Withdrawal Permitting and Compliance Program website here: https://www.deq.virginia.gov/Programs/Water/WaterSupplyWaterQuantity/WaterWithdrawalPermittingandCompliance.aspx

3. Permit Types

ODW issues four types of permits, summarized in the following table. A further description of these permits, the purpose of each, and their attachments is provided in this manual.

PERMIT	ATTACHMENTS	CHAPTER
Construction	Description Sheet of Proposed Construction (not required for some projects)	5
General (Local Review Program for construction of water distribution mains)	Memorandum of Understanding with ODW	7
Operation – Standard	Operation Permit Conditions. May also have Variance or Exemption	8
Operation – Temporary	Operation Permit Conditions, Temporary Operation Permit Requirements. May also have Variance or Exemption	8, Section 11



Flow Chart. Construction Permit Issuance Process

Chapter 2 - Preliminary Engineering Conference & Report

The Preliminary Engineering Conference (PEC) is a feasibility discussion that establishes the project's direction and scope for construction of a new waterworks or modification or expansion of an existing waterworks. Field office staff may discuss the following elements with the applicant and design engineer[1] at the PEC:

1. Service description and water demand;
2. Estimated construction development time frame and completion date;
3. Alternatives considered;
4. Issues related to the source of supply, *e.g.*, for wells: located in a GWMA, located in karst terrain, well development procedures, anticipated treatment needs, etc.;
5. Construction of storage and distribution facilities;
6. Permits and authorizations required from DEQ for surface or ground water withdrawal, treatment process wastewater discharge and/or disposal;
7. Proposed treatment processes to meet water quality standards;
8. Complex hydraulics;
9. Any potential design exceptions to the Regulations;
10. Future/anticipated monitoring and reporting requirements; and
11. Operator requirements.

For prospective owners who intend to purchase an existing waterworks or develop a new one, as well as owners who are proposing an expansion or modification to an existing waterworks, field office staff should also review the owner's ongoing responsibilities and regulatory requirements after operation commences, including monitoring, reporting, operator requirements, etc. At this stage, it may be useful to review a draft Waterworks Business Operations Plan (WBOP) for new waterworks owners (covered in Chapter 3). An example PEC meeting minutes template is in PM-C2-Attachment 1.

A Preliminary Engineering Report (PER) is normally required by the ODW field office for projects involving:

1. Treatment processes (other than simple chemical solution feeders);
2. Pumping;
3. Storage;
4. Distribution system expansions or modifications that have the potential to result in exceeding 80% of a waterworks' permitted capacity or negatively impacting distribution system pressures; and
5. Receipt of Drinking Water State Revolving Funds (DWSRF).

The field office will coordinate with the central office on a PER that includes innovative/alternative technology or design exceptions to the Regulations. ODW requires a minimum of one paper copy of the PER and an electronic PDF file of the final report. Upon approval, the field office will stamp the report approved and retain it in the field office records. If central office coordination

[1] For the purposes of this document, the term "design engineer" is used to describe an agent of the waterworks owner responsible for the engineering of the waterworks or modifications of the waterworks.

will be required for the project, the field office will forward an electronic copy of the final PER to the Division of Technical Services following field office approval. Field office staff will utilize the template for an approval letter for a PER in PM-C2-Attachment 2.

The field director has the discretion of waiving the requirement for a PER. This would be appropriate when the project consists of only simple additions or modifications that do not require analysis to determine the impact on the ability of the waterworks to comply with the Regulations and the proposed project design concept is typical and does not need analysis or further justification. Field office staff will provide appropriate justification and document such decision to waive the PER in the project review notes, memo to the files or on the Scope and Detail checklist (PM-C4-Attachment 1).

Appendix

Attachments are located at: \\odwsrv1\odwshare\13-Manuals\02-Permit Manual

PM-C2-Attachment 1- PEC Meeting Minute Template
PM-C2-Attachment 2- PER Approval Letter

Chapter 3 - Waterworks Business Operations Plan (WBOP)

1. Authority

The requirement for a waterworks to complete a WBOP is established in Va. Code § 32.1-172 B, which states that an application for a permit "…shall include a comprehensive business plan detailing the technical, managerial, and financial commitments to be made by the owner in order to assure that system performance requirements for providing the water supply will be met over the long term." Section 32.1-172 B further states that the State Board of Health (Board) "may require the submission of a business plan by those existing waterworks that have demonstrated significant noncompliance with the Waterworks Regulations." The term "comprehensive business plan" is synonymous with "Waterworks Business Operations Plan" and ODW acts on behalf of the Board to implement the Public Water Supplies Law.

The field office may waive the WBOP portion of the application if an applicant has "demonstrated a history of acceptable compliance with waterworks regulations." Va. Code § 32.1-172 B. "Acceptable compliance" is not defined in the Public Water Supplies law or Regulations and it is up to the discretion of the field director to determine, with the assistance of the central office if necessary.

2. Applicability

Field directors, based on field staff recommendations, determine if a waterworks owner is required to submit a WBOP pursuant to Va. Code § 32.1-172. Under the following circumstances, field directors will generally require waterworks owners to submit a WBOP:

2.1. First-Time Owners

ODW requires first-time owners of any new or existing waterworks to submit a WBOP. This also applies to transient noncommunity (TNC) waterworks owners because they generally need technical assistance to understand their obligations. These owners must recognize themselves as waterworks owners, understand the operational requirements of the Regulations, and have a budget (or reserve account) in place to cover the waterworks' expenses.

2.2. Previous or Current Owners of Waterworks with Poor Compliance History

ODW requires any previous owner of a waterworks that the field director has identified as "chronically noncompliant"[1] to complete a WBOP when acquiring another waterworks. The field office will notify the owner of the requirement to complete a WBOP during the permit application process.

[1] "Chronically noncompliant" is defined at Va. Code §32.1—167 and 12VAC5-590-125 as a waterworks that is unable to provide pure water for any of the following reasons: (i) the waterworks' record of performance demonstrates that it can no longer be depended upon to furnish pure water to the persons served; (ii) the owner has inadequate technical, financial, or managerial capacity to furnish pure water to the persons served; (iii) the owner has failed to comply with an order issued by the Board or Commissioner pursuant to § 32.1-26 or 32.1-175.01; (iv) the owner has abandoned the waterworks and has discontinued supplying pure water to the persons served; or (v) the owner is subject to a forfeiture order pursuant to § 32.1-174.1.

ODW may also require a WBOP from the current owner of an existing waterworks that the field office director has identified as being chronically noncompliant. This will typically be part of an enforcement order issued by the Commissioner, and NOT part of the permit process.

2.3. Current Waterworks Owners Applying for Funds from the Drinking Water State Revolving Fund (DWSRF)

ODW may require applicants for DWSRF support to complete a WBOP or update an existing plan prior to receiving funds from the DWSRF. ODW DWSRF staff may request that field office staff review the DWSRF applications to make this recommendation. Capacity Development Division staff may also make this recommendation based upon their review of DWSRF applications. The determination should be based on a satisfactory history of compliance, and consistently good operation and maintenance practices. A review of the owner's financial capacity is also needed, and will likely require assistance from the Capacity Development Division and/or DWSRF staff. The financial review should include, but is not limited to, review of financial credit ratios, established reserve funds, and properly set rates.

3. Preparer's Qualifications

In order to meet the intent and purpose of the WBOP, the plan should be prepared by skilled individuals who are knowledgeable in sound business practices as well as the complexity of waterworks business operations. ODW staff, providing technical assistance, may provide guidance to waterworks owners as they prepare the WBOP. The waterworks owner is ultimately responsible for the preparation, accuracy, and final certification of the WBOP. However, the owner may seek advice and counsel from others having the appropriate business skills, knowledge, and expertise in waterworks operations.

4. Resources and Assistance

WBOP resources for the three waterworks types (community, nontransient noncommunity (NTNC), and TNC) consist of handbooks, templates, worksheets, and related information. WBOP preparers should use the appropriate resources to develop the submittal for review and acceptance by the field office. Resource are located at http://www.vdh.virginia.gov/drinking-water/capacity-development/waterworks-business-operations-plan/ and a WBOP review guide is located at \\odwsrv1\odwshare\01-Central Office\180-Capacity Development\06 - Waterworks Business Operations Plan\WBOP Community Staff Review Guide_FINAL_June 2016.pdf

Field office staff should provide technical assistance to direct waterworks to resource materials. Field office staff typically offer this assistance during the PEC with prospective waterworks owners. Field office staff may also recommend that the waterworks owners seek one-on-one technical assistance from Capacity Development Division staff.

5. ODW Review Procedures

Review of the technical, managerial, and financial portions of the WBOP is required for every WBOP submitted in accordance with Va. Code § 32.1-172. Capacity Development Division staff are available to assist field office staff in reviewing the WBOP.

Field offices will return WBOPs that are incorrect, incomplete, or fail to demonstrate acceptable technical, managerial, and financial capacities to the owner/preparer for revision.

If a new community waterworks owner fails to submit an acceptable WBOP, one condition of a Temporary Operation Permit can be the requirement to submit a WBOP. ODW will not issue Temporary Operation Permits to a TNC or NTNC waterworks based solely on failure to submit a WBOP.

Field office staff will utilize PM-C3-Attachment 1 – WBOP Acceptance Letter to notify the waterworks owner when the field office determines that a WBOP is acceptable. Field office staff will then notify the directors of the Capacity Development Division and the DWSRF program, and save as scan of the signed document to \\odwsrv1\odwshare\08-Documents and Data Files\809-Waterworks Business Operation Plans using a file naming format of PWSID_WBOP_AP_YYYY_DD_MM.pdf. Field office staff will also enter the WBOP acceptance date into SDWIS in accordance with the ODW SDWIS Manual.

Appendix

Attachments are located at: \\odwsrv1\odwshare\13-Manuals\02-Permit Manual

PM-C3-Attachment 1- WBOP Acceptance Letter

Chapter 4 - Project Review

1. Project Tracking

ODW staff will use the project tracking database, PTLog, to account for all activities related to the handling of reports, plans, specifications, addenda, and change orders. ODW staff will enter projects into PTLog immediately upon receipt of documents, and update the system as actions are taken. The PTLog Manual is located at: \\odwsrv1\odwshare\03-Memos\301-Active Working Memos\301.02-Forms Letters Manuals\WM793- PTLOG\

2. Review Time Expectations

ODW staff will make every effort to review plans and submittals within a reasonable time. 12VAC5-590-210, states "All reports, plans, specifications shall be submitted to the field office at least 60 days prior to the date upon which action by the division is desired." This implies that ODW will respond to submittals within 60 calendar days. Although the complexity of proposed projects and the available staff resources may prove the 60-day response time to be challenging or unattainable, every effort shall be made to meet this time frame.

PTLog determines a Priority status for each active project. Any new or revised submittal that has not had ODW staff action taken within 60 days will be assigned Priority 1 status. If a project is assigned a Priority 1 status, the comment section in PTLog must be completed by ODW staff to include dates indicating when ODW staff comments or approval are expected to be made to the permit applicant. Additional information that explains the review delay may also be included in the comment section.

3. Submittals

Construction permit application: A construction permit application must be completed and submitted to the ODW field office prior to the review of engineering documents for a construction permit. Applicants can download the application from the ODW webpage at: https://www.vdh.virginia.gov/drinking-water/permits-and-design/

Engineering reports submitted to ODW for review and approval may include: Demonstration Studies, Treatability Studies, Alternative Design Evaluations, and Preliminary Engineering Reports. ODW requires one paper copy and one electronic PDF file of the final approved report.

Construction drawings, record drawing, and specifications: ODW requires one set of paper documents for initial review. For final approval, ODW requires one set of paper documents and an electronic PDF file of the final approved drawings and specifications. The process for document processing is presented in Appendix 3.

Change orders and addenda: ODW requires one set of paper documents for initial review. For final approval, ODW requires one set of paper documents and an electronic PDF file of the final approved plan sheets.

Final design calculations, design memoranda, and hydraulic analyses (computer model simulations) may be provided by the design engineer with the construction plans and specifications. ODW requires one paper copy and an electronic PDF file of the final approved report.

Waterworks, particularly privately-owned ones, may not always bid a project. Instead, the owner may pre-purchase equipment and include the manufacturer's literature (such as data sheets and shop drawings) in place of specifications and detailed drawings. The submittal must have sufficient detail that the contractor can construct the project and ODW can determine if the project complies with the requirements in Part III of the Regulations. ODW requires that these be submitted together as a bound document, with the cover sheet sealed, signed and dated by a licensed professional engineer.

3.1. Replacement-in-Kind

ODW does not generally require submission of design documents for approval of maintenance activities and "replacement-in-kind" items. Some examples include, replacing a 1,000 gallon pressure tank with another 1,000 gallon pressure tank of the same dimensions, replacing a chemical metering pump with a chemical metering pump of equal or greater capacity, or replacing a 2-inch water main with a 2-inch water main in the same street. Replacement items must comply with all requirements of Part III of the Regulations.

3.2. Laboratories

ODW requires submission of plans and specifications for the construction of a chemistry or biological laboratory at a waterworks. However, the ODW does not issue a Construction Permit if the laboratory is a separate project. If the laboratory is a separate project, field office staff will review the plans and specifications for conformance with 12VAC5-590-760, and notify the owner of any comments or notify the owner that ODW does not have any comments. When the laboratory is included in the construction documents for a new / upgraded / modified waterworks, field office staff will review this portion of the project for conformance with 12VAC5-590-760 and will require revisions if necessary prior to issuance of a construction permit. ODW staff will advise the owner and engineer that the Department of General Services, Division of Consolidated Laboratory Services certifies laboratories performing drinking water testing for microbiological and/or chemistry parameters for compliance with federal and state Safe Drinking Water Program (SDWP) requirements. ODW accepts data for SDWP compliance from laboratories either certified under 1VAC30-41 or accredited under 1VAC30-46.

3.3. Requirements for certification/sealing work prepared by a licensed Professional Engineer (PE)

In accordance with Va. Code § 54.1-410 B, ODW is required to ensure that plans, specifications or calculations prepared in connection with water treatment and distribution systems be prepared by a professional engineer licensed or authorized pursuant to Chapter 4 (§ 54.1-400 *et seq.*,) of Title 54.1 of the Code of Virginia. The Board for Architects, Professional Engineers, Land Surveyors, Certified Interior Designers and Landscape Architects (APELSCIDLA) is responsible for promulgating and regulations for licensure. The Department of Professional and Occupational Regulation (DPOR) serves as staff to the APELSCIDLA Board.

The APELSCIDLA Board has issued regulations which call for all final documents prepared by a licensed professional to carry that person's seal (18 VAC 10-20-760 B).

ODW requires that electronic PDF documents submitted bear the Professional Engineer's digital signature.

Plans and specifications:

In specific reference to the requirement for a PE seal, ODW will process the plans and specifications only if the cover sheets to all plans and specifications bear an "original" seal and signature, and are dated. The remaining plan sheets need only have facsimiles of the seal, signature, and date. ODW requires that any plan sheets prepared by a PE, who is not the PE sealing the cover sheet, must bear facsimiles (as a minimum) of the seal and signature of that engineer.

Addenda:

ODW requires submission of plans and specifications addenda must bear an “original seal”, signature and date, or the transmittal letter must be dated and signed by the PE.

Change Orders:

ODW does not require a seal for change orders, but a PE’s signature is required. ODW may review and approve change orders that have not been executed (signed by representatives of the owner and contractor) if the field office confirms that the owner supports the change order through communication with the owner.

Technical Reports and Other Documents:

The cover sheet of all Preliminary Engineering Reports shall bear an "original" PE seal, signature, and date. Other documents which are not engineering documents, such as compliance sampling reports, do not have to be prepared by or bear the seal of a PE.

Land surveyors:

Va, Code § 54.1-408 authorizes land surveyors to prepare plans and profiles for (among other things) sanitary sewer extensions and waterline extensions, but only for subdivisions, site plans, and development work. Va. Code § 54.1-408 does specifically prohibit land surveyors from engaging in the design of pressure hydraulic systems, and states that the allowed work must involve the use and application of standards prescribed by local and state authorities.

Based on guidance received from staff of the Office of the Attorney General, surveyors who were licensed under the prior law, former Va. Code §54-17.1(3)(b), or who have passed the appropriate exam given by APELSCIDLA may lay out the routing of a waterline on plans, but may not select the size or materials for that waterline. This work must be performed by a PE. ODW will accept plans and specifications for waterlines prepared by a licensed surveyor, as long as they are accompanied by hydraulic calculations (covering size and material selection) prepared and stamped by a PE.

4. Scope and Detail Review

Field staff will perform a Scope and Detail (S&D) review for all plans and specifications submitted for review within 10 calendar days of receipt of submittal. A S&D review is not required for engineering reports, addenda, record drawings, or change orders. The form for the S&D review is located in PM-C4-Attachment 1.

If a "NO" response is given for any of the items[1] listed on the S&D review checklist, the project becomes a technical "Return", and ODW staff will update PTLog with this information. Field office staff send a return letter (see PM-C4-Attachment 2) to the design engineer, with a copy to the project owner and funding agency, if appropriate. Project documents may be included with the return letter, or held for later review when required submittals are received by the field office.

The field office may use discretion in the decision to return plans or to proceed with the technical review and include scope and detail deficiencies in the first comment letter (such as a missing application). This needs to be justified and documented by the field office.

5. Technical Review

All reviews shall include clear, detailed notes and relevant calculations. ODW staff will check all engineering calculations critical to the process, including critical volumes, detention times, pump selection calculations and hydraulics. At a minimum, the proposed design must comply with the design criteria in Part III of the Regulations. Field offices will save notes and relevant calculations in the agency records for the waterworks in addition to the plans and specifications.

ODW will not approve water line extensions, etc. unless there is sufficient source capacity. If there is insufficient source capacity, ODW staff should return the project unapproved, with a statement that it may be resubmitted with documented provisions of an acceptable source that meets drinking water standards.

6. Comment Letters

Upon completion of the review, ODW staff will send comments on the design in writing, with a copy to the owner and funding agency, if identified. The comments should include a request for a response within 30 days. ODW staff should clearly identify comments as requirements or recommendations. A comment letter template is located in PM-C4-Attachment 3. ODW staff may provide less significant comments or suggestions verbally or by e-mail. ODW staff may also call the design engineer to discuss the comments and ensure that the design engineer understands what actions are necessary to obtain a Construction Permit.

7. Project Returns

If the permit applicant or design engineer does not address review comments within 30 days of the date of the comment letter, the following process should be followed by field staff until the review comments are addressed or a written request to delay the project is received.

1. Field staff will contact both the permit applicant and design engineer by telephone, email, or letter to request that, within 15 days, the permit applicant or engineer submit a written response and revisions, as appropriate, or a written request to delay the project review for a specific time period.
2. If the permit applicant or engineer does not respond to ODW within 15 days after the attempt to follow-up with both of them, the district engineer may contact the permit applicant and engineer again by telephone, email, or letter to request that, within 15 days,

[1] Other than "permissions".

