Stantec

Memo

To:	Justin DeMarco Department of Public Works Maynard, MA	From:	Garry McCarthy/ Victor Olson Stantec Consulting Services Inc. Burlington, MA
File:	195150821	Date:	June 13, 2024

Reference: Maynard Water Capacity Memo – AvalonBay Residential Development, 182 Parker Street, Maynard, MA

The intent of this memo is to provide information related to the Town's drinking water supply capacity, water demands, and the ability of the drinking water system to supply water to the planned development. The memo also addresses issues with providing sewer service from the site.

AVALONBAY RESIDENTIAL DEVELOPMENT WATER DEMANDS AND SEWER FLOWS

The proposed location for AvalonBay Residential Development is 182 Parker Street near "Cutting Field". It is assumed, for the purposes of the Water Capacity analysis, that this development would include 200 units comprised in stacked flat buildings and town homes, units.

Water demands for this future development were estimated assuming:

- 310 CMR 15.00: Septic Systems "Title 5" flow guidelines @ 110 Gallons Per Day (GPD)/bedroom.
- 340 bedrooms are included with the 200 units planned.

Based on these assumptions, the estimated average daily water usage at the AvalonBay Development, with 200 residential units with a total of 240 bedrooms, will be approximately 37,400 GPD. Considering a 1.65 ratio of maximum day demand to average day demand, the maximum day demand is 61,700 GPD.

Sewer flows for this future development are also estimated assuming:

- 310 CMR 15.00: Septic Systems "Title 5" flow guidelines @ 110 GPD/bedroom.
- Figure 2-1 Ratio of Extreme Flow to Average Daily Flow *(from the WEF/ASCE publication, MOP-FD-5 Gravity Sewer Design and Construction)*
- 340 bedrooms are included with the 200 units planned.

Based on these assumptions, the estimated average daily sewage discharge flow at the AvalonBay Development, with 200 residential units with a total of 240 bedrooms, will be approximately 37,400 GPD.

Gravity sewers should be designed on a peak hourly design flow basis . The ratio of Maximum 24-hour to Average daily discharge is 3.0 and the ratio of Peak on maximum day to Average daily discharge is 5.6. Title 5 includes a 200% peaking factor for design of septic systems. Dividing the flow in half and applying the peaking factor gives a Maximum 24-hour flow of 56,100 GPD and a Peak on maximum Day of 104,700 GPD flows respectively of gravity sewer design.

TOWN-WIDE WATER DEMANDS – CURRENT & FUTURE

Detailed documentation of the Town's historical, current, and estimated future annual water consumption is provided in the "White Pond Treatment and Transmission Study Report" (Section 3.0). ***In 2022, the average day demand was 0.748 Million Gallons Per Day (MGD) and the maximum day demand was 1.13 MGD***.

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The water demands from future buildout of developments were added to the future residential water demand estimated in the "White Pond Treatment and Transmission Study Report", resulting in ***future water demand estimates: an average day water demand of 1.19 MGD and a maximum day demand of 1.97 MGD***. This includes a 2% contingency for unknown future developments in Town and assumes that unaccounted for water decreases to 10% by 2045.

CURRENT WATER SUPPLY CAPACITY

Detailed documentation of the Town's water sources, and capacity of each source, is also provided in the "White Pond Treatment and Transmission Study Report" (Section 2.0). Figure 1 shows the current capacity of each of the sources based on recent historical operational data (2017-2022).

The Town of Maynard recently completed upgrades to the Well #4 Water Treatment Plant including installation of new well field to increase capacity from .327 MGD to .504 MGD. Despite this upgrade the water supply is insufficient to meet current average supply demands when the Rockland Avenue WTP and Wells are offline for required maintenance. This figure also shows the average and maximum day water demands for the current and future scenario with future development demands included.

There are four key takeaways from Figure 1:

1. The Town can meet average day demands currently, unless the largest WTP (Rockland Ave) is offline. Common water supply planning practice requires satisfying average demands with the largest source offline.

2. The Town is unable to meet current maximum day demands with current water supplies. The Town will need to rely on the water storage tanks and increased pumping capacity of one or more wells in order to meet maximum demands under the current operational scenario. Although this is a feasible short-term solution, it is not advisable to take this approach in the long term due to the stress that this sort of operations can put on the Town's existing wells and WTPs.

