



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

FINAL

July 3, 2018

**Plymouth Board of Selectmen
Town Hall
11 Lincoln St.,
Plymouth, MA 02360**

**RE: Plymouth – BRP/WMA
Plymouth Water Department
PWS ID #4082000
Water Management Act
Permit #9P421239.01**

Dear Sirs,

Attached please find:

- FINAL Findings of Fact in support of the renewal of Permit #9P421239.01, and
- FINAL WMA Permit #9P421239.01 for the Plymouth Water Department.

The signature on this cover letter indicates formal issuance of the attached documents. If you have any questions regarding this information, please contact Jen D'Urso at (617) 654-6591 or via e-mail at jen.durso@state.ma.us.

Sincerely,

Duane LeVangie
Chief, Water Management Act Program
Bureau of Resource Protection

Y:\DWP Archive\SERO\2018\Plymouth-WMA FINAL Permit 9P421239.01-2018-07-03

Ecc: Jonathan Beder, Town of Plymouth
Patti Kellogg, MassDEP SERO
Michele Drury, DCR OWR
Michelle Craddock, DFW
Jen Pederson, MWWA
Julia Blatt, MA Rivers Alliance
Mettie Whipple, Eel River Watershed Association

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

Contact Michelle Waters-Ekanem, Diversity Director/Civil Rights: 617-292-5751 TTY#
MassRelay Service 1-800-439-2370.

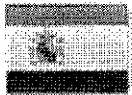
<http://www.mass.gov/eea/agencies/massdep/service/justice/>

(Version 3.30.15)



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.



3 Português (Portuguese):

Este documento é importante e deve ser traduzida imediatamente. Se você precisa deste documento traduzido, por favor, entre em contato com Diretor de Diversidade da MassDEP para os números de telefone listados abaixo.



4(a) 中國（傳統）(Chinese (Traditional)):

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。



4(b) 中国（简体中文）(Chinese (Simplified)):

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 的多样性总监联系。



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 đã dạng tại các số điện thoại được liệt kê dưới đây.



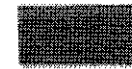
7 ប្រទេសកម្ពុជា (Kmer (Cambodian)):

ឯកសារនេះគឺមានសារៈសំខាន់និងគួរត្រូវបានបកប្រែភ្លាម។ ប្រសិនបើអ្នកត្រូវបានបកប្រែឯកសារនេះសូមទំនាក់ទំនងឆ្នោតជាមួយ MassDEP នៅលេខទូរស័ព្ទដែលបានរាយនាងក្រោម។



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):

Этот документ является важным и должно быть переведено сразу. Если вам нужен этот документ переведенный, пожалуйста, свяжитесь с директором разнообразия MassDEP по адресу телефонных номеров, указанных ниже.

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

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 3.30.15)



10 العربية (Arabic):

هذه الوثيقة الهامة وينبغي أن تترجم على الفور. إذا كنت بحاجة إلى هذه الوثيقة المترجمة، يرجى الاتصال مدير التنوع في MassDEP على أرقام الهواتف المدرجة أدناه.



11 한국어 (Korean):

이 문서는 중요하고 즉시 번역해야 합니다. 당신이 번역이 문서가 필요하다면 아래의 전화 번호로 MassDEP의 다양성 감독에 문의하시기 바랍니다.



12 հայերէն (Armenian):

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



13 فارسی (Farsi (Persian):

این سند مهم است و باید فوراً ترجمه شده است. اگر شما نیاز به این سند ترجمه شده، لطفاً با ما تماس تنوع مدیر MassDEP در شماره تلفن های ذکر شده در زیر.



14 Français (French):

Ce document est important et devrait être traduit immédiatement. Si vous avez besoin de ce document traduit, s'il vous plaît communiquer avec le directeur de la diversité MassDEP aux numéros de téléphone indiqués ci-dessous.



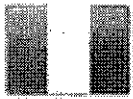
15 Deutsch (German):

Dieses Dokument ist wichtig und sollte sofort übersetzt werden. Wenn Sie dieses Dokument übersetzt benötigen, wenden Sie sich bitte Diversity Director MassDEP die in den unten aufgeführten Telefonnummern.



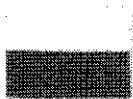
16 Ελληνική (Greek):

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):

Questo documento è importante e dovrebbe essere tradotto immediatamente. Se avete bisogno di questo documento tradotto, si prega di contattare la diversità Direttore di MassDEP ai numeri di telefono elencati di seguito.



18 Język Polski (Polish):

Dokument ten jest ważny i powinien być natychmiast przetłumaczone. Jeśli potrzebujesz tego dokumentu tłumaczone, prosimy o kontakt z Dyrektorem MassDEP w różnorodności na numery telefonów wymienionych poniżej.



19 हिन्दी (Hindi):

यह दस्तावेज महत्वपूर्ण है और तुरंत अनुवाद किया जाना चाहिए. आप अनुवाद इस दस्तावेज की जरूरत है, नीचे सूचीबद्ध फोन नंबरों पर MassDEP की विविधता निदेशक से संपर्क करें.



Department of Environmental Protection

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Findings of Fact in Support of FINAL Permit Issuance Water Management Permit #9P421239.01 Town of Plymouth

The Department of Environmental Protection (the Department) makes the following Findings of Fact in support of the attached Final Water Management Permit #9P421239.01, and includes herewith its reasons for issuing the Final Permit and for conditions of approval imposed, as required by M.G.L. c. 21G, § 11. The issuance of this permit is in response to a water withdrawal permit renewal application by the Town of Plymouth, Department of Public Works, Water Division, (Plymouth) for the purpose of public water supply.

