

TOWN OF PLYMOUTH
Department of Public Works
Engineering Division
26 Court Street
Plymouth, Massachusetts 02360

MEMO

To: Tara Brennan, Administrative Secretary
Zoning Board of Appeals

From: Sheila Sgarzi, P.E., Town Engineer SS ✓

CC: Jonathan Beder, Director of Public Works
Planning Office

Ref: LWP Plymouth, LLC– Case No 3970
Colony Place
Parcel ID 104-000-026-029

Date: December 29, 2020

Original Memo Date: November 12, 2020

Please be advised that this office has completed its review of the above referenced project. The documents were received by this office on October 26, 2020. The plans prepared by Highpoint Engineering, Inc. entitled “The Walk at Colony Place Issue for Comprehensive Permit” (6 sheets) is dated October 7, 2020. Architectural Plans prepared by W. Partnership, Inc. entitled “The Walk at Colony Place Apartments” (19 sheets), dated October 7, 2020. Landscaping plans prepared by GWH Landscape Architects entitled “The Walk at Colony Place” (7 sheets), dated October 7, 2020. Existing conditions plans prepared by Bay Colony Group, Inc. entitled “Existing Conditions Plan” (6 sheets), dated September 4, 2020.

The documents were received by this office on October 28, 2020. Sewer Force Main Extension Plan prepared by Highpoint Engineering, Inc. (1 sheet), dated October 27, 2020. Traffic Impact Assessment report prepared by Greenman-Pedersen, Inc. dated October 27, 2020.

The revised documents were received by this office on November 25, 2020. The plans prepared by Highpoint Engineering, Inc. entitled "The Walk at Colony Place Issue for Comprehensive Permit" (5 sheets) are dated revised November 24, 2020. Architectural Plans prepared by W. Partnership, Inc. entitled "The Walk at Colony Place Apartments" (3 sheets), dated revised November 24, 2020. Landscaping plans prepared by GWH Landscape Architects entitled "The Walk at Colony Place" (7 sheets), dated revised November 24, 2020. Construction phasing plan prepared by Highpoint Engineering, Inc. entitled "The Walk at Colony Place" (1 sheet) is dated revised November 24, 2020. Waiver list prepared by Highpoint Engineering, Inc. (6 sheets), dated November 24, 2020. Response to comments letter prepared by Highpoint Engineering, Inc. (9 sheets) is dated November 24, 2020. Copy of email from Battalion Chief David Malaguti in response to Fire Department comment letter dated November 16, 2020, (1 sheet), email dated November 19, 2020. Utility plan-Water Infrastructure and Emergency Vehicle Route Plan prepared by Highpoint Engineering, Inc. (2 sheets) are dated November 24, 2020.

An additional submittal was received by this office on December 9, 2020. The plans prepared by Highpoint Engineering, Inc. entitled "The Walk at Colony Place Issue for Comprehensive Permit" (5 sheets) is dated revised December 7, 2020. A letter (3 pages), dated December 9, 2020 prepared by LWP Plymouth, LLC, to Peter Conner with accompanying "Proposed Sewer, Water and Traffic Mitigation Items", dated December 7, 2020. Waiver list prepared by Highpoint Engineering, Inc. (5 sheets), dated December 7, 2020. Water and Wastewater System Impact Analysis letter prepared by Highpoint Engineering, Inc. (4 sheets) is dated December 7, 2020.

The applicant is requesting a comprehensive permit to create 320 residential units on land, of which not less than 25% or eighty (80) units shall be restricted as affordable for low-or moderate-income persons or families.

General Comments:

1. A Street Opening Permit is required for all projects. The applicant shall conform to Federal NPDES and State Storm Water Permit requirements prior to construction activities. It is not intended that this approval warrants or certifies any portion of the design. Our review has been limited to conceptual conformity with local regulations. There will not be any forthcoming correspondences unless this office receives additional instruction.
2. The applicant must get sign-off from the Fire Department regarding site access.

Comment Satisfied: 12-29-2020

3. The plans still lack the necessary details to perform a proper review. The applicant must provide detailed site/construction plans and construction detail sheets for review and approval prior to any water/sewer/street opening, permit remittance by the DPW.

Comment Not Satisfied: 12-29-2020 – No detailed constructions plans or construction details have been submitted.

4. The applicant's plans must note that the entire project lies within a Zone II Aquifer Protection District.

Comment Not Satisfied: 12-29-2020 – No note has been added to the plans.

Drainage Comments:

1. The applicant must provide drainage calculations conforming to the Town of Plymouth's Drainage Guide for review.

Comment Not Satisfied: 12-29-2020 – No drainage calculations have been submitted.

2. The applicant must provide detailed construction plans showing all existing and proposed drainage information, rim elevations, inverts, pipe sizes, slopes, lengths, etc.

Comment Not Satisfied: 12-29-2020 - No detailed constructions plans or construction details have been submitted.

3. The site lies within a Zone II Aquifer Protection District. The applicant must provide provisions on-site for shut down and containment of the drainage systems as required by the Town of Plymouth's Drainage Guide.

Comment Not Satisfied: 12-29-2020 - No detailed constructions plans or construction details have been submitted.

4. The applicant must specify proposed roofing materials, all metal roofs require special treatment per Massachusetts Stormwater Regulations which lie within a Zone II.

Comment Not Satisfied: 12-29-2020 - Please specify the proposed roofing materials to be used on-site.

5. The applicant is proposing to utilize existing drainage infiltration basins and drainage pipes. The applicant must provide previous approved calculations/documentation confirming the existing drainage systems were designed to accommodate the proposed flow and the drainage system as-built conditions reflect the previous approved plans and have the capacity to handle the additional flow.

Comment Not Satisfied: 12-29-2020 – No drainage calculations have been submitted.

6. The applicant must perform soil testing in proposed stormwater infiltration areas.

Comment Not Satisfied: 12-29-2020 – Soil testing must be completed prior to design.

Transportation Comments:

1. All pedestrian crossings (existing and proposed) within the Plaza Way, Commerce Way and Colony Place must be looked at regarding ADA compliance, sight distance and safety improvements.

Comment Partially Satisfied: 12-29-2020 – Please submit the “Sidewalk Exhibit” that identifies required maintenance corrections adjacent the project.

2. The proposed driveway and mid-block crossing may have limited visibility based on the travel speed and on-street landscape/tree plantings. The applicant must document that adequate stopping sight distance and intersection sight distance are provided at all intersections and crosswalks. The plans must show sight distance triangle and note the removal of obstructions, both existing and proposed within the sight distance triangle to the crosswalk and driveway.

