



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**

February 27, 2018

Thomas J. Rooney  
Barnstable Fire District  
1841 Phinney's Lane, P.O. Box 546  
Barnstable, MA 02630

RE: Barnstable Fire District  
PWS Number: 4020000  
WMA Permit #9P2-4-22-020.01  
Action: Permit Renewal

Dear Mr. Rooney:

Please find the attached documents:

- FINAL Findings of Fact in Support of the renewal of Permit #9P2-4-22-020.01; and
- FINAL Water Management Act Permit #9P2-4-22-020.01 (Cape Cod Basin) for the Barnstable Fire District.

The signature on this cover letter indicates formal issuance of the attached document. If you have any questions regarding this information, please contact Shi Chen at (617) 292-5532 or via e-mail at [shi.chen@state.ma.us](mailto:shi.chen@state.ma.us).

Very truly yours,

Rebecca Weidman,  
Director, Division of Watershed Management  
Bureau of Water Resources

Y:\DWPWMA\PermitRenewals\Cape Cod\Barnstable- BFD-FINAL Permit 9P242202001-2018-02-27

Ecc: Jen Pederson, MWWA

Michelle Craddock, DFW

Julia Blatt, Massachusetts Rivers Alliance

Tom Cambareri, Cape Cod Commission



**Massachusetts Department of Environmental Protection**  
**One Winter Street, Boston MA 02108 • Phone: 617-292-5751**  
**Communication For Non-English Speaking Parties - 310 CMR 1.03(5)(a)**



**1 English:**

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



**2 Español (Spanish):**

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



**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。



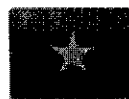
**4(b) 中国（简体中文）(Chinese (Simplified)):**

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



**7 ព្រះរាជាណាចក្រកម្ពុជា (Kmer (Cambodian)):**

ឯកសារនេះសំខាន់ណាស់សំខាន់និងគួរត្រូវបានបកប្រែភ្លាមៗ។ ប្រសិនបើអ្នកត្រូវបានបកប្រែឯកសារនេះសូមទំនាក់ទំនងជាមួយ លោកជានាយក MassDEP នៅលេខទូរស័ព្ទខាងក្រោម។



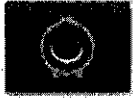
**8 Kriolu Kabuverdianu (Cape Verdean):**

*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.*



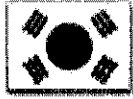
**9 Русский язык (Russian):**

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. 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 հայերեն (Armenian):**

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



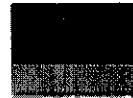
**13 فارسی (Farsi (Persian):**

این سند مهم است و باید 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.



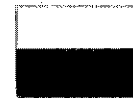
**16 Ελληνική (Greek):**

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



# Department of Environmental Protection

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## **Findings of Fact in Support of FINAL Water Management Permit # 9P2-4-22-020.01 Barnstable Fire District**

The Department of Environmental Protection (the Department) makes the following Findings of Fact in support of the attached Final Water Management Permit #9P2-4-22-020.01, 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 Barnstable Fire District 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 permits.**

### **Barnstable Fire District's Withdrawal History**

Barnstable Fire District (BFD) holds a registration statement (4-22-020.15) for an average annual daily withdrawal volume of 0.34 million gallons per day (MGD) from three wells in the Cape Cod Basin. BFD was first issued a Water Management Act permit on January 31, 1992 to increase the total authorized withdrawal volume and to include the G.P. Well #3 (4020000-03G) as a permitted withdrawal point. The permit was amended on August 31, 1992 and April 14, 2011 to add Well #4 (4020000-04G) and Well #5 (4020000-05G). BFD has reported annual withdrawals below their authorized volume of 0.66 MGD for the past 5 years. The average daily withdrawal volume for the BFD in 2016 was 0.57 MGD. No increase in authorized withdrawal volumes is authorized by this Renewed Permit Decision.

### **The Permit Extensions**

BFD's WMA permit was initially issued on January 31, 1992 which was set to expire on November 30, 2010. The Permit Extension Act (PEA), Section 173 of Chapter 240 of the Acts of 2010, as amended by Sections 74 and 75 of Chapter 238 of the Acts of 2012, extended all existing permits by four years. Therefore, WMA permits for withdrawals in the Cape Cod basin were extended to November 30, 2014. The Department accepted a renewal application from the BFD on August 27, 2010 and published notice of the permit renewal application in the Environmental Monitor on September 22, 2010. No comments were received.