3. The Town of Maynard also implements outdoor water use restrictions to manage maximum day water demands.

4. The Town of Maynard cannot currently accommodate new, significant water demand increases without new sources.

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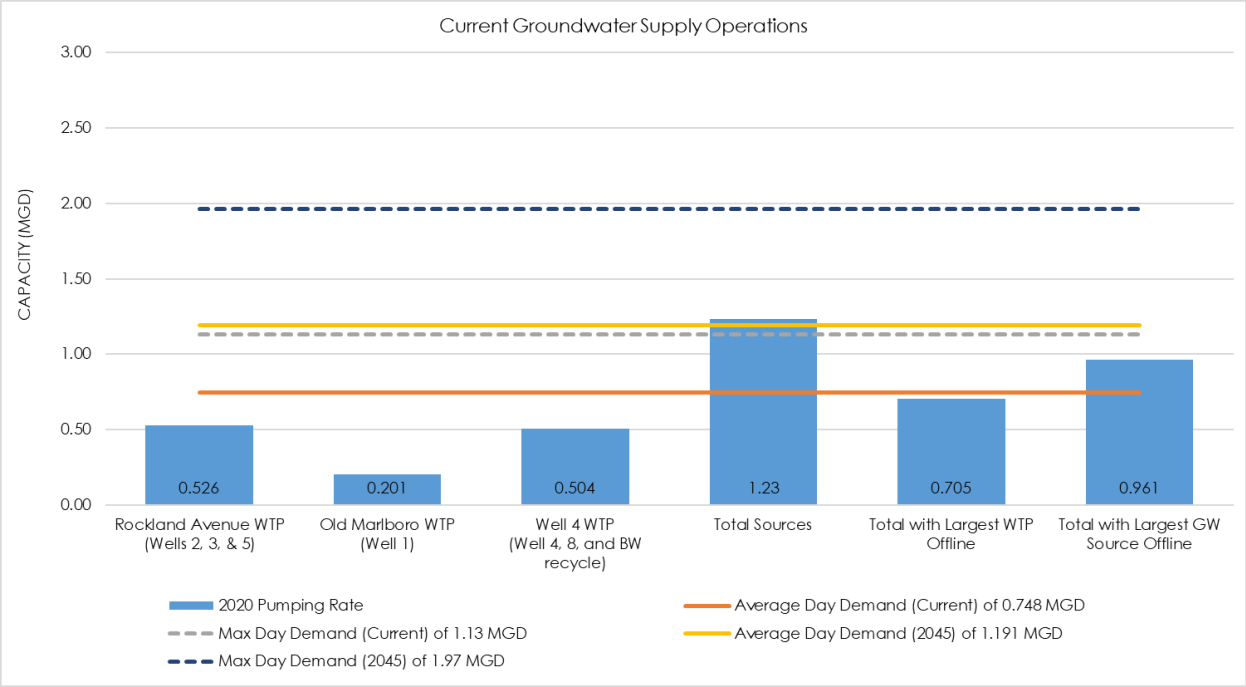

Figure 1 – Current Drinking Water Supply Capacity

OPTIONS TO MEET FUTURE WATER DEMANDS

Detailed documentation of the Town's options to increase water system capacity by exploring new sources and improving existing sources is provided in the "White Pond Treatment and Transmission Study Report" (Section 4.0). Figure 2 shows the estimated future capacity of each of the Town's existing WTPs, based on making the following improvements to the existing well fields and water treatment plants:

- Well 4A WTP:
  - New well sources at the Well 8 field was constructed and recently brought online in 2024.
  - The project also implemented filter backwash waste recycling, which allows for an additional 10% capacity at the WTP.

Despite this expansion the water supply is unable to meet current demands completely per regulatory requirements. As such, additional improvements to existing well fields and water treatment plants and development of new well source are required to move through the permitting and design process.

- Rockland Avenue WTP:
  - New well source (Well #1) at Rockland Ave well field (0.22 MGD); this option has only been conceptually considered at this time. If this project is pursued immediately, it is anticipated that permitting, design and construction could be finished by Summer 2027.
  - Implement filter backwash waste recycling, which will allow for an additional 10% capacity at the WTP.

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- Old Marlboro Road WTP:
  - Bring Old Marlboro Road Well #3 back online and implement major treatment improvements at Old Marlboro Road WTP to adequately treat the Well #3 water (i.e., organics pretreatment), allowing an additional 0.5 MGD of capacity.

It is anticipated that permitting, design and construction of these projects could be finished no sooner than the Summer 2029. The regulatory and permitting process drives the timeline to get this work completed.

Figure 2 shows the average and maximum day water demands for the current and future scenario with the identified future development demands included. The Town can significantly increase their ability to meet future water demands by implementing these well field source and WTP improvements. The only shortcoming is with regards to capacity if the largest individual source or largest water treatment facility were to be offline for maintenance or equipment failure; in this case, the Town would be able to meet average day demands but would not be able to meet future maximum day water demands.