Comment Partially Satisfied: 12-29-2020 - The proposed rapid flashing beacon pedestrian crosswalk system(s) must be shown on the plans.

3. The plans show the addition of an unsignalized mid-block crossing on Plaza Way, this requires an engineering study for evaluating the geometry of the location and possibility for consolidation of multiple crossing points along Plaza Way and other appropriate factors.

Comment Partially Satisfied: 12-29-2020 - The proposed rapid flashing beacon pedestrian crosswalk system(s) must be shown on the plans.

4. Any new marked crosswalk alone on Plaza Way, without other measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness and/or provide active warning of pedestrian presence, should not be installed without proper consideration towards the use of other safety features, including but not limited to pedestrian signage, lighting, RRFB pedestrian flasher, etc.

Comment Partially Satisfied: 12-29-2020 - The proposed rapid flashing beacon pedestrian crosswalk system(s) must be shown on the plans.

5. All proposed signage shall adhere to the current MUTCD, MassDOT, and Town of Plymouth Standard Specifications regarding size, fabrication, clearance to the bottom of the sign and lateral placement.

Comment Satisfied: 12-29-2020

6. Any proposed pavement markings along Plaza Way shall be highly reflective and durable Epoxy material.

Comment Satisfied: 12-29-2020

7. All wheelchair ramps and pedestrian crossing locations must comply with the latest ADA and MassDOT Construction Standards, Drawing Number(s) E 107.1.0 to E 107.6.9, and E 107.9.0.

Comment Satisfied: 12-29-2020

8. The 320 residential units will create a large increase in pedestrian traffic. A Road Safety Audit for pedestrian safety improvements along Plaza Way, Commerce Way and Colony Place must be conducted and submitted for review. The Road Safety Audit shall include the traffic signals at Plaza Way/Commerce Way and Colony Place/Commerce Way to verify pedestrian crossing times are adequate, and pushbutton placement, accessible pedestrian signals (APS), etc. are in place and functional.

Comment Not Satisfied: 12-29-2020

9. It is recommended that any missing or worn pavement markings for crosswalks, bike lanes/symbols and travel lanes along Commerce Way (Route 80 to Route 44) shall be replaced with highly reflective and durable Epoxy material.

Comment Not Satisfied: 12-29-2020 – See applicant’s response to redirect proposed mitigation contributions.

Water Comments:

1. The plan submittal is preliminary and lacks detail on the proposed water main layout. Please submit a detailed design plan to include main sizes and materials, valves, bends, hydrants, etc. facilitate a review of the proposed water main layout at the site. Alternatively, Applicant will have to submit such detailed plans for review and approval of this Department prior to the issuance of a water connection permit. As stipulated in the Water Rules and Regulations, all water mains shall be looped as a means to improve system reliability and enhance water system hydraulics. If detailed plans are deferred until Applicant seeks a water connection permit, the DPW requests that the ZBA include conditions in its decision to preserve this requirement.

Comment Not Satisfied: 12-29-2020

2. The submittal indicates that the development shall be connected to the Town of Plymouth’s water distribution system. The applicant must demonstrate through hydrant flow testing that the water system can deliver adequate fire flow and static pressure to the proposed development. In addition, the developer shall be required to work with the Town’s consultant to complete a hydraulic model assessment to ascertain the impacts and of the development on the West Plymouth Pressure Zone once we have received the necessary information from the design engineer. Accordingly, please refer to the final Water System Impact Analysis, developed by the Town’s consultant, Environmental Partners Group for additional water comments and recommendations pertaining to the proposed water connection. The applicant is currently working with the Town to develop a resolution to address the firm capacity issue in the West Plymouth Pressure Zone. The DPW Water Division shall not permit this connection until we have received final design plans and have

completed the hydraulic model. If Applicant defers submission of final design plans and hydraulic model until applying for a water connection permit, the DPW requests that the ZBA include conditions in its decision to preserve this requirement.

Comment Partially Satisfied: 12-29-2020 – Please refer to the December 29, 2020 “Supplemental Water System Analysis” from Environmental Partners Group for additional feedback.

3. The entire site lies within the Zone II area of the North Plymouth Well, a municipal drinking water well. The project is subject to §206-1 Paragraph H(4)(b) of the Zoning Bylaw which requires the installation of groundwater monitoring wells and a monitoring plan. The applicant shall meet with the DPW Water Division and the Department of Marine and Environmental Affairs for final review and approval of monitoring well locations and the proposed Groundwater Monitoring Plan.

Comment To Be Satisfied Prior to Construction: 12-29-2020

4. The applicant shall submit construction plans and meet with the Plymouth DPW for final review and approval of proposed utilities. The DPW Water Division will not sign off on building permits until construction plans have been submitted and approved. Construction plans must show adequate detail on the size and material of the proposed water mains and any fire service lines, including valves, fittings, hydrants, post indicator valves, and other related appurtenances. All water mains shall be made of Class 52, ductile iron pipe. All valves and hydrants shall OPEN RIGHT. Additionally, the applicant shall coordinate with the Plymouth Water Division to schedule an inspector to oversee the construction, chlorination and pressure testing of all water mains and services. The applicant is responsible for paying any fees associated with the inspector’s services. Upon completion of water main construction, the applicant shall submit copies of water main as-built plans and service connection tie cards to the DPW Engineering Division (1 copy) and DPW Water Division (1 copy). The DPW Water Division will not sign off on occupancy until the as-built plans have been submitted.

Comment To Be Satisfied Prior to Construction: 12-29-2020

5. The DPW Water Division encourages the applicant to employ water-saving devices and fixtures throughout the development. Irrigation systems connected to the Town’s water distribution network are discouraged.

Comment Satisfied: 12-29-2020

6. The applicant shall verify that all proposed hydrant locations are acceptable to the Plymouth Fire Department.

Comment To Be Satisfied Prior to Construction: 12-29-2020

Sewer Comments:

1. The plan submittal is preliminary and lacks detail on the proposed sewer layout. Please submit a utility plan to include pipe sizes and material, slopes, rims and inverts to facilitate a review of the proposed sewer layout at the site.

