

**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF HEALTH
OFFICE OF DRINKING WATER**

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To: Office of Drinking Water Staff

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Subject: **Working Memo 852**
SURVEILLANCE & REGULATIONS – Source Water Assessment Program
Implementation

Summary:

Section 1453 of the 1996 Amendments to the Safe Drinking Water Act requires each State to develop a Source Water Assessment Program (SWAP) that will delineate the boundaries of the assessment areas, identify contaminants and determine source susceptibility, and make these results available to the public. The main goal of the SWAP in Virginia is to help waterworks owners develop and implement a Source Water Protection Plan or its equivalent, which is also referred as a “Strategy in Place.” This memo is designed to instruct Office of Drinking Water (ODW) staff on implementation procedures and describes the deliverables associated with the SWAP.

This memo replaces Working Memo 852, dated December 15, 2004, in its entirety, including all appendices.

Disclaimer:

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1. PURPOSE

The purpose of the SWAP is to identify potential sources of contamination (PSCs) which are inventoried in available State, Federal and private databases, and potential conduits to groundwater (PCs), that could impact public water supplies (both groundwater and surface water) and present a threat to public health.

The main goal of the SWAP is to help waterworks owners develop and implement a Source Water Protection Plan or its equivalent, which is also referred to as a 'Strategy in Place'. The SWAP deliverables are also valuable in assessing proposed water sources (particularly well sites), evaluating synthetic organic chemical sampling requirements (waiver applications), and performing routine sanitary surveys of waterworks' sources.

Source water protection is supported by the ODW through related activities, including:

- Contract assistance with Source Water Protection plan development and implementation
- GIS mapping
- Source Water Protection Plan templates
- Wellhead Protection implementation project grants

More information about ODW's Source Water Assessment and Protection Programs is provided at: <http://www.vdh.virginia.gov/drinking-water/source-water-programs/>.

2. AUTHORITY

Section 1453 of the 1996 Amendments to the Safe Drinking Water Act requires each State to develop a Source Water Assessment Program that will:

- **“delineate the boundaries of the assessment areas** in such State from which one or more public water systems in the State receive supplies of drinking water, using all reasonably available hydrogeologic information on the sources of supply of drinking water in the State and the water flow, recharge, and discharge and any other reliable information as the State deems necessary to adequately determine such areas; and
- **identify the contaminants** regulated under this title for which monitoring is required under this title (or any unregulated contaminants selected by the State, in its discretion, which the State, for the purposes of this subsection, has determined may present a threat to public health), to the extent practical, the origins within each delineated area of such contaminants to **determine the susceptibility of the public water systems in the delineated area** to such contaminants.”
- **“...make the results** of the source water assessments conducted under this subsection **available to the public.**”

3. PROCESS OVERVIEW

This document describes the process for ODW staff to complete a Source Water Assessment in the Commonwealth of Virginia. The main steps are:

- Delineating the source water assessment area,
- Creating the inventory of potential contamination sources, and

- Determining the susceptibility of the source.

3.1 Source Water Assessment Area Delineation

ODW uses three categories of drinking water sources to delineate an assessment area: Groundwater, Groundwater under the Influence of Surface Water (GUDI), and Surface Water. All assessment areas are segregated into Zone 1 and Zone 2 assessment areas.

The Zone 1 assessment area is a priority zone for managing potential sources of contamination where contamination is believed to pose the greatest risk. Zone 2 is a secondary, larger management zone where potential sources of contamination are inventoried for long-term protection of the source.

Source Water Assessment Areas are determined as follows:

Groundwater Assessment Area

- Zone 1 = 1000-foot fixed radius surrounding source
- Zone 2 = 1-mile fixed radius surrounding source and outside of Zone 1

Surface Water Assessment Area

- Zone 1 = Watershed area within a 5-mile fixed radius of the raw water intake
- Zone 2 = Total watershed area outside of Zone 1

Groundwater Under the Direct Influence of Surface Water (GUDI)

With no identified flowing surface source:

- Zone 1 = 1000-foot fixed radius surrounding source
- Zone 2 = 1-mile fixed radius surrounding the source and outside of Zone 1

With identified flowing surface source:

- Zone 1 = 1000-foot fixed radius surrounding source
- Zone 2 = Total watershed area upgradient of the source and outside of Zone 1

3.2 Potential Sources of Contamination (PSC) Inventory

Once the source water assessment area has been delineated, a PSC inventory is created. This task mainly consists of listing sites that may cause water quality degradation if not properly managed. The PSC inventory and associated mapping are included in the “SWAP Outputs” located at \\odwsrv1\odwshare\15-SWAP-Processing\08-SWA_Outputs\

The PSC inventory includes information on each PSC such as the facility type, expected contaminants, distance to the source, and the owner’s mailing address. PSC locations are plotted on the Zone 1 and Zone 2 maps provided in the “SWAP outputs”.

