



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

DRAFT

September 30, 2016

Board of Selectmen
Town Hall
100 Center Street
Pembroke, MA 02359

Pembroke – BRP/WMA
Pembroke Department of Public Works
PWS ID #4231000
Water Management Act Permit #9P421231.01

Dear Sirs,

Attached please find:

- DRAFT Findings of Fact in support of the renewal of Permit #9P421231.01, and
- DRAFT WMA Permit #9P421231.01 for the Pembroke Department of Public Works.

Consistent with 310 CMR 36.27(6) - (8) of the revised Water Management Act Regulations promulgated on November 7, 2014, the Department will now publish notice in the Environmental Monitor that a DRAFT Permit is available for review and comment for 30 days following the October 5, 2016, publication in the Environmental Monitor. Notice of the public comment period will also be sent to all registrants, permittees and those having non-consumptive use statements within the South Coastal Basin. The Department expects to issue the final permit within 30 days of the close of the public comment period.

If you have any questions regarding this information, please contact Elizabeth McCann at (617) 292-5901 or via e-mail at elizabeth.mccann@state.ma.us.

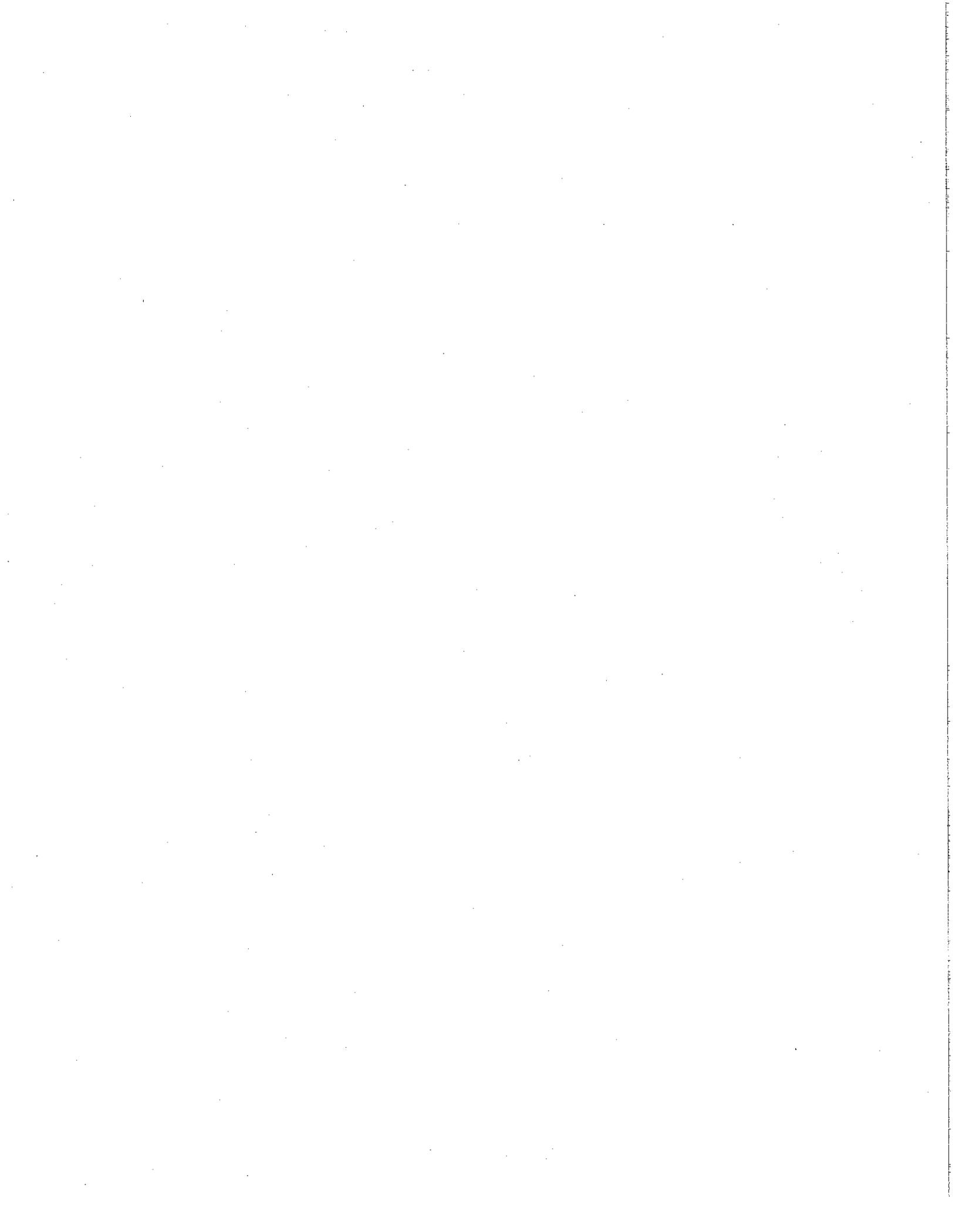
Sincerely,

Rebecca Weidman
Director, Division of Watershed Management
Bureau of Resource Protection

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Ecc:	E. Fulmine, Pembroke DPW	M. Drury, DCR OWR
	R. Trahan, Environmental Partners Group	M. Craddock, DFW
	D. LeVangie, MassDEP	J. Blatt, Mass River Alliance
	P. Kellogg, MassDEP SERO	J. Pederson, MWWA



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.



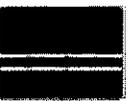
6 Việt (Vietnamese):

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.



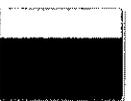
7 ប្រទេសកម្ពុជា (Kmer (Cambodian):

ឯកសារនេះគឺមានសារៈសំខាន់និងគួរត្រូវបានបកប្រែភ្លាមៗ ប្រសិនបើអ្នកត្រូវបានបកប្រែឯកសារនេះសូមទំនាក់ទំនងឆ្លោកជំនាញ 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.



10 العربية (Arabic):

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

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)



11 한국어 (Korean):

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



12 հայերեն (Armenian):

Այս փաստաթուղթը շատ կարևոր է եւ պետք է թարգմանել անմիջապես. Եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանվել դիմել MassDEP թարգմազանութունը տնօրեն 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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DRAFT Findings of Fact in Support of DRAFT Water Management Permit #9P421231.01 Town of Pembroke

