Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

# Department of Environmental Protection

Central Regional Office • 8 New Bond Street, Worcester MA 01606 • 508-792-7650

Charles D. Baker
Governor

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Lieutenant Governor

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Secretary

Martin Suuberg
Commissioner

August 9, 2019

Shirley Water District
Board of Water Commissioners
Attn: Ann Towne, Chair
124 Ayer Road
Shirley, MA 01464

Town: Shirley
PWS Name: Shirley Water District
PWS ID #: 2270000
WMA Permit #: 9P2-2-11-270.01
MassDEP Transmittal: WM02 X269166
Action: Draft WMA Permit Amendment

Dear Ms.Towne,

Please find the enclosed documents:

- Findings of Fact in Support of the Draft WMA Permit Amendment Decision; and
- Draft Water Management Act Permit Amendment 9P2-2-11-270.01 for the Shirley Water District in the Nashua River Basin.

Please review the draft permit. MassDEP will publish notice in the August 21, 2019 Environmental Monitor that a DRAFT Permit is available for review and comment for 30 days from the publication in the Environmental Monitor. Notice of the comment period will also be sent to all registrants, permittees and those having non-consumptive use statements within the Nashua River Basin. MassDEP expects to issue the final permit within 30 days of the close of the comment period. If you have any questions regarding the permit, please contact Susan Connors at 508-767-2701 or me at 508-767-2827.

Sincerely,

Marielle Stone, Deputy Regional Director
Bureau of Water Resources

cc: Martha Morgan, Nashua River Watershed Association, commenter
Lois Wortley, commenter
Town of Lancaster Conservation Commission, commenter
Jennifer A. Pederson, Mass Water Works Association (email)
Julia Blatt, Mass Rivers Alliance (email)
Adam Kautza, MassDFG-Westborough (email)
Duane LeVangie, MassDEP-WMA-Boston (email)

**Massachusetts Department of Environmental Protection**
**One Winter Street, Boston MA 02108 • Phone: 617-292-5751**

# Communication For Non-English Speaking Parties - 310 CMR 1.03(5)(a)

**1 English:**
This document is important and should be translated immediately. If you need this document translated, please contact MassDEP's Diversity Director at the telephone numbers listed below.

**2 Español (Spanish):**
Este documento es importante y debe ser traducido inmediatamente. Si necesita este documento traducido, por favor póngase en contacto con el Director de Diversidad MassDEP a los números de teléfono que aparecen más abajo.

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本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼與MassDEP的多樣性總監聯繫。

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**5 Ayisyen (franse kreyòl) (Haitian) (French Creole):**
Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradui imedyatman. Si ou bezwen dokiman sa a tradui, tanpri kontakte Divèsite Direktè MassDEP a nan nimewo telefòn ki nan lis pi ba a.

**6 Việt (Vietnamese):**
Tài liệu này là rất quan trọng và cần được dịch ngay lập tức. Nếu bạn cần dịch tài liệu này, xin vui lòng liên hệ với Giám đốc MassDEP đa dạng tại các số điện thoại được liệt kê dưới đây.

**7 ប្រទេសកម្ពុជា (Kmer (Cambodian):**
ឯកសារនេះគឺមានសារៈសំខាន់និងគួរត្រូវបានបកប្រែភ្លាម។ ប្រសិនបើអ្នកត្រូវបានបកប្រែ
ឯកសារនេះសូមទំនាក់ទំនងឆ្មោកជានាយក MassDEP នៅលេខទូរស័ព្ទដែលបានរាយខាងក្រោម។

**8 Kriolu Kabuverdianu (Cape Verdean):**
*Es documento é importante e deve ser traduzido imidiatamente. Se bo precisa des documento traduzido, por favor contacta Director de Diversidade na MassDEP's pa es numero indicode li d'boche.*

**9 Русский язык (Russian):**
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Contact Michelle Waters-Ekanem, Diversity Director/Civil Rights: 617-292-5751 TTY# MassRelay Service 1-800-439-2370. http://www.mass.gov/eea/agencies/massdep/service/justice/
(Version 11.21.17)

**10 العربية (Arabic):**
هذه الوثيقة الهامة وينبغي أن تترجم على الفور. اذا كنت بحاجة الى هذه الوثيقة المترجمة، يرجى الاتصال مدير التنوع في MassDEPعلى أرقام الهواتف المدرجة أدناه.

**11 한국어 (Korean):**
이 문서는 중요하고 즉시 번역해야합니다. 당신이 번역이 문서가 필요하면 아래의 전화 번호로 MassDEP의 다양성 감독에 문의하시기 바랍니다.

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Այս փաստաթուղթը շատ կարեւոր է եւ պետք է թարգմանել անմիջապես. Եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանվել դիմել MassDEP բազմազանությունը տնօրեն է հեռախոսահամարների թվարկված են ստորեւ.

**13 فارسی (Farsi [Persian]):**
این سند مهم است و باید فورا ترجمه شده است.
اگر شما نیاز به این سند ترجمه شده، لطفا با ما تماس تنوع مدیر MassDEP در شماره تلفن های ذکر شده در زیر.

**14 Français (French):**
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**15 Deutsch (German):**
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**16 Ελληνική (Greek):**
Το έγγραφο αυτό είναι σημαντικό και θα πρέπει να μεταφραστούν αμέσως. Αν χρειάζεστε αυτό το έγγραφο μεταφράζεται, παρακαλούμε επικοινωνήστε Diversity Director MassDEP κατά τους αριθμούς τηλεφώνου που αναγράφεται πιο κάτω.

**17 Italiano (Italian):**
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**19 हिन्दी (Hindi):**
यह दस्तावेज महत्वपूर्ण है और तुरंत अनुवाद किया जाना चाहिए. आप अनुवाद इस दस्तावेज़ की जरूरत है, नीचे सूचीबद्ध फोन नंबरों पर MassDEP की विविधता निदेशक से संपर्क करें.

Contact Michelle Waters-Ekanem, Diversity Director/Civil Rights: 617-292-5751 TTY# MassRelay Service1-800-439-2370 http://www.mass.gov/eea/agencies/massdep/service/justice/
(Version 11.21.17)

MassDEP
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**Findings of Fact in Support of the DRAFT Permit Amendment Decision**
**Shirley Water District, Water Management Permit 9P2-2-11-270.01**

The Massachusetts Department of Environmental Protection ("MassDEP") has completed its review of the Water Management Act Permit Amendment application for the Shirley Water District ("SWD") in the Nashua River Basin pursuant to the Water Management Act, M.G.L. ch. 21G. As a result of the review and SWD's response to the Order to Complete that was received March 15, 2018, MassDEP hereby issues this Draft Water Management Act Permit #9P2-2-11-270.01 (the "Permit") in accordance with the Water Management Act ("WMA" or "the Act").

MassDEP makes the following Findings of Fact in support of the attached permit amendment, and includes herewith its reasons for approving the Permit and for the conditions of approval imposed, as required by MGL c 21G, §11 and the "Massachusetts Water Resources Management Program", 310 CMR 36.00 ("the Regulations").

