

RESOLUTION NO. 2025134

RE: SETTING A PUBLIC HEARING IN CONNECTION WITH THE
ESTABLISHMENT OF ZONE OF ASSESSMENT “029A” AND
ZONE OF ASSESSMENT “029B” IN THE DUTCHESS COUNTY
WATER DISTRICT LOCATED IN THE TOWN OF HYDE PARK

Legislators D’AQUANNI, PAOLONI, GORMAN, CASWELL, and LAWLER offer the following and move its adoption:

WHEREAS, the New York State Legislature, by Chapter 592 of the Laws of 1991 (Section 1142, Public Authorities Law), as part of the creation of the Dutchess County Water & Wastewater Authority (WWA), established the Dutchess County Water District (“DCWD”), and

WHEREAS, the WWA, has presented to this Legislature a notice of project pursuant to Section 1124 of the Public Authorities Law which outlines the WWA’s plan to create Zone of Assessment “029A” and Zone of Assessment “029B” within the DCWD located in the Town of Hyde Park, and

WHEREAS, the WWA proposes to construct a water main extension to connect the existing Hyde Park Regional Water System to the existing Dutchess Estates water distribution system in the Town of Hyde Park, and

WHEREAS, the WWA proposes to acquire the existing Dutchess Estates water distribution system from the current owner following interconnection to the Hyde Park Regional Water System, and

WHEREAS, said notice of project also describes the two zones of assessment that will be created which are more particularly described in Attachment A annexed hereto, and

WHEREAS, it is necessary to conduct a public hearing on the establishment of such Zones of Assessment, now, therefore, be it

RESOLVED, that this Legislature shall conduct a public hearing on the 14 day of October 2025 at 6:30 p.m. in the Chambers of the Dutchess County Legislature, County Office Building, 22 Market Street, Poughkeepsie, New York, on a proposal to establish Zone of Assessment “029A” and “029B” in the Dutchess County Water District located in the Town of Hyde Park as described in Attachment A, annexed hereto, and be it further

RESOLVED, that the Clerk of the Legislature shall public notice of said hearing in the official newspapers of the County and shall include therein a description, identifying the areas to be included within the Zone of Assessment "029A" and Zone of Assessment "029B", the improvements proposed, the maximum amount to be expended for the improvements, the proposed method of assessment of the cost, the estimated cost of hook-up fees, if any, the cost to the typical property or one or two family home, all in accordance with Section 254 of the County Law.

CA-084-25
JC/CRC/rjw
G-1217-DD
08/06/2025
Fiscal Impact: None.

APPROVED
Sue Serino
SUSAN J. SERINO
COUNTY EXECUTIVE
Date 9/9/2025

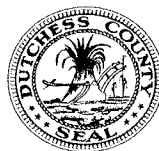
STATE OF NEW YORK

ss:

COUNTY OF DUTCHESS

This is to certify that I, the undersigned Clerk of the Legislature of the County of Dutchess, have compared the foregoing resolution with the original resolution now on file in the office of said clerk, and which was adopted by said Legislature on the 8th day of September 2025, and that the same is a true and correct transcript of said original resolution and of the whole thereof.

IN WITNESS WHEREOF, I have herunto set my hand and seal of said Legislature this 8th day of September 2025.



Leigh Wager
LEIGH WAGER, CLERK OF THE LEGISLATURE

FISCAL IMPACT STATEMENT



NO FISCAL IMPACT PROJECTED

APPROPRIATION RESOLUTIONS

(To be completed by requesting department)

Total Current Year Cost \$ _____

Total Current Year Revenue \$ _____
and Source

Source of County Funds *(check one)*: ☐ Existing Appropriations, ☐ Contingency,
☐ Transfer of Existing Appropriations, ☐ Additional Appropriations, ☐ Other *(explain)*.

Identify Line Items(s):

Related Expenses: Amount \$ _____

Nature/Reason:

Anticipated Savings to County: _____

Net County Cost (this year): _____
Over Five Years: _____

Additional Comments/Explanation:

Prepared by: Jonathan Churins, Executive Director, DCWWA

Prepared On: 08/04/2025



MEMORANDUM

To: Sue Serino, County Executive

From: Jonathan Churins, Executive Director 
Dutchess County Water and Wastewater Authority

1 Lagrange Avenue
Poughkeepsie, NY 12603
845-486-3601 845-486-3656 FAX
jchurins@dutchessny.gov

Subject: Resolution Request

Date: August 4, 2025

Please find attached a Resolution Request Form and Fiscal Impact Statement. The purpose of the requested resolution is to schedule a public hearing on the creation of County Water District Zone of Assessment "029A" and "029B" (Dutchess Estates Water System.)

The DCWWA is requesting that the County establish County Water District Zones of Assessment "029A" and "029B" to provide water services within the existing Dutchess Estates community in the Town of Hyde Park. The DCWWA is finalizing an agreement with the owner of the Dutchess Estates Water System to acquire the system at the point in time that DCWWA can provide an interconnection from its Hyde Park Regional Water System to the existing Dutchess Estates water distribution system. The interconnection is part of a larger project that connects the Hyde Park Regional and Quaker Hill Water Systems. A Map, Plan and Report for Zone of Assessment "029A" and "029B" will be submitted for review. The request for resolution is to begin the public hearing procedure for the Zone of Assessment creation.

The DCWWA's ability to provide a new water service to this area is contingent on the creation of the Zones of Assessment within the County Water District, encompassing all properties in the System's service area. To create the requested County Water District Zones of Assessment, the Legislature must first adopt a resolution to schedule the required public hearing.

Attached, please find Resolution 2024062, which can be used as a template for this requested resolution.

Cc: Jason Teed, PE, DCWWA

DUTCHESS COUNTY

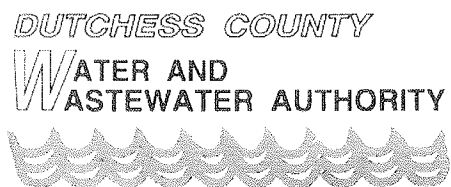
**Proposed County Water District
Zones of Assessment "029A" and "029B"**

(Dutchess Estates Water System)
Hyde Park, NY

MAP, PLAN AND REPORT

August 2025

Dutchess County Water and Wastewater Authority
Poughkeepsie, NY



**PROPOSED COUNTY WATER DISTRICT ZONES OF ASSESSMENT “029A” and “029B”
(DUTCHESS ESTATES WATER SYSTEM)**

MAP, PLAN AND REPORT

INTRODUCTION

This Map, Plan and Report contains the information required for the formation of the proposed County Water District Zone of Assessment “029A” (Zone “029A”) and Zone of Assessment “029B” (Zone “029B”). Together Zones “029A” and “029B” include an area of approximately fifty-seven (57) acres located in the center of the Town of Hyde Park and situated near the intersection of State Route 9G and all parts of the Dutchess Estates residential subdivision. Zone “029A” consists of parcels with direct access to the existing privately-owned Dutchess Estates Water System watermain, while Zone “029B” consists of parcels that are included within the Dutchess Estates residential subdivision as approved on August 24, 1956, as being served central water services, but require additional distribution system improvements in order to be served water. It is anticipated that, when the lots in Zone “029B” intend to be developed, a watermain extension into the undeveloped section of the Dutchess Estates residential subdivision will be required in order for Zone “029B” to be served water.

Upon successful formation of proposed Zone “029A” and Zone “029B” (the “Zones”) by the Dutchess County Legislature, and completion of a water main to allow an interconnection between the Dutchess Estates Water System and the DCWWA’s Hyde Park Regional Water System, ownership and operation of the Dutchess Estates Water System will transfer to the Dutchess County Water and Wastewater Authority (“DCWWA”, “Authority”) in accordance with the terms and conditions set forth in an agreement between the Authority and the Dutchess Estates Water Co. (“Owner”). The information provided herein includes the proposed Zone of Assessment boundaries and a list of the tax parcels that will comprise the future Zones of Assessment, as well as a description of the current and proposed infrastructure by which potable water will be produced, treated and delivered to customers.

In addition, budgetary estimates for the first-year operation and maintenance costs, and capital costs, as well as a cost allocation formula, have been included with this report.

The DCWWA will enter into a contract (the “Service Agreement”) with Dutchess County on behalf of the Zones of Assessment for the purpose of administering the retail sale of water services to all properties within the proposed Zones of Assessment, with such service to be provided through the water system facilities as described below. The Authority will administer the Zones of Assessment pursuant to guidelines established by the Service Agreement and collect water revenues. Water service rates will be set annually by the Authority.

HISTORY

The Dutchess Estates Water System (PWS ID# NY1302767) was originally constructed in the mid-1950s by a private developer. The water system gained its initial approval from the New York State Health Department. For all intents and purposes, the Dutchess Estates Water Co. has owned the Dutchess Estates Water System since inception, though the owner of Dutchess Estates Water Co. has changed over time. Wells 1 and 2 were developed under the original development. Well number 3 was developed in the 2010s; however, it remains offline as the existing treatment facility must be upgraded prior to making a permanent connection between Well number 3 and the system.

In May 2023, the Dutchess Estates Water Co. was awarded approval by the Dutchess County Department of Health for the full replacement of the existing water treatment facilities, which would consist of; building a new above-ground water treatment structure, replacement of the atmospheric storage facility (currently in disrepair,) the re-design of the booster pumping system via variable frequency drives (VFDs) in lieu of a standalone hydropneumatic tank, and the ability to bring Well 3 online to meet source capacity requirements.

On April 10, 2024, the Environmental Protection Agency (EPA) announced the final National Primary Drinking Water Regulation for six per- and polyfluoroalkyl substances (PFAS). Of those six, two chemicals (Perfluorooctanoic acid [PFOA] and Perfluorooctanesulfonic acid [PFOS]) had existing maximum contaminant levels reduced from 10 nanograms per liter (ng/L) to 4 ng/L. Due to the stricter regulations set forth by the EPA, and the history of PFOA and PFOS concentrations in Wells 1 and 2, the May 2023-approved water treatment facility replacement was no longer viable as it had not been required, nor was it designed to treat for the removal of PFAS. In addition, there is insufficient space within the design of the May 2023 water treatment facility replacement to house the treatment necessary to remove PFAS, further making the replacement insufficient to meet the new regulations set forth. The Dutchess Estates Water Co. has entered into the agreement to transfer ownership of the system to DCWWA to enable an interconnection to DCWWA's Hyde Park Regional Water System, as an alternative to designing and constructing a new water treatment facility.

COUNTY WATER DISTRICT ZONE OF ASSESSMENT "029A"

The Dutchess Estates Service Area Zone "029A" (Water District Map: Appendix A) consists of one hundred thirty-five (135) properties including one hundred twenty (120) detached residential properties, fourteen (14) undeveloped properties, and one (1) church/daycare.

COUNTY WATER DISTRICT ZONE OF ASSESSMENT "029B"

The Dutchess Estates Service Area Zone "029B" (Water District Map: Appendix A) consists of fourteen (14) undeveloped vacant properties.

EXISTING PHYSICAL FACILITIES

Water Supply and Treatment System

The Dutchess Estates Water System uses groundwater from two functional wells, out of the three that have been developed over time. The two functional wells are considered groundwater under the direct influence of surface water (GWUDI). Cartridge filtration is provided as the first form of treatment. Sodium tri-polyphosphate is added to the water to provide disinfection. After treatment, water is stored in a buried storage tank with one wall of the tank exposed in the treatment facility. Visual observation of the exposed tank wall shows extreme deterioration. Water is then sent to the system on demand using system booster pumps and a hydropneumatic tank. There are no booster stations within the distribution system.

Transmission and Distribution

The Dutchess Estates Water System distribution system is located solely within proposed Zone "029A" and adjacent to Zone "029B" where the properties remain undeveloped. The distribution system includes approximately 1,500 linear feet of 8-inch asbestos cement (AC) pipe, and approximately 5,500 linear feet of 6-inch AC pipe. Service laterals include ¾-inch diameter copper or galvanized pipe to the single-family residences and 1-inch diameter copper or galvanized pipe to the church/daycare. There are currently three flushing hydrants located in the system. The water system as originally designed and built does not provide fire protection.

The properties located within Zone "029B" are undeveloped and no water distribution main exists. To serve the parcels in Zone "029B", a water distribution main must be constructed and tied into the existing water distribution system. At this time, the area within Zone "029B" is undeveloped with no construction nor permanent road access provided. The entirety of Zone "029B" is owned by a single corporation, and the DCWWA will work with the corporation on the requirements to extend a water main to serve their parcels within the Zone of Assessment at the time the parcels are being developed.

SOURCE CAPACITY AND QUALITY EVALUATION – CURRENT SYSTEM

The Dutchess Estates Water System has two active groundwater supply wells – Wells 1 and 2, and one well awaiting approval – Well 3. The two active wells provide variable quality and cannot provide production capability to serve the proposed Zone "029A". Typically during the summer months, bulk potable water must be hauled on site to provide adequate quantity in combination with Wells 1 and 2. A third well was approved to be drilled and has superior quality and production capability compared to Wells 1 and 2, however the connection of Well 3 will require a new water treatment facility in order to facilitate the addressment of on-going violations against the New York State Sanitary Code.

The System has historically had issues discoloration since the 1980s. Dutchess County Department of Health (DCDOH) records indicate as early as the early 1980s, the Dutchess Estates Water System has received numerous customer complaints pertaining to water quality. In the early to mid-2000s, the DCDOH conducted a sanitary survey indicating that it was time to replace the water treatment facility. No upgrades were provided on the system until roughly 2008 when

the hydropneumatic tank suffered a full failure and required immediate replacement. Well 3 was drilled in 2014 to supplement the rapid deterioration of Wells 1 and 2 and provide source capacity for the Dutchess Estates Water System. Booster pumps were replaced upon total failure during the mid-2010s. No additional improvements to the system have been made, and no water treatment facility upgrade occurred per the sanitary survey requirement in the mid-2000s. The current representative of the Owner hired the services of a design professional with the intention of providing a design to replace the existing water treatment facility, and connect Wells 1, 2 and 3 to the new facility. The design for the water treatment facility was approved on May 4, 2023; however, no site work nor construction has commenced. With the addition of New York State regulation on emerging contaminants, including further decreasing the thresholds set forth by the regulations, Wells 1 and 2 currently exceed the maximum contaminant level for Per- and polyfluoroalkyl substances (PFAS), and will require additional treatment. The May 4, 2023, design approval of the water treatment facility replacement does not account for the exceedance of PFAS.

The installation date and depth of Wells 1 and 2 are unknown at this time; however, it has been noted in the past that both wells are GWUDI shallow gravel wells. Historically, it has been noted that Well 1 has been taken offline at times due to low production, including the need to hydro-surge the well to improve productivity. Well 3 is currently offline and not yet approved to connect to the system. Well 3 was drilled in 2014, providing a 35 gallon per minute stabilized yield. A Well Completion Report is on file with the DCDOH.