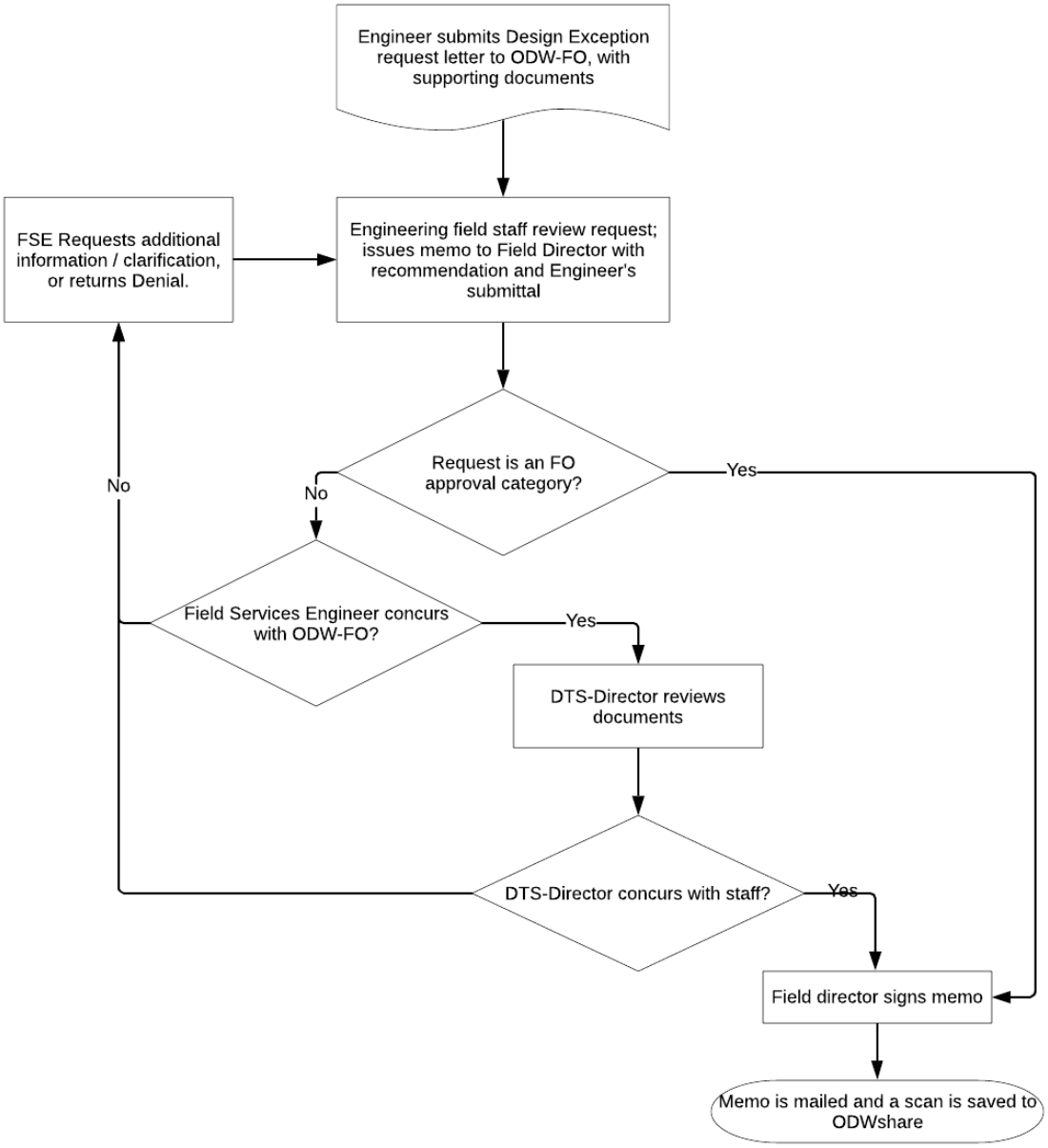
the permit applicant or engineer submit a written response and revisions, as appropriate, or a written request to delay the project review for a specific time period.

3. If the permit applicant or engineer does not respond to ODW within 120 days of the issuance of the comment letter, the district engineer will mail the permit applicant and engineer a "Project Return Letter". The district engineer may choose to return the project documents with this letter. Use the Project Return letter template provided in PM-C4-Attachment 4. The district engineer is to document this in the status section of PTLog as "Disapproved/Returned (R)".
4. If the district engineer receives a written response to delay the project for a specific time period and the district engineer approves this request, the district engineer will notify the permit applicant and engineer by telephone, email, or letter, and the hold status and end date will be noted on the "comments" section of the PTLog record. In this case, the district engineer will not proceed with the project return process unless a response is not received within the specified time period.

8. Design Exceptions

8.1. Procedure

Field office staff follow the procedure for evaluating a design exception request depicted in the following schematic:



Flow Chart. Design Exception Approval / Denial Process

8.2. Criteria

"Exception" is defined in the Regulations as "…an approved deviation from a "shall" criteria contained in Part III (12VAC5-590-640 et seq.) of this chapter." ODW may grant certain exceptions if the design engineer provides adequate justification, and the resulting nonconformity will not affect the waterworks ability to comply with the requirements for reliability specified in Part II (Operation Regulations for Waterworks) of the Regulations.

8.3. Approval and Documentation

Where exceptions are specifically allowed in the Regulations (i.e., Part IV of the Regulations), ODW does not require an applicant to submit a formal Design Exception Request (described subsequently), provided that the design engineer submits the supporting documentation/evaluation as prescribed in the Regulations to the field office with the design submittal.

ODW documents all other design exceptions as follows:

1. Central office approval - The field office provides a Design Exception Request memorandum to the central office using the form in PM-C4-Attachment 5. Field office staff will submit the request at the earliest possible time in the project review process (preferably at the PEC or PER stage), to allow the design engineer sufficient time to incorporate the Division of Technical Services director's decision into the final design.
2. Field office approval – The central office delegates the following types of design exceptions to the field office:
    a. Air backwash of gravity filters in lieu of surface wash
    b. Reduction in maximum chlorine feed capacity from Regulations' requirement of 15 mg/L
    c. Reduction in 30-day onsite supply of sodium hypochlorite
    d. Well lot plats and dedication documents for noncommunity waterworks (an exception request memo template is provided in PM-C4-Attachment 10
    e. Class IIIB well construction instead of Class IIB or better well construction for noncommunity waterworks

    The field office evaluates and documents these design exceptions with a Design Exception Request memorandum.

8.4. Tracking

Field offices will log all Design Exceptions into one Excel Workbook on "odwshare" maintained by the Division of Technical Services. The Design Exceptions log is located at:

odwsrv1\odwshare\14-Permits%20&%20Project%20Review/08-DESIGN%20EXCEPTIONS.xlsx

9. Exemptions for TNC Waterworks

ODW may exempt plans for construction permits for TNC waterworks from the professional engineer licensure requirements under the following conditions:

1. The waterworks is a TNC waterworks with actual or proposed service to no more than 100 persons per day.
2. The waterworks is a direct delivery system without any treatment, meaning that the system consists only of one groundwater source, pressure storage tank, and a single service connection (one structure). NOTE: The field office will require engineering plans and specifications for Point of Entry (POE) treatment.
3. The single service connection consists of a structure with area less than 5,000 square feet calculated using the outside dimensions of the structure.

   Example #1: Allowed Exemption: A single story structure is 80 ft long and 50 ft wide

   80 ft long x 50 ft wide = 4,000 square feet

   Example #2: Not Allowed for Exemption: A 5-story structure is 80 ft long and 50 ft wide

   80 ft long x 50 ft wide x 5 (stories) = 20,000 square feet

4. Construction of the well must be by a well driller with Class A contractor license. Field office staff can verify a well driller's license using the DPOR website.
5. Construction of the remainder of the waterworks must be by a master's level plumber or Class "A" contractor.
6. ODW requires that the information described in the checklist in PM-C4-Attachment 6 be submitted by the waterworks owner in lieu of plans, specifications, documents, and designs normally prepared by a licensed professional engineer. This information may also be better completed by the well driller or Class A contractor since they would normally be more knowledgeable in the completion of the checklist and diagram.

This exemption applies to new waterworks and modifications to existing waterworks that satisfy all the conditions listed above.

10. Record Drawings (As-Built Plans)

ODW does not require, but often receives record drawings ("as-built" plans) for projects that have a construction permit, unless the actual construction/field conditions were substantially different from the approved plans. In this case, ODW requires that record drawings accompany a fully executed change order. ODW cannot approve record drawings unless the drawings are sealed by a PE.

If construction was in substantial compliance with the approved project (ODW field office receives an engineer's letter of substantial completion, which verifies this), ODW does not require further action. Otherwise, the field office will review the project and modify the approval letter according to the circumstances. For projects constructed prior to formal approval due to emergency conditions, field offices will review the record drawings, and modify the approval letter accordingly. Refer to PM-C4-Attachment 7 for an example letter.

Field offices will review record drawings ("as-built" plans) for projects constructed illegally with no prior approvals as though they were for a new project. This may result in significant comments that necessitate field modifications or reconstruction. If major reconstruction is necessary, the field office may require a construction permit. Otherwise, once an approval is possible, the field

office will NOT issue a construction permit. A new/revised operation permit may be required. Field office staff will evaluate and document minor deviations from the Regulations in the review notes. ODW will not issue design exemptions for minor deviations from the Regulations on record drawings.

If ODW approval of record drawings is necessary, ODW requires the design engineer to submit final approved record drawings in electronic PDF format. The field office will keep the PDF in its files for the waterworks. [Note: At times record drawings are submitted to ODW because the contract documents require the contractor to submit record drawings. If the project was in substantial compliance with the approved documents, then no further review is necessary.]

Record drawing approvals may be issued by the field office without central office review if the constructed facilities are listed in Chapter 5, Section 3 - Projects Approved by Field Office. Otherwise, central office design review will be required.

11. Change Orders and Addenda

Addenda are modifications to the construction documents after the notice to bidders is issued, but before the contract is awarded. Change orders are modifications to the documents made after the project is awarded. If these items are received prior to project approval, the field office will process them with the entire package. If the field office receives either after project approval, staff will process them as a separate project. If the changes are major, the field office may issue a new construction permit. Otherwise, the field office will issue the approval without another permit and reference the original construction permit in the approval letter. Technical change orders and addenda for construction projects originally approved in the field office can also be approved by the field office. Otherwise, field office staff must submit them to the central office for approval. Field offices will utilize the letter format in PM-C4-Attachment 8. When change orders or addenda include revised drawings, ODW requires that these be labeled as described in section 5.5 of this manual.

ODW does not require approvals of change orders and addenda (CO&A) that are non-technical, or do not fall under the purview of Part III of the Regulations. ODW requests that design engineers submit all CO&A for DWSRF projects directly to the DWSRF project engineer. The DWSRF project engineer will coordinate with field office staff to determine if the field office needs to review and approve the change order or addenda. The DWSRF project engineer will also provide quantity adjustment change orders to field staff to decide whether quantity changes may require technical review.

The following are examples of CO&A's that DO NOT require ODW approval:

1. Non-technical: Changes in bid documents to include contract dates, bonding, bidding instructions, Davis Bacon, unit costs, etc.
2. Technical changes that are minor or do not fall under the purview of Part III of the Regulations:
    a. Changes to building paint color
    b. Changes to erosion and sediment control
    c. Changes to road compaction and material
    d. National Electrical Manufacturers Association (NEMA) enclosure

e. Adding additional pipe supports to contract

The following are examples of CO&A's that DO require ODW approval (review and approval letter):

1. Changes in pipe material
2. Changes in tank interior coating
3. Treatment unit changes
4. Waterline alignment, length, and diameter changes
5. Changes to control settings
6. Changes to pumps or pump motors

12. Specific Evaluation Topics

12.1. DEQ Notification Prior to Well Abandonment

The DEQ Ground Water Characterization Program is interested in re-using former production wells for groundwater monitoring purposes under the State Observation Well (SOW) network. If an owner plans to take a public water supply well out of service permanently, field offices will recommend to the waterworks that they contact the DEQ Ground Water Characterization Program regional geologist to determine if the well may be of interest to them, prior to permanent well closure.

If a well is permanently abandoned, ODW requires that the well driller document the abandonment procedure using DEQ's form GW-5 (Well Abandonment Report) and submit the form to ODW and to DEQ.

12.2. Waste Disposal

Wastewater discharged by the water treatment plant to a receiving stream/surface water or soil adsorption system MAY require a permit from DEQ and/or EPA. Field offices will notify the DEQ Regional Office, by letter, of the proposed discharge at the earliest possible time. Field offices will utilize the letter template in PM-C4-Attachment 9. During the PEC, field offices will advise the waterworks owner to follow up with DEQ regarding waste disposal.

Disposal restrictions that may be imposed by other agencies' permits (such as spent adsorption media, particularly if radionuclide removal is performed) should be addressed by the design engineer.

12.3. Internal Plant Recycle

The Filter Backwash Recycling Rule, 40 CFR § 141.76, applies to all surface water or groundwater under the direct influence of surface water (GUDI) systems that use conventional filtration or direct filtration and that recycle spent filter backwash water, thickener supernatant, or other dewatering process flows. Design engineers must take caution when considering the recycling of process waste flows within the treatment plant. When recycling is proposed, ODW requires that recycle must be returned prior to the point of primary coagulant addition, and must receive full treatment through all of the plant processes. (See 12VAC5-590-990)

ODW requires that recycle streams be controlled to prevent a hydraulic surge or a hydraulic loading in excess of plant capacity. The rate of recycle return should be no greater than 10 % of the plant influent (actual flow). ODW recommends additional settling of the recycle stream or recycle return to a pre-sedimentation basin as a minimum, to obtain a more consistent influent water quality to the plant. If alternative return locations are proposed, supporting justification from the design engineer is required by ODW, and the central office must approve the alternate location. (See 12VAC5-590-420 K)

ODW does not permit lagoon water receiving flow from plant floor drains, pump drains, etc., to be returned to the water treatment plant process flow stream, or upstream of a public waterworks' intake.

12.4. Distribution Systems

ODW will not permit a new or expanded distribution system unless an adequate water source exists or is proposed.

ODW requires that design fire flow (rate and duration) be documented by the design engineer indicating that the appropriate officials (Fire Marshall or local government building official) were consulted to establish the design fire flow.

Va. Code § 32.1-172 A exempts projects that consist of "the extension of water distribution pipes having a diameter of 8 inches or less and serving less than fifteen equivalent residential connections" from obtaining a permit. Because the Regulations define an equivalent residential connection as "a volume of water used equal to a residential connection that is 400 gallons per day unless supportive data indicates otherwise," 12VAC5-590-10, field offices may use census data, historic water demand, or other information to determine an appropriate value for an equivalent residential connection if less than 400 gallons per day.[1] The 15 equivalent residential connections are the determining factor, NOT the fire flow. The exception was not intended to allow owners to phase construction of large waterline extension projects, in order to circumvent the permit requirement. A PE must design exempt projects, as stipulated in the Code of Virginia. Enforcement of the license requirements is DPOR's responsibility.

The waterworks owner may obtain VDH approval for Standard Specifications and Plan Details. Thereafter, ODW only requires submission of the plans, provided that the plans reference the approved standards and details.

12.5. AWWA Disinfection Standards

Engineering specifications for disinfection of water treatment plants, wells, storage tanks and waterlines may reference the applicable AWWA standards or the Regulations. Since the AWWA Standards are copyrighted, duplication of the AWWA Standards in the specifications is in violation of the copyright, and is not required by ODW. Refer to WM-918 for additional information about

[1] The final amendments to the Regulations will remove the definition of "equivalent residential connection." Once the amendments are effective, ODW will not use the equivalent residential connection in in demand evaluation. ODW interprets this exemption as applying to projects composed of pipe no greater than 8 inched in diameter, serving no more than 15 total connections, and serving an average daily demand of no more than 6,000 gallons.

requirements for disinfection and bacteriological sampling procedures following construction, maintenance, and repair of waterworks facilities.

Appendix

Attachments are located at: \\odwsrv1\odwshare\13-Manuals\02-Permit Manual

PM-C4-Attachment 1- Scope and Detail Checklist
PM-C4-Attachment 2- Scope and Detail Return Letter
PM-C4-Attachment 3- Project Review Comment Letter
PM-C4-Attachment 4- Project Return Letter
PM-C4-Attachment 5- Design Exception Memo
PM-C4-Attachment 6- TNC Design and Construction Checklist (for Non-PE Design Projects)
PM-C4-Attachment 7- Record Drawings Approval Letter
PM-C4-Attachment 8- Change Order / Addenda Approval Letter
PM-C4-Attachment 9- DEQ Notification of Wastewater Discharge
PM-C4-Attachment 10- Example Noncommunity Well Plat & Dedication Document Exception

Chapter 5 - Construction Permit

1. Permit and Description Sheet of Proposed Construction

A construction permit number is assigned in the field office when a construction permit is issued. The construction permit number contains six (6) digits. The first digit is the assigned field office number (1-Abingdon, 2-Lexington, 3-Southeast, 4-Richmond, 5-Danville, 6-Culpeper). The next three numbers are sequential numbers, with each new calendar year beginning a new sequence, starting at 001. The last two digits represent the calendar year in which the permit is issued.

Field office staff write construction permits following the template in PM-C5-Attachment 1. Construction permits expire five years from the date of issuance. The field director must sign all construction permits. In the absence of the field director, the deputy field director may sign a construction permit on behalf of the field director, if the required QA/QC checks are completed.

As specified below, field offices will prepare a Description Sheet of Proposed Construction to accompany the construction permit. The Description Sheet of Proposed Construction is optional for other projects. A template for the Description Sheet is provided in PM-C5-Attachment 2**.** The Description Sheet, when used, must contain an evaluation of the design capacity of the project only, and wording in the final paragraph that indicates to the owner that the capacity will be re-evaluated for the waterworks' operation permit.

Projects that require a separate Description Sheet of Proposed Construction include the following:

1. Projects resulting in changes to the waterworks operation permit capacity.
2. Projects approved by the central office.
3. Projects that require a capacity evaluation of more than one process or component.
4. Projects that involve installation or changes to treatment, except as noted below.

Projects that are approved in the field office and do not require a separate Description Sheet of Proposed Construction include the following:

1. Waterline extensions and transmission mains.
2. Projects that do not affect waterworks capacity, such as solution-type chemical feed systems and filters without backwash features.

The projects without a separate Description Sheet of Proposed Construction must be described sufficiently in the permit, e.g., "This project consists of the addition of a sodium hypochlorite feed system which includes a 50-gallon solution tank and diaphragm metering pump rated at 20 gallons per hour."

2. Projects Approved by Central Office

Projects to be approved by the central office are scanned and uploaded to "odwshare" by the field office. If the proposed construction at a waterworks is not listed in the projects approved by the field office, staff must notify the Division of Technical Services and request they make a determination of whether Technical Services, or the field office, will approve the proposed construction project. Field offices will supply the following electronic documents:

Transmittal Checklist – Central Office Project Approval **(**see PM-C5-Attachment 3**)**

1. Permit Application
2. Plans, specifications, addenda and change orders
3. Design notes and calculations
4. All correspondence and emails
5. Review notes
6. Any Design Exceptions
7. Draft Construction Permit
8. Draft Description Sheet of Proposed Construction

3. Projects Approved by Field Office

The field offices will generally approve the following types of projects:

1. Water line extensions
2. Raw water lines and transmission mains
3. Distribution system booster pump stations
4. Distribution system storage tanks
5. A groundwater system consisting of wells, transfer booster pumps, hydropneumatic tanks (including bladder tanks), and/or gravity storage tanks
6. Metering pump and solution tank – type treatment systems, such as sodium hypochlorite for disinfection, phosphate for sequestration or corrosion control
7. Anion and cation exchange units
8. Sodium Fluoride Upflow Saturator
9. Iron and Manganese removal filters
10. Standard utility specifications. (Local Review Programs / General Permits must be approved by the central office)
11. Preliminary Engineering Reports. If a Design Exception request is included, central office approval is required. If the design exception was granted prior to submission of the PER, or if the design exception can be granted by the field office, then the field office may approve the PER.
12. Pilot Plant study reports. Discuss results and conclusions with the Division of Technical Services and obtain concurrence prior to approval.
13. Evaluation reports of full-scale technology (demonstration studies). Discuss results and conclusions with the Division of Technical Services and obtain concurrence prior to approval.