**The Shirley Water District's Water Withdrawal and Permit History**

Shirley Water District is permitted to withdraw 113.15 MGY or 0.31 MGD from its sources in the Nashua River Basin. In December 2009, SWD's Permit was amended to include the Walker Well as an authorized withdrawal point. The following Permit is an amendment to add a new withdrawal location, Well 5, located in the Town of Lancaster adjacent to Bow Brook. No additional withdrawal volume is authorized by this Permit. Well 5 will provide additional withdrawal capacity and flexibility within the current authorized withdrawal volume. SWD's reported withdrawal volumes for 2016, 2017, and 2018 were 0.40 MGD, 0.42 MGD, and 0.40 MGD respectively. SWD entered into an Administrative Consent Order with Penalty on July 17, 2019 to address the withdrawal exceedances and elevated unaccounted for water.

**The Permit Extension Act and Renewal Dates**

In February 2017, SWD submitted a 20-year permit renewal application for its Nashua River Basin permit. The Permit Extension Act (PEA), Section 173 of Chapter 240 of the Acts of 2010, as amended by Sections 74 and 75 of Chapter 238 of the Acts of 2012, extended all existing permits by four years. Therefore, the original expiration date for permits in the Nashua River Basin was extended from February 28, 2014 to February 28, 2018. Pursuant to M.G.L. c. 30A, § 13, and 310 CMR 36.18(7), SWD's amended permit will continue in force and effect until MassDEP issues a decision on its renewal application. This action is an amendment of SWD's existing Water Management Act permit and is not a renewal of the original permit. MassDEP has retained SWD's Nashua River Basin renewal application on file and will review that

application when MassDEP begins the basin renewal process for all applications in the Nashua River Basin in 2022. Note that MassDEP revised the Water Management Act Regulations (310 CMR 36.00) in November 2014 to require permittee's where applicable to address the impact of withdrawals on Cold Water Fishery Resources, and develop Minimization and Mitigation Plans. SWD will be contacted at the time of permit renewal if MassDEP needs any additional information to complete its review.

**The Water Management Act**

Permit Factors

Section 7 of the Act requires that MassDEP issue permits that balance a variety of factors including without limitation:

- Impact of withdrawal on other water sources;
- Water available within the safe yield of the water source;
- Reasonable protection of existing water uses, land values, investments and enterprises;
- Proposed use of the water and other existing or projected uses from the water source;
- Municipal and Massachusetts Water Resources Commission (WRC) water resources management plans;
- Reasonable conservation consistent with efficient water use;
- Reasonable protection of public drinking water supplies, water quality, wastewater treatment capacity, waste assimilation capacity, groundwater recharge areas, navigation, hydropower resources, water-based recreation, wetland habitat, fish and wildlife, agriculture, flood plains; and
- Reasonable economic development and job creation.

Safe Yield Permit Factor

Among the minimum permit factors Section 7 of the WMA requires is a determination by MassDEP that permitted water withdrawals are within the safe yield of the water source from which they are made. Section 2 of the Act defines "safe yield" as: "the maximum dependable withdrawal that can be made continuously from a water source including ground or surface water during a period of years in which the probable driest period or period of greatest water deficiency is likely to occur; provided however, that such dependability is relative and is a function of storage and drought probability".

For the purposes of the Water Management Program, MassDEP considers a water source to be the river basins delineated by the Water Resources Commission at 31 CMR 4.03. A map of the major river basins delineated by the Commission can be viewed in the Department of Conservation and Recreation guidance document "A Guide to the Interbasin Transfer Act and Regulations".

This permit is being issued in consideration of the safe yield methodology adopted by MassDEP on November 7, 2014, and described in the regulations at 310 CMR 36.13. MassDEP used the methodology described in the Regulations to calculate the safe yield for each river basin.

Under Section 11 of the Water Management Act, MassDEP cannot issue permits when the combined registered and permitted allocated withdrawal volumes exceed the safe yield of the water source. As of the issuance date of this Permit, the total allocated withdrawal volume does not exceed the safe yield for the Nashua Basin. Under this Permit the Nashua Basin safe yield will continue to be higher than the combined allocated withdrawal volume because the Permit

does not increase SWD's total allocated withdrawal but only authorizes a new source from which to withdraw those volumes.

**Findings of Fact for the Performance Standards**

Specific performance standards are applied to new Water Management permits and to existing permits at the time they are amended, during permit reviews, or permit renewal. Consistent with Section 3 of the Act, the performance standards of 65 residential gallons per capita day or less and 10% or less of unaccounted for water, summer limits on withdrawals, and efforts to offset the impacts of increasing withdrawal volumes are based on the Massachusetts Water Conservation Standards approved by the Water Resources Commission in 2006 and revised in July 2018. The latest Standards can be found at:
https://www.mass.gov/files/documents/2018/09/11/ma-water-conservation-standards-2018.pdf

MassDEP believes these standards are reasonable based on studies and data developed throughout the country, the 1996 AWWA Leak Detection and Water Accountability Committee report on water accountability (AWWA Journal; July 1996; pp. 108-111), and the fact that the average values in 2017 for Massachusetts were 54 RGPCD, and 14% UAW. While these performance standards represent the minimum standards required for compliance with the Permit, MassDEP believes that through the implementation of all the terms and conditions of Water Management permits, municipalities can meet the performance standards for RGPCD and UAW.

SWD has been required to meet the 65 residential gallons per capita day (RGPCD) and 10% unaccounted-for-water (UAW) performance standards since calendar year 2011. MassDEP will consider any permittee that has been unable to meet the 65 RGPCD or 10% UAW performance standard within five years of receiving its permit to be achieving functionally equivalent compliance with the performance standards, if they:

- are complying with the Water Conservation requirements included in the permit,
- have implemented the required limits on nonessential outdoor water use, and
- are making demonstrable efforts to finance, implement and enforce a MassDEP-approved compliance plan.

Because circumstances vary, a permittee may present an analysis of the cost effectiveness of implementing certain conservation measures required by MassDEP and offer alternative measures. The analysis must explicitly consider environmental impacts and must produce environmental benefits. MassDEP will allow permittees to:

- Document economic hardship and present an analysis demonstrating that implementation of specific measures will cause or exacerbate significant economic hardship;
- Present reasons why specific measures are not cost effective because the cost would exceed the costs of alternative methods of achieving the appropriate standard; and
- Propose specific conservation measures that would result in equal or greater system-wide water savings or equal or greater environmental benefits than the conservation measures included in the MassDEP Functional Equivalence Plan(s) (See Appendix A & B).

## Findings of Fact for Special Permit Conditions

The following Findings of Fact for the special condition included in the permit generally describe the rationale and background for each special condition in the permit. This summary of permit special conditions is not intended to, and should not be construed as, modifying any of the special conditions. In the event of any ambiguity between this summary and actual permit conditions, the permit language shall control.

MassDEP records indicate that all of SWD's sources have approved Zone II delineations. Public Water Systems are required to obtain MassDEP approval of Zone II delineations during the new source approval process and prior to activating any new sources; therefore this condition has been removed as a condition of this permit. The Zone II delineation for the proposed Well 5 was approved with the WS19 pumping test approval on April 6, 2017.

SWD's previous WMA permit included a condition that required water level monitoring in the vicinity of Morse Brook. MassDEP reviewed data submitted by SWD from 2010, 2011, 2012, 2013, and 2014. The data does not present any obvious short term or long term lowering of the groundwater table or water levels in Morse Brook due to the pumping wells. SWD has satisfied the permit condition and it is removed as a condition from this permit.

