DATE: February 10, 1997, **Revised 26 April 2012**

TO: Office of Drinking Water Technical Staff

FROM: Steven D. Pellei, PE, Acting Director SDP
Office of Drinking Water

SUBJECT: PERMITS & PROJECT REVIEW- Project Review and Permit Procedures

DELETE: WM 795, 862, 865, 879, 885, 901

REFERENCE: *Project Review and Permit Procedures Manual*

Project Leader: Susan E. Douglas SED

Revision Highlights:
This memo consolidates written guidance of 7 Working Memos into one separate *Project Review and Permit Procedures Manual* for ODW staff.

The purpose of this memorandum 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.

Related information for waterworks owners are posted on the VDH-ODW external website (*Information for Waterworks / Owners*), including:

- Operation Permit & Construction Permit Applications
- Waterworks Business Operations Plan
- Installing a new well (Handbook for Developing a Public Water Supply Well)

The *Project Review and Permit Procedures Manual* refers to a number of attachments. These templates, forms and letters shall standardize office procedures, improve office efficiency, and address regulatory requirements. **Permit templates should not be modified, unless approved by the ODW Director.** ODW staff is responsible for using the most current version of the *Project Review and Permit Procedures Manual*. Field Directors shall send email confirmation to the author that all staff have been notified of the revisions, and the changes reviewed by the date given in the revision notification.

The *Manual* and all attachments are available as electronic files on the ODW server location: **odwsrv1\odwshare\03-Memos\301-Active Working Memos\301.02-Forms Letters Manuals**.

END OF MEMO

PROJECT REVIEW & PERMIT PROCEDURES MANUAL FOR ODW STAFF

Version 2.0
April 4, 2012

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 FOR ODW STAFF

FOREWARD

This manual is intended to provide 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:

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

Separate public information documents related to the permitting process are shared on ODW's web page, including:

- "Determine Drinking Water Needs"
- "Permit Applications and Waterworks Business Operations Plans"
- "Well Development Procedures"

This manual will be updated as ODW procedures are modified. A revisions summary will be included here.

PROJECT REVIEW & PERMIT PROCEDURES MANUAL FOR ODW STAFF

Version 2.0
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1. INTRODUCTION

1.1. PERMIT PROCESS OVERVIEW

12VAC5-590-200 of the *Waterworks* Regulations requires an owner or authorized agent to submit an application for a permit from the Virginia Department of Health to construct, expand, modify, and/or operate a waterworks or water supply. The complete permitting process includes the following steps:

1. Permit Application / Notification of Intent
2. Preliminary Engineering Conference (PEC)
3. Waterworks Business Operations Plan (WBOP)
4. Preliminary Engineering Report (PER)
5. Final Plans and Specifications
6. Issuance of a Construction Permit
7. Final Inspection of Construction
8. Issuance of a New or Modified Operation Permit

There is only one permit application form for construction of a new waterworks, or the modification or purchase of an existing waterworks. Since the concerns and procedures will differ, two separate guidance documents have been created. The first is entitled “Applying for a Virginia Public Waterworks Construction Permit” for owners that already have a valid Waterworks Operation Permit. The second is “Applying for a Virginia Public Waterworks Operation Permit” for potential owners that do not have a valid Waterworks Operation Permit. Both documents are available for applicants and staff on ODW’s website. These guidance documents contain an overview of the application process, frequently asked questions, VDH contact information, and the application form itself, which can be filled out on-line and printed for submission to VDH. (A signed paper copy is required).

1.2. NEW WELLS

If a new well source is proposed, the procedures listed above are modified by the inclusion of 2 additional steps:

- Well Site Approval
- Well Construction

Detailed procedures are given in the “Handbook for Developing a Public Water Supply Well“, also posted on ODW’s website.

The Department of Environmental Quality (DEQ) issues a Groundwater Withdrawal Permit for well withdrawal systems located in a Groundwater Management Area that pump 300,000 gal/month or more. There are presently two Groundwater Management Areas in Virginia:

- Eastern Shore: Accomack & Northampton Counties;

- Eastern Virginia: King William, New Kent, James City, Isle of Wight, Surry, Charles City, Southampton Counties, Williamsburg, York, Poquoson, Hampton, Norfolk, Virginia Beach, Chesapeake, Suffolk, Portsmouth, Newport News, Hopewell, Franklin City; East of I-95 for Sussex, Prince George, Hanover, Henrico, and Chesterfield Counties *(note: this area may expand with revised Groundwater Management Regulations).*

A “Withdrawal system” is defined in DEQ’s Groundwater Management Regulations (Code of Virginia, 9VAC5-25-610-10) as follows:

> “”Withdrawal system” means (i) one or more wells or withdrawal points 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.”

The ODW and DEQ have developed a Memorandum of Understanding for coordinated issuance of both agencies’ permits. This memorandum is included in APPENDIX 1.

1.3 PERMIT TYPES

ODW issues 5 types of permits, summarized in the following table. A further description of these permits and their attachments is provided in this manual.

PERMIT	ATTACHMENTS
Construction	Engineering Description Sheet of Proposed Construction (not required for some projects)
General (for construction of water distribution mains)	Memorandum of Understanding with VDH-ODW
Operation – Standard	Engineering Description Sheet (entire waterworks) May also have Variance, Special Permit Requirements
Operation – Provisional	Engineering Description Sheet (entire waterworks), Special Permit Requirements
Operation – Temporary	Engineering Description Sheet (entire waterworks), Special Permit Requirements

FIGURE 1 - CONSTRUCTION PERMIT ISSUANCE PROCESS

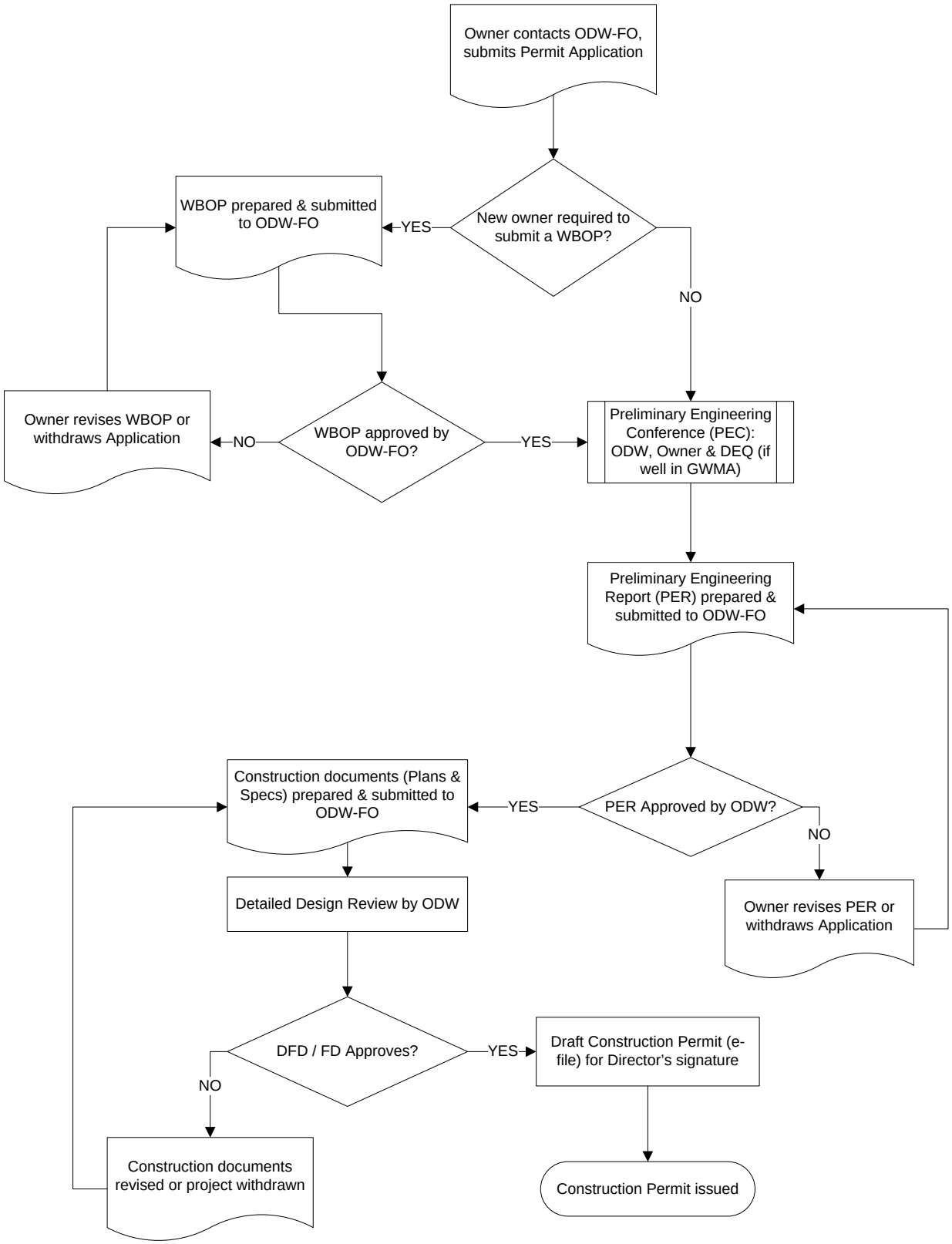
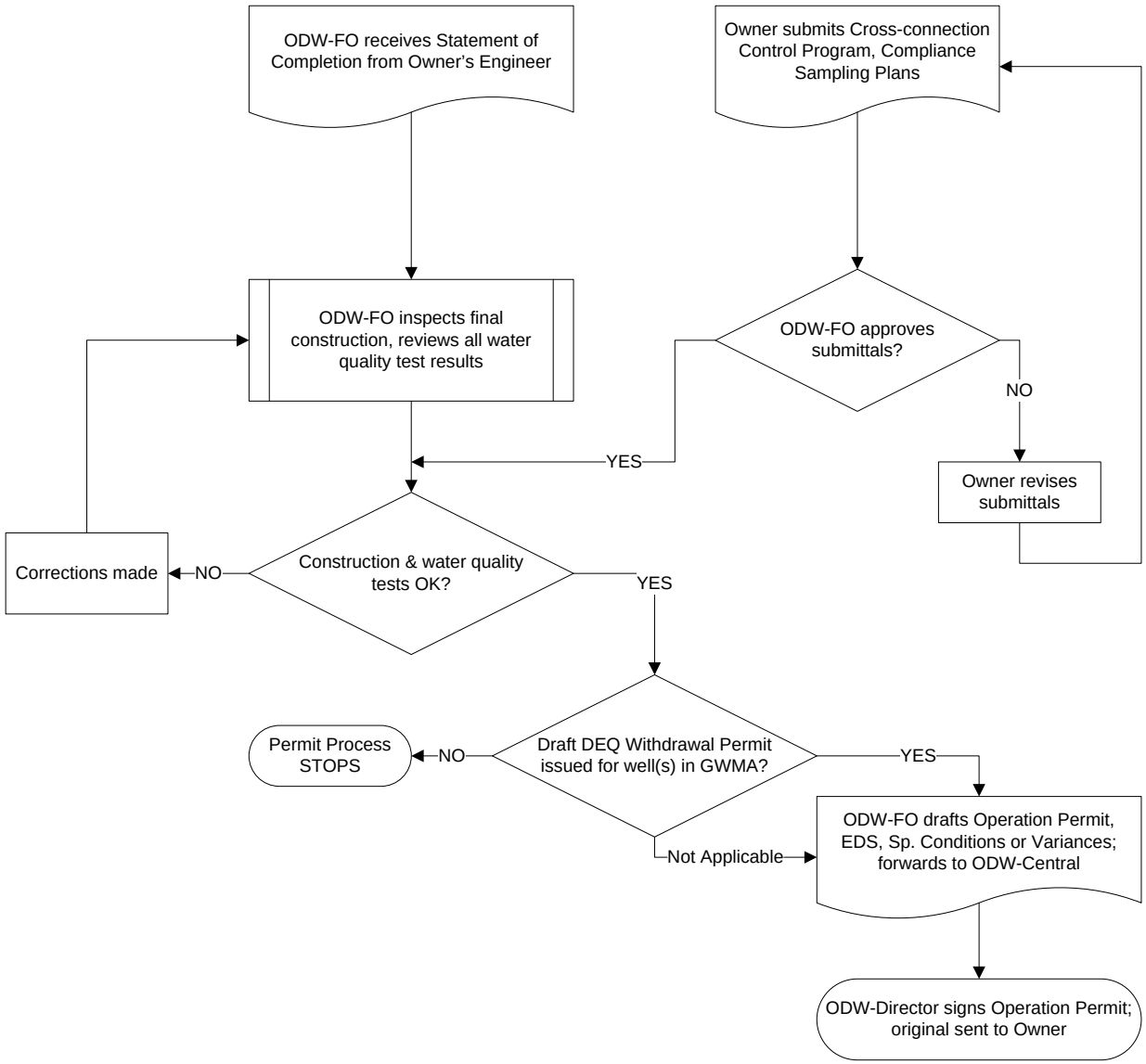