The Department adopted revised Water Management Regulations at 310 CMR 36.00 on November 7, 2014, (described in greater detail below). Since that time, the Department has been working closely with each Water Management Act (WMA) permittee to fully consider all aspects of their individual situations to ensure thoughtful and implementable draft permits.

The Permit Extensions

WMA permits issued during the first 20-year permitting cycle for the South Coastal Basin expired on August 31, 2010. All permittees seeking to renew their Water Management permit were required to file a renewal application on or before May 31, 2010. Plymouth filed a timely renewal application and received a one-year Interim Permit, to August 31, 2011, to continue operations while the permit renewal review was ongoing. The Department published notice of the permit renewal application in the Environmental Monitor on June 23, 2010. Subsequently, the expiration dates for all Water Management permits were extended for four years by Chapter 240 of the Acts of 2010 as amended by Chapter 238 of the Acts of 2012, collectively known as the Permit Extension Act. In addition, in a letter of September 25, 2015, the Department informed Plymouth that the Department would need additional time before making a determination on the application in order to ensure that all permit renewal applicants in the South Coastal Basin fully understood the new Water Management Regulations (discussed below), and to give proper consideration to all permit renewal applications within the basin. Pursuant to M.G.L. c. 30A, § 13, and 310 CMR 36.18(7), Plymouth's permit continues in force and effect until the Department issues a final decision on the permit renewal application.

The expiration date for all permits going forward in the South Coastal Basin will be August 31, 2030, in order to restore the staggered permitting schedule set forth in the regulations.

The Water Management Act (M.G.L. c. 21G)

The Water Management Act (Act) requires the Department to issue permits that balance a variety of factors including without limitation:

- Impact of the 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 of water from the water source;
- Municipal and Massachusetts Water Resources Commission (WRC) water resource 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.

Water Management Regulation Revisions

In 2010 the Executive Office of Energy and Environmental Affairs (EEA) convened the Sustainable Water Management Initiative (SWMI) for the purpose of incorporating the best available science into the management of the Commonwealth's water resources. SWMI was a multi-year process that included a wide range of stakeholders and support from the Departments of Environmental Protection, Fish and Game, and Conservation and Recreation. In November 2012 the *Massachusetts Sustainable Water Management Initiative Framework Summary* (<http://www.mass.gov/eea/docs/eea/water/swmi-framework-nov-2012.pdf>) was released.

On November 7, 2014, the Department adopted revised Water Management Regulations at 310 CMR 36.00 that incorporate elements of the SWMI framework and the Water Conservation Standards adopted by the Massachusetts WRC. The regulations reflect a carefully developed balance to protect the health of Massachusetts' water bodies while meeting the needs of businesses and communities for water.

Without limitation, the Department has incorporated the following into Water Management permitting:

- Safe yield determinations for the major river basins based on a new methodology developed through SWMI (see the Safe Yield in the South Coastal Basin section of this document);
- Water needs forecasts for public water suppliers developed by the Department of Conservation and Recreation, Office of Water Resources (DCR), using a methodology reviewed and approved by the Massachusetts WRC;
- Water supply protection measures for public water supplies including Zone II delineations for groundwater sources, and wellhead and surface water protection measures as required by Massachusetts Drinking Water Regulations (310 CMR 22.00);
- Water conservation and performance standards reviewed and approved by the WRC in July 2006 and revised in June 2012 (<http://www.mass.gov/eea/docs/eea/wrc/water-conservation-standards-rev-june-2012.pdf>), including without limitation;
 - performance standard of 65 residential gallons per capita day or less;
 - performance standard of 10% or less unaccounted-for-water;
 - seasonal limits on nonessential outdoor water use;
 - a water conservation program that includes leak detection and repair, full metering of the system and proper maintenance of the meters, periodic review of pricing, and education and outreach to residents and industrial and commercial water users; and
- Environmental protections developed through SWMI, including without limitation;
 - protection for coldwater fish resources;
 - minimization of withdrawal impacts in areas stressed by groundwater use;
 - mitigation of the impacts of increasing withdrawals.

Safe Yield in the South Coastal Basin

This permit is being issued under the safe yield methodology adopted by the Department on November 7, 2014, and described in the regulations at 310 CMR 36.13. As of the date of issuance of this permit, the safe yield for the South Coastal Basin is 70.1 million gallons per day (MGD), and total registered and permitted withdrawals are 47.4 MGD, leaving 22.70 MGD potentially available. The maximum withdrawals that will be authorized in this permit, and all other permits currently under review by the Department within the South Coastal Basin, will be within the safe yield and may be further conditioned as outlined in the regulations.

Findings of Fact for Permit Conditions in Plymouth's Water Management Act Permit

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

Plymouth operates 10 permitted sources in the South Coastal Basin, and 2 in the Buzzards Bay Basin. In addition, Plymouth maintains Great South Pond (4329000-02S) and Little South Pond (4329000-01S) as emergency surface water sources. Plymouth was issued its initial South Coastal Water Management Permit on June 21, 1993.