Field offices may issue approvals for engineering reports, standard utility specifications, and record drawings for permitted projects without central office document review.

4. Construction Permit Processing

The district engineer is responsible for the permit program within the district. The district engineer will prepare or supervise the review of submittal document and the preparation of a construction permit and necessary documents for each waterworks within the district. The deputy field director shall provide a technical review of the construction permit and all attachments before forwarding to the field director.

The field director is responsible for all aspects of the permit program within the field office region. The field director reviews the permit and associated documents.

Construction permits and other project approval documents will be processed by ODW as follows when central office approval is required:

1. The field office will post the electronic document file of the draft construction permit on "odwshare", and update the tracking spreadsheet.
2. The Field Services Engineer and the Director of Technical Services will review the documents. The Field Services Engineer and Director of Technical Services may make edits to the document, using the track changes feature in Microsoft Word, or ask the field office to provide more information or corrections to the document.
3. After the Field Service Engineer and/or Director of Technical Services approve the permit, they notify the field office will be notified and the spreadsheet will be updated by central office staff.
4. Field office administrative staff will print the version of the document reviewed by the Field Services Engineer, including edits to the document, if any. If the field office wishes to make additional or different changes to the document, the field office will contact the Field Services Engineer. The Field Director will sign the approved construction permit.
5. The field office will scan the signed permit documents and upload to "odwshare" and update the tracking spreadsheet. The field office will mail the original permit documents to the waterworks owner. The field office will also make and mail copies of the permit documents to all parties listed on the list of permit recipients. The field office will not return submittal documents to the owner with the signed construction permit. The field office will file the review sheets and associated data, notes, and calculations along with the record copy of the construction permit.
6. The field office will mark the paper copies of the plans and specifications "Approved" as noted in Section 5.5 and will file them for future reference. The field office will file electronic copies of the plans and specifications on the field office server for future reference.

Construction permits and other project approval documents will be processed by ODW as follows when central office approval is not required:

1. Field office administrative staff will print the documents and the field director will sign the approved construction permit.
2. The field office will scan the signed permit documents and upload to "odwshare". The field office will mail the original permit documents to the waterworks owner. The field office will also make and mail copies of the permit documents to all parties listed on the list of permit recipients. The field office will not return submittal documents to the owner with the signed construction permit. The field office will file the review sheets and associated data, notes, and calculations along with the record copy of the construction permit.

5. Well Data

A web-based database, VA Hydro, serves as the main repository of Water Well Completion Reports (GW-2 forms) for all drilled, modified and abandoned wells in Virginia. It is accessible to registered Water Well System Providers (well drillers), and registered DEQ and VDH staff at

http://deq1.bse.vt.edu/d.dh. Each field office has a primary and alternate staff member with login credentials to VA Hydro.

DEQ will monitor VA Hydro entries and send notifications of new entries to the ODW Special Projects Engineer. The Special Projects Engineer will download electronic GW-2s, post them in the folder:

odwsrv1\odwshare\14-Permits & Project Review\02-Well Data scanned\VA_Hydro_GW-2s,

The Special Projects Engineer will then send email notification of their availability to affected field directors and deputy field directors. The field directors will share the notification with appropriate district engineers and inspectors.

Every completed hardcopy GW-2 form received by ODW will be scanned by the field office into a single PDF file (ensure well location coordinates and datum, PWSID, and SDWIS well identification number are included), and uploaded to:

odwsrv1\odwshare\14-Permits & Project Review\02-Well Data scanned\FO upload,

along with the following files:

1. Yield and Drawdown Test (for new or modified wells),
2. Well development chemical test sample results (for new or modified wells). Field offices will utilize the "Owner Report" function in R&R, and ODW database, to create a report of all chemical sample results for the new well. (See R&R Manual). This report can be exported directly from R&R into a PDF file.

Field offices will follow a file naming scheme of the 7-digit PWSID number, followed by the SDWIS well identification number (i.e. 3165011WL002.pdf). The ODW Special Projects Engineer will forward the uploaded well data files to DEQ on a quarterly basis.

6. Document Labels

Field offices will mark paper copies of approved specifications, reports, addenda, change orders, and field orders with an approval mark containing the following information, and will retain the documents in the field office until final inspection has been completed.

Virginia Department of Health
Office of Drinking Water
Approved by _____

7. Electronic Plan Submission

ODW requires that the design engineer submit final plans and specifications in both electronic PDF format and in paper copy bearing the original PE seal. The paper copies are for the convenience of the field office staff, and the electronic copies will serve as the official record.

The field office may also maintain paper copies of the plans and specifications until the project is complete and ODW has conducted the final inspection and approved the project for operation. When the field office has no business reason to maintain paper copies of the plans and specifications, the field director may direct staff to destroy the paper copies if electronic copies of the plans and specifications are on file. The field office will maintain copies of the plans and specifications in accordance with ODW's document retention schedule. At the field director's discretion, field offices may retain paper copies longer, as space allows. The field office will retain electronic copies of documents on their computer server.

8. Expired Construction Permits

Construction permits expire after 5 years, and ODW does not extend the permit expiration date. Occasionally, the construction permit expires before construction of the project begins.

ODW requires a new construction permit if the Owner wishes to construct the project in accordance with the previously approved plans and specifications. The field office will reference the previously expired construction permit number and approval date in the first paragraph of the new construction permit (with a new permit number). Field staff will ensure that the plans and specifications have not changed and are still applicable. Field staff will also consider whether any changes to the Regulations or AWWA standards will require changes to the plans and specifications.

9. Completed Construction Projects

Upon completion of construction, the owner shall submit a statement signed by a PE certifying that the work was completed in accordance with the approved documents. Depending on the scope of the project[1], ODW staff may make a final inspection of the project to determine that the project was constructed in accordance with the approved plans. ODW staff shall not certify that the construction has been substantially completed; this is the responsibility of an engineer retained by the project owner. ODW staff will utilize the final inspection letter template in PM-C5-Attachment 5. For final inspection of a new waterworks, field staff should carry out a sanitary survey to cover all eight essential elements.

The field office, through the field director as required, may approve the project, allowing the owner to place it in service, or issue or amend the operation permit once the field office receives the engineer's letter of substantial completion, staff perform a final inspection (if necessary), the owner addresses inspection comments (if necessary) and all bacteriological samples (if necessary) are acceptable.

[1] A project that may not require an ODW final inspection is a waterline that is not financed through the DWSRF.

10. Changes to Projects Under Construction

ODW will not normally require a new construction permit for change orders to projects under construction; with the possible exception of those funded by the DWSRF. In those cases, field office staff work with the DWSRF Project Engineer to verify the owner will satisfy all federal contract requirements.

11. Alternate Project Delivery

Alternate project delivery methods are frequently utilized for utility construction projects, and may provide the owner advantages over the traditional "design-bid-build" delivery method. These projects provide a fast track to project completion, by allowing construction to begin before the final design is complete. Common examples of alternate project delivery methods include "design-build" and public-private partnerships.

ODW must issue a construction permit prior to the beginning of construction, per Va. Code § 32.1-172. To accommodate alternate project delivery projects, ODW will issue a construction permit with conditions. This will allow ODW staff to review and approve preliminary plans so that construction can begin. The conditions will require ODW review and approval of final plans prior to completion of construction.

Alternate Project Delivery Construction Permitting Steps:

1. Preliminary Engineering Conference between the field office and the design engineer to establish submittal requirements and procedures, including requirements for a PER, preliminary and final plans, specifications, meetings, permit issuance, field inspections, completion statements, etc. The field office staff will inform the design engineer that the field office may deny issuance of a construction permit if the proposal does not satisfy their concerns for maintaining adequate oversight, and that unapproved construction may require correction before the owner may place the project into service.
2. PER submitted by the design engineer and reviewed by ODW.
3. The field office must determine submittal requirements to ensure the project will meet applicable regulations prior to the post-PER Review Conference.
4. Post-PER Review Conference between the field office and the design engineer to establish the requirements of the preliminary, interim, and final submissions. The requirements for submission and approval of the preliminary plans, specifications, etc. must be identified and documented by the field office staff, because ODW will not receive the final documents prior to issuance of a construction permit. ODW requires the submission requirements to include, at a minimum: preliminary drawings (process flow schematic, site plan), draft specifications, and design calculations (design flows, loading rates for all units, hydraulic profiles), functional description of alarms controls and backup power, etc. The field office staff will remind the design engineer that the field office may deny issuance of a construction permit if the proposal does not satisfy their concerns for maintaining adequate oversight, and that unapproved construction may require correction before the project may be placed into service.
5. Submission and review of preliminary plans, specifications and design calculations by the design engineer. Preliminary documents may be 30% complete, 60% complete when submitted by the design engineer, or as agreed upon at the Post-PER Review Conference.

The field office should identify Design Exceptions during this step, if not sooner. A Professional Engineer shall seal the preliminary documents. To distinguish the preliminary from final documents, the design engineer may stamp "Preliminary" on the drawings, specifications, etc.

6. Issuance of construction permit with conditions. An example construction permit with conditions is in PM-C5-Attachment 6. Establish conditions that specify the following:
    a. Construction must adhere to Part III of the Regulations, Manual of Practice for Waterworks Design.
    b. Failure to comply with the Regulations will require corrections to achieve compliance with the Regulations, regardless of construction status.
    c. At least 180 days (days may be adjusted as appropriate) prior to completion of construction, a complete set of final plans and specifications must be submitted to the field office for review and approval. The plans and specifications must be properly signed and sealed by a professional engineer licensed in Virginia.
    d. Any deviations from the approved preliminary documents affecting capacity, hydraulic conditions, operating units, the functioning of the treatment processes, or the water quality delivered, must be approved by ODW before any such changes are made.
7. ODW staff must communicate with owner and design engineer throughout the construction process to minimize the risk of construction components not meeting the requirements in Part III of the Regulations. This may require the attendance at construction meetings, site visits, review of progress reports, or phone conferences.
8. Approval of Final Plans (ODW staff will modify PM-C4-Attachment 8 for Change Order approval and replace with "Final Plans and Specifications", as appropriate).
9. Construction completed.
10. Receipt of Letter of Substantial Completion from the design engineer.
11. Final inspection by ODW staff, finished water quality testing, and sanitary survey (if necessary).
12. ODW approval letter authorizing the owner to place the constructed waterworks in service.

Appendix

Attachments are located at: \\odwsrv1\odwshare\13-Manuals\02-Permit Manual

PM-C5-Attachment 1- Construction Permit
PM-C5-Attachment 2- Description Sheet of Proposed Construction
PM-C5-Attachment 3- Transmittal Checklist -Central Office Project Review
PM-C5-Attachment 4- Transmittal Checklist - Central Office Files
PM-C5-Attachment 5- Summary of Final Inspection
PM-C5-Attachment 6- Example Construction Permit with Conditions for Alternate Project Delivery

Chapter 6 - New or Nonconventional Methods, Processes, and Equipment

ODW will issue a temporary operation permit (formerly provisional operation permit) upon completion of construction projects involving the evaluation and approval of new or nonconventional methods, processes and equipment. Field offices will coordinate all such proposals through the central office and track temporary operation permits and expiration dates in "R&R". The process for evaluation and approval of new or nonconventional methods, processes and equipment is described in 12VAC5-590-290.

Chapter 7 - General Permit & Standard Specifications

12VAC5-590-300 provides the basis for all approved local review and approval programs. By this two-step procedure, ODW delegates, by general permit, plan review authority involving water distribution mains to a waterworks owner, or their representative.

1. Procedure

STEP ONE: The waterworks owner must first adopt, and then obtain ODW approval of General Specifications and Plan Details (Standards) covering all aspects of water distribution mains. The requirements of these specifications must be at least as stringent as the requirements in the current Regulations. A professional engineer licensed to practice in Virginia shall prepare these Standards[1]. Standard specifications are reviewed for conformance with applicable Regulations following a process similar to the process described in Chapter 5 for construction projects approved by the field office, except that the field office will not issue a construction permit but an approval letter if the project is determined to comply with the Regulations.

STEP TWO: The waterworks owner shall enter into a Memorandum of Understanding (MOU) with ODW outlining waterworks-specific provisions and the owner's method of compliance. The sample MOU in PM-C7-Attachment 1 provides typical language. These provisions, at a minimum, include the following:

1. The maximum size of pipe covered by the general permit. This applies only to distribution mains (as opposed to transmission mains). This has generally ranged from 12-inch to 16-inch diameter. See the definitions in the Regulations if you need further clarification.
2. Any modifications or amendments to the approved general specifications and plan details must be reviewed and approved by ODW prior to implementation. Optionally, language may be added describing the waterworks owner's procedures for modifying the general specifications and plan details, including ODW review and approval prior to implementation.
3. The waterworks owner must maintain adequate engineering staff (or retain a consultant) to conduct plan reviews. Adequate staff means at least one individual licensed as a Professional Engineer (PE) in Virginia with at least two years of experience in the design and construction of water distribution systems, or an individual with a governmental exemption. The PE must sign their approval on all projects processed under the general permit.
4. All individual projects serving 15 or more service connections or consisting of pipe greater than 8 inches in diameter shall have specific engineering plans and specifications prepared and approved under the general permit prior to construction. The general permit does NOT allow a waterworks owner to construct water distribution mains without project specific plans. Projects where the waterworks owner acts as both design engineer AND review engineer, are not allowed when review authority has been delegated from ODW to the

[1] A June 2005 APELSCIDLA ruling clarified that Regional Construction Standards, meaning general standards and standard details do not need to be sealed by a professional engineer; however, project specific documents which incorporate, in whole or in any part thereof, and/or modify such standards are required to be sealed by a professional engineer.

owner. ODW will only grant exceptions when the waterworks provides documented proof to ODW of a clear separation of design and review responsibilities, i.e. different departments or divisions, etc.

5. The waterworks owner shall maintain current distribution system maps. Generally, ODW requires system map(s) of the waterworks to be updated at least annually. Records, including copies of all project documents and approvals must be available for ODW inspection.
6. The waterworks owner agrees to submit an annual report (PM-C7-Attachment 2) and project summary report (PM-C7-Attachment 3) of each project approved and/or constructed under the terms of the MOU and general permit. This would include any related or supporting documents deemed necessary.

Once Steps One and Two are successfully completed, a general permit for distribution mains may be issued with the MOU attached. The general permit template is included in PM-C7-Attachment 4. A template for the transmittal letter to the Waterworks' owner is given in PM-C7-Attachment 5.

2. Multiple Waterworks With Same Owner

ODW may issue a general permit to an owner of multiple waterworks. In these cases, the general permit shall clearly define which systems are covered, either by listing specific systems or describing the geographical jurisdiction of the owner.

3. Field Office Jurisdiction

If a waterworks' service area crosses ODW field office boundaries, the general permit shall be issued by the same field office that issued the waterworks' operation permit. Design standards shall be reviewed and approved by the permitting office. If a waterworks owner has multiple waterworks located in the jurisdiction of more than one field office, the field directors shall collectively determine which field office shall review and approve the general specifications and plan details and issue the general permit. A copy of the approved standards shall be provided by the waterworks to all other field offices affected by the general permit.

4. Reporting and Audit of Local Review Programs

At a minimum of every 5 years, ODW staff will inspect the utility's program records and audit at least one set of plans. ODW staff will audit the program for conformance with the MOU. The template for the audit review is included in PM-C7-Attachment 6. ODW staff record audit dates in the general permit tracking log.

5. Expiration Date and Reissuance of General Permits

Under previous policy, general permits expired after 5 years. Initial issuance of general permits must have a 5 year expiration date, however; reissuances may be extended to 10 years if the Local Review Program is in good standing. To grant the extended 10 year expiration, the ODW program audit must reveal complete compliance with the MOU. If the Regulations or consensus standards referenced by the Regulations (e.g., AWWA C900, AWWA C651, etc.) have been revised during the general permit period or since the standards were last updated, then the utility's standards must be reviewed and updated to comply with the Regulations and reference the most recent standards as it pertains to waterline extensions, prior to reissuance of the general permit.

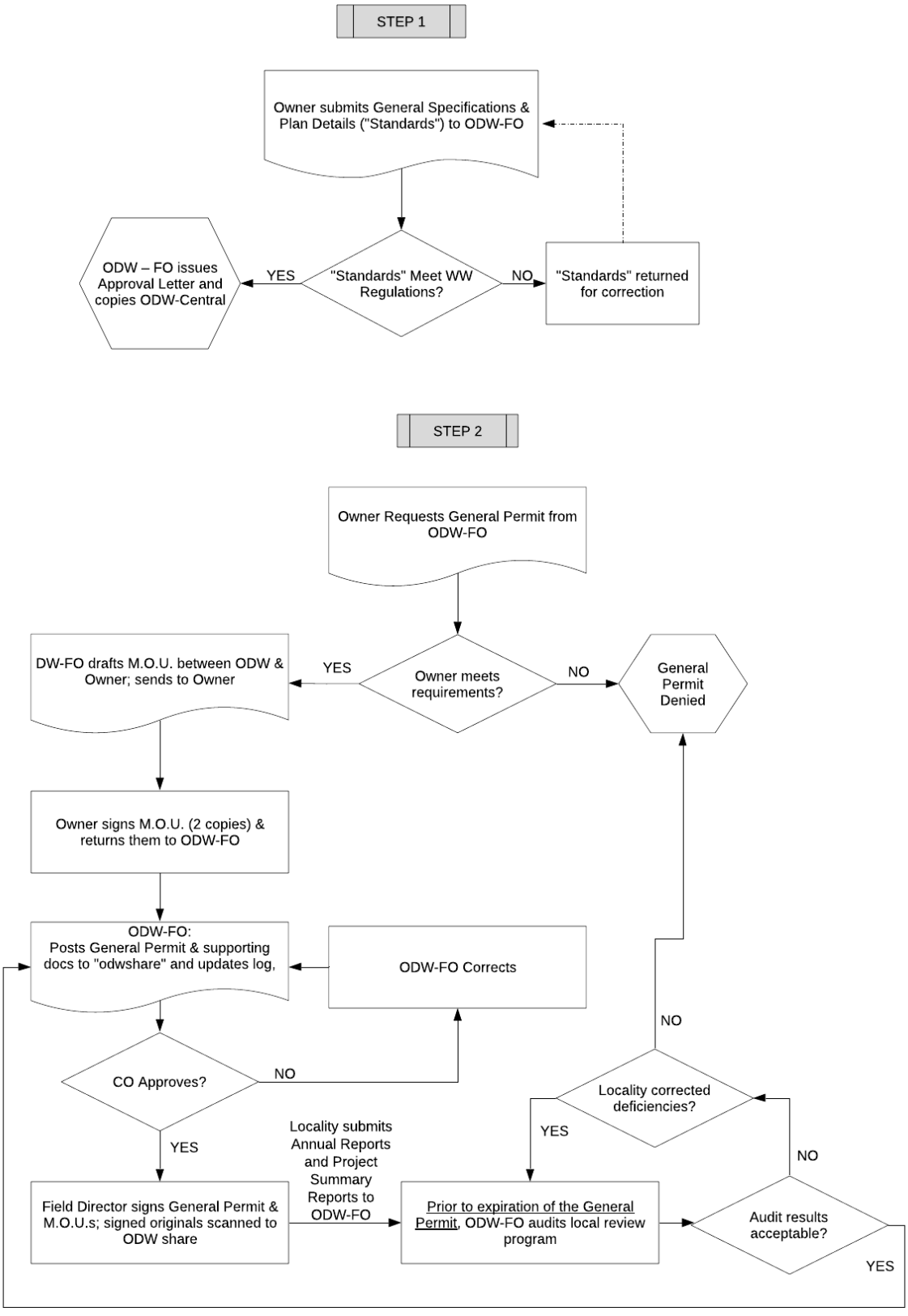
6. Processing and Tracking General Permits

Each field office maintains a tracking log (Excel workbook) on "odwshare" of general permits and Standards that they have approved. Field directors/deputy directors will be responsible for updating this log for their respective field office's worksheet tab.