Comment Not Satisfied: 12-29-2020

2. The applicant shall work in conjunction with the DPW Sewer Division and its consultant to review and confirm that the existing wastewater infrastructure, including area sewers, as well as the Christa McAuliffe Sewer Pump Station, can accommodate the additional flow from the proposed development. Accordingly, please refer to the final Sewer System Impact Analysis, developed by the Town's consultant, Environmental Partners Group for additional sewer comments and recommendations pertaining to the proposed sewer connection. As part of the ongoing analysis, Environmental Partners Group, shall review the "Sewer Force Main Extension" plan, prepared by Highpoint Engineering, Inc., dated October 27, 2020 and the "The Walk at Colony Place Development, Plymouth, Massachusetts Peak Hour Flow and Sewage Collection System Capacity Evaluation" prepared by Onsite Engineering, Inc, dated October 5, 2020.

Comment Partially Satisfied: 12-29-2020 – Please refer to the December 2, 2020 "Review of Supplemental Sewer Information Associated with Wastewater Analysis" from Environmental Partners Group for additional feedback.

3. All connections to Town sewer are subject to wastewater flow availability and payment of all applicable sewer connection fees. The applicant must submit wastewater flow calculations to the Plymouth DPW for review and approval.

Comment To Be Satisfied Prior to Construction: 12-29-2020

4. The applicant shall submit construction plans and meet with the Plymouth DPW for final review and approval of the proposed utilities. The DPW Sewer Division will not sign off on building permits until construction plans have been submitted and approved. Construction plans must show adequate detail on the size and material of the proposed and existing sewers, including service laterals, cleanouts, and manhole locations. Sewer laterals shall be a minimum of 6-inch diameter SDR 35 with two-way, 6-inch exterior cleanouts. Additionally, the applicant shall coordinate with the Plymouth Sewer Division to schedule an inspector to oversee the abandonment, construction, video inspection and testing of all sewers and appurtenances. The applicant is responsible for paying all fees associated with the inspector's services. Upon completion of sewer construction, the applicant shall submit copies of sewer as-built plans and service connection tie cards to the DPW Engineering Division (1 copy) and DPW Sewer Division (1 copy). The DPW Sewer Division will not sign off on occupancy until the as-built plans have been submitted.

Comment To Be Satisfied Prior to Construction: 12-29-2020

5. Discharge into the Town's sewer collection system shall be in accordance with the Town's Fats Oil and Grease (FOG) program. The applicant must document compliance with the Town's FOG program and grease trap requirements.

Comment To Be Satisfied Prior to Construction: 12-29-2020

Thank you and should you have any questions or require additional information, please let me know.



December 29, 2020

Ms. Sheila Sgarzi, P.E.
Town Engineer
Engineering Division, Town Hall
26 Court Street
Plymouth, MA 02360

**RE: The Walk at Colony Place Development, Plymouth, Massachusetts
Supplemental Water System Analyses**

Dear Ms. Sgarzi,

In response to your request, we have completed supplemental water impact analyses in the context of a proposed development, The Walk at Colony Place. Since our previous letter dated November 16, 2020, we have received the following additional information:

- A letter from Donald Smith of Saxon Partners to Lee Hartmann, Director of Planning and Development Town of Plymouth, titled "The Walk at Colony Place" dated December 21, 2020.
- Clarification on the current operational capacity of three water supply sources: Federal Furnace Well, Lout Pond Well, and Darby Pond Well.
- Clarification from MassDEP that the four-hour pumping restrictions associated with Darby Pond level will remain in effect until all cranberry bog operations cease at the end of 2023.

Based on our review of this additional information, we continue to note water system capacity risks in the northern pressure zones prior to 2024, particularly during late summer, as described below.

Darby Pond Well Updates

The Town of Plymouth (the Town) has been coordinating with MassDEP to remove existing pond level restrictions that can limit Darby Pond Well production to 4 hours per day of operation. As part of this effort, the Town has been purchasing nearby cranberry bogs; however, at least one cranberry bog owner may continue to operate through the end of 2023 in accordance with a lease agreement. Therefore, MassDEP will continue to require existing Water Management Act (WMA) permit requirements remain in effect until all cranberry bog operations cease at the end of 2023.

Once MassDEP lifts the pond level restrictions, Darby Pond Well is expected to be able to reliably operate at its permitted capacity of 0.8 MGD. For the purposes of firm capacity calculations,

Environmental Partners has assumed that pond level restrictions will be in effect. Based on previous discussions with the Town, we understood that Darby Pond Well could only produce 205,000 gallons per day (gpd) when the 4 hour pond level restrictions were in effect; however, based on discussions with operators and a review of the 2020 Darby Pond Level Report, Darby Pond Well can actually reliably produce 235,000 gpd.

Environmental Partners conducted further analysis of recent Darby Pond Level Reports. The results of this analysis suggest the following:

1. Pond level restrictions go into effect for several months most years. 2019 was an unusual exception when no pond level restriction occurred.
2. Pond level restrictions typically start in mid- to late summer, typically in the late July to early September timeframe.
3. Pond levels typically recover in the late fall or in the winter so that pond level restrictions are no longer required by springtime.
4. The Town typically follows a pond level management plan, which includes varying monthly limits in pumping regardless of pond level. These limits are below the 0.8 MGD permitted volume. This management plan has historically helped minimize the pond levels from dropping too soon in early Summer.