Special Condition 1, Maximum Authorized Annual Average Withdrawal The Department of Conservation and Recreation's Office of Water Resources (DCR) developed draft demand projections for Plymouth in the South Coastal Basin in September 2014. After several meetings and exchanges of information, final projections were issued on June 6, 2017. Because recent system-wide usage (2016 was 4.35 MGD and 2015 was 4.39 MGD) has been exceeding the 65/10 projections prepared by DCR, MassDEP is basing Plymouth's permitted volumes on DCR's Current Trend projections (4.59 MGD) for the first permit period. After this initial permit period Plymouth's permitted volumes are limited to the 4.61 mgd included in DCR's 65/10 projection with the exception of in 2020 because of the 400th Anniversary celebration or if Plymouth adopts the conservation conditions and Functional Equivalence Plans outlined in this condition.

MassDEP also held DCR's Current Trends projection through 2030 plus a 5% buffer of 5.04 MGD as a placeholder in the permit pending Plymouth's developing a RGPCD Functional Equivalence Plan for approval by the Department. MassDEP recognizes that future growth in water demand may not occur precisely as forecast. Therefore, this permit authorizes withdrawals of up to maximum authorized withdrawals at any time during the life of the permit provided that Plymouth is meeting all other permit conditions, including the development of an approved RGPCD Functional Equivalence Plan. Specifically the permittee may increase annual average daily withdrawals to 5.04 MGD prior to 2025. Plymouth's RGPCD values which have been in the low 70s, will need to be reduced to meet the DCR 65/10 Projections. Plymouth's permitted volumes will be reviewed annually to monitor progress.

In addition, the total withdrawals added together from both the South Coastal Basin and the Buzzards Bay Basin cannot exceed 5.04 MGD, except as noted below in 2020. Any withdrawals taken from the Buzzards Bay Basin must be subtracted from the total volume that can be withdrawn from the South Coastal Basin.

Summary of Plymouth Water Department's WMA Authorizations	
WMA Authorization	Volume Authorized
WMA Permit #9P-4-24-239.01	1.59 MGD (580.35 MGY)
WMA Permit #9P-4-21-239.01	5.04 MGD (1839.60 MGY)*
Total WMA Authorization	5.04 MGD (1839.60 MGY)*

*Except in 2020, when the total volume authorized shall be 5.58 MGD.

In 2016, Plymouth's average daily withdrawal from the South Coastal Basin was 3.78 MGD, and 0.57 MGD from the Buzzards Bay Basin. If water needs are expected to exceed the maximum authorized in this permit and Plymouth has made progress addressing their high RGPCD, Plymouth may apply for additional volume at any time by submitting a new Water Management Permit application BRPWM03.

In addition, MassDEP recognizes that visitor projections for the 400th Anniversary celebration in 2020 were not included in the DCR projections used in this permit. Plymouth is expecting a significant yet undefined increase in water demand in calendar year 2020 because of this one-time event. Understanding the significance and the unique nature of the increase in water use associated with the influx of tourists expected, MassDEP is maintaining an authorized withdrawal volume of 5.58 MGD for calendar year 2020. The 5.58 MGD volume is less than previously allocated to Plymouth, reflects the volumes Plymouth currently has mitigation to withdraw, is contingent upon their demonstrating compliance with the other conditions of this permit including the seasonal limits on nonessential outdoor water use outlined in Special Condition #7, and requires the filing of a report should more than 5.04 MGD be withdrawn on an average daily basis in 2020. The report should briefly explain and document the increase in water demands experienced, particularly the changes in commercial water use reported by Plymouth between 2018, 2019 and 2020.

Special Condition 2, Maximum Daily Withdrawals from Groundwater Withdrawal Points, reflects the MassDEP-approved Zone II maximum daily pumping rate for each of Plymouth's permitted wells based on prolonged pumping tests. Withdrawals in excess of these maximum daily rates require approval from the Department.

Special Condition 3, Zone II Delineation requirements have been met and no further delineations are required as a condition of this permit.

Special Condition 4, Wellhead and Surface Water Protection requirements have been met and are up to date as of the issuance of this permit.

Special Condition 5, Performance Standard for Residential Gallons Per Capita Day Water has changed from 80 RGPCD required in Plymouth's prior permit. Plymouth has been in compliance with the 80 standard since 2011. The RGPCD required for all PWS permittees is now 65 gallons. Permittees that cannot comply within the timeframe in the permit must meet Functional Equivalence (FEP) requirements outlined in Appendix A. Plymouth's DEP-approved 2016 RGPCD was 64. As noted in Special Condition 1 the Department is requiring that Plymouth develop and adopt a MassDEP approved RGPCD FEP to address their use of the Current Trend projection prepared by DCR. Plymouth shall submit a RGPCD Compliance Plan that at a minimum complies with the requirements outlined in Appendix A by January 2, 2019.

Special Condition 6, Performance Standard for Unaccounted for Water has changed from 15% UAW required in Plymouth's prior permit. The UAW required for all PWS permittees is now 10%. Permittees that cannot comply within the timeframe in the permit must meet 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. Plymouth's UAW for the most recent three years has been:

2016	2015	2014
14%	13%	12%

Special Condition 7, Seasonal Limits on Nonessential Outdoor Water Use, requires Plymouth to implement nonessential outdoor water use restrictions from May 1 to September 30, beginning in 2018. Plymouth can choose to implement the restrictions based on the calendar (all summer). It can also implement the restrictions only when groundwater levels in a U.S. Geological Survey (USGS) monitoring well fall below certain defined levels for at least 60 consecutive days or when a drought advisory is declared for the region.