There have been no recent pump tests completed to determine the actual yield of the wells, and recent operating information has suggested that the actual yields are declining in a typical fashion each seasonal cycle.

According to Ten States Standards, the total developed groundwater source capacity shall equal or exceed the design maximum day demand with the largest producing well out of service. Per the DCDOH, the Dutchess Estates Water System cannot meet maximum day demand with the largest producing well out of service, hence the necessity to drill Well 3. With the inability to bring Well 3 online in a manner that meets State and local Health Department regulations, the system cannot meet the required source capacity.

There is limited atmospheric storage provided by a single 30,000-gallon water storage tank, which has considerably heavy corrosion. Under maximum day demand, the current storage would provide water for approximately 0.45 days if none of the groundwater wells were operating. Under average day demand, the current storage would provide water for approximately 1.1 days if none of the groundwater wells were operating.

PROPOSED PHYSICAL FACILITIES

The intention of the Authority is to create Zones "029A" and "029B" in anticipation that the Dutchess Estates Water System will connect to the proposed Quaker Hill Water - Hyde Park

Regional Interconnection Water Main (“the Interconnection Main”) thus enabling the Dutchess Estates Water System to receive its water from the Hyde Park Regional Water System. An Engineer’s Report titled Quaker Hill PFAS Remedy, prepared by Tighe & Bond, last revised June 2024, and included in Appendix “E”, provides details including a water main extension from an existing 12-inch diameter water main along Crofton Street to State Route 9G. Once the 12-inch diameter water main has reached State Route 9G, it will travel northbound until Fallkill Road where the main will extend easterly toward North Quaker Lane. Once the water main reaches North Quaker Lane, it will extend southerly toward a public right-of-way that appears to be consistent with a town road extension from Pennington Drive to North Quaker Lane. The main will then extend westerly to the cul-de-sac of Pennington Drive where the main will connect into the existing QHW distribution system. That Interconnection Main Project has been awarded a combination of grant and loan funding from the NYS Environmental Facilities Corporation (EFC), and administrative steps are underway to begin the procurement process for the design phase of that interconnection.

After the Zones of Assessments are created, and construction of the Quaker Hills-Hyde Park Regional Interconnection Main has been completed to a point sufficient to enable a connection to Dutchess Estates Water the DCWWA will construct that tie-in to the Dutchess Estates Water System. The tie-in will be made where the Interconnection Main crosses State Route 9G nearest Halstead Drive and will be constructed with appropriate valve installation to isolate the existing Dutchess Estates water treatment plant from the distribution system. Upon completion of the tie-in, the DCWWA will acquire ownership of the distribution system from the Owner, while the Owner will continue to own the property associated with the wells and treatment plant. The future use of the existing water treatment plant parcel is unknown at this time and is not considered in the transfer of ownership from the Owner to the DCWWA.

SOURCE CAPACITY AND QUALITY EVALUATION – PROPOSED SYSTEM

Once the Dutchess Estates water system is connected to the Hyde Park Regional Water System, its sole source of water will come from the Hyde Park Water Treatment Plant, which is a surface water treatment plant sourced from the Hudson River. The Hyde Park Water Treatment Plant provides extensive treatment including but not limited to filtration, disinfection, and corrosion control before distributing water throughout its system. The Water Treatment Plant is permitted and capable of producing about 2,100,000 gallons per day but produces about 1,100,000 gallons per day to meet current demand. The Water Treatment Plant is committed to meeting a demand of approximately 1,600,000 gallons per day, considering the current service area, private projects currently under construction within the existing service area, and existing agreements to provide water for new service areas. The Hyde Park Water Treatment Plant will have no issues serving the proposed Zones of Assessment “029A” and “029B” in addition to the above commitments.

Finished water storage must also be provided to meet average daily demand. The Hyde Park Regional Water System provides approximately 1,750,000 gallons of finished water storage, which is sufficient to provide storage for Zones “029A” and “029B.”

FUTURE DEMAND

There are approximately fourteen (14) vacant properties within Zone “029A” that are serviceable through an adjacent existing water main. There are approximately fourteen (14) vacant properties within Zone “029B”; however, those parcels cannot be serviced with water until such a time that the necessary water main extension is constructed and additional site improvements such as road and utility construction are complete. It is estimated that a full buildout of all twenty-eight (28) vacant properties provides a future demand of approximately 7,000 gallons per day, based upon current usage of existing dwellings within Dutchess Estates. The Hyde Park Regional Water System will have no issues serving the 28 vacant properties in addition to its previously discussed commitments.

FUTURE CAPITAL IMPROVEMENTS

Source and Treatment Improvements

Under the creation of the Zones of Assessment, and at the time the interconnection is made and permitted for use, the DCWWA will own, operate and maintain the water distribution system only. The source of water will be provided by the Hyde Park Regional Water System. No further source or treatment improvements are necessary by the Hyde Park Regional Water System to serve the Dutchess Estates Water System.

Improvements for Zone of Assessment “029B”

It is anticipated that, once the Dutchess Estates Water System has the ability to provide adequate source and quality water via the interconnection to the Hyde Park Regional Water System, properties in Zone “029B” will have the ability connect to, and receive water service from, the Dutchess Estates Water System.

At the time of this report, there are no water distribution system improvements within proposed Zone “029B”. Approximately 950 linear feet of water main, hydrants and other appurtenances, including individual service connections with meters would need to be constructed to support the development of the fourteen (14) existing vacant lots.

A September 1986 litigation settlement between the Dutchess Estates Civic Association against the Dutchess County Department of Health, the Town of Hyde Park, and Carosel Homes, Inc., includes the stipulation of actions that must be taken for parcels within Zone “029B” to be developed; that stipulation includes the need to extend water mains to and throughout the undeveloped area. The remaining provisions of the stipulation pertain to Town of Hyde Park planning and zoning requirement.

As there are no current plans before the Town to develop the vacant lots in proposed Zone “029B”, estimated capital improvement costs provided are order-of-magnitude only. Actual costs will depend on the timing of the development, type of construction, and consideration of

all applicable standards at the time of development.

PROJECTED CAPITAL COSTS AND ALLOCATIONS

The Dutchess Estates Water District currently has no outstanding bonded indebtedness. DCWWA's ownership and operation of the Dutchess Estates Water System to provide service to properties within Zones "029A" and "029B" is predicated on the completion of the interconnection of the Dutchess Estates Water System to the Hyde Park Regional Water System in order to address a magnitude of water quality and quantity issues.

The interconnection of the Dutchess Estates Water System to the Hyde Park Regional Water System is part of a larger project that interconnects the Quaker Hill Water System to the Hyde Park Regional Water System. In addition, the Quaker Hill Water - Hyde Park Regional Water System Interconnection Main Project will also include the interconnection of the existing South Cross Water System (which DCWWA intends to acquire from the current owner) as well as the provision of water service to all directly adjacent properties along the projected Interconnection Main route. Proposals to establish a new Zone of Assessment for the South Cross Water service area, and a new Zone of Assessment (North Park Water) for the properties adjacent to the Interconnection Main route, will be submitted under separate cover.

The total cost of the Interconnection Main Project is estimated at \$21,875,700. The DCWWA has received grant funding from the NYS Environmental Facilities Corporation (EFC) for up to 70% of the total cost of the project, resulting in a grant fund of \$15,312,990. The remaining project balance of \$6,562,710 will be paid through a subsidized loan from the NYS EFC issued to the DCWWA, spread over a 30-year period. It is DCWWA's intent that debt service on the loan will be allocated among all Zones of Assessment that are directly serviced by Interconnection Main: the existing Zone of Assessment "U" (Quaker Hills Water System), the proposed Zones of Assessment "029A" and "029B" (Dutchess Estates Water System) and the two additional proposed Zones of Assessment described above for the South Cross Water System and the North Park Water Area, which are currently under development. The South Cross Water System will connect an existing community to the Interconnection Project while the North Park Water Area will address the properties directly adjacent to the proposed Interconnection Project. Both Zones of Assessment will be submitted under separate cover.

In order to provide a water main extension in accordance with the preferred route submitted in the NYS EFC grant request report, a transfer of ownership of existing main is being sought on the property defined as the Crofton Mews. The DCWWA continues to explore different cost-saving designs that make the project financially feasible while remaining in-line with one of the three alternative routes provided in the Engineer's Report titled Quaker Hill PFAS Violation Remedy, prepared by Tighe & Bond, last revised June 2024 included in Appendix "E".

In addition to the capital costs associated with the Interconnection Main, the existing annual debt expenses for previous improvements to the Hyde Park Regional Water System will be allocated equitably, through the assignment of benefit units, to each parcel included in the Zones of

Assessment that receive water from the Hyde Park Regional Water System and thereby benefit from funded improvements. This includes; these proposed Zones of Assessment "029A" and "029B", existing Zones of Assessment "A", "B", "C", "D", "I", "L", "R", "U", and "028", and proposed new Zones of Assessment "030" (South Cross Water System), North Park Water Area, and any future proposed Zones of Assessment that are established along the Interconnection Main Project, which will be submitted under separate cover.

Should all proposed Zones of Assessment benefitting from the Interconnection Main Project, as described above, be established, then the projected capital costs, including debt service, for a typical single-family residence within the Dutchess Estates Water Zone "029A" is approximately six hundred and five hundred and sixty-three dollars (\$563). For the purposes of creating Zones of Assessment "029A" and "029B", the worst-case scenario, that no additional Zones of Assessment are created beyond Dutchess Estates, would translate to an anticipated capital cost for a typical single-family residence of approximately one thousand five hundred and fifty-one dollars (\$1,551.)

The anticipated capital costs for each undeveloped property within Zone "029B" is equivalent to Zone "029A" as it pertains to the cost of the Interconnection Main Project. To serve Zone "029B", it is anticipated that the approximate 950 linear feet of water main, hydrants and other appurtenances will cost approximately \$875,000. Assuming a 30-year market rate loan issued to DCWWA, allocation of the debt service expense across all parcels in Zone "029B" would result in an additional cost per parcel of approximately four-thousand four hundred ninety-seven (\$4,497) dollars. The resulting total annual capital cost for a typical single-family residence in Zone "029B" would range from five thousand and one hundred dollars (\$5,100) if all other proposed Zones of Assessment are established, to six thousand and forty-seven dollars (\$6,047) if no additional Zones are established in conjunction with the Interconnection Project.

The methodology for the assignment of benefit units is attached in Appendix "C".

OPERATION AND MAINTENANCE (O&M) COSTS

Unmetered – Interim Rate

The Dutchess Estates Water System currently does not provide metered water usage per service connection. A master meter for the entire system indicates an average water usage of 263 gallons per day per service connection, or roughly 7,900 gallons per month per service connection. The 2025 adopted Water Rates for Hyde Park Regional Water System provided in Appendix "B", shows an unmetered water service rate that is based upon an average of 12,500 gallons per month and typical metered single family residence rate that is based upon an average of 5,000 gallons per month. Due to the Dutchess Estates Water System having the inability to provide individual metered service connections, the DCWWA is establishing an interim flat rate annual O&M charge of approximately one-thousand one hundred and seventy-two dollars (\$1,172). It is estimated that it will take the DCWWA approximately two years to provide water meters for each service connection. It is anticipated that the installation of one hundred and twenty (120) $\frac{3}{4}$ " and

one (1) 1" water meters will cost approximately \$103,000, or approximately sixty-two (\$62) per typical single family residence, paid through a market rate loan issued to the DCWWA, spread over a 30-year period, with no additional grant funding.

Metered – Hyde Park Regional Rate

Once meters are provided for each service connection, the operation and maintenance costs for the Zones of Assessment will align with the typical costs of water produced by the Hyde Park Regional Water System and the Authority's cost to operate, maintain and administer the water main distribution system, as reflected in the annual O&M budget adopted by the Authority. The 2025 adopted Water Rates for the Hyde Park Regional Water System are included in Appendix "B". The rates include a fixed monthly service charge based on the customer connection meter size, and a charge per thousand gallons of metered water use. For a single-family residential parcel in Zone of Assessments "029A" and "029B" once developed, the estimated annual O&M charge would be approximately eight hundred forty-four dollars (\$844).

CONNECTION CHARGES

For any properties within the proposed Zones of Assessment that are not connected and receiving water service from the Dutchess Estates Water System at the time that the DCWWA acquires the Water System, an "Application for Water Service" and a related fee will be required at the time water service is requested. This will include all parcels within Zone "029B" when it is developed. Generally, for a typical residential connection, the costs for the water meter, plan review and/or inspections, and tap on the main are covered by the Water Service Application (tapping fee) fee which is paid by the property owner to the DCWWA at the time of their request for service. As of the date of this report, the application fee for a standard ¾-inch water service connection is one-thousand one-hundred and fifty dollar (\$1,150) per service and is a one-time charge. The cost to install, repair and/or maintain the water service line from the Authority's curb valve to the property owner's house or other structure shall be the sole responsibility of the respective property owner.

Annual Cost per a Typical Property – First Year

The total annual cost for a typical property in a zone is generally a combination of the long-term capital charges (debt service) and water usage charges.

In the proposed Zone "029A" a typical property will be a single-family dwelling unit. Given the assumptions and estimates described above, which includes the unmetered interim rate to provide water service, the projected "First Year" total cost for a typical single-family dwelling in County Water District Zone "029A" will be two-thousand seven hundred and twenty-three dollars (\$2,723) at a worst case scenario, and one-thousand seven hundred thirty-five dollars (\$1,735) at a best case scenario. It should be noted that the actual first year total cost within Zone "029A" does not consider that the Dutchess Estates Water System will be connected to the Hyde Park Regional Water System prior to the completion of construction of the interconnection project. Should Zone "029A" be connected prior to the completion of construction, the annual cost per typical property will include the allocated share of its debt service but will not have allocation

towards the capital costs associated with the long-term financing of the Hyde Park Regional to Quaker Hill Water System interconnection as construction is still in progress. As such, the annual cost per typical property for the first year within Zone "029A" may be one-thousand three hundred and twenty-two dollars (\$1,322) as a worst-case scenario, or one-thousand three hundred and twelve dollars (\$1,312) as a best-case scenario. Reference is made to Appendix "D" for a breakdown of each scenario, based upon partial and full construction completion, and partial and full Zones of Assessments created under this report as well as the additional proposed Zones of Assessments to be submitted under separate cover.

At this time, as there are no developed parcels within Zone "029B", and only its share of debt service will be charged against the Zone, the First-Year cost for a typical parcel in Zone "029B", a vacant residential parcel, is one hundred and thirty-six dollars (\$136) as previously described in its best-case scenario, or one hundred forty-seven dollars (\$147) in its worst-case scenario.