The Department of Environmental Protection (the Department) makes the following Findings of Fact in support of the attached Draft Water Management Permit #9P421231.01, and includes herewith its reasons for issuing the Draft 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 Pembroke Department of Public Works (Pembroke) 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 and ensure thoughtful and implementable draft permits.

The Department met with Pembroke's representatives on three occasions regarding the conditions in this permit, in particular:

- A Minimization plan to address August net depletion in Subbasin 22032 where three of Pembroke's four water supply wells are located;
- The history of water level monitoring requirements around Well #5 and the information provided by 12 years of ongoing groundwater monitoring and resulting modifications to this permit;
- Based on water needs forecasts developed by the Department of Conservation and Recreation, Office of Water Resources (DCR), Pembroke will need to apply for a new permit to withdraw water beyond the amount authorized by this renewed permit. Any additional permitted water withdrawals will require mitigation to offset environmental impacts.

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. Pembroke 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. No public comment was received concerning Pembroke's Water Management Permit Renewal application.

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 Pembroke 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), Pembroke'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 Pembroke’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.

Special Condition 1, Maximum Authorized Annual Average Withdrawal, reflects the total 1.26 MGD annual daily average and total annual withdrawal volume authorized by this renewed permit. MassDEP cannot renew a Water Management permit for more than the authorized volume in the expiring permit.

Based on water needs forecasts developed by the Department of Conservation and Recreation, Office of Water Resources (DCR), Pembroke will need to apply for a new permit to withdraw water beyond the amount authorized by this renewed permit. Pembroke may apply for a new permit at any time by submitting form **BRP WM03** to MassDEP and completing the required public notice requirements. The form and instructions can be found at: <http://www.mass.gov/eea/agencies/massdep/service/approvals/brp-wm-03-water-mgmt-withdrawal-permits.html>. The Town must receive a new permit before making withdrawals in excess of those authorized in this permit.

DCR has developed two sets of water needs forecasts for public water suppliers; the first based on meeting the statewide performance standards of 65 residential gallons per capita day (RGPCD) and 10% unaccounted-for-water (UAW), and the second based on the PWS’s RGPCD and UAW when the forecasts were developed in 2010. DCR’s May 10, 2010, letter summarizes the final Water Needs Forecasts for Pembroke.