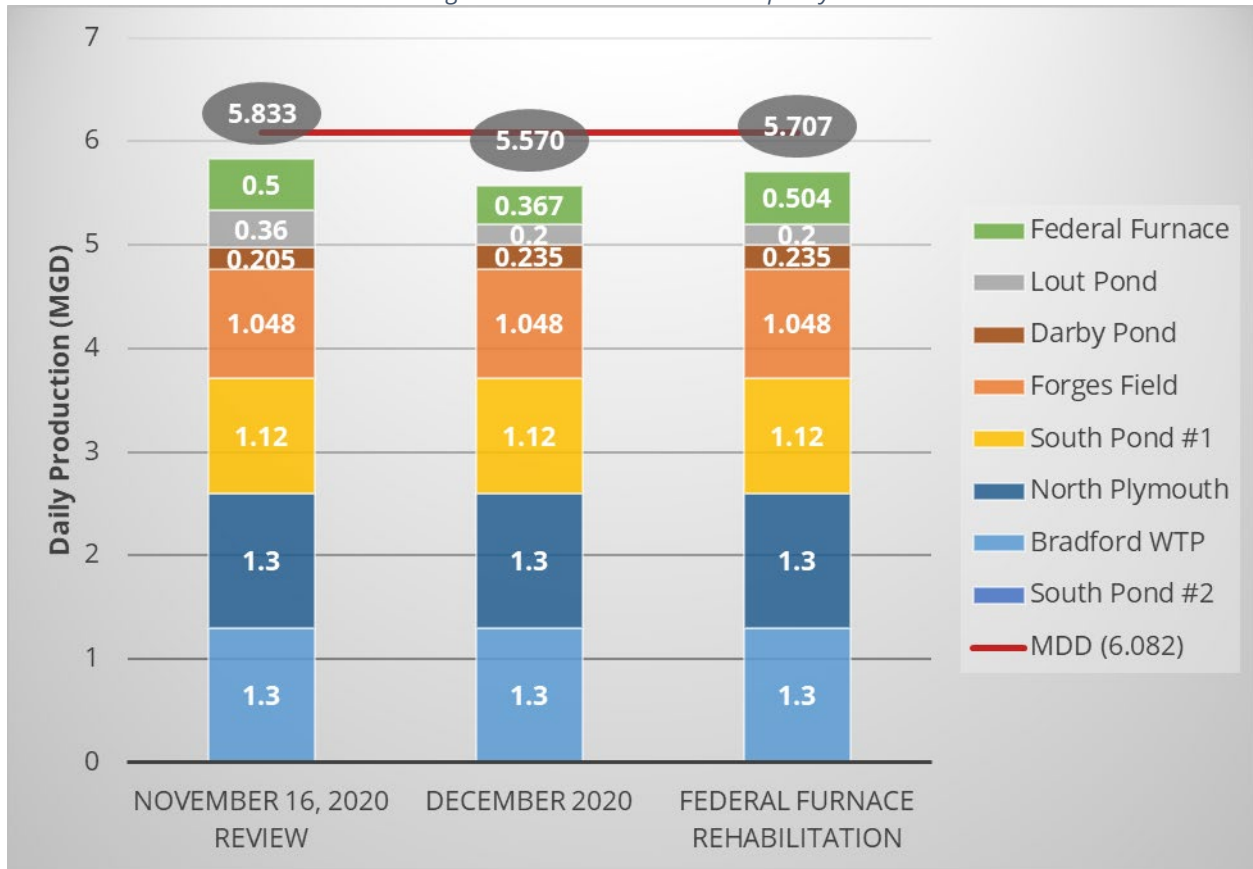
Firm Capacity

In previous analyses, Environmental Partners has calculated firm capacity with the largest source offline, consistent with industry standards for water system reliability. For example, the American Water Works Associations (AWWA) Manual of Water Supply Practice M31 describes a water system as “reliable” if it can deliver required fire flows “with the most critical limiting component out of service” under maximum-day demand conditions. In accordance with standard practice, Environmental Partners recommends water systems strive to provide reliable water service.

In our letter dated November 16, 2020, Environmental Partners reported a firm capacity of 5.833 MGD based on available information of the status of the Town’s water supply sources, which is based on data from 2018 and the master plan. However, there are now a few changes as pumping capacity varies regularly in between well redevelopment cycles. Currently, Lout Pond Well produces a maximum of 0.2 MGD based on hydraulic and water quality restrictions. In addition, Federal Furnace Well is now pumping at approximately 100 gpm less than previously reported; the Town is planning to rehabilitate the pump and motor soon, and they hope to regain lost capacity. Lastly, Darby Pond Well can provide 0.235 MGD during pond level restrictions as previously discussed.

The calculations for the previous firm capacity (5.833 MGD) as well as the current firm capacity (5.570 MGD) and the anticipated firm capacity after Federal Furnace Well is rehabilitated (5.707 MGD) are depicted in the stacked column chart below. In each column, the capacity of each source is listed in MGD, and the total firm capacity is reported in the circled area above. The maximum day demand (MDD) of 6.082 MGD is provided as a line for reference. With a capacity of 1.44 MGD, South Pond Well #2 is not included in any of these firm capacity calculations since it is the largest source in the northern zones. All calculations include the new Forges Field well supply, which was placed online in early 2020.

Figure 1: Northern Zone Firm Capacity

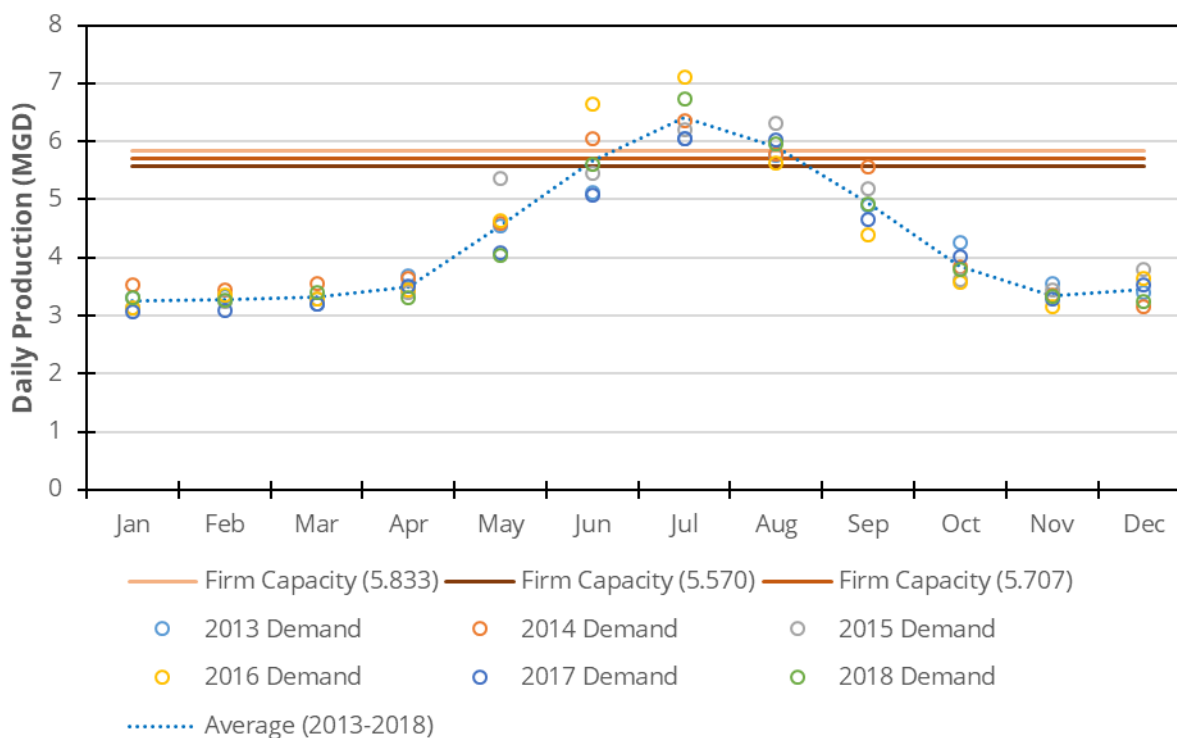


Based on a review of the information presented in Figure 1, the northern pressure zones do not have the firm capacity to meet maximum-day demands.