General permits are assigned permit numbers in the same manner as described in Chapter 5, Section 5.1 for construction permits.

The field office will obtain the owner's signature on two copies of the MOU, and the field director will countersign both copies of the MOU. At this time, the field office will also upload electronic files of the general permit and supporting documents (MOU, audit, project summary form, annual report form, etc.) to "odwsare", and update the tracking log's "Processing Log" tab.

The central office will notify the field office when the central office has approved the general permit. The field director will then sign the general permit. The field office will update the tracking log, scan the general permit and the MOU, and upload to the "odwshare". The field office will mail the general permit and one copy of the MOU to the waterworks.



Flow Chart. General Permit Issuance Process

Appendix

Attachments are located at: \\odwsrv1\odwshare\13-Manuals\02-Permit Manual

PM-C7-Attachment 1- Memorandum of Understanding (M.O.U.) for General Permit
PM-C7-Attachment 2- General Permit - Annual Report
PM-C7-Attachment 3- General Permit - Project Summary Report
PM-C7-Attachment 4- General Permit for Distribution Mains
PM-C7-Attachment 5- General Permit Transmittal Letter
PM-C7-Attachment 6- General Permit & Local Review Program Audit Review

Chapter 8 - Operation Permit

1. General

Va. Code § 32.1-172 and 12VAC5-590-190 require all waterworks or water supplies in Virginia to be operated under the authorization of a permit issued by the Commissioner to the owner. The Commissioner has delegated the authority to review and issue the permit to the Office of Drinking Water and has delegated signature authority to the field office director.

ODW may issue operation permits for newly constructed waterworks and previously un-permitted waterworks that have been located and identified as meeting the definition of a "waterworks." Under specified circumstances, ODW may also amend operation permits.

ODW issues an operation permit to the owner of the waterworks or water supply. "Owner" is defined as an individual, group of individuals, partnership, firm, association, institution, corporation, governmental entity, or the federal government, that supplies or proposes to supply water to any person within [the] Commonwealth from or by means of any waterworks." Va. Code § 32.1-167 and 12VAC5-590-10.

ODW understands "Owner" to mean the entity that owns the property where the water supply is located and who owns and may operate the water treatment plant, its major appurtenances, and the distribution system. In the case of some TNC or NTNC waterworks, a property owner (the "lessor") may lease the property where the waterworks is located to another entity (the "lessee") who uses the property, including the waterworks, for some reason such as operating a business. For purposes of the operation permit, the waterworks "owner" will be the property owner (the lessor) and should be the permittee. For example, John Deer owns property, which contains a well that is used to supply water to a building on the property. There is only one service connection, to the building, and water from the well is used for a restaurant with 10 employees that typically serves 100 customers a day, 5 days a week. A pump, sampling ports, water softener, and chlorinator are inside the building, along with sinks, restroom facilities, and dishwashers. The company known as Jill's Restaurant leases the building and operates the restaurant. ODW should issue the operation permit to John Deer, not Jill's Restaurant, because John Deer owns the waterworks.

In very limited circumstances, it is permissible to issue the permit to an entity other than the property owner, if there is a contractual agreement that assigns sufficient access, control, and responsibility over operation of the waterworks to that entity. This shifting of responsibility is common in a triple net lease.[1] ODW shall not provide legal advice to any party to the agreement,

[1] A triple net lease (triple-Net or NNN) is a lease agreement on a property whereby the tenant or lessee promises to pay all the expenses of the property including real estate taxes, building insurance, and maintenance. These payments are in addition to the fees for rent and utilities. Taxes, insurance, building maintenance, and sometimes utilities are typically the responsibility of the landlord in the absence of a triple, double, or single net lease.

but should look for the following features in the agreement to identify the "owner" of the waterworks for purposes of the operation permit:

1. Address issues of access to all parts of the waterworks
2. Identify the infrastructure (physical elements of the waterworks)
3. Assign responsibility for operation, maintenance, repair, and replacement of waterworks components
4. Assign responsibility for compliance with the Regulations
5. Identify the duration of the agreement.

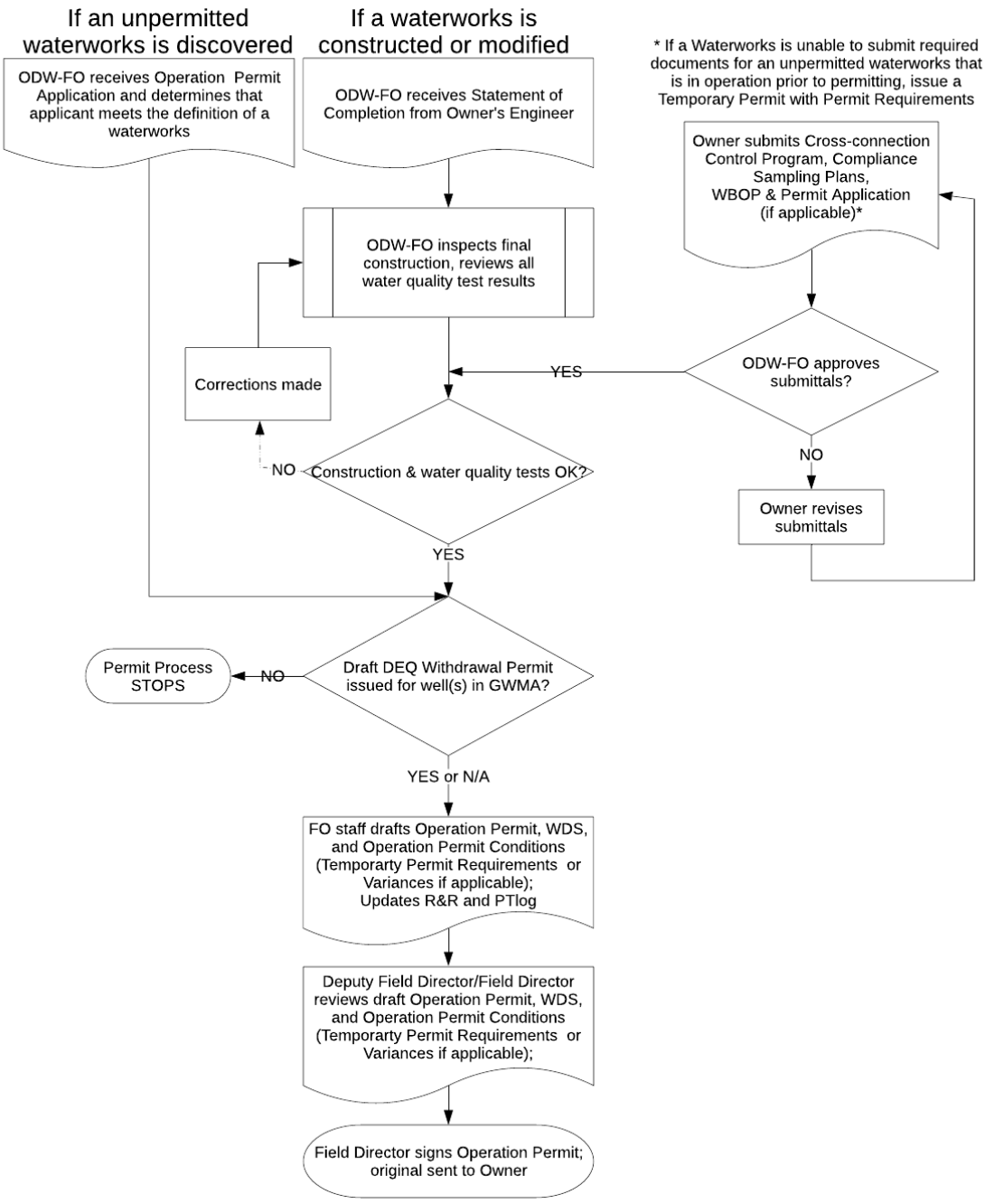
Direct questions of lease interpretation to the central office, through either the Field Services Engineer or the Policy and Program Director.

ODW issues two types of operation permits as listed in Chapter 1, Section 3 of this manual: standard and temporary. Templates for each type of operation permit are available in PM-C8-Attachment 1 and PM-C8-Attachment 2, respectively.

ODW normally issues an owner an operation permit, which consists of a permit plus operation permit conditions. The conditions generally include minimum operator license requirements; treatment technique requirements (if any); operation, monitoring and reporting requirements; and the waterworks' permitted capacity. The format and content of the operation permit conditions are available in PM-C8-Attachment 3.

Va. Code § 32.1-172 E also authorizes the Commissioner, who has delegated authority to the field director, to issue a temporary permit if a waterworks is not in compliance with all the requirements in the Regulations, as long as, operation of the waterworks will not jeopardize public health. The temporary permit will have operation permit conditions like an operation permit, a set expiration date, and appropriate requirements, "temporary operation permit requirements," for the owner to achieve compliance with the Regulations. See PM-C8-Attachment 4.

Standard operation permits will NOT be issued conditionally (*i.e.*, an action is required prior to the permit becoming effective, such as the drilling of a new well, or testing a pump to determine/verify capacity). ODW issues a temporary operation permit, with temporary permit requirements, to address the actions required, including provisions of permit application submittals.



Flow Chart. Operation Permit Issuance Process

2. Operation Permit Processing and Routing

The district engineer is responsible for the overseeing all waterworks permitting activity within the district. The district engineer will prepare or supervise the preparation of a permit and necessary documents for each waterworks within the district, and conduct all investigations necessary to ensure that the permit is accurate. The deputy field director shall provide a technical review of the operation permit and all attachments before forwarding to the field director.

The field director is responsible for all aspects of the permit program within the field office region. The field director reviews the permit and associated documents. The procedure for processing operation permits shall be similar to that for construction permits:

1. The deputy field directory shall complete a technical review of the operation permit and all attachments.
2. Field office administrative staff will print the document. The field director will complete a final review of the documents and sign the approved operation permit (and variance).
3. The field office will scan the signed permit documents and upload to "odwshare" The district engineer prepares a transmittal letter from the template in PM-C8-Attachment 6, and mails the permit and attachments to the owner**.** The transmittal letter template contains sample paragraphs that may be included for the following circumstances:
    a. Permit is an amended permit;
    b. Waterworks is "grandparented"[1] (serves to notify the owner that the "grandparented" status may be terminated by expansion, modification, change of use, failure to maintain reliability, or future sale);
    c. Temporary permit is being issued with temporary permit requirements attached (described in Section 8.11 of this memo);
    d. Operation permit conditions are attached;
    e. Variance is included;
    f. Waterworks has been, or will be, issued a draft or final Withdrawal Permit by DEQ.

3. Enforcement Issues and Insufficient Data for Capacity Determination

Before issuing or amending an operation permit for a waterworks that has a history of non-compliance, enforcement issues, or reliability problems, the field director should consult with the Division of Technical Services regarding the most effective way to ensure a safe, adequate drinking water supply and which permit type, Standard or Temporary, is appropriate. The field director should also contact the Division of Compliance and Enforcement to determine if enforcement action is appropriate.

Where insufficient data is available to establish hydraulic capacity, but the field office has made a decision to issue the permit for the existing services, then "existing" should appear in the WDS, operation permit conditions, and operation permit. By example,

[1] ODW may apply a "grandparented" status to existed facilities permitted by ODW due to changes in ODW policy. This "grandparented" status may exempt the waterworks from certain design requirements of the Regulations as determined by the field office.

1. TNC waterworks permit with capacity stated: “One existing structure with 80 existing restaurant seats”
2. NTNC waterworks permit with capacity stated: “existing service up to 950 students and staff”.

4. Format

Field offices maintain the standard operation permit appearance (layout, fonts, line spacing, etc.) in all permits. Staff follow the guidelines below:

1. Only use general references to the Va. Code and Regulations in the operation permit, as shown in the templates.
2. Designate waterworks class and operator class in Arabic numerals, or note as “unclassified”. Refer to the Regulations and ODW guidance for more information on this determination.
3. Designate NTNC and TNC status without hyphens or slashes.
4. Do not include “VA” in the permit number.
5. Do not use underlines in the fill in portions of the permit, except for an underline for the Director’s signature.
6. If a city is the owner, then issue to “City of…”, For a town, use “Town of…”. Do not include the County name for cities and towns.
7. If the “name of the service area” is subject to change because the tenant is not the property owner (as is the case with some TNC waterworks), substitute a property address and/or description for a proprietary name.

5. Operation Permit Number

Field offices will assign and maintain all permit numbers using the PWS identification number as the operation permit number. This is a seven-digit number as follows:

Digits 1 – 4: Locality Code

CODE	COUNTY/CITY	CODE	COUNTY/CITY	CODE	COUNTY/CITY
3001	Accomack	6630	Fredericksburg	5135	Nottoway
2003	Albemarle	1640	Galax	6137	Orange
6510	Alexandria	1071	Giles	2139	Page
2005	Alleghany	4073	Gloucester	5141	Patrick
5007	Amelia	4075	Goochland	3730	Petersburg
5009	Amherst	1077	Grayson	5143	Pittsylvania
5011	Appomattox	2079	Greene	3740	Portsmouth
6013	Arlington	3081	Greensville	4145	Powhatan
2015	Augusta	5083	Halifax	5147	Prince Edward
2017	Bath	3650	Hampton	3149	Prince George
5019	Bedford County	4085	Hanover	6153	Prince William
1021	Bland	2660	Harrisonburg	1155	Pulaski
2023	Botetourt	4087	Henrico	1750	Radford
1520	Bristol	5089	Henry	6157	Rappahannock
5025	Brunswick	2091	Highland	4760	Richmond City
1027	Buchanan	3670	Hopewell	4159	Richmond County
5029	Buckingham	3093	Isle Of Wight	2770	Roanoke City
2530	Buena Vista City	3095	James City	2161	Roanoke County
5031	Campbell	4097	King And Queen	2163	Rockbridge
6033	Caroline	6099	King George	2165	Rockingham
1035	Carroll	4101	King William	1167	Russell
4036	Charles City	4103	Lancaster	2775	Salem
5037	Charlotte	1105	Lee	1169	Scott
2540	Charlottesville	2678	Lexington	2171	Shenandoah
3550	Chesapeake	6107	Loudoun	1173	Smyth
4041	Chesterfield	2109	Louisa	3175	Southampton
2043	Clarke	5111	Lunenburg	6177	Spotsylvania
3570	Colonial Heights	5680	Lynchburg	6179	Stafford
2580	Covington	6113	Madison	2790	Staunton
2045	Craig	6685	Manassas	3800	Suffolk
6047	Culpeper	6687	Manassas Park	3181	Surry
5049	Cumberland	5690	Martinsville	3183	Sussex
5590	Danville	4115	Mathews	1185	Tazewell
1051	Dickenson	5117	Mecklenburg	3810	Virginia Beach
3053	Dinwiddie	4119	Middlesex	2187	Warren
3595	Emporia	1121	Montgomery	1191	Washington
4057	Essex	2125	Nelson	2820	Waynesboro
6059	Fairfax County	4127	New Kent	4193	Westmoreland
6061	Fauquier	3700	Newport News	3830	Williamsburg
1063	Floyd	3710	Norfolk	2840	Winchester
2065	Fluvanna	3131	Northampton	1195	Wise
3620	Franklin City	4133	Northumberland	1197	Wythe
5067	Franklin County	1720	Norton	3199	York
2069	Frederick				

Digits 5 – 7: Sequence Number

The sequence number ranges from 000 through 999. This system will accommodate 1,000 waterworks in each city or county. Previously assigned numbers maintain an alphabetical series for each city and county. Field offices assign new waterworks a sequence number based on the alphabetical name, using a number halfway between two existing numbers in the alphabetical order.

Waterworks that have been inactivated, and become active with or without a change in ownership, name or waterworks classification, shall retain the previously issued PWSID and operation permit number.

6. Operation Permit Conditions

Operation permits will contain an attachment titled "Operation Permit Conditions." A Template for this form is in PM-C8-Attachment 3.

The operation permit conditions highlight regulatory requirements that are applicable to the specific waterworks. They will include a capacity evaluation that itemizes source, treatment, storage and delivery capacities, and the waterworks overall permitted capacity. Field offices must specify *all treatment* in the operation permit conditions, including treatment that was voluntarily added by the waterworks owner. Staff will provide in-depth descriptions of the waterworks, *i.e.*, treatment unit details, distribution system details, and capacity calculations, in a separate Waterworks Description Sheet (see Section 8.6).

The operation permit conditions will contain operator and attendance requirements for the waterworks, and all federal treatment technique requirements. This could include:

1. Specific log inactivation requirements (Surface Water Treatment Rule, LT2 Rule, and the Groundwater Rule);
2. Turbidity removal requirements (Surface Water Treatment Rule)
3. Water quality parameters (Lead & Copper Rule).
4. Corrosion Control (treatment technique required by Lead & Copper Rule)
5. Disinfection (log inactivation treatment technique)

The operation permit conditions may also include additional operation, monitoring and reporting requirements for specific treatment processes, such as UV disinfection and membrane filtration.

7. Waterworks Description Sheet

Field offices will write a Waterworks Description Sheet (WDS) for each waterworks using the template in PM-C8-Attachment 5. The WDS will provide important system information, including a description of the entire waterworks, all treatment processes, and a detailed capacity evaluation as described in the examples provided in Chapter 9.

The WDS is not an attachment to the operation permit, but rather a stand-alone document. The field office will keep the WDS up-to-date. The field office may issue an updated WDS to the waterworks owner without issuing an updated operation permit. Field offices must issue a new or updated WDS with any new or updated operation permit.

The WDS will include the effective date of the current operation permit. Historical operation permit numbers and issuance dates should be included on all newly written WDSs, to clarify ownership, name, or classification changes, or to describe inactive periods. This information may also be included on updated WDSs.

Formatting and content of the "Description of the Waterworks" is at the discretion of the field office, but the following components should be included:

1. A description of the service population used to determine waterworks type (community, TNC, or NTNC). Pertinent data may include:
    a. Business type
    b. Number customers served daily
    c. Number of employees
    d. Number year round residents
    e. Days/weeks/months of operation
    f. Hours per day of operation (needed for the TNC vs NTNC determination)
    g. Population served
    h. Number of service connections
2. Adequate information to support the capacity evaluation, including relevant dimensions and capacities of treatment units, pumps, and storage or pressure tanks.
3. Specific automated control settings that must remain in place for the waterworks to work properly or remain in compliance with regulations, such as booster pump initiation or low suction pressure cutoff settings.

