



COMMONWEALTH of VIRGINIA

M. Norman Oliver, MD, MA
State Health Commissioner

Department of Health
P O BOX 2448
RICHMOND, VA 23218

TTY 7-1-1 OR
1-800-828-1120

September 21, 2020

The Honorable Ralph S. Northam
Governor of Virginia
Post Office Box 1475
Richmond, VA 23218

RE: The Efficacy of Virginia's Capacity Development Strategy Report

Dear Governor Northam:

Section 1420 of the Safe Drinking Water Act (42 USC § 300g-9) requires states to develop and implement programs that will assist new and existing waterworks to possess sufficient technical, managerial and financial capacity to ensure and enhance their sustainable operations. To fulfill this requirement, the Virginia Department of Health (VDH), through its Office of Drinking Water (ODW), has devised a Capacity Development Strategy. The U.S. Environmental Protection Agency (EPA) approved the original strategy in 2000 and the revised strategy 2014. In July 2020, VDH updated its Strategy to incorporate requirements in America's Water Infrastructure Act (AWIA); EPA approval for the updated Strategy is pending.

The attached report has been prepared pursuant to Section 1420(c)(3) and constitutes the seventh report on Virginia's Waterworks Capacity Development Program. Section 1420(c)(3) requires that every three years, VDH submit "to the Governor a report that shall also be available to the public on the efficacy of the strategy and progress made toward improving the technical, managerial and financial capacity of water systems in the State."

The Virginia Drinking Water State Revolving Fund Capitalization Grant from the EPA largely funds the efforts of ODW's Capacity Development Strategy. This funding is critical to the continued success of this and many of other ODW programs. Please review this report to gain an understanding of the significant work that ODW is doing to protect the health of all people in the Commonwealth of Virginia who receive and use water from a regulated waterworks.

If you, or your staff, have any questions regarding the contents of this report or ODW's Capacity Development Program, please contact Mr. Dwayne Roadcap, ODW Director at (804) 864-7522 or by e-mail at Dwayne.Roadcap@vdh.virginia.gov.

Sincerely,

DocuSigned by:

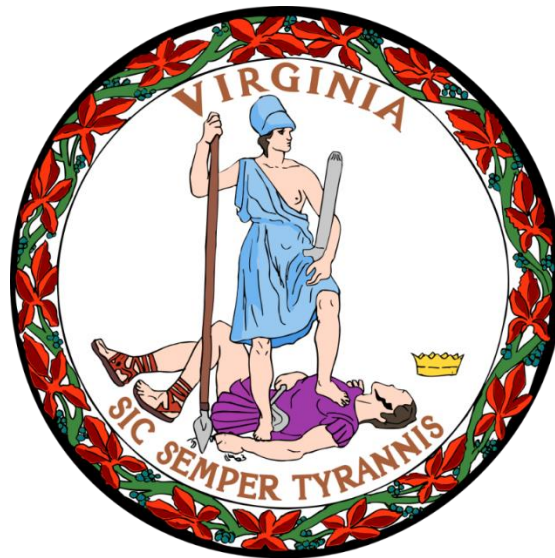
M. Norman Oliver, MD

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M. Norman Oliver, MD, MA
State Health Commissioner

Report to the Governor

Efficacy of Virginia's Waterworks Capacity Development Strategy

July 1, 2017 to June 30, 2020



Virginia Department of Health
Office of Drinking Water
109 Governor Street
Richmond, Virginia 23219

Published:
September 30, 2020

COMMONWEALTH OF VIRGINIA

Ralph Northam, Governor

VIRGINIA DEPARTMENT OF HEALTH

M. Norman Oliver, MD, MA

State Health Commissioner

OFFICE OF DRINKING WATER

Dwayne Roadcap, Director

TRAINING, CAPACITY DEVELOPMENT AND OUTREACH DIVISION

Barry E. Matthews, CPG

Division Director

Location:

109 Governor Street, 6th Floor

Richmond, VA 23219

Phone: (804) 864-7522

Mailing Address:

VDH- Office of Drinking Water

Training, Capacity Development & Outreach Division

109 Governor Street, 6th Floor

Richmond, VA 23219

Submit questions or comments to Dwayne Roadcap, Director, Office of Drinking Water,
at (804) 864-7522, Dwayne.Roadcap@vdh.virginia.gov

This report is available to the public on the VDH Office of Drinking Water website at:
<https://www.vdh.virginia.gov/drinking-water/capacity-development/>

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1.0 Executive Summary

The Virginia Department of Health (VDH), Office of Drinking Water (ODW) is the primacy agency for implementation of the Safe Drinking Water Act (SDWA) in the Commonwealth of Virginia. The SDWA defines a public water system, also known as a waterworks in Virginia law and regulations, 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.” There are currently 2,808 waterworks in the Commonwealth of Virginia collectively serving approximately 7.6 million consumers--about 89% of the total population of Virginia (8.5 million people). The SDWA categorizes waterworks into three system types: community, nontransient noncommunity (NTNC), and transient non-community (TNC). Approximately 7.1 million Virginians receive water from 1,093 community waterworks that serve year-round residents. VDH regulates 509 NTNC waterworks, which provide drinking water to schools, day care centers, industrial centers, factories and other facilities that serve at least 25 of the same persons 6 months out of the year. Finally, VDH regulates 1,206 TNC waterworks, which serve 25 or more different people for at least 60 days a year. TNCs include hotels, restaurants, campgrounds, and marinas.

Pursuant to Section 1420(c)(3) of the SDWA (42 U.S.C. § 300g-9 (c)(3)), VDH must submit a report to the Governor on the efficacy of VDH’s Capacity Development Strategy (Strategy), including VDH’s progress to improve the technical, managerial, and financial (TMF) capacity of waterworks in Virginia. The Strategy describes VDH’s work to evaluate and assist waterworks with TMF capacity. The Strategy incorporates programmatic and individualized assistance based on need. TMF capacity drives the success of a waterworks’ program to comply with state and federal regulations.

In July 2020, VDH updated its Strategy to incorporate requirements in America’s Water Infrastructure Act (AWIA); U.S. Environmental Protection Agency (EPA) approval for the updated Strategy is pending. Virginia’s currently approved Strategy has three main objectives:

- 1) Posses and exercise sufficient authority to prevent nonviable community and NTNC waterworks;
- 2) Assess, prioritize, and respond to correct TMF capacity limitations; and,
- 3) Ensure waterworks offered financial assistance have, or will develop, sufficient TMF capacity prior to fund disbursement.

VDH’s drinking water program centers on permitting, compliance, TMF assistance, and enforcement. VDH’s program identifies waterworks lacking TMF capacity, provides assistance to improve capacity, and permits the operation of regulatory compliant waterworks.

During the reporting period (July 1, 2017 – June 31, 2020), the Capacity Development Program grew and accomplished many programmatic goals. VDH issued 553 construction permits and 701 operation permits for new waterworks or modifications of existing waterworks. Staff completed 1,577 source water assessments and 70 well site inspections. VDH ensured 1,598 waterworks had a properly licensed operator. In implementing its Strategy, VDH accomplished the following:

- Offered \$58,338,275 in low interest or interest-free construction loans to 77 waterworks through the Drinking Water State Revolving Fund (DWSRF).

- Awarded \$1,065,600 for lead service line replacements to four localities (Alexandria, Chesapeake, Henry County, and Richmond).
- Awarded \$900,750 in planning and design grant funds to 25 waterworks.
- Provided \$217,000 in small project engineering assistance to 17 waterworks.
- Completed 3,857 routine sanitary surveys of waterworks facilities.
- Conducted 168 special sanitary surveys in response to complaints or water quality issues.
- Evaluated 2,665 requests for water quality monitoring waivers for man-made chemicals.
- Issued 4,942 notices of alleged violation for noncompliance with the SDWA and Virginia Waterworks Regulations.
- Produced 190 warning letters to waterworks that were persistently in noncompliance with the regulations.
- Issued 15 administrative orders to waterworks substantially and persistently out of compliance with regulations, eight of which have been fully resolved.
- Responded to 31,560 requests for technical assistance from waterworks and operators.
- Evaluated 1,597 community and NTNC waterworks for TMF capacity.
- Reviewed 35 source water protection plans, with an additional 11 plans in draft format.
- Collaborated with technical assistance partners who provided 1,068 hours of leak detection services to 74 waterworks using equipment paid with DWSRF funding.

VDH's Strategy provides training to ensure managerial capacity at waterworks. VDH trains and assists waterworks owners on business operation plans. VDH contracts with Virginia Tech to provide two classes a year on managerial capacity. During the reporting period, Virginia Tech held four courses for waterworks decision makers. VDH and Virginia Tech canceled two courses in 2020 because of the pandemic.

Waterworks lacking TMF capacity were required to complete Waterworks Business Operations Plans as part of DWSRF funding. Virginia's Strategy helped waterworks reliably produce and deliver safe drinking water to consumers through direct technical assistance and regulatory compliance help. The Strategy incorporates VDH's major program activities, which maximizes capacity development in Virginia. This report documents VDH's assistance to waterworks, especially small waterworks (those serving 10,000 or fewer consumers), which tend to have the greatest need.

2.0 Background

The SDWA 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 capacity to operate, maintain, and sustain a waterworks successfully over a long period is comprised of TMF components. TMF components demonstrate a waterworks’ ability to reliably produce and deliver safe, affordable drinking water that meets federal and state quality standards to Virginians. TMF assessments measure a waterworks’ ability to plan, achieve, and maintain compliance with the SDWA, Virginia’s Public Water Supplies law, and associated federal and state regulations.

VDH evaluates TMF of a waterworks through on-site inspections and other evaluations:

- *Technical Capacity* represents the physical infrastructure of the waterworks, including its water source, and the knowledge and skill required to operate the facility in accordance with regulations and best management practices;
- *Managerial Capacity* means the waterworks’ ability to plan, organize, and regularly achieve compliance with applicable laws and regulations that protect drinking water; and,
- *Financial Capacity* reflects the waterworks’ ability to balance revenues and expenditures, have acceptable loan ratios, and to maintain overall healthy financial data.

The TMF elements are interdependent--all three are essential for ensuring the sustainability of a waterworks. Weakness in one area of capacity will impair other components. For example, a waterworks that lacks financial capacity might have inadequate service rates, which affects the waterworks’ ability to hire qualified and licensed staff, to plan and implement necessary repairs and maintenance, and to manage the waterworks effectively.

