Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

100 Cambridge Street 9th Floor Boston, MA 02114 • 617-292-5500

Maura T. Healey
Governor

Kimberley Driscoll
Lieutenant Governor

Rebecca L. Tepper
Secretary

Bonnie Heiple
Commissioner

October 9, 2023

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

RE: Plymouth – BRP/WMA
Plymouth Water Department
PWS ID #4239000
Final WMA Permit #9P-4-24-239.01
Permit Renewal

Dear Board Members,

Attached please find:

- Final Findings of Fact in support of the renewal of Water Management Act (WMA) Permit #9P-4-24-239.01 for the Town of Plymouth in the Buzzards Bay Basin, and
- Final Renewed WMA Permit #9P-4-24-239.01 for the Town of Plymouth in the Buzzards Bay Basin.

The signature on this cover letter indicates formal issuance of the attached documents. If you have any questions regarding this information, please contact Jen D'Urso via e-mail at jen.durso@mass.gov.

Sincerely,

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

Ecc: William Coyle, Plymouth DPW
Peter Gordon, Plymouth Water Division
Jen Pederson, MWWA
Julia Blatt, MA Rivers Alliance
Kate Bentsen, DFW
Jesse Leddick, FEW
Mettie Whipple, Eel River Watershed Association
Michelle Regon, MassDEP SERO
Anne Carroll, DCR OWR
Sarah Bower, MA Rivers Alliance
Community Land and Water Coalition

MassDEP Sharepoint: DEP BWR\DWP Archive\SERO\2023\Plymouth-4239000-WMA Final Permit Renewal 9P424239.01 10.29.2023
MassDEP Sharepoint: DEP BWR\DWP WMA\Permit Renewals\Buzzards Bay\ Plymouth-4239000-WMA Final Permit Renewal 9P424239.01 10.9.2023

重要 महत्वपूर्ण σημαντικός Important կարեւոր quan trọng مهم

Communication for Non-English-Speaking Parties

This document is important and should be translated immediately.

If you need this document translated, please contact MassDEP's Director of EJ at the telephone number listed below.

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Este documento es importante y debe ser traducido de inmediato. Si necesita este documento traducido, comuníquese con la Directora de Diversidad de MassDEP al número de teléfono que aparece más abajo.

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繁體中文 Chinese Traditional

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简体中文 Chinese Simplified

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Ayisyen Kreyòl Haitian Creole

Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradwi l imedyatman. Si ou bezwen dokimar sa a tradwi, tanpri kontakte Direktè Divèsite MassDEP la nan nimewo telefòn endike anba.

Việt Vietnamese

Tài liệu này rất quan trọng và cần được dịch ngay lập tức. Nếu quý vị cần dịch tài liệu này, xin liên lạc với Giám đốc Đa dạng của MassDEP theo các số điện thoại ghi dưới đây.

ប្រទេសកម្ពុជា Khmer/Cambodian

ឯកសារនេះគឺសំខាន់ហើយគួរត្រូវបានបកប្រែភ្លាមៗ។ ប្រសិនបើអ្នកត្រូវការឱ្យគេបកប្រែឯកសារនេះ
សូមទាក់ទងមកនាយកផ្នែកពិពិធកម្មរបស់ MassDEP តាមលេខទូរស័ព្ទខាងក្រោម។

Kriolu Kabuverdianu Cape Verdean

Kel dukumentu li é inpurtánti y debe ser traduzidu imidiatamenti. Se bu meste di kel dukumentu traduzidu, pur favor kontakta Diretor di Diversidádi di MassDEP na numeru abaxu indikadu.

Contact Deneen Simpson 857-406-0738
Massachusetts Department of Environmental Protection
100 Cambridge Street 9th Floor Boston, MA 02114
TTY# MassRelay Service 1-800-439-2370 • https://www.mass.gov/environmental-justice

(Version revised 4.21.2023) 310 CMR 1.03(5)(a)

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العربية Arabic

هذه الوثيقة مهمة وتجب ترجمتها على الفور.

إذا كنت بحاجة إلى ترجمة هذه الوثيقة، فيرجى الاتصال بمدير العدالة البيئية فيMassDEP على رقم الهاتف المذكور أدناه.

한국어 Korean

이 문서는 중대하므로 즉시 번역되어야 합니다.
본 문서 번역이 필요하신 경우, 매사추세츠 환경보호부의 "환경정의" 담당자 분께 문의하십시오. 전화번호는 아래와 같습니다.

հայերեն Armenian

Այս փաստաթուղթը կարևոր է, և պետք է անհապաղ թարգմանել այն:
Եթե Ձեզ անհրաժեշտ է թարգմանել այս փաստաթուղթը, դիմեք Մասաչուսեթսի շրջակա միջավայրի պահպանության նախարարության (MassDEP) Բնապահպանական հարցերով արդարադատության ղեկավարին (Director of Environmental Justice)՝ ստորև նշված հեռախոսահամարով

فارسی Farsi Persian

این نوشتار بسیار مهمی است و باید فوراً ترجمه شود.
اگر نیاز به ترجمه این نوشتار دارید لطفاً با مدیر عدالت محیط زیستی MassDEP در شماره تلفن ذکر شده زیر تماس بگیرید.

Français French

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Deutsch German

Dieses Dokument ist wichtig und muss sofort übersetzt werden. Wenn Sie eine Übersetzung dieses Dokuments benötigen, wenden Sie sich bitte an MassDEP's Director of Environmental Justice *(Direktor für Umweltgerechtigkeit in Massachusetts)* unter der unten angegebenen Telefonnummer.

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Το έγγραφο αυτό είναι πολύ σημαντικό και πρέπει να μεταφραστεί αμέσως. Αν χρειάζεστε μετάφραση του εγγράφου αυτού, παρακαλώ επικοινωνήστε με τον Διευθυντή του Τμήματος Περιβαλλοντικής Δικαιοσύνης της Μασαχουσέτης στον αριθμό τηλεφώνου που αναγράφεται παρακάτω

Italiano Italian

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Ten dokument jest ważny i powinien zostać niezwłocznie przetłumaczony. Jeśli potrzebne jest tłumaczenie tego dokumentu, należy skontaktować się z dyrektorem ds. sprawiedliwości środowiskowej MassDEP pod numerem telefonu podanym poniżej.

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यह दस्तावेज महत्वपूर्ण है और इसका अनुवाद तुरंत किया जाना चाहिए। यदि आपको इस दस्तावेज का अनुवाद कराने की जरूरत है, तो कृपया नीचे दिए गए टेलीफोन नंबर पर MassDEP के पर्यावरणीय न्याय निदेशक से संपर्क करें।

Contact Deneen Simpson 857-406-0738
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(Version revised 8.2.2023) 310 CMR 1.03(5)(a)

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Findings of Fact in Support of a Permit Renewal
Water Management Permit #9P-4-24-239.01
Town of Plymouth

The Department of Environmental Protection (the Department or MassDEP) makes the following Findings of Fact in support of the attached renewed Water Management Permit #9P-4-24-239.01 and includes herewith its reasons for issuing the renewed 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 permit renewal application by the Town of Plymouth, Department of Public Works, Water Division, (Plymouth) for the purpose of public water supply.

The Permit Extensions

WMA permits issued during the first 20-year permitting cycle for the Buzzards Bay Basin were scheduled to expire on May 31, 2011. 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. All permittees seeking to renew their Water Management permit in the Buzzards Bay Basin were required to file a renewal application on or before May 31, 2015. Plymouth filed a timely renewal application and pursuant to M.G.L. c. 30A, § 13, and 310 CMR 36.18(7).

The expiration date for all renewed permits going forward in the Buzzards Bay Basin will be September 4, 2032, to restore the staggered permitting schedule in the regulations. The new expiration date is a change from the expiration date (May 31, 2031) identified in the Draft permit.