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APPENDICES

Appendix A – Description of County District Zone of Assessment “029A” and “029B” (Map & Parcel List)

Appendix B – Proposed Operation & Maintenance Budget

Appendix C – Proposed Benefit Assessment Methodology

Appendix D – Annual Cost per Typical Property – First Year - Table

Appendix E – Engineer’s Report titled Quaker Hill PFAS Violation Remedy, prepared by Tighe & Bond, last revised June 2024

APPENDIX "A"

DUTCHESS COUNTY WATER DISTRICT ZONE OF ASSESSMENT "029A" and "029B" *Dutchess Estates Water System*

DESCRIPTION OF ZONE

(map and parcel listing)

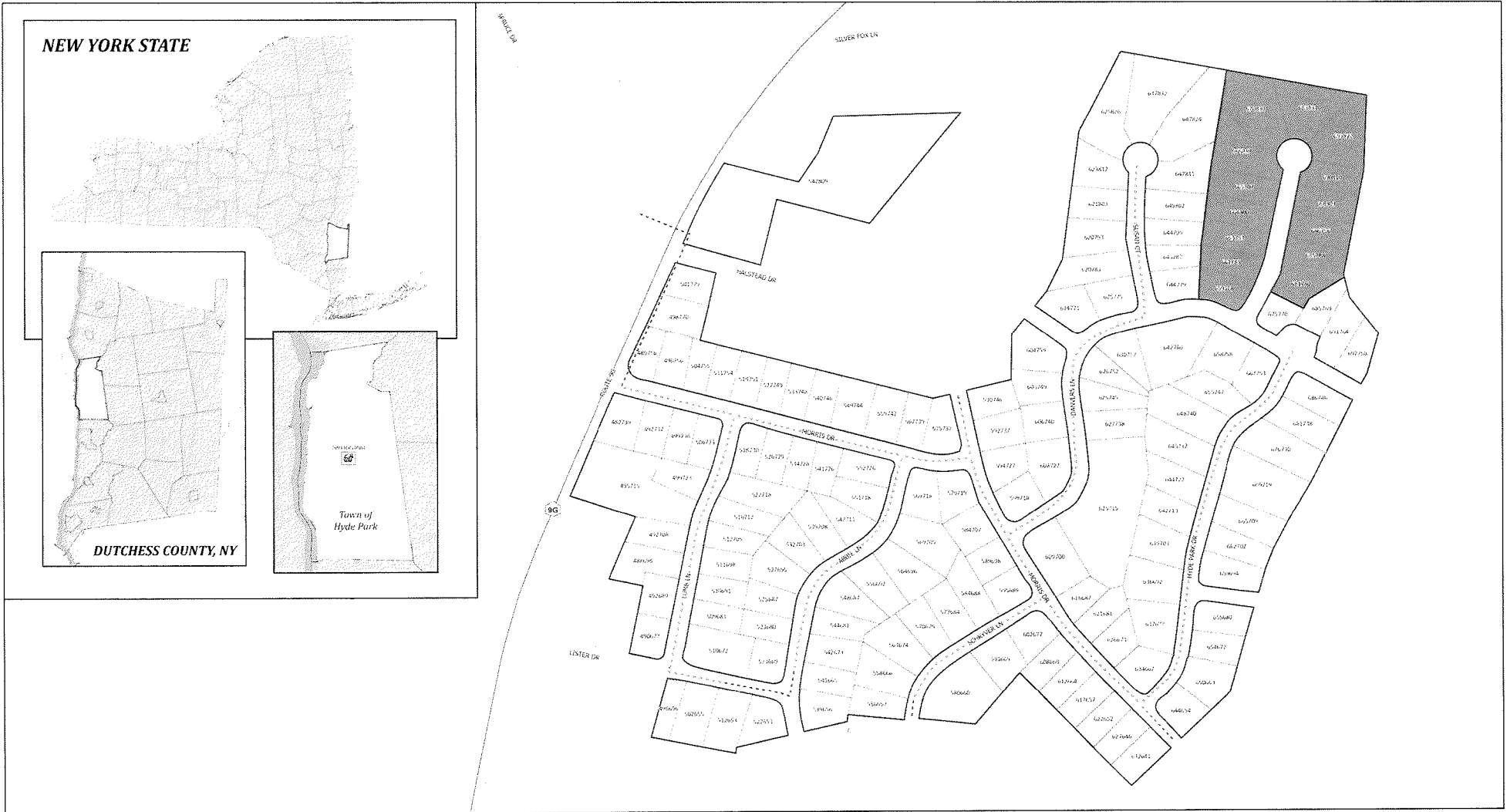
The Dutchess County Water District Zone of Assessment "029A" shall include all those tax parcels presently indicated on the attached boundary map. These parcels are further described by the following list of tax parcel grid numbers:

6165-01-492737-0000	6165-02-532703-0000	6165-02-551718-0000
6165-01-482739-0000	6165-02-563674-0000	6165-02-569705-0000
6165-02-612664-0000	6165-02-511754-0000	6165-02-630757-0000
6165-02-501779-0000	6165-02-622652-0000	6165-02-525687-0000
6165-02-569718-0000	6165-02-647811-0000	6165-02-621803-0000
6165-02-575737-0000	6165-02-580660-0000	6165-02-564696-0000
6165-02-625745-0000	6165-02-659694-0000	6165-02-547711-0000
6165-02-516712-0000	6165-02-623812-0000	6165-02-616687-0000
6165-02-644779-0000	6165-01-492708-0000	6165-02-502655-0000
6165-02-592737-0000	6165-01-492689-0000	6165-02-504755-0000
6165-01-488698-0000	6165-02-642713-0000	6165-02-620783-0000
6165-02-558666-0000	6165-02-648740-0000	6165-02-522718-0000
6165-01-498770-0000	6165-02-523669-0000	6165-02-534728-0000
6165-02-599718-0000	6165-02-533748-0000	6165-02-644795-0000
6165-02-512653-0000	6165-02-634667-0000	6165-02-614771-0000
6165-02-626673-0000	6165-02-556692-0000	6165-02-608669-0000
6165-02-590746-0000	6165-02-510672-0000	6165-01-490677-0000
6165-02-665709-0000	6165-01-496756-0000	6165-02-645802-0000
6165-01-499736-0000	6165-01-495715-0000	6165-02-637832-0000
6165-02-540746-0000	6165-01-489756-0000	6165-02-658758-0000
6165-02-637677-0000	6165-02-603749-0000	6165-02-644722-0000
6165-02-645732-0000	6165-02-617657-0000	6165-02-667753-0000
6165-02-526729-0000	6165-02-627646-0000	6165-02-594727-0000
6165-02-621681-0000	6165-02-625775-0000	6165-02-549744-0000
6165-02-593669-0000	6165-02-595689-0000	6165-02-509683-0000
6165-02-519751-0000	6165-02-548687-0000	6165-01-499723-0000

6165-02-544681-0000	6165-02-644654-0000	6165-02-523680-0000
6165-02-512705-0000	6165-02-647824-0000	6165-02-506733-0000
6165-02-541726-0000	6165-02-539708-0000	6165-02-527695-0000
6165-02-655680-0000	6165-02-609700-0000	6165-02-642760-0000
6165-02-518730-0000	6165-02-584707-0000	6165-02-669719-0000
6165-02-639703-0000	6165-02-527749-0000	6165-02-676730-0000
6165-02-604759-0000	6165-02-686746-0000	6165-02-627738-0000
6165-02-567739-0000	6165-02-654672-0000	6165-02-606740-0000
6165-02-510691-0000	6165-02-602677-0000	6165-02-522653-0000
6165-02-681738-0000	6165-02-579719-0000	6165-02-608727-0000
6165-02-626752-0000	6165-02-570679-0000	6165-02-539656-0000
6165-02-650663-0000	6165-02-636692-0000	6165-02-697758-0000
6165-02-511698-0000	6165-02-643787-0000	6165-02-675770-0000
6165-02-662702-0000	6165-02-577684-0000	6165-02-542673-0000
6165-02-552726-0000	6165-02-620793-0000	6165-02-691764-0000
6165-02-655747-0000	6165-02-589698-0000	6165-02-541665-0000
6165-02-632641-0000	6165-02-559742-0000	6165-02-625715-0000
6165-02-625826-0000	6165-02-584688-0000	6165-02-685769-0000
6165-01-495656-0000	6165-02-556657-0000	6165-02-542809-0000

The Dutchess County Water District Zone of Assessment "029B" shall include all those tax parcels presently indicated on the attached boundary map. These parcels are further described by the following list of tax parcel grid numbers:

6165-02-659778-0000
 6165-02-688803-0000
 6165-02-663793-0000
 6165-02-686796-0000
 6165-02-666817-0000
 6165-02-693822-0000
 6165-02-681780-0000
 6165-02-685788-0000
 6165-02-670830-0000
 6165-02-683831-0000
 6165-02-661785-0000
 6165-02-664800-0000
 6165-02-690810-0000
 6165-02-665807-0000



Dutchess Estates Water Hyde Park, NY Dutchess County Water District Zone of Assessment DISCLAIMER: pipeline shown for discussion purposes, but field verification is required to determine location of pipe in street.	--- Existing Water Main Zone 029A Zone 029B 0 250 500 1,000 Feet	Dutchess County Water and Wastewater Authority 1 LaGrange Avenue Poughkeepsie, NY 12603	Sheet No. 1 of 1	Data Sources: Dutchess County Real Property Tax Service Agency Prepared by: Dutchess County Department of Planning & Development Date: March, 2025
--	--	---	--	---

APPENDIX “B”

Dutchess Estates Water System

Proposed Operation & Maintenance Budget

***Adopted Water Rate Schedule – Effective January 1, 2025
(Future Connection to Hyde Park Regional Water System)***

DUTCHESS COUNTY WATER AND WASTEWATER AUTHORITY

DUTCHESS COUNTY WATER DISTRICT ZONES A & B – HYDE PARK REGIONAL WATER SYSTEM

Adopted Water Rate Schedule - Effective January 1, 2025

A. WATER CHARGES ARE BILLED TO THE PROPERTY OWNER WITHIN A REASONABLE PERIOD FOLLOWING THE CLOSE OF THE BILLING CYCLE:

Section 1000--Periods end February 28, May 31, August 31, and November 30

Section 2000--Periods end March 31, June 30, September 30, and December 31

Section 3000--Periods end February 28, May 31, August 31, and November 30

NOTE: *Rates subject to change on January 1, 2026

B. WATER CHARGES

1. Metered Usage Rate: \$9.12 per 1,000 gallons + monthly service charge.
(All customers subject to monthly service charge regardless of usage).

2. Monthly Service Charge:

In addition to the water charges described above, there will be a monthly service charge assessed according to meter/service size as follows:

<u>Meter/Service Size:</u>	<u>Rate Per Month:</u>
3/4 inch	\$24.73
1 inch	\$34.62
1.5 inch	\$44.51
2 inch	\$71.70
3 inch	\$271.98
4 inch	\$346.15
6 inch	\$519.23
8 inch	\$717.03
10 inch	\$890.10
16 inch	\$1,409.33

3. Domestic Non-metered (Based upon size of connection) + monthly service charge.

<u>Meter/Service Size:</u>	<u>Rate Per Month:</u>
3/4 inch	\$114.00
1 inch	\$177.33
1.5 inch	\$253.33
2 inch	\$380.00
3 inch	\$1,097.77
4 inch	\$2,195.54
6 inch	\$6,755.51
8 inch	\$13,511.02
10 inch	\$25,333.16
16 inch	\$67,555.09

C. MISCELLANEOUS CHARGES

See following definitions.

Charges:	Rates:
Property Transfer Charge - Buyer	\$60.00
Property Closing Charge - Seller	\$85.00
Inaccessible Meter Charge	\$100.00 *
Meter Re-Read Charge	\$50.00
Meter Tampering Charge	\$50.00 **
Returned Check Charge	\$20.00
Service Restoration Fee	\$150.00
Service Tampering Charge	\$50.00 ***

D. PAST DUE BILL CHARGE

All arrears of water rents, charges and penalties after each due date shall be subject to interest computed at the annual rate of 21% or 5.25% per billing period.

E. RELEVY OF UNPAID BILLS

In September/October of each year all accounts in arrears will be referred to the property tax collector for inclusion on the following year's January tax bill. Included in these amounts will be a late charge of up to 4 months for the total amount due.

F. PROPERTY TRANSFER CHARGE - BUYER

There will be a charge assessed each time title to a property changes or transfers. The charge will appear on the next scheduled billing of the new property owner. This fee will cover the cost of establishing a new customer account along with preparing pro-rated bills as needed for both the new and former owner.

G. PROPERTY CLOSING CHARGE - SELLER

There will be a charge assessed to the current owner each time title to a property changes or transfers. The charge will appear on the final bill due on account and presented at closing of the property. This fee will cover operational and administrative costs incurred during the processing of account closeout.

H. SPRINKLER SYSTEM CHARGE

Service charge only for size of service line supplying the fire sprinkler system.

I. INACCESSIBLE METER CHARGE

An inaccessible meter charge may be assessed *each month to customers who refuse to allow access to their property for meter installation, who fail to remove obstructions encumbering access to the water meter or its remote read head, and/or who refuse access to their property for an indoor meter reading.

J. MULTIPLE REGISTER METER CHARGE

Each register billed for gallonage plus service charge - see above schedule.

K. METER READINGS

If there is a meter reading discrepancy between the meter (located inside) versus the remote read head (located outside), it is the meter that has precedence. Meter tampering is unlawful and may result in legal action.

L. METER TAMPERING CHARGE

Tampering with meter and meter appurtenances is prohibited. Tampering with meter and meter appurtenances will result in a fine** plus a surcharge for labor and materials for replacing and/or repairing the tampered equipment and shall be imposed on the next water bill.

M. RETURNED CHECK CHARGE

There will be a charge for each returned check. The Dutchess County Water and Wastewater Authority (DCWWA) reserves the right not to accept checks in the future.

N. RESTORATION OF WATER SERVICE

A customer may request water service to be temporarily suspended and shut off at the curb valve. However, the customer will remain financially responsible for all monthly service charges and applicable capital surcharges due per billing cycle while service is suspended. Additionally, a service restoration fee upon water turn on will be added to the next billing cycle.

O. SERVICE TAMPERING CHARGE

Water service is turned on or off at the curb or the main by the DCWWA. Unauthorized persons are not permitted to turn water on or off at the curb valve or corporation stop. The owner of the affected property shall be subject to a service tampering charge for each offense*** plus a surcharge for labor and materials for replacing and/or repairing the tampered equipment and shall be imposed on the next water bill.