There are currently 2,808 waterworks in the Commonwealth of Virginia collectively serving approximately 7.6 million consumers (roughly 89% of the Commonwealth’s total population of 8.5 million people). Most Virginians receive water from community waterworks, which have at least 15 service connections with year-round residents, or that regularly serve at least 25 year-round residents. Community waterworks include systems serving hundreds of thousands of consumers, small towns, and individual neighborhoods. NTNC waterworks serve at least 25 of the same persons over six months out of a year. Examples of NTNCs include schools, hospitals, or manufacturing plants. TNC waterworks serve at least 25 persons daily for at least 60 days out of the year. Examples include restaurants, campgrounds, and hotels. Figure 1 shows the composition and population served by each classification.

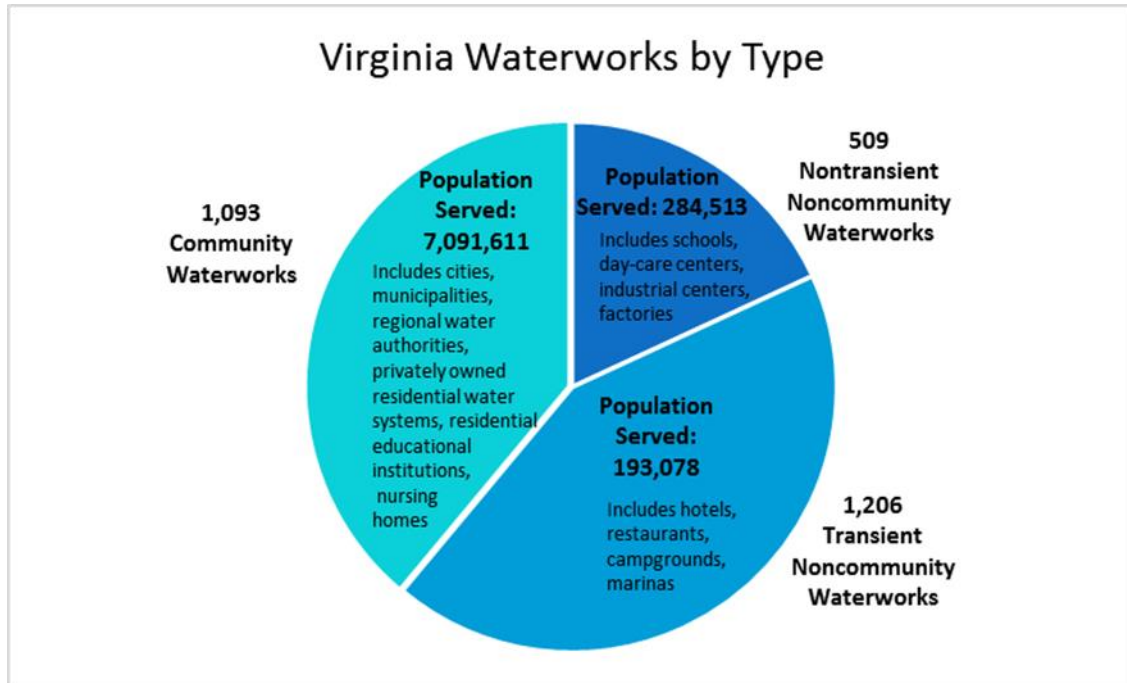


Figure 1: Virginia Waterworks by Type

VDH has well-established procedures to address TMF through routine interactions and inspections. VDH's sanitary survey program evaluates the condition of a waterworks' infrastructure, operational practices, and drinking water quality indicators. VDH can identify TMF strength and weakness at the waterworks through its routine business process. Staff provides waterworks with ongoing, daily help with TMF.

3.0 Technical Capacity

Technical capacity encompasses the physical infrastructure of a waterworks, including its: water source, treatment facility and distribution system. Equally important are the knowledge, skills, best management practices, and training required to operate the facility in accordance with regulations. Technical capacity includes the permits and regulations that establish operational requirements. Described below are VDH-specific operational areas that provide support to waterworks.

3.1 Construction Plans and Permit Review

VDH issued 553 Construction Permits and 701 Operation Permits from July 1, 2017, to June 30, 2020. Applicants document TMF in the process of securing a permit from VDH. Virginia Code §§ 32.1-169 and 172B, and the Virginia Waterworks Regulations, at 12VAC5-590-190, prohibit the establishment, construction, or operation of a waterworks without a written permit. Hence, TMF is a part of every application. Construction and operation permits ensure that waterworks have TMF sustainability before operating the waterworks. Waterworks owners must satisfactorily complete a five-step application process before receiving a permit. The application process includes:

- Notification of Intent (Permit Application),
- Preliminary Engineering Conference,
- Submission of a Waterworks Business Operations Plan,
- Submission of a Preliminary Engineering Report, and
- Submission of Final Plans and Specifications.

After installation and construction of the plans, a professional engineer must certify that the final construction complied with approved plans and specifications. Upon receipt of the engineer's completion statement, VDH will issue an Operation Permit, which also establishes operator licensure and other requirements. The above procedures ensure that a new waterworks is properly designed, constructed, and inspected, and has sufficient TMF with licensed operators on staff. VDH procedures compel prospective waterworks owners to plan for long-term financial sustainability.

3.2 Sanitary Survey Program / On-site Inspections

VDH staff perform on-site inspections of waterworks through the sanitary survey program. Inspections include thorough evaluations of the waterworks' infrastructure and water treatment processes, a review of drinking water quality monitoring records, and an examination of the operational practices and controls. VDH also reviews waterworks staff qualifications. Currently, staff complete sanitary surveys in paper format. However, VDH is finalizing an electronic sanitary survey platform to reduce survey reporting time, increase consistency, and allow for analysis of statewide sanitary survey data to reveal trends.

During a sanitary survey, if VDH staff identify "Significant Deficiencies," they develop "Corrective Action Plans" for these deficiencies. Significant Deficiencies are defects that cause or have the potential to cause an unacceptable risk to health or that could affect the reliable delivery of safe drinking water. Corrective Action Plans are designed to resolve Significant Deficiencies by a specific date.

VDH staff conduct special sanitary surveys of waterworks to evaluate new construction, investigate consumer complaints, and respond to specific requests for assistance. Staff also make site visits to perform source water assessments and to evaluate locations of proposed new wells. These visits provide VDH with opportunities for direct, face-to-face interaction with waterworks owners and operators, and allows guidance for TMF capacity improvement.

Through the sanitary survey program, staff identify waterworks' capacity needs, and prioritize and target waterworks for additional guidance and assistance. VDH staff document sanitary surveys through a written report that also serves as an action plan for waterworks owners to correct deficiencies and improve operations.

Figure 2 summarizes VDH field activities in the current and previous reporting periods, offering trends over time for the number of sanitary surveys and groundwater assessments.

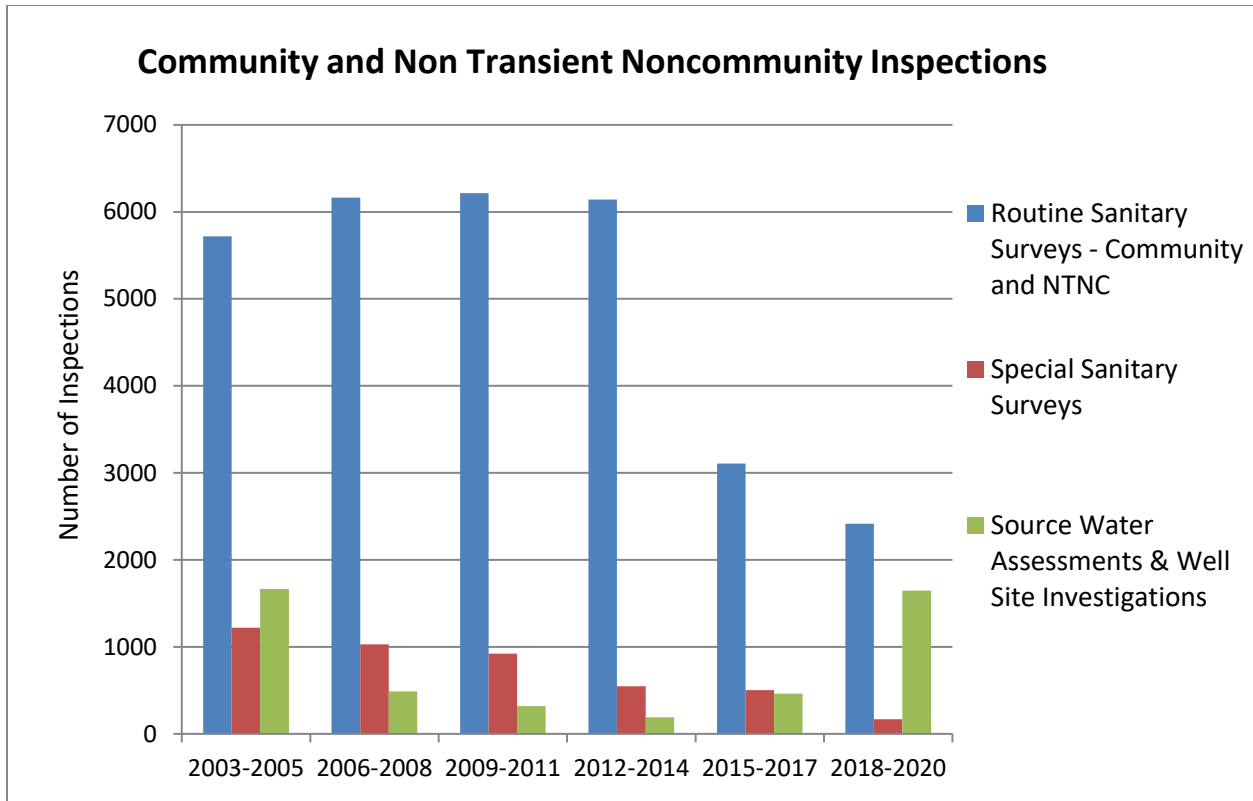


Figure 2: Community and Non-transient Noncommunity Inspections

During this reporting period, VDH staff performed 2,417 routine sanitary surveys at community and NTNC waterworks, 168 special sanitary surveys (including inspection of new construction, complaint investigations requiring field visits, and delivery of on-site assistance), and 70 well site inspections.