FIGURE 2 - OPERATION PERMIT ISSUANCE PROCESS



2. PRELIMINARY ENGINEERING CONFERENCE & REPORT

The Preliminary Engineering Conference 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. Elements which should be included are:

- Permits and authorizations required from DEQ for surface or ground water withdrawal permits, wastewater discharge and/or disposal;
- Proposed treatment processes and complex hydraulics, particularly any potential design exceptions to the Virginia *Waterworks Regulations*;
- Impact of SDWA Rules and Regulations on waterworks operation and compliance 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, a review of the owner's ongoing responsibilities and regulatory requirements after operation commences should be included in the conference. Topics may include monitoring, reporting, operator requirements, etc. At this stage, it may be useful to review a draft Waterworks Business Operations Plan for new waterworks owners.

A Preliminary Engineering Report (PER) is normally required for all projects involving treatment processes or complex hydraulics. A PER that includes innovative/alternative technology or design exceptions to the *Regulations* must be coordinated with the Central Office. Refer to the *Waterworks Regulations* for information required in the report. One copy of the PER is required. Upon approval, the report shall be stamped approved and retained in the Field Office. An electronic PDF file of the final report should also be requested. An example of an approval letter for a PER is provided in **Attachment A.1**.

The Deputy Field Director or Field Director has the discretion of waiving the requirement for a PER. This needs to be justified and documented in the project review notes, memo to the files or on the Scope and Detail Review Sheet (Attachment B).

3. WATERWORKS BUSINESS OPERATIONS PLAN (WBOP)

3.1. AUTHORITY

The requirement for a waterworks to complete a WBOP is established in § 32.1-172 of the *Code of Virginia*, 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 the waterworks' performance requirements for providing the water supply will be met over the long term," and further states that we "may require the submission of a business plan by those existing waterworks that have demonstrated significant noncompliance with the *Waterworks Regulations*."

In addition, the *Code* allows for waiving the WBOP portion of the application if an applicant has demonstrated an acceptable history of compliance with the *Waterworks Regulations*.

Very few waterworks will be affected by our requirement to have a WBOP. Waterworks owners that are governmental entities or private companies with a history of acceptable compliance with the *Regulations* will not normally be required to provide a WBOP.

3.2. APPLICABILITY

ODW must make the decision on who is and who is not required to submit a WBOP. Generally, only the following waterworks owners will require such a plan:

3.2.1. Owners of new community and non-transient non-community waterworks

A WBOP is required for the development of a new waterworks or the purchase of an existing waterworks by a potential first-time owner of a Virginia waterworks, or an owner that has a poor compliance history with the *Waterworks Regulations*.

This decision should be made during the Preliminary Engineering phase of the application process, prior to any source site inspections. The final decision shall receive the concurrence of the Field Director. The WBOP should be prepared and submitted with the Preliminary Engineering Report.

3.2.2. Owners of existing community and non-transient non-community waterworks

A WBOP is required if the existing waterworks is in significant noncompliance with the *Waterworks Regulations*. Many waterworks that are in significant noncompliance with the *Regulations* are very small. A requirement for a WBOP may be exactly what is needed to establish sound fiscal practices, but may also cause additional financial hardship.

The requirement for a WBOP is appropriate for inclusion in many consent orders. The WBOP may be a good persuasive tool for owners that are significant non-compliers, or those on the verge of becoming significantly noncompliant and debating whether to continue as an independent waterworks.

3.2.3. Waterworks owners applying for a loan through DWSRF

A WBOP is required unless the applicant has demonstrated an acceptable history of compliance with the *Waterworks Regulations*. VDH staff administering the Drinking Water State Revolving Fund (DWSRF) will determine whether a WBOP or another form of certification will be required.

3.2.4. Non-community waterworks owners

The criteria above for determining if a waterworks must submit a WBOP also applies to non-community systems. Owners of both transient (TNC) and non-transient non-community (NTNC) facilities must demonstrate that they recognize themselves as public waterworks, and that a budget is in place that will cover the waterworks' expenses.

NTNC waterworks that do not produce and wholesale drinking water may submit a simplified version of the financial portion of the WBOP. The simplified version <u>does not</u> apply to NTNC waterworks that own and operate a source and treatment facilities that wholesales drinking water (e.g., water service authorities). These waterworks must complete the WBOP in its entirety. A simplified version is available for TNC waterworks required to submit a WBOP.

3.3 PREPARER'S QUALIFICATIONS

In order to meet the intent and purpose of the WBOP, the plan must be prepared by skilled individuals who are knowledgeable in sound business practices as well as the complexity of waterworks business operations. Therefore, community and non-transient non-community

waterworks owners must have their plans prepared and submitted by any or a combination of the following:

- Certified Public Accountant (CPA)
- Licensed Professional Engineer (P.E.), or
- Other individuals with significant knowledge of waterworks operations and management, as approved by the Field Director.

A simplified WBOP for transient non-community waterworks is designed to be completed by the waterworks owner.

3.4 RESOURCES AND ASSISTANCE

WBOP resources for waterworks are posted on the ODW web site. The web resources consist of

- Handbook for Community and Non-transient Non-community Waterworks
- companion financial worksheets for the handbook
- simplified Business Operations Plan worksheet for Transient Non-community waterworks

These documents are designed to be accessed and completed online, though copies can also be printed and distributed to waterworks owners to complete manually. Additionally, model WBOP documents are posted on “ODWSHARE”. The models cover a variety of waterworks types and situations, and can be printed and distributed to owners seeking additional guidance on completing a business plan.

By design, the process of preparing a WBOP is intended to increase waterworks owners’ awareness of their financial and managerial obligations. Consequently, staff assistance with the completion of business plans is expected to be minimal, and ODW staff shall not research or prepare business plans on behalf of owners. However, staff assistance may be needed to direct waterworks to the resource materials and forms that are appropriate to their situation. This guidance should typically be offered during preliminary engineering discussions with prospective waterworks owners.

3.5 REVIEW PROCEDURES

Review of the Operations, Management, and Planning portions of the WBOP should be similar to our review of a PER. For the financial portion, a plan developed by the parties identified above and meeting the financial analyses provided in the form should require only a limited review of the assumptions. The WBOP Handbook provides guidelines for analyzing financial worksheets, and describes consequences for passing or failing financial analyses included in the required WBOP submittals. The WBOP submittal form for Transient Non-community waterworks includes a check box to indicate if the submittal is technically adequate.

ODW approval will be by letter similar to PER approval. When required, a complete WBOP must be approved prior to the issuance of a Construction Permit or an Operation Permit.

4. PROJECT REVIEW

4.1 PROJECT TRACKING

ODW's automated database shall be used to account for all activities related to the handling of reports, plans, specifications, addenda, and change orders. Projects shall be entered into the system immediately upon receipt of documents, and updated as actions are taken.

4.2 SUBMITTALS

Engineering reports submitted to ODW for review and approval may include: Demonstration Studies, Treatability Studies, Alternative Design Evaluations, and Preliminary Engineering Reports. One paper copy is required from the engineer; an electronic PDF format file should also be requested..

Construction drawings, specifications, Change Orders and Addenda: two sets of paper documents are required. This may be reduced to one paper copy, if the final documents are also submitted in electronic PDF format.
Final design calculations, design memoranda, and hydraulic analyses (computer model simulations) may accompany the construction plans and specifications. Only one copy needs to be submitted to the ODW reviewer.

Specific requirements for submittals from a licensed Professional Engineer (P.E.) are described in APPENDIX 2.

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. These must be submitted together as a bound document, with the cover sheet sealed, signed and dated by a licensed professional engineer.

Maintenance activities and "replacement-in-kind" items do not generally require submission of design documents for approval.

The construction of a chemistry or biological laboratory at a waterworks requires submission of plans and specifications. However, the ODW does not issue a Construction Permit if the laboratory is a separate project. When the laboratory is included in the construction documents for a new / upgraded / modified waterworks, review this portion of the project for conformance with 12VAC5-590-760 of the *Waterworks Regulations*. Advise the owner and engineer to seek approval from DCLS for the laboratory design, if the lab will perform work that requires EPA or State certification.

4.3 SCOPE AND DETAIL REVIEW

A Scope and Detail (S&D) review is performed for all plans and specifications submitted for review. A S&D is not required for Engineering Reports, Addenda or Change Orders. The form for the S&D review is provided in **Attachment B.**

If a "NO" response is given for any of the items[1] listed on the S&D checklist, the project becomes a technical "Return", and the tracking database is updated with this information. A

[1] Other than "permissions".

return letter **(see Attachment A.2**) is sent 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.

The field office may use discretion in returning plans or proceeding with review and including scope and detail deficiencies in the first comment letter (such as a missing application). This needs to be justified and documented.

4.4 TECHNICAL REVIEW

All reviews shall include neat detailed notes and relevant calculations. All engineering calculations critical to the process shall be checked, including critical volumes, detention times, pump selection calculations and hydraulics.

No approvals will be made for water line extensions, etc. unless there is sufficient source capacity. If there is insufficient source capacity, the project should be returned unapproved, with a statement that it may be resubmitted with documented provisions of an acceptable source that meets drinking water standards.

4.5 COMMENT LETTERS

Upon completion of the review, comments on the design must be sent 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. Comments should be clearly identified as requirements or recommendations. An example of a comment letter is provided in **Attachment A.3**. Less significant comments or suggestions may be made verbally or by e-mail. If the engineer has not responded within the 30 days requested, then a reminder letter should be sent or a phone call made and documented.