APPENDIX "C"

Dutchess Estates Water System Dutchess County Water District Zones of
Assessment "029A" and "029B"

Proposed Benefit Assessment Methodology
COUNTY WATER DISTRICT
ZONES OF ASSESSMENT C, D, H, M, O, P, Q, R, S, T, U and 028 (Not J or K)

PART COUNTY SEWER DISTRICT #1, 2, 3, 6 & 7

BENEFIT ASSESSMENT METHODOLOGY

DEVELOPED LAND (Use the higher of either LAND USE/WATER USE or ACREAGE)

LAND USE/WATER USE

RESIDENTIAL

FIRST DWELLING UNIT	10
EACH ADDITIONAL DWELLING UNIT	8

COMMERCIAL/INSTITUTIONAL:

FIRST 500 GPD WATER USAGE	20
EACH ADDITIONAL 100 GPD	4

ACREAGE

FIRST 2 ACRES	10
EACH ADDITIONAL WHOLE ACRE	2

UNDEVELOPED LAND

FIRST 2 ACRES	8
EACH ADDITIONAL WHOLE ACRE	2

STATE PARK LANDS

FIRST 500 GPD WATER USAGE	20
EACH ADDITIONAL 100 GPD	4

APPENDIX “D”

Dutchess Estates Water System Dutchess County Water District Zones of Assessment “029A” and “029B”

Annual Cost per Typical Property – First Year - Table

DEW Annual Cost per a Typical Property - First Year (Assuming full construction of interconnection project *not complete* ⁸)

	Worst Case Scenario				Best Case Scenario			
	QHW ¹	QHW + DEW ²	QHW + DEW + SCW ³	QHW + DEW + NPW ⁴	QHW + DEW + NPW + SCW ⁵			
Project Cost Allocation	\$ -	\$ -	\$ -	\$ -	\$ -			
HPR Debt Service Allocation ⁵	\$ -	\$ 150.00	\$ 147.00	\$ 143.00	\$ 140.00			
O&M ⁷	\$ -	\$ 1,172.00	\$ 1,172.00	\$ 1,172.00	\$ 1,172.00			
Total Cost	\$ -	\$ 1,322.00	\$ 1,319.00	\$ 1,315.00	\$ 1,312.00			

DEW Annual Cost per a Typical Property - First Year (Assuming full construction of interconnection project *completed*)

	Worst Case Scenario				Best Case Scenario			
	QHW ¹	QHW + DEW ²	QHW + DEW + SCW ³	QHW + DEW + NPW ⁴	QHW + DEW + NPW + SCW ⁵			
Project Cost Allocation	\$ 3,101.00	\$ 1,403.00	\$ 872.00	\$ 524.00	\$ 427.00			
HPR Debt Service Allocation ⁵	\$ 151.00	\$ 148.00	\$ 145.00	\$ 139.00	\$ 136.00			
O&M ⁷	\$ 844.00	\$ 1,172.00	\$ 1,172.00	\$ 1,172.00	\$ 1,172.00			
Total Cost	\$ 4,096.00	\$ 2,723.00	\$ 2,189.00	\$ 1,835.00	\$ 1,735.00			

¹ QHW is the existing Quaker Hill Water system that assumes no Zones of Assessment created

² QHW + DEW assumes only Dutchess Estates Water (DEW) Zone of Assessment is created and benefits from the interconnection project

³ QHW + DEW + SCW assumes only DEW and South Cross Water (SCW) (under separate cover) are created and benefit from the interconnection project

⁴ QHW + DEW + NPW assumes only DEW and North Park Water (NPW) (under separate cover) are created and benefit from the interconnection project

⁵ HPR Debt Service Allocation refers to the debt service shared by all Zones of Assessment that benefit from the Hyde Park Regional Water Treatment Facility and storage tanks

⁶ QHW + DEW + NPW + SCW assumes all of DEW, NPW and SCW (under separate cover) are created and benefit from the interconnection project

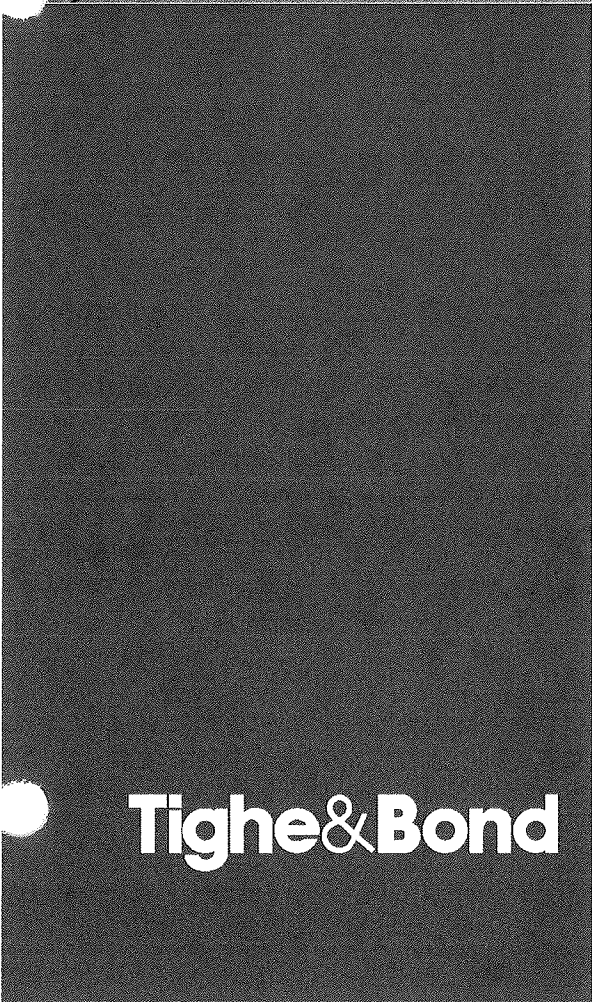
⁷ The difference in O&M for DEW assumes the interim un-metered water rate as DEW will not have water meters installed at the time of the connection, but the intention that they will be installed within the next two years. Once meters are installed, the O&M will be the same as all other Zones of Assessment connected to the Hyde Park Regional Water System which are all metered. The current 2025 metered rate calculates an average \$844 per year in O&M costs

⁸ Not complete refers to a point where long-term financing has not closed, and QHW has not connected. For the purposes of limiting the number of scenarios versus the miniscule differences in Debt Service, not complete shall refer to QHW not connected, but the other ZOAs connected and paying into the Debt Service

APPENDIX "E"

Dutchess Estates Water System County Zone of Assessment "029"

Engineer's Report titled Quaker Hill PFAS Violation Remedy, prepared by
Tighe & Bond, last revised June 2024



Executive Summary

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Executive Summary

Tighe & Bond has evaluated two alternatives for addressing the recent PFOS MCL exceedance at the Quaker Hill Water System. The two alternatives considered for the Quaker Hill Water System include abandonment of the existing wellfield and treatment system and interconnection to the Hyde Park Regional Water System (HPRWS) or replacement of the existing wellhouse/treatment building with a new system with PFAS treatment. A no-action alternative is also discussed in the report but will not satisfy the Notice of Violation. A summary of the alternatives that will be considered is below:

- Alternative No. 1:
 - Connect the Quaker Hill Water System to the HPRWS (Route B)
 - Booster pump station at the North Tank site
 - Abandon the existing Quaker Hill Wellfield and treatment system
- Alternative No. 2:
 - Install a new treatment building with deep foundation
 - Install new system components including treatment for PFOS
 - Improvements to existing wells
 - Demolish the existing wellhouse/treatment building
 - Site improvements to protect the new facilities from flooding

An opinion of probable project cost was developed for the two alternatives (Section 2.6) and are summarized in Table E-1, detailed opinions of probable cost for each alternative are provided in Appendix C.

TABLE E-1

Alternative No. 1 & 2 Opinion of Probable Cost

Item	Alternative No. 1	Alternative No. 2
Construction Cost	\$12,881,100	\$4,886,000
Engineering (20%)	\$2,576,300	\$977,200
Contingency (30%)	\$3,864,400	\$1,465,800
Escalation (4%/year for 3 years)	\$1,609,900	\$612,000
Opinion of Probable Cost	\$20,931,700	\$7,941,000

A life cycle cost analysis (Section 3.1) was utilized to better compare the two alternatives to determine the most long-term cost-effective alternative, rather than just the alternative with the lowest capital construction cost. Table E-2 summarizes the net present value of each alternative over a 70-year life cycle planning period, which is the anticipated life cycle of the Alternative No. 1 transmission main.

TABLE E-2

Alternative Life Cycle Cost Analysis

Item	Alt. No. 1	Alt. No. 2
Capital Cost	\$20,931,700	\$7,941,000
Annual O&M Cost	\$112,500	\$230,800
Present Day O&M Cost	\$13,566,900	\$27,833,200
Present Day Salvage Value	-\$210,400	-\$647,000
Net Present Value of Life Cycle Cost	\$34,709,000	\$36,421,200
	Planning Period	70 years
	Inflation Rate	4.0%
	Discount Rate	2.5%

As shown in Table E-2, Alternative No. 1 is expected to have a lower life cycle cost than Alternative No. 2. Additionally, Alternative No. 1 has the ability to increase the customer base served by connecting other Public Water Systems along the route which could ultimately result in the lowest debt service cost per EDU. Alternative No. 2 has no potential to increase the customer base.

Based on the life cycle cost analysis, estimated annual debt service, potential to increase the customer base by interconnecting other public water systems, and non-monetary factors (see Section 2.7), Alternative No. 1 is the recommended alternative. The basis for selection of Alternative No. 1 is as follows:

- Lowest life cycle cost
- Potential to connect several other PWSs, including PWSs in potential environmental justice areas and disadvantaged communities
- Potential for the lowest annual debt service cost per user if all existing PWSs along the proposed route connect to the system
- Simpler construction and permitting
- Less operation and maintenance
- Better public perception

It is important to consider that the number of PWSs that have PFAS concerns is based upon data provided by DCDBCH which is relative to the previous MCL of 10 ppt. It is anticipated that additional PWSs may have PFAS concerns when considering the new MCL of 4 ppt.

This engineering report has been prepared in anticipation of the pursuit of a low-interest loan or grant. Table E-3 provides the opinion of probable cost for implementation of Alternative No. 1 in a format that is consistent with funding agency requirements.

TABLE E-3

Recommended Project Costs

Item	Cost
1. Construction Costs ¹	
a. Contract 1 - General	\$14,201,200
b. Contract 2 - Electrical	\$289,800
c. Contract 3 - HVAC	\$0
d. Contract 4 - Plumbing	\$0
2. Engineering Costs	
a. Planning	\$62,400
b. Design	\$1,030,500
c. Construction	\$1,545,800
3. Other Expenses	
a. Local Counsel	\$10,200
b. Bond Counsel	\$43,500
c. Work Force	\$202,900
d. Financial Services	\$0
e. Net Interest	\$0
f. Miscellaneous	\$0
4. Equipment	\$0
5. Land Acquisition	\$0
6. Project Contingency (30%)	\$3,864,400
7. Total Project Costs	\$21,250,700
8. Less Other Sources of Financing	\$0
9. Project Costs to be Financed	\$21,250,700
10. SRF Issuance Costs	
a. Direct Expense (1%)	\$212,600
b. Bond Issuance Charge (0.84%)	\$178,600
c. Administrative Fee (1.1%)	\$233,800
Total Project Cost Including Financing	\$21,875,700

¹Includes an escalation of 4%/year for 3 years

Section 1

Project Background & History

1.1 Introduction

This report presents an alternatives analysis performed for the Dutchess County Water and Wastewater Authority (DCWWA) to address the Dutchess County Department of Behavioral and Community Health (DCDBCH) Notice of Violation issued in response to exceedance of the Maximum Contaminant Limit (MCL) for Perfluorooctanesulfonic Acid (PFOS) at their Quaker Hill Water System. This evaluation aims to identify the most appropriate and cost-effective way (or ways) of addressing the MCL violation in a manner that is protective of public health and in the best interests of the DCWWA and its customers.

Tighe & Bond, whose services are provided in New York through T&B Engineering & Landscape Architecture, P.C. (Tighe & Bond), has been engaged by DCWWA to prepare this Preliminary Engineering Report (PER) in a format consistent with the New York State Environmental Facility Corporation (EFC) New York State Drinking Water State Revolving Fund Engineering Report guidelines.

1.2 Site Information

1.2.1 Location

The Quaker Hill Water District (District) is in the eastern extent of the Town of Hyde Park, NY, as shown in Figure 1-1 below. The District serves approximately 109 residential connections located along Quaker Hill Drive and surrounding streets including Pennington Drive, Guerney Drive, Barkley Road, and Shaker Lane.



FIGURE 1-1
Quaker Hill Water District

The District was formed in 1970 and, after being acquired by the Town of Hyde Park in 1980, underwent significant upgrades including construction of a new treatment building and the addition of Well No. 2. The Water District Advisory Committee was formed in 1988 to assist the Town with effective administration of the District. At present, the District's facilities include two wells, one hydropneumatic tank, and one wellhouse/treatment building. Water is delivered to the distribution system via a series of 6-inch cast iron water mains, totaling approximately 9,500 feet in length.

1.2.2 Geologic Conditions

Figure 1-2 shows the USDA Natural Resources Conservation Service (NRCS) soil map for the District. The District is largely composed of Nassau, Hoosic, and Natchaug soil types. The existing wellfield and the existing wellhouse/treatment building are within the Natchaug muck soil type as shown in Figure 1-2. Natchaug muck is categorized as Hydrologic Soil Group (HSG) Type B/D and is defined as highly decomposed organic material over loamy glaciofluvial deposits and/or loamy till. Natchaug muck soils are very poorly drained, nearly level soils in low areas or wetlands. The reported depth to bedrock is more than 80-inches and the reported depth to the water table is 0-6 inches.