Monthly Demands

Environmental Partners conducted additional analyses to further identify the most critical times of demand in any calendar year. This was conducted by comparing monthly variations in demand to Darby Pond Well restrictions and firm capacity limits. Similar to Table 4-8 in Environmental Partners' Draft Water Supply Master Plan (November 2019), Figure 2 below presents the variations in monthly demands in the Plymouth Water System from 2013 to 2018. In the figure, the circles represent individual monthly data points while the dotted blue line represents the average monthly demand as presented in Table 4-8 of the Draft Water Supply Master Plan. This figure also includes horizontal lines to represent firm capacity limits for the Northern Pressure Zones as described in the Firm Capacity section above.

Figure 2: Monthly System Demands & Northern Zone Firm Capacity



While demands are relatively low for most of the year, average monthly system demands often exceed approximately 6 MGD in June, July, and August. Since Darby Pond restrictions often go into effect in the late summer as discussed above, August and early September are the times of year when the water system is most at risk of a supply shortfall.

Given this precarious situation, it is best to limit late summer demands whenever possible, particularly before the Darby Pond Well restrictions are lifted at the end of 2023. The latest available construction schedule for the Walk at Colony Place references occupancy beginning in the summer of 2022. Environmental Partners recommends that occupancy be delayed until late September 2022 at a minimum to help preserve available water to meet existing system demands during late summer of 2022. (It would be better to postpone occupancy until September 2023, but a delay of at least 3 months in 2022 would help reduce the risk of water supply deficits in 2022.)

We also note that the Town has observed the potential effects of implementing a water ban on system demands during a drought. As illustrated in Figure 2, June and July 2016 demands were higher than other recent years prior to the implementation of a water ban. After implementing a strict water ban, the Town observed below average water demands in the subsequent months. Water bans are unpopular, and it can be difficult to predict exact reductions in demands. However, if the Town is willing to implement water bans and can achieve a similar level of demand reduction in a future water ban, it may be possible to overcome short-term summertime supply issues.

Response to Comments

Environmental Partners provides the following responses to bulleted comments in the December 21, 2020 letter from Mr. Donald Smith. The original comments are numbered and presented in plain text with our response following.

1. The analysis of new projects is done with extremely conservative assumptions regarding the projected water use levels of each proposed project. For example, the analysis for this project uses an estimated water usage of 65 gallons per day, when the actual usage in similar apartment projects operated by The Hanover Company average less than 47 gallons per day (calculations attached). The result is an estimated use that is almost 40% higher than Hanover is actually experiencing in similar apartment complexes. That difference then gets amplified when a multiple is applied to the estimated average demand to create an estimated maximum day demand. We have had a similar experience in our other projects in Plymouth, where the estimated gallonage used for the permitting process exceeds the actual observed uses once the project is completed by a significant margin (perhaps reflecting the fact that the estimated amounts are based on the historic experience from projects that pre-date the latest water conservation fixtures).

EP Response 12/28/2020: 65 gpd is standard in Massachusetts for residential consumption and is consistent with recently reported residential per-capita water use in Plymouth as presented in Table 4-7 of the Draft Water System Master Plan.

2. The analysis includes the water demand assumptions calculated in the same manner for projects that have been proposed but have not proceeded. Some of these projects may not proceed for years, if ever (a list of future projects included in the water demand calculations is attached).

EP Response 12/28/2020: Several of the projects have been constructed or are in construction, and more may move forward prior to scheduled occupancy of The Walk at Colony Place.

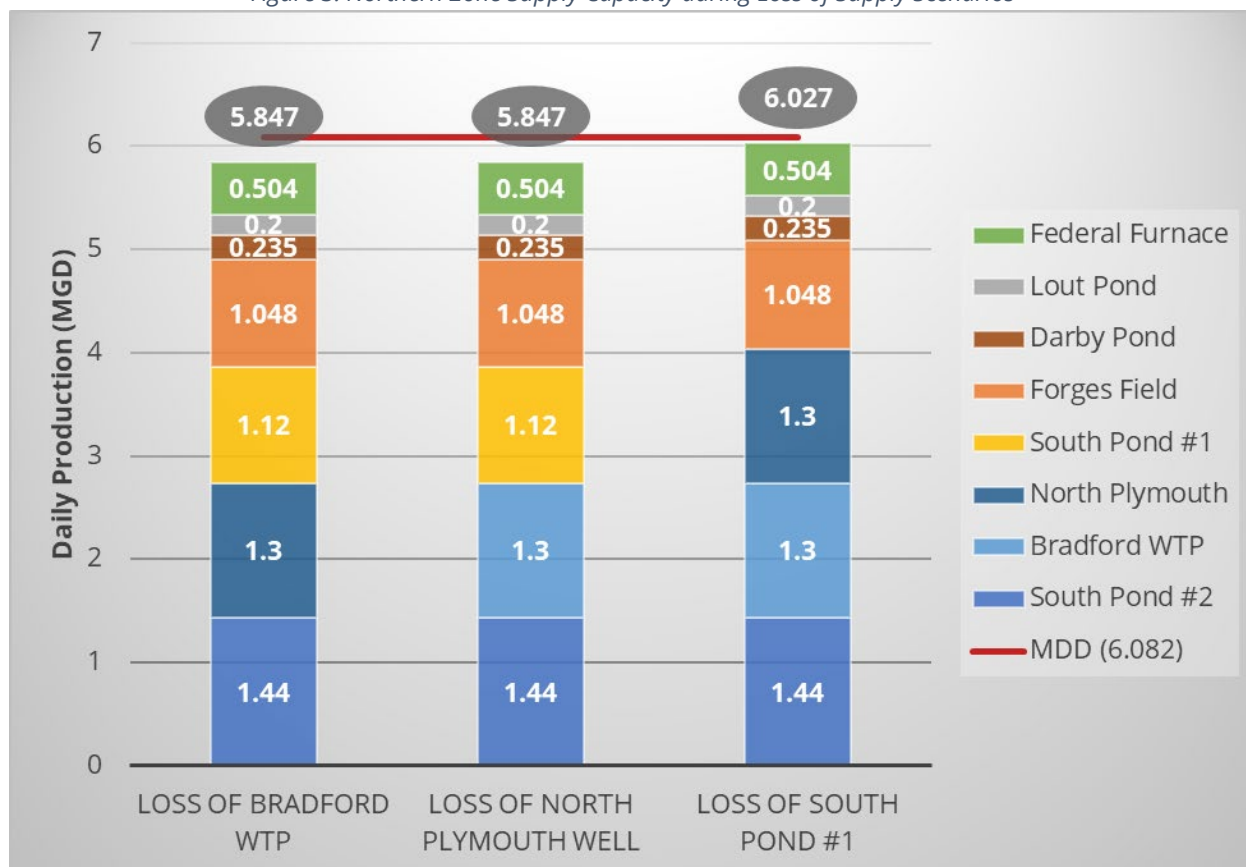
3. The analysis often excludes the benefits of water system improvement measures that have already been achieved, including the partial reduction in draws from the Darby Pond area, water loss reduction improvements, water conservation measures and the Forges Field improvements (a project which we understand alone would completely offset the amounts set forth in the FIRM capacity deficit calculations).