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 Buzzards Bay 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 2018 (https://www.mass.gov/massachusetts-water-conservation-standards), 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; and
    - 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.

Safe Yield in the Buzzards Bay Basin

This permit is being amended 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 Buzzards Bay Basin is 148.4 million gallons per day (MGD), and total registered and permitted withdrawals are 83.78 MGD. The maximum withdrawals that will be authorized in this amended permit, and all other permits currently under review by the Department within the Buzzards Bay Basin, will be within the safe yield and may be further conditioned as outlined

in the regulations. Also note that this permit amendment is not allocating any increase in withdrawal volumes, so this permitting decision is not changing the currently allocated volumes in the basin identified above.

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

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

Plymouth operates 2 permitted sources in the Buzzards Bay Basin and 10 permitted sources in the South Coastal Basin. Plymouth was issued its initial WMA permit (at the time, joint for both basins) on June 21, 1993. In 2018, a renewed permit was issued for their withdrawal in the South Coastal Basin.

In May 2020, Plymouth submitted a permit amendment application to remove the pumping limits on their Darby Pond Well (08G) which were included in the May 2001 dual basin Permit. An amended permit was issued on August 5, 2021, that altered the pumping limits of the Darby Pond Well, limited the combined allocation volumes to be withdrawn by Plymouth in the South Coastal and Buzzards Basins, and updated the water conservation and demand management measures in the permit to bring it in-line with those conditions already included in Plymouth's South Coastal Basin permit.

Special Condition 1, Maximum Authorized Annual Average Withdrawal- Remains at the currently authorized volume of 1.59 MGD in the Buzzards Bay Basin. In addition, the combined withdrawals from the Buzzards Bay Basin and the South Coastal Basin cannot exceed 5.04 MGD.

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

*Based on Plymouth meeting certain conditions outlined in their South Coastal and Buzzards Bay permits.

In 2020, Plymouth's average daily withdrawal from the South Coastal Basin was 3.89 MGD, and 0.60 MGD from the Buzzards Bay Basin.

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

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

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

Special Condition 5, Pond Level Monitoring requires implementation of the Darby Pond Management Plan, including pond level monitoring as described in the memorandum prepared by Amory Engineers dated August 31, 2000. Pond level measurements shall be recorded, compiled, and verified weekly from October 1st through April 30th.

Special Condition 6, Conservation Water Level requires that withdrawals from Darby Pond Well cease when the pond falls below 121.5 feet above MSL from November 15th to March 31st, surveyed to NGVD. The one exception is that that pumping may occur for no more than 4 hours of per day to allow for the proper maintenance of water quality in the distribution lines. Withdrawals may not return to normal until such time as the level of the pond has returned to 121.5 feet above MSL.

Special Condition 7, Performance Standard for Residential Gallons Per Capita Day Water The RGPCD required for all PWS permittees is now 65 gallons. Plymouth was required to meet the 65 RGPCD based on its South Coastal permit in 2018. Permittees that cannot comply within the timeframe in the permit must meet Functional Equivalence (FEP) requirements outlined in Appendix A. Plymouth's MassDEP-approved RGPCD for the most recent five years has been:

2021	2020	2019	2018	2017
59	67	64	65	62

While Plymouth did exceed their RGPCD in 2020, the Department makes note of the exceptional circumstances of 2020, including the town's Bicentennial and the COVID Pandemic, resulting in an increase in residential water usage. Plymouth also took steps in 2020 and 2021 to reduce their RGPCD, including: the creation of a committee to explore ways to conserve water; the distribution of 100 rain barrels to households on the town's municipal water system; and developing and circulating a water conservation flyer and a water conservation poster that was included with water bills mailed in early July 2021. Therefore, MassDEP is not requiring additional steps based on Plymouth's 2020 RGPCD exceedance.

Special Condition 8, Performance Standard for Unaccounted for Water The UAW required for all PWS permittees is now 10% for two out of the three most recent years. Plymouth was required to meet the 10% UAW based on its South Coastal permit in 2018. Permittees that cannot comply within the timeframe in the permit must meet Functional Equivalence requirements based on the AWWA/IWA Water Audits and Loss Control Programs, Manual of Water Supply Practices M36, as outlined in Appendix B. Plymouth is in compliance with their permit requirements. Plymouth's MassDEP-approved UAW for the most recent five years has been:

2021	2020	2019	2018	2017
11%	14%	9%	10%	15%

Plymouth will need to submit a UAW Compliance Plan within 60 days of this permit being issued as final.

Special Condition 9, Seasonal Limits on Nonessential Outdoor Water Use, requires Plymouth to implement nonessential outdoor water use restrictions from May 1 to September 30. Plymouth was required to begin instituting outdoor water use restriction based on its South Coastal permit in 2018. Plymouth can choose to implement the restrictions based on the calendar (all summer). It can also implement the restrictions only when groundwater levels in a U.S. Geological Survey (USGS) monitoring well fall below certain defined levels for at least 60 consecutive days or when a Level 1-Mild Drought (formerly drought advisory) is declared for the region.

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

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

Special Condition 10, Water Conservation Requirements, incorporates the Water Conservation Standards for the Commonwealth of Massachusetts reviewed and approved by the WRC in July 2018. (https://www.mass.gov/massachusetts-water-conservation-standards).

Special Condition 11, Mitigation of Impacts for Withdrawals that Exceed Baseline[1], requires mitigation of the impacts of withdrawals above the permittee's baseline by direct and/or indirect mitigation activities. Plymouth's Baseline in the Buzzards Bay Basin (0.8 MGD) is based on the average annual withdrawals made during 2003-2005 plus 5%. Plymouth's system-wide Baseline is 5.36 MGD based on their 2005 use + 5%. Mitigation of the impacts of increasing withdrawals can be through:

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

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

The mitigation volume calculation below assumes that Plymouth's future withdrawals will be discharged to on-site septic systems at the same rate (82%) as current water withdrawals. A "wastewater adjustment" is calculated for water withdrawn that is returned to the ground as wastewater within the same major basin. MassDEP will assume that 85% of water delivered to customers with septic systems will be returned to the ground thus reducing the amount of mitigation needed. In addition, approximately 5,000 gallons of wastewater per day is sent to the subsurface infiltration beds at

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

Plymouth's Airport Wastewater Treatment Plant. This volume is calculated after treatment, so no adjustment is required. Also, approximately 5% (0.0775 MGD) of the total treated wastewater (1.55 MGD) from the Camelot Drive Treatment Facility goes to open infiltration beds. MassDEP is assuming a 15% evaporation rate for these open beds. After calculating for all of the wastewater return adjustments, Plymouth's total mitigation requirement based on renewing the currently permitted volume of 1.59 mgd will be up to 165,000 gallons per day, or 17 indirect mitigation credits. Please see Table 5.

Table 5: Plymouth Water Department
Mitigation Volume Calculation

Permit request above Baseline = 0.79 MGD • Permit amount above Baseline: 1.59 – 0.80 = 0.79 MGD
Adjustment for Wastewater Discharge to Local Groundwater = 0.62 MGD • 82% of increased withdrawals are delivered to areas with on-site groundwater disposal systems: 0.79 MGD x 0.82 (82%) = 0.65 MGD • 85% of water delivered to areas with on-site groundwater disposal systems returns to groundwater: 0.65 MGD x 0.85 (85%) = **0.55 MGD** • 0.005 MGD is disposed of at the subsurface infiltration bed at the Airport Wastewater Treatment Plant= **0.005 MGD** • 5% of wastewater at the Camelot Drive Wastewater Treatment Plant (1.55 MGD) goes to infiltration beds: 0.0775 MGD • 85% of water delivered to Camelot Drive Wastewater Treatment Plant infiltration beds returns to groundwater: 0.0775 MGD x 0.85 (85%) = **0.07 MGD**
Amount to be Mitigated after Adjustment for Wastewater Discharge to Local Groundwater = 0.16 MGD • Permitted amount above baseline (0.79 MGD) – adjustment for wastewater discharge to local groundwater (0.55 + 0.005 + 0.07 MGD) = 0.79 MGD – 0.625 MGD=0.165 MGD or 17 credits.