**Special Condition 1, Maximum Authorized Annual Average Withdrawal Volume,** reflects the permitted annual average withdrawal volume of 0.31 MGD based on water use projections prepared by the Department of Conservation and Recreation (DCR), Office of Water Resources prepared for the 1996 Permit. DCR reviewed SWD's Annual Statistical Reports for calendar years 2011 through 2015 and determined that a new water needs forecast could not be prepared. Key issues of concern were data quality and the high variability of unaccounted for water. DCR requires at least three years of unaccounted for water between 5% and 15% to prepare a forecast.

**Special Condition 2, Maximum Authorized Daily Withdrawals from each Withdrawal Point,** reflects the maximum daily withdrawal rates by source, according to MassDEP approved pumping test and/or Zone II rates. This amendment includes an assigned rate of 0.446 MGD (310 gpm) for Well 5 based on the pumping test performance.

**Special Condition 3, Bow Brook Water Level Monitoring**
Bow Brook is a coldwater fishery resource as identified by the Massachusetts Department of Fish and Game. The model created based on the pumping test predicted streamflow depletion extending 2,000 feet upgradient of Well 5, with the greatest simulated impact within 1,000 feet of the well. Long term water level monitoring of Bow Brook is required as a condition of this Permit to determine if the model's predictions are accurate and if Well 5 adversely impacts water levels in Bow Brook. A proposed monitoring plan was submitted by SWD on January 16, 2019 and is incorporated into this Permit along with additional requirements per MassDEP.

**Special Condition 4, Groundwater Supply Protection**
The Towns of Shirley and Lancaster do not have land use controls that meet the Drinking Water Regulations for Groundwater Supply Protection [310 CMR 22.21(2)]. SWD is required to complete a Best Effort to have the towns adopt the appropriate zoning or non-zoning controls as instructed in the WMA Permit condition. The most recent Best Effort was completed in January 2019.

**Special Condition 5, Performance Standard for Residential Gallons Per Capita Day Water Use,** discussed previously. As accepted by MassDEP, SWD's RGPCD for 2016 was 54 and for 2017 and 2018 was 61.

**Special Condition 6, Performance Standard for Unaccounted for Water (UAW),** discussed previously. This permit condition has changed since the 2010 permit issued to SWD to reflect MassDEP's latest approach to controlling UAW. UAW is defined as the residual resulting from the total amount of water supplied to a distribution system as measured by master meters, minus the sum of all amounts of water measured by consumption meters in the distribution system, and minus confidently estimated and documented amounts used for certain necessary purposes.

UAW includes unavoidable leakage, recoverable leakage, meter inaccuracies (unless they fall under the category of source meter calibration which allows for adjustment per results of source meter calibration); errors in estimation of stopped meters, unauthorized hydrant openings, illegal connections, stand pipe overflows, data processing errors; and undocumented firefighting uses. The need for water main flushing and the use of water in construction or meter calibration should be metered or estimated as appropriate to assist in determining actual demand. Uses that can be confidently estimated and documented in writing include: storage tank overflow and drainage; water main flushing and flow testing; firefighting; bleeders or blow-offs; sewer and stormwater system flushing; and street cleaning. Any adjustments made as a result of properly documented source meter calibration should be provided as required by the Annual Statistical Report (ASR). Any adjustment in the calculation of UAW made as a result of confidently estimated uses should be fully documented in the ASR.

As accepted by MassDEP, SWD's UAW for 2016, 2017 and 2018 were 21%, 19%, and 3.6% respectively.

**Special Condition 7, Seasonal Limits on Nonessential Outdoor Water Use**, is based upon Permittee's Residential Gallons per Capita Day (RGPCD) for the preceding year, and will be implemented according to either: 1) calendar triggered restrictions; or 2) streamflow triggered restrictions.

> **1. Calendar triggered restrictions:** Restrictions shall be implemented from May 1st through September 30th. Many public water suppliers will find this option easier to implement and enforce than the streamflow triggered approach.
>
> **2. Streamflow triggered restrictions:** Restrictions shall be implemented at those times when streamflow falls below designated flow triggers measured at an assigned, web-based, real-time U.S. Geologic Survey (USGS) stream gage from May 1st through September 30th. At a minimum, restrictions shall commence when streamflow falls below the trigger for three consecutive days. Once implemented, the restrictions shall remain in place until streamflow at the assigned USGS local stream gage meets or exceeds the trigger streamflow for seven consecutive days.

The basis for streamflow triggers is derived from Aquatic Base Flow (ABF) values calculated by the Sustainable Yield Estimator (SYE)[1] for simulated natural flow applied to

[1] Archfield, S.A., Vogel, R.M., Steeves, P.A., Brandt, S.L., Weiskel, P.K., and Garabedian, S.P., 2010, The Massachusetts Sustainable-Yield Estimator: A decision-support tool to assess water availability at ungaged stream

the assigned local USGS stream gage. The two-tiered trigger values are based on flow levels that are protective of aquatic habitat for fish spawning during the spring bioperiod, designated with the June ABF; and protective flows for fish rearing and growth during the summer bioperiod, designated with the August ABF trigger. Protective flow levels are derived from index gage flow data which represent the least altered stream flows in Massachusetts, and are further described in the Department of Conservation and Recreation (DCR)[2] and USGS Index Reports[3].

If SWD selects the streamflow approach, it has been assigned the USGS local stream gage of #01096500 - Nashua River at E. Pepperell, MA. The USGS Index Gage associated with your local gage is 01096000- Squannacook River near W. Groton. The index gage has a June ABF stream value of 0.98 cfsm and an August ABF value of 0.38 cfsm. These index cfsm units translate to your local gage streamflow triggers as 426 cubic feet per second (cfs) for May and June, and 165 cfs for July, August and September.

Should the reliability of flow measurement at the Nashua River gage be so impaired as to question its accuracy, Permittee may request MassDEP's review and approval to transfer to another gage to trigger restrictions. MassDEP reserves the right to require use of a different gage.

Drought triggered restrictions are incorporated into the seasonal limits on outdoor water use as outlined in this Special Condition. Times of low streamflow and drought do not always coincide, but both low streamflow and drought conditions can have adverse effects on water supplies, natural resources and aquatic life. Please note that many communities impose drought-based outdoor water use restrictions before the Massachusetts Drought Management Task Force declares a Drought Advisory because drought conditions can begin to impact local water supplies before a regional advisory is declared.

This Permit condition will be updated at the time of the Permit renewal to replace the drought triggered restrictions with a 7 day low flow that will limit non-essential outdoor water use to one day per week regardless of the RGPCD value.

**Special Condition 8, Requirement to Report Raw and Finished Water Volumes,** ensures that the information necessary to evaluate compliance with the conditions included herein is accurately reported.

**Special Condition 9, Water Conservation Requirements,** incorporates the Water Conservation Standards for the Commonwealth of Massachusetts reviewed and approved by the Water Resources Commission in July 2006 and revised in 2018.

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locations in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2009–5227, 41 p. plus CD-ROM. See http://pubs.usgs.gov/sir/2009/5227/

[2] Massachusetts Department of Conservation and Recreation (DCR), 2008 Index Streamflows for Massachusetts, May 2008, Prepared by Office of Water Resources for the Massachusetts Water Resources Commission, 45 p., plus CD-ROM.

[3] Armstrong, D.S., Parker, G.W., and Richards, T.A., 2008, Characteristics and classification of least altered streamflows in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2007-5291, 113 p., plus CD-ROM.