4.6. PROJECT RETURNS

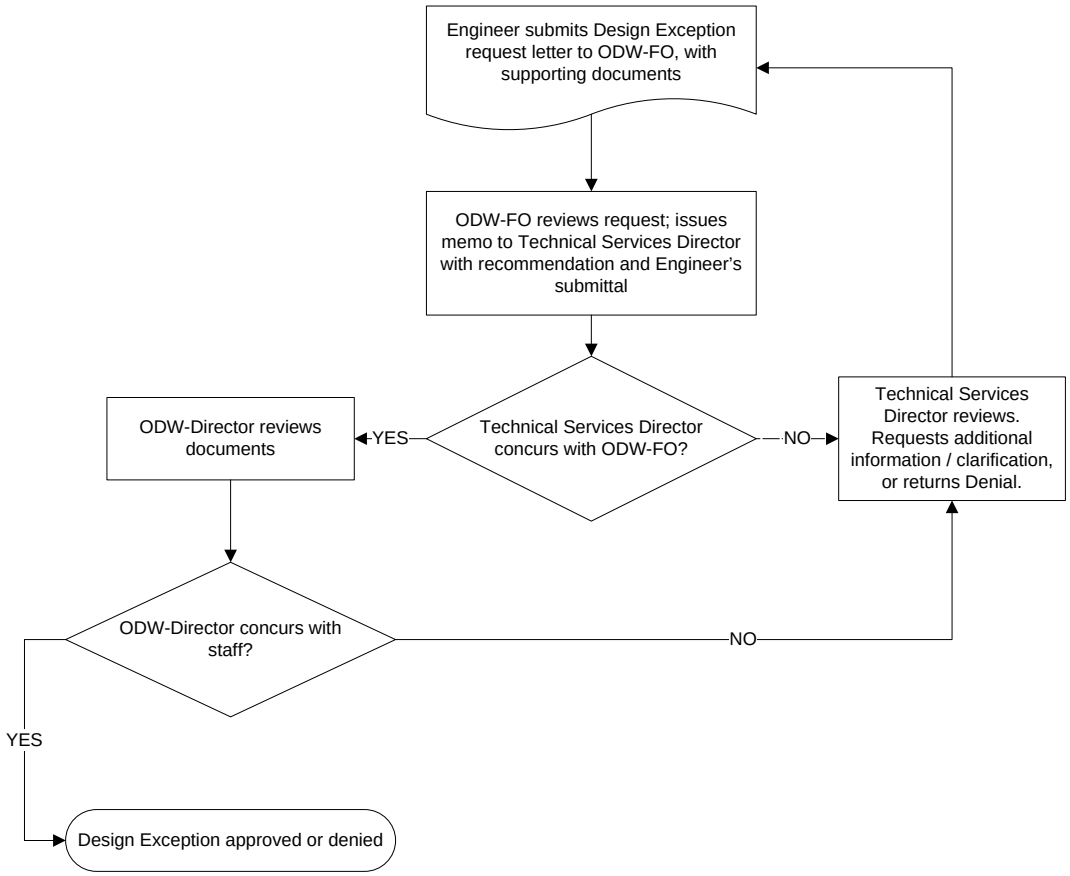
If the owner's engineer does not address review comments within the specified time frame, the District Engineer must follow-up with telephone requests, e-mails or reminder letters. If no response is received within 10 days of one or two contacts, the documents may be returned. Use the Project Return letter format provided in **Attachment A.4**.

4.7. DESIGN EXCEPTIONS

4.7.1. Procedure

The procedure for evaluating a design exception request is depicted in the following schematic:

FIGURE 3. Design Exception Approval / Denial Process



4.7.2. 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." Certain exceptions may be granted if adequate justification is provided, and the resulting nonconformity will not impact the waterworks ability to comply with the requirements for reliability specified in Part II (Operation Regulations for Waterworks) of the Regulations.

4.7.3. Approval and Documentation

Where exceptions are specifically allowed in the Regulations, a formal Design Exception Request (described subsequently) is not required, provided that the engineer submits the supporting documentation/evaluation as prescribed in the Regulations to the field office with the design submittal.

All other Design Exceptions must be documented as follows:

- Central Office approval - A Design Exception Request memorandum from the Field Office, for the Office Director's approval signature, is required. Refer to **Attachment C** for the memo. The request must be submitted at the earliest possible time in the project review process (preferably at the PEC or PER stage), to allow the owner's engineer sufficient time to incorporate the VDH decision into the final design documents.

- Field Office approval – Until the Regulations are revised to allow the following types of design exceptions, the following may be granted by the Field Office:

    a. Air backwash of gravity filters in lieu of surface wash
    b. Reduction in maximum Cl feed capacity from Regulations' requirement of 15 mg/L
    c. Reduction in 30 day onsite supply of NaOCl

  The Field Office approved Exceptions must also be documented with a Design Exception Request memorandum. Modify the approval signature for the Field Director's name. A copy of the design exceptions memo shall be included with the documents forwarded to the Central Office for all projects.

4.7.4. Tracking

ODW Design Exceptions granted by the Central Office will be logged into one database on "ODWSHARE" maintained by the Division of Technical Services. The Field Offices will be responsible for maintaining the datasheet for Design Exceptions originating in their respective Field Office.

4.8. EXEMPTIONS FOR TRANSIENT NONCOMMUNITY WATERWORKS

Plans for construction permits for transient non-community waterworks may be exempt from the Professional Engineer licensure requirements under the following conditions:

- The waterworks is a transient non-community waterworks with actual or proposed service to no more than 100 persons per day.
- The waterworks must be a direct delivery system without any treatment, meaning that the system consists only of <u>one</u> groundwater source, small pressure storage tank, and a single service connection (one structure). NOTE: Point of Entry (POE) treatment requires engineering plans and specifications.
- The single service connection consists of a structure with area less than 5,000 square feet. The determination of square footage will be performed using the outside perimeter of the single service connection.

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

- Construction of the well must be by a well driller with Class A contractor license. This can be verified through online access of licensed well drillers on the DPOR website.
- Construction of the remainder of the waterworks must be by a master's level plumber or Class "A" contractor.
- Information described in the checklist in **Attachment D** must 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.

4.9 RECORD DRAWINGS (AS-BUILT PLANS)

Record drawings ("as-built" plans) are often received, but are generally not required for projects that have a Construction Permit, unless the actual construction/field conditions were substantially different from the approved plans. In this case, record drawings must accompany a fully executed change order.

If construction was in substantial compliance with the approved project (an engineer's letter of substantial completion was obtained which verifies this), no further action is necessary. Otherwise, review the project and modify the approval letter according to the circumstances. Projects that were constructed prior to formal approval due to emergency conditions should be reviewed, and the approval letter modified accordingly. Refer to **Attachment A.5** for example letter.

As-built plans for projects constructed illegally with no prior approvals should be reviewed 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, a construction permit may be appropriate. Otherwise, once an approval is possible, do NOT issue a construction permit. A new/revised Operation Permit will be required.

All approved record drawings shall be labeled and forwarded for scanning into electronic file format, unless electronic PDF files of final documents are submitted.

4.10 ADDENDA AND CHANGE ORDERS

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, process them with the entire package. If received after project approval, process them as a separate project. If the changes are major, a new Construction Permit may be issued. Otherwise issue the approval without another permit and reference the original one in the approval letter.

Change orders must be fully executed (signed by the owner, design engineer and contractor) prior to review and approval by VDH.

The Field Office can approve non-technical change orders and addenda for all projects. Technical change orders and addenda for projects originally approved in the Field Office can also be approved in the Field Office. Otherwise it must be approved by the Central Office. Refer to **Attachment A.6** for the letter format. When change orders or addenda include revised drawings, these must be labeled as described in **section 5.4** of this manual.

4.11. SPECIFIC EVALUATION TOPICS

4.11.1 DEQ Notification Prior to Well Abandonment

The DEQ Office of Ground Water Characterization is interested in re-using former production wells for groundwater monitoring purposes. If a public water supply well is to be taken out of service permanently, recommend to the waterworks that they contact the DEQ Office of Ground Water Characterization regional geologist to determine if the well may be of interest to them, prior to permanent well closure.

4.11.2. 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. Notify the DEQ Regional Office, by letter, of the proposed discharge at the earliest possible time. Refer to **Attachment A.7** for the format of this letter. The waterworks owner should be informed during the Preliminary Engineering Conference to follow up with DEQ.

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 applicant's engineer.

4.11.3. Internal Plant Recycle

The Filter Backwash Recycling Rule 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. VDH strongly discourages the recycling of process waste flows within the treatment plant. When recycling is proposed, recycle flows must be returned prior to the point of primary coagulant addition, and must receive full treatment through all of the plant processes.

Recycle streams must 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). Additional settling of the recycle stream or recycle return to a pre-sedimentation basin is recommended, as a minimum, to obtain a more consistent influent water quality to the plant. If alternative return locations are proposed, supporting justification from the engineer is required, and the Central Office must approve the alternate location.

Lagoon water receiving flow from plant floor drains, pump drains, etc CANNOT be returned to the water treatment plant process flow stream, or upstream of a public waterworks' intake.

4.11.4. Distribution Systems

No approvals will be made for a distribution system unless an adequate source exists or is proposed.

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

The Code of Virginia 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 Construction Permit. 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 licensed engineer must design exempt projects, as stipulated in the Code of Virginia. Enforcement of the licensed engineer requirements is the responsibility of the Department of Professional and Occupational Regulation (DPOR).

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

4.11.5. AWWA Disinfection Standards

Engineering specifications for disinfection of 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 cannot be required.

5. CONSTRUCTION PERMIT

5.1. PERMIT AND ENGINEERING DESCRIPTION SHEET

A construction permit number is assigned in the Field Office. The construction permit number contains six (6) digits. The first digit is the assigned Field Office number (1-Abingdon, 2-Lexington, 3-Southeast, 4-East Central, 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.

A Construction Permit is written in accordance with the format given in **Attachment E**. Issuance and expiration dates are written on the permit at the same time that the plans and specifications are signed and dated. The expiration date will post cede the issuance date by five years. Add at least five working days to the date on which the permit (electronic document) is posted to "ODWSHARE". <u>All construction permits must be signed by the Office Director.</u>

Construction permits are usually accompanied by an Engineering Description Sheet for Proposed Construction, which is provided in **Attachment F.** The Engineering 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 Engineering Description Sheet include the following:

- Projects resulting in changes to the waterworks operation permit capacity
- Projects approved by the Central Office
- Projects that require a design capacity evaluation of more than one process or component.

Projects that are approved in the Field Office and do <u>not</u> require a separate Engineering Description Sheet include the following:

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

The projects without a separate Engineering Description Sheet must be described sufficiently in the permit. By example: "This project consists of the addition of a sodium hypochlorite feed system which includes a 50 gallon solution tank and 20 gph diaphragm metering pump."

5.2. PROJECTS APPROVED BY CENTRAL OFFICE

Projects to be approved by the Office Director must be packaged and sent to the Central Office; excluding the Construction Permit and Engineering Description Sheet. Electronic files of those documents shall be sent via email to the Technical Services Director for review and approval. The package must include the following paper documents:

1. Project Review Transmittal Checklist **(**see Attachment G**)**
2. Permit Application
3. One paper copy of plans, specifications, addenda and change orders.
4. Copies of design notes and calculations
5. Copies of all correspondence and emails, if they have not been forwarded previously.

One copy of the construction documents (plans, specifications, addenda and change orders), once approved by the Central Office, will be signed by the Director and returned to the field office, with a copy of the construction permit. The Central Office will mail the final construction permit to the waterworks owner. The Central Office will also make and mail copies of the permit to all parties listed, with addressed envelopes provided by the Field Office.