A supplemental land use map is also provided in the “SWAP Outputs”. This helps to identify potential non-point sources of contamination, which would not be represented on the PSC maps or inventory. This information is not used in the susceptibility determination, but is an important tool for utilities developing Source Water Protection Plans.

Additional information on SWAP documents that are included in the “SWAP Outputs” can be found in the SWAP User Guide found in every GIS output folder.

In order to maximize the resources available for the SWAP, ODW relies primarily on third party information. Consequently, the information is only as good as that provided by the source. A small portion of the PSC database is owned and maintained by ODW; this information was collected during the initial assessment effort in 2002 and additional updates are collected during sanitary surveys/field visits, as described later in section 4.1. Some data layers from the initial ODW inventory effort such as septic drainfields have been replaced with land use mapping and other third party datasets in order to maintain the same data accuracy across the Commonwealth. These data layers are available upon request from the GIS Technician.

Since the SWAP uses large quantities of information, frequent updates to the databases are required. The Data Bibliography included in every GIS output folder provides the sources of information, the date of the last update and a description of each database.

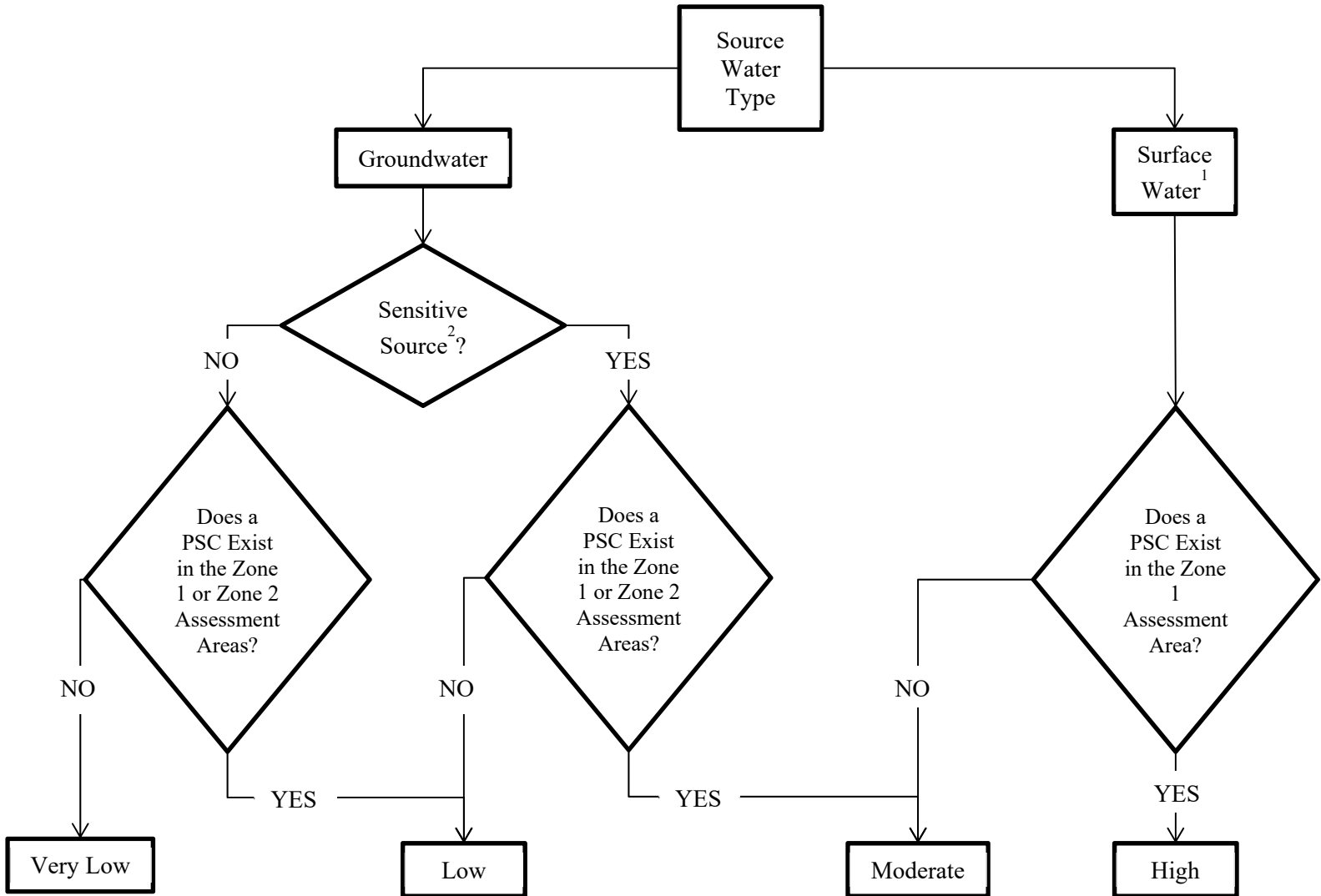
3.3 Susceptibility Determination

The PSC inventory combined with the source type (groundwater or surface water) and sensitivity determination are used to determine the sources susceptibility to contamination. The source water type, sensitivity, and number of PSCs in the Zone 1 and Zone 2 assessment area are provided in the second table of the report. The source’s susceptibility determination is provided in the first table of the report.

The sensitivity determination is based on well construction and geological setting. A Class II B (or better) well that is constructed in accordance with the *Virginia Waterworks Regulations* and has a completed Uniform Water Well Completion Report (GW-2) that shows evidence in the driller’s log that the well withdraws water from a confined aquifer is deemed to be non-sensitive. A confined aquifer is defined by the United States Environmental Protection Agency as “an aquifer bounded above and below by impermeable beds or by beds of distinctly lower permeability than that of the aquifer itself; an aquifer containing confined groundwater” (40 CFR 260.10). All other sources are deemed to be sensitive.

Figure 1 details the process for determining a sources susceptibility to contamination.