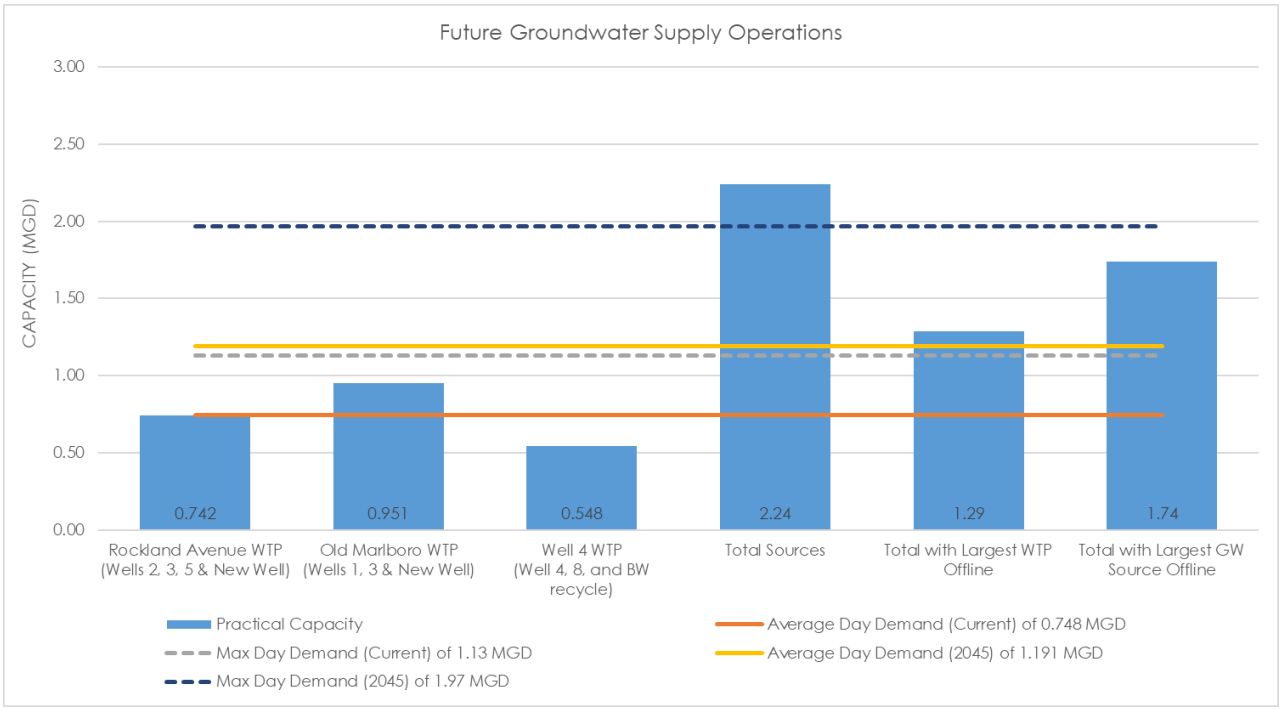

Figure 2 – Future Capacity with Groundwater Source Improvements & OMR WTP Treatment Upgrades

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In Figure 3, the addition of a new source of water from connection to the Massachusetts Water Resources Authority (MWRA) system is included, in addition to all the well source and WTP improvements/expansions included in Figure 2. This scenario assumed that an MWRA interconnection would provide a maximum of 1.7 MGD capacity. With a connection to MWRA's supply, the Town would be able to meet all average and maximum day demands under all operating circumstances well into the future. The Town has been engaged in meetings and a planning project with MWRA to develop a plan for expansion of the MWRA system into the Metro West communities. At this time, the project is in early planning stages and is not a certainty. If the MWRA Metro West expansion project proceeds, it is believed at this time that the best-case scenario would have MWRA supply accessible to the Town of Maynard in 7 years (i.e., 2031) or more.