5.3 PROJECTS APPROVED BY FIELD OFFICE

The following types of projects will generally be approved by the field office:

a. Water line extensions.
b. Raw water lines and transmission mains
c. Distribution system booster pump stations.
d. Distribution system storage tanks with an individual nominal volume $\leq$ 1 MG.
e. A simple groundwater system consisting of wells, transfer booster pumps, hydropneumatic tanks (including bladder tanks), and/or gravity storage tanks.
f. Metering pump and solution tank – type treatment systems, such as sodium hypochlorite for disinfection, phosphate for sequestration or corrosion control.
g. Cation exchange water softener.
h. Sodium Fluoride Upflow Saturator
i. Iron and Manganese removal filters.
j. Non-technical change orders and addenda, including those for water treatment plants originally approved in the Central Office.
k. Standard utility specifications. (Local Review Programs / General Permits must be approved by the Central Office).
l. 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.
m. Pilot Plant study reports. Discuss results and conclusions with Central Office Division of Technical Services and obtain concurrence prior to approval.
n. Evaluation reports of full-scale technology (demonstration studies). Discuss results and conclusions with Central Office Division of Technical Services and obtain concurrence prior to approval.
o. Record drawings (“as-builts”).

The field office shall post the electronic document file of the Construction Permit on “ODWSHARE”, and update the tracking spreadsheet when the permit is ready for the Office Director’s signature. After the permit is signed, it will be scanned into PDF file format, and the electronic PDF file will be posted on “ODWSHARE” and the spreadsheet updated by Central Office staff. The Field Office will mail the final construction permit to the waterworks owner. The Field Office will also make and mail copies of the permit to all parties listed.
The Field Office shall mail a set of approved plans with completed approval stamp, signed by the field office director, to the Central Office file room for scanning into PDF file format, unless an electronic PDF file was submitted.

Information on new wells, including the

- Well Driller's Completion Report,
- Yield and Drawdown Test,
- Well lot plat and
- Well dedication document

shall be forwarded to the Central Office, where it will be scanned into PDF file format and transmitted to DEQ.

5.4. DOCUMENT LABELS

Paper copies of specifications, reports, addenda, change orders and field orders shall bear an approval stamp containing the following information, and retained in the field office.

Virginia Department of Health
Office of Drinking Water
Approved by _____
Field Director
Date_____

If an electronic PDF file copy of the drawings is not received, then the paper drawings shall be sent to Central Office, with the label below affixed to the lower right quadrant of the cover sheet, bearing the Field Director or Office Director's signature and date included on the label. If the label will obscure information on the cover sheet, then attach a separate page to the front of the cover sheet with the label. This includes modified plans accompanying addenda and change orders. (The original Construction permit number should be included on the label.) This labeled set of paper drawings will be converted to electronic format and stored in accordance with ODW's document retention schedule.

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

Office of Drinking Water
Safe Drinking Water for a Healthy Virginia

Approved By_____**P.E.**
Approval Date _____
Field Office_____ _____
No. Name
City/County _____ _____
No. Name
Construction Permit No._____
Project No._____
Project Name_____
PWSID No._____
Waterworks Name_____

NOTE: If the PWSID No. is not established for the project, then enter the number as follows:

1st digit: Field Office number
2 - 7 digits: enter "000000"

For the waterworks name, enter **"**New"

No documents will be returned to the owner with the construction permit. The original paper copy will be retained in the Field Office.

6. NEW OR NONCONVENTIONAL METHODS, PROCESSES, EQUIPMENT

Projects involving the evaluation and approval of new or nonconventional methods, processes and equipment shall follow the criteria in 12VAC5-590-290 of the Regulations. All such proposals must be coordinated through the Central Office. A database of Provisional Operation Permits will be maintained by the Central Office and made available on the shared network drive "ODWSHARE" for all technical staff.

7. GENERAL PERMIT

12VAC5-590-300 of the *Waterworks Regulations* provides the basis for all approved local review and approval programs. This is a two step procedure to delegate, by General Permit, plan review authority involving water distribution mains to a waterworks owner, or their representative.

7.1. PROCEDURE

STEP ONE: The waterworks owner must first adopt, and then obtain VDH Office of Drinking Water 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 of the latest Waterworks Regulations. These Standards shall be prepared by a professional engineer licensed to practice in Virginia[2]**.**

STEP TWO: The Waterworks owner shall enter into a Memorandum of Understanding (MOU) with the VDH Office of Drinking Water outlining waterworks-specific provisions and the owner's method of compliance. The sample MOU in **Attachment H** provides typical language. These provisions include the following:

A. The maximum size of pipe covered by the General Permit. This is intended to only include distribution mains (as opposed to transmission mains). This has generally ranged from 12-inch to 16-inch diameter. See the definitions in the Waterworks *Regulations* if you need further clarification.

B. The procedure to amend or modify the General Specifications. This is handled differently by utilities: some update specific sections or pages, others revise their entire standards. More detailed language may be needed to define procedures.

[2] A June 2005 APELSCIDLA ruling clarified that Regional Construction Standards 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.

C. The waterworks owner must maintain (or retain) adequate engineering staff to conduct plan reviews. Adequate staff means at least one individual licensed as a Professional Engineer (P.E.) in Virginia with at least two years experience in the design and construction of water distribution systems, or an individual with a governmental exemption. The P.E. must sign their approval on all projects processed under the General Permit.

D. The MOU must require that engineering plans and specifications be prepared for each individual project prior to any 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 VDH to the owner. Exceptions will only be granted when there is documented proof to VDH of a clear separation of design and review responsibilities, i.e. different departments or divisions etc.

E. The general distribution system map(s) of the waterworks must be updated annually. Records, including copies of all project documents and approvals must be available for VDH inspection.

F. The waterworks owner agrees to submit an annual report and statistical summary of all projects 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 **Attachment I**. A sample transmittal letter to the Waterworks' owner is given in **Attachment A.8**.

7.2. MULTIPLE WATERWORKS WITH SAME OWNER

A General Permit may be issued 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.

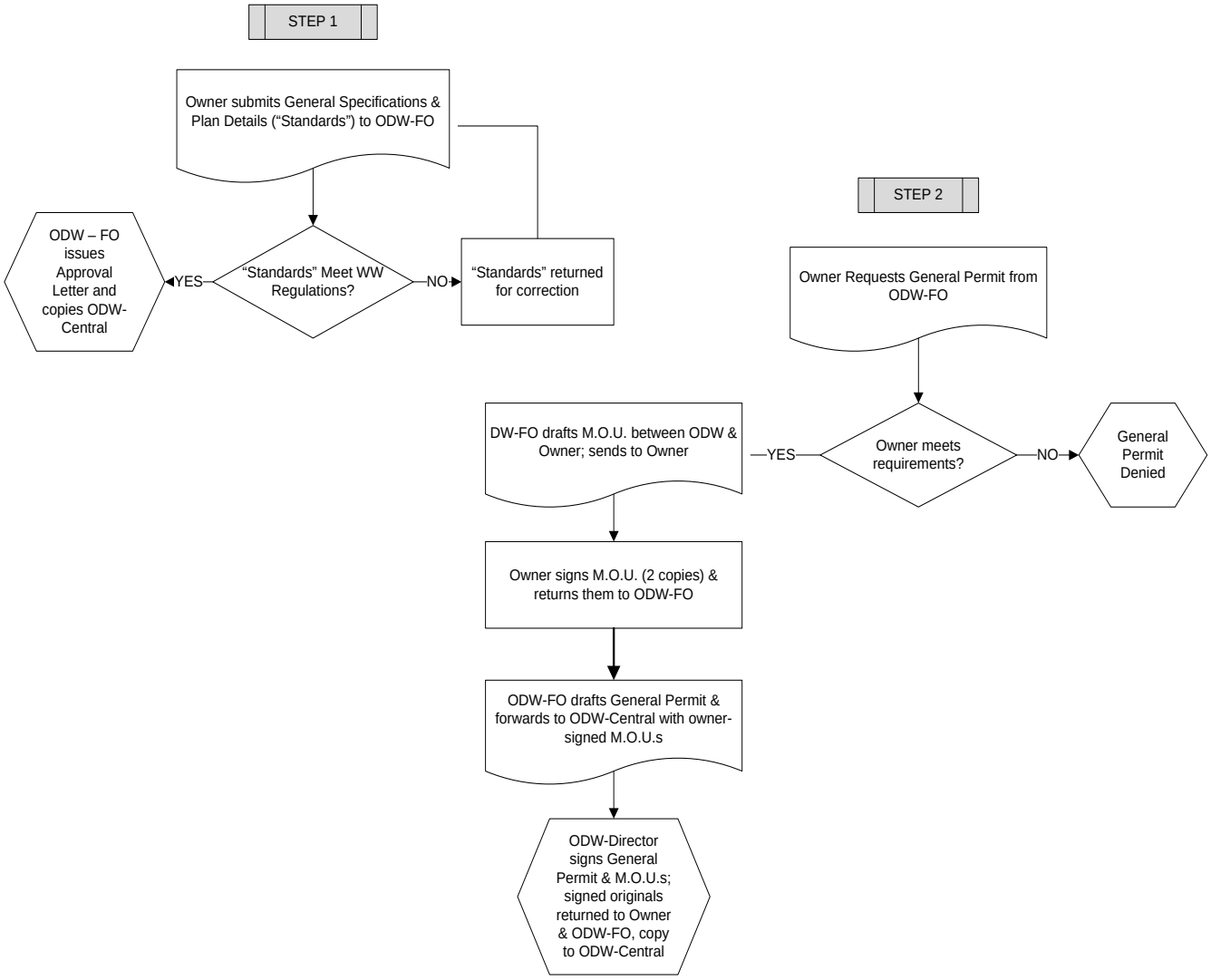
7.3 FIELD OFFICE JURISDICTION

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. A copy of the approved standards shall be provided to all other field offices affected by the General Permit.

7.4. EXPIRATION DATE AND REISSUANCE OF GENERAL PERMITS

The typical duration of a General Permit is 5 years. After a review of the utility's adherence to the MOU, the General Permit may be reissued. If the *Waterworks Regulations* have been revised during the General Permit period, then the utility's standards must be reviewed and updated to comply with the regulations as it pertains to waterline extensions, prior to reissuance of the General Permit.

FIGURE 4. General Permit Issuance Process



7.5. PERIODIC AUDIT OF LOCAL REVIEW PROGRAMS

The VDH Office of Drinking Water should audit a utility's Local Review Program concurrently with the sanitary survey of the distribution system. Prior to reissuance of the General Permit, VDH shall inspect the utility's program records and audit at least one set of plans.

7.6 TRACKING GENERAL PERMITS

A listing of General Permits issued by each Field Office, and Standards approved (with or without a General Permit), shall be maintained by each Field Office and will also be maintained by the Division of Technical Services on "ODWSHARE".

8. OPERATION PERMIT

8.1 GENERAL

12VAC5-590-190 of the Waterworks Regulations requires all public waterworks or water supplies in Virginia to be operated under the authorization of an Operation Permit issued by the Commissioner. This authority has been delegated to the Office of Drinking Water (ODW).

ODW issues new Operation Permits for the following situations:

1. New waterworks identified
2. New waterworks constructed

ODW issues Amended Operation Permits for the following situations:

1. Changes in ownership, name, waterworks classification or type
2. Changes in design capacity
3. Changes to the treatment process or equipment
4. Changes to the storage or distribution systems[3]
5. Reactivation of existing waterworks (with or without changes in ownership, name or system type)
6. Issuance of Variances or Special Permit Requirements (including operating conditions)
7. Correction of previous permit errors

The legal owner (individuals, partnerships, corporations, governmental bodies, etc.) of a drinking water system shall be issued an Operation Permit. "Legal owner" is generally understood to mean the entity that owns the property where the source is located, and the waterworks' major appurtenances. In very limited circumstances, it is permissible to issue the permit to an entity other than the legal owner, if there is a contractual agreement between the owner and the entity to which responsibility is being assigned. ODW shall not provide legal advice to the owner, but should look for these features in the agreement:

- Address issues of access
- Identify the infrastructure (physical elements of the waterworks)
- Assign responsibility for maintenance, repair, and replacement of infrastructure
- Assign responsibility for compliance with the Regulations
- Identify the duration of the agreement

[3] Distribution system water line extensions that have no impact on design capacity (or modify the EDS) do not require a permit amendment.