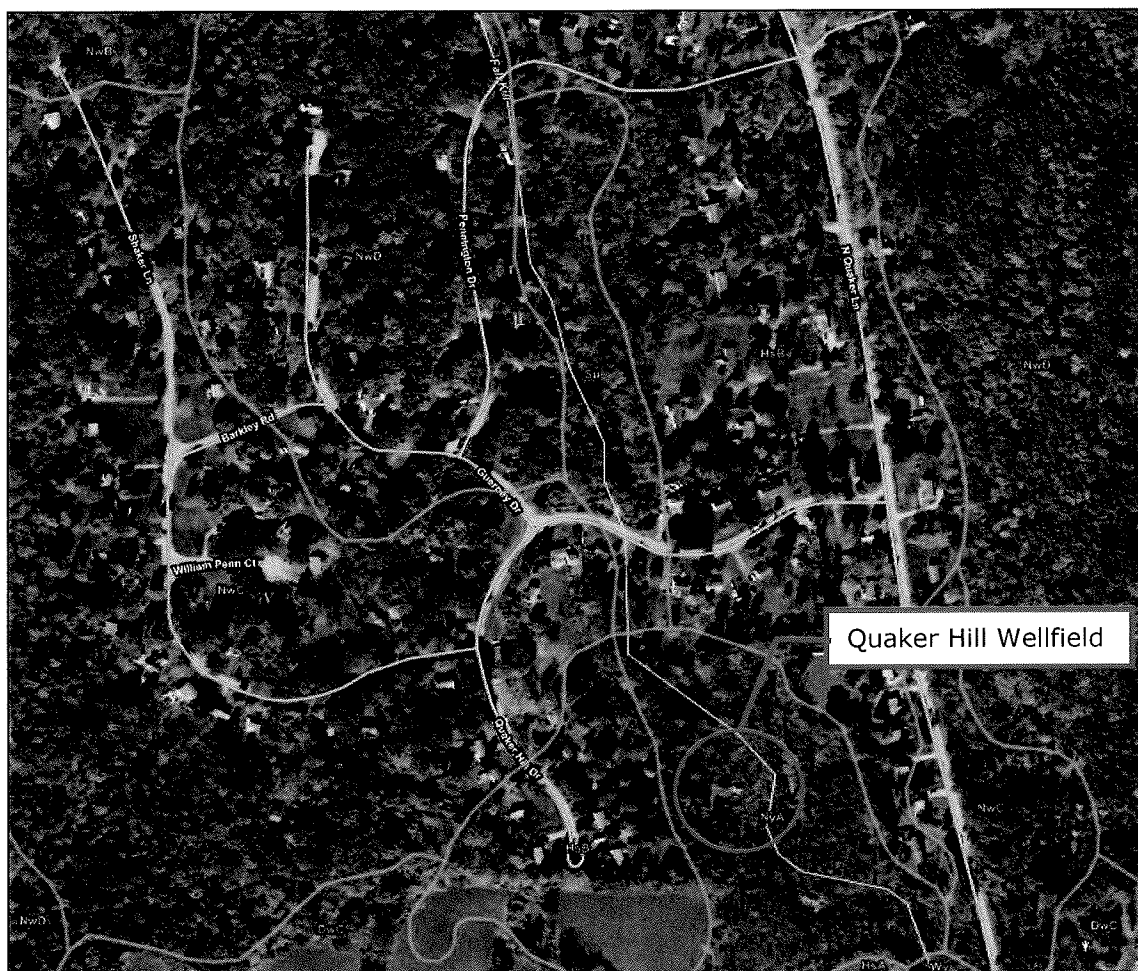


FIGURE 1-2
Quaker Hill Soil Map

A report titled *Quaker Hill Water District Pump House Building Evaluation* by Morris Associates dated April 2010 (2010 Report) provides information about the subsurface conditions at the Quaker Hill wellfield and wellhouse/treatment building site. The report was developed to understand why the wellhouse/treatment building had settled over the years and to recommend improvements for repairing or replacing the wellhouse/treatment building.

The 2010 Report references a geotechnical report prepared by Daniel Loucks. Subsurface conditions at the site, based on one boring drilled at the site and documented in the above-referenced geotechnical report, are expected to consist of the following soil strata:

- 0 - 4 feet below ground surface (bgs) - loose to very loose silty sand FILL;
- 4 - 14.5 feet bgs - Very soft, black, PEAT;
- 14.5 - 41 feet bgs - Loose, native sandy gravel or gravelly sand with minor amounts of silt;
- 41 - 43.5 feet bgs - Dense native gravelly sand with silt; and
- Refusal at 43.5 feet bgs.

In addition to the one test boring near the existing wellhouse/treatment building, the 2010 report describes that two deep test pits were excavated with a backhoe approximately 100 feet west of the existing wellhouse/treatment building. However, the results of these test pits were that the same peat material is present at a depth of approximately 6 feet below grade.

1.2.3 Surface Water Features

As shown on Figure 1-3, the existing wellhouse/treatment building parcel is completely within a New York State Department of Environmental Conservation (NYSDEC) regulated freshwater wetland (SP-21). Fall Kill Creek flows from north to south through the parcel and there are also federal wetlands around Fall Kill Creek; much of which overlap with the NYSDEC wetlands. Fall Kill Creek is a Class C waterbody. Class C waterbodies are suitable for supporting fisheries and non-contact activities.

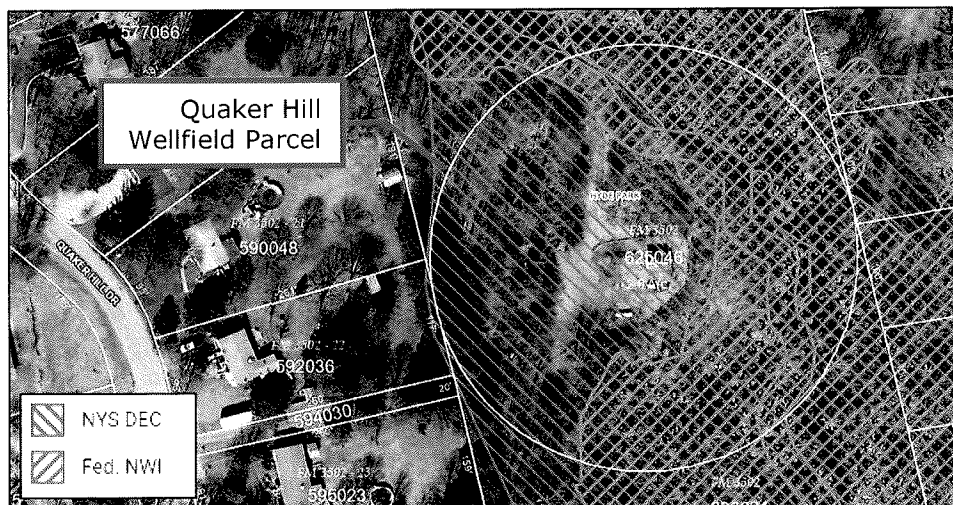


FIGURE 1-3

Wetlands at Quaker Hill Wellhouse/Treatment Building

1.2.4 Environmental Resources

The District was found to be within the NYSDEC rare plants and rare animals check zone as shown on their Environmental Resource Mapping tool. The locations shown in the Environmental Resource Mapper Rare Plants and Rare Animals layer are not precise locations. Rather, they show those generalized areas where New York Natural Heritage has information in its databases regarding rare animals and/or rare plants. These generalized areas show the vicinity of actual, confirmed observations and collections of rare animals and rare plants. The precise locations are not provided by this tool. The Environmental Resource Mapper Tool noted that the District is within the vicinity of Bats which are listed as endangered or threatened. No significant natural communities were noted within the vicinity of the District.

1.2.5 Environmental Justice Areas & Disadvantaged Communities

The Quaker Hill Water District is not within a potential environmental justice area (PEJA) according to the NYSDEC info locator mapping tool presented in Figure 1-4. However, an area just north of the Quaker Hill Water District between Route 9G and Falkkill Road is identified as PEJA (purple shading). Some of the public water supply systems (PWSs) discussed later in the report are within this PEJA.

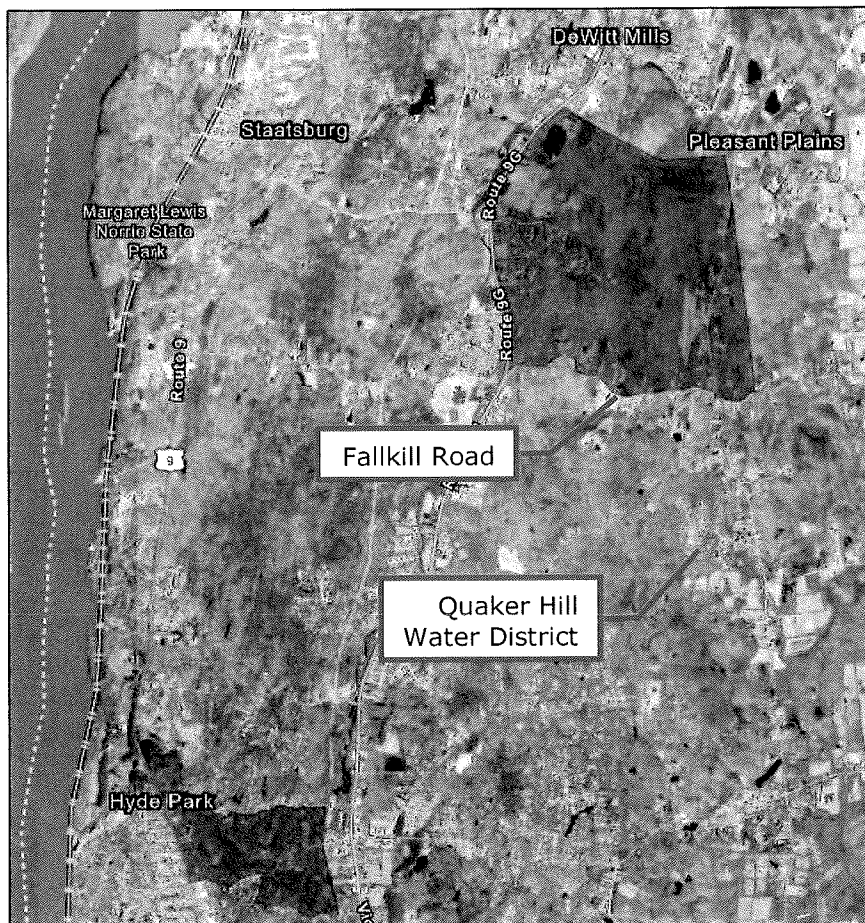


FIGURE 1-4

Town of Hyde Park Potential Environmental Justice Areas

The PEJA maps are based on U.S. census block groups that had populations that met or exceeded at least one of the following statistical thresholds:

1. At least 52.42% of the population in an urban area reported themselves to be members of minority groups; or
2. At least 26.28% of the population in a rural area reported themselves to be members of minority groups; or
3. At least 22.82% of the population in an urban or rural area had household incomes below the federal poverty level.

According to the 2014-2018 5-year American Community Survey (ACS), conducted by the US Census Bureau, the percentage of the census block group who reported themselves as a minority population is 34.73% and the percentage below the poverty level is 3.82%. Therefore, this portion of Hyde Park is considered a PEJA since more than 26.28% of the population in the rural area reported themselves to be members of minority groups. The percentage of the population below the federal poverty level (3.82%) is less than the statistical threshold (22.82%).

The Quaker Hill Water District is not a disadvantaged community (DAC) according to the NYSDEC info locator mapping tool. However, the area west of Route 9G is identified as a DAC (see Figure 2-1). Some of the public water supply systems (PWSs) discussed later in the report are within this DAC area.

1.2.6 Floodplain Considerations

The Quaker Hill wellfield and wellhouse/treatment building has experienced flooding in the past, with the most notable flooding event in August 2011 during Hurricane Irene. Reportedly, flood waters rose up to 3 feet above grade in the vicinity of the wellhouse/treatment building, submerging the generator, lifting the propane tank off its support, and entering the wellhouse/treatment building, rendering the system inoperable.

Review of Federal Emergency Management Agency (FEMA) flood insurance rate maps (FIRMs) shows that the area is not within a mapped 100-year or 500-year flood area, and therefore, no formal flood elevation exists. As such, we recommend utilizing historical records to provide adequate protection from flooding for any new buildings at the site. Although official measurements were not recorded for the 2011 flooding, District representatives stated that flood waters rose to just below the electrical equipment inside the wellhouse. Based on field measurements, this is approximately 3 feet above the finished floor of the existing wellhouse/treatment building.

In accordance with the Recommended Standards for Water Works (10 State Standards), the finished floor of any new building constructed at the site should be located at least 3 feet above the flood of highest record, or approximately six feet above existing grade.

1.3 Ownership & Service Area

The Quaker Hill Water District is owned and operated by the DCWWA. DCWWA is an independent public benefit corporation established, at the request of the County of Dutchess, by an act of the State Legislature and governed by an appointed Board of Directors. The mission of DCWWA is to protect and enhance the health, environmental

sustainability, and economic stability of Dutchess County and its residents through the provision of clean drinking water and proper treatment of wastewater.

As an owner and operator of water and wastewater systems, DCWWA is committed to the provision of reliable water and wastewater service. DCWWA has a team of professionals including certified water operators who operate the Quaker Hill and Hyde Park systems.

1.3.1 Water District Boundaries

The Quaker Hill Water District is approximately 100 acres in size and includes 109 served properties. There is only one vacant parcel within the District that is undeveloped and there are 4 other undevelopable lots. The district delineation is described in the Proposed County Water District Zone of Assessment U Map, Plan, and Report (MP&R) dated February 2015. Figure 1-5 from the MP&R shows the Quaker Hill Water District boundaries.

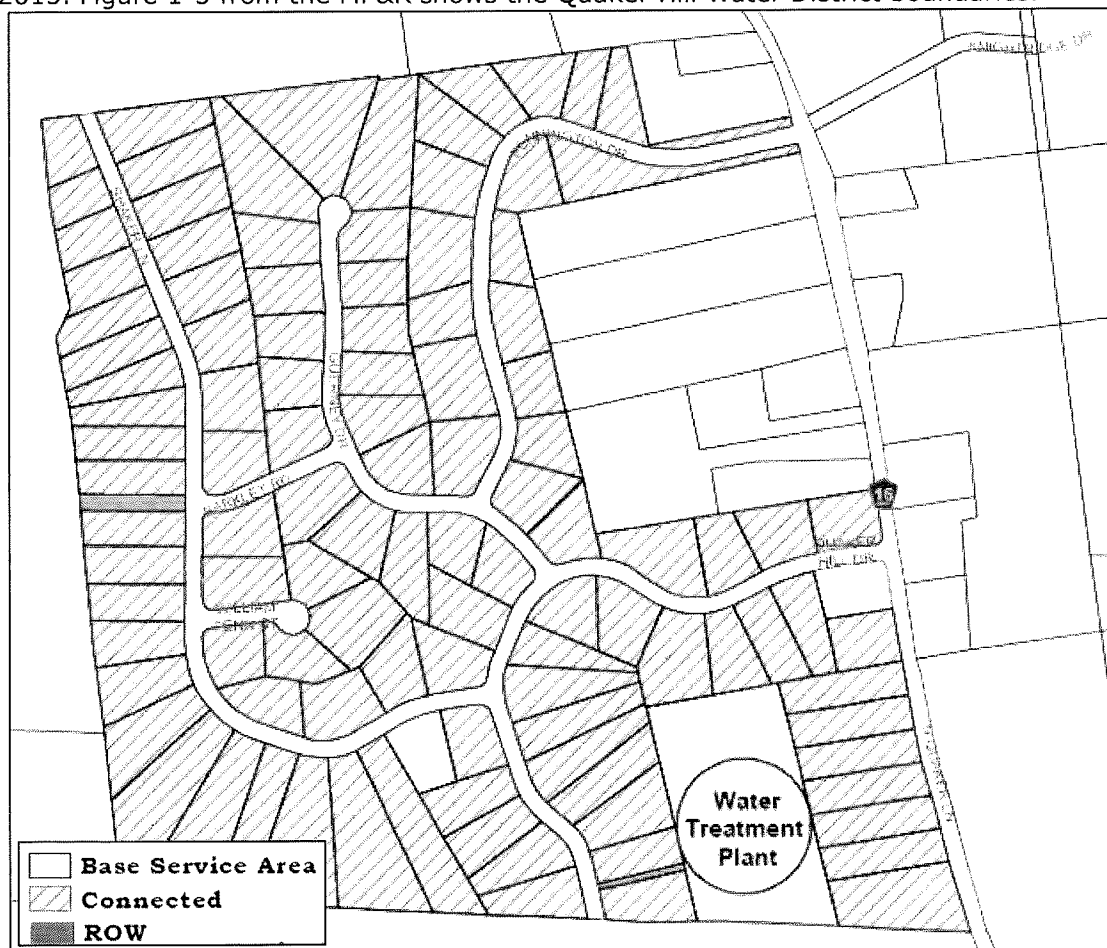


FIGURE 1-5
Quaker Hill Water District

1.3.2 Outside Users

There are no existing outside users, water purchase contracts, or inter-municipal agreements with the Quaker Hill Water District.