If Plymouth selects the USGS monitoring well approach, it has been assigned the USGS monitoring well 415453070434901 (MA-PWW 22) at Plymouth, MA.

If Plymouth would like to propose an alternative nonessential restriction program in the future for inclusion in the permit, the alternative nonessential restriction program should be as stringent as the USGS monitoring well approach. MassDEP will review the alternative nonessential restriction program and include it in the permit through permit amendments, if applicable.

Special Condition 8, Water Conservation Requirements, incorporates the Water Conservation Standards for the Commonwealth of Massachusetts reviewed and approved by the WRC in July 2006 and revised in June 2012. (<http://www.mass.gov/eea/docs/eea/wrc/water-conservation-standards-rev-june-2012.pdf>).

Special Condition 9, Reporting Requirements, ensures that the information necessary to evaluate compliance with the conditions included herein is accurately reported.

Special Condition 10, Mitigation of Impacts for Withdrawals that Exceed Baseline¹, requires mitigation of the impacts of withdrawals above the permittee's baseline by direct and/or indirect mitigation activities. Plymouth's Baseline in the South Coastal Basin (4.58 MGD) is based on the average annual withdrawals made during 2003-2005 plus 5%. Plymouth's system-wide Baseline is 5.36 MGD based on their 2005 use + 5%. Mitigation of the impacts of increasing withdrawals can be through:

- Direct mitigation that will result in enhanced streamflows through
 - Purchase and retirement of other registered or permitted withdrawals,
 - Surface water releases,
 - Stormwater recharge, or
 - Infiltration and inflow removal from sewer systems.

- Indirect mitigation activities that will result in streamflow and habitat improvements

¹ Baseline is the volume of water withdrawn in 2005 plus 5%, or the average volume withdrawn from 2003 to 2005 plus 5%, which is greater. Baseline cannot be less than the registered volume, and cannot be more than the authorized volume during the 2003-2005 period. For suppliers with authorizations in multiple major basins, baseline is computed for each basin and for the entire system.

In addition, since the additional volumes proposed to be withdrawn are expected to serve areas with on-site septic systems or those served by the Town's groundwater discharge facility, the Department assumes that 85% of the water withdrawn above the baseline will be returned to the subsurface. This permit authorizes Plymouth to withdraw up to 5.58 MGD in the South Coastal Basin for the year 2020 only, 1.0 MGD above the baseline rate 4.58 MGD. Otherwise, the maximum authorization is for 5.04 MGD in the South Coastal basin, 0.46 MGD above the baseline rate of 4.58 MGD.

Plymouth is celebrating its 400 year anniversary in 2020. The town expects somewhere between 1 and 7 million additional visitors during the months of April-October for the numerous celebrations and special exhibits that are to be showcased during that time (estimate from the Plymouth Planning Department.) For that one year only, Plymouth has a potential additional allocation of 0.54 MGD to accommodate this increase in commercial usage.

After accounting for the 85% wastewater return adjustment, 0.15 MGD (15% of 1.0 MGD) of future additional withdrawals from the South Coastal basin must be mitigated.

Tidmarsh Farms (Registration #4-21-239.25) was an active and operating 179 acre cranberry bog with a Water Management Registration of 1.6 MGD. In October 2016, The Town of Plymouth purchased 50 acres of this property with Mass Audubon holding conservation restrictions on this acreage. Based on calculations developed through studies on cranberry cultivation it was calculated that approximately 22.5% of the water used by growers was consumptively lost in the growing process. Based on those assumptions, the calculations in Appendix C of the permit below identifies the direct mitigation credit for the retirement of the Tidmarsh Farm Bog accrued by Plymouth for the 50 acres purchased and protected.

The Ashley V. Holmes Bog (Registration #4-21-239.12) was entered into the Wetlands Reserve Program at the National Resource Conservation Service in 2005. Under this program, the owner received funds to permanently create an easement for the property that limited use to:

1. control of access
2. title and right to convey title
3. quiet enjoyment
4. undeveloped recreational uses
5. subsurface resources
6. and water rights

This property along with the easement was sold to the Town of Plymouth in 2005, as such these 13 acres qualify for the direct mitigation credits outlined in Appendix C for land purchased and protected.

The approximately 7 acre Savery Bog (Registration # 4-21-239.34) purchased and protected by Plymouth in 2016 also qualifies for direct mitigation credit.

Plymouth's mitigation need of 0.15 MGD is met by the 0.15 MGD in direct mitigation achieved with the retirement of the cranberry registrations and conservation restrictions on the former Tidmarsh Farms, Savery Bog, and Holmes Bog property. See Appendix C.