Figure 1. Susceptibility Determination Flowchart



¹ All surface water sources are considered sensitive sources

² Only a Class II B (or better) well that is constructed in accordance with the Virginia *Waterworks Regulations* and has a completed Uniform Water Well Completion Report (GW-2) that shows evidence in the driller's log that the well withdraws water from a confined aquifer is deemed to be non-sensitive.

4. DELIVERABLES

There are two different types of products that may be generated from a Source Water Assessment, depending upon the stage in the life cycle of a source. The contents, templates and coordination methods associated with each “SWAP Output” product will vary accordingly. The two types of “SWAP Outputs” are:

1) Preliminary Source Water Assessment (PreSWA)

This is requested when a public drinking water source has been proposed. A PreSWA should help waterworks owners during site selection, design and construction of **new** source(s). It also can serve as a reference for synthetic organic chemical monitoring waiver evaluations.

2) Source Water Assessment Report

This is requested when:

- An existing waterworks is developing or updating protection measures. These updates should be coordinated with the ODW-Technical Services Division and the appropriate source water protection contractor; or
- A new source is permitted at a new or existing community waterworks; or
- New information has been obtained, such as updated GIS information obtained from other regulatory agencies or from discoveries made during ODW Sanitary Surveys, which changes the susceptibility determination of a waterworks source.

Source Water Assessment Reports include “SWAP Outputs” and a Source Water Assessment Report letter. ODW-Technical Services Division will generate and provide each field office director with a list of waterworks with new or updated Source Water Assessment Reports when available.

4.1 PreSWA and Source Water Assessment Updates

SWAP Request Log

The ODW-Technical Services Division maintains a request log for all SWAP requests which can be found here: \\odwsrv1\odwshare\15-SWAP-Processing\SWAP_TrackingLog.xlsx. This log is checked multiple times daily by ODW-Technical Services Division to ensure quick turnaround. In order to make a request, please see Figures 2 and 4 and follow the instructions below:

- a) Fill one row per active (SWA_Update) or proposed source (PreSWA)
- b) For PreSWA requests, fill columns A through J.
- c) For other requests, fill columns A through G and column J. Coordinates are not required if the source has been logged into SDWIS prior to the most recent GIS update.
- d) If modifications are needed, fill columns M and P.