Chapter 9 of this manual provides details on the capacity evaluation required in each WDS.

If a Groundwater Withdrawal Permit has been or will be issued by DEQ, then ODW staff will include a section in the WDS entitled "Other Permits." Use the following language for the section:

> "The Department of Environmental Quality has (drafted) (issued) a Groundwater Withdrawal Permit (No. -XXX) to this waterworks."

Include the permitted withdrawal values, typically a maximum annual and a maximum monthly quantity. ODW does not limit waterworks permit capacity to permitted withdrawal values.

Add the following language to "Other Permits":

> "Compliance with the conditions and requirements of the Groundwater Withdrawal Permit shall not limit the authority of the Virginia Department of Health to assign capacity to the waterworks, based on the evaluation as follows."

If located in a Groundwater Management Area, but DEQ has not issued a groundwater withdrawal permit, note this information using the following language:

> "This waterworks is located in the (*Eastern Shore / Eastern Virginia*) Groundwater Management Area. However, a groundwater withdrawal permit is not required by the Department of Environmental Quality at this time. A groundwater withdrawal permit may be required for this waterworks in the future.

8. Wholesale and Consecutive Waterworks

"Wholesale waterworks" means a waterworks that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another waterworks. Delivery may be through a direct connection or through the distribution system of one or more consecutive waterworks. 12VAC5-590-10.

"Consecutive waterworks" means a waterworks that has no water production or source facility of its own and that obtains all of its water from another permitted waterworks or receives some or all of its finished water from one or more wholesale waterworks. Delivery may be through a direct connection or through the distribution system of one or more consecutive waterworks. 12VAC5-590-10.

The sum of the storage on both the wholesale and consecutive waterworks should be adequate for the sum of the water demand, as demonstrated by computations and/or hydraulic modeling. Consecutive waterworks are NOT required to have separate storage when storage is adequately provided for by the wholesale waterworks, and can be reliably delivered by the wholesale waterworks. ODW staff will identify an allocation of both source and storage capacity between the wholesale waterworks and consecutive waterworks in the WDS of the wholesale waterworks and tabulate this allocation in the table under Waterworks Capacity.

As part of the process to evaluate and issue an operation permit, the district engineer will identify and obtain a copy of any contractual agreements and limitations on water transfer between each wholesale and consecutive waterworks. ODW will encourage all consecutive waterworks to obtain firm gallons-per-day contracts, so that their growth will not be limited by another waterworks' service area growth. ODW will also encourage all consecutive waterworks to obtain firm water quality standards in their purchase contracts, particularly for disinfectant residuals, disinfection byproducts, and disinfection byproduct precursors. Allocations of source (production) capacity and storage should be defined in the contractual agreement between the wholesale and consecutive waterworks. When a contract with a firm capacity is not available, field staff will consult DTS to determine how to set the permitted capacity of the waterworks.

Permitting of consecutive waterworks shall follow these procedures:

1. Identify point(s) of water transfer. Identify and obtain a copy of any contractual limitations on water transfer.
2. Identify any physical or design limitation on water transfer (for example, a pump station may establish the capacity at a particular connection).
3. Identify water transfer limitations due to wholesale source capacity and wholesale system water use (the sum of the parts $\leq$ the whole).
4. The permitted capacity of the consecutive waterworks shall be the lowest identified capacity limitation.

In cases where a waterworks does not have a contractual or written agreement (or the contract does not stipulate a quantity), but on-going receipt of water can be demonstrated, the historical water usage shall be used as a basis for allocating waterworks capacity. ODW recommends the maximum monthly consumption over a period of at least 2 years as a capacity value.

If the field office issues a temporary operation permit for the consecutive waterworks (purchaser), the expiration date of the permit shall not extend beyond and the term specified in the purchase contract.

The field office will verify the applicable Combined Distribution System schematic, and provide any revisions to the field services engineer. Combined Distribution System schematics are located at odwsrv1\odwshare\06-Technical Resources\635-Combined Distribution Systems

9. Variances

Variances, when granted by ODW, are usually issued with an operation permit. They may be issued by ODW separately, without amending an existing permit. Variances only apply to Part II of the Regulations.

ODW sometimes grants variances for the following:

1. Operator personnel, 12VAC5-590-460 B
2. Metering of total water production, 12VAC5-590-520 B

ODW may issue waterworks a temporary operation permit when additional measures are required to meet a Primary Maximum Contaminant Level or Treatment Technique requirement. Variances and Exemptions are allowed in the Regulations for this purpose, but should rarely be issued by ODW. Variances to a Secondary Maximum Contaminant Level are also permitted in the Regulations, but are generally not issued by ODW.

Current policy allows TNC waterworks producing less than 10,000 gpd to request a metering variance, which remains in effect, as long as water production remains below 10,000 gpd and the waterworks does not provide treatment. Field offices estimate the water production / consumption in the WDS Capacity Evaluation, in order to justify the variance. However, ODW encourages all waterworks to install and use meters.

A waterworks owner may apply in writing for a variance as specified in 12VAC5-590-140 B. The application must meet these requirements. PM-C8-Attachment 14 documents the required information for an owner to apply for a metering variance.

The variance format is provided in PM-C8-Attachment 7. The variance should clearly and completely specify deviations from the regulatory requirements that are being granted. An expiration date, other appropriate conditions, and information to support the variance request may also be included as necessary.

10. Amended Permits

Va. Code § 32.1-173 and 12VAC5-590-310 allow the Commissioner to amend an operation permit for an existing waterworks when there is a change in the manner of storage, the treatment, or the source of supply of the water at a permitted location. Examples of these changes may include:

1. Certain changes to the storage or distribution systems;[1]
2. Changes to the treatment process or equipment;[2]
3. Changes in waterworks capacity specified in the permit; and
4. Issuance of variances, temporary permit requirements, or operation permit conditions.

In addition, Va. Code § 32.1-173 states that the Commissioner may amend a permit whenever he determines that the existing permit is no longer valid. An operation permit is not valid when, for example, there are:

1. Changes in the waterworks name, ownership, classification, or type;
2. Reactivation of a previously permitted waterworks (with or without changes in name, ownership, or system type); and
3. Errors in the permit.

Unless the owner requests the amendment, ODW is required to provide the owner notice and, if requested, an opportunity to participate in an informal fact-finding proceeding and/or formal hearing before amending the permit. The purpose of the informal proceeding and/or formal hearing is for ODW to establish the fact basis for the decision to amend the permit and for the owner to have an opportunity to present facts and evidence for the agency to consider in making its decision. Virginia's Administrative Process Act defines the agency decision as a "case decision." *See* Va. Code §§ 2.2-4001 and 2.2-4019. Compliance and Enforcement Division staff can provide assistance with an informal fact-finding proceeding.

10.1. Notification

The district engineer shall inform the owner that ODW intends to amend the waterworks operation permit BEFORE the field office issues the amended permit. This notification shall be by written letter, sent by First Class U.S. Mail, and the district engineer may supplement this letter by an email, meeting, or conversation with the owner. When the permit amendment is a unilateral decision made by ODW (*i.e.*, the owner did not request to amend the operating permit or apply for a construction permit) and amending the permit will affect the owner's existing rights (*e.g.* reduce capacity of the waterworks, which will reduce the owner's right to serve customers), the field office will send the notification letter by certified mail, return receipt requested.

The district engineer will state in the letter to the owner that ODW intends to amend the operation permit and provide the specific reason(s) for the amendment. The notice will also contain a request that the owner notify ODW in writing if they object to the amendment of the permit. The district engineer will use the letter template in PM-C8-Attachment 8**,** Notice of Intent to Amend Permit. If the owner objects to ODW's proposed permit amendment, they are entitled to and may request that ODW make a case decision regarding the requirement to amend the permit. At this point, ODW can decide not to amend the permit and inform the owner that the current operation permit

[1] Distribution system storage, pumping, or water line extensions that have no impact on permitted capacity do not require a permit amendment.

[2] Changes to treatment processes or equipment that have no impact on permitted capacity or Operation Permit Conditions do not require a permit amendment.

remains in effect. Alternatively, if ODW still intends to amend the permit, the owner is entitled to have ODW conduct an informal fact-finding proceeding, in accordance with Va. Code § 2.2-4019, or both sides may agree to waive informal proceedings and go directly to a formal hearing. See Va. Code § 2.2-4020. In any situation where an owner requests that ODW make a case decision, the field director must refer the case to the Compliance and Enforcement Division in the central office.

If the certified mail is returned undelivered, then the district engineer should make additional efforts to contact the owner in person or by email or telephone. If these attempts are unsuccessful, then the district engineer will document the attempts to reach the owner and, after at least 15 business days, proceed to issue the amended permit.

10.2. Procedures

Field offices will follow the procedures below when amending a permit:

1. Retain existing permit number
2. Modify effective date of permit
3. Modify date of operation permit conditions
4. Update the WDS operation permit history

The operation permit checklist should include a brief explanation for the permit amendment in the "Comments" section of the Transmittal Checklist (PM-C8-Attachment 9).

Field offices will send a copy of the amended permit to all entities (local governments, etc.) that received a copy of the original permit from ODW. The district engineer will use the template transmittal letter provided in PM-C8-Attachment 6, including an explanation that the amended permit replaces and nullifies the original, and directs the owner to destroy the original permit immediately.

10.3. Change in Ownership

Prior to the Version 4.0 of the Permit Manual, the ODW procedure was to revoke the existing operation permit and issue a new operation permit. Beginning with Version 4.0, ODW will amend the operation permit based on the Commissioner's ability to amend any permit, on his own motion, whenever he determines that the existing permit is no longer valid. *See* Va. Code § 32.1-173 B.

When the field office becomes aware of a proposed or actual change in ownership, the district engineer will attempt to contact the new waterworks owner to explain that ODW intends to amend the operation permit and follow the procedures outlined above to notify the former and new owner of the amendment using the letters provided in PM-C8-Attachment 13. Field offices will send the letters to both the former owner and the new owner of the waterworks.

In the event that a new owner is informed about the requirement to amend the operation permit to reflect the change in ownership and fails or refuses to accept responsibility for the waterworks by obtaining an operation permit, the district engineer or field director should consult with Compliance and Enforcement Division staff in the central office about enforcement options.

10.4. Existing Operation Permits That Are No Longer Valid

Prior to Version 4.0 of the Permit Manual, the ODW procedure for water systems that served a fewer than 15 service connections and 25 individuals for at least 60 days out of the year, such that it appeared that they no longer met the definition of a waterworks, was to revoke the existing operation permit. Beginning with Version 4.0, rather than revoking an operation for a water system that no longer meets the definition of a "waterworks," ODW will utilize the authority provided by Va. Code § 32.1-173 B to invalidate the permit. Va. Code § 32.1-173 B states that "The Commissioner may on his own motion, amend any permit whenever he determines that: ... the existing permit is no longer valid."

The procedure for invalidation of an existing permit is as follows:

1. Owner notifies ODW field office - If a waterworks owner believes that their system does not meet the definition of a "waterworks," it is their responsibility to provide sufficient information and records for ODW, acting under delegated authority from the Commissioner, to determine whether the operation permit for that waterworks is still valid.
2. Field office evaluation - The ODW field office will evaluate the justification and records provided by the owner.
    a. The field office will review the guidance provided by Working Memo 896 and determine if the justification provided by the owner suggests that the system may not be a waterworks. If the field office determines that the system is a waterworks based on the guidance found in Working Memo 896, field office staff will notify the owner and will not proceed with permit invalidation. Note that the owner may request an informal fact finding proceeding and a case decision if they do not agree with the decision not to take any action on the permit.
    b. The field office will determine if records provided by the owner thoroughly support the owner's justification. Claims made by the owner about the service population, water system configuration, or other criteria used to evaluate whether the system meets the definition of a "waterworks" will not be considered unless supported by records, such as business ledgers, sales receipts, or photographs.
3. Site visit - Field office staff will perform a site visit to confirm information provided by the owner, such as closure of the facility, the number of seats in a restaurant, or physical separation of the water system. Field office staff may also review physical copies of documents emailed to the field office during the site visit. Field offices may perform this site visit unannounced.
4. Sister agency notification - Field office staff will notify any other state agency regulating the facility to confirm ODW's proposed permit invalidation aligns with other permits and programs (e.g., local building official, local zoning, local health department (restaurant permit, campground permit, hotel permit, etc.), Virginia Department of Agriculture and Consumer Affairs (VDACS, food permit), Virginia Department of Social Services (child day program) , Virginia Department of Education (schools), VDH's Office of Environmental Health Services, etc.). If information the owner provides to ODW disagrees with information obtained from other agencies, ODW will not proceed with invalidation of the permit without resolving the discrepancies.
5. Central Office review –

a. When the field office has collected adequate information such that the field director is assured that the water system does not meet the definition of a waterworks, the field director will email a summary of the situation and copies of the documentation compiled to the Field Services Engineer and the Director of the Division of Technical Services. This email will explain how the field office determined that the system does not meet the definition of a "waterworks".
b. If the Field Services Engineer and the Director of the Division of Technical Services concur with the field director's assessment, they will present this information to the ODW Office Director.
c. If the ODW Office Director concurs, the Field Services Engineer will inform the field director that the field office may inform the owner that the operation permit is no longer valid because the water system is not a waterworks.

6. Owner notification – If the ODW Office Director agrees that the permit is no longer valid, field office staff will utilize attachment PM-C8-Attachment 17- Operation Permit No Longer Valid to notify the owner. If the owner does not agree with ODW' decision (i.e., the waterworks permit is no longer valid), they may request an informal fact-finding proceeding.

11. Temporary Permits

A temporary operation permit allows additional time for the waterworks to achieve required reliability or performance standards, collect additional data, and perform tests and/or determinations to establish hydraulic capacity. ODW describes these requirements to achieve compliance in temporary permit requirements.

The ODW field office may issue a temporary operation permit for the following circumstances:

1. Upon expiration or modification of an existing water purchase contract, where a new agreement includes a termination date which is less than 5 years from the operation permit issuance date (otherwise issue a standard permit);
2. When an enforcement action (Consent or Special Order) requires specific studies or improvements;
3. When existing source(s) have shown declining yield over time, as documented by sanitary surveys and monthly operation reports. Groundwater wells would require a yield and drawdown test; other sources may require special studies and evaluations;
4. Following construction of water treatment methods, processes, or equipment which are not covered by the design criteria in Part III of the Regulations, and which in principle and/or application are new or non-conventional. A temporary operation permit allows additional time for testing and evaluation of the treatment method, process, or equipment to establish confidence the waterworks will operate as proposed. (This was formerly addressed as a provisional permit);
5. When a standard operation permit has not been issued, and the owner has failed to submit in a timely manner the required documentation for issuance of a standard operation permit.

Such required documentation *may include* the WBOP[1], Cross Connection Control Plan, Operation Permit Application, Bacteriological Sample Siting Plan, well lot plat, etc.;

6. When permitting existing but newly-discovered or reclassified waterworks having groundwater sources without complete water quality test results, and is operating without a permit. Examples of activities that could be completed by a waterworks owner under this scenario include:
    a. Initial compliance chemical sampling such as nitrate/nitrite, unpreserved nitrite, inorganics, metals, volatile organic chemicals (VOCs), and cyanide;
    b. Lead and copper tap sampling;
    c. Raw water sampling (or distribution sampling if no treatment is provided and substitution is allowed) to support a GUDI evaluation. Normally, at least ten monthly samples are required. The district engineer may adjust the sampling frequency;
    d. Completion and submittal of sampling plans for bacteriological, or disinfectants/disinfection byproduct sampling;
    e. Completion and submittal of lead and copper materials survey and cross connection control plan;
    f. Completion and submittal of a Waterworks Business Operations Plan; and
    g. Completion and submittal of a signed agreement with a licensed waterworks operator.

If a waterworks does not meet the requirements of the Temporary Operation Permit, then enforcement action may be necessary.

Place a "T" at the end of the permit number, and include an expiration date below the effective (issue) date. The expiration date will depend on the reason for issuance, and the date determination will be documented by the field office. Generally, a Temporary Permit shall expire in 12 – 18 months and should not extend more than 24 months. However, the field office may consider longer Temporary Permit durations in special cases, for example, three years, to allow re-evaluation of the yield of wells or springs.

Field office staff will track Temporary Operation Permit issuance and expiration dates in R&R.

The field office should issue a Standard Operation Permit before the Temporary Permit expires if the Temporary Operation Permit Requirements have been completed. The Temporary Permit expiration date should be at least one month later than the deadline for the final temporary permit requirement to allow time to issue a Standard Permit before the Temporary Permit expires. This one-month period will also allow the field office time to review sample results, approve sampling plans, and complete GUDI evaluations in advance of issuing a Standard Permit.

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[1] SPECIAL NOTE: ODW will not issue a temporary permit to an owner of a "for-profit" TNC or NTNC waterworks solely because a WBOP has not been submitted. In these cases, a standard permit will be issued and the field office will inform the waterworks owner of the requirement to submit a WBOP.

Field office staff track completion of temporary permit requirements utilizing SDWIS compliance schedules. See the ODW SDWIS Users Manual for detailed instructions. If the owner fails to meet a deadline or complete actions required to meet a deadline, field office staff should remind the owner of the requirements, encourage completion of the requirements, and notify the Division of Compliance and Enforcement. If temporary permit expires and the requirements have not been completed, field office staff will:

1. Contact the owner to establish a schedule for completion.
2. Assist the owner, to the extent possible, with completion.
3. Confer with the Division of Compliance/Enforcement to determine next steps.
4. Issue a NOV for operation without an Operation Permit.

Reissuance of Temporary Operation Permits when the owner has failed to complete the required temporary permit requirements is considered by ODW on a case-by-case basis considering the following:

1. Owner must have a reasonable explanation for not meeting the requirements of the previous Temporary Operation Permit and the field office staff must concur.
2. Field office staff must be reasonably confident that that the owner will complete the requirements of the new Temporary Operation Permit within the revised timeframe.
3. Owner has another VDH operation permit, e.g., food permit, campground permit, or marina permit, that could possibly be revoked or not renewed by the local health department.
4. ODW has confirmed the local health department is willing to work with ODW to compel compliance through their permit revocation process.
5. Compliance and Enforcement Division staff must concur with this approach.

Field office staff will generally utilize the template found in PM-C8-Attachment 2- Temporary Operation Permit for temporary permits. In cases where the owner of a TNC waterworks requests an expedited permit, field staff may use the short form found in PM-C8-Attachment 16- Short Temp Permit for TNCs.

After approval by the field director, field offices will route temporary permits through the compliance specialist to enter the temporary permit requirements into SDWIS, and notify Capacity Development Division staff if a WBOP is required.

12. Permit Revocation

ODW may revoke a permit pursuant to Va. Code § 32.1-174 when the Commissioner determines that:

1. The waterworks can no longer be depended upon to furnish pure water;
2. The capacity of the waterworks is inadequate for the purpose of furnishing pure water;
3. The owner has failed to abide by an order issued by the Commissioner;
4. The owner has abandoned the waterworks and discontinued supplying pure water; or
5. The owner has failed to pay the waterworks operation fee required by § 32.1-171.1.