1.3.3 Population Trends

The population for the Quaker Hill Water District has been relatively consistent since the completion of the residential development in 1970. There is no census data available for only the Quaker Hill Water District. The estimated population served by the district is 350.

The development is built out and all residences are occupied excluding a single vacant developable parcel. There are no current or anticipated plans to expand the Quaker Hill Water District. Therefore, the population is projected to remain steady over the next 20 years.

1.3.4 Historical and Projected Water Use Data

Existing Demands

The Quaker Hill Water District has two onsite groundwater wells (Well No. 1 and Well No. 2). One totalizing flow meter measures total flow from the facility; however, no individual flow meter for each well with readout is present to measure and record individual flow production. Since no individual flow data is available, monthly operating reports were reviewed to evaluate well production for the district. Monthly operating reports from January 2022 through November 2023 were evaluated. A summary of wellfield daily demand including data from January 2022 through November 2023 is summarized in Figure 1-6.

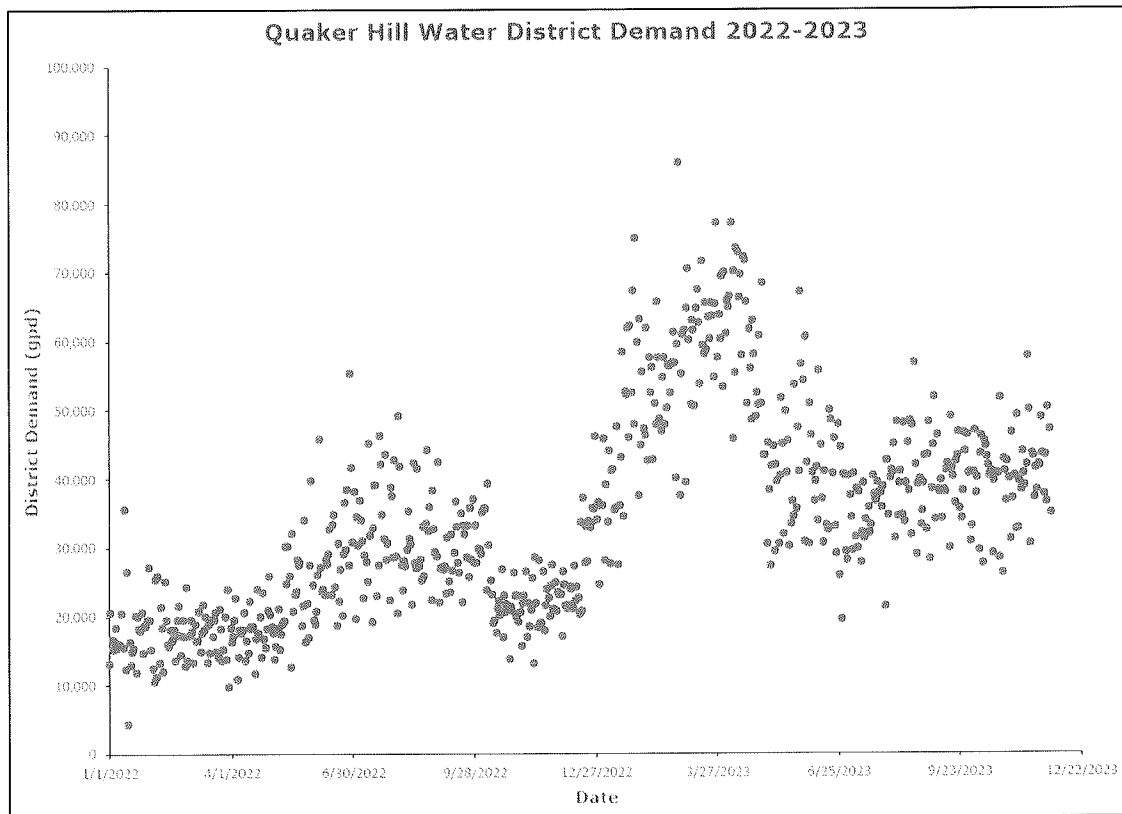


FIGURE 1-6
Quaker Hill Water District Daily Demand 2022-2023

As shown in Figure 1-6, daily demand was generally higher in 2023 than it was in 2022. This increased demand was caused by water main breaks in the distribution system, the largest of which was estimated by DCWWA operations staff as 60,000 gpd. There were no major leaks in 2022, therefore, the flow data from 2022 is assumed to be more representative of actual system demands. For this reason, production data from January through December 2022 was used to determine average and maximum day demand.

Since there is no flow meter monitoring instantaneous flow from the facility, there are no records for peak hourly demand for the facility. As such, the peak hour demand was estimated using typical peaking factors. Typical peak hour peaking factors (ratio of peak hour demand to average day demand) range from 2 to 7 (*Water Treatment*, Montgomery, 1985). A summary of this average day demand, maximum day demand, and peak hour demand is provided in Table 1-1.

TABLE 1-1

Quaker Hill Water District Demands

Condition	Demand (gpd)	Demand (gpm)
Average Day Demand	25,000	17
Maximum Day Demand	56,000	39
Peak Hour Demand ¹	100,000	69

¹Based on Peaking Factor of 4.0 x Average Day Demand

As shown in Table 1-1, average day demand is 25,000 gpd, or approximately 17 gpm, the maximum day demand during this period was 56,000 gpd (which occurred in June 2022), and the estimate peak hour demand is 4,200 gallons per hour (gph), or approximately 69 gpm.

In 2014, as part of the Quaker Hill Water District Evaluation (2014 Report), the demands for the Quaker Hill Water system were based on 2013 production data. Based on 2013 production data, the average day demand was determined to be 24,428 gpd and the maximum day demand was 44,100 gpd. This indicates relatively consistent demands in the Quaker Hill Water District during years with minimal water main breaks.

The 2014 Report recommended several steps to address issues in the distribution system including a leak detection program, replacement of meters, installation of backflow preventers, and strategic water main improvements. Although not necessary to address the PFAS violation, we agree that improvements to the water distribution system are important to reduce unaccounted for water and ultimately a more stable water demand. As such, the recommended distribution system improvements for the Quaker Hill Water System are not included in the alternative analysis but are presented as "Phase 2" as discussed in Section 2.5. Further discussion regarding the condition of the existing water mains can be found in section 1.4.2.

Fire Flow

With no elevated storage, the system is not currently designed to provide fire flow. The 2014 Report estimated ISO needed fire flows of 750 gpm for 2 hours (90,000 gallons) based on the minimum distance of 30-50 feet between existing single-family dwellings.

Future Demands

The development is built out and all residences are occupied excluding a single vacant but developable parcel. The system has sufficient capacity to serve the additional parcel should it be developed. The District is located in a rural area of Hyde Park, and so there are a limited number of properties that could feasibly connect to the District, therefore, no future demands are anticipated.

Unaccounted Water

Based on the wide variation in total daily production discussed above, it appears that there has been a significant amount of unaccounted for water throughout the life of the Quaker Hill Water System. The 2014 Report estimated unaccounted for water due to water main breaks and leaks may have exceeded 100% for many months in 2013. However, metering limitations (customers are billed at a flat rate and usage is not metered) make it difficult to estimate what percentage of the demand is unaccounted for water.

Adjacent Public Water Systems

Several PWSs, the largest of which is the Hyde Park Regional Water System (HPRWS), are located near the Quaker Hill Water District. These systems are discussed in greater detail in Section 2.2.

Community Involvement

DCWWA maintains a website and notification system for alerts and advisories regarding the Quaker Hill Water System. This provides a convenient way of communicating with the users of the Quaker Hill Water System.

There have been no major capital improvement projects for the Quaker Hill Water System in many years. It is assumed that the community would be in support of improvements that protect the drinking water system and address the outstanding PFOS MCL violation.

There is also potential for enhanced community involvement if the interconnection alternative (see Section 2.2) is selected, offering a resolution for adjacent PWSs with outstanding water quality violations.

1.4 Existing Facilities**1.4.1 Location & Layout**

The Quaker Hill Water District is accessed from North Quaker Lane in the Town of Hyde Park and serves the residential properties along Quaker Hill Drive, Shaker Lane, Barkley Road, Guerney Drive, and Pennington Drive (see Figure 1-5).

The District facilities are located on an approximately 7 acre site, as shown in Figure 1-7 below. Access to the site is via a 20-foot-wide utility easement near the end of Quaker Hill Drive. The access drive is a gravel road approximately 260 feet long that runs between two residential properties.

The parcel is 400-feet in diameter centered on one of the wells. The parcel is low-lying and completely within a NYSDEC freshwater regulated wetland. Fall Kill Creek runs through the parcel.

The electric service for the existing facilities is overhead from the power line that runs in a back lot right of way on the west side of North Quaker Lane. The overhead power lines cross the creek and the wetland, with utility poles located in the wetland.

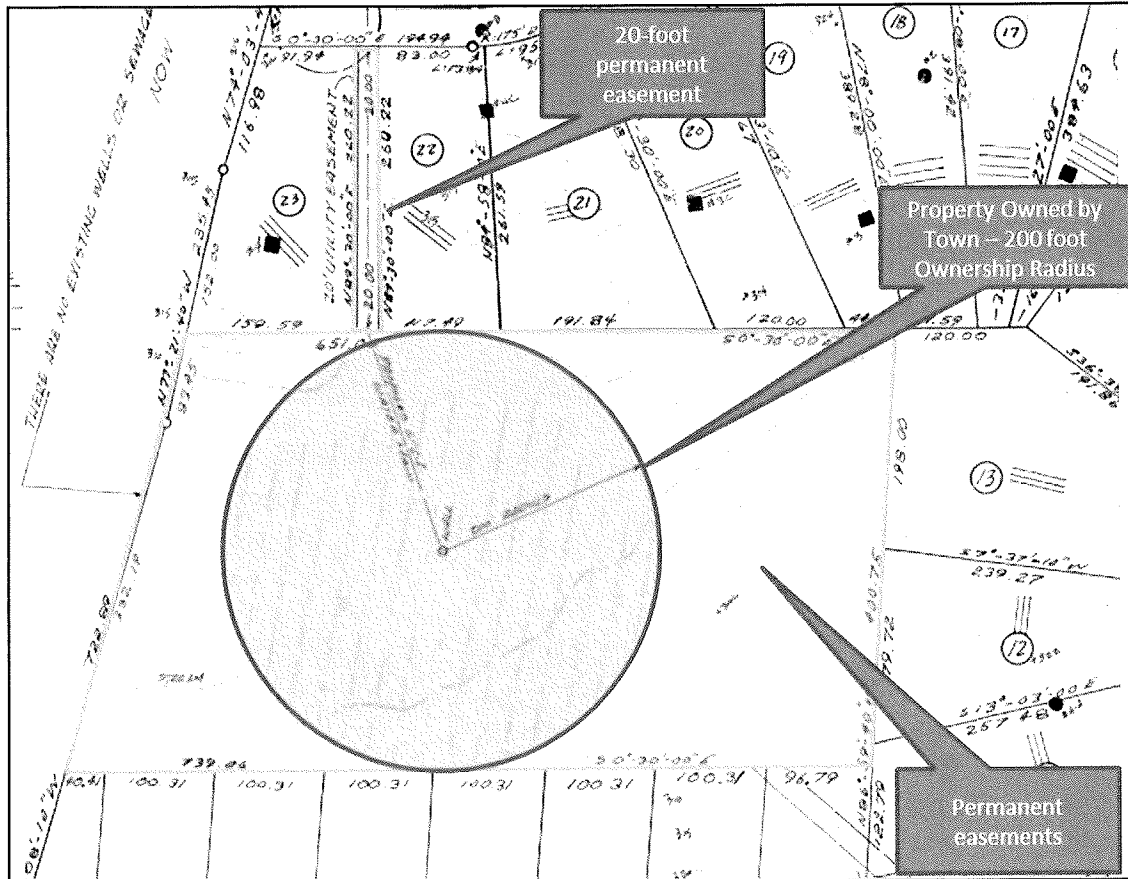


FIGURE 1-7
Quaker Hill Water District Ownership and Easements

The site contains three wells (two active and one abandoned), the wellhouse/treatment building, a buried hydropneumatic tank, security fencing, a generator, and a propane tank. Figure 1-8 shows a general layout of these structures at the site, including:

- Wellhouse/Treatment Building with Well No. 1 inside (1)
- Well No. 2 (2) – originally designated as Well No. 3 on historical drawings, but was renamed with the abandonment of the original Well No. 2.
- Generator (3)
- Buried hydropneumatic tank (4)
- Propane tank (5)
- Test Well No. 3 (abandoned) (6) – Originally designated as Well No. 2 on historical drawings.
- Security fencing (7)

- Access drive (8)
- Overhead electric service (9)