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

# Department of Environmental Protection

Central Regional Office • 8 New Bond Street, Worcester MA 01606 • 508-792-7650



## WATER WITHDRAWAL PERMIT
## MGL C 21G

This Permit Amendment is issued pursuant to the Massachusetts Water Management Act for the sole purpose of authorizing the withdrawal of a volume of water as stated herein and subject to the following special and general conditions. This Permit Amendment conveys no right in or to any property beyond the right to withdraw the volume of water for which it is issued.

**PERMIT NUMBER:** 9P2-2-11-270.01 **RIVER BASIN:** Nashua

**PERMITTEE:** Shirley Water District

**ISSUANCE DATE:** Draft

**EXPIRATION DATE:** February 28, 2018*

**NUMBER OF WITHDRAWAL POINTS:** 4 Groundwater

**USE:** Public Water Supply

**DAYS OF OPERATION:** 365

**LOCATION(S):**

**Table 1: Withdrawal Point Identification**

| Source Name | PWS Source ID Code |
|---|---|
| Catacunemaug Well | 2270000-02G |
| Patterson Well | 2270000-03G |
| Walker Well | 2270000-04G |
| Well 5 | To Be Assigned |

* SWD's most recent 20-year permit was set to expire February 28, 2014. In 2010, the permit was extended for 2 years to February 28, 2016 by Section 173 of Chapter 240 of the Acts of 2010 (Permit Extension Act). In 2012 the Permit Extension Act was amended by Chapter 238 of the Acts of 2012 and this permit was extended an additional 2 years to February 28, 2018. Pursuant to M.G.L. c. 30A, § 13, and 310 CMR 36.18(7), the amended permit will continue in force and effect until MassDEP issues a decision on SWD's renewal application.

## SPECIAL PERMIT CONDITIONS

### 1. Maximum Authorized Annual Average Withdrawal Volume

This Permit authorizes Shirley Water District ("SWD") to withdraw water from the Nashua River Basin at the rate described below in Table 2. The permitted volume is expressed both as an annual average daily withdrawal rate (million gallons per day or MGD), and as a total annual withdrawal volume (million gallons per year or MGY) for each five-year period of the permit term.

The Department of Environmental Protection (MassDEP) will use the total raw water volume withdrawn from the authorized withdrawal points to assess compliance with the permitted withdrawal volumes.

SWD's most recent 20-year permit was set to expire February 28, 2014. In 2010, the permit was extended for 2 years to February 28, 2016 by Section 173 of Chapter 240 of the Acts of 2010 (Permit Extension Act). In 2012 the Permit Extension Act was amended by Chapter 238 of the Acts of 2012 and this permit was extended an additional 2 years to February 28, 2018. Pursuant to M.G.L. c. 30A, § 13, and 310 CMR 36.18(7), the amended permit will continue in force and effect until MassDEP issues a decision on SWD's renewal application.

**Table 2: Maximum Authorized Annual Withdrawal Volumes**

| Permit Periods | Daily Average (MGD) | Total Annual (MGY) |
|---|---|---|
| 6/20/1996 to 2/28/1999 | 0.29 | 105.85 |
| 3/1/1999 to 2/29/2004 | 0.30 | 109.5 |
| 3/1/2004 to 2/28/2009 | 0.31 | 113.15 |
| 3/1/2009 to 2/28/2018 | 0.31 | 113.15 |

### 2. Maximum Authorized Daily Withdrawal from Each Withdrawal Point

Withdrawals from individual withdrawal points are not to exceed the approved maximum daily volumes listed below in Table 3 without specific advance written approval from MassDEP. The authorized maximum daily volume is the approved rate of each source. In no event shall the combined withdrawals from the individual withdrawal points exceed the withdrawal volumes authorized above in Special Condition 1.

**Table 3: Maximum Authorized Daily Withdrawal Volumes**

| Source Name | PWS Source ID Code | MGD |
|---|---|---|
| Catacunemaug Well | 2270000-02G | 0.321 |
| Patterson Well | 2270000-03G | 0.418 |
| Walker Well | 2270000-04G | 0.645 |
| Well 5 | To Be Assigned | 0.446 |

## 3. Bow Brook Water Level Monitoring

Shirley Water District shall implement a water level monitoring plan beginning in 2020, to monitor water levels in Bow Brook and groundwater points near Bow Brook. SWD submitted a proposed plan on January 16, 2019 that is incorporated below and includes additional requirements by MassDEP:

- Surface water level measurements and surface water temperature at three locations in Bow Brook shall be collected annually from May 1 through September 30. The locations shall be 1) upstream from the well outside of the Area of Influence; 2) downstream from the well outside the Area of Influence; 3) and near the well inside the Area of Influence.
- The water level and temperature measurements shall be collected with an electronic measuring device that shall be set to record data minimally every 15 minutes.
- Daily precipitation measurements shall be recorded onsite or from the closest NOAA weather station.
- Daily pumping volumes from Well 5 shall be recorded.
- Weekly hand water level measurements shall be collected from May 1 through September 30 in observation wells 5-12, 100E, and 200E.
- All data shall be provided to MassDEP in graph and table formats by December 31$^{st}$ each year. Water level data may be submitted only in electronic format (e.g. Excel), due to the volume of data, but the graphs and tables of precipitation and pumping volumes shall be submitted in paper format with a cover letter briefly describing any issues with the data collection and/or field observations.
- The monitoring shall continue for a minimum of three seasons after Well 5 is placed on-line before MassDEP will consider a reduction in the monitoring plan.

## 4. Groundwater Supply Protection

Shirley Water District must demonstrate its "Best Effort", as stated in 310 CMR 22.21(1)(d), in encouraging the Town of Shirley and the Town of Lancaster to adopt land use controls which meet the Drinking Water Regulations for wellhead protection at 310 CMR 22.21(2) for SWD's Zone II areas in those communities. SWD demonstrated a Best Effort in January 2019.

Until the Towns of Shirley and Lancaster pass wellhead protection requirements that satisfy the regulations for the land covered by the Zone II areas, MassDEP' Best Effort requirement must be repeated for each of the following: new source approval (including replacement wells); monitoring waiver applications; WMA water withdrawal permit reviews, amendments, or renewals; Zone II re-delineations; and Sanitary Survey stipulations.

## 5. Performance Standard for Residential Gallons Per Capita Day Water Use

Permittee's performance standard for residential gallons per capita day (RGPCD) is 65 gallons. Permittee is required to report its RGPCD water use annually in its Annual Statistical Report (ASR) and document compliance with this Performance Standard in its ASR. Permittee shall report its RGPCD and the calculation used to derive that figure as part of its ASR including, without limitation, the source of the data used to establish the service population and the year in which this data was developed. See Appendix A for additional information on the requirements if the performance standard for RGPCD is not met.

## 6. Performance Standard for Unaccounted for Water

Permittee's Performance Standard for Water (UAW) is 10% or less of overall water withdrawal for 2 of the most recent 3 years throughout the permit period beginning with calendar year 2018. If Permittee does not meet the standard, it shall be in compliance with the Functional Equivalence Requirements based on the AWWA/IWA Water Audits and Loss Control Programs, Manual of Water Supply Practices M36, as outlined in Appendix B. Permittee is required to report its UAW annually in its Annual Statistical Report (ASR) so as to document compliance with this performance standard. Permittee's ASR shall include the calculation used to derive that figure including, without limitation, the source of data used, the methodology for calculating UAW and any assumptions used in making the calculation.