Plymouth identified the acquisition of a cranberry bog that ceased production permanently since 2005 for inclusion in their mitigation plan. Cranberry bogs that have ceased operation after January 1, 2005 may qualify for direct mitigation credits. Only the portion of water consumptively lost to the basin during the baseline period is eligible for direct credits. Based on industry-wide standards, cranberry bogs are estimated to consume 22.5% of their allocated water via irrigation and evapotranspiration losses, with the remaining 77.5% returned to the basin. Permittees who acquire or own cranberry bogs that cease operation may receive a direct mitigation credit based on the cultivated acreage reported in compliance with their WMA registration or permit between the periods of 2003-2005.

According to MassDEP`s records and the information submitted by Plymouth, the cranberry bog eligible for direct mitigation credits in this permit is the property formally known as the Degrenier Bogs. The total irrigated acreage during the baseline period for this bog was 26.5 acres. The total direct mitigation credits achieved through the decommissioning of this cranberry bog is 0.053 MGD. Details are presented in Appendix C.

Plymouth has also identified 11.1 in indirect credits from land protection credits and a wetlands bylaw. Again, Appendix C summarizes how those indirect credits are assigned. Should there be any changes to

the status of the cranberry bog during the life of this permit, the land protected or the wetlands bylaw, Plymouth should contact MassDEP about the changes and the mitigation requirements will need to be reassessed.

Special Condition 12, Reporting Requirements, ensures that the information necessary to evaluate compliance with the conditions included herein is accurately reported.

General Permit Conditions contains general permit conditions required of all permitees.

Coldwater Fish Resource Protection was incorporated into the Water Management Regulations in November 2014. Coldwater Fish Resource Protection was not evaluated as a condition of this permit because Plymouth's withdrawals in the Buzzards Bay Basin do not impact waters that MA Division of Fisheries and Wildlife has identified as supporting coldwater fish. Therefore, no additional conditions were included in this permit to address CFR protection.

Minimization of Groundwater Withdrawal Impacts in Stressed Subbasins requires permittees with permitted groundwater sources in subbasins[2] with net groundwater depletion of 25% or more during August to minimize their withdrawal impacts on those subbasins to the greatest extent feasible. Minimization of Groundwater Withdrawal Impacts is not a condition of this permit at the present time, since there are no delineated subbasins in Plymouth.

Response to Comments

The draft amended Permit was posted in the Massachusetts Environmental Monitor for public comment from December 7, 2022 to January 7, 2023. Comments were submitted by the Community Land and Water Coalition, a project of Save the Pine Barrens. Several of the concerns raised were general concerns about the timeliness and applicability of the Water Management Act regulations developed in 2014 and as a result request modifications to the permit that are not aligned with current Water Management Program regulations (310 CMR 36.00). Comments pertaining to the safe yield methodology used in permitting or implementation policies developed as part of the Sustainable Water Management Initiative (SWMI) are not within the scope of individual Water Management permits.

MassDEP continues to work with all constituents to review programmatic requirements in forums outside of the development of individual permits.

Comments on regulatory and policy issues and comments addressing modifications that are not aligned with current regulations are not included in this Finding of Fact. Comments submitted by the Community Land and Water Coalition that are included in this Findings of Fact fell under the following general categories:

1. Local permitting in Plymouth's Zone IIs.
2. The December 2022 Recommendations of the Plymouth Water Conservation Committee were not taken up; no implementation date announced.

[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).

3. The Town has implemented a patchwork approach to addressing the Town's "water crisis," stating that wellhead protection zones must be protected, yet issuing permits for development within them anyway.
4. The Impacts of the Proposed Development Agreement and ZBA permit for Claremont Development.
5. MEPA reviews have been sidestepped in the Buzzards Bay Basin.
6. Opposition to lifting the withdrawal limits on the Darby Pond Well because of the impacts to the Darby Pond ecosystem and the plant and animal communities.
7. The draft Permit's failure to assess, incorporate, and monitor withdrawals from non-municipal water suppliers such as Pine Hills and AD Makepeace.
8. MassDEP should postpone the issuance of the permit until each of the issues addressed here are adequately and thoroughly addressed and the information provided in a public meeting.

MassDEP requested that Plymouth respond to issues 1-4 listed above. Please find the responses in a letter dated February 14, 2023, addressed to Duane LeVangie, Water Management Act Chief, from Peter Gordon, Plymouth DPW Water Division Superintendent. This letter will be provided alongside the final Water Management Act Permit. Please see below for MassDEP's response to issues 5-8.

Issue 5: MEPA review has been sidestepped for sand mining operations by operating under agricultural permits in the Buzzards Bay watershed.

Response: MEPA review thresholds are outlined in 301 CMR 11.00. These thresholds are reviewed periodically and questions on the review thresholds or individual projects should be addressed to MEPA staff.

Issue 6: Opposition to lifting the withdrawal limits on the Darby Pond Well because of the impacts to the Darby Pond ecosystem and the plant and animal communities.

Response: In May 2020, Plymouth submitted a permit amendment application to remove the pumping limits on their Darby Pond Well (08G). An amended permit was issued on August 5, 2021, that altered, but did not remove, the pumping limits of the Darby Pond Well, limited the combined allocation volumes to be withdrawn by Plymouth in the South Coastal and Buzzards Basins, and updated the water conservation and demand management measures in the permit to bring it in-line with those conditions already included in Plymouth's South Coastal Basin permit. The Department believes that these changes, which were made in coordination with the Massachusetts Department of Fish and Wildlife, along with the removal of other withdrawal points from Darby Pond, remain protective of the local ecosystems.

Issue 7: The draft Permit's failure to assess, incorporate and monitor withdrawals from non-municipal water suppliers such as Pinehills and others.

Response: Both entities mentioned in this comment, Pinehills and AD Makepeace, have WMA permits and are required to comply with 310 CMR 36.00, including conditions requiring the implementation of water conservation and demand management measures. Of the two, only AD Makepeace, located in Wareham, is in the Buzzards Bay Basin. All Basins have identified Safe Yield volumes which were

developed based on the methodologies incorporated into the Water Management Act Regulation in 2014.

Issue 8: We urge MassDEP to postpone the issuance of the permit until each of the issues addressed here are adequately and thoroughly addressed and the information provided in a public meeting.

Response: The 30-day public comment period, along with the required notification, is sufficient to collect public comments. The WMA program does not hold public meetings to respond to comments on individual permits.

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
100 Cambridge Street 9th Floor Boston, MA 02114 • 617-292-5500

WATER WITHDRAWAL PERMIT RENEWAL
FINAL Permit #9P-4-24-239.01
Town of Plymouth

This renewal of Permit #9P424239.01 is approved pursuant to the Massachusetts Water Management Act (WMA) for the sole purpose of authorizing the withdrawal of a volume of water as stated below and subject to the following special and general conditions. This permit conveys no right in or to any property.

PERMIT NUMBER: 9P-4-24-239.01 **RIVER BASIN**: Buzzards Bay

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

EFFECTIVE DATE: October 9, 2023
EXPIRATION DATE: September 4, 2032

TYPE AND NUMBER OF WITHDRAWAL POINTS: Groundwater: 2 Surface Water: 0

USE: Public Water Supply

DAYS OF OPERATION: 365

AUTHORIZED WITHDRAWAL POINTS:

Table 1: Withdrawal Point Identification

Source Code	Source
4239000-04G	Federal Furnace Well
4239000-08G	Darby Pond Well

SPECIAL CONDITIONS – PERMIT #9P-4-24-239.01

1. Maximum Authorized Annual Average Withdrawal

This permit authorizes the Town of Plymouth to withdraw water from the Buzzards Bay Basin at the rate described in Table 2 below. In addition, Table 3 reflects the combined volumes authorized to Plymouth under this permit and their WMA Permit #9P-4-21-239.01 in the South Coastal Basin. The permitted volumes are expressed both as an average daily withdrawal rate (million gallons per day or MGD), and as a total annual withdrawal volume (million gallons per year or MGY) for each permit period outlined.