In addition, in a letter on September 25, 2015, the Department informed the BFD 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 Cape Cod 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), BFD'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 Cape Cod Basin will be November 30, 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 on Cape Cod:

- Safe yield determinations for the major river basins based on a new methodology developed through SWMI. For water sources where an estimate of natural annualized streamflow is not applicable because the water source is groundwater-driven, the Safe Yield is determined through estimates of groundwater recharge during drought conditions. For more information on the Safe Yield methodology, go to the November 28, 2012 SWMI Framework Summary and Appendices;
- 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:
  - 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;
- Environmental protections developed through SWMI, including:
  - protection for coldwater fish resources;
  - mitigation of the impacts of increasing withdrawals.

### **Safe Yield in the Cape Cod Basin**

This permit is being issued in accordance with the Safe Yield methodology adopted by the Department on November 7, 2014, in the Regulations at 310 CMR 36.13. As of the date of issuance of this permit, the Safe Yield calculation for the Cape Cod Basin is 266.0 million gallons per day (MGD), and total registered and permitted withdrawals are 51.9 MGD. The maximum withdrawals that are authorized in this permit, and all other permits currently under review by the Department within the Cape Cod Basin, will be within the Safe Yield and conditioned in accordance with the regulations. Withdrawal authorizations may be further limited by other factors, such as the impact to local resources, water quality constraints, pumping rate limits placed on individual wells and surface water supplies, and the regulatory requirement that permit holders demonstrate a need for the water, which for public water systems is done through Water Needs Forecasts prepared by the Department of Conservation and Recreation.

### **Findings of Fact for Permit Conditions in Barnstable Fire District (BFD)'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 final 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 Volume**, reflects the authorized annual average withdrawal volume of 0.66 MGD. The Department of Conservation and Recreation's Office of Water Resources (OWR)'s most recent projection for BFD is 0.77 MGD by the year of 2030 with a 10% buffer that increase that value by 0.08 MGD, for a total allocation of 0.85 MGD. In the December 1, 2016 consultation meeting, the representative from BFD confirmed that the District would not be applying for the 0.85 mgd projection at this time and would continue with the existing allocation of 0.66 mgd. Should volumes greater than those authorized in this permit be necessary, BFD will need to apply and obtain a new permit and complete the required public notice requirements.

**Special Condition 2, Maximum Authorized Daily Withdrawals Points**, reflects the MassDEP-approved Zone II maximum daily pumping rate for each of BFD'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 Delineations**, all of BFD's permitted sources have approved Zone II's delineated. No further Zone II work is required as a condition of this permit.

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

**Formerly Special Condition 5, Monitoring of Flint Rock Pond and Fresh Hole** has been removed. On May 31, 2017, the BFD submitted a report with monitoring data from 2014-2016, and also submitted a memo on July 24, 2017 with additional information on the relationship between their groundwater withdrawals and impacts on these ponds. The Cape Cod Commission reviewed the documents provided and agreed that Well 5 did not appear to affect the water levels in the Flint Rock Pond and Fresh Hole. Therefore MassDEP has removed the monitoring condition as a condition of this permit.

**Special Condition 5, Performance Standard for Unaccounted for Water**, for all PWS permittees is 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 A. As accepted by the Department, BFD's UAW for the most recent three years has been:

2014	2015	2016
17%	9%	2%

**Special Condition 6, Seasonal Limits on Nonessential Outdoor Water Use**, requires BFD to implement nonessential outdoor water use restrictions from May 1 to September 30, beginning in 2018. BFD can choose to implement the restrictions based on the calendar (all summer) or when groundwater levels in a U.S. Geological Survey (USGS) monitoring well fall below certain defined levels for at least 60 consecutive days and when a drought advisory is declared for the region.

If BFD selects the USGS monitoring well approach, it has been assigned the USGS monitoring well 413930070190901 (MA-A1W 306) at Barnstable, MA.

**Special Condition 7, Water Conservation Requirements**, incorporates the Water Conservation Standards for the Commonwealth of Massachusetts reviewed and approved by the Water Resources Commission in July 2006 and revised in June 2012 (<http://www.mass.gov/eea/docs/eea/wrc/water-conservation-standards-rev-june-2012.pdf>).