Pembroke’s Water Needs Forecasts (MGD)		
Permit Period	DCR Water Needs Forecast assuming 65 RGPCD and 10% UAW	DCR Water Needs Forecast assuming current trend RGPCD and UAW
2015-2020	1.64	1.51
2020-2025	1.70	1.56
2025-2030	1.75 + 0.09 buffer = 1.84	1.61 + 0.08 buffer = 1.69

Pembroke may request a new permit based on either DCR forecasts calculated using 65 RGPCD/10% UAW or Pembroke’s current trends RGPCD and UAW. Pembroke’s decision on which projections to use will affect the minimization and mitigation requirements in a new permit.

Special Condition 2, Maximum Daily Withdrawals from Groundwater Withdrawal Points, reflects the MassDEP-approved Zone II maximum daily pumping rate for each of Pembroke'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, MassDEP records show that all of Pembroke's permitted wells have approved Zone II delineations.

Special Condition 4, Wellhead Protection, MassDEP records show that Pembroke has implemented municipal controls that comply with the Wellhead Protection Regulations, 310 CMR 22.21(2).

Special Condition 5, Performance Standard for Residential Gallons Per Capita Day Water (RGPCD) and **Special Condition 6, Performance Standard for Unaccounted for Water (UAW)** are new conditions in Pembroke's permit and are based on the *Massachusetts Water Conservation Standards* approved by the Water Resources Commission in July 2006 and updated in June 2012. These standards can be found at <http://www.mass.gov/eea/docs/dcr/watersupply/intbasin/waterconservationstandards.pdf>.

The RGPCD required of all PWS permittees is 65 RGPCD. Pembroke is required to meet 65 RGPCD within 2 full calendar years, i.e. by December 31, 2019. Permittees that cannot comply within the timeframe in the permit must meet Functional Equivalence requirements outlined in Appendix A. Pembroke is currently in compliance with the RGPCD Performance Standard. RGPCD for the most recent three years has been:

Pembroke RGPCD		
2015	2014	2013
53	49	52

The UAW required for all PWS permittees is 10% or less. Pembroke is required to meet 10% or less UAW for 2 of the 3 most recent years throughout the permit period. Pembroke shall be in compliance with this performance standard by December 31, 2019. 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. Pembroke's UAW for the most recent three years has been:

Pembroke UAW		
2015	2014	2013
3.6%	10%	1%

Special Condition 7, Limits on Nonessential Outdoor Water Use reflects the restrictions on nonessential outside water use from May through September. The options outlined of Special Condition 7 for Pembroke are based on whether Pembroke's reported RGPCD for the previous year was in compliance with the RGPCD Performance Standard (see Special Condition 5, Performance Standard for RGPCD). In addition, the number of days per week when outdoor water use is restricted has been designed to minimize withdrawals in August net groundwater depleted subbasins.

Each year Pembroke may choose one of two options for implementing nonessential outdoor watering restrictions.

- **Calendar triggered restrictions** are 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.
- **Streamflow triggered restrictions** are 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 streamflow triggers are based on Aquatic Base Flow (ABF) levels that are protective of aquatic habitat for fish spawning during the spring bioperiod (May – June), and protective of flows for fish rearing and growth during the summer bioperiod (July – September). The flow levels are simulated natural flow values calculated by the Sustainable Yield Estimator (SYE)¹ from index gage flow data which represent the least altered stream flows in Massachusetts, and applied to the assigned local USGS stream gage.

If Pembroke selects the streamflow trigger approach, it has been assigned USGS stream gage 01105730 Indian Head River at Hanover, MA. The May - June streamflow trigger is 31 cubic feet per second (cfs), and the July – September streamflow trigger is 13 cfs. Should the reliability of flow measurement at the Indian Head River River gage be so impaired as to question its accuracy, Pembroke 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.

- **The 7-Day Low Flow Trigger**, at which restrictions increase, is incorporated into both Calendar and Streamflow Triggered restrictions in order to provide additional protection to streamflows when flows are very low. The 7-day low flow trigger is based on the median value of annual 7-day low flows for the period of record. The 7-day low flow trigger for Pembroke is 4.9 cfs.

Pembroke may choose to implement limits on nonessential outdoor water use that are stricter than those required by the permit.

Special Condition 8, Water Conservation Requirements (formerly Special Condition 5), incorporates the WRC Water Conservation Standards for the Commonwealth of Massachusetts, July 2006, revised in June 2012 (<http://www.mass.gov/eea/docs/dcr/watersupply/intbasin/waterconservationstandards.pdf>). The Department recognizes that the Town of Pembroke is currently implementing a conservation program that incorporates these requirements as documented in Pembroke's *Water Conservation Plan for Public Water Suppliers*, May 2010.