Three types of operation permits are described in section 1 of this manual: standard, temporary, and provisional. Each type of Operation Permit consists of a permit plus an attached Engineering Description Sheet (EDS), which includes the waterworks' description and capacity determination.

Standard Operation Permits shall NOT be issued conditionally (i.e.: an action is required first, such as the drilling of a new well, or testing of a pump to determine/verify capacity). However, special requirements may be included with all Operation Permit types, which are enforceable with the permit.

The issuance of an Operation Permit may be delayed or denied by the failure of the owner or owner's agent to complete the application process or submit a Waterworks Business Operations Plan.

8.2 INSUFFICIENT DATA FOR CAPACITY DETERMINATION

The reliability status shall be firmly established before determining whether to issue an Operation Permit, or which permit type (standard or temporary). Where insufficient data is available to establish hydraulic capacity, but a decision has been made to reissue the permit for the existing services, then "existing" should appear in the EDS and permit. By example,

- TNC waterworks is issued a permit with capacity stated: "One existing structure with 80 existing restaurant seats"
- NTNC waterworks is issued a permit with capacity stated: "existing service up to 950 students and staff".

8.3. FORMAT

The standard Operation Permit format that is to be used is provided in **Attachment J**. The model permit's appearance (layout, fonts, line spacing, etc.) must be maintained in all permits submitted for signature. The following guidelines must be followed:

1. Only general references to the Code of Virginia and the *Waterworks Regulations* are used in the operation permit, as shown in the template. Modifications to the standard permit format for Temporary and Provisional permits are described later in this memo.
2. Designate waterworks class or note as "unclassified" (permit) and operator class (EDS) in Roman numerals. Refer to the *Waterworks Regulations* and ODW guidance for more information on this determination.
3. Designate non-transient non-community and transient non-community status without hyphens or slashes.
4. Do not include "VA" in the permit number.
5. Underlines are not to be used in the fill in portions of the permit, except for an underline for the Director's signature).
6. Use Expiration date line only for Temporary or Provisional permits.
7. 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.
8. If the "name of the service area" is subject to change because the tenant is not the property owner (as is the case with many transient non-community systems), a property address and/or description may be substituted for a proprietary name.
9. Do not refer to permit issuances to previous owners in the permit face or EDS.

8.4 OPERATION PERMIT NUMBER

All permit numbers will be assigned and maintained at the Field Offices. The PWS Identification Number will be used as the Operation Permit Number. This is a seven-digit number as follows:

1st Digit: Field Office Number
- 1 – Abingdon
- 2 – Lexington
- 3 – Southeast
- 4 – East Central
- 5 – Danville
- 6 – Culpeper

Digits 2 – 4: Locality Code (See APPENDIX 3)

Digits 5 – 7: Sequence Number

The sequence number ranges from 000 through 999. The system will accommodate 1,000 waterworks in each city or county. Previously assigned numbers maintain an alphabetical series for each city and county. New waterworks are assigned 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.

8.5. ENGINEERING DESCRIPTION SHEET

An Engineering Description Sheet (EDS) will be provided with each permit. The EDS format is different from that used in the Construction Permit; see example provided in **Attachment K.** The EDS will provide important system information, including a description of the waterworks, and a design capacity evaluation as identified in the examples provided in this manual.

The EDS shall include the effective date of the current permit issuance. At the Field Director's discretion, previous amendments to the permit may also be included in the EDS, if they were made to the current owner. A history may also be included in the EDS for community or non-transient non-community waterworks, to clarify ownership, name, or classification changes, or to describe inactive periods.

The operator's classification shall be designated in Roman numerals.

If a Groundwater Withdrawal Permit *has not* been issued prior to the permit effective date, then the EDS should include a section "Other Permits" with the following language:

> *"*Our records indicate that the waterworks owner has not secured a Groundwater Withdrawal Permit (GWP) from the Virginia Department of Environmental Quality. A GWP may be required.

If a Groundwater Withdrawal Permit *has* been issued by DEQ, then include in the EDS a section "Other Permits" the following language:

> "The Department of Environmental Quality has issued a Groundwater Withdrawal Permit No. (*insert Permit number)*for these sources.

In either case, the following language should also be added to "Other Permits":

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

8.6 PRIMARY AND CONSECUTIVE WATERWORKS

Primary waterworks own at least one active source of raw water.

Consecutive waterworks receive finished water from one or more other waterworks.

A waterworks may be considered both a primary and a consecutive waterworks, if both criteria (listed above) are satisfied.

The sum of the storage on both the primary and consecutive waterworks should be adequate for the sum of the connections, as demonstrated by computations and/or hydraulic modeling. Consecutive waterworks are NOT required to have separate storage when it is adequately provided for and can be reliably delivered by the primary waterworks. An allocation of both source and storage between the primary waterworks and consecutive waterworks shall be identified in the EDS attached to the primary waterworks' permit. This allocation shall be tabulated as shown in the example EDS provided in Attachment **K.**

The District Engineer shall identify and obtain a copy of any contractual agreements and limitations on water transfer between primary and each consecutive waterworks. ODW shall 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. Allocations of source (production) capacity and storage should be defined in the purchase agreement.

Permitting of consecutive waterworks shall follow these procedures:

- Identify point(s) of water transfer. Identify and obtain a copy of any contractual limitations on water transfer.
- Identify any physical or design limitation on water transfer (for example, a pump station may establish the capacity at a particular connection).
- Identify water transfer limitations due to primary source capacity and primary system water use (the sum of the parts $\leq$ the whole).
- 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. The maximum monthly consumption over a period of at least 2 years is recommended as a design value. Background information and additional rationale shall be included in a transmittal memo with the permit to the Central Office.

When a Temporary Operation Permit for the consecutive waterworks (purchaser) is issued, the expiration date of the permit and the purchase contract shall be the same.

Verify the applicable Combined Distribution System schematic located on "ODWSHARE", and include a paper copy of any revisions with the Operation Permit to the Central Office.

8.7 PERMIT PROCESSING AND ROUTING

The District Engineer (DE) is responsible for the permit program within the district. The DE will prepare or supervise the preparation of a permit and necessary documents for each waterworks within the district, and conduct all investigations necessary to insure 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 (FD).

The FD is responsible for all aspects of the permit program within the Field Office region. The FD reviews the permit and associated documents. Construction permits requiring the Office Director's signature are forwarded to the Central Office with the Operation Permit Checklist **(see Attachment L).** The Technical Services Director reviews these projects before forwarding the Operation Permit and all attachments (EDS, Variance, Special Permit Requirements) to the Director for signature. Copies of the signed permit and attachments are made for the Central Office files, and the originals are sent back to the Field Office.

When the signed permit is received back in the Field Office, the DE prepares a transmittal letter given in **Attachment A.9**, and mails the permit with attachments to the owner**.** The transmittal letter contains sample paragraphs that may be included for the following circumstances:

1) Permit is an amended permit;
2) Waterworks is "grandparented" (serves to notify the owner that the "grandparented" status may be terminated by expansion, modification, failure to maintain reliability, or future sale);
3) Temporary Permit is being issued (described in Section 8.10 of this memo);
4) Special Permit Requirements are attached;
5) Variance is included;
6) Waterworks has been, or will be, issued a draft or final Withdrawal Permit by DEQ.

8.8 VARIANCES

Variances, when granted, are usually issued with an operation permit. They may be issued separately, without amending an existing permit. Variances only apply to Part II of the Regulations. When issued with the operation permit, the variance shall be transmitted with the permit, and a check mark made on the face of the operation permit to indicate that a variance is granted. No reference to a variance shall be made in the EDS.

Variances are sometimes granted for the following:

1) Operator personnel, 12VAC5-590-460 B
2) Metering of total water production, 12VAC5-590-520 B
3) Cross connection control program, 12VAC5-590-580

Waterworks may be issued 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. Variances to an Secondary Maximum Contaminant Level are also permitted in the Regulations, but should not be issued.

The Office of Drinking Water may initiate temporary operational variances for waterworks that are new to our surveillance. Extraordinary circumstances will be handled on a case-by-case basis.

Current policy allows transient non-community waterworks producing less than 10,000 gpd a metering variance, which remains in effect as long as water production remains below 10,000 gpd and no treatment is provided. The water production / consumption shall be estimated in the EDS Capacity Evaluation, in order to justify the variance. However, installation of meters in all waterworks should be encouraged.

The variance format is provided in **Attachment M.** 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.

8.9 AMENDED PERMITS

Code of Virginia §32.1-173 authorizes the amendment of permits. There are numerous reasons to amend Operation Permits, including correction of errors in the permit, changes in major equipment, special operating conditions, and change in design capacity. Refer to section 8.1 of this memo for a listing of conditions requiring a permit amendment.

8.9.1 Notification

The DE shall inform the owner of changes to the operation permit BEFORE it is issued. This notification shall be by written letter, sent by certified mail, return receipt requested, when the proposed permit amendment:

- Is a unilateral decision made by ODW (the owner did not request amendment of the permit, or apply for a construction permit), and
- Will curtail the existing rights of the permit holder (e.g. reduce capacity of the waterworks, which will reduce the owner's right to serve customers)

The letter to the permit holder shall state that it is our intention to amend the permit and the reason(s) for the amendment. The notice shall also contain a request that the permit holder notify ODW in writing if they object to the amendment of the permit. Use the letter given in **Attachment A.10,** Notice of Intent to Amend Permit.

If the permit holder objects to the amendment of the permit, then a hearing must be held, as required in 12VAC5-590-160. These situations must be referred to the Director of Hearings and Legal Services in the Central Office.

If the certified mail is returned undelivered, then the DE should make every effort to contact the permit holder in person, email or by telephone. If these attempts are unsuccessful, then the DE shall proceed to issue the amended permit.

8.9.2. Procedures

The following procedures shall be followed when amending a permit:

1) Retain existing permit number (Add a "T" for temporary permits, "P" for provisional permits, as described later in this memo)
2) Modify EFFECTIVE DATE of permit
3) Add EXPIRATION DATE for temporary or provisional permits
4) Modify date of Engineering Description Sheet (on both the permit and the Description Sheet), if applicable.

When the amended permit is forwarded to the ODW Director, the Operation Permit Checklist should include a brief explanation for the permit amendment in the “Comments” section of the Transmittal Checklist.

Be sure that a copy of the amended permit is also sent to all entities (local governments, etc.) that received a copy of the original permit from ODW. Use the template transmittal letter provided in Attachment A.9, including an explanation that the amended permit replaces and nullifies the original, and directs the owner to destroy the original permit immediately.

8.10. 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. These actions are enumerated in Special Permit Requirements, which are attached to the permit with the EDS.

A Temporary Operation Permit may be appropriate 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) To support an Enforcement action (Administrative Order) requiring specific studies or improvements;
3) Existing source(s) that 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. Note that the permit process would require a permit revocation prior to issuance of a Temporary Permit, and where reliability has not been demonstrated (see WM 896).

A “T” shall be placed at the end of the permit number, and an expiration date shall be included below the effective (issue) date. The expiration date will depend on the reason for issuance, and the date determination shall be documented by the Field Office and included with the permit package sent to the Director for approval. Generally a Temporary Permit shall expire in 12 – 18 months, and should not extend more than 24 months.

Temporary Operation Permit issuance and expiration dates shall be tracked in a database on “ODWSHARE”.