Nothing in the Permit shall prevent a Permittee who meets the 10% performance standard from developing and implementing a water loss control program following the AWWA M36 Water Audits and Loss Control Programs. Permittees implementing a water loss control program based on AWWA M36 annual water audits and guidance shall continue to report UAW annually as required in the Annual Statistical Report for public water suppliers.

## 7. Seasonal Limits on Nonessential Outdoor Water Use

Permittee shall limit nonessential outdoor water use through mandatory restrictions from May 1$^{st}$ through September 30$^{th}$ as outlined in Table 4 below. Permittee shall be responsible for tracking streamflows and drought advisories and recording when restrictions are implemented if streamflow triggered restrictions are implemented. See *Accessing Streamflow and Drought Advisory Website Information* in Table 4 for instructions.

Permittee shall document compliance with the summer limits on nonessential outdoor water use annually in its Annual Statistical Report (ASR), and indicate whether it anticipates implementing calendar triggered restrictions or streamflow triggered restrictions during the next year. Nothing in this permit shall prevent Permittee from implementing water use restrictions that are more restrictive than those set forth in this permit.

### Water Uses Restrictions

**Nonessential outdoor water uses that are subject to mandatory restrictions** include:

- irrigation of lawns via sprinklers or automatic irrigation systems;
- washing of vehicles, except in a commercial car wash or as necessary for operator safety; and
- washing of exterior building surfaces, parking lots, driveways or sidewalks, except as necessary to apply surface treatments such as paint, preservatives, stucco, pavement or cement.

**The following uses may be allowed** when mandatory restrictions are in place:

- irrigation to establish a new lawn and new plantings during the months of May and September;
- irrigation of public parks and recreational fields by means of automatic sprinklers outside the hours of 9 am to 5 pm; and
- watering lawns, gardens, flowers and ornamental plants by means of a hand-held hose.

**Water uses NOT subject to mandatory restrictions** are those required:

- for health or safety reasons;
- by regulation;
- for the production of food and fiber;
- for the maintenance of livestock; or
- to meet the core functions of a business (for example, irrigation by golf courses as necessary to maintain tees, greens, and limited fairway watering, or irrigation by plant nurseries as necessary to maintain stock).

**Table 4 Seasonal Limits on Nonessential Outdoor Water Use**

| |
|---|
| **Permittees meeting the 65 RGPCD standard for the preceding year (as reported in the ASR and accepted by MassDEP) must implement either:** |
| **1. Calendar Triggered Restrictions from May 1st through September 30th**<br>**No nonessential outdoor water use from 9 am - 5 pm** |
| **2. Streamflow Triggered Restrictions from May 1st through September 30th**<br>**No nonessential outdoor water use from 9 am - 5 pm whenever:**<br>a) Streamflow at the assigned USGS local stream gage 01096500 Nashua River at East Pepperell falls below the following designated flow triggers for **three (3)** consecutive days:<br>• May 1st through June 30th: **426 cfs** (based on minimum flows that are protective of habitat for fish spawning during the spring bioperiod), and<br>• July 1st through September 30th: **165 cfs** (based on minimum flows that are protective of habitat for fish rearing and growth during the summer bioperiod).<br><br>Once implemented, the restrictions shall remain in place until streamflow at the assigned USGS local stream gage meets or exceeds the trigger streamflow for **seven (7)** consecutive days; or<br><br>b) A Drought Advisory or higher is declared by the Massachusetts Drought Management Task Force. |
| **Permittees NOT meeting the 65 RGPCD standard for the preceding year (as reported in the ASR and accepted by MassDEP) must implement either:** |
| **1. Calendar Triggered Restrictions from May 1st through September 30th**<br>a) **Nonessential outdoor water use is allowed TWO DAYS per week** before 9 am and after 5 pm; and<br><br>b) **Nonessential outdoor water use is allowed ONE DAY per week** before 9 am and after 5 pm; whenever a Drought Advisory or higher is declared by the Massachusetts Drought Management Task Force. |

2. **Streamflow Triggered Restrictions from May 1st through September 30th Nonessential outdoor water use is allowed ONE DAY per week before 9 a.m. and after 5 p.m. whenever:**
   a) Streamflow at the assigned USGS local stream 01096500 Nashua River at East Pepperell falls below the following designated flow triggers for **three (3)** consecutive days:
      - May 1st through June 30th: **426 cfs** (based on minimum flows that are protective of habitat for fish spawning during the spring bioperiod), and
      - July 1st through September 30th: **165 cfs** (based on minimum flows that are protective of habitat for fish rearing and growth during the summer bioperiod).

      Once implemented, the restrictions shall remain in place until streamflow at the assigned USGS local stream gage meets or exceeds the trigger streamflow for **seven (7)** consecutive days; or

   b) A Drought Advisory or higher is declared by the Massachusetts Drought Management Task Force.

**Instructions for Accessing Streamflow and Drought Advisory Website Information**

**Streamflow information** is available at the USGS National Water Information System (NWIS): Web Interface. The USGS NWIS default shows Massachusetts streamflows in real time, i.e., the most recent, usually quarterly hourly, reading made at each USGS stream gage.

Seasonal Limits on Nonessential Outdoor Water Use are implemented when the mean daily streamflow falls below the designated trigger. The mean daily flow is not calculated until after midnight each day when the USGS computes the hourly data into a mean daily streamflow. As a result, permittees must use the mean daily streamflow from the preceding day when tracking streamflows.

**Mean daily streamflow gage** readings are available at the USGS NWIS Web Interface at http://waterdata.usgs.gov/ma/nwis/current/?type=flow.

- Scroll down to 01096500 Nashua River at East Pepperell.
- Click on the gage number.
- Scroll down to "Provisional Date Subject to Revision – Available data for this site" and click on the drop down menu.
- Click on "Time-series: Daily data" and hit GO.
- Scroll down to the "Available Parameters" box. Within the box, be sure "Discharge (mean)" is checked, then, under "Output Format" click "Table" and hit GO.
- Scroll down to "Daily Mean Discharge, cubic feet per second" table and find the current date on the table.
- Compare the cubic feet per second (cfs) measurement shown on the table to the cfs shown under Streamflow Triggered Restrictions above.

**Drought Advisory** information is available at the Massachusetts Department of Conservation and Recreation (DCR) Drought Status Website at https://www.mass.gov/service-details/current-drought-status.

- The color coded map displays the six drought regions in Massachusetts. Restrictions are implemented when a Drought Advisory, Watch, Warning or Emergency is announced through the DCR website.

**Public Notice of Water Use Restrictions**

Permittee shall notify its customers of the restrictions and the consequences of failing to adhere to the restrictions.

- For calendar-triggered restrictions, customers shall be notified by April 15th each year.
- For streamflow-triggered restrictions, when streamflow at the assigned USGS local stream gage falls below a streamflow trigger for three consecutive days, customers shall be notified as soon as possible, but within three days of implementing the restrictions.

Notice to customers shall include the following:

- A detailed description of the restrictions and penalties for violating the restrictions;
- The need to limit water use, especially nonessential outdoor water use, to ensure a sustainable drinking water supply and to protect natural resources and streamflow for aquatic life; and
- Ways individual homeowners can limit water use, especially nonessential outdoor water use.