**Special Condition 8, Reporting Requirements**, ensures that the information necessary to evaluate compliance with the conditions included herein is accurately reported.

**Special Condition 9, Mitigation of Impacts for Withdrawals that Exceed Baseline**, requires mitigation, where feasible, for withdrawals over a baseline volume. Baseline withdrawal means the volume of water withdrawn during calendar year 2005 plus 5%, or the average annual volume withdrawn from 2003 through 2005 plus 5%, whichever is greater provided that:

- (a) baseline cannot be less than a permittee's registered volume;
- (b) baseline cannot be greater than the permittee's authorized volume for 2005; and
- (c) if, during the period from 2003 to 2005, the permittee's withdrawals from the water source were interrupted due to contamination of the source or construction of a treatment plant, the Department will use best available data to establish a baseline volume from the water source.

The calculated baseline volume for the BFD is 210.76 MGY or 0.58 MGD, which is the 2005 withdrawal volume plus 5%. This permit authorizes BFD to withdraw up to 0.66 MGD, and therefore BFD needs to mitigate the difference between the authorized volume and the baseline volume (i.e., 0.08 MGD). A wastewater adjustment can be applied against the volume required to be mitigated for systems where the water withdrawn is returned to the ground as wastewater within the same major basin as the withdrawal. BFD reported on its permit renewal application that 29% of its wastewater is disposed of at the Barnstable Waste Water Treatment plant through a groundwater discharge and the remaining 71% of the wastewater is disposed of through on-site disposal systems. MassDEP assumes that 85% of the wastewater generated by the additional withdrawal over baseline of 0.08 MGD will be returned to the ground within the same major basins as the withdrawal, thus reducing the amount needing to be mitigated. This adjustment results in a volume to be mitigated of 0.012 MGD for BFD.

Because BFD's authorized volume exceeds its baseline volume, a mitigation plan is required. BFD submitted a mitigation plan that included protecting land for public water supply purposes on July 8, 2015 in its responses to the Order to Complete (OTC) issued by MassDEP. Representatives from MassDEP and BFD met on December 1, 2016 regarding the potential conditions in this permit and, in particular the mitigation activities required. MassDEP identified that direct mitigation activities that can be volumetrically quantified like stormwater recharge, infiltration and inflow removal and surface water releases are required to be evaluated first and that indirect mitigation activities that will improve fluvial habitat but cannot be volumetrically quantified including dam removal, culvert replacement, land protection etc. may then be evaluated to obtain the remaining mitigation credits as necessary. BFD evaluated its direct mitigation options and identified a couple of stormwater infiltration projects located within its service area that potentially may qualify for the mitigation credits. On April 13, 2017, MassDEP and BFD discussed the qualifications and crediting methodologies for both the stormwater recharge projects and the land protection projects.

Stormwater BMPs that were built on or after January 1, 2005 and infiltrate stormwater from directly connected impervious surfaces<sup>1</sup> existing before 2005 are eligible for the mitigation credits. The BMP mitigation credit is calculated based on average annual precipitation, BMP design infiltration depth<sup>2</sup>, and the area of directly connected impervious surface built prior to 2005 re-directed to the BMP built on or after January 1, 2005. BFD consulted with the Town of Barnstable and identified two stormwater BMPs within BFD's service area that qualified for credit. Based on the information provided by the BFD, one of the BMPs is located at the Blish Point Parking Area and the other is located at the Scudder's Lane. The BMPs were completed in 2010 and 2012 respectively. The two BMPs together infiltrate a total of 0.007 MGD of stormwater.

Since the stormwater infiltrated is less than the volume required to be mitigated and without any other identified eligible direct mitigation activities, indirect mitigation activities needed to be evaluated. BFD identified land purchased for the purpose of protecting the public water supply as its indirect mitigation option. The protection of lands for water supply protection may be eligible for 0.2 credits for each acre acquired or protected, provided MassDEP approved the land acquisition per M.G.L. Chapter 40 Section 38 and 39B and M.G.L. Chapter 40, Section 41. Based on the Assessing Division at the Town of Barnstable, Parcel #278048, located at 0 Pine Lane, is owned by Barnstable Fire District. BFD obtained approval from MassDEP on June 25, 2009 to acquire the Pine Lane property to protect the public water supply. This land was purchased on March 18, 2010 and has a total area of 17.3 acres. The property has been recorded with the Barnstable County Registry of Deeds in Book #24427 Page 197. Therefore BFD will receive 3.45 credits for the Pine Lane property purchase. As outlined in the 2014 Water Management Act Permit Guidance, 1 indirect mitigation credit translates into 0.01 MGD of required mitigation, which means this credit is translated to 0.035 MGD of mitigation.