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

Table 2: Buzzards Bay Authorized Withdrawal Rates		
Permit Periods	**Total Raw Water Withdrawal Volumes Permit**	
	Daily Average (MGD)	**Total Annual (MGY)**
10/9/2023 to 9/4/2032	1.59	580.35

The combined maximum authorized annual withdrawal volumes from the South Coastal and Buzzards Bay Basins are confined to the volumes outlined in Table 3 as well. MassDEP further limits system-wide withdrawals from all of Plymouth's sources as outlined in A. and B.

Table 3: Summary of Plymouth Water Department's WMA Authorizations	
WMA Authorization	**Volume Authorized**
WMA Permit #9P-4-24-239.01 (Buzzards Bay)	1.59 MGD (580.35 MGY)
WMA Permit #9P-4-21-239.01 (South Coastal)	5.04 MGD (1839.60 MGY)*
Total WMA Authorization	5.04 MGD (1839.60 MGY)*

*Based on Plymouth meeting certain conditions outlined in their South Coastal and Buzzards Bay permits.

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

B. Withdrawals may increase to an average daily withdrawal of up to 5.04 MGD prior to January 1, 2026, provided Plymouth is:
   - Meeting the unaccounted-for water use (UAW) standard of 10% or less, or all UAW functional equivalence requirements in Appendix B;
   - Implementing required seasonal limits on nonessential outdoor water use in Special Condition 9; and
   - Implementing all water conservation requirements in Special Condition 10.

2. **Maximum Daily Withdrawals from Groundwater Withdrawal Points**
   Withdrawals from permitted groundwater sources are not to exceed the approved maximum daily rates listed in Table 4 below without advance approval from the Department.

Table 4: Maximum Daily Withdrawal Rates from Authorized Groundwater Withdrawal Points	
Source and ID #	**Maximum Daily Rate**
Federal Furnace Well - 4239000-04G	0.79 MGD
Darby Pond Well - 4239000-08G	0.80 MGD

3. **Zone II Delineation**
   Department records show that all of Plymouth's sources have approved Zone II delineations, therefore, no further Zone II work is required.

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

5. **Pond Level Monitoring**
   This condition requires implementation of the Darby Pond Management Plan, including pond level monitoring as described in the memorandum prepared by Amory Engineers dated August 31, 2000. Pond level measurements shall be recorded, compiled, and verified weekly from October 1st through April 30th. Please see Appendix D.

6. **Conservation Water Level**
   From November 15th to March 31st, if Darby Pond falls below the base level of 121.5 feet above MSL, surveyed to NGVD, Plymouth is required to cease withdrawals from the Darby Pond Well with the exception that pumping may occur for no more than 4 hours of per day, to allow for the proper maintenance of water quality in the distribution lines. Withdrawals may not return to normal until such time as the level of the pond has returned to 121.5 feet above MSL. In the event of a catastrophic event causing the level of the pond to drop significantly, thus necessitating Plymouth to cease withdrawals from the Darby Pond Well or seek permission of MassDEP to continue to operate the well, the Department agrees to respond to any reasonable request for relief by Plymouth from this requirement as expeditiously as possible consistent with existing rules and regulations.

7. **Performance Standard for Residential Gallons Per Capita Day Water Use**
   The Town of Plymouth's performance standard for residential gallons per capita day (RGPCD) is 65 gallons or less. Plymouth has been required to be in compliance with this performance standard since December 31, 2019. If Plymouth does not meet the standard, Plymouth shall implement a Residential Gallons Per Capita Day Compliance Plan (Appendix A)**.**

8. **Performance Standard for Unaccounted for Water**
   The Town of Plymouth's Standard for Unaccounted for Water (UAW) is 10% or less of overall water withdrawal for 2 of the most recent years 3 throughout the permit period. Plymouth has been required to be in compliance with this performance standard since December 31, 2018 or, if Plymouth does not meet the standard, shall be in compliance with the functional equivalence requirements (Appendix B). Plymouth will need to submit a UAW Compliance Plan within 60 days of this permit being issued as final.

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.

9. Seasonal Limits on Nonessential Outdoor Water Use

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

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

Restricted Nonessential Outdoor Water Uses

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

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

The following uses may be allowed, before 9 am and after 5 pm, when mandatory restrictions are in place:

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

Water uses NOT subject to mandatory restrictions are those required:

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

Public Notice of Seasonal Nonessential Outdoor Water Use Restrictions

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

Table 5: Seasonal Limits on Nonessential Outdoor Water Use

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

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

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

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

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

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

*As of 3/10/2016

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

b) A Level 1- Mild Drought (formerly Drought Advisory) or higher is declared by the Massachusetts Drought Management Task Force for Southeastern MA.

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

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

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

- Scroll down to 415453070434901 MA-PWW 22, Plymouth, MA.
- Click on the station number.
- Click on one of the available number of days, or click on "Change Time Span" and enter the number of days of records you would like and hit "Change Time Span" again.

- Click on "Retrieve Data".
- The table provides the "Daily Mean Depth to water level, feet below land surface" for the most recent number of days chosen.
- Compare each day's value to its month's trigger value (25th percentile) in your permit. Outdoor water use restrictions must be implemented when the daily depth to water level is at or below the trigger for 60 consecutive days.

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

10. Water Conservation Requirements

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

Table 6: 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 AWWA Manual 36.
4. Plymouth shall have repair reports available for inspection by the Department. Plymouth shall establish a schedule for repairing leaks that is at least as stringent as the following: o Leaks of 3 gallons per minute or more shall be repaired within 3 months of detection. o Leaks of less than 3 gallons per minute at hydrants and appurtenances shall be repaired as soon as possible. o Leaks of less than 3 gallons per minute shall be repaired in a timely manner, but in no event more than 6 months from detection, except that leaks in freeway, arterial or collector roadways shall be repaired when other roadwork is being performed on the roadway. Leaks shall be repaired in accordance with Plymouth's priority schedule including leaks up to the property line, curb stop or service meter, as applicable. Plymouth shall have water use regulations in place that require property owners to expeditiously repair leaks on their property.
Metering
1. Calibrate all source and finished water meters at least annually and report date of calibration on the ASR.
2. Plymouth reports its system is 100% metered. All water distribution system users shall have properly sized service lines and meters that meet AWWA calibration and accuracy performance standards as set forth in AWWA Manual M6 – Water Meters.
3. Plymouth shall have an ongoing program to inspect individual service meters to ensure that all service meters accurately measure the volume of water used by its customers. The metering program shall include regular meter maintenance, including testing, calibration, repair, replacement and checks for tampering to identify and correct illegal connections. The plan shall continue to include placement of sufficient funds in the annual budget to calibrate, repair, or replace meters as necessary.
Pricing