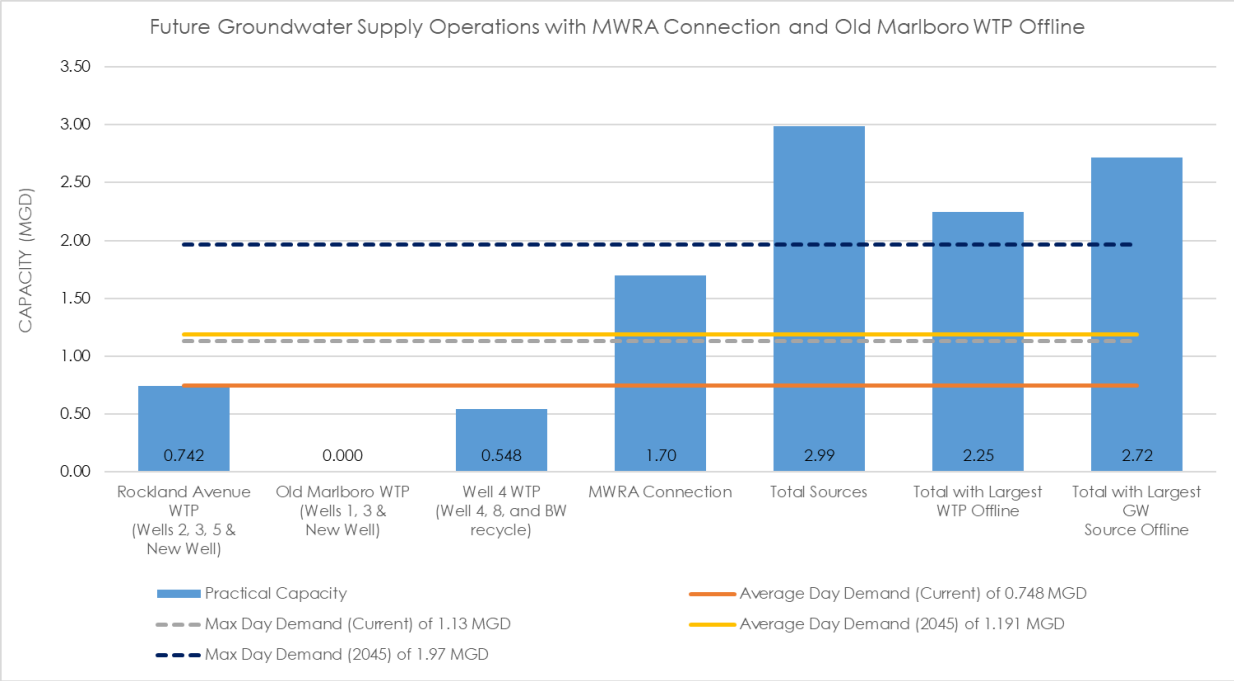

Figure 3 – Future Capacity with Groundwater Source Improvements (OMR WTP Treatment Offline) & New MWRA Source

STRATEGY TO INCREASE WATER SUPPLY

The Town has completed the first phase of a 4-phased approach to increasing the water supply capacity in the water system, as follows:

Phase 1: Increase capacity at Well 4 water treatment facility by adding a new well supply (Well 8) and adding backwash waste recycling at the WTP **– Completed**.

Phase 2: Increase capacity at Rockland Avenue water treatment facility by adding a new well supply and adding backwash waste recycling at the WTP.

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Phase 3: Increase capacity at Old Marlboro Road water treatment plant (WTP) by upgrading the treatment process, which will allow for Well 3 to be brought back online.

Phase 4: Connect to MWRA system, eliminate Phase 3 and abandon existing Old Marlboro Road WTP and sources.

The Town's 4-Phase Strategy to Increase Water Supply was developed prior to the EPA PFAS MCLs being published, so this strategy does not take into consideration the need for PFAS treatment upgrades at the water treatment facilities. Additional upgrades required for PFAS treatment may extend the timeline.

AVALONBAY RESIDENTIAL DEVELOPMENT WATER SUPPLY AVAILABLILITY

The Town of Maynard's drinking water system is currently unable to supply water at the estimated average daily water usage of 37,400 GPD at the planned AvalonBay Development. The Town is moving forward with a phased program to expand its water supply. It will take at least 5 -years to implement through Phase 3 completion, at which time the Town could consider new significant water supply requests.

Once the supply issues have been addressed, the water distribution system would need to be extended to and into the proposed development.

AVALONBAY RESIDENTIAL DEVELOPMENT SEWER AVAILABILTY

There is no sanitary sewer in Parker Street (Route 27) adjacent to the proposed development site. There is a small E-One pump force main for a single private property near the town line that discharges into the existing 8-inch gravity sewer at sewer manhole number S36 located before the intersection of Parker Street and Wisteria Lane. This sewer is upstream of the existing Old Marlboro Road Sewer Pump Station on Old Marlboro Road.

New flows and peak flows will need to be evaluated as to their impact to this existing pump station. Given the topography and elevations of the existing sewerage system nearest to the AvalonBay Residential Development at 182 Parker Street, the development will likely require a new private pump station and force main to collect and transport the wastewater to the existing sewer system. The design of these facilities shall be such to mitigate impacts to downstream facilities and infrastructure beginning at sewer manhole number S36.

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CONCLUSION

1. **The Town of Maynard cannot currently grant the request to connect to the water system since it cannot accommodate new, significant water demand increases without new water supply sources.**

2. **Expansion of water distribution and sewer collection systems would be required to service the proposed development site.**

3. **A private sewer pump station is required for the development to connect to the existing sewer system. An evaluation of downstream infrastructure from the discharge point to the existing Old Marlboro Road Pump station is required to assess impacts and possible downstream mitigation.**

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