Source water assessments use GIS tools and other database records to identify sources of contamination and provide insights on protecting the water supply. Staff occasionally require field verification of sources of contamination with the permitting or sanitary survey processes.

The SDWA requires inspection of certain waterworks once every three years. In prior reporting periods, VDH conducted more routine and special sanitary inspections. Beginning in 2015, VDH modified its inspection frequency to align with the minimum inspection frequency established by the SDWA and the Waterworks Regulations. The adjustment allowed staff to onboard new, previously unregulated TNC waterworks. In other words, VDH now inspects more systems less frequently. This trend is likely to continue as laws and regulations expand to cover more contaminants and facilities. ODW did not receive additional full-time employees to handle the additional workload, which is one reason why inspection frequencies decreased over time. VDH now regulates hundreds more TNCs than prior to 2015. VDH also increased attention in source water assessments. The next section provides details on work with TNCs.

3.3 Transient Noncommunity Inspections

The Commonwealth of Virginia has 32 health districts and a local health department (LHD) in 109 counties and cities. The LHD issues permits for restaurants, food service facilities, campgrounds, hotels, migrant labor camps, and other businesses. The LHD forwards copies of permits for commercial establishments to the regional Office of Drinking Water. If a business meets the definition of a waterworks, then ODW will help the applicant with permitting and TMF. Hence, a business could have multiple permits from VDH, one for the food establishment, one for the hotel/motel, one for the sewage system, and another permit for the drinking water supply.

ODW works with the LHD to ensure all businesses have proper permits for drinking water. Many times the water quality and production is ancillary to the business. The business owner may treat the water supply as a lower-priority as compared to the primary business operation (e.g., serving food, manufacturing, etc.). TNCs in particular often lack TMF capacity. Compliance with the Virginia Waterworks Regulations can be challenging, which is why VDH created and hired a specific position in 2019 to focus on these waterworks. The noncommunity Sustainability Coordinator works directly with TNC owners and operators to enhance understanding of TMF responsibilities and requirements. Staff develops training and outreach materials, provides technical assistance on compliance with regulations, including sampling frequency, and evaluates policy and procedures to improve compliance and sustainability. VDH performed 1,440 sanitary surveys at TNC facilities during the reporting period.

3.4 Source Water Assessment and Source Water Protection

Beginning in April 2003, VDH started an EPA-required effort to perform source water assessment susceptibility rankings for all active public water supplies. EPA and VDH designed the assessments to reveal potential vulnerabilities from manmade sources of contamination. The assessments help with water supply planning, source water protection, and managerial capabilities. VDH performs assessments on new water supplies and records conditions found from field observations and sanitary surveys. During the reporting period, VDH completed 1,577 source water assessments. Source water assessments have increased substantially since the last reporting period by streamlining business processes and renewing the focus on this important work. Performance metrics track assessments completed and waterworks that need an assessment.

In July 2003, VDH created a Wellhead Protection Plan program for small community groundwater systems, which VDH continues to implement. VDH requires a qualified consultant to assist in plan development. The program helps waterworks with a high contamination susceptibility to develop a wellhead protection plan. Waterworks serving less than 50,000 persons receive technical support from a qualified contractor. The resulting protection plans ensure the participating waterworks safeguard drinking water sources by managing and controlling activities near the source, which could compromise water quality and quantity. Staff expanded the program from groundwater systems with 10,000 or less persons to waterworks that use surface water and serve less than 50,000 persons. Approximately 12 small waterworks prepare site-specific Source Water Protection Plans (SWPPs) each year. Program contractors contact an average of 30 waterworks to determine interest. In this reporting period, contractors made eight program presentations at local advisory committee meetings. To date, approximately 500 waterworks have received an offer of assistance.

During this reporting period, waterworks and their consultants completed 35 SWPPs, facilitated 13 local advisory committee meetings, drafted 11 more SWPPs (waiting on approval by the waterworks' management), and offered assistance to 375 waterworks.

3.5 On-site Assistance and Outreach to Operators and Owners

Owners and operators of small waterworks have difficulty finding the time and financial resources to attend formal classroom-style training events. VDH leadership encourages staff to provide in-field training during inspections and other in-person visits. Staff answer questions and provide guidance on regulations, technical topics, and best management practices. Staff handle technical assistance informally during sanitary surveys, telephone conversations, or by emails. Technical assistance represents a cornerstone of the ODW program and includes sharing information and expertise, answering questions, providing instruction or training, conveying working knowledge, and the transfer of technical data. Staff offer technical assistance during site visits, training, meetings, letters, telephone calls, emails and other communications. Effective relationships developed over time ensure community partners, customers, and the regulated community receive the most up-to-date information available.

Staff encourages and Virginia law requires in certain instances, a Waterworks Business Operations Plan (WBOP). Capacity Development staff meet with waterworks owners to evaluate, document, and codify processes and resources vital for sustainability. The WBOP is a useful roadmap for waterworks to follow. The WBOP serves as an educational tool for staff to provide one-on-one training on topics such as water rates, maintenance procedures, asset management, and capital improvement planning.

VDH continues to develop "Hip Pocket Tools" to increase individualized training to waterworks operators. Recognizing that society increasingly prefers digital content for ease of portability, use, and access, VDH has converted the Hip Pocket Tools into electronic format and posted these field guides on the VDH website. To support and encourage the use of Asset Management Plans (AMP), VDH posted specific content to the website that supports in-person and online AMP training. VDH staff can use this material during field visits and at other technical assistance meetings. The on-site training meets specific needs and can make significant improvements in TMF capacity. This tool and approach provides immediate on-site coaching. Additionally, owners and operators can access the information when they have time, and then follow up with questions if in-person coaching does not happen.

3.6 Assistance Contacts by VDH Staff

VDH staff interacts with waterworks owners and operators through a variety of informal contacts including meetings, telephone calls, and emails. Staff gives assistance that covers a full range of TMF capacity concerns. For instance, staff may help to address drinking water quality sampling needs, to follow-up on corrective measures described in a sanitary survey report, or to review and assist with the preparation of an annual Consumer Confidence Report. Staff inform waterworks operators of upcoming training opportunities or offer help with water treatment dosage calculations. Staff can advise owners of potential impacts from, or requirements of, pending state or federal regulations. During the reporting period, VDH staff received and responded to 31,560 technical assistance requests from waterworks owners and operators.

3.7 Vulnerability Assessments for Issuing Monitoring Waivers for Some Classes of Contaminants

Waterworks owners must collect water samples to test for regulated contaminants. For some man-made chemical contaminants, waterworks may forgo routine water quality monitoring when the drinking water source is located and constructed to eliminate susceptibility to the contaminants. The source water cannot be vulnerable to contamination because there is no use of the chemicals near the source. A waterworks owner may request a waiver from regulation of certain contaminants in these situations.

The waiver application process requires the waterworks owner to conduct a self-assessment of the source water's susceptibility and vulnerability to contamination. VDH screens the waterworks for conditions that may impair source water quality. The waiver process encourages TMF capacity by highlighting beneficial planning efforts that the owner can implement through programs, such as wellhead and surface water protection plans. VDH staff reviewed and assessed 2,665 applications for monitoring waivers from eligible waterworks during the reporting period.

3.8 Water Loss and Evaluation Assistance

VDH increased efforts to provide assistance to waterworks experiencing water loss and leakage in distribution systems. Staff requested water loss information from DWSRF applicants and planning grant applicants. Staff discusses water loss and unbilled water during sanitary surveys and when issuing operation reports. This effort has improved understanding about the number of waterworks experiencing significant water loss and the potential need for assistance to small waterworks.

During the reporting period, VDH partnered with Southeast Rural Community Assistance Project (SERCAP) through a set-aside suggestion for the purchase of leak detection equipment. SERCAP purchased the equipment from DWSRF set-aside funding for capacity development activities. SERCAP provided leak detection assistance to four waterworks, representing approximately 20 hours of direct in-field technical assistance. Once SERCAP locates a water line leak, the waterworks repairs the section of pipe to eliminate the water loss.

Since July 1, 2014, VDH and the Virginia Rural Water Association (VRWA) have coordinated leak detection technical assistance. VRWA staff includes "circuit riders," experienced and specifically trained staff who provide on-site assistance locating leaks in distribution systems using leak detection equipment. In February 2020, VRWA purchased leak detection equipment with DWSRF set-aside funding. VRWA increased leak detection services to waterworks during the reporting period. VDH referred water loss information collected during sanitary surveys and from funding applications to VRWA to improve prioritization of assistance to waterworks. During the reporting period, VRWA staff provided 70 individual water systems with leak detection assistance, which represents 1,047.75 person-hours of in-field leak detection efforts. Appendix 1 lists the systems assisted with leak detection and Appendix 2 details success stories related to leak detection.

3.9 Asset Management Planning

Asset management planning is an important part of long-term prioritization of the maintenance, repair, improvement, and sustainability of waterworks. This is reflected in America's Water Infrastructure Act of 2018 (AWIA) Section 2012, which amends the SDWA to require Virginia to

amend its Capacity Development Strategy. The revised Strategy must describe how Virginia will encourage the development and use of Asset Management Plans (AMPs). VDH staff revised the Strategy based on feedback received from EPA in August 2020. Staff will submit the revised Strategy before the end of the year.

VDH began to formalize a process to use AMPs in Virginia prior to the enactment of AWIA. VDH and participating organizations trained technical service providers' staff on AMPs and encouraged their use as a sustainability tool. VDH provides funding mechanisms for waterworks to develop AMPs that include the five core components: (1) Asset Inventory, (2) Life Cycle Costs, (3) Level of Service, (4) Criticality and (5) Long-term Funding. VDH can fund AMPs through the Planning and Design Fund Program, the Small Project Engineering Program, and as an additional engineering cost associated with a DWSRF-funded construction project. VDH requires an AMP as part of a DWSRF project when a waterworks does not already have a current plan or has not updated it within the last 5 years. To encourage asset management planning, VDH will make available the lesser of the actual cost of an AMP or \$15,000 as principal forgiveness when requested as part of a construction funding offer.

VDH partnered with SERCAP and Draper-Aden and Associates to train VDH, SERCAP, and VRWA staff on effective methods for training waterworks staff on AMPs. This train-the-trainer effort forms the backbone of the asset management collaborative effort in Virginia. VDH staff trains waterworks staff on AMPs, but also refers water utilities to technical assistance partners when completing AMPs. VDH is continuing to provide in-person and virtual training to waterworks owners and operators on this important tool to enhance TMF capacity and move towards waterworks sustainability.