Table 6: Minimum Water Conservation Requirements
1. Plymouth shall maintain a water pricing structure that includes the full cost of operating the water supply system. Plymouth shall evaluate rates at a minimum every three to five years and adjust costs as needed. Full cost pricing factors all costs - operations, maintenance, capital, and indirect costs (environmental impacts, watershed protection) - into prices.
2. Plymouth shall not use decreasing block rates. Decreasing block rates which charge lower prices as water use increases during the billing period, are not allowed by M.G.L. Chapter 40 Section 39L.
Residential and Public Sector Conservation
1. Plymouth shall meet the standards set forth in the Federal Energy Policy Act, 1992 and the Massachusetts Plumbing Code.
2. Meter or estimate water used by contractors using fire hydrants for pipe flushing and construction.
3. Plymouth has reported that all municipally owned public buildings have been retrofitted with water saving devices (faucet aerators, low flow shower heads and low flow toilets). Plymouth shall continue to ensure that water savings devices are installed in all municipal buildings as they are renovated, and shall ensure water conserving fixtures and landscaping practices are incorporating into the design of new municipal capital projects.
Industrial and Commercial Water Conservation
1. Plymouth shall ensure water conservation practices in all development proposals, particularly low flow devices and water-wise landscaping practices.
Public Education and Outreach
1. Plymouth shall continue to implement its water conservation and education efforts designed to educate the Town's water customers on ways to conserve water. Without limitation, Plymouth's plan may include the following actions: o Include in bill stuffers and/or bills, a work sheet to enable customers to track water use and conservation efforts and estimate the dollar savings; o Public space advertising/media stories on successes (and failures); o Conservation information centers perhaps run jointly with electric or gas company; o Speakers for community organizations; o Public service announcements; radio/T.V./audio-visual presentations; o Joint advertising with hardware stores to promote conservation devices; o Use of civic and professional organization resources; o Special events such as Conservation Fairs; o Develop materials that are targeted to schools with media that appeals to children, including materials on water resource projects and field trips; and o Provide multilingual materials as needed.
2. Upon request of the Department, the Town of Plymouth shall report on its public education and outreach effort, including a summary of activities developed for specific target audiences, any events or activities sponsored to promote water conservation and copies of written materials.

11. Mitigation of Impacts for Withdrawals that Exceed Baseline

Plymouth is required to mitigate 0.165 MGD for its renewed permitted withdrawals over baseline in the Buzzards Bay Basin. The Buzzards Bay mitigation requirement of 0.165 MGD will be met with 0.053 MGD in direct volume credit from the removal of one cranberry bog from active agricultural use, and from 11.1 in indirect credits from land protection acreage and a wetlands bylaw. See Appendix C.

12. Reporting Requirements

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

General Permit Conditions (applicable to all Permittees)

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

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

3. Entry and Inspections The Permittee or the Permittee's agent shall allow personnel or authorized agents or employees of MassDEP to enter and examine any property, inspect and monitor the withdrawal, and inspect and copy any relevant records, for the purpose of determining compliance with this permit, the Act or the regulations published pursuant thereto, upon presentation of proper identification and an oral statement of purpose.

4. Water Emergency Withdrawal volumes authorized by this permit are subject to restriction in any water emergency declared by MassDEP pursuant to M.G.L. c. 21G, §§ 15-17, M.G.L. c. 111, § 160, or any other enabling authority.

5. Transfer of Permits This permit shall not be transferred in whole or in part unless and until MassDEP approves such transfer in writing, pursuant to a transfer application on forms provided by MassDEP requesting such approval and received by MassDEP at least thirty (30) days before the effective date of the proposed transfer. No transfer application shall be deemed filed unless it is accompanied by the applicable transfer fee established by 310 CMR 36.37.

6. Duty to Report The Permittee shall submit annually, on a form provided by MassDEP, a certified statement of the withdrawal. Such report is to be received by MassDEP by the date specified by MassDEP. Such report must be mailed or hand delivered to the address specified on the report form.

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

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

9. Amendment, Suspension or Termination The Department may amend, suspend or terminate this permit in accordance with M.G.L. c. 21G or 310 CMR 36.29.

APPEAL RIGHTS AND TIME LIMITS

This permit is a decision of MassDEP. Any person aggrieved by this decision may request an adjudicatory hearing. Any such request must be made in writing, by certified mail and received by MassDEP within twenty-one (21) days of the date of receipt of this permit.

No request for an appeal of this permit shall be validly filed unless a copy of the request is sent by certified mail, or delivered by hand to the local water resources management official in the community in which the withdrawal point is located; and for any person appealing this decision, who is not the

applicant, unless such person notifies the permit applicant of the appeal in writing by certified mail or by hand within five (5) days of mailing the appeal to MassDEP.

CONTENTS OF HEARING REQUEST

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

FILING FEE AND ADDRESS

The hearing request, together with a valid check, payable to the Commonwealth of Massachusetts in the amount of $100 must be mailed to:

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

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

EXEMPTIONS

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

WAIVER

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

_____ _____

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

Date

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

MassDEP will consider PWS permittees who cannot meet the 65 RGPCD performance standard to be functionally equivalent, and in compliance with their permit, if they have an on-going program in place that ensures "best practices" for controlling residential water use as described below.

If the permittee fails to document compliance with the RGPCD performance standard in itsAnnual 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 Compliance 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 MassDEP, 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 steps of the top down water audit may not result in valid performance indicators, and may not be comparable to the UARL and ILI calculations for larger systems.

However, these small systems can benefit from developing reliable data and conducting an annual top down water audit. Small systems can rely on the real losses (gallons per mile of main per day) performance indicator developed in the water audit as a measure of real water loss when developing a water loss control program. The M36 Manual discusses the audit process for small systems, and includes a chapter to guide small systems in understanding the results of their audits and in developing

a water loss control program (*Manual of Water Supply Practices – M36, Fourth Edition, Chapter 9: Considerations for Small Systems*, pp. 293-305).