Coldwater Fish Resource Protection was incorporated into the Water Management Regulations in November 2014. Coldwater Fish Resource Protection was evaluated as a condition of this permit because Plymouth's withdrawals from the Lout Pond Well, Bradford Wells, and South Pond Wells may impact waters that MA Division of Fisheries and Wildlife has identified as supporting coldwater fish. Plymouth evaluated their ability to

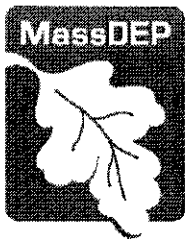
optimize all of their sources to reduce the environmental impact of these sources on the Eel River and Wellingsley Brook. The Bradford Wells are the sole sources for the Bradford pressure zone, which services 2,500 connections and serves critical users such as the Beth Israel Hospital, along with several schools, nursing homes, and a correctional facility. The South Pond Wells are the main suppliers of the Pine Hills pressure zone, and any reduction in their pumping rate would compromise public health and safety. Lastly, the Lout Pond Wells' withdrawals are, on average, approximately 34 MGY, or 0.1 MGD. MassDEP and the Division of Fisheries and Wildlife agreed that given that there are no identified subbasins in this area, and with Plymouth's operational constraints, it is difficult to determine what impact, if any, reducing this withdrawal would have on the CFR. Therefore no additional conditions were included in this permit to address CFR protection.

Minimization of Groundwater Withdrawal Impacts in Stressed Subbasins requires permittees with permitted groundwater sources in subbasins² with net groundwater depletion of 25% or more during August to minimize their withdrawal impacts on those subbasins to the greatest extent feasible. Minimization of Groundwater Withdrawal Impacts is not a condition of this permit at the present time, since there are no delineated subbasins in Plymouth.

Response to Comments

The Department received comments from the Eel River Watershed Association on June 21, 2018 regarding Plymouth's permit renewal application. These comments questioned the development of Safe Yield in the Plymouth-Carver Aquifer, and reiterated the high concentration of listed rare and endangered wildlife in the area. The Department believes that the reduction in the allocated withdrawal volumes of over MGD and the addition of non-essential outdoor water use restrictions in the permit will further protect and enhance Plymouth's water resources.

² Subbasins used for WMA permitting are the 1,395 subbasins delineated by the U.S. Geological Survey in *Indicators of Streamflow Alteration, Habitat Fragmentation, Impervious Cover, and Water Quality for Massachusetts Stream Basins* (Weiskel *et al.*, 2010, USGS SIR 2009-5272).



Department of Environmental Protection

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FINAL WATER WITHDRAWAL PERMIT RENEWAL

Permit #9P-4-21-082.01

Town of Plymouth

This renewal of Permit #9P421082.01 is approved pursuant to the Massachusetts Water Management Act (WMA) for the sole purpose of authorizing the withdrawal of a volume of water as stated below and subject to the following special and general conditions. This permit conveys no right in or to any property.

PERMIT NUMBER: 9P-4-21-239.01 **RIVER BASIN:** South Coastal

PERMITTEE: Town of Plymouth
Board of Selectmen
Town Hall
11 Lincoln Street
Plymouth, MA 02360

EFFECTIVE DATE: July 3, 2018
EXPIRATION DATE: August 31, 2030

TYPE AND NUMBER OF WITHDRAWAL POINTS: Groundwater: 10 Surface Water: 0
USE: Public Water Supply
DAYS OF OPERATION: 365

AUTHORIZED WITHDRAWAL POINTS:

Table 1: Withdrawal Point Identification	
Source Code	Source
4239000-03G	SHIP POND WELL
4239000-05G	NO. PLYMOUTH GP WELL
4239000-06G	BRADFORD GP WELL
4239000-07G	ELLISVILLE GP WELL
4239000-09G	SOUTH POND WELL 1
4239000-10G	SOUTH POND WELL 2
4239000-11G	SAVERY POND WELL
4239000-12G	BRADFORD REPLACEMENT WELL 1A
4239000-13G	LOUT POND REPLACEMENT WELL
4239000-14G	WANNOS POND REPLACEMENT WELL

SPECIAL CONDITIONS – PERMIT #9P421239.01

1. Maximum Authorized Annual Average Withdrawal

This permit authorizes the Town of Plymouth to withdraw water from the South Coastal Basin at the rate described in Table 2 below. In addition, Table 3 reflects the combined volumes authorized to Plymouth under this permit and their WMA Permit #9P-4-24-239.01 in the Buzzards Bay Basin. The permitted volumes are expressed both as an 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 permit period outlined.

The Department of Environmental Protection (MassDEP) will use the raw water withdrawal volume from all authorized withdrawal points to assess compliance with the registered and permitted withdrawal rates.

Table 2: South Coastal Authorized Withdrawal Rates

Permit Periods	Total Raw Water Withdrawal Volumes	
	Permit	
	Daily Average (MGD)	Total Annual(MGY)
X/X/2018 to 12/31/2019	4.59	1675.35
1/1/2020 to 12/31/2020	5.58	2036.70
1/1/2021 to 12/31/2025	4.71	1719.15
1/1/2026 to 8/31/2030	5.04	1839.60

The combined maximum authorized annual withdrawal volumes from the South Coastal and Buzzards Bay Basins are confined to the volumes outlined in Table 2 as well. MassDEP further limits system-wide withdrawals from all of Plymouth’s sources as outlined in A., B., and C.

- A. Plymouth may only withdraw above an annual average daily withdrawal of 4.61 MGD (DCR’s 65/10 Forecast for 2030 +5%) provided Plymouth is:
 - complying with the requirements of a MassDEP approved RGPCD Functional Equivalence Plan (Appendix A).

- B. Withdrawals may increase to an average daily withdrawal of up to 5.04 MGD prior to January 1, 2026, provided Plymouth is:
 - Meeting the unaccounted-for water use (UAW) standard of 10% or less, or all UAW functional equivalence requirements in Appendix B;
 - Implementing required seasonal limits on nonessential outdoor water use in Special Condition 7; and
 - Implementing all water conservation requirements in Special Condition 8.