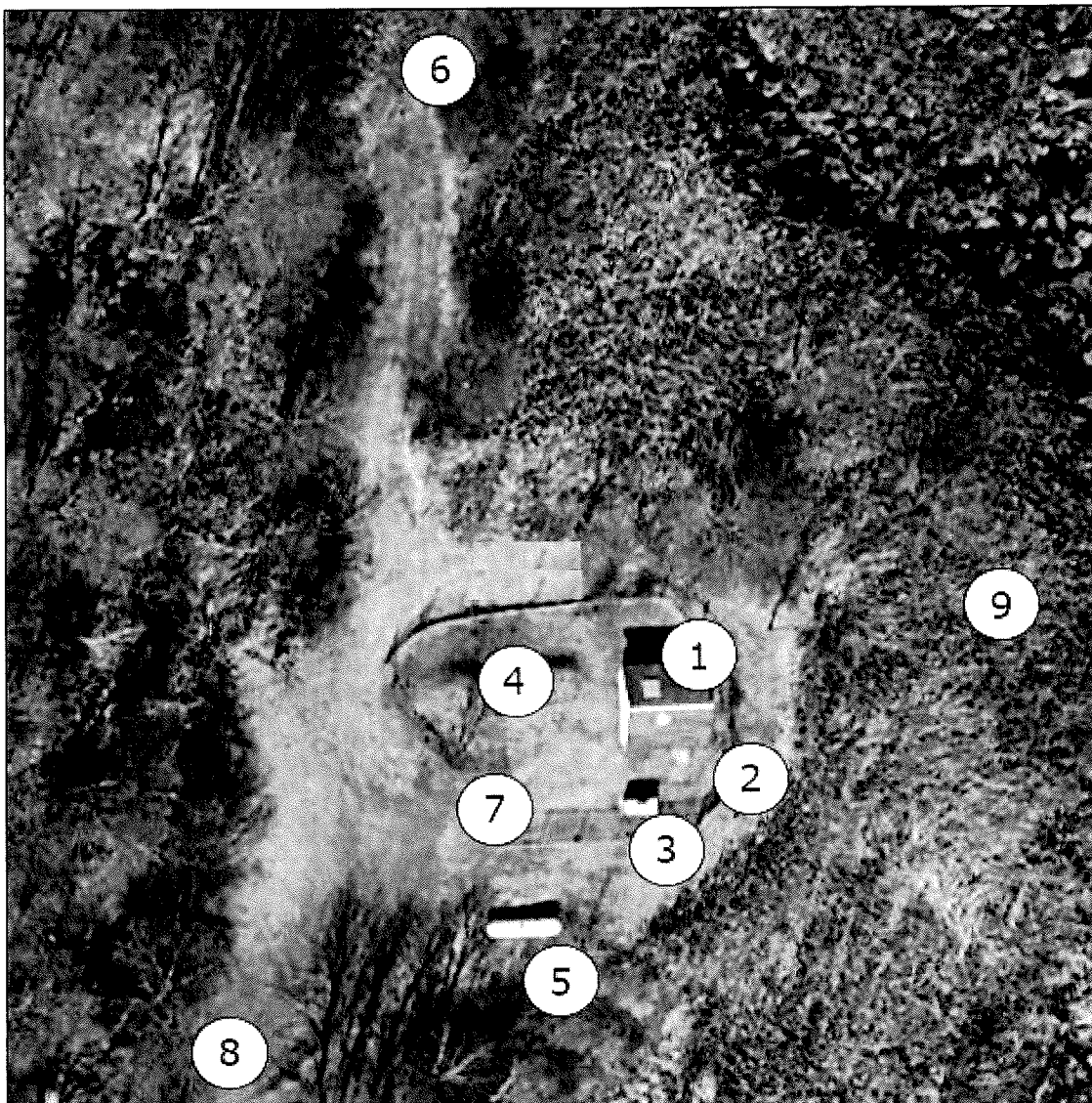


FIGURE 1-8
Quaker Hill Water Treatment Facilities

Appendix A contains photographs of the existing facilities.

1.4.2 General Description & History

The Quaker Hill Water District source and treatment system includes two wells (Well No. 1 and Well No. 2), a small masonry wellhouse/treatment building, a sodium hypochlorite feed system, and a buried 10,000 gallon hydropneumatic tank. Figure 1-9 shows a schematic of the existing system.

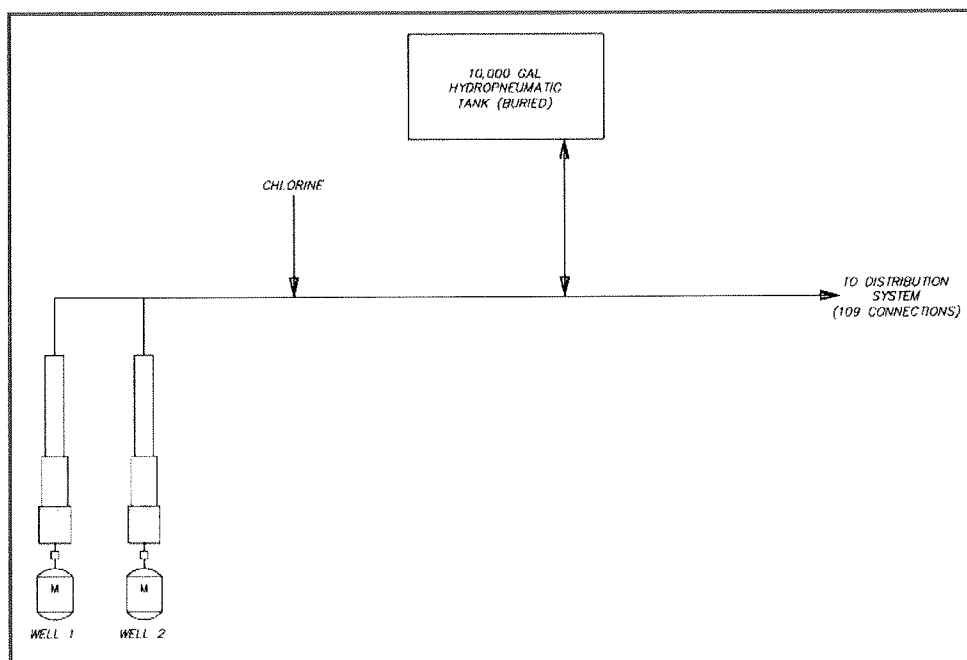


FIGURE 1-9
Existing System Schematic

According to available system documentation from the Town of Hyde Park, the Quaker Hill Water Corporation developed the central water system during the period of 1965 to 1970. Due to poor water distribution main installation practices, the water system experienced extensive water main leaks by 1976. District records indicate that the water mains were installed directly on shale, with no gravel bedding. This has resulted in a multitude of water main failures over the years. Unfortunately, leak detection programs have had minimal success because of the fractured nature of shale. It has also been noted that, in general, the water mains were not installed to five feet below ground surface, and on average have just over three feet of cover, rendering the piping susceptible to damage from frost.

By 1978 the Dutchess County Department of Health assumed operational control of the system from the Quaker Hill Water Corporation. Circa 1980, the Town acquired the water system, forming the Quaker Hill Water District. The water system's sole hydropneumatic tank was replaced around 1998.

The New York Department of State awarded the Town of Hyde Park a Local Government Efficiency Grant in 2011. The Grant funds were used for an engineering evaluation and to assess the feasibility of transferring the District's assets and management to DCWWA. In February of 2015, the Town of Hyde Park transferred ownership of eight water and wastewater systems to DCWWA, including the Quaker Hill Water System.

As the Quaker Hill Water System is now 54 years old, and with minimal reconstruction projects undertaken under previous ownership, it is generally recognized that most system components are beyond their useful service life. The 2014 Report noted concerns regarding the condition of the wellhouse/treatment building and distribution system and identified several mechanical and safety issues.

While the water supply of the District is of adequate quantity, there has been a recent MCL exceedance for PFOS (see Section 1.5 for further discussion).

1.4.3 Present Condition

Source Capacity

Groundwater Well No. 1 and Well No. 2 are the two sources of water supply for the Quaker Hill Water System. Both wells are located within the same parcel. The DCDBCH, following its 2019 sanitary survey, required that both source wells be evaluated for potential Groundwater Under Direct Influence of Surface Water (GWUDI). The first stage of GWUDI testing data collection was conducted from April 2020 to May 2021. DCDBCH representatives reviewed the data and issued an official determination that the Quaker Hill Water System source wells are not under the direct influence of surface water.

Existing well capacity was estimated as part of the 2014 Report based on historical records and the DCDBCH inspection reports. According to a 1978 report by Morris Associates, Well No. 1 is an 8-inch diameter shallow gravel well, with a safe yield of 220 gpm. The well is approximately 50 feet deep, with a 20 foot deep clay confining layer. Well No. 1 is equipped with a 185 gpm well pump.

There are no well construction details for Well No. 2; however, a DCDBCH inspection report from 1983 reports that the well is equipped with a well pump rated for 112 gpm. In both the 1983 and 1984 reports, it was noted that Well No. 2 had not received a completed works approval; we were unable to confirm if this had ever been received. Table 1-2 shows the reported capacity for the two wells based on the most recent water withdrawal reporting forms.

TABLE 1-2
Reported Well Capacity

Well	Capacity (gpm)	Capacity (gpd)
Well 1	180	259,200
Well 2	109	157,000

According to 10 States Standards, the total developed groundwater source capacity shall equal or exceed the design maximum day demand with the largest producing well out of service. Since there is no atmospheric storage, the groundwater wells must meet peak hour demand (estimated to be 69 gpm, see Section 1.3.4). The system has had no issues maintaining system pressures, even with the history of water main breaks.

With the largest well (Well No. 1) out of service, the firm capacity of the wellfield is 109 gpm, or the reported capacity of Well No. 2. This is greater than the estimated peak hour demand of 69 gpm, therefore, this requirement is satisfied. However, we recommend that District consider yield testing to determine the actual safe yield of the wells, specifically for Well No. 2. The well pump sizes and capacities should also be confirmed.

Water Quality

Prior to recent regulations requiring public water supplies to test for perfluoroalkyl substances in source waters, Quaker Hill records indicate that concentrations of all regulated contaminants were well below their respective regulatory limits. However, both Quaker Hill source water wells contain perfluoroalkyl concentrations that exceed the EPA's MCL of 4 nanograms per liter (ng/L) or parts per trillion (ppt), and New York State's current MCL of 10 ppt. Section 1.5 provides further discussion regarding the MCL exceedances in the Quaker Hill System.

Site/Civil/Security

Several low hanging branches were observed along the entrance road. These branches should be trimmed and maintained to ensure continuous access to the site. The grounds surrounding the Quaker Hill Water Wellhouse/treatment building are generally wet and muddy due to their low-lying nature in the wetland. The facility is surrounded by a perimeter fence with barbed wire and is equipped with a manual swing gate at the main entrance. The fence is in fair condition, with several areas of rusting observed. There are no door contacts, security cameras, or security alarms.

Safety

The Quaker Hill Water System facilities were evaluated for compliance with general health and safety practices as well as OSHA CFR 1910 as part of the 2014 Report. Although OSHA does not have direct jurisdiction over municipality-owned public utilities in New York, the facility is subject to compliance with New York State safety requirements which are very similar to OSHA and must provide a safe working environment for employees, contractors, and visitors at all times. Several of the safety concerns highlighted in the 2014 Report have been addressed since DCWWA took ownership of the system. The following health & safety concern remain:

- Eye wash is accomplished through the use of portable bottles. Permanent eye wash/shower stations should be considered in all locations where chemicals are handled and stored. Appropriate signage should be located near all eye wash stations.

Structural/Architectural

The existing wellhouse/treatment building is a single story structure with single wythe, 8-inch CMU walls, a concrete slab on grade and timber framed gable roof. The interior dimensions are 14'-9" by 14'-9" with a floor to ceiling height of 7'-10".

Overall, the existing wellhouse/treatment building is in poor condition. The building structure has significant structural issues. Occupancy of the building in an earthquake or significant wind or flooding event would be unsafe. Settlement of the building and floor slab has resulted in misalignments of the piping system and cracks in the floor slab leaving the wells vulnerable to contamination. The building has been subjected to flooding (see Section 1.4.5), which has also impacted the life expectancy of the structure and its equipment. Settling of the structure is likely due to poor subsurface ground conditions and the history of the issues are well documented.

The architectural components of the building are also in poor condition including the asphalt shingle roofing which is heavily deteriorated and is approaching a failed condition. There is also moderate rust on the hollow metal door and door frame.

It is feasible to remove and replace the broken mortar joints. However, since it is likely unreinforced, the repaired masonry system will be susceptible to further cracking of the mortar joints particularly if any further movement of the building occurs. Also, while some of the failed mortar joints have been filled with spray foam insulation, it is likely that other failed joints have allowed moisture to enter into the concrete masonry blocks.

Finally, unreinforced masonry does not provide significant lateral load resistance (wind/earthquake), and so the building might be unsafe during these conditions. We recommend demolishing the existing masonry building and replacing it with a new structure.

Process/Mechanical

Equipment at the Quaker Hill Water District facility varies in age and condition. However, most of the equipment is at or past the end of its useful service life. This section provides an overview of the condition of the process/mechanical equipment including:

- Wells & Well Pumps
- Process Piping
- Hydropneumatic Tank
- Chemical Feed System

Two wells are currently in place at the site. Well No. 1 is located inside the treatment building. A sleeve was installed in Well No. 1 a few years ago according to DCWWA staff; however, this solution was only intended to be temporary and therefore Well No. 1 needs to be replaced. The new well casing should be extended at least 18 inches above grade, and 3 feet above maximum flood elevation, in accordance with 10 States Standards, and be provided with a lockable, watertight well cap.

Well No. 2 is located outside of the fenced area and the grading around Well No. 2 is not graded to allow surface drainage away from the well. We recommend that grading improvements be made to Well No. 2 and the casing should also be extended to 3 feet above the maximum flood elevation. Test Well No. 3 has been abandoned.

The motor for Well Pump No. 1, along with the wiring, check valve, and well pipe was replaced in 2023. The age of both well pumps and the motor for Well Pump No. 2 is unknown, and we expect they are past their useful life expectancy. Both well pumps should be replaced and sized for the conditions of the new treatment facility. Well yield testing is also recommended to confirm the safe yield capacity of each well.

The piping system inside the building consists of cast iron pipe, isolation valves, a flow totalizer, and chlorine injection point. Overall, the piping is in poor condition. The paint system on the piping has deteriorated, and areas of corrosion were observed. Portions of piping where it interfaces with the floor slab have significant corrosion. Settlement of the building following its construction has resulted in a significant amount of cracks and misalignment of the floor slab. This has resulted in notable pipe alignment issues and stress on the existing piping system joints and restraints. Repairs have been made over the years to account for the misalignment, but these are generally less resilient installation practices and the piping is at risk as the building continues to settle. All piping inside the building should be replaced.

Pressure stabilization for the system is achieved using a 10,000 gallon hydropneumatic tank. The hydropneumatic tank was replaced in approximately 1998 and is past its useful life expectancy.

The existing hydropneumatic tank is completely buried, however, according to 10 State Standards, hydropneumatic tanks should be located above normal ground surface and be completely housed.

The wellhouse/treatment building houses a sodium hypochlorite chemical feed system. Overall, the feed system is in good condition, with the day tank and metering pump recently replaced. The metering pump is a diaphragm style pump. Based on the typical service life for chemical feed system equipment, the tank and metering pump will be due for replacement in a three to five years. Therefore, it is recommended that the chemical feed system be replaced at the time of the treatment building improvements/replacement. The design of the new chemical feed system should include redundant metering pumps and a tank vented to the exterior.