According to MassDEP's review, BFD has identified a total of 0.042 MGD mitigation credits through its stormwater recharge and land protection projects, which is in excess of the required mitigation volume of 0.012 MGD. Should there be any changes to these mitigation activities during the life of the permit, BFD should contact MassDEP about the changes and the mitigation requirements will need to be reassessed.

**Minimization of Groundwater Withdrawal Impacts in Stressed Subbasins**, requires permittees with permitted groundwater sources in subbasins<sup>3</sup> with net groundwater depletion of 25% or more during August to minimize their withdrawal impacts on those subbasins to the greatest extent feasible.

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<sup>1</sup> Directly connected impervious surfaces are those whose runoff discharges to a surface water body.

<sup>2</sup> BMP design infiltration depth is the inches of runoff from 24 hours of precipitation that is infiltrated via a BMP in 72 hours, per MA Stormwater Handbook, Vol. 3, Ch. 1, page 25

<sup>3</sup> 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).

Since BFD's permitted sources are located in the Cape Cod Basin where August net depletion has not been established, they are not currently required to implement measures to minimize their withdrawal impacts.

**Coldwater Fish Resource Protection** was incorporated into the Water Management Regulations in November 2014. Coldwater Fish Resource Protection is not a condition of this permit because Barnstable Fire District's withdrawals do not impact any waters that MA Division of Fisheries and Wildlife has identified as supporting coldwater fish at this time.



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Executive Office of Energy & Environmental Affairs

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## FINAL WATER WITHDRAWAL PERMIT #9P242202001 Barnstable Fire District

This permit is issued 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 beyond the right to withdraw the volume of water for which it is issued.

**PERMIT NUMBER:** 9P2-4-22-020.01

**RIVER BASIN:** Cape Cod

**PERMITTEE:** Barnstable Fire District

**EFFECTIVE DATE:** February 27, 2018

**EXPIRATION DATE:** November 30, 2030

**NUMBER OF WITHDRAWAL POINTS:**

Groundwater: 3

Surface Water: 0

**USE:** Public Water Supply

**DAYS OF OPERATION:** 365

### WITHDRAWAL POINT IDENTIFICATION

Source Name	PWS Source ID Code
Well #3	4020000-03G
Well #4	4020000-04G
Well #5	4020000-05G

## SPECIAL CONDITIONS

### 1. Maximum Authorized Annual Average Withdrawal Volume

This permit authorizes Barnstable Fire District to withdraw water from the Cape Cod Basin at the rate described below (Table 1). The volume reflected by this rate is in addition to the 0.34 million gallons per day previously authorized to Barnstable Fire District under Water Management Act (WMA) Registration #4-22-020.15 for withdrawal from the Cape Cod Basin. The permitted volume is expressed both as an annual average daily withdrawal rate (million gallons per day or MGD), and as a total annual withdrawal volume (million gallons per year or MGY).

The Department of Environmental Protection (MassDEP) bases these withdrawal volumes on the raw water withdrawn from the authorized withdrawal points, and will use the raw water amount to assess compliance with the registered and permitted withdrawal volumes.

**Table 1: Maximum Authorized Withdrawal Volumes**

Permit Periods	Total Raw Water Withdrawal Volumes			
	Permit		Permit + Registration	
	Daily Average (MGD)	Total Annual (MGY)	Daily Average (MGD)	Total Annual (MGY)
2/27/2018 to 11/30/2020	0.32	116.8	0.66	240.9
12/01/2020 to 11/30/2025	0.32	116.8	0.66	240.9
12/01/2025 to 11/30/2030	0.32	116.8	0.66	240.9

### 2. Maximum Authorized Daily Withdrawal Points

Withdrawals from permitted withdrawal points are not to exceed the approved maximum daily volumes listed below without specific advance written approval from MassDEP (Table 2). The authorized maximum daily volume is the approved rate of each source. In no event shall the combined withdrawals from the individual withdrawal points exceed the withdrawal volumes authorized above in Special Condition 1.