A standard Operation Permit should be issued before the Temporary Permit expires if the Special Permit Requirements have been completed. If not, an NOV shall be issued for Operation Permit.

Existing but newly-discovered or reclassified waterworks having groundwater sources without well yield and drawdown test results, or with test results that do not meet Maximum Contaminant Limits, and are operating without a permit, will be followed by enforcement actions as necessary.

8.11 SPECIAL PERMIT REQUIREMENTS

Special Permit Requirements may include facility improvements related to source, treatment, storage or distribution, or source yield determinations (wells, springs, etc.). Specific operations (membrane plants, 4-log virus inactivation) may also be identified in Special Permit Requirements. Refer to **Attachment N** for a template of Special Permit Requirements.

8.12. PROVISIONAL PERMITS

A Provisional Permit may be allowed by Regulation 12VAC5-590-290 for water treatment methods, processes, or equipment which are not covered by the design criteria in Part III or Part IV of the Regulations, and which in principle and/or application are new or non-conventional. A Provisional Permit allows additional time for testing and evaluation of the treatment method, process, or equipment to establish confidence the waterworks will operate as proposed. Refer to 12VAC5-590-290 for requirements.

Provisional Permits shall be issued for a minimum of 12 months but no longer than 18 months to provide time for the evaluation period. For Provisional Permits place a "P" at the end of the permit number, and include the Expiration Date below the Effective (Issue) Date.

Provisional Operation Permit issuance and expiration dates shall be tracked in a database on "ODWSHARE".

8.13 PERMIT REVOCATION

A permit may be revoked pursuant to 12VAC5-590-320 of the Waterworks Regulations and VA Code §32.1-174 for:

a. failure to comply with the conditions of the permit;
b. violation of §32.1 of the Code or the Waterworks Regulations;
c. change in ownership;
d. abandonment;
e. owner has failed to pay waterworks operations fee;
f. waterworks has discontinued supplying water;
g. waterworks is no longer classified as a waterworks;
h. waterworks can no longer be depended upon to furnish pure water;
i. capacity of the waterworks is inadequate;
j. owner has failed to abide by an order issued by the Commissioner.

Justification for revocation needs to be evaluated on a case-by-case basis with input from the enforcement staff. In some situations, permit revocation may need to be pursued through the enforcement process.

When the permit holder is initiating the revocation, they may request permit revocation in writing; and if applicable, should specify in the request that a hearing is not required. A letter revoking the permit is then to be prepared for the Office Director's signature.

When ODW is initiating the revocation, the DE, with concurrence of the FD, will send a notice by certified mail, return receipt requested, to the permit holder stating that it is our 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 **Attachment A.10** (Notice of Intent to Revoke Permit) and **A.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 DE should make every effort to contact the permit holder in person, or by telephone or email. If the attempts are unsuccessful,

then the DE, with concurrence from the FD, will prepare a letter of revocation for the ODW Director's signature. The letter, signed by the ODW Director, will be mailed to the permit holder at the last known address by certified mail, return receipt required. If the letter is returned undelivered, it shall be retained in the correspondence file as evidence of notification, and will serve as authorization to revoke the permit.

2) If the permit holder notifies the Office in writing that he does not object to revocation of the permit, prepare a letter for the ODW Director's signature revoking the permit. If the permit holder objects to the revocation of the permit, then a hearing must be held, in accordance with 12VAC5-590-160 of the Regulations. These situations must be referred to the Director of Hearings and Legal Services in the Central Office for further guidance.

ODW shall require the waterworks owner to notify all customers of the change in status if there are any unresolved water quality issues. If the owner is unable or unwilling to do so, the Field Director shall consult with the local Health Director regarding the need to notify customers directly.

ODW shall notify the local building official of the details pursuant to permit revocation, by copy of the notification letter.

9. DESIGN CAPACITY EVALUATION OF WATERWORKS

9.1 INTRODUCTION

12VAC5-590-690 of the *Regulations* requires that the waterworks' design capacity exceed the maximum daily water demand of the system. The waterworks' design capacity is determined through an evaluation of the major components' ability to meet that demand at a minimum 20 psi pressure.[4] (Major component categories are source, treatment, delivery and storage). The limiting value becomes the permitted capacity of the waterworks. Source capacity *may* be further limited by the Department of Environmental Quality (DEQ), through a Groundwater Withdrawal Permit, or a Virginia Water Protection (VWP) Permit that limits surface water withdrawal.

9.2. DESIGN BASIS

9.2.1. Water Supply Planning

The State Water Control Board's regulation 9VAC25-780 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 adequate to meet demands. The Health Department is to be given the opportunity to comment on the plan as well as drought response and contingency plans (referred to as the "local program") during a 90 day review period.

The Water Supply Plan will include 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

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

industrial, etc. These Regulations require all local programs to be reviewed, revised and resubmitted to DEQ every 10 years after the last approval date.

9.2.2. Water Demands and the Equivalent Residential Connection (ERC)

ERC is defined in 12VAC5-590-10 of the *Regulations* as equal to 400 gallons per day. It is a fixed rate which is used as the demand basis for evaluating the waterworks capacity. If actual water usage figures (or water demands in an approved Water Supply Plan) are available and reliable, they should be used to evaluate the design. Caution is advised when using Water Supply Planning data for design basis; note the date and source of data used in the Plan. A peaking/safety factor should be used to establish a maximum day demand from average or maximum monthly water consumption data.

When water use data is used as a design basis, a connection is expressed as a fraction of an ERC. By example, if water usage figures indicate that 1 single family connection uses 280 gpd, then the design basis becomes: 1 connection = 280 gpd = 0.70 ERC, and this value is used to evaluate the waterworks. This is illustrated for community and non-community waterworks:

Community Waterworks

The design basis shall be defined in gpd and ERC units; for example:

1 mobile home connection = 300 gpd = 0.75 ERC
1 residential connection = 400 gpd = 1 ERC

If a community waterworks consists of a variety of users, then estimate the total water demand in gpd and divide by 400 gpd/ERC, to determine the ERC value.

The capacity of a community waterworks is evaluated in terms of flowrate (gpd) and ERC in the Engineering Description Sheet. On the Operation Permit it is expressed in terms of gpd only, unless adequate information is not available to establish a design flow capacity. If only one groundwater source is available, the waterworks is limited to a maximum of 49 residential connections. In this case, the permit capacity should be written in terms of "no more than 49 residential connections or [*the waterworks' limiting component capacity in gpd],* whichever is reached first". Refer to the example in this memo.

Noncommunity Waterworks:

The design basis for waterworks with non-residential water use must also be clearly defined – for example:

Factory A:	25 gpd / person / 8-hr shift
Hospital B:	300 gpd / bed
School C:	10 gpd/person (students + staff)

Regardless of whether a meter is provided, include an estimate of the water usage in flow rate units (gpd), and define the basis for the estimate in the capacity evaluation. The basis can be derived from the *Waterworks Regulations* "Daily water consumption rates (annual daily water demand)", actual water usage measurements from the customer or similar facilities, measured peak hourly rates or estimates with defined peaking factors, and other published references.

Where a meter is not provided, define the waterworks' capacity in terms of the user characteristics, i.e. number of hospital beds, restaurant seats, students and staff, etc.

9.3 GROUNDWATER SOURCES

9.3.1 Well Yield

Groundwater well source capacity is determined from the well yield test results and the well pump performance characteristics. The well safe 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 safe yield. The pump should be sized not to exceed the well yield test results, except under unusual circumstances.

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

The Department of Environmental Quality (DEQ) currently regulates two Groundwater Management Areas in the Coastal Plain. Wells in these areas may require a Groundwater Withdrawal Permit from DEQ if they withdraw 300,000 gal/month or more.

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

An alternative yield and drawdown test procedure (as described below) may be allowed for wells if a DEQ Withdrawal Permit is *NOT* required. Wells drilled into consolidated aquifers (rock) and/or water table aquifers (shallow wells) are excluded from this procedure. Consultation by the owner with the District Engineer must be conducted prior to initiation of this alternative yield and drawdown test procedure. Agreement must be documented in writing and signed by the owner and District Engineer.

1) The yield and drawdown test duration will be a minimum of 24 hours.

2) Calculations will be submitted to the District Engineer with the 24 hour yield data which projects the maximum available drawdown (based on pumping times of 2880 minutes and 100,000 minutes) and the maximum predicted well yield. The maximum predicted well yield will be limited to the more stringent of the following criteria:
   - Twice the 24 hour pump test rate
   - 80% of the available drawdown [specific capacity (gpm/ft) x drawdown (ft) x 0.8]

3) The specific capacities of the well at 500, 1000, and 1440 minutes must be within 10% of each other.

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

A 48-hour yield and drawdown test will normally be run 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 pumping rate will be controlled throughout the test to maximize the production from the well during the test. The yield and drawdown test will be run such that at a constant flowrate a stabilized pumping water level is achieved for at least the last six hours of the yield test. Immediately following the yield and drawdown test, the water level

recovery in the well will be recorded for no less than 6 hours, or until the well returns to its static water level, whichever occurs first.

9.3.4. Other Yield Considerations

When the well is drilled into geologic formations that have historically demonstrated a declining well yield over time (typically fractured rock wells), the capacity of the well as determined by the yield and drawdown test may be reduced by up to 50%, with concurrence of the Field Director.

The Regulations allow Non-community waterworks to reduce the yield test to no less than 8 hours, if source capacity requirement is 3 gpm or less. The minimum 8 hr test duration will only be considered for Transient Non-community waterworks.

Non-transient Non-community systems such as 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 safe 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 safe yield will be assigned as:

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

The safe yield will be reevaluated periodically (every three years recommended).

A waterworks utilizing wells as the sole source of supply will provide a minimum source capacity (well yield) of 0.5 gpm/ERC, per the *Regulations*. This equates to 800 min/day of well operation (400 gpd/ERC)/(0.5 gpm/ERC), or a safety factor of 1.8 (1440 min/day)/(800 min/day).

Systems serving > 49 residential connections must provide at least one additional well with a capacity of ≥ 20% of the total required capacity[5].

Well Yield Calculation:

Community

_Q_ gpm (over a 48 hr test) / 0.5 gpm/ERC = ___ERC
___ ERC * 400 gpd/ERC = ___ gpd

Non-community

Q gpm (over a 48 hr test)) * 1440 min/day = ____ gpd
(conversion to gpd may be reduced, depending on system time of operation)
___gpd / ___gpd/person = ___ persons
___gpd / ___gpd/bed = ___ beds, etc.

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.

[5] *Note that the proposed Regulations revisions increase this value to 30%*

Q gpd = Q gpm * 1440 min/day = ___ gpd

Wells will be evaluated individually for both *yield* and *pump capacity*, and the limiting value selected for each well. Waterworks with multiple wells are evaluated for source capacity as illustrated below:

Well #	Well Yield, gpd = gpm / (0.5 gpm/ERC) * 400 gpd/ERC		Well Pump, gpd = gpm * 1440 min/day		Limiting Capacity, gpd
1	10 gpm	8,000 gpd	10 gpm	14,400 gpd	8,000 gpd
2	20 gpm	16,000 gpd	10 gpm	14,400 gpd	14,400 gpd
Total	-	-	-	-	22,400 gpd

9.4. SPRING SOURCES

The safe yield of new springs will be determined using actual source water flow data. Until sufficient data is available to conduct a frequency distribution analysis (the Log Pearson Type III method is recommended with a minimum of 1000 daily flow measurements) the capacity will be assigned as:

- the lowest day production rate of record if the spring is the sole source for the waterworks
- the lowest average daily production rate for any month if the spring is not the sole source for the waterworks

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

Other unusual surface water sources, such as reclaimed mines, may be suitable to this method of determining safe yield. The safe yield of these sources will be reevaluated periodically (every three years recommended), in accordance with Special Permit Requirements issued with a Temporary Operation Permit.