4.0 Managerial Capacity

Managerial capacity is a waterworks' planning, organization, and ability to achieve compliance with applicable laws and regulations. This capacity is where an organization must make the decisions that affect technical and financial capacities. A strong managerial capacity will achieve results even when the other capacities may not be as robust.

4.1 Data Collection and Analysis

VDH maintains and uses the Safe Drinking Water Information System (SDWIS), which is an extensive electronic inventory of waterworks facilities, personnel, sampling data, and compliance status. SDWIS is the primary vehicle by which VDH reports required information to EPA. A SDWIS interface called "Data Reports and Retrieval" is the principal repository of data that VDH uses to manage contacts with waterworks, inspection schedules, and compliance sampling schedules. Staff uses associated electronic tracking tools for application and plan review activities. Use of these electronic tools facilitates interaction with waterworks and provides a quick way to assess many elements related to waterworks TMF capabilities. VDH is currently replacing legacy, interface applications that work with SDWIS through a private vendor.

EPA requires VDH to conduct a triennial capacity assessment. Since July 2001, VDH has used an electronic tool to complete a capacity baseline assessment of all community and NTNC waterworks. The scoring system accounts for compliance status, infrastructure condition, managerial and financial indicators, and preparedness to comply with regulations. The higher the

score, the better the result. Staff conducts this “triennial capacity assessment” once every three years.

During the reporting period, VDH conducted a required triennial assessment. In early 2020, VDH assessed all community and NTNC waterworks in Virginia. The assessment consisted of 18 “yes” or “no” questions. The questions related to the three TMF capacities. VDH staff used official records to answer questions and directly contacted waterworks for additional information as needed. Staff compared results of this assessment to the baseline assessment conducted in 2016. Technical questions explored whether the waterworks had sufficient operator coverage for sick leave and vacation as well as asking whether the facility addressed recommendations from recent sanitary surveys. Managerial questions included asking whether the waterworks facilities and appurtenances were in good operating condition and whether the waterworks met all established National Drinking Water Standards. Financial questions included asking whether the waterworks had at least 45 days cash on-hand to cover expenses and whether the waterworks had adjusted rates in the past three years. If staff were unable to get a response to a particular question, then staff answered that question “No” per the process instructions. Appendix 2 has the complete list of questions asked during the triennial assessment.

Staff evaluated 1,597 systems, 1,093 were community waterworks and 504 were NTNC waterworks. The maximum score possible was 18 and waterworks scoring 10 or lower tend to demonstrate substantial TMF capacity and operational challenges. Overall, the average score of all waterworks surveyed was 14. The average score of all community waterworks was slightly higher at 15 and the average score of all non-transient noncommunity waterworks was lower at 13. Waterworks in Virginia perform well with smaller systems scoring lower than the large community waterworks. Further analysis of the data provides additional insights and areas needing attention.

Composite data in Figures 3 and 4 show a change from the 2016 baseline assessment. The current data indicates a general improvement, with more waterworks scoring higher overall. In the 2016 data there was a peak centered around 11 points. In 2020, this peak no longer exists and scores trend upward. The data no longer indicates a distinct peak at 16 points, but rather a less pronounced peak at 17 points. These upward trends in the data indicate an increase in overall TMF capacity at waterworks and a positive impact from capacity-building measures VDH implemented through the Strategy in the past three years.

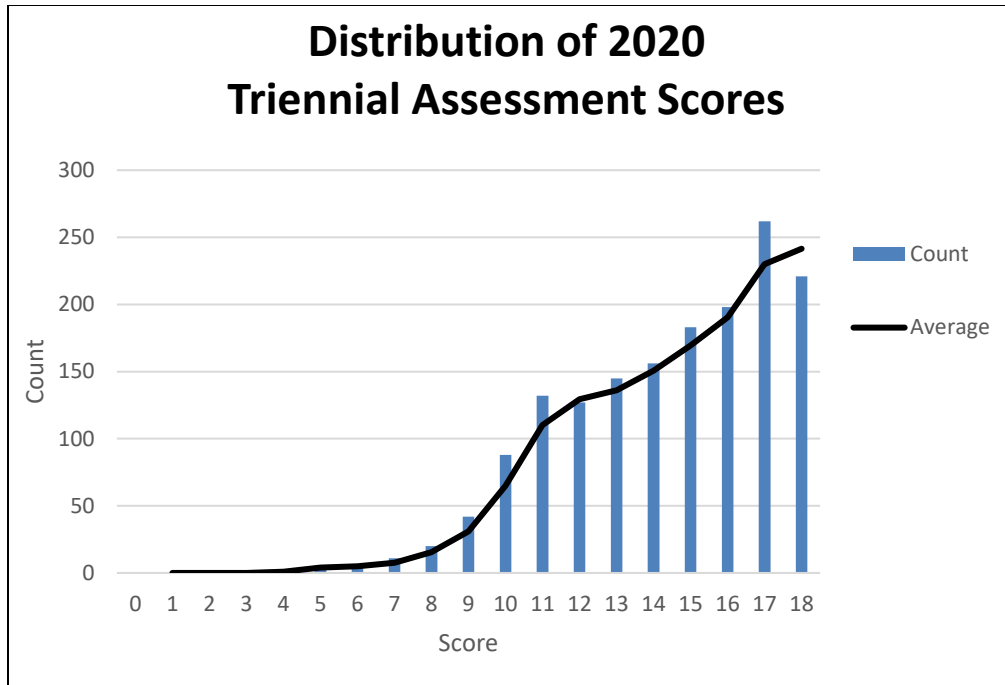


Figure 3: Distribution of 2020 Triennial Assessment Scores (Community and NTNC)

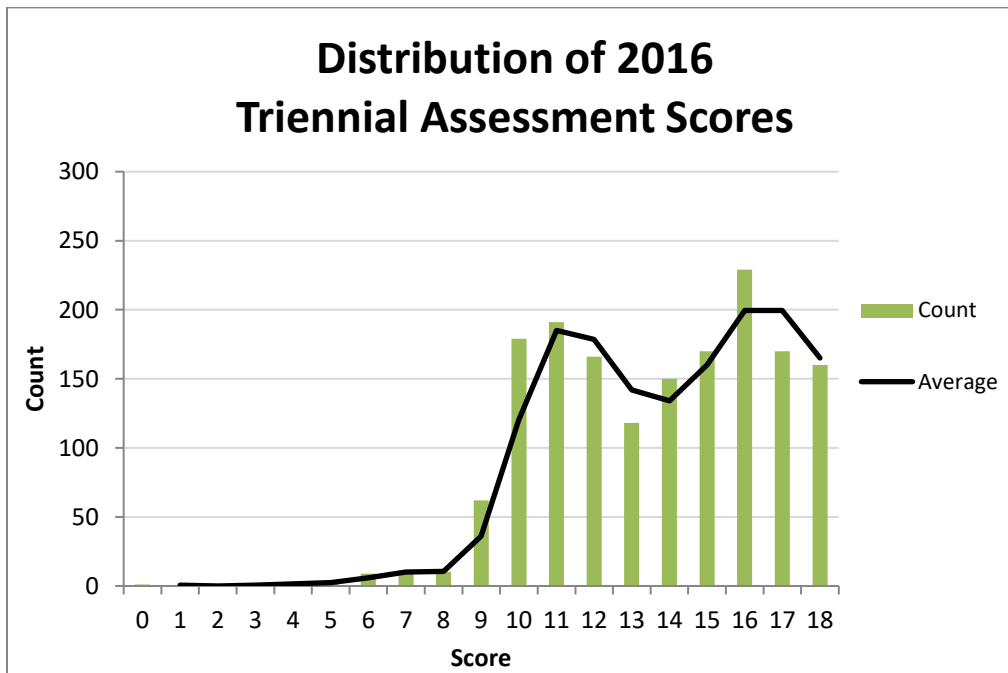


Figure 4: Distribution of 2016 Triennial Assessment Scores (Community and NTNC)

The 2020 data reveals that 14% of waterworks scored the maximum 18 points. This demonstrates an improvement from 10% of waterworks achieving a score of 18 during the baseline triennial assessment. The lowest score reported in 2020 was 4 points; two waterworks fell into this lowest bin and both are located in southeast Virginia. In the 2016 assessment, one waterworks scored a

zero, with four waterworks scoring four or less. This indicates improvement on the lower end of the spectrum.

Further review of both the 2016 and 2020 data shows other trends. Most notably, waterworks in southeast Virginia, roughly bounded by Rt. 29 to the west and I-64 to the north, and generally encompassing “Southside Virginia” tend to have lower TMF capacity scores than those in other geographic areas of the state. In 2016, 63% of waterworks that scored less than 10 were located in the territories covered by the Danville, Richmond, and Southeast Virginia Field Offices. In 2020, that percentage increased to 80%. This would indicate that the areas in the northern and western portions of the Commonwealth are improving in TMF capacity. Conversely, the central and southern areas of the state continue to struggle with TMF capacity.

VDH will prioritize training, funding workshops, technical assistance, and financial resources in south-central Virginia to address this trend. Planning district commissions in southwest Virginia have helped waterworks apply for DWSRF funding. These organizations have resources and expertise that benefit their member communities. Staff will contact Planning District Commissions (PDCs) in the south-central part of the Commonwealth to increase funding opportunity awareness. During the reporting period, staff collaborated with PDCs to hold funding workshops with multiple drinking water funding partners.