**Table 2: Maximum Daily Withdrawal Volumes**

Source Name	PWS Source Code ID	Maximum Daily Rate (MGD)
Well #3	4020000-03G	0.77
Well #4	4020000-04G	0.67
Well #5	4020000-05G	1.296

### **3. Zone II Delineations**

MassDEP records show that all of Barnstable Fire District's sources, both registered and permitted, have MassDEP approved Zone II delineations. No further Zone II work is required as a condition of this permit for these sources

### **4. Wellhead Protection**

MassDEP records indicate that Barnstable Fire District has satisfied MassDEP's Wellhead Protection Zoning and Non-zoning Controls Requirement 310 CMR 22.21(2) and is currently operating in compliance with these regulations.

### **5. Performance Standard for Unaccounted for Water**

Barnstable Fire District's Performance Standard for Unaccounted for Water (UAW) is 10% or less of overall water withdrawal for 2 of the most recent 3 years throughout the permit period. BFD shall be in compliance with this performance standard by December 31, 2020. See Appendix A for additional information on requirements if the Performance Standard for UAW is not met.

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.

### **6. Seasonal Limits on Nonessential Outdoor Water Use**

Barnstable Fire District shall limit nonessential outdoor water use through mandatory restrictions from May 1<sup>st</sup> through September 30<sup>th</sup> as outlined in Table 3 below. Barnstable Fire District shall start implementing the seasonal limits on nonessential outdoor water use on May 1, 2018.

Barnstable Fire District 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*.

Barnstable Fire District 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**

Barnstable Fire District 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.

**To the extent feasible, all summer outdoor water use should take place before 9 am and after 5 pm when evaporation and evapotranspiration rates are lower.**

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

**Table 3: 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 1<sup>st</sup> through September 30<sup>th</sup>**

**Nonessential outdoor water use is allowed no more than TWO DAYS per week before 9 am and after 5 pm whenever:**

- a) Groundwater levels at USGS Monitoring Well 413930070190901 (MA-A1W 306) Barnstable, 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 25<sup>th</sup> percentile depth to water level values, as determined and published by the USGS. Restrictions could start on May 1, so monitoring of A1W 306 begins on March 1 of each year.

Trigger Values for Outdoor Water Use Restrictions (feet below land surface)\*

March	April	May	June	July	Aug	Sept
25.77	25.40	25.29	25.34	25.80	25.90	26.28

\*As of 2/14/2018

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).

AND;

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

**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](http://waterdata.usgs.gov/ma/nwis/current/?type=gw&group_key=county_cd)

- Scroll down to 413930070190901 MA-A1W 306, Barnstable, 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 (25<sup>th</sup> 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.

**Drought Advisory** information is available at the Massachusetts Department of Conservation and Recreation (DCR) Drought Status Website at <http://www.mass.gov/eea/agencies/dcr/water-res-protection/water-data-tracking/drought-status.html>

- Under “Drought Status Reports”, click on “drought map” on the right-hand side of the page. The color coded map displays the six drought regions in Massachusetts. Restrictions are implemented when a Drought Advisory, Watch, Warning or Emergency is announced through the DCR website.

## 7. Water Conservation Requirements

At a minimum, Barnstable Fire District shall implement the following conservation measures. Compliance with the water conservation requirements shall be reported to MassDEP upon request or by August 31, 2020, unless otherwise noted below.

Table 4: Minimum Water Conservation Requirements	
System Water Audits and 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 <i>AWWA Manual 36</i> .
4.	BFD shall have repair reports available for inspection by MassDEP. BFD shall establish a schedule for repairing leaks that is at least as stringent as the following: <ul style="list-style-type: none"><li>• Leaks of 3 gallons per minute or more shall be repaired within 3 months of detection.</li><li>• Leaks of less than 3 gallons per minute at hydrants and appurtenances shall be repaired as soon as possible.</li><li>• Leaks of less than 3 gallons per minute shall be repaired in a timely manner, but in no</li></ul>

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.

Leaks shall be repaired in accordance with BFD's priority schedule including leaks up to the property line, curb stop or service meter, as applicable. BFD shall have water use regulations in place that require property owners to expeditiously repair leaks on their property.