Notice that restrictions have been put in place shall be filed each year with MassDEP within 14 days of the restriction's effective date. Filing shall be in writing on the Water Use Restrictions Form on the MassDEP website. Notice to MassDEP need not be provided if Permittee has already implemented water use restrictions that conform to the applicable restrictions and those restrictions are still in force.

## 8. Requirement to Report Raw and Finished Water Volumes

SWD shall report annually on its ASR the raw water volumes and finished water volumes for the entire water system and the raw water volumes for individual water withdrawal points.

## 9. Water Conservation Requirements

Compliance with the following conservation measures was required in the Permit issued to SWD December 23, 2009. Continuing compliance is required.

**Table 5: Minimum Water Conservation Requirements**

| **System Water Audits and Leak Detection** |
|---|
| 1. At a minimum, conduct a full leak detection survey every three years. SWD reported to MassDEP that leak detection surveys are completed annually on the entire distribution system. |
| 2. Perform a leak detection survey of those sections of the distribution system that have not been surveyed within the last year whenever the percentage of unaccounted for water increases by 5% or more (for example an increase from 3% to 8%) over the percentage reported on the ASR for the prior calendar year. Within 60 days of completing the leak detection survey, Permittee shall submit to MassDEP a report detailing the leak detection survey, any leaks uncovered as a result of the survey or otherwise, dates of repair and the estimated water savings as a result of the repairs. |
| 3. Conduct field surveys for leaks and repair programs in accordance with the *AWWA Manual 36*. |
| 4. Permittee shall have repair reports available for inspection by MassDEP. Permittee shall establish a schedule for repairing leaks that is at least as stringent as the following:<br>• Leaks of 15 gallons per minute or more shall be repaired as soon as possible but not later than one month after leak detection.*<br>• Leaks of less than 15 gallons per minute, but greater than 5 gallons per minute, shall be repaired as soon as possible but not later than two months after leak detection.* |

**Table 5 Continued: Minimum Water Conservation Requirements**

- Leaks of 5 gallons per minute or less shall be repaired as soon as possible but not later than six months after leak detection, except that hydrant leaks of one gallon or less per minute shall be repaired as soon as possible.*
- Leaks shall be repaired in accordance with the priority schedule including leaks up to the property line, curb stop or service meter, as applicable.
- Have water use regulations in place that require property owners to expeditiously repair leaks on their property.

**System Water Audits and Leak Detection Continued**

The following exceptions can be considered:

- Repair of leakage detected during winter months can be delayed until weather conditions become favorable for conducting repairs;* and
- Leaks in freeway, arterial or collector roadways may be coordinated with other scheduled projects being performed on the roadway.**

*Reference: MWRA regulations 360 CMR 12.09
**Mass Highway or local regulations may regulate the timing of tearing up pavement on roads to repair leaks.

5. Ensure placement of sufficient funds in the annual water budget to conduct water audits and leak detection and repair leaks as necessary.

**Metering**

1. Calibrate all source and finished water meters at least annually and report date of calibration on the ASR.
2. Ensure that the system is 100% metered, including all water use at municipal facilities (schools, school athletic fields, etc.). Permittee reports its system is 100% metered.
3. All water distribution system users shall have properly sized service lines and meters that meet AWWA calibration and accuracy performance standards.
   AWWA References:
   AWWA Manual M22 – Sizing Water Service Lines and Meters
   AWWA Manual M6 – Water Meters, or as amended
4. Permittee shall have an ongoing program to inspect individual service meters to ensure that all service meters accurately measure the volume of water used by your customers. The metering program shall include regular meter maintenance, including testing, calibration, repair, replacement and checks for tampering to identify and correct illegal connections.
5. Ensure placement of sufficient funds in the annual water budget to calibrate, repair, or replace meters as necessary.

**Pricing**

1. Implement a water revenue structure that includes the full cost of operating the water supply system in compliance with state and federal requirements by the next permit renewal scheduled for 2022. Evaluate revenues every three to five years and adjust rates as needed. Full cost pricing factors all costs - operations, maintenance, capital, and indirect costs (environmental impacts, watershed protection) - into the revenue structure.
   AWWA References for Additional Information on Pricing:
   AWWA Manual 1 – Principals of Water Rates, Fees and Charges
   AWWA Manual 29 – Fundamentals of Water Utility Financing
2. Permittee shall not use decreasing block rates. Decreasing block rates which charge lower prices as water use increases during the billing period, are not allowed by M.G.L. Chapter 40 Section 39L.

**Table 5 Continued: Minimum Water Conservation Requirements**

| **Residential and Public Sector Conservation** |
|---|
| 1. Permittee shall meet the standards set forth in the Federal Energy Policy Act, 1992 and the Massachusetts Plumbing Code. |
| 2. Meter or estimate water used by contractors using fire hydrants for pipe flushing and construction. |
| 3. Municipal buildings<br>On May 3, 2019 SWD submitted a list of district and municipally owned buildings in its service area and whether or not those buildings are fitted with water saving plumbing fixtures (faucet aerators, low flow toilets, and low flow shower heads). Within one (1) year of the date of this permit, the Permittee shall insure that the SWD office at 124 Ayer Road has been retrofitted with water saving plumbing fixtures as applicable. The water at SWD's pump stations is used for water quality sampling and in-line analyzers and is excluded from the retrofit requirement.<br><br>Only one municipally owned building, the old DPW at 26 Clark Street, is not equipped with water saving plumbing fixtures, but the building is currently only used for storage. Prior to changing the current use of the building to include water use, ensure that it has been retrofitted with water saving plumbing fixtures. For Water Districts, a demonstration to MassDEP's satisfaction that a "Best Effort" was made by the District to get the Town to make those retrofits will satisfy this requirement. |
| **Industrial and Commercial Water Conservation** |
| 1. Permittee shall review the use records for its industrial, commercial and institutional water users and develop an inventory of the largest water users. Permittee shall develop and implement an outreach program designed to inform and (where appropriate) work with its largest industrial, commercial and institutional water users on ways to reduce their water use. Such outreach plans can include, but are not limited to: information on water audits, meter sizing, water reuse, low-flow plumbing fixtures, mandatory outdoor water use restrictions, suggestions for contacting trade associations for process specific information on water use reductions, and information on contacting the Executive Office of Environmental Affairs Office of Technical Assistance for Toxics Use Reduction (OTA) which offers a range of assistance and information to help facilities improve water use efficiency and reduce wastewater discharge. OTA can be contacted at (617) 626-1060 or at www.mass.gov/envir/ota. |
| 2. Upon request by MassDEP, Permittee shall report on industrial, commercial and institutional water conservation including the results of its review of water use records for industrial, commercial and institutional water users, the inventory of the largest water users, copies of any outreach materials distributed to industrial, commercial and institutional water users, and to the extent practical, a summary of water use reductions or savings that have resulted. Upon receipt of this report, MassDEP will take whatever action it deems appropriate to promote the interests of the WMA, including without limitation requiring Permittee to take additional actions to reduce industrial, commercial and institutional water use. |
| **Lawn and Landscape** |
| 1. Continue to implement Permittee's water use restriction bylaw. |