- C. Should withdrawals exceed 5.04 MGD in 2020, Plymouth must file with their 2020 Annual Statistical Report a brief report explaining the increase in water demands resulting from Plymouth’s 400th Anniversary. The report shall document changes in water use, particularly commercial water use between calendar years 2018 – 2020.

2. Maximum Daily Withdrawals from Groundwater Withdrawal Points

Withdrawals from permitted groundwater sources are not to exceed the approved maximum daily rates listed in Table 4 below without advance approval from the Department.

Table 3: Maximum Daily Withdrawal Rates from Authorized Groundwater Withdrawal Points	
Source	Maximum Daily Rate
SHIP POND WELL - 4239000-03G	0.86 MGD
NO. PLYMOUTH GP WELL - 4239000-05G	1.53 MGD
BRADFORD GP WELL - 4239000-06G	1.51 MGD (combined with well 4239000-12G)
ELLISVILLE GP WELL - 4239000-07G	1.12 MGD
SOUTH POND WELL 1 - 4239000-09G	1.12 MGD
SOUTH POND WELL 2 - 4239000-10G	1.5 MGD
SAVERY POND WELL - 4239000-11G	1.50 MGD
BRADFORD REPLACEMENT WELL 1A - 4239000-12G	1.51 MGD (combined with well 4239000-06G)
LOUT POND REPLACEMENT WELL - 4239000-13G	0.72 MGD
WANNOS POND REPLACEMENT WELL - 4239000-14G	0.94 MGD

3. Zone II Delineation

Department records show that all of the Town of Plymouth’s sources have approved Zone II delineations, therefore, no further Zone II work is required.

4. Wellhead and Surface Water Protection

Department records show that Plymouth has implemented municipal controls that comply with Wellhead Protection Regulations at 310 CMR 22.21(2).

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

The Town of Plymouth’s performance standard for residential gallons per capita day (RGPCD) is now 65 gallons or less. Plymouth shall be in compliance with this performance standard by December 31, 2019, or, if Plymouth does not meet the standard, shall be in compliance with the functional equivalence requirements (Appendix A).

6. Performance Standard for Unaccounted for Water

The Town of Plymouth’s Performance Standard for Unaccounted for Water (UAW) is 10% or less of overall water withdrawal for 2 of the most recent years 3 throughout the permit period. Plymouth shall be in compliance with this performance standard by December 31, 2019 or, if Plymouth does not meet the standard, shall be in compliance with the functional equivalence requirements (Appendix B).

Nothing in the permit shall prevent a permittee who meets the 10% performance standard from demonstrating compliance with the UAW performance standard by developing and implementing a water loss control program following the *AWWA M36 Water Audits and Loss Control Programs*.

Permittees meeting the Performance Standard for Unaccounted for Water through implementation of 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

Plymouth shall limit nonessential outdoor water use through mandatory restrictions from May 1st through September 30th as outlined in Table 5 below. Plymouth shall start implementing the seasonal limits on nonessential outdoor water use on May 1, 2018.

Plymouth shall be responsible for tracking groundwater levels and drought advisories and recording and reporting when restrictions are implemented if groundwater level triggered restrictions are implemented. See Table 3 *Instructions for Accessing U.S. Geologic Survey Groundwater Level and Massachusetts Drought Advisory Website Information*. Plymouth shall also document compliance with the seasonal limits on nonessential outdoor water use annually in its Annual Statistical Report (ASR), and indicate whether it anticipates implementing calendar triggered restrictions or USGS monitoring well triggered restrictions during the next year.

Restricted Nonessential Outdoor Water Uses

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

- irrigation of lawns via sprinklers or automatic irrigation systems;
- filling swimming pools;
- washing of vehicles, except in a commercial car wash or as necessary for operator safety; and
- washing 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, before 9 am and after 5 pm, 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;
- irrigation of gardens, flowers and ornamental plants by means of a hand-held hose or drip irrigation systems; and
- irrigation of lawns 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).

Public Notice of Seasonal Nonessential Outdoor Water Use Restrictions

Plymouth shall notify its customers of the restrictions, including a detailed description of the restrictions and penalties for violating the restrictions. Notice that restrictions have been put in place shall be filed each year with the Department within 14 days of the restriction's effective date. Filing shall be in writing on the form "Notification of Water Use Restrictions" available on MassDEP website.

Table 4: Seasonal Limits on Nonessential Outdoor Water Use

Permittee must at a minimum implement the following outdoor water use restrictions:

Groundwater Level Triggered Restrictions from May 1st through September 30th

Nonessential outdoor water use is allowed no more than TWO DAYS per week before **9 a.m. and after 5 p.m.** whenever:

- Groundwater levels at USGS Monitoring Well 415453070434901 (PWW 22) Plymouth, MA decline to or below the groundwater trigger for 60 consecutive days. The monthly trigger levels are listed below and are the period of record monthly 25th percentile depth to water level values, as determined and published by the USGS. Restrictions could start on May 1, so monitoring of PWW 22 begins on March 1 of each year.

March	April	May	June	July	Aug	Sept
24.46	24.1	24.06	24	24.44	24.97	25.25

*As of 3/10/2016

Once implemented, the restrictions shall remain in place until the daily value of the groundwater levels at the assigned USGS monitoring well have recovered to less than the trigger for 30 consecutive days (when the water table elevation has risen above the trigger level); or

- A Drought Advisory or higher is declared by the Massachusetts Drought Management Task Force for Southeastern MA.