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

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

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

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

Appendix C – Direct and Indirect Mitigation Credits

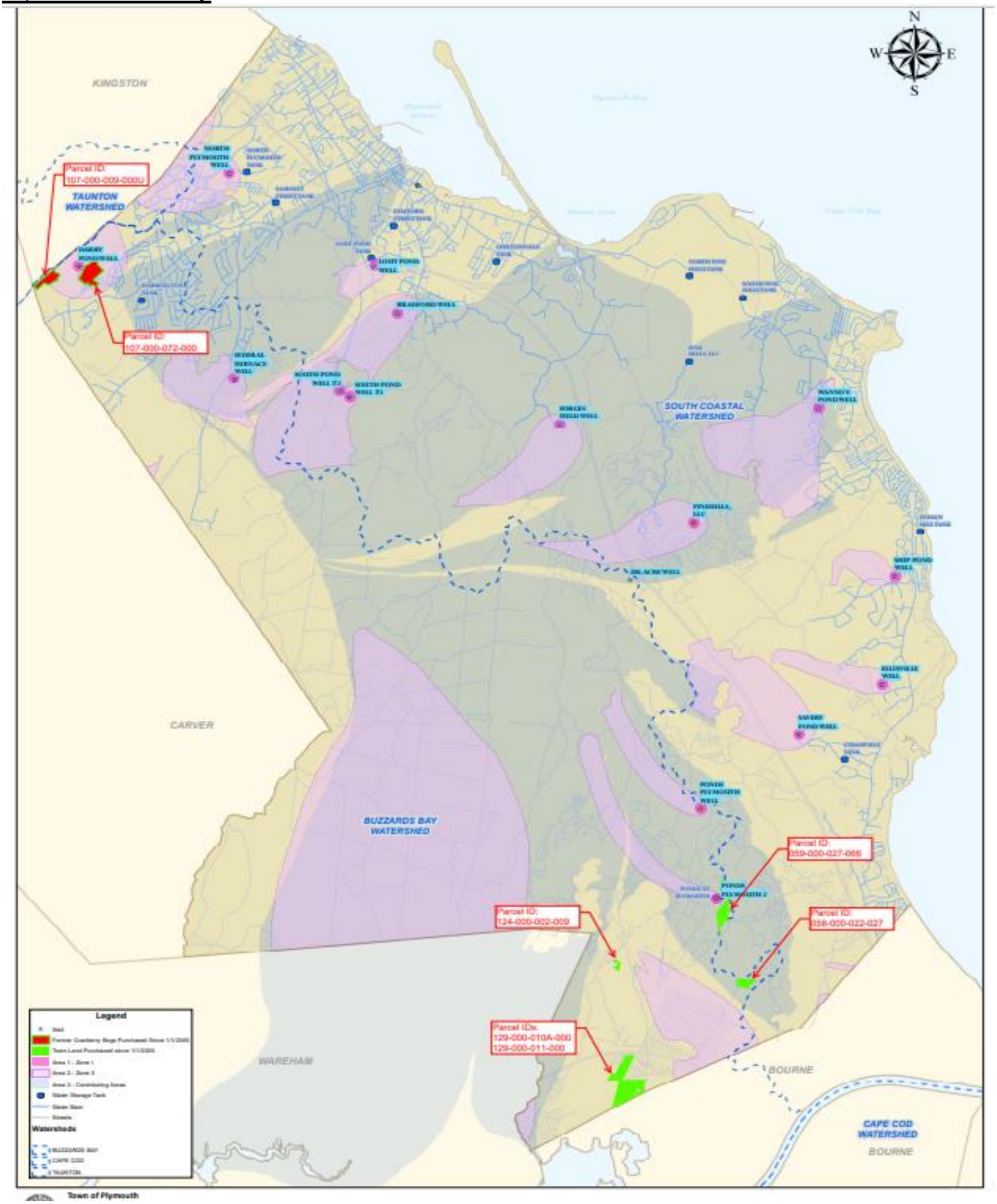
Direct Mitigation Volumes

Cranberry Bog Water Use Offset

Watershed	Total Acres	Bog Acres	Registered Rate (MGD)	Direct Mitigation Credit (MGD) (Registered Rate x 22.5%)	Bog Name	Parcel ID	Street Name	Owner	Town Meeting
Buzzards Bay	39.879	26.5	0.237	0.053	Degrenier Bogs	107-000-072-000	Graffam Road	Board of Water Commissioners	April 7, 2018, Art 15A
			Total Direct Credit:	**0.053 MGD**					

Please see the Plymouth Parcel Map below.

Plymouth Parcel Map



Indirect Mitigation Credits

Bylaws

Plymouth's Bylaw Credits		
Local Wetlands Protection Regulations Approved 2010	1 credit for enforceability of the bylaw. 1 credit for jurisdiction to resource areas "*whether or not they border surface waters"*	2 credits
	Total Credit	**2**

Land Protection in a Zone II

Watershed	Total Acres	Bog Acres	Indirect Mitigation Credits in Zone II (0.2 Credit/Acre)**	Bog Name	Parcel ID	Street Name	Owner	Town Meeting	WS 26 Issued
Buzzards Bay	39.879	26.5	2.6758	Degrenier Bogs	107-000-072-000	Graffam Road	Board of Water Commissioners	April 7, 2018, Art 15A	July 31, 2018
Buzzards Bay	21.4	7.46	1.3767	Franklin Marsh Bogs	07-000-009-000U	Graffam Road	Board of Water Commissioners	October 17, 2020, Art 5	March 26, 2021
	Total Indirect Credit:		**4.1**						

Land Protection Not in a Zone II

Watershed	Total Acres	Indirect Mitigation Credits in Zone II (0.1 Credit/Acre)	Name	Parcel ID	Street Name	Owner	Town Meeting
Buzzards Bay	26.2	2.62	Little Sandy Pond Road and Livingston Drive	059-000-027-066	Little Sandy Pond Road	Conservation Commission	April 2, 2016, Article 16G
Buzzards Bay	26.65	2.67	Garland Property	129-000-010A-000	Off Bourne Road	Conservation Commission	Oct 18, 2014, Article 16D

Total Indirect Credit: 5.29, reduced to 5.0 for maximum allowed credit.

Please see the Plymouth Parcel map above.

Appendix D

AMORY ENGINEERS, P.C.

WATER WORKS • WATER RESOURCES • CIVIL WORKS

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August 31, 2000

Ms. Therese Martin
DEP Southeast Regional Office
20 Riverside Drive
Lakeville, MA 02347

Subject: **Special Condition Nos. 5, 7 and 8- Plymouth Department of Public Works - Water Division - Water Withdrawal Permit Nos. 9P-4-21-239.01 and 9P-4-24-239.01**

Dear Ms. Martin:

On behalf of the Town of Plymouth Water Division, we are submitting this revised letter response to Water Withdrawal Permit Nos. 9P-4-21-239.01 and 9P-4-24-239.01 - Special Condition Nos. 5 (Pond Level Monitoring), 7 (Pond Management Plan) and 8 (Demand Management and Drought Contingency Planning). The permit required the Town to develop these items due to concerns about the potential for lowering water levels in Darby Pond as a result of pumpage from Darby Pond Well. The Town and adjacent cranberry bog operations share the water resources of the watershed tributary to Darby Pond. They are cooperatively working together to manage these resources.

Background

The Town of Plymouth operates a well supply about 550 to 600-ft. from Darby Pond. The supply includes an 18-in. x 30-in. gravel-pack well 90-ft. deep. The supply has an approved Zone II that extends downgradient some 2,500-ft. +/-, upgradient to the limits of the watershed, and laterally to include Darby Pond and Little Clear Pond. The well was put into operation in 1991. During the first two years of operation, pumpage from Darby Pond Well varied. Since 1993 pumpage has ranged from 120 to 175 million gallons per year, averaging about 145 million gallons per year. Table 1 presents annual pumpage from Darby Pond Well from 1991 to date:

Table 1 - ANNUAL PUMPAGE FROM DARBY POND WELL

Year	Annual Pumpage (gallons)
1991	47,386,000
1992	78,516,000
1993	131,883,400
1994	145,155,000
1995	175,245,900
1996	147,936,100
1997	156,664,100
1998	134,569,800
1999	120,543,400
2000 (Jan. 1 – July 31)	59,728,700
Average 1993 – 1999	144,285,400

Other water users surrounding Darby Pond include Double A Cranberry Company (Alberghini), and Willows Cranberries (DeGrenier). The Alberghini bogs consist of a total of 26.4 acres of cranberry bogs (7.5 acres - Darby bogs, 10.42 acres - Hall bogs, and 8.5 acres - Slug bogs). Double A Cranberry has a WMA registered withdrawal volume of 0.22 mgd for the 25 acres of registered cranberry acreage. Water for bog management for the Darby bogs is from Darby Pond via a suction connection that had required the Pond to be above elevation 121.5+/-. Only the Darby bogs are within the approved Zone II of the Darby Pond Well.

The Annawon Boy Scout Council owns property adjacent to Darby Pond that includes Camp Norse. The Council sold a portion of the property, including active cranberry bogs and undeveloped land adjacent to Darby Pond to DeGrenier. The DeGrenier bogs consist of 15.5 acres of existing cranberry bogs [12 acres of registered cranberry acreage (Willows) plus 3 acres of registered cranberry acreage (Annawon)] and some 8.5+/- acres of cranberry bogs recently constructed. Water for bog management for the existing bogs is from a tail water southwest of Darby Pond. Water for the new bogs comes from a reservoir constructed on the property located within the Darby Pond Well Zone II. The combined WMA registered withdrawal volume for the existing bogs is 0.13 mgd (0.11 - Willows plus 0.02 - Annawon). The total acreage of new bogs is less than the 9.3 acre WMA permit threshold when “best management practices” are employed.

Review of soil logs and water table maps of the area indicate the pond is hydraulically connected to the water table, which is at the “high point” of the Plymouth-Carver Aquifer basin.