**Table 5 Continued: Minimum Water Conservation Requirements**

| **Public Education and Outreach** |
|---|
| 1. Develop and implement a Water Conservation Education Plan. Permittee's Water Conservation Education Plan shall be designed to educate Permittee's water customers of ways to conserve water. Without limitation, Permittee's plan may include the following actions:<br>• Annual work sheets, included in water bills or under separate cover, to enable customers to track water use and conservation efforts and estimate the dollar savings;<br>• Public space advertising/media stories on successes (and failures);<br>• Conservation information centers perhaps run jointly with electric or gas company;<br>• Speakers for community organizations;<br>• Partner with garden clubs, or other private and non-profit organizations, to promote efficient water use;<br>• Provide information on water-wise landscaping, gardening, efficient irrigation and lawn care practice;<br>• Public service announcements; radio/T.V./audio-visual presentations;<br>• Joint advertising with hardware stores to promote conservation devices;<br>• Water conservation workshops for the general public<br>• Use of civic and professional organization resources;<br>• Special events such as Conservation Fairs;<br>• Develop materials that are targeted to schools with media that appeals to children, including materials on water resource projects and field trips; and<br>• Make multilingual materials available as needed.<br><br>References and additional information available through the USEPA Water Sense Program at http://www.epa.gov/watersense. |
| 2. Upon request of MassDEP, Permittee shall report on its public education and outreach effort, including a summary of activities developed for specific target audiences, any events or activities sponsored to promote water conservation and copies of written materials. |

## GENERAL PERMIT CONDITIONS (applicable to all permittees)

No withdrawal in excess of 100,000 gallons per day over the registered volume (if any) shall be made following the expiration of this permit, unless before that date MassDEP has received a renewal permit application pursuant to 310 CMR 36.00.

1. **Duty to Comply:** The Permittee shall comply at all times with the terms and conditions of this permit, the Act and all applicable State and Federal statutes and regulations.

2. **Operation and Maintenance:** The Permittee shall at all times properly operate and maintain all facilities and equipment installed or used to withdraw water so as not to impair the purposes and interests of the Act.

3. **Entry and Inspections:** The Permittee or the Permittee's agent shall allow personnel or authorized agents or employees of MassDEP to enter and examine any property over which Permittee has authority, title or control, for the purpose of determining compliance with this permit, the Act or the regulations published pursuant thereto, upon presentation of proper identification and an oral statement of purpose.

4. **Water Emergency:** Withdrawal volumes authorized by this permit are subject to restriction in any water emergency declared by MassDEP pursuant to M.G.L. c. 21G, §§ 15-17, M.G.L. c. 150, § 111, or any other enabling authority.

5. **Transfer of Permits:** This permit shall not be transferred in whole or in part unless and until MassDEP approves such transfer in writing, pursuant to a transfer application on forms provided by MassDEP requesting such approval and received by MassDEP at least thirty (30) days before the effective date of the proposed transfer. No transfer application shall be deemed filed unless it is accompanied by the applicable transfer fee established by 310 CMR 36.33.

6. **Duty to Report:** The Permittee shall submit annually, on a form provided by MassDEP, a certified statement of the withdrawal. Such report is to be received by MassDEP by the date specified by MassDEP. Such report must be submitted as specified on the report form.

7. **Duty to Maintain Records:** The Permittee shall be responsible for maintaining withdrawal and all other records as specified by this permit.

8. **Metering**: Withdrawal points shall be metered. Meters shall be calibrated annually. Meters shall be maintained and replaced as necessary to ensure the accuracy of the withdrawal records.

9. **Right to Amend, Suspend or Terminate:** MassDEP may amend, suspend or terminate the permit in accordance with M.G.L. c. 21G and 310 CMR 36.29.

## APPEAL RIGHTS AND TIME LIMITS

This permit is a decision of MassDEP. Any person aggrieved by this decision may request an adjudicatory hearing as described herein and in accordance with the procedures described at 310 CMR 36.37. Any such request must be made in writing, by certified mail or hand delivered and received by MassDEP within twenty-one (21) days of the date of receipt of this permit. The hearing request, including proof of payment of the filing fee, must be mailed to:

Case Administrator
MassDEP Office of Appeals and Dispute Resolution
One Winter Street
Boston, MA 02108

No request for an appeal of this permit shall be validly filed unless a copy of the request is sent by certified mail, or delivered by hand to the local water resources management official in the community in which the withdrawal point is located; and for any person appealing this decision, who is not the applicant, unless such person notifies the permit applicant of the appeal in writing by certified mail or by hand within five (5) days of mailing the appeal to MassDEP.

**CONTENTS OF HEARING REQUEST**
310 CMR 1.01(6)(b) requires the request to include a clear and concise statement of the facts which are the grounds for the request and the relief sought. In addition, the request must include a statement of the reasons why the decision of MassDEP is not consistent with applicable rules and regulations, and for any person appealing this decision who is not the applicant, a clear and concise statement of how that person is aggrieved by the issuance of his permit.

**FILING FEE AND ADDRESS**
MassDEP's fee transmittal form, together with a valid check, payable to the Commonwealth of Massachusetts in the amount of $100 must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

The request shall be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

**EXEMPTIONS**
The filing fee is not required if the appellant is a municipality (or municipal agency), county, district of the Commonwealth of Massachusetts, or a municipal housing authority.

**WAIVER**
MassDEP may waive the adjudicatory hearing filing fee for any person who demonstrates to the satisfaction of MassDEP that the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request, an affidavit setting forth the facts which support the claim of undue hardship.

_____ _____

Marielle Stone, Deputy Regional Director
Bureau of Water Resources
Central Regional Office

Date

## Appendix A – Residential Gallons Per Capita Day (RGPCD)

### I. Compliance Plan Requirement

If the Permittee fails to achieve and document compliance with the RGPCD performance standard in its Annual Statistical Report (ASR), then the Permittee must file with that ASR a Residential Gallons Per Capita Day Compliance Plan (RGPCD Plan) which shall:

a. meet the requirement set forth below in Section II;
b. include measures to be implemented to meet the performance standard); and
c. include the schedule for implementing such measures.

The filing of an RGPCD Plan shall not constitute a return to compliance, nor shall it affect MassDEP's authority to take action in response to the Permittee's failure to meet the performance standard.

If an RGPCD Plan is required, the Permittee must:

a. submit information and supporting documentation sufficient to demonstrate compliance with its RGPCD Plan annually at the time it files its ASR; and
b. continue to implement the RGPCD Plan until it complies with the performance standard and such compliance is documented in the Permittee's ASR for the calendar year in which the standard is met.

### II. Contents of an RGPCD Plan

A Permittee that does not meet the 65 RGPCD performance standard within 2 years, has the choice to file an RGPCD Plan containing measures that the Permittee believes will be sufficient to bring the system into compliance with the performance standard (Individual RGPCD Plan) or may adopt the MassDEP RGPCD Functional Equivalence Plan that includes mandated Best Management Practices (BMPs).

A Permittee that has been unable to meet the 65 RGPCD performance standard within 5 years must implement the MassDEP RGPCD Functional Equivalence Plan to be considered functionally equivalent with the performance standard.

At a minimum, all RGPCD Compliance Plans must include a detailed:

a. description of the actions taken during the prior calendar year to meet the performance standard;
b. analysis of the cause of the failure to meet the performance standard;
c. description and schedule of the actions that will be taken to meet the performance standard; and
d. analysis of how the actions described in c. will address the specific circumstances that resulted in the failure to meet the performance standard.