Column P is reserved for any notes the field staff has for the ODW-Technical Services Division staff and/or any contact information for a request that originated from outside ODW. Light blue fields are reserved for ODW-Technical Services Division use only. In addition, the GIS software does not permit use of special characters e.g. " !()- ", so please avoid using these when completing an entry.

The ODW-Technical Services Division will send email confirmation that the request has been completed. All files for ODW staff use will be saved on the shared drive based on the SWAP product type. Server locations for SWAP Products are as follows:

- PreSWA Outputs - \\odwsrv1\odwshare\15-SWAP-Processing\07-PreSWA_Outputs
- SWAP Outputs - \\odwsrv1\odwshare\15-SWAP-Processing\08-SWA_Outputs
- SWAP Reports - \\odwsrv1\odwshare\15-SWAP-Processing\12-SWA_Reports

Source Water Assessment Reports and their corresponding outputs have been previously generated and can be accessed by staff at any time at the above folder locations. The log is used to record provided reports to waterworks so that follow-up on source water protection measures can be initiated by the ODW-Technical Services Division, or to request a change to an already created report.

Figure 2. SWAP Example Request

A	B	C	D	E	F	G	H	I	J
Deliverable Type	Requestor (First & Last)	PWSID	Waterworks Type	Waterworks Name	Source	County/City	Latitude	Longitude	Request Date
PreSWA	Tony Dongarra	4133720	C	Town of Reedville	WL003B	Northumberland	37.845800	-76.276150	12/30/2016

Field Verification

While conducting a sanitary survey/field visit, the staff shall document discrepancies between current field conditions and the SWAP products and provide their notes to the ODW-Technical Services Division GIS Technician for corrections. Use the email template below (Figure 3). A word document version of this template is also available at

\\odwsrv1\odwshare\15-SWAP-Processing\PSC_Change_EmailTemplate.docx.

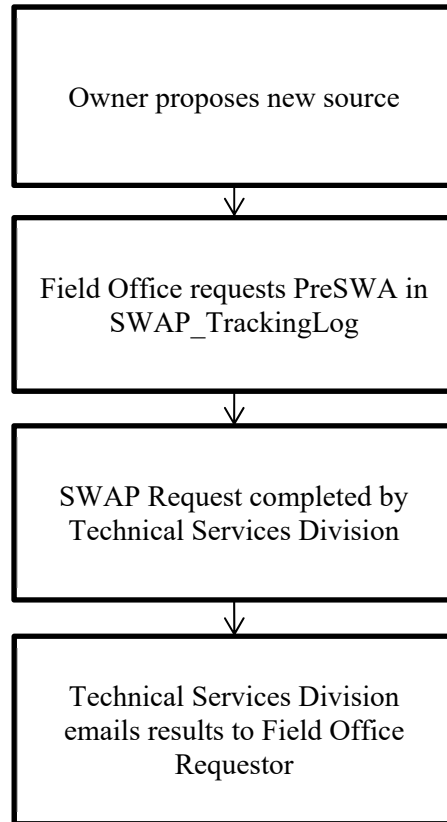
Figure 3. PSC Change Request Email Template

To: GIS Technician			
Cc: Special Project Engineer			
Subject: Sanitary Survey – PSC Change			
Content: Hello, Please see table below for an updated PSC found during a recent sanitary survey.			
PSC Type	Latitude	Longitude	Comments
Thanks, <i>Staff Signature</i>			

The ODW-Technical Services Division will then update the source water assessments as necessary. The ODW field staff is **not required** to investigate the entire extent of the assessment area. Examples of these types of corrections are:

- watershed adjustments based on field conditions
- addition/subtraction of a PSC from the assessment area during a well site inspection or sanitary survey