The pond level-monitoring and management plans must include recognition of water needs of the Town and adjacent water users. The Town and Double A Cranberries (Alberghini) have historically worked together to allow concurrent use of the shared resource for both public water

supply and bog management. Numerous meetings have been held with Town representatives and cranberry growers/representatives attempting to reach mutual agreement on Pond Management and sharing of cost for cranberry grower pump intake modifications. The growers have developed intake modifications. Funding is to be a combination of USDA grants, grower funds and in-kind labor, and Town contribution. The Town has encumbered some $9,850 for costs associated with these modifications. We understand that $6,700 has been allocated to Alberghini's pump. The remainder allocated to DeGrenier's modifications. Sharing with DeGrenier cannot proceed any further until three competitive quotes have been received. Mr. DeGrenier has refused to provide this information. Due to Town procurement requirements, this information must be provided. The Alberghini modifications have been constructed.

Water Usage - Municipal Needs

The Darby Pond Well is one of three well supplies that serve the Town of Plymouth's Super High Pressure Zone (SHPZ). The pressure zone includes the area west of Standish Avenue to the Carver town line and from the Myles Standish State Forest north to the Kingston town line. Other sources of supply for the SHPZ include Federal Furnace and North Plymouth Wells and a booster station (Deepwater BPS) which transfers water from the adjacent Plymouth Center Pressure Zone to the SHPZ.

The Town currently has a WMA withdrawal permit for water withdrawals through 2010. The permit includes not only the three SHPZ wells but also seven other well supplies that comprise the municipal water supply system. Darby Pond Well has a monthly-authorized average daily withdrawal rate of 0.8 mgd. The North Plymouth and Federal Furnace Wells are authorized for 1.53 mgd and 0.79 mgd average daily withdrawal, respectively. Historic annual pumpage by supply for the SPHZ for the period since Darby Pond has been on-line, 1991, is presented in Appendix Table A-1. Historic monthly pumpage for the individual SHPZ sources are presented in Appendix Tables A-2 through A-6. As shown in Appendix Figure A-1, the annual monthly pumpage pattern is shaped like a bell curve, peaking during the on-season (summer months) and lower during the off-season (spring, fall and winter months). Historic Average Daily Pumpage for Darby Pond Well is presented in Appendix Table A-7.

For the period 1994 to 1999, Darby Pond Well has supplied between 20 to 30 percent of SHPZ demand. The Town's WMA permit includes Daily Average Permitted Withdrawal levels of 5.76 mgd for the period through 2000, 6.06 mgd through 2005, and 6.36 mgd through 2010. Based on 1999 pumping levels, Super High Pressure Zone demand represents about 32 percent of total system demand. Assuming similar future percentage of demand in the SHPZ and limiting monthly pumpage from Darby Pond Well to historic 1994 through 1999 monthly averages[3], the projected monthly and daily average pumpage for Darby Pond Well through the period 2010 are projected as follows:

[3] Estimated to be approximately 0.25 to 0.45 mgd in the off-season (September through May) and 0.65 to 0.80 mgd in the on-season (June through August).

TABLE 2. PROJECTED MONTHLY PUMPAGE
DARBY POND WELL

Month	Total Monthly Pumpage (million gallons)	Average Daily Pumpage (mgd)
January	9.30	0.30
February	8.40	0.30
March	9.30	0.30
April	9.00	0.30
May	13.90	0.45
June	17.90	0.60
July	21.60	0.70
August	21.60	0.70
September	12.00	0.40
October	12.40	0.40
November	9.00	0.30
December	9.30	0.30
TOTAL	153.70	0.42

Water Usage - Bog Management Needs

Normal water use practices for bog management of a level bog for a typical weather year, based on information prepared by the US Department of Agriculture in the report entitled "Water Use in Cranberry Production – Southeastern Massachusetts", December 1974 are presented in Table 3.

TABLE 3. WATER USE PRACTICES FOR BOG MANAGEMENT[4]

Level Bog

Purpose	Assumed Month	No. of Days	Water Needs[5] (mil. gal.)	Percent of Yearly Water Use %	No. of Applications
Winter flood	December - January	62	0.7	17.9	2
Late Winter flood	February	28	0.5	12.8	1
Spring (frost)	March-May	92	1.0	25.5	6
Summer (irrigation)	June-September	107	0.4[6]	10.6	10 - 12

[4] See "Water Use in Cranberry Production – Southeastern Massachusetts – Massachusetts Water Resources Study", December 1974, by United States Department of Agriculture.
[5] Per acre of bog.
[6] Assumes 1 inch of water per week for irrigation during the growing season, verbal comment from growers.

Table 3. (continued)

Level Bog

Purpose	Assumed Month	No. of Days	Water Needs[7] (mil. gal.)	Percent of Yearly Water Use %	No. of Applications
Fall (frost)	September-November	69	0.7	17.9	4
Fall flood (harvest)	October	7	0.2	5.1	1
Clean up flood	October	N/A	0.4	10.2	1
TOTAL		365	3.9	100.0	
Y	3.9 mil. gal./acre or 12.0 acre foot for average year				

Based on discussions with the adjacent cranberry bog owners/operators we understand that water usage is not metered and that their usage patterns would be as described by the Cranberry Growers Association. We note the annual water needs noted above are greater than the DEP standard for cranberry cultivation of 10-acre ft. of water per bog acre in production per year. For purposes of this report, estimates of water needs utilize the 10-acre ft. standard coupled with the percent of yearly water use reported by the Department of Agriculture. Assuming a total of 50.42 acres of cranberry bogs, relative percentage of water use noted in Table 3, and the DEP standard of 10 acre-ft./year (3.26 mil. gal./year) per bog acre in production, we estimate a total annual water requirement for bog management of 164.5 mil. gal. [86.2 mil. gal. for Double A Cranberries (24.5 mil. gal - Darby Pond bogs, 34.0 mil. gal. - Hall bogs, and 27.7 mil. gal. - Slug bogs) and 78.3 mil. gal. for De Grenier bogs (50.6 mil. gal. for existing bogs and 27.7 mil. gal. for new bogs)]. Table 4 presents a summary of monthly water needs for bog management. Appendix Table A-8 breaks monthly needs down by individual bog.

TABLE 4. ESTIMATED MONTHLY WATER REQUIREMENTS FOR BOG MANAGEMENT

Month	Alberghini (mil. gal.)	De Grenier (mil. gal.)	Total (mil. gal.)
January	7.70	6.99	14.69
February	10.99	9.99	20.98
March	7.41	6.73	14.14
April	7.17	6.51	13.68
May	7.41	6.73	14.14
June	2.64	2.40	5.05

Table 4. (continued)

Month	Alberghini (mil. gal.)	De Grenier (mil. gal.)	Total (mil. gal.)
July	2.64	2.40	5.05

[7] Per acre of bog.

August	2.64	2.40	5.05
September	4.63	4.20	8.83
October	18.55	16.85	35.39
November	6.69	6.08	12.77
December	7.70	6.99	14.69
TOTAL	86.17	78.28	164.45

As shown in Appendix Figure 2, comparison of projected water requirements for municipal water supply and bog management indicate compatible use patterns. Plymouth Water Division's need for water from Darby Pond Well is greatest June through September, while bog management requirements are greatest October through February. Total monthly water requirements are estimated in Table 5, as follows:

TABLE 5. TOTAL MONTHLY WATER REQUIREMENTS

Month	**Darby Pond Pumpage** (mil. gal.)	**Bog Management** (mil. gal.)	**Total** (mil. gal.)
January	9.30	14.69	23.99
February	8.40	20.98	29.38
March	9.30	14.14	23.44
April	9.00	13.68	22.68
May	13.90	14.14	28.04
June	17.90	5.05	22.95
July	21.60	5.05	26.65
August	21.60	5.05	26.65
September	12.00	8.83	20.83
October	12.40	35.39	47.79
November	9.00	12.77	21.77
December	9.30	14.69	23.99
TOTAL	153.70	164.45	318.15

The area of the approved Darby Pond Zone II is estimated to be about 1.4 square miles. Assuming a dependable yield of 0.8 mgd/sm for stratified drift, the aquifer area can yield about 1.1 mgd or 400 mil. gal./year. Based on the above analysis, it does not appear that during a normal year, pumpage at historic average monthly levels from Darby Pond Well coupled with withdrawals for bog management will negatively impact the aquifer. However, due to geographic Pond location, at the higher point in the drainage basin, changes in groundwater levels due to ambient conditions may result in lowering of Darby Pond. This situation can be further acerbated by the withdrawals for municipal water supply and bog management. Therefore, careful management of the resources of the area will continue to be necessary.