EP Response 12/28/2020: As depicted in Figure 1 above, the firm capacity calculations incorporate the supply from Forges Field Well and continue to show a deficit when compared to the maximum day demand.

4. The analysis focusses on a FIRM capacity level that requires the highly unlikely simultaneous occurrence of three events: 1) the largest well going offline; 2) the Darby Pond well restrictions being triggered; and 3) the water use of all current and proposed projects (whether or not built) using water at the Maximum Day demand levels.

EP Response 12/28/2020: As discussed in the Firm Capacity section above, the firm capacity calculation is standard practice for a water utility. Regardless, the problem is more acute than simply the loss of the largest source, South Pond Well #2. In fact, as illustrated in Figure 3 below, the loss of any one of the Town's next three largest sources (Bradford Water Treatment Plant, North Plymouth Well, or South Pond Well #1) would result in a water supply deficit. Furthermore, if the Federal Furnace Well pump upgrades are not as successful as hoped, it is possible that the loss of Forges Field Well could also lead to a supply deficit.

Figure 3: Northern Zone Supply Capacity during Loss of Supply Scenarios



In addition, as discussed in other portions of this letter, Darby Pond Well restrictions are typically in effect by mid- to late summer when system demands are high. Therefore, it is reasonable to assume that Darby Pond Well can only provide 0.235 MGD during critical demand periods.

Lastly, the analysis considers maximum-day demand as is typical for system reliability calculations.

- The analysis excludes the fact that there are emergency measures that could be put in place in the highly unlikely event of that FIRM capacity calculation becoming relevant.

EP Response 12/28/2020: As discussed above, a water ban can help reduce water demands; however, water bans can be unpopular, can reduce water department revenue, and can provide uncertain results.

Conclusion

Mitigation provided by the developer to assist with maintenance and redevelopment of key water supplies in the northern zones to maximize capacity should be provided to the Town. As referenced in our November 16th letter, the Draft Master Plan, and our July 2020 Water Quality Study, the Division and the developer have a range of available mitigation options:

1. Facilitate the removal of pumping restrictions on the Darby Pond Well and provide backup power. As discussed earlier, the Division has made significant progress on purchasing land surrounding the pond and permitting with MassDEP to remove the pumping restrictions; however, the well also lacks backup power. Given the vulnerability of the existing overhead wires, a generator at Darby Pond Well will be particularly important as the well's permitted production capacity increases.
2. Offset additional demands by reducing existing and proposed demands via the installation of low-flow fixtures, no-water urinals and drought tolerant landscaping. We understand the Developer would install a private well for irrigation purposes.
3. Perform preventative maintenance and provide redundancy for the Deep Water Booster Pumping Station pumps and mechanical equipment to ensure the equipment can withstand the increased demands proposed for the West Plymouth Pressure Zone. We estimate this work to be about \$25,000.
4. Complete the planned rehabilitation work at Federal Furnace Well. We estimate this work to be about \$25,000.
5. Complete upgrades at Lout Pond Well to improve capacity. As referenced in our July 2020 Water Quality Study, the Division could implement cartridge filters to help treat elevated levels of iron in the source water. Alongside this work, the Division could improve hydraulic restrictions through a combination of control modifications to minimize high head system conditions and physical upgrades to increase pump output. This work could be upwards of \$700,000. However, we'd suggest an interim hydraulic analysis in the Town's hydraulic model with specific recommendations for increasing the pump and motor prior to proceeding. We'd suggest budgeting \$10,000 for this study.
6. Implement water conservation measures including developing a Water Balancing/Banking Program to offset increased demands. We estimate this work to be about \$15,000.

Based on our analyses and discussions with operators over recent years, we understand that reliable water supply is a concern most summers in Plymouth. Once the Town is able to fully complete the permitting changes at Darby Pond and implement other recommended water system improvements, we anticipate that the water supply situation will improve. Until then, we suggest the

Town proceed cautiously with respect to proposed developments, such as The Walk at Colony Place, to help maintain water system reliability.

We thank you for the opportunity to assist you with this important project. Please feel free to contact me at (617) 657-0200 or rjt@envpartners.com with any questions or concerns.

Very truly yours,



Environmental Partners Group, Inc.

Ryan J. Trahan

Senior Principal

O: 617.657.0200

E: rjt@envpartners.com

CC: Jonathan Beder
Peter Gordon

LWP PLYMOUTH, LLC

Live ♦ Work ♦ Play

December 21, 2020

Mr. Lee Hartman
Director of Planning and Development
Town of Plymouth
26 Court Street
Plymouth, MA 02360

Re: The Walk at Colony Place;

Dear Lee:

As agreed at the last meeting, we would like to assist with the process of ensuring that the Zoning Board of Appeals is comfortable with the Town of Plymouth's ability to provide water service to this project.

We recognize that the Board will look for that guidance from the Department of Public Works and the Town's water consultants (Environmental Partners Group or "EP"). To that end, we are providing the construction schedule for the project which should be helpful in assessing the timing of the project's water usage alongside the many programs underway for improvements to the system.