Figure 4. Source Water “PreSWA” Request Flow Chart



4.2 Source Water Assessment Report

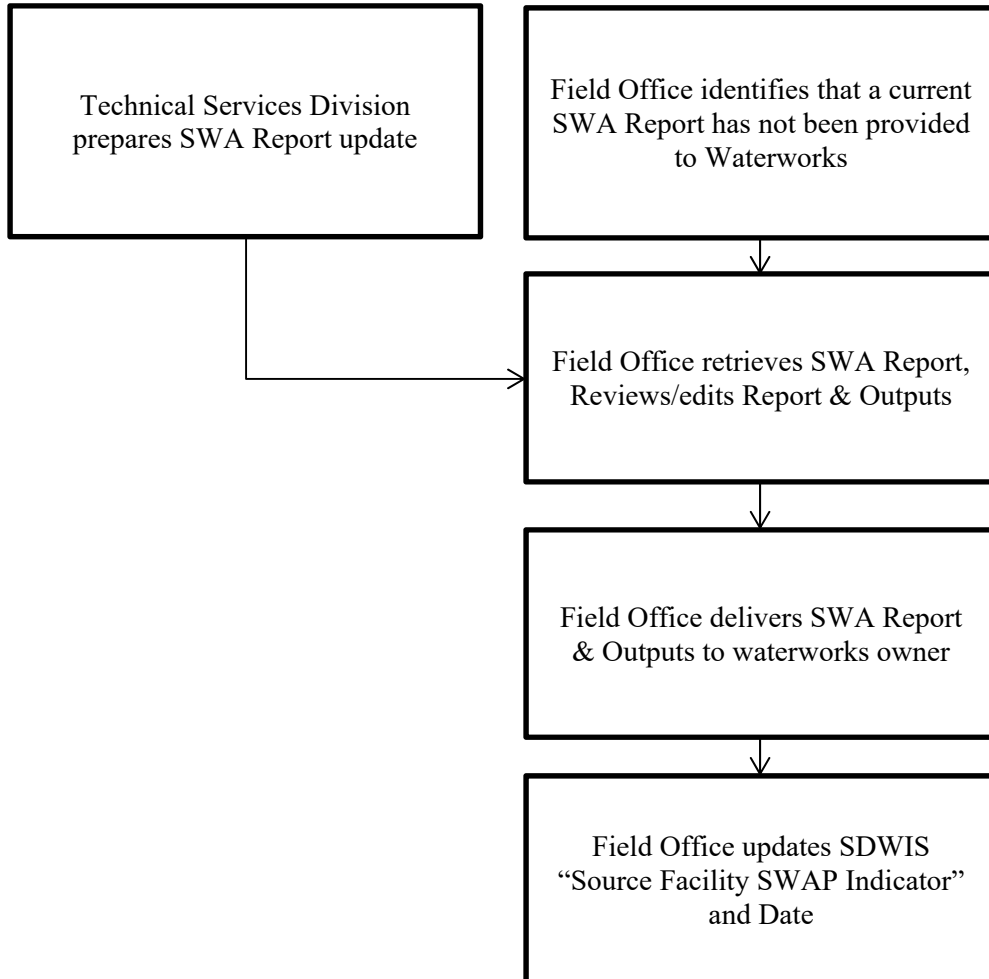
Source Water Assessment Reports are requested by ODW field staff in the processing log as a SWA_Update. These reports are generated by ODW-Technical Services Division. When reports are generated, a spreadsheet located at <\\odwsrv1\odwshare\15-SWAP-Processing\12-SWA Reports> will be made available to ODW field office staff, indicating which waterworks have a new or updated Source Water Assessment Report, and the date the report was generated.

Field office staff should provide reports to waterworks when they are attending a meeting or during a scheduled visit/sanitary survey with waterworks owner or operator. When preparing a report for issuance, field office staff will need to review the spreadsheet to confirm that the outputs are up to date and edit the automatically generated reports prior to providing them to the waterworks.

Figure 5 presents a summary of the Source Water Assessment Report procedure.

These reports will also be located with the spreadsheet at <\\odwsrv1\odwshare\15-SWAP-Processing\12-SWA Reports>. A blank template of the report letter addressed to the administrative contact will also be provided in this folder for reference.

Figure 5. Source Water Assessment Report Flow Chart



A separate report is generated for each source. For waterworks with multiple sources, information from the tables in each report should be copied to a single report when providing the documents to the waterworks. The one change required to each letter will be the signature block at the bottom of the letter which will contain the name of the person sending the report and their office.

Each report should be issued with the following attachments:

1. Source Water Assessment Delineation Definitions and GIS Products¹,
 - Zone 1 Map (one for each source)
 - Zone 2 Map (one for each source)
 - Potential Sources of Contamination Summary (one for each source, found in Summary Reports PDF)

2. Potential Sources of Contamination Inventory (one for each source, found in Summary_Reports PDF)
3. Zone 2 Land Use Map (one for each source)
4. Typical Contaminants Compendium
5. Data Bibliography

Once the reports are provided to the waterworks, field staff will update the “SWAP Report” indicator and “SWAP Report” date in SDWIS.