Instrumentation & Controls

A cellular alarm system at the existing facility notifies operations staff of high and low pressure conditions. This is currently the only alarm system at the facility.

Neither well is equipped with level instrumentation, flow meters, or individual pressure gauges on their discharge lines. The new treatment processes should include new instrumentation and controls for well levels, individual well flow meters, combined flow meter, pressure monitoring, tank level monitoring, new pump controls, chlorine residual monitoring, and alarms.

Electrical and HVAC

The existing electrical system at Quaker Hill facility consists of a propane fired engine generator, automatic transfer switch (ATS), main disconnect switch, pump starters, load center, pump control panel and a compressor disconnect switch. Most of the equipment has reached the end of its useful life and shows signs of corrosion. We recommend that the main disconnect switch, starters, pump control panel, compressor disconnect switch and load center be replaced. There is currently no surge protection provided on the well pumps. We recommend that surge protection be provided to protect the well pumps.

The generator is a 35 kilowatt propane-fired Katolight generator, located exterior to the building, but within the perimeter fencing system. The ATS is a 100 amp, 240 volt Katolight. Both the generator and ATS appear to be in fair condition, despite having weathered a flooding condition, when both the generator and switch were partially submerged. It is our understanding that most of the critical components in both pieces of equipment were evaluated and/or replaced following the flooding event. Also, the battery and charger were replaced in 2014. However, the generator and ATS are past their anticipated useful life and should be replaced and sized appropriately for the new treatment facility design.

Also, the main disconnect switch and ATS installations are in violation of working space requirement of 36 inches (National Electrical Code) for electrical equipment. As a result, the main disconnect should be powered down completely before completing any service work on the switch.

The existing exterior light and interior unit heater are original to the facility and should be replaced. In general, wiring, conduit, and receptacles inside the building are in poor condition, and the receptacles are not GFI rated.

The overhead electrical service for the wellfield and wellhouse/treatment facility comes from the east, across the wetland. DCWWA staff report that vegetation in the wetland has grown up beneath the electrical service and interfered with the overhead electrical lines. The vegetation has caused disruptions to the electrical service. It is difficult to perform maintenance and trimming of the vegetation beneath the electrical service because it runs through the wetland. Consideration was given to relocating the electrical service to Quaker Hill Road, however the only power available at Quaker Hill Road is single phase and it is a residential dead-end road, which poses significant difficulties to power the station loads.

1.4.4 Permit Conditions

The Quaker Hill Water District is subject to a water withdrawal permit. The water withdrawal permit limit for the Quaker Hill Water System is 289 gpm or approximately 416,000 gpd.

There are no wastes generated as part of operations at the Quaker Hill Water System.

1.4.5 History of Infrastructure Damage due to Storm/Flood Impacts

As discussed in Section 1.2.6, the Quaker Hill wellfield and wellhouse/treatment building has experienced flooding in the past, with the most notable flooding event in August 2011 during Hurricane Irene. Reportedly, flood waters rose up to 3 feet above the finished floor elevation of the existing wellhouse/treatment building, submerging the generator, lifting the propane tank off its support, and entering the wellhouse/treatment building, rendering the system inoperable.

1.5 Need For Project

On January 17, 2024, DCWWA received a Notice of Violation for exceeding the PFOS MCL (10 ppt) based on an average of the last three samples for Well #2 at the Quaker Hill Estates Water System. A copy of the Notice of Violation is attached as Appendix B.

Samples collected since 2021 from Well 1 and Well 2 consistently detected PFOA and PFOS, and concentrations have risen over time. Recent water quality samples collected in late 2023 and early 2024 from both wells at the Quaker Hill Water System range from 3.10 ppt to 13.60 ppt for both PFOS and perfluorooctanoic acid (PFOA). The current New York State MCL for PFOS and PFOA is 10 ppt.

On April 10, 2024, the EPA announced the final National Primary Drinking Water Regulation for six per- and polyfluoroalkyl substances (PFAS). The new rule set a MCL for PFOS and PFOA of 4 ppt and a MCL for PFHxS, PFNA, and HFPO-DA (commonly known as GenX Chemicals) of 10 ppt. In addition, mixtures containing two or more of PFHxS, PFNA, HFPO-DA, and PFBS will be regulated by a calculated *Hazard Index* (HI) value of 1 (unitless) based on the sum of individual compound's concentrations relative to their reference dose (Equation 1-1). Table 1-3 provides a summary of the raw water sample results for PFAS compounds with current regulatory limits.

$$\text{Hazard Index} = \left(\frac{[GenX_{water}]}{[10 \text{ ppt}]} \right) + \left(\frac{[PFBS_{water}]}{[2,000 \text{ ppt}]} \right) + \left(\frac{[PFNA_{water}]}{[10 \text{ ppt}]} \right) + \left(\frac{[PFHxS_{water}]}{[10.0 \text{ ppt}]} \right) \quad [\text{Equation 1}]$$

TABLE 1-3

Summary of PFAS Data for Quaker Hill Water System Wells 1 and 2

Source	Date	PFOA	PFOS	PFHxS	PFNA	PFBS	GenX	HI
Well 1	3/29/2024	3.10	3.70	0.00	0.00	0.00	0.00	0.00
	11/9/2023	5.10	7.52	1.27	0.00	3.02	0.00	0.14
	10/11/2023	4.90	5.44	1.09	0.00	2.72	0.00	0.12
	5/18/2023	4.62	4.40	1.03	0.00	2.46	0.00	0.12
	1/11/2023	3.27	2.53	0.99	0.00	2.00	0.00	0.11
	11/21/2022	3.54	3.00	1.26	0.00	2.38	0.00	0.14
	5/17/2022	3.84	3.55	1.75	0.00	2.92	0.00	0.20
	3/1/2022	2.35	2.56	1.12	0.00	2.78	0.00	0.13
	12/23/2021	5.42	7.67	1.38	0.00	4.70	0.00	0.16
	9/21/2021	4.06	6.02	0.80	0.00	3.48	0.00	0.09
	5/25/2021	2.64	2.80	0.69	0.00	1.88	0.00	0.08
	2/10/2021	2.83	3.71					
	Well 1 Average	3.81	4.41	1.03	0.00	2.58	0.00	0.12
Well 2	3/29/2024	3.70	10.00	0.00	0.00	2.80	0.00	0.00
	11/9/2023	8.59	13.60	1.62	1.04	4.32	0.00	0.29
	10/12/2023	10.60	13.50	1.65	0.81	4.26	0.00	0.27
	5/18/2023	9.81	9.26	1.46	0.00	3.66	0.00	0.16
	1/11/2023	8.90	8.64	1.55	0.00	4.47	0.00	0.17
	11/8/2022	6.36	5.66	1.41	0.00	3.54	0.00	0.16
	8/16/2022	5.05	4.70	1.14	0.00	3.04	0.00	0.13
	5/17/2022	6.72	7.30	1.25	0.00	4.63	0.00	0.14
	3/1/2022	7.05	7.44	1.31	0.00	4.99	0.00	0.15
	12/23/2021	5.64	7.39	1.39	0.61	4.75	0.00	0.22
	9/21/2021	7.45	9.18	1.02	0.00	4.85	0.00	0.12
	5/25/2021	7.38	8.30	1.26	0.00	3.56	0.00	0.14
	2/10/2021	7.17	8.09					
	Well 2 Average	7.26	8.09	1.26	0.21	4.07	0.00	0.16

LEGEND:

Exceeds current MCL (4 ppt) Will require quarterly monitoring

In addition to the Notice of Violation, sanitary surveys from the DCDBCH continually note issues with aging infrastructure. To summarize, the improvement project at the Quaker Hill Water System is needed for the following reasons:

- Notice of Violation for MCL PFOS Exceedance
- Sanitary Surveys identify issues with the condition of existing equipment
- Infrastructure is well past its useful life
- Infrastructure is in poor condition
- Facilities are subject to flooding
- Certain system components do not meet current design standards

1.6 Capacity Development

The New York State Department of Health (DOH) is required to ensure that all systems receiving DWSRF assistance have adequate technical, managerial, and financial capabilities to provide safe drinking water. Systems that lack adequate capacity may be determined as ineligible by DOH to receive DWSRF assistance unless the project to be financed corrects the technical, managerial, and financial deficiencies.

Attached in Appendix D is the completed Capacity Development Program Evaluation Form.

Section 2

Alternative Analysis

2.1 Alternatives Considered

There are two main alternatives to consider for the Quaker Hill Water System including abandonment of the existing wellfield and treatment system and connection to the Hyde Park Regional Water System (HPRWS) or replacement of the existing wellhouse/treatment building with a new system. A summary of the alternatives being considered is below:

- Alternative No. 1:
 - Connect the Quaker Hill Water System to the HPRWS (Route B)
 - Booster pump station at the North Tank site
 - Abandon the existing Quaker Hill Wellfield and treatment system
- Alternative No. 2:
 - Install a new treatment building with deep foundation
 - Install new system components including treatment for PFOS
 - Improvements to existing wells
 - Demolish the existing wellhouse/treatment building
 - Site improvements to protect the new facilities from flooding
- Alternative No. 3:
 - No Action

A no-action alternative (Alternative No. 3) will be discussed, but given the issues noted in Section 1.5 of this report, it is not a viable alternative. Rehabilitation of the existing wellhouse/ treatment building was also considered but found to be infeasible due to the significant settling issues and vulnerability to future flooding.

Section 2.5 presents the recommendations for water main improvements in the Quaker Hill Water System. Although not necessary to address the PFAS violation, the water main improvements should be considered as a second phase to either of the alternatives. A total of 500 feet of water main replacement within the existing Quaker Hill distribution system has been included in each alternative to address the highest priority areas of water main replacement.

2.2 Alternative No. 1 – Interconnection to HPRWS

As part of the alternatives analysis to address the PFOS MCL exceedance, the installation of a transmission water main from the HPRWS to replace the impacted water supply for the Quaker Hill Water System was considered.

Hydraulic conditions along the alternative interconnection routes were evaluated for water main sizing and the need for pumping and/or pressure reduction. The hydraulic evaluation used both the existing HPRWS hydraulic model (WaterGEMS) and GIS data to develop elevation and pressure profiles along each route. Hydraulic calculations presented utilize the Hazen-Williams equation to calculate headloss, assuming the installed main is cement lined ductile iron pipe with a C-factor of 130 (most conservative in range of values).

The Quaker Hill Water System does not currently provide fire flow. Therefore, the interconnection evaluation considers domestic flows only and recommended sizing does not include fire flow capacity. Three interconnection route alternatives were evaluated:

- Route A - Connection to the HPRWS from the 12-inch main in Route 9 at the Prospect Street intersection. (26,300 LF)
- Route B - Connection to the HPRWS at the North Storage Tank site via a cross country easement. (25,100 LF)
- Route C - Connection to the HPRWS at the North Storage Tank site via Mill Road and Hudson Drive. (35,900 LF)

The Route A, Route B, and Route C interconnections are shown in Figure 2-1.



**FIGURE 2-1
ALTERNATIVE 1
INTERCONNECTION ROUTES**

Hyde Park - Quaker Hill
Interconnection Analysis
Hyde Park, New York
June 2024

Environment Committee Roll Call

<i>District</i>	<i>Name</i>	<i>Yes</i>	<i>No</i>
District 7 - Hyde Park and Pleasant Valley	Truitt*	✓	
District 25 - Amenia, Washington, Pleasant Valley & Millbrook	Houston*		
District 3 - LaGrange	Polasek*		
District 16 - Fishkill and Beacon	Valdés Smith*		
District 9 - City of Poughkeepsie	Atkins*	Absent	
District 1 - Town of Poughkeepsie	Gorman		
District 4 - Hyde Park and Town of Poughkeepsie	Lawler		
District 5 - Town of Poughkeepsie	D'Aquanni (C)		
District 6 - Town of Poughkeepsie	Kaul		
District 13 - East Fishkill and Wappinger	Paoloni (VC)		
District 18 - City of Beacon and Fishkill	Page	Absent	
District 24 - Dover and Pawling	House		

Present: <u>10</u>	Resolution: <u>✓</u>	Total : <u>10</u>
Absent: <u>2</u>	Motion: <u> </u>	Yes No
Vacant: <u>0</u>		Abstentions: <u>0</u>

2025134 SETTING A PUBLIC HEARING IN CONNECTION WITH THE ESTABLISHMENT OF ZONE OF ASSESSMENT "029A" AND ZONE OF ASSESSMENT "029B" IN THE DUTCHESS COUNTY WATER DISTRICT LOCATED IN THE TOWN OF HYDE PARK

SEPTEMBER 4, 2025

Roll Call Sheets

District	Last Name	YES	NO
District 7 - Hyde Park and Pleasant Valley	Truitt	✓	
District 25 - Amenia, Washington, Pleasant Valley & Millbrook	Houston		
District 3 - LaGrange	Polasek		
District 16 - Fishkill and Beacon	Valdés Smith		
District 9 - City of Poughkeepsie	Atkins	Absent	
District 1 - Town of Poughkeepsie	Gorman		
District 2 - LaGrange, Pleasant Valley & Town of Poughkeepsie	Travelpiece		
District 4 - Hyde Park and Town of Poughkeepsie	Lawler		
District 5 - Town of Poughkeepsie	D'Aquanni		
District 6 - Town of Poughkeepsie	Kaul		
District 8 - City and Town of Poughkeepsie	Brendli		
District 10 - City of Poughkeepsie	Johnson		
District 11 - Clinton, Pleasant Valley, and Rhinebeck	Kearney		
District 12 - East Fishkill	Metzger		
District 13 - East Fishkill and Wappinger	Paoloni		
District 14 - Wappinger and Town of Poughkeepsie	Versaci	Absent	
District 15 - Wappinger	Faust		
District 17 - Town and Village of Fishkill	McHoul		
District 18 - City of Beacon and Fishkill	Page		
District 19 - North East, Stanford, Pine Plains, Milan & Red Hook	Drago		
District 20 - Red Hook, Tivoli, and Rhinebeck	Munn		
District 21 - East Fishkill	Caswell		
District 22 - Beekman and Union Vale	Garito		
District 23 - Pawling, Beekman and East Fishkill	Rolison		
District 24 - Dover and Pawling	House		

Present: 23 Resolution: ✓ Total : 23 0
 Absent: 2 Motion: — Yes No
 Vacant: 0 Abstentions: 0

2025134 SETTING A PUBLIC HEARING IN CONNECTION WITH THE ESTABLISHMENT OF ZONE OF ASSESSMENT "029A" AND ZONE OF ASSESSMENT "029B" IN THE DUTCHESS COUNTY WATER DISTRICT LOCATED IN THE TOWN OF HYDE PARK

SEPTEMBER 8, 2025