Special Condition 9, Coldwater Fish Resource (CFR) Protection, requires permittees with permitted withdrawals that impact streamflow at a CFR, identified at http://maps.env.state.ma.us/flexviewers/SWMI_Viewer/index.html, to shift withdrawals to their other withdrawals points, as feasible, to minimize impacts at the CFR. Pembroke's sources 4231000-01G, 02G, 04G and 05G are located in Subbasin 22023, which supports a coldwater fishery in Herring Brook.

Department of Fish and Game review of Pembroke's sources in Subbasin 22023 shows that Hobomock Well 01G is close enough to Herring Brook to impact streamflow at the CFR. Well 01G has been off-line since 2009 due to water quality concerns and withdrawals have been shifted to other wells away from the CFR. No further optimization is required unless Pembroke anticipates using the well again during the life of this permit.

Special Condition 10, Minimization of Groundwater Withdrawal Impacts in Stressed Subbasins, requires permittees with permitted groundwater sources in subbasins² with net groundwater depletion of 25% or more

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 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 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).

during August to minimize their withdrawal impacts on those subbasins, to the greatest extent feasible, through optimization of groundwater source use, surface water releases to improve streamflows, outdoor water use restrictions and water conservation programs that go beyond standard Water Management permit requirements.

The Department reviewed Pembroke's performance relative to these requirements based on Department records and information submitted by Pembroke and finds that minimization requirements will be met as follows:

- Pembroke's groundwater sources 4231000-01G, 02G, 04G and 05G are located in Subbasin 22023, which is 59.4% August net groundwater depleted. Pembroke has one registered groundwater source, Well #03G, in an unassessed coastal area in which August net groundwater depletion cannot be readily determined. There are other resources including anadromous fisheries and a public water supply source near Well #03G. Department review of Pembroke's pumping records show that Pembroke has consistently pumped Well #03G at between 60% and 65% of its Department-approved maximum daily capacity throughout the past 5 summers. This permit does not require that Pembroke shift additional pumping to Well #03G because increased pumping could have adverse effects on sensitive resources in the area.
- Pembroke has no surface water supplies and, therefore, cannot make releases to improve streamflow.
- The limits on nonessential outdoor water use set forth in Special Condition 7 are restrictions developed to minimize withdrawals in August net groundwater depleted subbasins.
- Pembroke outlined its current conservation measures that go beyond standard Water Management permit requirements in the Minimization Plan Memorandum of June 29, 2016. Continued implementation of specific measures is required in **Special Condition 10**.

Please note that additional minimization efforts may be required if Pembroke receives a new permit for additional withdrawals.

Mitigation of Impacts for Withdrawals that Exceed Baseline Withdrawals was incorporated into the Water Management Regulations in November 2014. This permit renewal does not include mitigation requirements because withdrawals authorized do not exceed Pembroke's 1.26 MGD baseline.

Please note that mitigation will be required if Pembroke receives a new permit for additional withdrawals. During permit renewal consultation, Pembroke and the Department have identified potential mitigation measures already undertaken by Pembroke, or that can be undertaken in the future. MassDEP's Water Management Act Permit Guidance Document provides additional information on mitigation planning. In addition, Water Management Program staff is available for consultation as a mitigation plan is prepared.

Water Level Monitoring (formerly Special Condition 6) required monitoring of both the water level in Great Sandy Bottom and Little Sandy Bottom Ponds and the surrounding aquifer in order to assess any long-term impacts to local water resources. The water level monitoring requirements have been removed for reasons outlined below.

Surface Water Monitoring

- Based on review of the available data, there does not appear to be any long-term downward trend, and water levels in Great Sandy Bottom Pond have remained consistent over 12 years of monitoring and well above the historic low levels of 1981. The pond was full (58.8) in March 2010 and has ranged between approximately 56 and 53 with a dip to 52 feet in August 2014. The pond level recovered to 55+ at the beginning of 2015.
- Due to ongoing difficulties maintaining staff gages in the ponds, Pembroke has been unable to monitor pond water levels.
- The Abington-Rockland Joint Water Works takes regular water level measurements of Great Sandy Bottom Pond and can provide water level measurements to Pembroke.