#### **Metering**

1. Calibrate all source and finished water meters at least annually and report date of calibration on the ASR.
2. BFD 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 AWWA Manual M6 – Water Meters.
3. BFD 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 include placement of sufficient funds in BFD's annual water budget to calibrate, repair, or replace meters as necessary.

#### **Pricing**

1. BFD shall maintain a water pricing structure that includes the full cost of operating the water supply system. BFD 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. BFD reports using an increasing block rate structure and shall continue to do so.

#### **Residential and Public Sector Conservation**

1. BFD shall meet the standards set forth in the Federal Energy Policy Act, 1992 and the Massachusetts Plumbing Code.
2. BFD reports metering water used by contractors using fire hydrants for pipe flushing and construction and shall continue to do so.
3. BFD shall 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. BFD shall ensure water conservation practices in all development proposals, particularly low flow devices and water-wise landscaping practices.

#### **Lawn and Landscape**

1. BFD shall update as necessary its water use restriction bylaw in accordance with the restricted nonessential outdoor water uses condition.

#### **Public Education and Outreach**

1. BFD shall develop and implement a Water Conservation Education Plan. BFD's Water Conservation Education Plan shall be designed to educate BFD's water customers of ways to conserve water. Without limitation, BFD's plan may include the following actions:
  - Include in bill stuffers and/or bills, a work sheet to enable customers to track water

<ul style="list-style-type: none"><li>• use and conservation efforts and estimate the dollar savings;</li><li>• Public space advertising/media stories on successes (and failures);</li><li>• Conservation information centers perhaps run jointly with electric or gas company;</li><li>• Speakers for community organizations;</li><li>• Public service announcements; radio/T.V./audio-visual presentations;</li><li>• Joint advertising with hardware stores to promote conservation devices;</li><li>• Use of civic and professional organization resources;</li><li>• Special events such as Conservation Fairs;</li><li>• Develop materials that are targeted to schools with media that appeals to children, including materials on water resource projects and field trips; and</li><li>• Make multilingual materials available as needed.</li></ul>
2. Upon request of MassDEP, BFD 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.

## 8. Reporting Requirements

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

## 9. Mitigation of Impacts for Withdrawals that Exceed Baseline

Barnstable Fire District (BFD) is required to mitigate 0.012 MGD for its renewed permitted withdrawals over the baseline. BFD's mitigation will be met through a combination of direct mitigation credits accrued through stormwater recharge and the indirect credits achieved through land purchase and protection.

BFD identified eligible stormwater recharge mitigation projects that are located at the Blish Point Parking Area (41° 42' 32.0394"N, 70° 17' 58.5594"W) and Scudder's Lane (41° 42' 34.1994"N, 70° 19' 21.7194"W) in the Town of Barnstable. The two projects were completed in 2010 and 2012 respectively. According to the information provided, the Blish Point Parking Area project with a design infiltration depth of 4.9 inches would infiltrate 0.0029 MGD of stormwater for the 1.1 acres of directly connected impervious surface built before 2005 that was routed to the project. The Scudder's land project with a design infiltration depth of 4.9 inches would infiltrate 0.0045 MGD of stormwater for the 1.7 acres of directly connected impervious surface built before 2005 that was routed to the project. Therefore Barnstable Fire District receives a total of 0.007 MGD direct mitigation credits from these two stormwater recharge projects.

BFD acquired Parcel #278048 located at 0 Pine Lane in the Town of Barnstable in 2010 for the purpose of protecting the public water supply. MassDEP approved the land acquisition per M.G.L. Chapter 40 Section 38 and 39B and M.G.L. Chapter 40, Section 41.

The Parcel 278048 has a total area of 17.3 acres and has been recorded with the Barnstable Country Registry of Deeds in Book #24427 Page 197 under the title of the Board of Water

Commissioners of the Barnstable Fire District in perpetuity. Barnstable Fire District receives a total of 3.45 indirect mitigation credits (equals to 0.035 MGD) from this land protection project.

Barnstable Fire District shall contact MassDEP should there be changes to the status of the mitigation projects.

**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.



Rebecca Weidman, Director  
Division of Watershed Management  
Bureau of Water Resources

  
Date

## **Appendix A – 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/TWA Manual of Water Supply Practices – M36, Water Audits and Loss Control Programs* (AWWA M36).

If, as of December 31, 2020, 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* as follows:

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 6<sup>th</sup> 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.