Instructions for Accessing U.S. Geologic Survey Groundwater Level and Massachusetts Drought Advisory Website Information

Groundwater level information is available at the USGS National Water Information System (NWIS): Web Interface. The USGS NWIS default shows Massachusetts groundwater levels in real time, i.e., the most recent, usually hourly, water level measured and recorded at each USGS monitoring well. Seasonal Limits on Nonessential Outdoor Water Use are implemented when the daily mean depth to water level exceeds the designated trigger for 60 consecutive days (*i.e.*, when the depth to water becomes larger than the trigger value as the water table elevation declines). The daily water level is compared to the trigger for that month. To determine if restrictions must be implemented on May 1 it is necessary to monitor the daily water level in March and April.

Mean daily groundwater level readings are available at the USGS NWIS Web Interface at http://waterdata.usgs.gov/ma/nwis/current/?type=gw&group_key=county_cd

- Scroll down to 415453070434901 MA-PWW 22, Plymouth, MA.
- Click on the station number.
- On the pull-down menu "Available data for this site" choose "Daily data".
- Under "Available Parameters" click on "WaterLevel, BelowLSD (Mean)".
- Under "Output Format" click on "Table" and enter the number of days of records (the default is 7 days; entering 60 will give you 60 days of data) and hit "GO".
- The table provides the "Daily Mean Depth to water level, feet below land surface" for the most recent number of days chosen.
- Compare each day's value to its month's trigger value (25th percentile) in your permit. Outdoor water

use restrictions must be implemented when the daily depth to water level is at or below the trigger for 60 consecutive days.

Nothing in the permit shall prevent Permittee from implementing water use restrictions that are more stringent than those set forth in this permit.

8. Water Conservation Requirements

At a minimum, Plymouth shall implement the following conservation measures forthwith. Compliance with the water conservation requirements shall be reported to the Department upon request, unless otherwise noted below.

Table 5: Minimum Water Conservation Requirements	
Leak Detection	
1.	At a minimum, conduct a full leak detection survey every three years.
2.	Conduct leak detection of the entire distribution system within one year whenever the percentage of UAW 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, submit to the Department a report detailing the 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 <u>AWWA Manual 36</u> .
4.	<p>Plymouth shall have repair reports available for inspection by the Department. Plymouth shall establish a schedule for repairing leaks that is at least as stringent as the following:</p> <ul style="list-style-type: none"> o Leaks of 3 gallons per minute or more shall be repaired within 3 months of detection. o Leaks of less than 3 gallons per minute at hydrants and appurtenances shall be repaired as soon as possible. o Leaks of less than 3 gallons per minute shall be repaired in a timely manner, but in no event more than 6 months from detection, except that leaks in freeway, arterial or collector roadways shall be repaired when other roadwork is being performed on the roadway. <p>Leaks shall be repaired in accordance with Plymouth’s priority schedule including leaks up to the property line, curb stop or service meter, as applicable. Plymouth shall have water use regulations in place that require property owners to expeditiously repair leaks on their property.</p>
Metering	
1.	Calibrate all source and finished water meters at least annually and report date of calibration on the ASR.
2.	Plymouth reports its system is 100% metered. All water distribution system users shall have properly sized service lines and meters that meet AWWA calibration and accuracy performance standards as set forth in <u>AWWA Manual M6 – Water Meters</u> .
3.	Plymouth shall have an ongoing program to inspect individual service meters to ensure that all service meters accurately measure the volume of water used by its customers. The metering program shall include regular meter maintenance, including testing, calibration, repair, replacement and checks for tampering to identify and correct illegal connections. The plan shall continue to include placement of sufficient funds in the annual budget to calibrate, repair, or replace meters as necessary.
Pricing	
1.	Plymouth shall maintain a water pricing structure that includes the full cost of operating the water supply system. Plymouth shall evaluate rates at a minimum every three to five years and adjust costs as needed. Full cost pricing factors all costs - operations, maintenance, capital, and indirect costs (environmental

Table 5: Minimum Water Conservation Requirements	
impacts, watershed protection) - into prices.	
2. Plymouth 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.	
Residential and Public Sector Conservation	
1. Plymouth 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. Plymouth has reported that all municipally owned public buildings have been retrofitted with water saving devices (faucet aerators, low flow shower heads and low flow toilets). Plymouth shall continue to ensure that water savings devices are installed in all municipal buildings as they are renovated, and shall ensure water conserving fixtures and landscaping practices are incorporating into the design of new municipal capital projects.	
Industrial and Commercial Water Conservation	
1. Plymouth shall ensure water conservation practices in all development proposals, particularly low flow devices and water-wise landscaping practices.	
Public Education and Outreach	
1. Plymouth shall continue to implement its water conservation and education efforts designed to educate the Town's water customers on ways to conserve water. Without limitation, Plymouth's plan may include the following actions: <ul style="list-style-type: none"> o Include in bill stuffers and/or bills, a work sheet to enable customers to track water use and conservation efforts and estimate the dollar savings; o Public space advertising/media stories on successes (and failures); o Conservation information centers perhaps run jointly with electric or gas company; o Speakers for community organizations; o Public service announcements; radio/T.V./audio-visual presentations; o Joint advertising with hardware stores to promote conservation devices; o Use of civic and professional organization resources; o Special events such as Conservation Fairs; o Develop materials that are targeted to schools with media that appeals to children, including materials on water resource projects and field trips; and o Provide multilingual materials as needed. 	
2. Upon request of the Department, the Town of Plymouth 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.	