Aquifer Level Monitoring

- Pembroke set up the groundwater monitoring network required to assess long-term environmental impacts and has submitted monitoring data from 2003 – 2011 with some gaps in later years due to trouble keeping the transducers in working order.
- Based on review of available data, Well #5 does not appear to have any long-term impacts on groundwater levels.

Special Condition 12, Water Conservation Levels requires that withdrawals from Well #5 cease if the water level in Great Sandy Bottom Pond falls below 52.1 feet above MSL as measured by the Abington-Rockland Joint Water Works.

Pembroke's current WMA permit requires that withdrawals from Well #5 cease when the water level in Great Sandy Bottom Pond falls below 53.5 feet above mean sea level (MSL). Subsequently, in a letter of July 10, 2002, the water level for shut-off of Well #5 was revised to 52.1 feet above MSL pending the completion of a survey to verify the appropriate elevation to be used to assess withdrawal impacts to the ponds. The comprehensive survey was not completed.

Special Condition 13, Reporting Requirements, ensures that the information necessary to evaluate compliance with the conditions included herein is accurately reported.



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

DRAFT WATER WITHDRAWAL PERMIT RENEWAL

#9P421231.01

Town of Pembroke

This renewal of Permit #9P421231.01 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: 9P421231.01 **RIVER BASIN:** South Coastal

PERMITTEE: Town of Pembroke
Board of Selectmen
100 Center Street
Pembroke, MA 02359

EFFECTIVE DATE: October XX, 2016

EXPIRATION DATE: August 31, 2030

TYPE AND NUMBER OF WITHDRAWAL POINTS: Groundwater: 4 Surface Water: 0

USE: Public Water Supply

DAYS OF OPERATION: 365

AUTHORIZED WITHDRAWAL POINTS:

Source	Source Code
Hobomock Well #1	4231000-01G
Center Street Well #2	4231000-02G
Bryantville Well #4	4321000-04G
Windswept Well #5	4231000-05G

SPECIAL CONDITIONS – PERMIT #9P421231.01

1. Maximum Authorized Annual Average Withdrawal

This permit authorizes the Town of Pembroke to withdraw water from the South Coastal Basin at the rate described in Table 2 below. The volume reflected by this rate is in addition to the 0.99 MGD previously authorized to Pembroke under WMA Registration #421231.01. The permitted volume is 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 five-year period of the permit term.

Table 2: Authorized Withdrawals				
Permit Periods	Total Raw Water Withdrawal Volumes			
	Permit		Registration + Permit	
	Daily Average (MGD)	Total Annual (MGY)	Daily Average (MGD)	Total Annual (MGY)
XX/XX/2016 to 8/31/2020	0.27	98.55	0.99 + 0.27 = 1.26	459.90
9/1/2020 to 8/31/2025	0.27	98.55	0.99 + 0.27 = 1.26	459.90
9/1/2025 to 8/31/2030	0.27	98.55	0.99 + 0.27 = 1.26	459.90

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 3 below without advance approval from the Department.

Table 3: Maximum Daily Withdrawal Rates from the Authorized Groundwater Withdrawal Points		
Source	Source Code	Maximum Daily Rate (MGD)
Hobomock Well #1	4231000-01G	0.53
Center Street Well #2	4231000-02G	1.00
Bryantville Well #4	4321000-04G	1.00
Windswept Well #5	4231000-05G	Approved for 0.50 MGD annual average daily rate per letter of 7/26/2000 from L. Dayian of MassDEP to M. Valenti of Pembroke. In addition, pumping shall cease when the water level of Great Sandy Bottom Pond falls below 52.1 feet above MSL. See Special Condition 11 .

3. Zone II Delineation

Department records show that all of Pembroke’s sources have approved Zone II delineations. Therefore, no further Zone II delineation work is required.

4. Wellhead Protection

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

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

The Town of Pembroke’s performance standard for residential gallons per capita day (RGPCD) is 65 gallons or less. Pembroke shall be in compliance with this performance standard by December 31, 2018, or, if Pembroke does not meet the standard, shall be in compliance with the functional equivalence requirements outlined in Appendix A.

6. Performance Standard for Unaccounted for Water

The Town of Pembroke’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. Pembroke shall be in

compliance with this performance standard by December 31, 2019 or, if Pembroke does not meet the standard, shall be in compliance with the functional equivalence requirements outlined in Appendix B.

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 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

Pembroke shall limit nonessential outdoor water use through mandatory restrictions from May 1st through September 30th as outlined in below. To the extent feasible, all summer outdoor water use should take place before 9 a.m. and after 5 p.m. when evaporation and evapotranspiration rates are lower.