We have been keeping informed of the Town's pro-active steps regarding the water supply system and are confident that this project can be served by that system. Both the State water permit documents and the Town's extensive 2019 Water Master Plan Report set forth the many measures that the Town has been undertaking to ensure the Town can continue to supply sufficient water. Those measures have been successful at keeping the Town of Plymouth on track to avoid having to ask Town Meeting to impose a water moratorium.

Some of the key considerations that we have learned from our conversations with MaDEP and from the various reports and presentations prepared by DPW and EP include:

- The analysis of new projects is done with extremely conservative assumptions regarding the projected water use levels of each proposed project. For example, the analysis for this project uses an estimated water usage of 65 gallons per day, when the

actual usage in similar apartment projects operated by The Hanover Company average less than 47 gallons per day (calculations attached). The result is an estimated use that is almost 40% higher than Hanover is actually experiencing in similar apartment complexes. That difference then gets amplified when a multiple is applied to the estimated average demand to create an estimated maximum day demand. We have had a similar experience in our other projects in Plymouth, where the estimated gallonage used for the permitting process exceeds the actual observed uses once the project is completed by a significant margin (perhaps reflecting the fact that the estimated amounts are based on the historic experience from projects that pre-date the latest water conservation fixtures).

- The analysis includes the water demand assumptions calculated in the same manner for projects that have been proposed but have not proceeded. Some of these projects may not proceed for years, if ever (a list of future projects included in the water demand calculations is attached).
- The analysis often excludes the benefits of water system improvement measures that have already been achieved, including the partial reduction in draws from the Darby Pond area, water loss reduction improvements, water conservation measures and the Forges Field improvements (a project which we understand alone would completely offset the amounts set forth in the FIRM capacity deficit calculations).
- The analysis focusses on a FIRM capacity level that requires the highly unlikely simultaneous occurrence of three events: 1) the largest well going offline; 2) the Darby Pond well restrictions being triggered; and 3) the water use of all current and proposed projects (whether or not built) using water at the Maximum Day demand levels.
- The analysis excludes the fact that there are emergency measures that could be put in place in the highly unlikely event of that FIRM capacity calculation becoming relevant.

I have attached a slide from EP's presentation at January's public forum that we found particularly helpful in illustrating the town's progress on this front. The slide illustrates how the FIRM capacity deficit (which, as noted above, is calculated in an exceptionally conservative manner and is highly unlikely to ever be experienced) has been reduced in recent years by the Town's proactive approach to improving the water system.

As relates to this particular permit application, EP reviewed the project and recommended that it not be approved without the mitigation in three categories (copy attached):

- 1) Supporting the Town's acquisition of land around the Darby Pond Well.
- 2) Incorporating water conservation measures into the project (low flow fixtures, drought tolerant landscaping, etc.).
- 3) Supporting the Town's water system maintenance program.

In an effort to work cooperatively with the Town of Plymouth on this permitting process, we have agreed to include all three of these recommended measures as conditions of the

approval. The proposed conditions include a substantial financial contribution that the Town can direct to those water system measures that will be most effective and/or most timely in increasing the water system capacity and/or reducing system water loss and/or reducing per capita water usage.

In addition to those proposed mitigation measures, we are agreeable to the approval including a limitation that occupancy would not commence at the project until June of 2022, thereby setting a timetable during which additional progress would be achieved under the Town's many water system improvement programs.

We would be happy to discuss this project in greater detail if that would be helpful in ensuring that the Zoning Board of Appeals can receive a document from DPW and EP that addresses their concerns and facilitates the completion of this permitting process.

Thank you again for your assistance with this project.

Sincerely,



Donald Smith



Water Demand Calculation

Project: The Walk at Colony Place
Location: Plaza Way, Plymouth, MA
Performed By: Highpoint Engineering
Created By: MF

Applicant: LWP Plymouth LLC
Developer: Hanover Companies
Project No. 19023 & 20027

Date: 12/21/2020

Bedroom Count (Record Plans 12/7/2020)

Design Criteria:	Unit Type	Unit Type	Bedroom
		Total	Total
	1 x bedroom units	176	176
Unit Type	2 x bedroom units	112	224
	3 x bedroom units	32	96
			496
Total Bedrooms =		496 Bedrooms	

Standard Avg Daily Water Demand (MassDEP recommendation)

RGPCD = 65 residential gallons per capita per day (rgpcd)

Actual Water Meter Readings (Hanover New England Properties)

Name	Units	Total Bedrooms	Average (gpd)	Average Daily Demand (gpd)
Hanover Cambridgepark	254	173	8,305	47.94
Hanover at Andover	248	280	11,266	40.23
Hanover Alewife	213	195	11,057	56.61
Hanover Foxborough	248	392	19,172	48.97
Hanover Vinnin Square	184	180	8,326	46.30
Hanover Westford Valley	240	256	10,035	39.26

Average Daily Demand = 46.55 residential gallons per capita per day (rgpcd)

Calculate Project Water Demand

Per MaDEP Std (gpd) 65 gpd x 496 bdrms = 32,240
Per Actual (gpd)¹ 46.55 gpd x 496 bdrms = 23,089

1 Note: Actual Readings include water usage for pool complex in development (if applicable)

Estimated Demand Forecast, Water System Master Plan, November 2019

4.5.3 Demand Forecast

The demand forecast considers population growth, employment projections, and added demand from known future developments. According to the Town of Plymouth Planning Department, there are several developments currently in the planning or early construction stages. Estimated demand for these known future developments is listed in Table 4-20.

Table 4-20– Known Future Developments

Development	Additional ADD (GPD)	Expected Completion
Fairfield Inn	7,675	2020
Commerce Way Plaza (#43)	16,301	2020
Cordage Park	97,866	2020
Summer Reach ¹	17,280	2020
Forges & Bradford Expansion	11,595	2020
800 Colony Place	27,907	2025
Newfield Estates	6,900	2025
150 Water Street	7,200	2025
Tonya Stump School	6,000	2025
Home Depot Drive	35,728	2025
104 Carver Road	9,190	2025
Plaza Way Hotel	7,489	2025
#1 Commerce Way	13,008	2025
30 Prestige Way	2,125	2025
Village at Sawmill Woods	41,760	2025
Beaver Dam Road	7,320	2025
Cordage Park Future	58,860	2025
Home Depot Drive Future	21,457	2025
Entergy ²	(72,000)	2025
Total	323,661	

1. The Summer Reach development is partially completed and some consumption was reported in the Division's 2018 billing data. The ADD in this table is reflects the full estimated demands for the development.
2. The Entergy Nuclear Power Plant is one of the Division's largest customers and expected to significantly reduce water consumption by 2025 as they work toward decommissioning the plant.