A review of statewide responses for the triennial assessment provides other insights. The following questions generated the lowest scores, with less than 50% of all waterworks meeting the criteria (Figure 5):

- Question 5: Does the waterworks have a written policy for responding to customer complaints? (45%)
- Question 17: Has the waterworks adjusted rates in the past three years? (48%)
- Question 18: Does the waterworks have an Asset Management Plan? (49%)

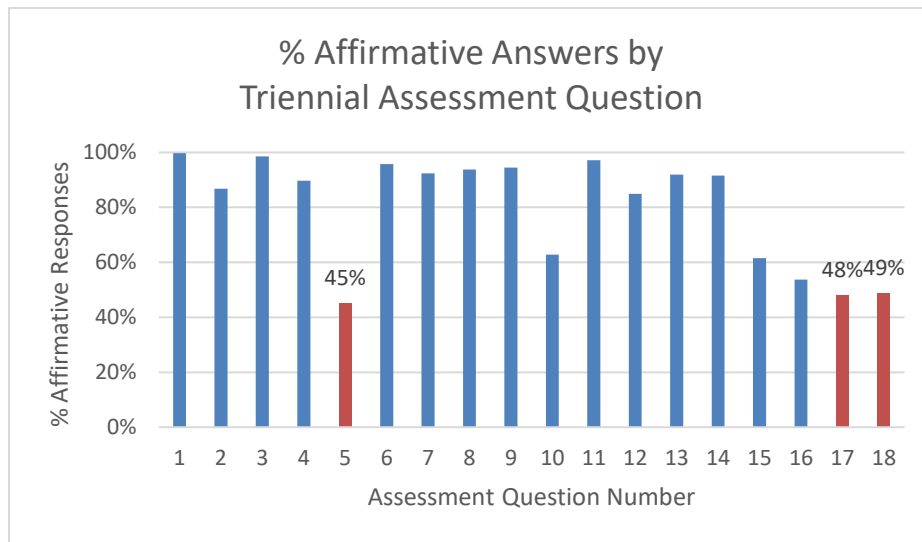


Figure 5: Percentage Affirmative Answers by Triennial Assessment Question

These three questions provide guidance on where VDH can focus programmatic attention. VDH has focused training on AMPs and rate adjustments as the model for waterworks' financial sustainability. Customer service at waterworks is an opportunity area. Waterworks with clear customer service policies and practices enhance customer experience and trust, which help the waterworks support needed improvements with rate and policy adjustments.

Small waterworks can benefit from improved customer service. A written customer service plan codifies actions that ensure a similar response to each customer. Although statewide trends may appear positive, VDH will provide system-by-system help to address specific challenges, no matter the size of the waterworks, its location, or its financial condition.

4.2 Compliance and Enforcement Program

VDH routinely reviews water quality data submitted by waterworks, and issues Notices of Alleged Violation (NOAVs) for sample results that do not appear to meet the Virginia Waterworks Regulations. VDH may also issue NOAVs for the failure to monitor and report water quality results, the failure to employ licensed operators, recordkeeping violations, and other conditions that deviate from the regulatory requirements. The SDWA, the National Primary Drinking Water Regulations, and the Virginia Waterworks Regulations establish standards. During the reporting period, VDH issued approximately 4,943 NOAVs to waterworks; approximately 3,602, or 73%, of those were for monitoring violations, typically associated with a waterworks' failure to collect and analyze required water quality samples. Staff enter violations into the SDWIS database where the system tracks and can generate reports.

VDH uses EPA's Enforcement Response Policy and its associated Enforcement Targeting Tool (ETT) to identify waterworks with violations of significant noncompliance. VDH focuses on waterworks with health-based violations and those that show a history of violations across multiple rules. EPA compiles data for the ETT quarterly from the NOAVs that VDH issues and records in SDWIS.

The enforcement targeting formula in the ETT identifies waterworks with the highest total noncompliance across all rules, within a designated time. The ETT formula places a higher weight on health-based violations, including treatment technique and maximum contaminant level violations. The formula calculates a score for each waterworks based on unresolved violations and violations that have occurred over the past five years. Scores do not include violations that have returned to compliance or are on a "path to compliance" through a specified enforceable action. VDH uses the quarterly ETT report to prioritize staff assistance to waterworks with numerous or serious compliance issues. The ETT can also help identify waterworks that are in danger of becoming priority systems.

EPA generates the ETT quarterly report based on SDWIS/State data. EPA considers waterworks with ETT scores greater than 10 a "serious violator;" waterworks with ETT scores of 5-10 are considered "potential serious violators;" and the approach to waterworks with an ETT score less than five is discretionary. Figure 6 shows the number of systems with an ETT score greater than 10 for each quarter of the July 1, 2017 through June 30, 2019 reporting periods, which represents less than 1.0% of all waterworks in the Commonwealth.

In 2019, VDH implemented several new policies and procedures that contributed to the steep decline in serious violators during the first quarter 2020 reporting period. VDH moved away from a centralized approach of enforcement actions to a more decentralized approach that enabled field offices to return waterworks to compliance expeditiously. Field offices, each with one Compliance Specialist, began to take the lead on formal enforcement actions, such as issuing consent orders and monitoring cases for compliance. The Compliance Specialists work closely with central office for legal advice, enforcement strategy, fairness, and consistency. The central office hired a Compliance Coordinator to provide real-time compliance information to the field offices, evaluate enforcement priorities, as well as ensure consistent enforcement approach and collaborative strategies with various assistance programs. VDH is revising its Enforcement Manual to reflect the new approach.

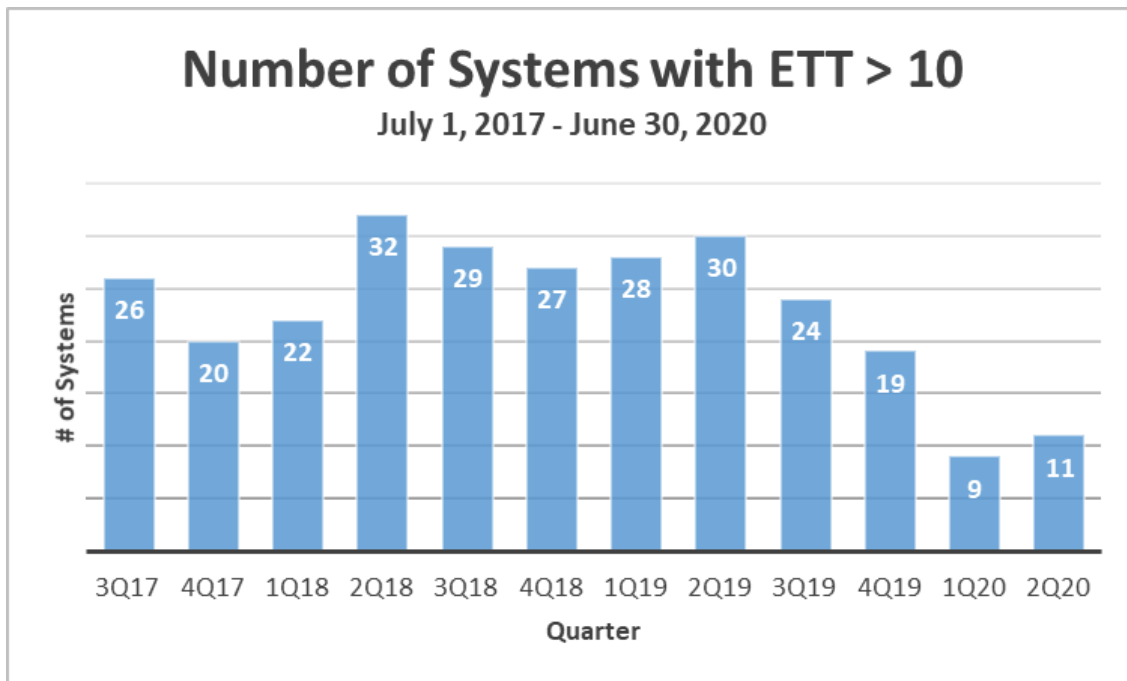


Figure 6: Number of Systems with ETT>10, July 1, 2017 - June 30, 2020

VDH also uses the ETT as a guide for the issuance of warning letters to encourage waterworks owners to take actions necessary to return to compliance. Warning letters summarize the waterworks' violations, corrective action deadlines, and consequences for failure to act. VDH issued 190 warning letters to noncompliant waterworks during the July 1, 2017 - June 30, 2020 reporting period.

The ETT helps direct staff actions to encourage and require compliance with applicable laws and regulations. VDH uses administrative consent orders and special orders to enforce requirements. The State Health Commissioner has authority to issue binding, bilateral consent orders and unilateral special orders to waterworks owners who have violated the Virginia Waterworks Regulations. As required by Virginia law, VDH conducts hearings to provide parties due process before issuing adverse decisions that could result in a unilateral special order. Both orders set timelines to compel corrective measures. During the reporting period, the Health Commissioner

issued 15 orders to bring waterworks into compliance and eight waterworks satisfied the terms of the consent orders, concluding the enforcement action.

VDH's enforcement approach is highly focused on identifying solutions to the underlying causes of waterworks' noncompliance with state and federal drinking water regulations. VDH uses various tools to direct attention and provide guidance to waterworks owners on ways to correct deficits in TMF capabilities. For instance, during an administrative enforcement hearing, staff may determine that inadequate revenues are the ultimate cause of the waterworks' chronic monitoring failures. Staff may ask the waterworks to submit a WBOP as a budgeting tool or give assistance with rate setting to address the lack of financial capacity.

Noncompliance with the regulations reflects on the effectiveness of the Capacity Development Strategy. Tracking and addressing compliance failures help staff learn what activities, grant awards, and metrics are the most effective. Staff must continue to improve and develop methods to assist priority waterworks on the ETT. Staff are developing metrics to assess the Capacity Development Strategy.

4.3 Waterworks Classification and Operator Licensure

The Virginia Waterworks Regulations classify waterworks from Class 6 to Class 1 based on the population served, source, and operational complexity. Regulations require each community and NTNC waterworks to have a licensed operator of equal or higher classification as their waterworks. This person can be a member of staff or otherwise contracted. In June 2020, a licensed operator is required at 1,598 community and NTNC systems. VDH encourages small waterworks with TMF capacity deficiencies to connect to a larger municipal water distribution system or service authority when possible.

As of January 1, 2017, the Virginia Department of Professional and Occupational Regulation (DPOR) adopted the Association of Boards of Certification (ABC) national examination requirements. DPOR regulates licensure of waterworks operators in the Commonwealth. Operators must have applicable experience and education. DPOR requirements include passing an examination of the minimum required knowledge, skills, and abilities to receive a license. Requirements limit experience credits to the operation and maintenance of water distribution systems, laboratory work, and treatment plant maintenance. Minimum experience requirements depend on the operator classification: less experience is required for Class 6 compared to Class 1. The minimum educational requirement for a Virginia operator's license is a high school diploma or General Educational Development certificate. Candidates without a high school diploma may get a license by substituting more operator-in-training experience for education.

During the reporting period, the number of licensed waterworks operators increased from 2,116 to 2,201, an increase of 85 licensed operators. Staff attribute this increase to operators taking advantage of learning opportunities and the upward trends of licensure testing pass rates. VDH offers low cost education solutions to increase operators' knowledge, skills and abilities. This training and education also increases the number of licensed operators available for hire.