<p>Restrictions if Pembroke has met the 65 RGPCD Standard for the preceding year RGPCD was less than or equal to 65 as reported in the ASR and accepted by MassDEP</p>	
<p>Calendar Triggered Restrictions</p>	<p>Nonessential outdoor water use is restricted to:</p> <ul style="list-style-type: none"> a) two (2) days per week before 9 a.m. and after 5 p.m.; and b) one (1) day per week before 9 a.m. and after 5 p.m. when USGS stream gage 01105730 – Indian Head River at Hanover, MA falls below 4.9 cfs for three (3) consecutive days. <p>Once streamflow triggered restrictions are implemented, they shall remain in place until streamflow at the gage meets or exceeds 4.9 cfs for seven (7) consecutive days.</p>
<p>Streamflow Triggered Restrictions</p>	<p>Nonessential outdoor water use is restricted to:</p> <ul style="list-style-type: none"> a) two (2) days per week before 9 a.m. and after 5 p.m. when USGS stream gage 01105730 – Indian Head River at Hanover, MA falls below: <ul style="list-style-type: none"> • May 1 – June 30: 31 cfs for three (3) consecutive days • July 1 – September 30: 13 cfs for three (3) consecutive days b) one (1) day per week before 9 a.m. and after 5 p.m. when USGS stream gage 01105730 – Indian Head River at Hanover, MA falls below 4.9 cfs for three (3) consecutive days. <p>Once implemented, the restrictions shall remain in place until streamflow at the gage meets or exceeds the trigger streamflow for seven (7) consecutive days.</p>
<p>Restrictions if Pembroke has not met the 65 RGPCD standard for the preceding year RGPCD was more than 65 as reported in the ASR and accepted by MassDEP</p>	
<p>Calendar Triggered Restrictions</p>	<p>Nonessential outdoor water use is restricted to one (1) day per week before 9 a.m. and after 5 p.m.</p>
<p>Streamflow Triggered Restrictions</p>	<p>Nonessential outdoor water use is restricted to one (1) day per week before 9 a.m. and after 5 p.m. when USGS stream gage 01105730 – Indian Head River at Hanover, MA falls below:</p> <ul style="list-style-type: none"> • May 1 – June 30: 31 cfs for three (3) consecutive days • July 1 – September 30: 13 cfs for three (3) consecutive days <p>Once implemented, the restrictions shall remain in place until streamflow at the gage meets or exceeds the trigger streamflow for seven (7) consecutive days.</p>

Instructions for Accessing Streamflow and Drought Advisory Website Information

If the Pembroke chooses Streamflow Triggered Restrictions, Pembroke shall be responsible for tracking streamflows and drought advisories and recording and reporting to MassDEP when restrictions are implemented.

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 quarter-hourly, reading made at each USGS stream gage.

Seasonal Nonessential Outdoor Water Use Restrictions are implemented when the mean daily streamflow falls below the designated trigger for 3 consecutive days. 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 01105730 – Indian Head River at Hanover, MA.
- 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.

Pembroke shall document compliance with the Seasonal Nonessential Outdoor Water Use Restrictions annually in its Annual Statistical Report (ASR), and indicate whether it anticipates implementing calendar triggered restrictions or streamflow 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 automatic irrigation systems or sprinklers;
- filling swimming pools;
- washing 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 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 before 9 a.m. and after 5 p.m.;
- irrigation of gardens, flowers and ornamental plants by means of a hand-held hose or drip irrigation system; 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 minimal fairway watering, or irrigation by plant nurseries as necessary to maintain stock).

Public Notice of Seasonal Nonessential Outdoor Water Use Restrictions

Pembroke shall notify its customers of the restrictions, including a detailed description of the restrictions and penalties for violating the restrictions, by April 15th each year.

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.

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

8. Water Conservation Requirements (formerly Special Condition 5)

At a minimum, Pembroke 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>Pembroke shall have repair reports available for inspection by the Department. Pembroke shall establish a schedule for repairing leaks that is at least as stringent as the following:</p> <ul style="list-style-type: none"> ○ Leaks of 3 gallons per minute or more shall be repaired within 3 months of detection. ○ Leaks of less than 3 gallons per minute at hydrants and appurtenances shall be repaired as soon as possible. ○ 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 Pembroke’s priority schedule including leaks up to the property line, curb stop or service meter, as applicable. Pembroke 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.	Pembroke 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.	Pembroke 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.