ODW previously revoked permits because of changes in ownership, replacing a standard permit with a temporary permit, and determination that a water system does not meet the definition of a waterworks. In the case of changes in ownership or replacing a standard permit with a temporary

permit, ODW will issue an amended permit. The procedures for changes in ownership are in Chapter 8, Section 10.3. Change in Ownership. If ODW determines that a water system does not meet the definition of a waterworks, ODW will determine the permit to not be valid as described in Chapter 8, Section 10.4.

The field office will evaluate justification for revocation on a case-by-case basis with input from the enforcement staff. In some situations, the field office may need to pursue permit revocation through the enforcement process.

When the owner (i.e., the permit holder) is initiating the revocation, they may request permit revocation in writing, stating the reason for the permit revocation; and if applicable, should specify in the request that a hearing is not required. Field office staff then prepare a letter revoking the permit for the field director's signature.

When ODW is initiating the revocation, the district engineer, with concurrence of the field director, will send a notice by certified mail, return receipt requested, to the permit holder stating that it is ODW's intention to revoke the permit and the reason for the revocation. The notice shall also contain a request that the permit holder notify ODW in writing that they do or do not object to the revocation of the permit. Use the letters given in PM-C8-Attachment 10 (Notice of Intent to Revoke Permit) and PM-C8-Attachment 11 (Operation Permit Revocation).

Two courses of action may be followed, depending on receipt of the certified mail:

1. If the certified mail is returned undelivered, the district engineer should make every effort to contact the owner in person, or by telephone or email. If the attempts are unsuccessful, then the district engineer, with concurrence from the field director, will prepare a letter of revocation for the field director's signature. The field office will mail the letter, signed by the field director, to the owner at the last known address by certified mail, return receipt required. If the letter is returned undelivered, the field office will retain the letter in the correspondence file as evidence of notification, and will serve as authorization to revoke the permit.
2. If the owner notifies the field office in writing that he does not object to revocation of the permit, prepare a letter for the field director's signature revoking the permit. If the owner objects to the revocation of the permit, ODW will hold a hearing, in accordance with 12VAC5-590-160 of the Regulations. In these situations, the field office will refer to the Director of the Division of Compliance and Enforcement in the central office for further guidance.

If the owner is unable or unwilling to do so, the field director will consult with the local Health Director regarding the need to notify customers directly. ODW will notify the local building official of the details pursuant to permit revocation, by copy of the notification letter.

The procedure for processing a permit revocation are as follows:

1. The field office will post the electronic document file of the draft revocation letter on "odwshare", and update the tracking spreadsheet.

2. The effective date of the permit revocation letter shall be at least five working days after the date on which the letter (electronic document) is posted to "odwshare" by the field office.
3. The Field Services Engineer, the Director of Technical Services, and the Office Director will review the documents and may make edits to the revocation letter, or ask the field office to provide more information or corrections to the revocation letter.
4. After the central office approves the revocation letter, the central office will update the tracking spreadsheet. The central office will notify the field office after revocations are approved.
5. Field office administrative staff will print the version of the revocation letter reviewed and potentially edited by the central office. If the field office deems changes to the revocation letter necessary, the field office will contact the Field Services Engineer. The field director will sign the approved revocation letter.
6. The field office will scan the signed permit documents and upload to "odwshare" and updated the tracking spreadsheet. The field office will mail the revocation letter via Certified Mail to the waterworks owner. The field office will also make and mail copies of the revocation letter to all parties listed after the field director's signature.

Appendix

Attachments are located at: \\odwsrv1\odwshare\13-Manuals\02-Permit Manual

PM-C8-Attachment 1- Standard Operation Permit
PM-C8-Attachment 2- Temporary Operation Permit
PM-C8-Attachment 3- Operation Permit Conditions
PM-C8-Attachment 4- Temporary Operation Permit Requirements
PM-C8-Attachment 5- Waterworks Description Sheet
PM-C8-Attachment 6- Operation Permit Transmittal Letter
PM-C8-Attachment 7- Variance
PM-C8-Attachment 8- Notice of Intent to Amend Operation Permit
PM-C8-Attachment 9- Transmittal Checklist – Operation Permit for Director's Signature
PM-C8-Attachment 10- Notice of Intent to Revoke Operation Permit
PM-C8-Attachment 11- Operation Permit Revocation Letter
PM-C8-Attachment 12- Cover Letter – Change of Ownership Agreement Form
PM-C8-Attachment 13- Change of Ownership Agreement Form (C.O.A.F.)
PM-C8-Attachment 14- Application for Metering Variance
PM-C8-Attachment 15- Operation Permit Application
PM-C8-Attachment 16- Short Temp Permit for TNCs

Chapter 9 - Capacity Evaluation of Waterworks

1. Introduction

12VAC5-590-690 of the Regulations requires that the waterworks' capacity exceed the maximum daily water demand of the system. The waterworks' capacity is determined through an evaluation of the major components' ability to meet that demand at a minimum 20 psi pressure.[1] (Major component categories are source, treatment, delivery and storage). The limiting value becomes the permitted capacity of the waterworks.

Water withdrawals may be limited by the Department of Environmental Quality (DEQ), through a Groundwater Withdrawal Permit, a Virginia Water Protection Permit, or by the DEQ, Virginia Marine Resources Commission (VMRC) and U.S. Army Corps of Engineers (USACE) collectively through a joint permit. These permits may affect the source capacity of the waterworks.

The overall capacity may also be limited for some waterworks by other VDH permits issued by the local health department, such as the food permit, or on-site waste disposal permit. When permitting a very small waterworks (serving less than 5 connections), field office staff should request all VDH permits for the facility from the local health department if the waterworks is new, or any new permits if the waterworks is expanded.

An on-site waste disposal permit may limit the overall capacity when no substantial amount of water is used by the water system for purposes that do not contribute to sewage volume. Examples of water uses that do not contribute to sewage volume include: irrigation, filling swimming pools, and producing canned or bottled beverages.

Other VDH permits are typically only limiting when the waterworks capacity is limited to existing facilities due to inadequate information to evaluate the capacity. In this case, the waterworks permitted capacity will typically match the other VDH permitted capacity, unless the waterworks serves more facilities than the other VDH permit (i.e. if a waterworks has connections to or serves a restaurant and an adjacent residence, the permitted capacity should include both, though only the restaurant would be included on the restaurant permit).

2. Estimated Demand

2.1. Water Supply Planning

The State Water Control Board's regulation (9VAC25-780, Local and Regional Water Supply Planning) requires all local governments to submit a water supply plan for the locality, or participate in a regional plan. This plan requirement includes an evaluation of current and projected water demands and a determination of whether the existing source(s) is/(are) adequate to meet demands. VDH has an opportunity to comment on the plan, as well as drought response and contingency plans (referred to as the "local program"), during a required 90-day review period.

[1] The *recommended* minimum working pressure is 40 psi for all waterworks; 20 psi is the absolute minimum required in the Regulations.

A water supply plan includes existing and projected water demands for each community waterworks, determined for average and maximum daily water withdrawal, as well as an average annual and average monthly basis. Water use estimates in the water supply plan will be disaggregated in categories of users, such as residential, commercial, institutional and light industrial, etc. The water supply planning regulations require all local programs to be reviewed, revised and resubmitted to DEQ every 10 years after the last approval date.

2.2. Water Demands

In the past, ODW based design daily water demands on Equivalent Residential Connections (ERC). An ERC was equivalent to 400 gpd.[1] This often resulted in an inflated water demand, as national and state data now show that typical water usage for a single-family residential connection is 100-200 gpd per residence, or less. In addition, non-residential water demands are not accurately reflected in the ERC values, particularly when waterworks provide water to commercial or industrial consumers with significant water use/consumption.

The field office staff estimates the maximum daily water demand determined for each waterworks and includes it in the capacity evaluation section of the WDS. If actual water usage figures are available and reliable, staff will use this data to evaluate the estimated demand. Staff will obtain historical water use data from monthly operation reports for metered systems and use minimum of 12 months of water production data. To account for seasonal variations in water use and avoid biasing the calculated average, multiples of 12 months of water production should be used. For new waterworks, the design engineer must provide estimated water demands as the design basis for the system. Actual water usage measurements from similar facilities or other published references are recommended by ODW.

Field office staff may estimate daily water demands for small non-community systems without historical water use records using AWWA's "Design and Construction of Small Systems", 1999. (PM-C9-Attachment 1). When actual or revised data is available, it should be used instead of these values.

Field office staff may use U.S. Census data to determine average number of persons per residential connection (http://quickfacts.census.gov/qfd/states/51000.html) or, without actual population data or representative Census data, assume each single family dwelling connection serves 2.5 persons per residence.

Field office staff may use a peaking factor (PF) to establish a peak hourly demand from average or maximum monthly water consumption data. Peaking factors should be used with caution, as they will depend on the type of customers in the service area. Particular attention to commercial and industrial water users is advised. Typical peaking factors are as follows:

Reference	Maximum Day= PF * Average Day	Peak Hour = PF * Average Day

[1] "12VAC5-590-10 defines "Equivalent residential connection" means a volume of water used equal to a residential connection that is 400 gallons per day unless supportive data indicates otherwise; however, 400 gallons per day overestimates current design demand for residential connections and ODW is no longer relying on this design criteria.

1	PF Average=1.8; PF range = 1.2 – 4.0	PF Average =2.6; PF range = 1.5 – 120.
2	PF Range = 1.5 – 3.0	PF Range = 2.5 – 5.0

Reference 1: Water and Wastewater Calculations Manual, Shyndar Lin, 2001

Reference 2: Handbook of Public Water Supply Systems, HDR Engineering, 2001

Demand Calculation:

Community waterworks

Field office staff estimated maximum daily demand in gpd or MGD if an estimate is not provided by the design engineer; for example:

1 mobile home connection = (50 gpd/person) (3.0 persons/home) = 150 gpd

1 residential connection = (50 gpd/person) (2.5 persons/residence) = 125 gpd

Staff evaluate the capacity of a community waterworks in terms of flowrate (gpd or MGD) in the WDS and on the Operation Permit, unless adequate information is not available to establish a permit capacity. If only one groundwater source is available, ODW limits the waterworks to a maximum of 49 residential connections. In this case, staff write the permit capacity as "### gpd and no more than 49 residential connections". Refer to the example in this manual.

Noncommunity waterworks:

Field office staff also clearly define the design basis for waterworks with non-residential water use, for example:

Factory A: 25 gpd / person / 8-hr shift

Hospital B: 300 gpd / bed

School C: 25 gpd / pupil

Regardless of whether a meter is provided, staff include an estimate of the water usage in flow rate units (gpd), and define the basis for the estimate in the capacity evaluation. Where a meter is not provided, staff define the waterworks' capacity in terms of the user characteristics, i.e. number of hospital beds, restaurant seats, students, etc.

3. Groundwater Sources

3.1. Well Yield and Groundwater Source Capacity

Field staff determine groundwater well source capacity from the well yield test results and the well pump performance characteristics. The well yield is equal to the stabilized pumping rate during the test. In situations where the capacity of the test pump is the limiting factor, the measured

pumping rate will be used as the well yield. Field staff should ensure that the pump is sized to not exceed the well yield test results, except under unusual circumstances.

3.2. Yield Test Requirements – Wells Constructed in the Coastal Plain Region

DEQ currently regulates two Groundwater Management Areas (GWMA) in the Coastal Plain: the Eastern Virginia GWMA and the Eastern Shore GWMA. Facilities with wells in these areas may require a Groundwater Withdrawal Permit from DEQ if they withdraw 300,000 gal/month or more. In 2014, DEQ expanded the Eastern Virginia GWMA. In the expanded area, DEQ may grandparent the well capacity initially, through a "historical permit" which contains special requirements for owners to obtain well and aquifer data before the permit expiration date.

DEQ will forward all draft withdrawal permits to ODW for review and comment. The ODW Source Water Manual provides coordination procedures.

When issuing a Construction Permit for a waterworks within the GWMA, field office staff will include the appropriate comment regarding the DEQ Withdrawal Permit in the Construction Permit (see PM-C5-Attachment 1).

If DEQ issues a groundwater withdrawal permit, ODW field office staff will include the DEQ permit withdrawals in the Waterworks Description Sheet (WDS). ODW does not use the DEQ permit maximum month or maximum annual withdrawals to determine source capacity; instead, the values shall be included for reference only.

When a DEQ withdrawal permit is NOT required, the yield and drawdown test duration will be a minimum of 48 hours for a community waterworks, or 24 hours for a noncommunity waterworks. The field office may require longer yield and drawdown test durations if conditions warrant (12VAC5-590-840 B6). The well driller will run the test such that at a constant flowrate, a stabilized pumping water level is achieved for at least the last 6 hours of the test. Immediately following the pumping test, the well driller will record the water level recovery in the well for no less than 6 hours, or until the well returns to its static water level, whichever occurs first.

3.3. Yield Test Requirements – Wells Constructed in Areas Other than the Coastal Plain Region

The well driller will normally run a 48-hour yield and drawdown test at exhaustive capacity, which is the maximum rate the pump can deliver without lowering the water level below the minimum submergence required for the pump. The well driller will also:

1. Control the pumping rate throughout the test to maximize the production from the well during the test.
2. Run the yield and drawdown test such that at a constant flowrate, a stabilized pumping water level is achieved for at least the last six hours of the yield test.
3. Record the water level recovery in the well, immediately following the yield and drawdown test, for no less than 6 hours, or until the well returns to its static water level, whichever occurs first.

3.4. Other Yield Considerations

The Regulations allow noncommunity waterworks to reduce the yield test to no less than 8 hours, if source capacity requirement is 3 gpm or less. ODW field offices will only consider the minimum 8 hr test duration for TNC waterworks. See 12VAC5-590-1260 B.

NTNC waterworks serving schools and commercial areas that do not operate 24 hours a day may reduce the yield test to 24 hours (or 12 hours in the Coastal Plain), provided that the well drawdown reaches equilibrium prior to the last 6 hours of the reduced test period.

When an existing well fails to deliver the yield previously established by methods described above and/or the actual yield of the well is known to vary depending on month of the year, the field office will assign the yield as:

1. The lowest day production rate of record if the well is the sole source for the waterworks, or
2. The lowest average daily production rate for any month if the well is not the sole source for the waterworks.

Field office staff will then reevaluate the yield periodically (every three years recommended).

For community waterworks that have a well or wells in consolidated rock formations, staff will assign a safety factor of 1.8 to well pump test results to determine the well's sustainable yield. Wells in as the Eastern Virginia and Eastern Shore Groundwater Management Areas do not require a safety factor when determining that well's sustainable yield.

Systems serving > 49 residential connections must provide at least one additional well with a capacity of $\geq$ 20% of the total required capacity[1].

Well Yield Calculation:

Community waterworks, in consolidated rock formations

(Q gpm over a 48 hr test) (1440 min/day) / 1.8 safety factor (SF) = ___ gpd

Community, in unconsolidated formation within the GWMA

(Q gpm over a 48 hr test) (1440 min/day) = ___ gpd

Noncommunity

(Q gpm over a 48 hr test) (1440 min/day) = ____ gpd

(conversion to gpd may be reduced, depending on system time of operation)

[1] Note that the final amendments to the Regulations increase this value to 30%. When staff completed the current revisions to this manual, the final amendments had not been approved (when approved, this will be in 12VAC5-590-830 R).

Well Pump Calculation:

Critical capacity = Q gpm, as determined from the pump performance curve at the design head requirements, or for existing systems, by actual observed pump output when system head and pump curve data are not available.

Q gpd = (Q gpm) (1440 min/day) = ___ gpd

ODW field staff will evaluate wells individually for both *yield* and *pump capacity*, and select the limiting value for each well. Staff evaluate the source capacity of waterworks with multiple wells as illustrated below:

Well #	Well Yield		Well Pump		Limiting Capacity
	gpm	gpd[1]	gpm	gpd[2]	gpd
1	10	8,000	10	14,400	8,000
2	20	16,000	10	14,400	14,400
Total	-	-	-	-	22,400

[1] gpd = gpm * 1440 min/day / 1.8 SF

{NOTE: The 1.8 SF is NOT used in unconsolidated formations in the Eastern Virginia & Eastern Shore GWMAs}

[2] gpd = gpm * 1440 min/day

4. Spring Sources

Field office staff determine the yield of new springs using actual source water flow data to estimate the available flow during a 30-year drought using the Log Pearson Type III method. Field staff use a minimum of 1,000 daily flow measurements for analysis utilizing the Log Pearson Type III method when possible. Until sufficient data is available to conduct a frequency distribution analysis, staff assign the capacity as:

1. The lowest day production rate of record if the spring is the sole source for the waterworks, or
2. The lowest average daily production rate for any month if the spring is not the sole source for the waterworks.

(Q gpm) (1440 min/day) = ___ gpd

Other unusual surface water sources, such as reclaimed mines, may be suitable to this method of determining yield. Staff will reevaluate the yield of these sources periodically (every three years recommended). If this evaluation indicates a change in the permitted capacity, the staff will amend the operation permit as described in Chapter 8, section 10. Field office staff may utilize a spreadsheet located in PM-C9-Attachment 2 for assistance in performing this analysis.

5. Surface Water Sources

5.1. "Safe Yield" and Sustainable Surface Water Capacity

12 VAC5-590-830 includes the definitions for "safe yield" of simple and complex intakes, with a recommendation to request assistance from the State Water Control Board to determine this value. Section 830 has not been amended to reflect the creation of DEQ, and requests for assistance should be directed to the agency instead of the board. The "safe yield" is only one of several parameters considered in the determination of allowable withdrawal by DEQ.

Withdrawal restrictions are typically established through a Virginia Water Protection (VWP) permit that DEQ issues. The permit is sometimes issued jointly by DEQ, the Virginia Marine Resources Commission, and the U.S. Army Corps of Engineers, and is referred to as a joint permit. The VWP permit may restrict the withdrawal rate under certain conditions and times of the year, and may specify different maximum daily, monthly, annual, and instantaneous withdrawal rates.

There are also several "grandparented" waterworks that do not hold a withdrawal permit from DEQ. Generally, these waterworks established their withdrawal rights and intakes prior to July 1, 1989 and have not made alterations or improvements to them that would require a VWP permit. In grandparented cases, the source capacity was *most likely* assigned to be the "safe yield" value determined when the intake was designed.

ODW field offices use the maximum daily withdrawal rate in the VWP permit as the limiting source water quantity, when available. If a maximum daily withdrawal rate is not stipulated in an existing VWP Permit, or if the waterworks does not hold a VWP Permit, then ODW will consider historical withdrawal rates, and the most current "safe yield" determinations of the stream or reservoir to determine source capacity.

Field office staff shall contact DEQ, Office of Water Supply, to obtain a copy of the current VWP permit. Field office staff will include background information on the source of the safe yield determination and the VWP permit in the "Capacity Evaluation" section of WDS (see PM-C8-Attachment 5).

5.2. Intake Capacity

Pumps

Field office staff will determine the intake pump capacity with the largest pump out of service (the "firm" pump capacity). At least two pumps are required.

(Q gpm)(1440 min/day) = ___ gpd

Screens

Intake screen design may be restricted in the VWP permit or joint permit from the DEQ, VMRC and USACE, and ODW field office staff must include the screen capacity in the capacity evaluation. Common restrictions include the maximum screen opening size and maximum screen face intake velocity. This information, evaluated with the actual intake screen design, may limit the hydraulic flowrate permissible through the intake structure.