9. Reporting Requirements

Plymouth shall report annually as required by completing the electronic Annual Statistical Report (eASR) for public water suppliers, and shall provide other reporting as specified in the Special Conditions above.

10. Mitigation of Impacts for Withdrawals that Exceed Baseline

Plymouth is required to mitigate 0.15 MGD for its renewed permitted withdrawals over baseline in the South Coastal Basin. The South Coastal mitigation requirement of 0.15 MGD will be met with the Direct Mitigation volumes achieved through the purchase and protection of the Ashley Holmes Bog, the Savery Bog, and 50

acres of cranberry bog previously registered to Tidmarsh Farms. In October 2016, Plymouth purchased 50 acres of registered bog, which is subject to conservation restrictions held by Mass Audubon at the former Tidmarsh Farm property. These 76 acres of registered bog is equivalent to 0.15 MGD of direct mitigation volumes which is equal to the required mitigation volume of 0.15 MGD. Please see Appendix C.

11. General Permit Conditions (applicable to all Permittees)

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 up to the authorized volume 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, inspect and monitor the withdrawal, and inspect and copy any relevant records, 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. 111, § 160, 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 36.37.
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 mailed or hand delivered to the address specified on the report form.
7. **Duty to Maintain Records** The Permittee shall be responsible for maintaining withdrawal records as specified by this permit.
8. **Metering** Withdrawal points shall be metered. Meters shall be calibrated annually. Meter shall be maintained and replaced as necessary to ensure the accuracy of the withdrawal records.
9. **Amendment, Suspension or Termination** The Department may amend, suspend or terminate this permit in accordance with M.G.L. c. 21G or 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. Any such request must be made in writing, by certified mail and received by MassDEP within twenty-one (21) days of the date of receipt of this permit.

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

The hearing request, 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

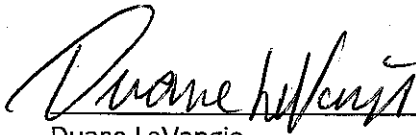
The request shall be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

EXEMPTIONS

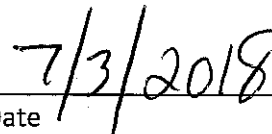
The filing fee is not required if the appellant is a municipality (or municipal agency), county, district of the Commonwealth of Massachusetts, or a municipal housing authority.

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.



Duane LeVangie
Chief, Water Management Act Program
Bureau of Water Resources



Date

Appendix A – Functional Equivalence with the 65 Residential Gallons Per Capita Day Performance Standard

MassDEP will consider PWS permittees who cannot meet the 65 RGPCD 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 residential water use as described below.

If the permittee fails to document compliance with the RGPCD performance standard in its 2018 Annual Statistical Report (ASR), or in any ASR thereafter, then the permittee must file with that ASR a Residential Gallons Per Capita Day Compliance Plan (RGPCD Plan) which shall include, at a minimum:

1. A description of the actions taken during the prior calendar year to meet the performance standard;
2. An analysis of the cause of the failure to meet the performance standard;
3. A description of the actions that will be taken to meet the performance standard which must include, at a minimum, at least one of the following:
 - 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, by-law or regulation to require the installation of moisture sensors or similar climate related control technology on all automatic irrigation systems; and may include, without limitation, the following:
 - d) the use of an increasing block water rate or a seasonal water rate structure as a tool to encourage water conservation;
 - e) a program that provides rebates or other incentives for the installation of moisture sensors or similar climate related control technology on automatic irrigation systems;
 - f) the adoption and enforcement of an ordinance, by-law or regulation to require that all new construction include water saving devices and low water use appliances;
 - g) the adoption and enforcement of an ordinance, by-law or regulation to require that all new construction minimize lawn area and/or irrigated lawn area, maximize the use of drought resistant landscaping, and maximize the use of top soil with a high water retention rate;
 - h) the implementation of a program to encourage the use of cisterns or rain barrels for outside watering;
 - i) the implementation of monthly or quarterly billing.
4. A schedule for implementation; and
5. An analysis of how the planned actions will address the specific circumstances that resulted in the failure to meet the performance standard.

If the permittee is already implementing one or more of these programs, it must include in its 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.

RGPCD plans may be amended to revise the actions that will be taken to meet the performance standard. Amended RGPCD plans must include the information set forth above.

If a RGPCD plan is required, the permittee must:

1. submit information and supporting documentation sufficient to demonstrate compliance with its RGPCD plan annually at the time it files its ASR, and
2. 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.

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 the Department.
3. Continued implementation will be a condition of the permit in place of meeting the 10% UAW performance standard.
4. Upon request of the Department, 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.

Appendix C – Plymouth’s Retired and Protected Cranberry Bogs for Direct Mitigation Credit

Bog Name	End Date	Registered Acres	Reg. Volume (MGD)	Consumptive Use (= 22.5% of total) (MGD)
Ashley V. Holmes	6/28/2005	13	0.17	0.038
Tidmarsh Farms	6/16/2016	50	0.45	0.101
Savery Bog	11/16/2016	6.78	0.06	0.014
Total		69.78	0.68	0.153