9.5. SURFACE WATER SOURCES

9.5.1. Safe Yield

The Regulations refer to the safe yield of surface water reservoirs as the minimum daily withdrawal rate determined by the worst drought of record since 1930. For run-of-the-stream intakes, the safe yield is the 1Q30 flow, which is statistically a flow that occurs on average one day every 30 years. Safe yield is determined by hydrologic analysis of stream gage data from the proposed intake's waterway. If the data is unavailable, data may be transposed from another watershed with similar hydrologic characteristics.

If DEQ has not made an evaluation of the safe yield (the most recent determination is available on "ODWSHARE"), then safe yield will be determined by the waterworks' engineer and submitted for review and approval to ODW.

9.5.2. Withdrawal Permits

Withdrawal restrictions are typically established through a Virginia Water Protection (VWP) permit, issued by the Virginia Department of Environmental Quality (DEQ). 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, maximum annual, and maximum instantaneous withdrawal rates. The details

of the VWP permit restrictions must be included in the capacity evaluation of the surface water source. The maximum daily withdrawal rate in the VWP permit will be used as the limiting source water quantity. In some cases, this value may be less than the 1Q30 flow.

9.5.3. Intake Capacity

Pumps

The intake pump capacity will be determined 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, and must be included 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.

9.6. TREATMENT

All major treatment process units will be evaluated for hydraulic capacity and documented in the design review of a project; however, only the limiting component needs to be included in the EDS capacity evaluation. For conventional surface water treatment plants, the major processes include:

- Coagulation
- Flocculation
- Sedimentation
- Filtration
- Disinfection

Example 1 – Flocculation:

Q gpm = Floc. Basin Volume (gal) / Detention Time (min)

Q gpm * 1440 min/day = ___ gpd

Example 2 – Filtration:

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

Q gpm * 1440 min/day = ___gpd

(Generally the filters are the limiting component in conventional plants.)

In nonconventional plants, major process units which will be evaluated 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, then this amount is added to Q to determine the total capacity.

9.7. DELIVERY SYSTEMS

9.7.1. Booster Pump Capacity

This includes groundwater facilities using pressure and atmospheric storage, and consecutive in-line booster pump stations in the distribution system serving ≤ 49 connections with pressure storage only.

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

The required capacity must meet the *peak* hour demand, or the maximum day demand + fire flow (whichever is the design condition).

For small community systems (less than 1000 residential connections) the *peak* hour demand is Q (gpm) = 11.4 $N^{0.544}$, where N = number of residential connections.

For noncommunity systems, the *peak* hour demand must be provided by the owner's engineer.

9.7.2. Transfer Capacity

This includes groundwater well pump and hydropneumatic tank; no booster pumps.

Transfer capacity is computed for noncommunity waterworks using the Design Exception noted in 12 VAC 5-590-1250A: Transfer capacity is the capacity of the well pump output over 1 hour + effective storage of the hydropneumatic tank. For example, a TNC waterworks has a peak hourly demand of 50 gpm, a well capacity of 44 gpm, and a pressure tank with an effective storage of 360 gal.

The required transfer capacity is: 50 gpm * 60 min = 3,000 gal

The transfer capacity provided is: 44 gpm * 60 min = 2,640 gal
+ effective storage of the hydropneumatic tank = 360 gal
Total transfer capacity = 3,000 gal

Low Service and High Service Pumps (surface water facilities) and Distribution Booster Pumps (transfer to pressure zone with atmospheric storage) are evaluated thus:

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

Q gpm * 1440 min/day = ___ gpd

9.8. STORAGE

9.8.1. Minimum Storage Capacity

The *Regulations* require a minimum effective storage of 200 gallons/ERC (which equates to at least one-half the design maximum daily demand) at minimum pressure (20 psi). Non-community 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.).

Raw or partially treated water storage is NOT included in the evaluation of water storage capacity.

9.8.2. Storage in Primary & Consecutive Waterworks

The Operation Permit Engineering Description Sheets of both primary and consecutive waterworks must include information on the provision of storage: whether storage is provided by the primary, by the consecutive, or a combination thereof and whether the storage arrangement is by contract.

9.8.3. 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.

9.8.4. 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.

9.8.5. 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).

9.9. DESIGN EXCEPTIONS AND PERMIT CAPACITY

9.9.1. Storage Design Exceptions

Waterworks may be granted an exception to the storage requirement if computer modeling demonstrates that adequate pressure will be maintained under peak demands, including fire flows. An extended period simulation will be used for this purpose. The minimum requirements for the model are as follows:

a. Use a calibrated system model that accurately reflects the existing pipes, pump stations, and storage tanks and the way they are actually operated
b. 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.
c. Input set points (pump on/off, tank levels) similar to normal operating values
d. Model extended period simulation of MDD with fire flow added during the peak hour
e. Model duration of at least 30 hours (48 hours recommended).

The success criteria required to demonstrate that the waterworks has sufficient capacity to meet both existing and future water demands are as follows:

a. All nodes must be able to provide a minimum 20 psi at both MDD plus fire flow and at peak hour flow conditions.

b. 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.
c. Tanks must not empty. The levels for elevated tanks must fluctuate less than 30 feet.

Waterworks that are permitted an exception to the storage requirement in the *Regulations* must update their computer model continuously to reflect changing facilities, demands and operating conditions. At a minimum, the model will be run every two years to verify that the waterworks is able to meet the defined success criteria at the permitted flow. This requirement will be included as a condition of the Operation Permit.

Emergency/standby power capabilities will be required to provide emergency power for all pumping needs required in the computer model. Emergency power capabilities (i.e. portable generator receptacle/hook up and manual transfer switch) shall be required at waterworks serving < 500 population. Standby power (i.e. automatically activated on-site generator) will be required for other waterworks.

9.9.2 Conventional Plant Re-rating

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

9.10 CONCLUSIONS

The Capacity Evaluation in the EDS will conclude with a summary sentence / paragraph. These will be different for Construction Permits and Operation Permits.

9.10.1. Construction Permits

It is important not to “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 EDS 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.”

9.9.2. Operation Permits

The capacity evaluation conclusion in an Operation Permit EDS 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 of the Operation Permit’s Engineering Description Sheet for a pre-existing system will depend on the evidence to substantiate whether the system is performing adequately. Existing systems with no evidence of inadequate performance in the past may be permitted for the capacity of the existing service(s), described in appropriate units for the waterworks (such as restaurant seats), until missing data is obtained and evaluated.

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, 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 and the first page of the EDS, the design capacity shall read "### gpd and no more than 49 residential connections".

Existing transient non-community 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:

VWP Permit withdrawal limitation is less than the hydraulic capacity of all other components:

"Conclusion: This waterworks is limited to a capacity of ### gpd due to the maximum daily withdrawal restriction in VWP Permit No. ###."

Waterworks has been granted a Design Exception to storage requirement after demonstrating reliable service by computer modeling; storage is no longer the limiting component. 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."

9.11. EXAMPLE CALCULATIONS

The following examples are given for capacity evaluations to be included in an Operation Permit Engineering Description Sheet. Change the title from "CAPACITY EVALUATION OF THE WATERWORKS " to "PROJECT CAPACITY EVALUATION" for a Construction Permit.

9.11.1 Community Waterworks

Example 1

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.

CAPACITY EVALUATION OF THE WATERWORKS

Design Basis: per Waterworks Regulations, one ERC= 400 gpd.

1. Estimated Water Demand: (40 connections)(400 gpd/ERC) = 16,000 gpd

2. Source Capacity:
   Well Yield: 30 gpm / 0.5 gpm/ERC = 60 ERC
   60 ERC * 400 gpd/ERC = 24,000 gpd

   Well Pump Capacity: 20 gpm * 1440 min/day = 28,800 gpd

3. Booster Pump Capacity: combined capacity = 120 gpm
   Assigning $Q_{pk\ hr}$ = 120 gpm = 11.4 $N^{0.544}$
   Solving for N = ERC = 76
   76 ERC * 400 gpd/ERC = 30,400 gpd

4. Storage Capacity: 20,000 gal + 5,000gal/3 = 21,700 gal
   21700 gal / 200 gal/ERC = 108 ERC
   108 ERC * 400 gpd/ERC = 43,300 gpd

Conclusion: This waterworks is limited to 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 capacity should be limited 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 permit would be limited to 19,600 gpd (49*400 gpd/ERC) or 49 connections, whichever comes first}*

Example 2

If the system above had 50 connections, 2 wells with a yield of 10 gpm and 20 gpm respectively, and individual well pump capacities of 10 gpm, then the evaluation would be as follows:

CAPACITY EVALUATION OF THE WATERWORKS

Design Basis: per Waterworks Regulations, one ERC= 400 gpd.

1. Estimated Water Demand: (50 connections)(400 gpd/ERC) = 20,000 gpd

2. Source Capacity:

Well #	Well Yield, gpd = gpm / (0.5 gpm/ERC) * 400 gpd/ERC		Well Pump, gpd = gpm * 1440 min/day		Limiting Capacity, gpd
1	10 gpm	8,000 gpd	10 gpm	14,400 gpd	8,000 gpd
2	20 gpm	16,000 gpd	10 gpm	14,400 gpd	14,400 gpd
Total	-	-	-	-	22,400 gpd

3. Booster Pump Capacity: combined capacity = 120 gpm
   Assigning $Q_{pk\ hr}$ = 120 gpm = 11.4 $N^{0.544}$
   Solving for N = ERC = 76
   76 ERC * 400 gpd/ERC = 30,400 gpd

4. Storage Capacity: 20,000 gal + 5,000gal/3 = 21,700 gal
   21700 gal / 200 gal/ERC = 108 ERC
   108 ERC * 400 gpd/ERC = 43,300 gpd

Conclusion: This waterworks is limited to a capacity of 22,400 gpd due to a combination of limited well yield and well pump capacity.

{The capacity on the Operation Permit would be written as 22,400 gpd.}

Example 3

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.

CAPACITY EVALUATION OF THE WATERWORKS

Design Basis: per Waterworks Regulations, 1 mobile home connection = 300 gpd = 0.75 ERC

1. Estimated Water Demand: (44 connections)(300 gpd/connection) = 13,200 gpd

2. Source Capacity:
   Well Yield: (32 gpm) / 0.5 gpm/ERC = 64 ERC
   64 ERC * 400 gpd/ERC = 25,600 gpd
   Well Pump Capacity: (30 gpm) * 1440 min/day = 43,200 gpd

3. Storage Capacity: Effective storage = 3 * 86gal / 3 = 86 gal
   86 gal / 200 gal/ERC = 0.43 ERC
   0.43 ERC * 400 gpd/ERC = 172 gpd

Conclusion: This waterworks is limited to a capacity of 172 gpd due to limited storage. However, the waterworks has a history of satisfactory performance and is therefore permitted for the existing 44 mobile home connections.
{The capacity on the Operation Permit would be written as 44 existing mobile home connections.}

9.11.2. Nontransient-Noncommunity (NTNC) Waterworks

Example
A school designed for 300 students and staff 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.

CAPACITY EVALUATION OF THE WATERWORKS

Design Basis: per Waterworks Regulations, the design daily water demand at an elementary school = 10 gpd/person.