Table 5: Minimum Water Conservation Requirements	
Pricing	
1.	Pembroke shall maintain a water pricing structure that includes the full cost of operating the water supply system. Pembroke 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 impacts, watershed protection) - into prices.
2.	Pembroke 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.	Pembroke 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.	Pembroke 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). Pembroke 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.	Pembroke shall ensure water conservation practices in all development proposals, particularly low flow devices and water-wise landscaping practices.
Public Education and Outreach	
1.	<p>Pembroke 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, Pembroke's plan may include the following actions:</p> <ul style="list-style-type: none"> ○ 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; ○ Public space advertising/media stories on successes (and failures); ○ Conservation information centers perhaps run jointly with electric or gas company; ○ Speakers for community organizations; ○ Public service announcements; radio/T.V./audio-visual presentations; ○ Joint advertising with hardware stores to promote conservation devices; ○ Use of civic and professional organization resources; ○ Special events such as Conservation Fairs; ○ Develop materials that are targeted to schools with media that appeals to children, including materials on water resource projects and field trips; and ○ Provide multilingual materials as needed.
2.	Upon request of the Department, Pembroke 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. Coldwater Fish Resource (CFR) Protection

Pembroke's sources 4231000-01G, 02G, 04G and 05G are located in Subbasin 22023, which supports a coldwater fishery in Herring Brook. Review shows that only Hobomock Well 01G is close enough to Herring Brook to impact streamflow at the CFR. Well 01G has been off-line since 2009 due to water quality concerns, but it still maintained as an active source.

Should Pembroke anticipate resuming withdrawals from Well 01G, prior to resuming withdrawals, Pembroke shall notify the Department and develop an optimization plan to minimize impacts to Herring Brook by managing the timing and magnitude of pumping at Well 01G in order to minimize streamflow impacts, to the extent feasible, using the Town's other available sources.

10. Minimization of Groundwater Withdrawal Impacts in Stressed Subbasins

Pembroke shall minimize the impacts of its groundwater withdrawals from sources 4231000-01G, 02G, 04G and 05G, located in Subbasin 22023, as follows:

- Implement seasonal limits on nonessential outdoor water use as outlined in **Special Condition 8**;
- Implement the conservation program outlined in the Minimization Plan Memorandum of June 29, 2016, including:
 - Continued implementation of the Town by-law prohibiting automatic irrigation systems connecting to the town's water distribution system;
 - Installation and maintenance of radio-read meters.

11. Water Conservation Levels

Groundwater withdrawals from Windswept Well #05G shall be constrained by water levels in Great Sandy Bottom Pond as described below:

- When water levels in Great Sandy Bottom Pond fall below the base level of 52.1 feet above mean sea level (MSL), surveyed to National Geodetic Vertical Datum (NGVD), all withdrawals from Windswept Well #5 shall cease, and shall not resume until such time as the level of the pond has returned to 52.1 feet above MSL.
- Pembroke shall request to receive in writing, either electronically or by U.S. Mail, reservoir water level readings for Great Sandy Bottom Pond from the Abington Rockland Joint Water Works on the first of each month.
- Pembroke shall keep a record of all monthly reservoir water level readings for Great Sandy Bottom Pond and shall provide them to the Department annually as an attachment to Pembroke's Annual Statistical Report (ASR), or upon request of the Department.
- Should a catastrophic event occur causing the level of the pond to drop significantly for an extended period, the Town would no longer be able to operate the Windswept Well #5 without the permission of the Department. In such an event, the Department agrees to respond to any reasonable request for relief by the Town of Pembroke from this permit condition as expeditiously as possible consistent with existing rules and regulations.

12. Reporting Requirements

Pembroke 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.

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 the Department has received a renewal permit application pursuant to and in compliance with 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 the Department 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 the Department 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 the Department approves such transfer in writing, pursuant to a transfer application on forms provided by the Department requesting such approval and received by the Department 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 the Department, a certified statement of the withdrawal. Such report is to be received by the Department by the date specified by the Department. 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** The Department 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 the Department. 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 the Department 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 the Department.

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 the Department 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 Department'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

The Department may waive the adjudicatory hearing filing fee for any person who demonstrates to the satisfaction of the Department 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.



Rebecca Weidman
Director, Division of Watershed Management
Bureau of Resource Protection

9/30/16

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.