In response to Special Condition No. 7 (Pond Management Plan), the Town proposes to continue working cooperatively with the adjacent water users to the extent feasible while meeting system demands

in accordance with the permitted withdrawal volumes. Assuming the above noted schedule of pumpage is followed and the adjacent cranberry operations utilize water for bog management in accordance with industry practice (including Best Management Practices) impacts to Darby Pond will be managed to the extent feasible. The intake modifications will improve the grower's ability to withdraw water below El. 121.5. As discussed later in this report, water level in Darby Pond is influenced by ambient conditions including overall aquifer levels and rainfall as well as by municipal pumpage and/or bog management practices. Submittal of municipal pumping data is part of the Annual Statistics filing with DEP.

Pond Level Monitoring

Special Condition No. 5 required the Town to develop a pond stage - monitoring program for Darby Pond. In summary, the permit requires a permanent reference location validated annually, and monthly pond level measurements (October - April) or weekly pond level measurements (May - September). Data is to be analyzed and submitted to DEP Southeast Regional Office annually.

The Town has had in place since April 1989, a monitoring program that satisfies a portion of this condition. Specifically, the Department of Public Works Engineering Division has collected on a monthly basis, pond level measurements from a location immediately adjacent to Darby Pond. The location of the "benchmark" is the concrete flume near the DeGrenier pump house. According to Town data, this permanent benchmark has been surveyed to be at El. 124.57 mean sea level (MSL). Because the benchmark is permanent, with no impact from ice expected, no annual validation appears necessary. Since June 1998, Water Division personnel have augmented this data, by collecting daily measurements of the Pond from this reference point.

Appendix Table A-9 presents historic levels of Darby Pond and a "reference" well maintained by the USGS at Plymouth Airport (10,000-ft. from Darby Pond and not influenced by municipal or bog management pumpage). Appendix Figure A-3 graphically presents the variation of water levels at Darby Pond and USGS Well PWW 22 since 1989.

As part of the Town's WMA permit, conservation water levels were established at Darby Pond. Because the Alberghini bog pump house intake required water to be 8-in. above pump suction, a threshold level of 121.5 MSL had been established. Recent intake modifications by Alberghini allow water to be withdrawn at lower levels. We note historically Darby Pond was at or below this level September - December 1992; August 1993 - January 1994; September 1994 - March 1995; July 1995 - February 1996; October 1997 - January 1998, October 1998, December 1998 and July – November 1999. During 1995, the Water Division assisted Alberghini with alternative pumping when Pond level dropped below suction intake.

The DEP limit level of 121.5 MSL appears in part to have been set based on minimum pond level in 1991, prior to the well going on line. At that time, ambient groundwater level as measured at PWW 22 was noted to be 119 +/- MSL. Since that time the ambient water table has been below 119 MSL during periods similar to but not as lengthy as Darby Pond. See Appendix Figure A-3 for a comparison of Pond level and ambient well level over time. Although pumpage from Darby Pond Well does affect Darby Pond level, the level of the Pond is also impacted by seasonal water level changes, rainfall and adjacent bog operations. Appendix Figure A-4 plots Pond level and monthly rainfall data, when monthly rainfall declines, both Pond level and ambient groundwater level also decline. It appears unfair to limit only the Plymouth Water Division when others in the area also impact the Pond. Appendix Figure A-3 presents pond level over time and the DEP threshold level. Appendix Figure A-5 presents daily pond level over the last two years.

In response Special Condition No. 5 (Pond Level Monitoring), the Town proposes to continue monthly measurements by the Engineering Division augmented as required in the permit by weekly (or daily) measurements by the Water Division. Submittal will be at the same time as the Annual Statistics filing.

Demand Management/Drought Contingency Plan

As part of the Town's original WMA permit, a "daily" pumping rate limit was established for Darby Pond Well at 0.67 mgd. During the period 1993 to 1996, this threshold was frequently exceeded. Since 1996, when the Town installed a timer at the pumping station that limited daily pumping to 16 hours and to 10 hours since January 1998, daily pumpage has been generally below this level with minimal number of violations. The Water Division intends to continue the practice of limiting Darby Pond Well to less than 10 hours per day operation during the off-season period. However, should demands on the SHPZ reach levels where Federal Furnace and North Plymouth Well supplies are pumping more than 18 - 20 hours/day during the on-season, this practice will be modified. For water quality reasons, the well should be pumped for a minimum of approximately two to four hours per day.

As noted earlier the Town's WMA permit includes Daily Average Permitted Withdrawal levels of 5.76 mgd for the period through 2000, 6.06 mgd through 2005, and 6.36 mgd through 2010. Assuming future demands in the SHPZ similar to current levels, projected SHPZ monthly average day demands are as shown in Table 6.

TABLE 6. PROJECTED SHPZ MONTHLY AVERAGE DAY DEMAND

Month	2000 (actual mgd)	2000 (mgd)	2005 (mgd)	2010 (mgd)
January	1.16	1.57	1.65	1.73

February	1.16	1.55	1.63	1.71
March	1.18	1.51	1.58	1.66
April	1.15	1.55	1.63	1.72
May	1.45	1.69	1.78	1.87
June	1.88	2.71	2.85	2.99
July	2.05	3.08	3.24	3.40
August		2.24	2.35	2.47
September		2.00	2.11	2.21
October		1.78	1.88	1.97
November		1.55	1.63	1.71
December		1.55	1.63	1.71
TOTAL		1.90	2.00	2.10

Special Condition No. 2 revised the limitation at Darby Pond Well to 0.8 mgd on a monthly averaged daily basis, the well safe yield is estimated to be 1.2 mgd. Combined with the permitted daily pumping level of 0.79 mgd from Federal Furnace Well and 1.53 mgd from North Plymouth Well, the SHPZ projected 2000 through 2010 demands can be satisfied with minimal transfer of water from adjacent pressure zones.

During June and July with Federal Furnace and North Plymouth wells pumping at 20 hours per day and Darby limited to 0.8 mgd up to 0.67 mgd will be required via transfer from Deepwater Booster Station. The current pumping capacity of Deep-Water Booster station is 500 gpm (0.72 mgd). The Town has included increased pumping capacity at Deepwater in its capital improvement program. As part of a report on build-out analysis and ability of the system to meet long-term demand various alternatives are being investigated. The report is currently being prepared and will be submitted to DEP in September 2000.

Measures, which have been used by the Water Division to limit overall system demands successfully in the past, include the following:

- Public education programs at Plymouth public schools.
- Direct mail of bill stuffers with water conservation tips.
- Voluntary odd-even watering or voluntary water bans (modifications to the wording of the Town's existing Water Use Restriction Bylaw are required).
- Provision of Water Conservation Kits to Town residents for free.
- System wide Leak Detection surveys.
- Meter installation programs.

In response to Special Condition No. 8 (Demand Management and Drought Contingency Planning), the Town proposes to continue its above noted programs. Should Pond levels be impacted such that withdrawals are limited from Darby Pond Well, transfer of water from adjacent pressure zones will allow demand to be met for most periods. However, water use restrictions can be put into place immediately by the Selectmen if necessary.

Please call if you have any question.

Very truly yours,

AMORY ENGINEERS, P.C.

By:

Richard S. Johnson, P.E.

RSJ:vs
cc: Leighton Peck
Davis Proctor
Robert Alberghini
John DeGrenier
Cape Cod Cranberry Growers Association