Estimated Water Demand
Design Daily Demand: (300 persons)(10 gpd/person) = 3,000 gpd

Peak Hour Demand: Estimated PF[6] = (4)(24hrs/day/8hrs/day use) = 12
(12) (300 persons)(10 gpd/person) = 36,000 gpd
36,000 gpd (1 hr) / 24 hr/day = 1,500 gal

1. Source Capacity:
   Well Yield: 12 gpm * 1440 min/day = 17,280 gpd

   Well Pump Capacity: 10 gpm * 1440 min/day = 14,400 gpd

3. Greensand Filter Capacity: (π * 4)/4 sf * 3 gpm/sf = 9.42 gpm
   9.42 gpm * 1440 min/day = 13,600 gpd

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 Engineering Description Sheet capacity evaluation.

4. Booster Pump Capacity: combined pump capacity = 30 gpm
   30 gpm * 1440 min/day = 43,200 gpd
   The pumps must be able to meet peak hour demand in conjunction with storage.

5. Storage Capacity: 5,000 gal + 5,000 gal/3 = 6,670 gal
   Noncommunity systems are required to provide delivery capacity to meet peak hour demand.

   Estimated delivery capacity during 1 hour (including pressure storage):
   Booster pumps = (43,200 gpd / 24 hr/day)(1 hr) = 1,800 gal
   Hydro Tank = 5,000 gal/3= 1,700 gal
   Total = 3,500 gal

Peak hour demand = 1,500 gal < 3,500 gal provided with storage

Conclusion: This waterworks is limited to a capacity of 13,600 gpd due to limited treatment capacity, and is adequate for the design capacity of 300 students and staff. {*The capacity on the Operation Permit would be written as 13,600 gpd.*}

9.11.3. Transient Noncommunity (TNC) Waterworks

Example 1

Existing system without well yield or pump capacity information; no meter:
A 30 seat restaurant is discovered; the water system consists of a well and 86-gal bladder tank serving one building. No meter or treatment is included in the waterworks.

CAPACITY EVALUATION OF THE WATERWORKS

Design Basis: per Waterworks Regulations, the average water demand for a restaurant is 50 gpd/seat.

1. Estimated Water Demand: 50 gpd/seat * 30 seats = 1500 gpd

[6] It would be preferable to get this value from the engineer rather than computing with peaking factor (PF) assumptions

2. Source Capacity:
   Well Yield: No information
   Well Pump Capacity: No information

3. Storage Capacity: Effective storage = 86 gal / 3 = 29 gal
   Noncommunity systems are required to provide delivery capacity to meet peak hour demand.

Conclusion: This waterworks is limited to 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 capacity on the Operation Permit would be written as one existing structure with 30 existing restaurant seats.}*

Example 2

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 from May 1 to October 31 every year. It averages 1500 visitors/day and has two comfort stations behind the visitor center. 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.

CAPACITY EVALUATION OF THE WATERWORKS

Design Basis: per Waterworks Regulations, the average water demand for a picnic area is 5 gpd/person.

1. Estimated Water Demand: (1500 visitors) (5 gpd/visitor) = 7,500 gpd

2. Source Capacity:
   Well Yield: 51 gpm * 1440 min/day = 73,400 gpd

   Well Pump Capacity: (26 gpm)(1440 min/day) = 37,400 gpd

3. Storage Capacity: Effective storage = 20,000 gal
   Noncommunity systems are required to provide delivery capacity to meet peak hour demand.

Conclusion: Based on the calculations above, this waterworks is limited to a capacity of 37,400 gpd due to limited well pump capacity. {Since there appears to be plentiful water supply, an estimate of peak hourly demand is not included (and might be difficult to accurately predict). The capacity on the Operation Permit would be written as 37,400 gpd. Note that there was inadequate information provided on the hypochlorite feed system; if treatment is required then verify this data and check the adequacy of the treatment capacity with the issuance of the Operation Permit. Simple solution-type chemical feed systems do not need to be included in the Engineering Description Sheet Capacity Evaluation, but need to be included in the reviewer's notes.}

APPENDIX 1 - MEMORANDUM OF UNDERSTANDING BETWEEN DEQ-WATER DIVISION AND VDH-ODW

MEMORANDUM OF UNDERSTANDING BETWEEN

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER DIVISION

AND

VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF DRINKING WATER

APPLICATIONS FOR WATERWORKS OPERATION PERMITS
IN GROUND WATER MANAGEMENT AREAS

This Memorandum of Understanding (MOU) describes the coordinated responsibilities between the Virginia Department of Environmental Quality Water Division (DEQ-WD) and the Virginia Department of Health Office of Drinking Water (VDH-ODW) in the Ground Water Withdrawal and Waterworks Operations Permitting Processes. This coordination addresses the agency requirements associated with, and potential revisions to VDH-ODW well system capacity (Virginia Waterworks Regulations *12 VAC 5-590*, Code of Virginia *§ 32.1-12* and *§ 32.1-170*), and DEQ-WD ground water withdrawal permitting (*9 VAC 25-610*, Code of Virginia *§ 62.1-254 et seq.*). The goal of this MOU is to provide a coordinated interagency approach for the issuance of a DEQ ground water withdrawal permit consistent with VDH well site approvals, and waterworks permits. This MOU is limited to well sources in Virginia's Ground Water Management Areas.

This MOU is a statement of the intentions of the signatory agencies to coordinate their efforts to carry out their statutory duties and does not modify the statutory authorities or duties of either signatory agency. This MOU is not a contract enforceable in any judicial or administrative forum and does not create any rights or duties of any party that is not a signatory.

I. Applicable Laws and Regulations

For VDH-ODW:

12 VAC 5-590-190 (Permits) provides:

> No owner or other person shall cause or allow the construction or change in the manner of transmission, storage, purification, treatment, or distribution of water (including the extension of water pipes for the distribution of water) at any waterworks or water supply without a written construction permit from the

APPENDIX 2 - PROFESSIONAL ENGINEER (P.E.) SEAL

In accordance with the *Code of Virginia* §54.1-410.B, ODW is required to ensure that submittals for our approval comply with the rules and regulations adopted by the Board for Architects, Professional Engineers, Land Surveyors, and Landscape Architects (APELSLA). The Department of Professional and Occupational Regulation (DPOR) serves as staff to the Board.

The APELSLA Board has issued regulations which call for all work prepared by a licensed professional to carry that person's seal (18 VAC 10-20-760 B.4), including work that is not specifically required by the Code to bear a seal.

When electronic PDF documents are submitted, they shall bear the Professional Engineer's digital signature.

Plans and specifications:
In specific reference to the requirement for a professional engineer's 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. Any plan sheets prepared by a licensed engineer, other than the engineer sealing the cover sheet, must bear facsimiles (as a minimum) of the seal and signature of that engineer.

According to DPOR and APELSLA, the seal consists of the "shell" (which can be created by a rubber stamp, an embossing machine, computer-generated seals or pre-printed seals with gummed backing) and the signature and date. An "original" seal consists of the shell plus an original signature and date. A facsimile seal consists of the shell (which may at this point be duplicated via any means) and a duplicated signature and date. For an "original" seal to be properly authenticated, the signature and date must truly be original. The "shell" may be created by many different ways, some of which involve copying. For example, a computer-generated shell could be applied to the master blueprint of a cover sheet, and an engineer could apply an original signature and date to a print made from the master. This would meet the requirement for an "original" seal, signature, and date.

Addenda:
Addenda must bear an "original seal", signature and date, or the transmittal letter must be dated and signed by the licensed engineer.

Change Orders:
No seal is required for Change Orders, but a licensed engineer's signature is required. ODW may review Change Orders that have not been executed (signed by representatives of the owner and contractor.)

Technical Reports and other documents:
The cover sheet of all preliminary engineering reports shall bear an "original" seal, signature, and date. P.E. seals are also to be required for items such as compliance sampling reports, but only if they are prepared by, or under the supervision of, a licensed professional engineer. (There is no requirement for these non-engineering documents to be prepared by a licensed professional engineer.)

Land surveyors:
There has been significant controversy about the role of land surveyors with respect to preparation of certain types of plans and specifications. The *Code of Virginia*, at §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. The *Code* then goes on to 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 old §54.17.1(3)(b) or who have passed the appropriate exam given by APESLA may lay out the routing of a waterline on plans, but may not select the size or materials for that waterline. This work is to be done by a licensed P.E. 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 licensed P.E.

APPENDIX 3 - LOCALITY CODES

CODE	COUNTY	DISTRICT	CODE	COUNTY	DISTRICT	CODE	IND. CITY	DISTRICT
001	Accomack	22	103	Lancaster	17	510	Alexandria	08
003	Albemarle	10	105	Lee	01	515	Bedford	12A
005	Alleghany	05	107	Loudoun	08	520	Bristol	01
007	Amelia	11	109	Louisa	10	530	Buena Vista	06
009	Amherst	11	111	Lunenburg	12A	540	Charlottesville	10
011	Appomattox	11	113	Madison	09	550	Chesapeake	20B
013	Arlington	08	115	Mathews	18	560	Clifton Forge	10
015	Augusta	06	117	Mecklenburg	13	570	Colonial Heights	19
017	Bath	06	119	Middlesex	18	580	Covington	05
019	Bedford	11	121	Montgomery	04	590	Danville	12B
						595	Emporia	19
021	Bland	03	125	Nelson	10			
023	Botetourt	05	127	New Kent	15B	600	Fairfax	08
025	Brunswick	13	131	Northampton	22	610	Falls Church	08
027	Buchanan	02	133	Northumberland	17	620	Franklin	20B
029	Buckingham	14	135	Nottoway	12A	630	Fredericksburg	16
						640	Galax	03
031	Campbell	13	137	Orange	09			
033	Caroline	16	139	Page	07	650	Hampton	21
035	Carroll	03	141	Patrick	14	660	Harrisonburg	06
036	Charles City	15A	143	Pittsylvania	12B	670	Hopewell	19
037	Charlotte	14				678	Lexington	06
						680	Lynchburg	11
041	Chesterfield	15B	145	Powhatan	15B			
043	Clarke	07	147	Prince Edward	14	685	Manassas	08
045	Craig	05	149	Prince George	19	687	Manassas Park	08
047	Culpeper	09	153	Prince William	08	690	Martinsville	12B
049	Cumberland	14	155	Pulaski	04			
						700	Newport News	21
051	Dickenson	02	157	Rappahannock	0	710	Norfolk	20A
053	Dinwiddie	19	159	Richmond	17	720	Norton	01
057	Essex	18	161	Roanoke	05			
059	Fairfax	08	163	Rockbridge	06	730	Petersburg	19
061	Fauquier	09	165	Rockingham	06	735	Poquoson	21
						740	Portsmouth	20A
063	Floyd	04	167	Russell	02			
065	Fluvanna	10	169	Scott	01	750	Radford	04
067	Franklin	12A	171	Shenandoah	07	760	Richmond	15A
069	Frederick	07	173	Smyth	03	770	Roanoke	05
071	Giles	04	175	Southampton	20B			
						775	Salem	05
073	Gloucester	18	177	Spotsylvania	16	780	South Boston	14
075	Goochland	15B	179	Stafford	16	790	Staunton	06
077	Grayson	03	181	Surry	19	800	Suffolk	20B
079	Greene	10	183	Sussex	19			
081	Greensville	19	185	Tazewell	02	810	Virginia Beach	20A
						820	Waynesboro	06
083	Halifax	14	187	Warren	07	830	Williamsburg	21
085	Hanover	15A	191	Washington	03	840	Winchester	07
087	Henrico	15A	193	Westmoreland	17			
089	Henry	12B	195	Wise	01			
091	Highland	06	197	Wythe	03			
093	Isle of Wight	20A	199	York	21			
095	James City	21						
097	King and Queen	18						
099	King George	16						
101	King William	18						