RGPCD Plans may be amended to revise the actions that will be taken to meet the performance standard.

**Individual RGPCD Plan**

Individual RGPCD Plan will document a plan to adopt and implement measures tailored to the specific needs of the water supply system that the Permittee believes will be sufficient to bring the system into compliance with the performance standard within three years.

At a minimum, all Individual RGPCD Plans for failure to meet the RGPCD performance standard must include implementation of at least one of the following residential conservation programs:

a. a program that provides water saving devices such as faucet aerators and low flow shower heads at cost;
b. a program that provides rebates or other incentives for the purchase of low water use appliances (washing machines, dishwashers, and toilets); or
c. the adoption and enforcement of an ordinance, bylaw or regulation to require the installation of moisture sensors or similar climate related control technology on all automatic irrigation systems.

If the Permittee is already implementing one or more of these programs, it must include in its Individual RGPCD Plan the continued implementation of such program(s), as well as implementation of at least one additional program. All programs must include a public information component designed to inform customers of the program and to encourage participation in the program.

Without limitation, the Individual RGPCD Plan for failure to meet the RGPCD performance standard may include any of the actions set forth in the MassDEP RGPCD Functional Equivalence Plan below.

**MassDEP RGPCD Functional Equivalence Plan**

In order to be considered functionally equivalent with the RGPCD performance standard, the Permittee must adopt and implement the MassDEP RGPCD Functional Equivalence Plan that requires all the following residential conservation programs:

a. a program that provides water saving devices such as faucet aerators and low flow shower heads at cost;
b. a program that provides rebates or other incentives for the purchase of low water use appliances (washing machines, dishwashers, and toilets);
c. the adoption and enforcement of an ordinance, bylaw or regulation to require the installation of soil moisture sensors or similar climate related control technology on all automatic irrigation systems;
d. the use of an increasing block water rate or a seasonal water rate structure as a tool to encourage water conservation;
e. the adoption and enforcement of an ordinance, bylaw or regulation to require that all new construction include water saving devices and low water use appliances; and
f. the implementation of monthly or quarterly billing.

**Hardship**

A Permittee may present an analysis of the cost effectiveness of implementing certain conservation measures included in the MassDEP RGPCD Functional Equivalence Plan and offer alternative measures. Any analysis must explicitly consider environmental impacts and must produce equal or greater environmental benefits. Suppliers will be able to present:

a. Reasons why specific measures are not cost effective because the cost would exceed the costs of alternative methods of achieving the appropriate standard;
b. Alternative specific conservation measures that would result in equal or greater system-wide water savings or equal or greater environmental benefits than the conservation measures included in the MassDEP RGPCD Functional Equivalence Plan; and
c. When applicable, an analysis demonstrating that implementation of specific measures will cause or exacerbate significant economic hardship.

## Appendix B – Functional Equivalence with the 10% Unaccounted for Water Performance Standard

MassDEP will consider PWS Permittees who cannot meet the 10% UAW performance standard to be functionally equivalent, and in compliance with their Permit, if they have an on-going program in place that ensures "best practices" for controlling water loss. The water loss control program will be based on annual water audits and guidance as described in the AWWA/IWA *Manual of Water Supply Practices – M36, Water Audits and Loss Control Programs* (AWWA M36).

If, as of December 31, 2019, the Permittee fails to document compliance with the Unaccounted for Water performance standard (UAW of 10% or less for 2 of the 3 most recent years throughout the permit period), then the Permittee shall develop and implement a water loss control program following the *AWWA M36 Water Audits and Loss Control Programs* within 5 full calendar years.

1. Conduct an annual "top down" water audit, calculate the data validity level/score using AWWA Water Loss Control Committee's Free Water Audit Software, and submit the AWWA WLCC Free Water Audit Software: Reporting Worksheet and data validity score annually with its Annual Statistical Report (ASR).
    - If a PWS's data validity level/score is less than Level III (51-70), steps recommended through the audit(s) shall be taken to improve the reliability of the data prior to developing a long-term program to reduce real and apparent water losses.
    - Data with a validity score of 50 or less are considered too weak to be used to develop a component analysis or for infrastructure planning and maintenance.
    - Developing data with an acceptably strong validity score can be a multi-year process.

2. When the data validity score meets the Level III (51-70) requirement, the Permittee shall conduct a component analysis to identify causes of real and apparent water loss and develop a program to control losses based on the results of the component analysis. The Permittee shall submit the component analysis and water loss control program with a proposed implementation schedule to MassDEP.

3. Continued implementation will be a condition of the Permit in place of meeting the 10% UAW performance standard.

4. Upon request of MassDEP, the Permittee shall report on its implementation of the water loss control program.

A PWS Permittee may choose to discontinue the water loss program implementation if UAW, as reported on the ASR and approved by DEP, is below 10% for four consecutive years, and the water audit data validity scores are at least Level III (51-70) for the same four years.

**NOTE FOR SMALL SYSTEMS**: For small systems with less than 3,000 service connections or a service connection density of less than 16 connections per mile of pipeline, the Unavoidable Annual Real Loss (UARL) calculation and the Infrastructure Leak Index (ILI) developed as the final steps of the top down water audit may not result in valid performance indicators, and may not be comparable to the UARL and ILI calculations for larger systems.

However, these small systems can benefit from developing reliable data and conducting an annual top down water audit. Small systems can rely on the real losses (gallons per mile of main per day) performance indicator developed in the water audit as a measure of real water loss when developing a water loss control program. The M36 Manual discusses the audit process for small systems, and includes a chapter to guide small systems in understanding the results of their audits and in developing a water loss control program (*Manual of Water Supply Practices – M36, Fourth Edition, Chapter 9: Considerations for Small Systems*, pp. 293-305).

**MassDEP UAW Water Loss Control Measures:** Permittees who do not have MassDEP approved Water Loss Control Programs in place by 6th calendar year after 2019 will be required to implement the MassDEP UAW Water Loss Control Measures outlined below:

- An annual water audit and leak detection survey, as described in the AWWA M36 Manual, of the entire system.
  - Within one year, repair 75% (by water volume) of all leaks detected in the survey that are under the control of the public water system;
  - Thereafter, repair leaks as necessary to reduce Permittee's UAW to 10% or the minimum level possible.
- Meter inspection and, as appropriate, repair, replace and calibrate water meters:
  - Large Meters (2" or greater) – within one year
  - Medium Meters (1" or greater and less than 2") – within 2 years
  - Small Meters (less than 1") - within three years
  - Thereafter, calibrate and or replace all meters according to type and specification.
- Bill at least quarterly within three years.
- Water pricing structure sufficient to pay the full cost of operating the system.

Hardship – A Permittee may present an analysis of the cost effectiveness of implementing certain conservation measures included in the MassDEP UAW Water Loss Control Measures and offer alternative measures. Any analysis must explicitly consider environmental impacts and must produce equal or greater environmental benefits. Suppliers will be able to present:

- Reasons why specific measures are not cost effective because the cost would exceed the costs of alternative methods of achieving the appropriate standard;
- Alternative specific conservation measures that would result in equal or greater system-wide water savings or equal or greater environmental benefits than the conservation measures included in the MassDEP UAW Functional Equivalence Plan; and
- When applicable, an analysis demonstrating that implementation of specific measures will cause or exacerbate significant economic hardship.