4.4 Emergency Preparedness

Virginia is vulnerable to many hazards. Waterworks owners must prepare for, respond to, and recover from tornados, hurricanes, winter storms, earthquakes, floods, terrorism, vandalism, and other natural and man-made hazards. VDH provides a variety of all-hazards training, exercises, and planning tools to assist with waterworks preparedness. VDH assists waterworks during incidents and emergencies by serving as the lead agency of Emergency Support Function 3 at the Virginia Emergency Operations Center. VDH staff also provides technical assistance during the recovery stages of incidents and emergencies.

VDH staff prepares waterworks owners for hurricanes and winter weather by offering preparedness materials to community waterworks during the Governor's proclamation of Winter Preparedness Week and at the beginning of hurricane season (June 1 – November 30). Preparedness materials are also available on the VDH website and include information for the issuance of boil water advisories, VDH after-hours emergency contact information, pre-incident preparedness planning, incident response planning, well disinfection procedures, information for generators, and backup power needs. VDH provides contact information for other organizations and agencies that assist with incident planning and response, such as the Virginia Water/Wastewater Agency Response Network.

Extended power outages resulting from hurricanes, severe weather and winter storms can pose technical and financial challenges. The Virginia Waterworks Regulations require that waterworks have an Emergency Management Plan (EMP) for extended power outages. About 35% of community waterworks have emergency power available for the entire waterworks. The drinking water industry and VDH need to improve outreach and training to achieve sustainable and resilient practices.

In 2018, VDH participated in the National Level Exercise hosted by Federal Emergency Management Agency (FEMA). This exercise included a water sector-specific tabletop component, as well as a functional exercise with participation from 43 counties, state government, and federal government. The exercise included a joint exercise at the Lee Hall water treatment plant in Newport News. In 2019, VDH held a Harmful Algal Bloom (HAB) tabletop exercise based on a HAB scenario at the Flannagan Reservoir, which is at high risk of HABs. Participants included the Cumberland Plateau Health District, the Department of Environmental Quality, and the Flannagan Water Authority. VDH partnered with the Department of Environmental Quality in 2019 to provide an "Emergency Planning & Community Right-to-Know Act" presentation for the Virginia Hazardous Materials Conference. This presentation explained the new reporting requirements enacted from AWIA.

4.5 Continuing Professional Education

VDH facilitates development of TMF competencies for waterworks staff through on-going training. The curricula for these programs include technical topics such as equipment operation and maintenance, drinking water chemistry and microbiology, water treatment technologies, and operator math. Sessions address managerial aspects of waterworks operation through instruction and training on the Virginia Waterworks Regulations, capacity development, financial planning, asset management, waterworks administration, and waterworks security.

The Water Operators Short School is the preeminent water and wastewater operator training in Virginia. VDH actively participates in the Short School by volunteering as course instructors. This annual training at Virginia Tech is a weeklong course held annually since the 1940s. Historically, there have been three levels to the course: introductory, intermediate, and advanced. Each level provides approximately 15 classes and focuses on a variety of waterworks operations topics. The curricula for the intermediate and advanced courses build on the preceding year's course. Starting in August 2018, Virginia Tech offered an additional level, "Year 4," for supervisors or operators looking to move into management. The Year 4 sessions include asset management, communications, human resources, as well as new technologies. In 2020, Virginia Tech moved the course online to allow students to participate during the COVID-19 pandemic. Virginia Tech held the Short School online from July 27 to August 1, 2020; 96 people attended it.

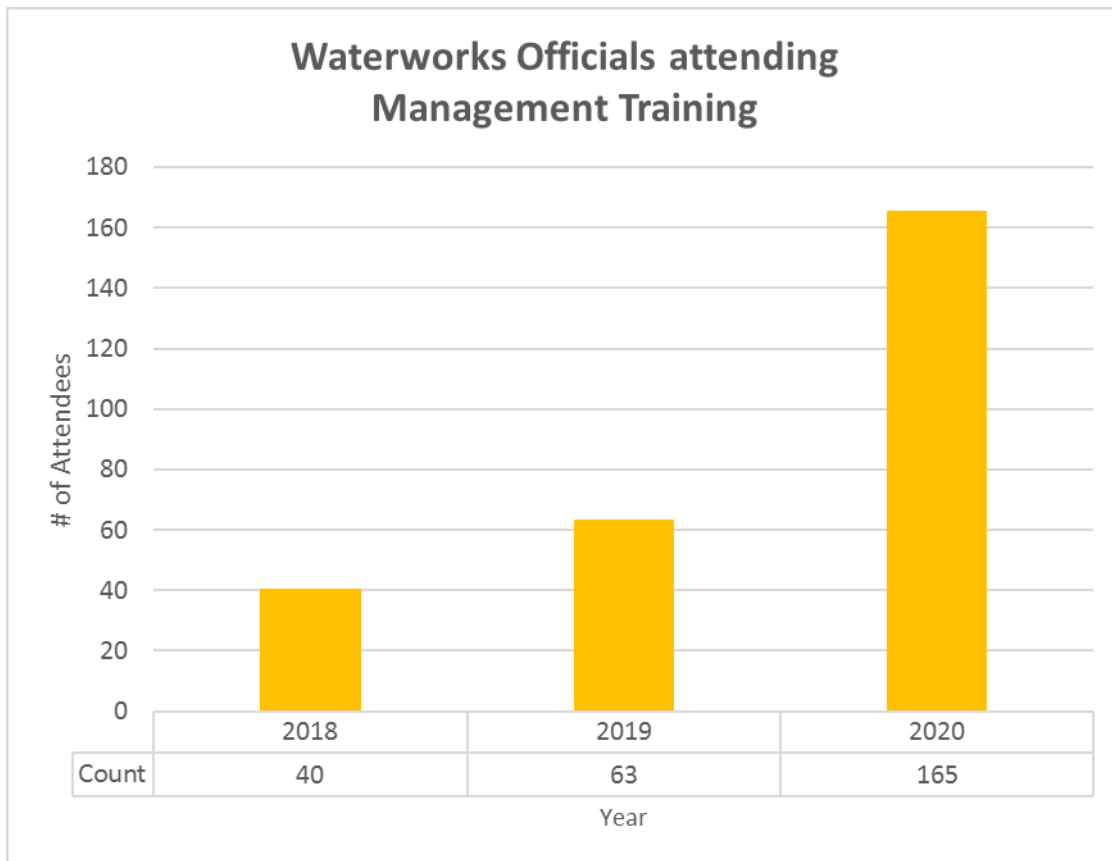


Figure 7: Waterworks Officials Attending Management Training

Figure 7 shows the number of waterworks "decision-makers" that have attended VDH-sponsored management training. VDH offers several additional training courses. Virginia Tech, Mountain Empire Community College, and other service providers hold these courses through contracts with VDH. Course offerings vary yearly; however, VDH ensures a core of training courses to develop employees and the waterworks' TMF capacity. Owners and operators find course offerings on the VDH website.

The COVID-19 pandemic created many challenges for in-person training. VDH cancelled all in-person courses on March 13, 2020 because of health risks. VDH and Virginia Tech transitioned some courses to webinar-based courses. Course attendees gave favorable feedback for these webinars. DPOR offered extensions for renewal and testing for licensure. VDH will return to in-person instruction when deemed safe. VDH will modify and offer online training either as pre-recorded modules or as instructor-led online courses going forward while the risks remain high.

4.6 Waterworks Advisory Committee

The SDWA requires states to identify persons with interest or involvement in the creation and execution of a capacity development strategy. VDH consults with the Waterworks Advisory Committee (WAC), which represents a diverse group of waterworks stakeholders throughout the Commonwealth. The WAC committee gives stakeholders and the public opportunities to address VDH policies and procedures, including training and capacity development. Staff consults with the WAC at least quarterly. From 2018 through 2019, the WAC met more frequently to revise the Waterworks Regulations. VDH expects final regulations to take effect in 2021. The WAC and VDH staff met 13 times during the reporting period.

5.0 Financial Capacity

Financial capacity reflects the waterworks' ability to balance revenues and expenditures, have acceptable loan ratios, and maintain overall healthy financial data. To secure loans and grants through the DWSRF and other lending agencies, waterworks must demonstrate financial capacity.

5.1 Drinking Water State Revolving Fund (DWSRF)

The DWSRF program provides financial aid through loans, principle forgiveness, and grants. This funding helps waterworks in need of infrastructure improvement, which can help with reliability, maintenance, and operational costs. VDH staff assesses qualifying applicants to determine whether the waterworks has TMF capacity before loan closing. If a waterworks does not have sufficient TMF capacity, then VDH, through its financial partner Virginia Resources Authority, sets requirements for waterworks restructuring as part of the funding process. Requirements may include; a WBOP, an AMP, waterworks rate increases, the completion of annual audits, or the completion of compliance plans and programs. During the reporting period, the DWSRF entered into binding commitments on low-interest or interest-free construction loans totaling \$58,338,275 to 77 waterworks.

The DWSRF program funded important water infrastructure projects and guided those projects to completion during the reporting period. Since the 2017 Report on the Efficacy of the Capacity Development Strategy, staff incorporated several new objectives into the DWSRF program. The program now includes requirements and commitments to evaluate and adjust rates for applicants to receive principal forgiveness loans. This change furthers TMF capacity development at waterworks receiving DWSRF funding and applies to any waterworks whose water use rates appear below the target rate of 1.0% of median household income for the service area.

VDH initiated a rebate program to promote lead service line replacements. Lead is a neuro-toxin and there is no safe level of lead in drinking water. Removing lead services lines is an important measure to reduce health risks from lead. Waterworks are eligible for principal forgiveness loans with reimbursement to a maximum of \$5,000 per lead service line replaced and a maximum of

\$500,000 per year for individual waterworks. Since the last report, the program funded eight projects across four different localities and two projects are complete and closed. Of the \$3,690,000 awarded, the program disbursed \$1,065,600, and VDH received a new application requesting \$500,000 in FY 2021. The current and expected results of this lead service line replacement funding are:

- Richmond - 146 line replacements completed in Phase I, 200 anticipated in Phase II
- Alexandria - 10 recorded addresses completed in Phase I, 50 anticipated in Phase II
- Henry County Fieldale Phase I - 54 lead goosenecks, 16 galvanized service lines, 4 fire hydrants, and 2 air release valves replaced in Phase I. Phase I also included construction and replacement of lines on the public side.
- Henry County Fieldale Phase II - project estimates 34 +/- homes, 10 addresses identified.
- Henry County Fieldale Phase III - project application estimates 23 +/- homes
- Chesapeake - anticipates approximately 100 homes according to their application

The DWSRF revised the program to allow waterworks to complete and submit Preliminary Engineering Reports (PERs) for cost reimbursement to facilitate design build/public private partnership projects and accelerate the application process. Previously, applicants submitted PERs (or a waiver by VDH) with the DWSRF application.