Mitigation Measures Recommended in EP Review of 11/16/2020

To improve the water system's ability to meet these and future demands, the Division and developer have a range of available mitigation options, including the following:

1. Facilitate the removal of pumping restrictions on the Darby Pond Well. Since our last review, Plymouth's Spring Town Meeting (October 17, 2020) appropriated funding to secure the remaining cranberry bogs adjacent to the Darby Pond Well. As the town will soon own all of the bogs around the Darby Well, the Town anticipates that the Darby Pond Pumping restrictions will eventually be eliminated from the Water Management Act Permit. However, that may take time as we are working with the MassDEP responding to questions on the order to complete for the project amendment. Once the project proponent provides detailed design plans for review and approval, the project could be conditionally approved to not take occupancy until the pumping restrictions have been removed, but that date is uncertain. Amending the Town Water Management Permit to remove the pumping restriction will fully address the Firm Capacity issue, allowing for connection.
2. Offset additional demands by reducing existing and proposed demands via the installation of low-flow fixtures, no-water urinals and drought tolerant landscaping;
3. Perform preventative maintenance on the Deep Water Booster Pumping Station pumps and mechanical equipment to ensure the equipment can withstand the increased demands proposed for the West Plymouth Pressure Zone. We estimate this work to be about \$25,000.

Construction Timetable



HANOVER COMPANY

Anticipated Construction Schedule				
Construction Start	29-Apr-21			
Clubhouse and Leasing Office Turn		23-Jun-22	14	months
First Phase Turn-80 Units		23-Jun-22	14	months
Second Phase Turn-64 Units		22-Aug-22	16	months
Third Phase Turn-88 Units		21-Oct-22	18	months
Final Turn-88 Units		20-Dec-22	20	months
Substantial Completion		18-Feb-23	22	months

Water Conservation Measures:

Private Irrigation Well

Drought Tolerant Plants

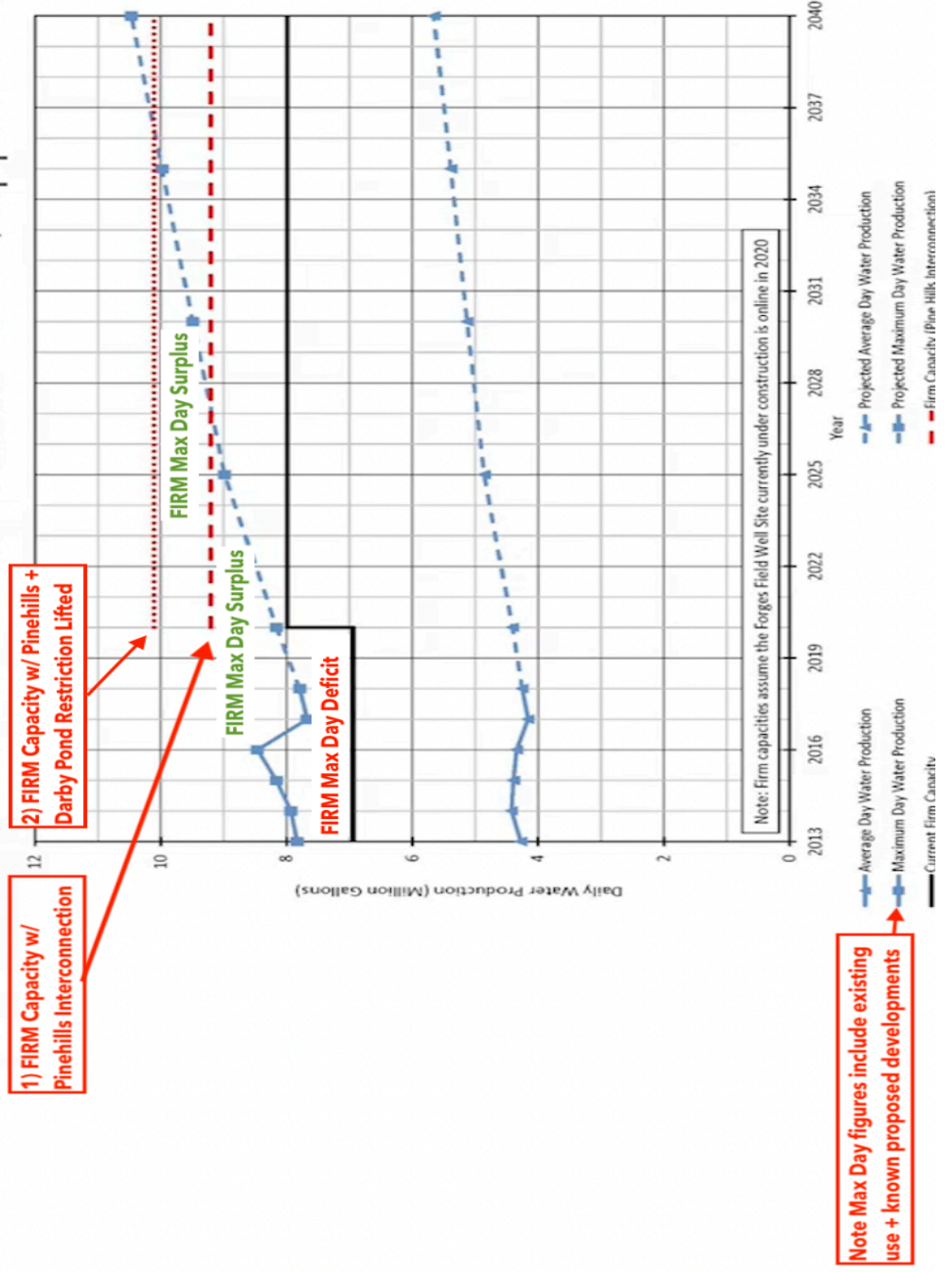
Drip irrigation in Landscape Beds with Timer and Rain Sensors

Low Flow Plumbing Fixtures

Initial Pool Fill and Seasonal Refilling via Truck

Future Improvement Project

- Pine Hills Pressure Zone Interconnection – FY22, Approx. \$6M



1) FIRM Capacity w/ Pinehills Interconnection

2) FIRM Capacity w/ Pinehills + Darby Pond Restriction Lifted

Note Max Day figures include existing use + known proposed developments