6. Purchased Supply

Waterworks may obtain all of the water supply or a portion of the supply from a wholesale waterworks. The daily allocated volume of water supply from the wholesaler should be documented in a legal agreement between the consecutive and wholesale waterworks. Field office staff include the allocated volume in the source capacity section of the WDS and operation permit conditions, and cite the legal agreement.

7. Treatment

Field office staff will evaluate all major treatment process units for hydraulic capacity and document in the WDS capacity evaluation. For conventional surface water treatment plants, the major processes include:

1. Coagulation
2. Flocculation
3. Sedimentation
4. Filtration
5. Disinfection

Flocculation:

Q gpm = Number of Floc Basins * Volume of each Floc. Basin (gal) / Required Detention Time (min)

(Q gpm)(1440 min/day) = ___ gpd

Filtration:

Q gpm = Number of filters * Surface loading rate (gpm/sf) * surface area per filter (sf)

(Q gpm)(1440 min/day) = ___gpd

In nonconventional plants, major process units evaluated by staff include:

Ion Exchange:

Hydraulic capacity: Q gpm = Surface loading rate (gpm/sf) * surface area (sf)

Loading rate: Grains of filter capacity / grains/gal of constituents = ___ gal treated prior to regeneration. A realistic regeneration frequency should be established.

Membrane Filter:

Q gpm = permeate flow rate

(Q gpm)(1440 min/day) = ___ gpd

If unfiltered water is blended with permeate (for reverse osmosis systems), then this amount is added to Q to determine the total capacity.

8. Delivery Systems

8.1. Booster Pump Capacity

This includes pump stations that pump water to pressure storage (hydropneumatic tank).

1. At least two pumps are required.
2. Capacity is the combined pump capacity with all pumps in service.

Note that for small noncommunity systems, the booster pump duplicity and capacity requirements may be reduced by the field office in accordance with the type and size of system served.

The required capacity must meet the *peak* hour demand, or the maximum day demand + fire flow (whichever is the design condition). The *peak* hour demand or the maximum day demand + fire flow must be provided by the owner's engineer.

(No. of pumps)(Q gpm)(1440 min/day) = ___ gpd

Field office staff calculate the transfer capacity for noncommunity waterworks using the criteria noted in 12 VAC 5-590-1250A: Delivery capacity is the capacity of the well pump or booster pump output over 1 hour + effective storage. For example, a TNC waterworks has a peak hourly demand of 50 gpm, a well pump capacity of 44 gpm, and a pressure tank with an effective storage of 360 gal.

The required delivery capacity is:	(50 gpm) (60 min) =	3,000 gal
The delivery capacity provided is:	(44 gpm) (60 min) =	2,640 gal
+ effective storage of the hydropneumatic tank =		360 gal
Total delivery capacity =		3,000 gal

In some cases, the well pump may not directly serve the demand, such as a well that pumps to an atmospheric storage tank, followed by a booster pump that pumps from the atmospheric storage tank to a hydropneumatic tank. In this case, the delivery capacity is the booster pump output over 1 hour + effective storage of the hydropneumatic tank; well pump capacity and atmospheric storage capacity are not included. However, field staff evaluate these capacities to ensure that they can adequately supply the booster pump capacity. For example, a TNC waterworks has a peak hourly demand of 55 gpm, a well pump capacity of 44 gpm, an atmospheric storage tank with an effective storage of 1,000 gal, a booster pump capacity of 50 gpm, and a pressure tank with an effective storage of 360 gal.

The required delivery capacity is:	(55 gpm) (60 min) =	3,300 gal
The delivery capacity provided is:	(50 gpm) (60 min) =	3,000 gal
+ effective storage of the hydropneumatic tank =		360 gal
Total delivery capacity =		3,360 gal

Supply check:

The booster pump capacity provided is:	(50 gpm) (60 min) =	3,000 gal
The well pump capacity provided is:	(44 gpm) (60 min) =	2,640 gal
+ effective storage of the atmospheric tank =		1,000 gal
Total delivery capacity =		3,640 gal

This calculation only needs to be provided in the capacity evaluation if the booster pump supply capacity is limiting.

When facility expansion is expected, ODW staff will calculate a 24 hour equivalent capacity as shown below. This capacity is not limiting, but will serve as a threshold to indicate that the waterworks' delivery capacity should be reevaluated if the 24 hour equivalent capacity is exceeded.

24 hour equivalent capacity = (Peak Hour Capacity) (24hr/day) / [(1 hr) (peaking factor)]

8.2. Transfer Pump Capacity

This includes pump stations which pump water to atmospheric storage, such as raw water pumps, low service pumps, high service pumps (surface water facilities), and distribution pump stations.

1. At least two pumps are required.
2. Capacity is determined with the largest pump out of service (the "firm" pump capacity).

(Q gpm)(1440 min/day) = ___ gpd

9. Storage

9.1. Storage Capacity

The amount of storage capacity required is the sum of the equalizing storage, fire flows (if fire protection is provided), and sometimes a reserve for emergencies. Equalizing storage is the amount of water needed to allow the water production facilities to operate at a constant rate, since demands will vary over time during a day.[1] Traditionally, ODW has estimated the required storage to be 0.5 * maximum day demand for community waterworks.

Noncommunity systems are exempt from this minimum storage requirement, provided that sufficient delivery capacity is available to meet the peak hour demand (12VAC5-590-1250 A).

Field office staff do not include raw or partially treated water storage in the evaluation of water storage capacity.

9.2. Storage in Wholesale & Consecutive Waterworks

The operation permit WDS of both wholesale and consecutive waterworks must include information on the provision of storage, whether storage is provided by the wholesale waterworks, by the consecutive waterworks, or a combination thereof and whether the storage arrangement is by contract.

9.3. Storage: Atmospheric Tanks

Total effective storage volume is the useable volume available to store water in reservoirs or tanks, measured as the difference between the overflow elevation or the normal maximum operating level, and the minimum storage elevation. For tanks that directly provide system pressure, the effective volume is the storage volume above the minimum elevation that can provide a minimum pressure of 20 psi throughout the reservoir's service area under maximum daily water demand. Ground storage tanks that serve as reservoirs for booster pumps may have a minimum water elevation determined by pump controls.

9.4. Storage: Pressure Tanks

When a hydropneumatic tank (or bladder tank) is fed directly by a well (or wells), the effective storage volume is typically taken as one-third of the tank gross volume. Alternatively, effective storage can be calculated directly from pump control settings (pump on and off elevations), if the resulting value is more conservative.

9.5. Storage: Combined Tanks

When a pressure tank is fed from a ground storage tank, the total effective storage is the sum of the effective storage from the ground storage tank(s) and the pressure tank(s).

---

[1] Handbook of Public Water Systems, Culp/Wesner/Culp, 1986.

10. Design Exceptions and Permit Capacity

10.1. Storage Design Exceptions

Field offices may grant waterworks an exception to the storage requirement if computer modeling demonstrates that adequate pressure will be maintained under peak demands, including fire flows. The design engineer will use an extended period simulation for this purpose. ODW has established the following minimum requirements for the model:

1. Use a calibrated system model that accurately reflects the existing pipes, pump stations, and storage tanks and the way they are actually operated;
2. Model realistic water demands: Develop Maximum Day Demand: Average Day Demand (MDD:ADD) ratios and diurnal variations from historical data; model anticipated growth by increasing demands at existing nodes in probable locations;
3. Input set points (pump on/off, tank levels) similar to normal operating values;
4. Model extended period simulation of MDD with fire flow added during the peak hour; and
5. Model duration of at least 30 hours (48 hours recommended).

ODW has established the following success criteria required to demonstrate that the waterworks has sufficient capacity to meet both existing and future water demands:

1. All nodes must be able to provide a minimum 20 psi at both MDD plus fire flow and at peak hour flow conditions;
2. Total storage volume must recover to within 5% of the initial value at the end of the simulation. Individual storage tank levels must recover to within 10% of their initial levels; and
3. Tanks must not empty. The levels for elevated tanks must fluctuate less than 30 feet.

Waterworks for which the field office approves an exception to the storage requirement in the Regulations must update their computer model continuously to reflect changing facilities, demands and operating conditions. The waterworks must update the model at least every two years to verify that the waterworks is able to meet the defined success criteria at the permitted flow. The field office will include this requirement as a condition of the operation permit.

The field office will require emergency/standby power capabilities to provide emergency power for all pumping needs required in the computer model. The field office will require emergency power capabilities (i.e. portable generator receptacle/hook up and manual transfer switch) at waterworks serving < 500 population and standby power (i.e. automatically activated on-site generator) for waterworks serving ≥ 500 persons.

10.2. Conventional Plant Re-rating

Field staff will refer to WM 902 for information on re-rating conventional treatment processes, including flocculation, sedimentation and gravity filters.

11. Conclusions

The capacity evaluation in the WDS or description sheet of proposed construction will conclude with a summary sentence / paragraph. These will be different for construction permits and operation permits.

11.1. Construction Permits

The field office will not "promise' an operation permit capacity at this stage, unless the construction permit is for an entire, new waterworks. In most cases, the summary in a construction permit description sheet of proposed construction will contain the following language:

> "Conclusion: This project may result in change in the permitted capacity of the waterworks. After the proposed improvements are constructed and placed in operation, the permitted capacity of the entire waterworks will be re-evaluated."

11.2. Operation Permits

The capacity evaluation conclusion in a WDS and the operation permit conditions will state the permitted capacity of the entire waterworks, and provide an explanation for the assigned value. When information on individual components of a waterworks is insufficient, such as well yield or well pump rating, a capacity determination for the entire system may be difficult. The conclusions made in the capacity evaluation for a pre-existing system will depend on the evidence to substantiate whether the system is performing adequately. Field offices may permit existing systems with no evidence of inadequate performance in the past for the capacity of the existing service(s), described in appropriate units for the waterworks (such as restaurant seats), until the field office obtains and evaluates the missing data.

Operation permit - Examples of common evaluation conclusions:

Waterworks' limiting hydraulic component is storage:

> "Conclusion: This waterworks is limited to a capacity of ### gpd due to limited storage."

Only one well source, community waterworks' limiting hydraulic component is well yield:

> "Conclusion: This waterworks is limited to a capacity of ### gpd due to limited well yield. However, the number of connections cannot exceed 49 until an acceptable additional source is provided."
>
> NOTE: On the permit face the capacity will read "### gpd and no more than 49 connections".

Existing TNC waterworks, hydraulic data is lacking for existing well and bladder tank, but past performance is satisfactory:

> "Conclusion: This waterworks is limited to a capacity of one existing structure with ## existing restaurant seats until information on the well yield and pump capacity is provided and the need for additional storage is evaluated."

Operation permit - Examples of more unusual evaluation conclusions:

The field office has granted the waterworks a Design Exception to storage requirement after the waterworks demonstrated reliable service through computer modeling and storage is no longer the limiting component. The field office will include a statement such as:

"Conclusion: Storage is adequate for a maximum daily water demand of ## MGD, based on the waterworks' evaluation of the distribution system using a computer model. Therefore, this waterworks is limited to a capacity of ### MGD due to limited (raw water withdrawal)(specific treatment component hydraulic capacity)(low service/high service pumping capacity)."

Consecutive waterworks without firm gallon-per-day purchase contract; source or transfer facility is limiting component:

"Conclusion: This waterworks is limited to a capacity of ### gpd due to the ability of the water purveyor to deliver."

12. Calculation Units

Field staff staff utilize the following abbreviations in in capacity calculations to ensure consistency.

C - degrees Celsius [°C]	lb – pounds
F – degrees Fahrenheit [°F]	lb/ft^2 – pounds per square foot
CT – (the residual disinfectant concentration, in mg/L)(contact time, in min)	mg – milligrams
CU – color units	MGD – million gallons per day
ft^2 – square foot (feet) of area	mg/L – milligrams per liter
ft/min – foot (feet) per minute	min – minutes
ft/sec – foot (feet) per second	mL – milliliters
gal – gallon(s)	mm – millimeters
gpd – gallons per day	NTU – nephelometric turbidity units
gpd/ft^2 – gallons per day per square foot	pCi – picocurie(s)
gpm – gallons per minute	psi – pound(s) per square inch
gpm/ft – gallons per minute per foot	T – time, in minutes
gpm/ft^2 – gallons per minute per square foot	µm - micrometers (or microns)
in – inch(es)	µg/L - micrograms per liter

13. Example Calculations

To estimate water demands for existing waterworks:

1. Historical usage/production data is preferred.
2. If historical data is not available, estimate demands based on similar facilities or published references.

To estimate water demands for new waterworks:

1. Use estimated demands provided by the engineer from the approved PER or project design calculations.
2. The capacity of the waterworks must meet or exceed the maximum daily water demand of the system.

For noncommunity waterworks, if the field office cannot determine a flow rate for source, treatment, or delivery, then the field office will limit the waterworks capacity to the existing facility(ies) (i.e., existing restaurant seats, students & staff, buildings, etc.).

Example 1 - Existing TNC – no historical usage data

Existing system without well yield or pump capacity information; no meter: ODW discovers a 30 seat restaurant; the water system consists of a well and 86-gal bladder tank serving one building. No meter or treatment is included in the waterworks. The owner states the restaurant serves an average of 120 patrons per day.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   Average water use = 10 gpd/restaurant patron*
   Average daily demand = (10 gpd/patron) (120 patrons) = 1,200 gpd
   Estimated peaking factor (PF) = (4) (24 hrs/day / 12 hrs/day operation) = 8.0
   (8.0) (1,200 gpd) = 9,600 gpd
   Peak hour demand = (9,600 gpd) (1 hr) / (24 hrs/day) = 400 gal

   (*per AWWA Design and Construction of Small Water Systems, 2nd Edition, 1999)

2. Source Water Capacity:

Well Name	Well Yield[1]		Well Pump[2]		Limiting Capacity
Well 1	unknown	unknown	unknown	unknown	unknown
Total	-	-	-	-	unknown

[1,2] gpd = gpm x 1440 min/day

3. Storage Capacity:

Tank Name	Effective Storage
Hydropneumatic Tank:	(1/3)(86 gal) = 29 gal
Total:	29 gal

   Noncommunity waterworks are required to provide delivery capacity to meet peak hour demand.

Conclusion: This waterworks is permitted for a capacity of one existing structure with 30 existing restaurant seats until information on the well yield and pump capacity is provided and the need for additional storage is evaluated. *{The field office staff would write the capacity on the operation permit as one existing structure with 30 existing restaurant seats. The staff would not evaluate peak hour delivery capacity because data is not available on the well pump capacity}*

Example 2 - Existing TNC – with meter data

Existing system with information on the well construction, yield and pump capacity; treatment and meter are provided:

A picnic area and visitor center is open 16 hours per day from May 1 to October 31 every year. It averages 1,500 visitors/day and has two comfort stations behind the visitor center. The comfort stations have sinks for handwashing. A 6-inch diameter well is used which yielded 51 gpm. The well is provided with a 5 hp submersible pump rated for 26 gpm. The system includes a meter, hypochlorite feed system, and 20,000 gal storage tank. Water flows by gravity from the tank through 3-inch and 4-inch diameter distribution lines.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   Average daily demand = 15,000 gpd*
   (*Per Monthly Operating Reports dated April, 2016 - July, 2018, the average water production is 15,000 gpd)

   Peak hour demand:
   Estimated PF = (4) (24 hrs/day / 16 hrs/day operation) = 6.0
   (6.0) (15,000 gpd) = 90,000 gpd
   (90,000 gpd) (1 hr) / (24 hrs/day) = 3,750 gal

2. Source Water Capacity:

Well Name	Well Yield[1]		Well Pump[2]		Limiting Capacity
Well 1	51 gpd	73,440 gpd	26 gpd	37,440 gpd	37,440 gpd
Total	-	-	-	-	37,440 gpd

[1,2] gpd = gpm x 1440 min/day

3. Storage Capacity:

Tank Name	Effective Storage
Atmospheric Storage Tank:	20,000 gal
Total:	20,000 gal

Noncommunity systems are required to provide delivery capacity to meet peak hour demand.

4. Delivery Capacity:

Peak Hour Delivery:

Well pumping: (26.0 gpm) (60min/hr) =	1,560 gal
Storage:	20,000 gal
Total:	21,560 gal

Peak hour demand = 3,750 gal < 21,560 gal provided

Equivalent 24 hour capacity = (21,560 gal) (24 hr/day) / [(1 hr) (4.0)] = 129,400 gpd

This capacity is not limiting, but exceedance may indicate that peak hour delivery capacity is inadequate.

Conclusion: This waterworks is permitted for a capacity of 37,400 gpd due to limited well pump capacity. {The field office staff would write the capacity on the operation permit as 37,400 gpd. Note that the waterworks provided inadequate information on the hypochlorite feed system. If treatment is required then field office staff will verify this data and check the adequacy of the treatment capacity. Staff do not need to include simple solution-type chemical feed systems in the Waterworks Description Sheet Capacity Evaluation, but need to include them in the reviewer's notes.}

Example 3 - New NTNC

A school designed for 200 students is served by a groundwater well with a reported yield test of 12 gpm, furnished with a 10 gpm submersible pump. One 2.0-ft diameter manganese greensand filter is supplied with sodium hypochlorite and permanganate feed systems. One 5,000 gal atmospheric storage tank, two booster pumps with a combined capacity of 30 gpm, and one 5,000 gal hydropneumatic tank are also provided.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   Average daily demand = 4,000 gpd*
   Maximum Daily Demand = 5,000 gpd*
   Peak hour demand = 2,500 gal*
   (*Per the approved Preliminary Engineering Report titled XXXX, dated XXXX)

2. Source Water Capacity:

Well Name	Well Yield[1]		Well Pump[2]		Limiting Capacity
Well 1	12 gpm	17,280 gpd	10 gpm	14,400 gpd	14,400 gpd
Total	-	-	-	-	14,400 gpd

[1,2] gpd = gpm x 1440 min/day

3. Treatment Capacity:

   Greensand filtration:
   Number of filters: 1
   Total surface area: 3.1 sf
   Maximum filtration rate 3 gpm/sf
   Capacity = (3.1 sf) (3 gpm/sf) (1,440 min/day) = 13,600 gpd

   Limiting treatment capacity: 13,600 gpd based on Filtration

   (Simple solution-type chemical feed systems must be verified for feed capacity with respect to the well pump capacity, but do not need to be included in the Waterworks Description Sheet capacity evaluation.)

4. Storage Capacity:

Tank Name	Effective Storage
Hydropneumatic Tank:	(1/3) (5,000 gal) = 1,667 gal
Atmospheric Storage Tank:	5,000 gal
Total:	6,667 gal

Noncommunity systems are required to provide delivery capacity to meet peak hour demand.

5. Delivery Capacity:

Booster Pump:
Number of Pumps: 2
Capacity = (30.0 gpm) (1,440 min/day) = 43,240 gpd

Peak Hour Delivery:

Booster pumping: (30.0 gpm) (60min/hr) =	1,800 gal
Hydropneumatic Tank:	1,667 gal
Total:	3,467 gal

Peak hour demand = 2,500 gal < 3,467 gal provided

Estimated Peak Hour PF = (2,500 gal)(16 hr/day operation) / (5,000 gpd) = 8.0
Equivalent 24 hour capacity = (3,467 gal) (24 hr/day) / [(1 hr) (8.0)] = 10,400 gpd
This capacity is not limiting, but exceedance may indicate that peak hour delivery capacity is inadequate.