Since January 2019, VDH requires completion of an Asset Management Plan as part of a funded project, if the waterworks does not have one. An update is required if the current AMP is older than 5 years. AMPs help waterworks plan and respond to aging infrastructure conditions and replacement needs. To encourage asset planning and replacement, VDH will reimburse the actual cost of an AMP or \$15,000 as principal forgiveness, whichever is less.

As a condition of funding, VDH may require rate changes, including annual rate increases to build long-term financial sustainability at the waterworks. To build waterworks financial capacity, VDH intends to offer reduced interest rates (up to 25 basis points or 0.25%) for recipients that commit to compound annual rate increases of at least 2% a year for five years, provided the additional funds are for the sole use of the waterworks. VDH now offers reduced interest rates of up to 25 basis points or 0.25% for recipients that can close loans within 12 months of the standard award date, to promote readiness to proceed and timely use of funds.

5.2 Planning and Design Grant Assistance

VDH awards Planning and Design funds to small, financially challenged, community and not for profit NTNC waterworks. This grant helps waterworks that would not have the financial ability to evaluate drinking water problems, identify solution alternatives, and make recommendations for correction. Eligible projects may include preliminary engineering planning, design of plans and specifications, source water quality and quantity studies, drilling, and installation of test wells to determine source feasibility, or other similar technical assistance projects.

Recipients may use funds to address distribution system leakage and water loss. These types of projects often include surveying and mapping of the distribution system (to include type of pipe material and estimated age), water audits to estimate loss from leakage, identification of suspected leak locations, training with leak detection equipment, and review of previous detection work. The resulting report typically recommends waterline replacement priorities and schedules, leak

detection and repair plans, water audit recommendations, and meter maintenance activities. These efforts improve resiliency and sustainability.

VDH increases awareness of grant opportunities available through the planning and design fund program by posting information on its website and in the Virginia Register. The Sustainability Coordinators make direct contact to waterworks about these opportunities. Staff remind waterworks owners of the program, answer questions, and provide information and resources for applicants. The program accepts grant applications year-round and reviews them for acute, chronic, and public health points. Staff reviews applications that do not have acute, chronic or public health needs in September every year.

During the reporting period, the maximum grant award was \$35,000 per project and VDH committed \$900,750 to fund 25 waterworks planning and design projects. This activity helps support TMF capacity. Waterworks benefit from the new or renovated infrastructure built from the planning activities.

5.3 Waterworks Business Operations Plan (WBOP)

VDH requires the completion of a WBOP as a financial evaluation tool before issuing an operation permit. The WBOP relates to proposed new waterworks, existing waterworks under new ownership, or waterworks with significant non-compliance. The DWSRF program may require a WBOP to correct ongoing enforcement actions. In the previous reporting period, VDH updated the WBOP documents to be more user-friendly and provided training on the revised documents. Tracking VDH acceptance of WBOPs needs improvement. Staff incorporated instructions into the Permit Manual and the SDWIS Manual, which increase the tracking consistency of WBOPs.

Waterworks gain valuable insights into strengthening TMF capacities from creating and implementing WBOPs. The planning process helps establish effective budgets, appropriate service rates, and financial reserves for long-term sustainability. Plans must include an inventory of infrastructure assets, anticipated operational and maintenance expenses, monitoring costs, and revenue sources. During the reporting period, VDH accepted 225 WBOPs as complete.

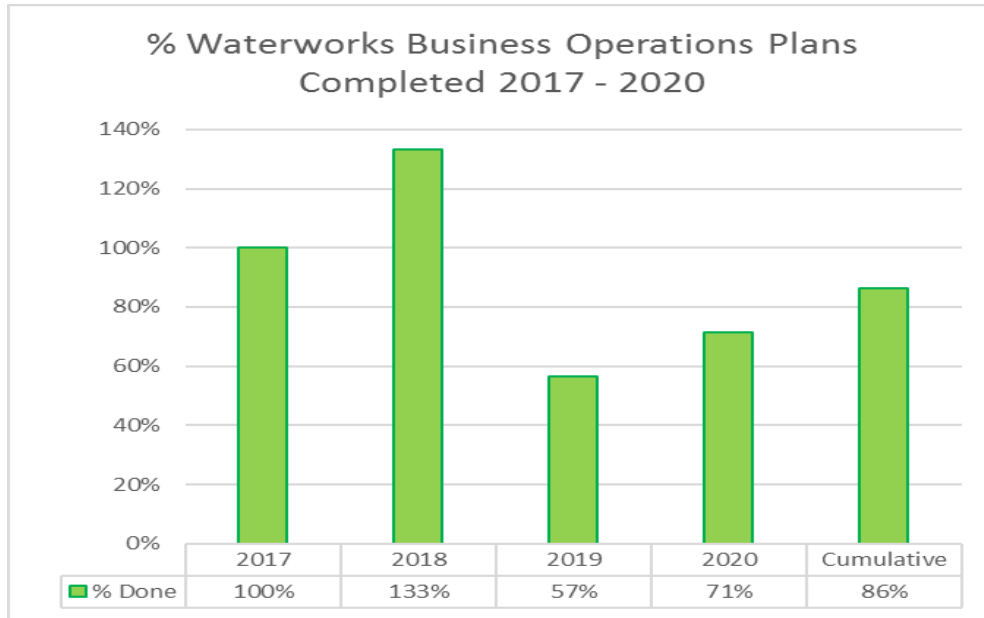


Figure 8: Percentage of Community and NTNC WBOPs Completed

Figure 8 depicts the progress of completed WBOPs based on the year in which VDH accepted each WBOP as complete. In 2018, VDH addressed both current and backlog WBOPs that resulted in a completed percent greater than 100%. The actual number of WBOPs processed each year fluctuates depending on the number of DWSRF-required and Field Office-required WBOPs added to the program during any given year.

5.4 Small Projects Engineering Program

The Small Projects Engineering (SPE) program, started in 2014, is an internal-referral program that VDH uses to provide engineering assistance to small community and non-profit NTNC waterworks. Waterworks who seek this help typically do not have the staff to apply for funding programs. VDH procures services from three engineering firms to provide this assistance. Each engineering firm serves a dedicated geographic area. Whitman, Requardt & Associates, LLC provides engineering services to the eastern part of Virginia, Hurt and Proffitt serves central Virginia, and Thompson & Litton, Inc. serves southwest Virginia. Typical projects include engineering drawings for small chlorination systems, evaluation of remedial options for lead and copper, and AMPs. During the reporting period, these three firms assisted seventeen waterworks with engineering services, totaling approximately \$217,000.00.

6.0 Efficacy of Virginia's Waterworks Capacity Development Strategy

The Capacity Development Strategy focuses on TMF components to improve a waterworks' ability to reliably produce and deliver safe drinking water to consumers. VDH's focus on TMF capacity maximizes the Strategy's potential. VDH enforces rules and regulations and provides technical assistance to improve performance and sustainability of waterworks.

Small waterworks must develop and improve TMF capacity for long-term viability. The complexity and number of federal drinking water regulations is increasing over time. VDH must implement, monitor, and enforce these changes. Staff must provide technical assistance, track

routine sanitary surveys, and evaluate the capability of waterworks to ensure compliance with state and federal drinking water standards. The Strategy helps VDH provide assistance to waterworks who are responsible for providing safe drinking water to people of the Commonwealth of Virginia.

State grant matching funds pay a 20% match to the Capitalization Grant that supports the services described in this report. Technical assistance fees from the regulated community pay less than 25% of salary and benefits for staff positions that offer technical assistance. EPA's Capitalization Grant through the capacity development and source water set-aside pays for staff dedicated to capacity development, training, and security. Dedicating more state funding to programmatic initiatives would benefit struggling waterworks.

7.0 Success Stories

VDH provides the following success stories to highlight the types of projects and the impact that the Strategy had for specific waterworks, communities, and people in the Commonwealth of Virginia who receive and use water from a waterworks.

Since the beginning of the reporting period, VDH added one position to the Capacity Development team and converted an existing position to a supervisory role. The new position focuses on assistance to TNC waterworks. The supervisor focuses on Strategy implementation and team leadership. Five full-time and one part-time staff actively support the Capacity Development Strategy for the reporting period. During the reporting period, staff accomplished the following:

- Published seven articles in industry periodicals;
- Produced Consumer Confidence Report Hip Pocket Tool for waterworks;
- Developed and deployed an "Asset Management for your Waterworks" workshop for small waterworks, collaborating with SERCAP, VRWA, and Draper Aden and Associates;
- Initiated and/or coordinated several training events for waterworks;
- Advanced the use of an Auto-dialer system to remind waterworks to collect samples, thus reducing monitoring violations;
- Made numerous marketing efforts to increase the number of waterworks personnel attending training events;
- Collaborated with United States Department of Agriculture-Rural Development (USDA-RD) and planning district commissions on funding workshops for water and wastewater utilities; and,
- Worked with many utility boards to provide regulatory insight, discuss technical issues, and offer suggestions for funding options.

A selection of some projects where VDH staff helped waterworks are included below. Although not comprehensive, the summaries reflect the type of assistance staff provides through the Capacity Development Strategy.

The Tauxemont Community Association owns a water system in Fairfax County that serves 114 connections and approximately 250 people from three wells to a looped network of distribution mains. The system began operations in the 1940s. In September 2015, contractors drilled a replacement well for the system. After the drilling contractor completed the new well, the engineering firm never finalized plans and specifications for it. In September 2018, VDH matched

Tauxemont with an engineering firm through the VDH Small Project Engineering program to develop as-built schematic drawings, record components of the pumping system, and provide hydraulic calculations. In January 2019, VDH approved the as-built plans and specifications and Tauxemont began using the well to support its community. The well is vital for the sustainable operation of the waterworks.

Capacity Development staff helped the Town of Richlands (population 4,564) in Tazewell County complete an AMP. With the assistance of a contract engineer funded through the SPE program, the Town completed an AMP that identified infrastructure in poor condition, which was critical to their operations. The Town prioritized the replacement of this infrastructure in a phased approach and paid project costs from revenue generated from water service billings. The Town plans to implement a small rate increase to offset the cost of the remaining projects.

Staff assisted the Town of Bluefield in Tazewell County to complete an AMP using the SPE contract engineer. The Town serves a population of 5,811 persons. Town officials prioritized future capital projects into several phases. The Town also received DWSRF construction funding to complete first two project phases. Construction is underway for these projects now. The Town will request additional DWSRF funding in the future to complete projects identified by the AMP. As part of the current funding offer, VDH required the Town to complete a WBOP. The Town identified gaps in their operations from the WBOP. VDH will help produce Standard Operating Procedures (SOPs) for the water treatment plant and distribution system. The Town also plans to build financial reserves for the waterworks separate other Town reserve funds.

The Town of Port Royal, with a population of 327, is located in rural Caroline County, Virginia. In 2014, representatives from the Town began seeking funds for several improvements to comply with the Waterworks Regulations and eliminate significant deficiencies. The Town's waterworks pumped groundwater from two drilled wells to a 22,000-gallon elevated water storage tank. The Town obtained the tank in used condition from Fort A.P. Hill in 1967. During an inspection in August 2013, the Town discovered holes in the storage tank's roof. The Town needed to address the long-term need to replace the existing tank and the short-term need to effect emergency repairs. While the efforts to secure funding for replacing the tank were ongoing, SERCAP awarded the Town a \$30,000 grant and provided them with technical assistance for the necessary emergency tank repairs. The Town received an award of \$990,684 in DWSRF funding through VDH with \$594,410 as principal forgiveness, and an additional \$429,000 grant/loan mix from USDA-RD. The Town installed a new 20' x 20' precast concrete building for two booster pumps and two bladder tanks with emergency standby power, installed approximately 5,400 linear feet of waterline, and installed new meter box assemblies. In 2019, contractors for the Town carefully took down the elevated water storage tank. VDH staff conducted the final inspection in May 2019. The Town held a ribbon-cutting ceremony in August 2019. A large group including Mayor Alex Long, Congressman Robert Whitman, Delegate Margaret Ransone, and Chief Deputy Commissioner Dr. Parham Jaberri gathered at the Town for the ribbon-cutting celebration for this project.

On June 9, 2018, a strong storm hit the Town of Orange in Orange County. The Town water treatment plant suffered a lightning strike damaging the Supervisory Control and Data Acquisition (SCADA) system rendering it inoperable. The waterworks, serving approximately 6,584 persons

through 3,056 service connections, had substantial damage. Staff operated the treatment system in manual mode for weeks. The Town reached out to the USDA-RD and VDH Capacity Development for funding assistance to replace the SCADA system. USDA-RD had emergency funding available but the timeframe for accessing the funds was very tight. Capacity Development staff quickly began working with field office staff, gathering information from waterworks records, interviewing the Chief Water Operator for specifics about the interim operational conditions, and drafting a letter of support. The Town added that letter of support to the packet and sent it to USDA-RD for approval. USDA-RD approved the project as an “emergency situation,” and awarded \$115,275 in grant funds to the Town to replace the SCADA system.

In early August 2017, the Town of Monterey waterworks in Highland County suffered a catastrophic event resulting in a water outage to the approximately 450 residents served. The infrastructure impacts included empty water storage tanks, inadequate water pressure, and inadequate well pumping rates from well pump malfunctions and low well water levels. Officials declared a local emergency, and issued a Boil Water Advisory with assistance from VDH. Neighboring localities and VDH provided assistance. The Town restored the operation of the system to prior conditions and lifted the Boil Water Advisory. The Town did not have adequate monitoring and fail-safes to reduce the likelihood of a repeat occurrence. In April 2019, the Town applied for \$215,000 in DWSRF funding to install a SCADA system. Capacity Development staff determined the Town did not have adequate TMF capacity to meet DWSRF funding requirements. The Town recognized that TMF capacity improvement would represent a positive, long-term commitment to the utility and community. VDH requested that the Town complete two action items in order to be eligible for funding: a water rate analysis and a WBOP. In November 2019, the Town presented and adopted a Board resolution committing to the completion of both items. The Town completed a water rate analysis with the Environmental Finance Center Network’s help and a draft WBOP with Capacity Development staff’s help. The Town’s DWSRF construction project is moving forward.

The Town of Buchanan in Botetourt County, population of 1,220, had a major water leak in March 2020. The Vice Mayor contacted VRWA regarding an estimated 40,000 gallons per day of water loss from the Town’s distribution system. A VRWA circuit rider arrived on-site and located an area that appeared to be the location of the leak. After isolating a section of pipe and re-pressurizing the system, the Town could not determine a location of leakage. VRWA used a leak correlator and pressure tested the main to find the leaking pipe’s location. VRWA provided direction about the necessary repairs to abate the water loss. VDH provided the leak detection equipment to VRWA through a set-aside grant, showing the success of this funding.

The Town of Charlotte Courthouse in Charlotte County has a population of about 1,975 people. Maintenance staff from the Town called VRWA and requested help finding a water line that appeared to be leaking. The circuit rider located the water main, found the water leak, and shut the water off at a pool house near a private club to prevent the Town from losing all its stored water. The circuit rider found the water line going to the pool house had its own cut off valve. Town staff shut off the valve to allow the main building to continue getting water. Again, VDH provided the leak detection equipment to VRWA through a set-aside grant.

Rye Valley Water Authority in Smyth County serves approximately 1,276 people. The Authority contacted VRWA on January 13, 2020, to help with a major water loss within the Authority's drinking water distribution system. At the time of the call, Rye Valley had 27% water revenue accountability, meaning that 63% of the costs to treat and distribute drinking water had no revenue generating potential. A VRWA circuit rider arrived on Jan. 16, 2020. After a day and a half of surveying valves, meters, and hydrants, the circuit rider found a leak. VRWA used a correlator in survey mode to confirm the leak. VRWA decided that ground-penetrating radar could find the service line better than the use of other water loss detection instrumentation. The circuit rider and Town found a point of interest and marked it for excavation. Rye Valley Water Authority reported that VRWA's circuit rider found the location of the line leak. The Authority repaired the line, and the circuit rider recommended that the authority replace the aging galvanized pipe service line. VDH provided the leak detection equipment to VRWA through a set-aside grant.

APPENDIX 1

Virginia Rural Water Association Leak Detection Program Waterworks Assisted July 1, 2017 – June 30, 2020			
Hours of Leak Detection Service	Waterworks Name	Hours of Leak Detection Service	Waterworks Name
2.25	Luray, Town of	5.5	New Market, Town of
4	Warsaw, Town of	153.25	Rye Valley Water Authority
7	Va. Department of Forestry	10.75	U.S. Forest Service
5.25	Egypt Bend Estates	26.25	Charlotte Courthouse, Town of
35.25	Gloucester County Public Utilities	7.25	Young Life Camp
2.25	Cape Charles, Town of	18.75	St. Charles Water Authority
15.75	Cedar Bluff, Town of	9.25	Gloucester, Town of
60.75	Windsor, Town of	15.25	Montross, Town of
22	Waverly, Town of	53.5	Buchanan, Town of
19.75	Exmore, Town of	2.25	Hanover County Utilities
48.75	Appalachia, Town of	8.75	Wakefield, Town of
9.25	Nicklesville, Town of	2.25	Covington, City of
11.25	Pennington Gap, Town of	3	Pittsylvania County Service Auth.
4.5	Goshen, Town of	6.25	Strasburg, Town of
21.25	Campbell County Utilities	16.25	Gate City, Town of
13	Jonesville, Town of	17.25	Southampton County Service Authority
8	Russell County Public Service Auth.	12	Boydton, Town of
2.75	Grottoes, Town of	84.5	Edinburg, Town of
8.25	Bluefield, Town of	7	Stanley, Town of
3.25	Kenbridge, Town of	2.25	Remington, Town of
2.25	Goochland County	1	Gretna, Town of
14.25	Va. Department of Corrections	14	Fauquier County Sanitation Auth.
7.75	Sussex County Service Authority	21.25	Iron Gate, Town of
22.75	Emporia, City of	12.5	Allegheny County Public Works
2.5	Amelia County Sanitary District	2.25	Henry County PSA
1.25	White Tail Park	2.25	Waynesboro, City of
18.75	Altavista, Town of	15	Amherst, Town of
17	Dungannon, Town of	25.25	Shenandoah, Town of
4.25	Pembroke, Town of	16.5	Bath County PSA
27	Montvale Water System	3	Greensville County
5.75	Pound, Town of	3.25	Rural Retreat
1	Vinton, Town of	7.25	Warm Springs Water Assoc.
2.25	Thomas Bridge Water Corp.	3	Holiday Acres Park
10.25	Clifton Forge, Town of	5	Northumberland County
5.25	Isle of Wight County	8	Lee County PSA

APPENDIX 2

2020 Triennial Capacity Assessment Questions

Technical	Is the waterworks score on the 2019 ETT \leq 10?	Does the waterworks have sufficient operator coverage for sick leave and vacation?	Has the waterworks either not received significant deficiencies, or completed timely correction of all significant deficiencies?	Did the waterworks address recommendations from recent sanitary surveys?	Does the waterworks have a written policy for responding to customer complaints?	Are all plans and reports up to date and implemented (e.g. BSSP, LCR Plan, CCCP, CCR, WBOP, Sampling, etc.)?
Managerial	Did the waterworks consistently operate within 80% of its permitted capacity in the last 3 years?	Does the system meet Waterworks Regulations design and construction standards?	Are the waterworks facilities and appurtenances in good operating condition?	Are all service connections metered and is there a water accountability program in place?	Does the waterworks meet all established National Primary Drinking Water Standards?	Have all operators attended a technical training seminar or conference each year covered by this survey?
Financial	Did the waterworks pay the technical assistance fee?	Does the waterworks have at least 45 days cash on-hand to cover expenses?	Is the waterworks budget independent from subsidization by general funds, sewer funds or other funding sources?	Does the waterworks have a written Capital Improvement Plan?	Have the waterworks' rates been adjusted in the past three years?	Does the waterworks have an Asset Management Plan?