Conclusion: This waterworks is permitted for a capacity of 13,600 gpd due to limited treatment capacity. {*The capacity on the operation permit would be written as 13,600 gpd. Note that because there are components located upstream of the booster pumps, there is potential for those components to limit the peak hour delivery capacity. To ensure that this is not the case, field office staff will perform a supply check as follows. This does not need to be included in the capacity evaluation calculations unless the supply is limiting.*

Supply check:

The well pump capacity provided is:	*(10 gpm) (60 min) =*	*600 gal*
+ effective storage of the atmospheric tank =		*5,000 gal*
Total delivery capacity =		*5,600 gal*

5,600 gal > 3,467 –ok }

Example 4 - Existing community

A 40-home subdivision is served by a simple groundwater system consisting of one drilled well with a 48-hr test yield of 30 gpm, a 20 gpm submersible well pump, 20,000 gal atmospheric storage tank, two booster pumps with a combined capacity of 120 gpm, and a 5,000 gal hydropneumatic tank. Well is drilled in consolidated bedrock. Accurate historical metering data is not available.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   1 residential connection = 75 gpd/person*
   Population density: 2.4 persons/residence**
   Average water use = (75 gpd/person) (2.4 persons/residence) =180 gpd/residence
   Average daily demand = (180 gpd) (40) = 7,200 gpd

   (*per AWWA Design and Construction of Small Water Systems, 2nd Edition, 1999)
   (**per 2010 US Census Data for XXX County)

2. Source Water Capacity:

Well Name	Well Yield[1]		Well Pump[2]		Limiting Capacity
Well 1	30 gpm	24,000 gpd	20 gpm	28,800 gpd	24,000 gpd
Total	-	-	-	-	24,000 gpd

[1] gpd = gpm x 1440 min/day / 1.8 SF
[2] gpd = gpm x 1440 min/day

3. Storage Capacity:

Tank Name	Effective Storage
Hydropneumatic Tank:	(1/3) (5,000 gal) = 1,667 gal
Atmospheric Storage Tank:	20,000 gal
Total:	21,667 gal

   Available storage capacity at 0.5 day storage = 21,667 gal/0.5 day = 43,333 gpd

4. Delivery Capacity:

   Booster Pump:
   Number of Pumps: 2
   Capacity = (120.0 gpm) (1,440 min/day) = 172,800 gpd

Conclusion: This waterworks is permitted for a capacity of 24,000 gpd due to limited well yield. However, the number of connections cannot exceed 49 until an acceptable additional source is provided.

{Since well yield is limiting and there is only one well, the field office should limit the capacity on the operation permit to no more than 24,000 gpd or 49 connections, whichever is reached first. In the absence of well yield information the field office would limit the permit to 40 existing residential connections.

Example 5 - Existing community

A community system has 50 connections and a historical average day water production of 8,300 gpd, 2 wells with a yield of 10 gpm and 20 gpm respectively, and individual well pump capacities of 10 gpm, 20,000 gal atmospheric storage tank, two booster pumps with a capacity of 60 gpm each, and a 5,000 gal hydropneumatic tank. The wells are located in consolidated rock formation.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   Average daily demand = 8,300 gpd*
   (*Per Monthly Operating Reports dated April, 2016 - March, 2018, the average water production is 8,300 gpd)

2. Source Water Capacity:

Well Name	Well Yield[1]		Well Pump[2]		Limiting Capacity
Well 1	10 gpm	8,000 gpd	10 gpm	14,400 gpd	8,000 gpd
Well 2	20 gpm	16,000 gpd	10 gpm	14,400 gpd	14,400 gpd
Total	-	-	-	-	22,400 gpd

[1] gpd = gpm x 1440 min/day / 1.8 SF
[2] gpd = gpm x 1440 min/day

3. Storage Capacity:

Tank Name	Effective Storage
Hydropneumatic Tank:	(1/3) (5,000 gal) = 1,667 gal
Atmospheric Storage Tank:	20,000 gal
Total:	21,667 gal

   Available storage capacity at 0.5 day storage = 21,667 gal/0.5 day = 43,333 gpd

4. Delivery Capacity:

   Booster Pump:
   Number of Pumps: 2
   Capacity = (2) (60.0 gpm) (1,440 min/day) = 172,800 gpd

Conclusion: This waterworks is permitted for a capacity of 22,400 gpd due to source capacity. *{The field office would write the capacity on the operation permit as 22,400 gpd.}*

Example 6 - Existing community

A mobile home park with 44 existing connections is provided with a well and three 86-gal bladder tanks. The well yield is reported to be 32 gpm and the pump is rated for 30 gpm. A review of the waterworks performance over the past 5 years demonstrates that the facilities have provided adequate service (quantity and pressure) to all customers. The well is drilled in consolidated bedrock.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   1 residential connection = 50 gpd/person*
   Population density: 3.6 persons/residence**
   Average water use = (50 gpd/person) (3.6 persons/residence) =180 gpd/residence
   Average daily demand = (180 gpd) (44) = 7,920 gpd

   (*per AWWA Design and Construction of Small Water Systems, 2nd Edition, 1999)
   (**per 2010 US Census Data for XXX County)

2. Source Water Capacity:

Well Name	Well Yield[1]		Well Pump[2]		Limiting Capacity
Well 1	32 gpm	25,600 gpd	30 gpm	43,200 gpd	25,600 gpd
Total	-	-	-	-	25,600 gpd

[1] gpd = gpm x 1440 min/day / 1.8 SF
[2] gpd = gpm x 1440 min/day

3. Storage Capacity:

Tank Name	Effective Storage
Hydropneumatic Tank:	(1/3) (3x86 gal) = 86 gal
Total:	86 gal

   Available storage capacity at 0.5 day storage = 86 gal/0.5 day = 172 gpd

Conclusion: This waterworks is permitted for a capacity limited to the existing 44 mobile home connections until the need for additional storage is evaluated.

{The field office would write the capacity on the operation permit as 44 existing mobile home connections.}

Example 7 - New community

A developer proposed a new residential subdivision with 80 single-family dwellings and a recreation center. The waterworks will use groundwater pumped from two drilled wells located in consolidated rock. Well 1 has a 48-hr test yield of 50 gpm and is installed with a 45 gpm submersible well pump. Well 2 has a 48-hr test yield of 22 gpm and is installed with a 22 gpm submersible well pump. The wells pump to a 5,000 gal ground storage tank. The system is served by dual 10,000 gal hydropneumatic tanks and dual 50 gpm booster pumps. The approved PER lists average daily demand of 12,000 gpd.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   Average daily demand = 12,000 gpd*
   Maximum daily demand = 18,000 gpd*
   (*Per the approved Preliminary Engineering Report titled XXXX, dated XXXX)

2. Source Water Capacity:

Well Name	Well Yield[1]		Well Pump[2]		Limiting Capacity
Well 1	50 gpm	40,000 gpd	45 gpm	64,800 gpd	40,000 gpd
Well 2	22 gpm	17,600 gpd	22 gpm	31,680 gpd	17,600 gpd
Total	-	-	-	-	57,600 gpd

[1] gpd = gpm x 1440 min/day / 1.8 SF
[2] gpd = gpm x 1440 min/day

3. Storage Capacity:

Tank Name	Effective Storage
Hydropneumatic Tank 1:	(1/3) (10,000 gal) = 3,333 gal
Hydropneumatic Tank 2:	(1/3) (10,000 gal) = 3,333 gal
Atmospheric Tank:	5,000 gal
Total:	11,667 gal

   Available storage capacity at 0.5 day storage = 11,667 gal/0.5 day = 23,333 gpd

4. Delivery Capacity:

   Booster Pump:
   Number of Pumps: 2
   Combined Capacity = (2)(50.0 gpm) (1,440 min/day) = 144,000 gpd

Conclusion: This waterworks is permitted for a capacity of 23,333 gpd due to limited storage capacity. *{The field office would write the capacity on the operation permit as 23,333 gpd.}*

Example 8 - Conventional Surface Water Treatment Plant

The DEQ has issued a waterworks containing a conventional surface water treatment plant an updated VWP Permit limiting the maximum daily withdrawal to 2.5 MGD.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   Average daily demand = 745,600 gpd*
   (*Per Monthly Operating Reports dated March 2015 - February 2018, the average water production is 745,600 gpd. Maximum day water production was 810,000 gpd.)

2. Source Water Capacity:

Source Name	Capacity
North Fork Shenandoah River:	2,500,000 gpd
Total Source Capacity:	2,500,000 gpd

3. Treatment Capacity:

   Raw water pumps:
   Number of pumps: 2
   Capacity (1 unit out of service) = (2,300 gpm) (1,440 min/day) = 3,312,000 gpd

   Flocculation:
   Number of basis: 3
   Total volume: 56,104 gal
   Required retention time: 25 min
   Capacity = (56,104 gal) / (25 min) (1,440 min/day) = 3,232,000 gpd

   Sedimentation:
   Number of basis: 3
   Total volume: 448,830 gal
   Required retention time: 200 min
   Capacity = (448,830 gal) / (200 min) (1,440 min/day) = 3,232,000 gpd

   Media filtration:
   Number of filters: 3
   Total surface area: 675.0 sf
   Maximum filtration rate 4 gpm/sf
   Capacity = (675.0 sf) (4 gpm/sf) (1,440 min/day) = 3,888,000 gpd

   Clearwell:
   Number of vessels: 1
   Total volume: 299,220 gal

(299,220 gal) (0.9 baffle factor) = 269,298 gal
Minimum chlorine residual = 1.2 mg/L
Required CT = 36.0 min-mg/L at 0.5 °C and pH = 7.0
Required retention time = (36.0 min-mg/L) / (1.2 mg/L) = 30 min
Required retention time: 30 min
Capacity = (269,298 gal) / (30 min) (1,440 min/day) = 12,930,000 gpd

Sodium Hypochlorite:
Chemical concentration: 12.5% = 125,000 mg/L
Metering pump capacity: 115.2 gpd
Required concentration: 1.2 mg/L
Capacity = (125,000 mg/L)/(1.2 mg/L)(115.2 gpd) = 12,000,000 gpd

Orthophosphate:
Chemical concentration: 36% = 360,000 mg/L
Metering pump capacity: 24.0 gpd
Required concentration: 2.0 mg/L
Capacity = (360,000 mg/L)/(2.0 mg/L)(24.0 gpd) = 4,320,000 gpd

Caustic Soda:
Chemical concentration: 50% = 500,000 mg/L
Metering pump capacity: 115.2 gpd
Required concentration: 10.0 mg/L
Capacity = (500,000 mg/L)/(10.0 mg/L)(115.2 gpd) = 5,760,000 gpd

High service pumps:
Number of pumps: 3
Capacity (1 unit out of service) = (2,084 gpm) (1,440 min/day) = 3,001,000 gpd

Limiting treatment capacity: 3,001,000 gpd based on High Service Pumping

4. Storage Capacity:

Tank Name	Effective Storage
Banks Fort Road Elevated Tank:	200,000 gal
Strasburg Reservoir:	1,000,000 gal
Strasburg Junction Tank:	66,300 gal
Route 55 Tank:	2,105,000 gal
Total:	3,371,300 gal

Available storage capacity at 0.5 day storage = 3,371,300 gal/0.5 day = 6,743,000 gpd

5. Delivery Capacity:

Aileen Avenue Booster Pump Station:
Number of Pumps: 2
Capacity (1 unit out of service) = (1) (300.0 gpm) (1,440 min/day) = 432,000 gpd

Strasburg Junction Booster Pump Station:
Number of Pumps: 2
Capacity (1 unit out of service) = (1) (46.0 gpm) (1,440 min/day) = 66,240 gpd

North Shenandoah Industrial Park Booster Pump Station:
Number of Pumps: 2
Capacity (1 unit out of service) = (1) (412.0 gpm) (1,440 min/day) = 593,280 gpd

Fairfield Drive Booster Pump Station:
Number of Pumps: 2
Capacity (1 unit out of service) = (1) (120.0 gpm) (1,440 min/day) = 172,800 gpd

Conclusion: This waterworks is permitted for a capacity of 2.5 MGD due to limited source water capacity.

Example 9 - Coastal Plain Groundwater Management Area

A Community waterworks serving less than 50 connections has a well located within the coastal plain Groundwater Management Area.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   Average daily demand = 8,562 gpd*
   (*Per Monthly Operating Reports dated March, 2015 - February, 2018, the average water production is 8,562 gpd)

2. Source Water Capacity:

Well Name	Well Yield[1]		Well Pump[2]		Limiting Capacity
Well 1	36 gpd	51,840 gpd	14 gpd	20,160 gpd	20,160 gpd
Total	-	-	-	-	20,160 gpd

[1,2] gpd = gpm x 1440 min/day

3. Storage Capacity:

Tank Name	Effective Storage
Hydropneumatic Tank:	(1/3)(2,960 gal) = 987 gal
Atmospheric Tank:	9,134 gal
Total:	10,121 gal

   Available storage capacity at 0.5 day storage = 10,121 gal/0.5 day = 20,241 gpd

4. Delivery Capacity:

   Booster Pump Station:
   Number of Pumps: 2
   Capacity = (2) (88.0 gpm) (1,440 min/day) = 253,440 gpd

Conclusion: This waterworks is permitted for a capacity of 20,160 gpd due to limited source capacity, and no more than 49 residential connections.

Example 10 - Consecutive waterworks

A consecutive community waterworks, the XYZ Service Authority, consists of a consecutive connection with the Town of Happyville and a distribution system. The XYZ Service Authority has a purchase contract with the Town of Happyville, dated 12/31/2015, providing up to 40,000 gpd of finished water. The XYZ Service Authority waterworks has no storage facilities and relies on the Town of Happyville to provide storage capacity.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   Average daily demand = 90,837 gpd*
   (*Per Monthly Operating Reports dated March, 2015 - February, 2018, the average water purchased from Happyville is 90,837 gpd)

2. Source Water Capacity:

Source Name	Capacity
Town of Happyville, Purchase [PWSID XXXXXXX]:	40,000 gpd
Total Source Capacity:	40,000 gpd

Water production and storage is allocated to the following consecutive waterworks as follows:

Waterworks Name	PWSID	Permit Capacity (gpd)	Delivered Capacity (gpd)	Total Storage Required [1] (gal)	Storage Provided-Consecutive[2] (gal)	Storage Provided – Wholesale[3] (gal)
XYZ Service Authority	XXXXXX	40,000	None	20,000	None	20,000

1. Total storage required by the consecutive waterworks.
2. Total effective storage provided by the consecutive waterworks.
3. Total effective storage provided by this wholesale waterworks.

Conclusion: This waterworks is permitted for a capacity of 40,000 gpd due to limited source capacity.

Example 11 - Storage Capacity justified by hydraulic model

A community waterworks has two wells located in a consolidated rock formation. The owner's engineer has provided a hydraulic model indicating minimum pressure requirements can be obtained throughout the distribution system during peak hour and during max-day demand plus fire flow.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   Average daily demand = 280,000 gpd*
   (*Per Monthly Operating Reports dated March, 2015 - February, 2018, the average water production is 280,000 gpd. Maximum day production was 360,000 gpd)

2. Source Water Capacity:

Well Name	Well Yield[1]		Well Pump[2]		Limiting Capacity
Well 1	100 gpm	80,000 gpd	100 gpm	144,000 gpd	80,000 gpd
Well 2	200 gpm	160,000 gpd	150 gpm	216,000 gpd	160,000 gpd
Total	-	-	-	-	240,000 gpd

[1] gpd = gpm x 1440 min/day / 1.8 SF
[2] gpd = gpm x 1440 min/day

3. Storage Capacity:

   The Waterworks' system-wide hydraulic model titled, "Town of Bridgewater, Hydraulic Modeling Report", dated June 4, 2014, demonstrated that adequate pressure can be maintained during peak demands (maximum day of 360,000 gpd and fire flow) with a total atmospheric storage of 120,000 gal.

4. Delivery Capacity:

   Booster Pump Station:
   Number of Pumps: 2
   Capacity (1 unit out of service) = (1) (200.0 gpm) (1,440 min/day) = 288,000 gpd

Conclusion: This waterworks is permitted for a capacity of 240,000 gpd due to limited source capacity.

Example 12 - 4-log virus inactivation

A noncommunity waterworks has one well located in a consolidated rock formation and requires 4-log virus inactivation. The engineer's analysis indicates that a contact time of 6.0 min-mg/L is required.

WATERWORKS CAPACITY

1. Estimated Water Demand:

   Average daily demand = 5,000 gpd*
   Peak hour demand = 900 gal*
   (*Per the approved Preliminary Engineering Report titled XXXX, dated XXXX)

2. Source Water Capacity:

Well Name	Well Yield[1]		Well Pump[2]		Limiting Capacity
Well 1	14 gpm	20,160 gpd	15 gpm	21,600 gpd	20,160 gpd
Total	-	-	-	-	20,160 gpd

[1,2] gpd = gpm x 1440 min/day

3. Treatment Capacity:

   Clearwell:
   Number of vessels: 1
   Total volume: 212 gal
   (212 gal) (0.3 baffle factor) = 63 gal
   Required CT = 6.0 min-mg/L at 10 °C and pH = 6.0 – 9.0
   Average retention time = (63 gal) / (14 gpm) = 4.5 min
   Minimum C = (6.0 min-mg/L) / (4.5 min) = 1.33 mg/L free chlorine

4. Storage Capacity:

Tank Name	Effective Storage
Hydropneumatic Tank:	(1/3) (1,000 gal) = 333 gal
Total:	333 gal

   Noncommunity systems are required to provide delivery capacity to meet peak hour demand.

5. Delivery Capacity:

Peak Hour Delivery:

Well pumping: (15.0 gpm) (60 min/hr) =	900 gal
Storage:	333 gal
Total:	1,233 gal

Peak hour demand = 900 gal < 1,233 gal provided

Conclusion: This waterworks is permitted for a capacity of 20,160 gpd due to limited source capacity.

APPENDIX B

Triennial Assessment 18 Factors

Technical Factors

Question 1

Is the waterworks score on the 2019 Enforcement Targeting Tool ≤ 10?

Question 2

Does the waterworks have sufficient operator coverage for sick leave and vacation?

Question 3

Has the waterworks either not received significant deficiencies, or completed timely correction of all significant deficiencies?

Question 4

Did the waterworks address recommendations from recent sanitary surveys?

Question 5

Does the waterworks have a written policy for responding to customer complaints?

Question 6

Are **all** plans and reports up to date and implemented (e.g. BSSP, LCR Plan, CCCP, CCR, WBOP, Sampling Plan, etc.)?

Managerial Factors

Question 7

Did the waterworks consistently operate within 80% of its permitted capacity in the last 3 years?

Question 8

Does the system meet Waterworks Regulations design and construction standards?

Question 9

Are the waterworks facilities and appurtenances in good operating condition?

Question 10

Are **all** service connections metered and is there a water accountability program in place?

Question 11

Does the waterworks meet all established National Primary Drinking Water Standards?

Question 12

Have all operators attended a technical training seminar or conference each year covered by this survey?

Financial Factors

Question 13

Did the waterworks pay the technical assistance fee?

Question 14

Does the waterworks have at least 45 days cash on-hand to cover expenses?

Question 15

Is the waterworks budget independent from subsidization by general funds, sewer funds or other funding sources?

Question 16

Does the waterworks have a written Capital Improvement Plan?

Question 17

Have the waterworks' rates been adjusted in the past three years?

Question 18

Does the waterworks have an Asset Management Plan?