ENVIORNMENT

RESOLUTION NO. 2025150

RE: SETTING A PUBLIC HEARING IN CONNECTION WITH THE ESTABLISHMENT OF ZONE OF ASSESSMENT "032" IN THE DUTCHESS COUNTY WATER DISTRICT LOCATED IN THE TOWN OF HYDE PARK

Legislators D'AQUANNI, PAOLONI, GORMAN, and CASWELL 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 "032" within the DCWD located in the Town of Hyde Park, and

WHEREAS, the WWA proposes to provide an interconnection from its existing Hyde Park Regional Water system to the existing Madison-Holt Water distribution system and the proposed water main extension on Rothkranz Street in the Town of Hyde Park, and

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

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

RESOLVED, that this Legislature shall conduct a public hearing on the 10th day of November, 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 "032" 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 publish 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 "032", 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-122-25; CRC/mar/rjw; G-1217-GG; 09/05/2025; Fiscal Impact: None.

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 14th day of October 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 hereunto set my hand and seal of said Legislature this 14th day of October 2025.

LEIGH WAGER, CLERK OF THE LEGISLATURE

DUTCHESS COUNTY
WATER AND WASTEWATER AUTHORITY

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: September 2, 2025

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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 "032" (Madison-Holt Water System).

The DCWWA is requesting that the County establish County Water District Zones of Assessment "032" to provide water services to directly adjacent properties along an existing water main extension (interconnection) in the Town of Hyde Park. The interconnection was part of a project that connected the Hyde Park Regional and Pinebrook Estates Water Systems. A Map, Plan and Report for Zone of Assessment "032" 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
# Zone of Assessment "032"

(Madison-Holt Water System)
Hyde Park, NY

## MAP, PLAN AND REPORT

September 2025

Dutchess County Water and Wastewater Authority
Poughkeepsie, NY

DUTCHESS COUNTY
WATER AND
WASTEWATER AUTHORITY

September 2025

**PROPOSED COUNTY WATER DISTRICT ZONE OF ASSESSMENT "032"**
**(MADISON-HOLT 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 "032" (Zone), which includes an area of approximately twenty-nine (29) acres located on Holt Road West, Holt Road, Dogwood Lane, Rothkranz Street, Violet Avenue, Madison Avenue, Cathy Drive, Gary Drive, and Old Violet Avenue, in the Town of Hyde Park, NY.

The information provided herein includes the proposed Zone's boundaries and a list of the tax parcels that will comprise the future Zone, 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 Dutchess County Water and Wastewater Authority will enter into contract (the "Service Agreement") with Dutchess County on behalf of the Zone for the purpose of administering the retail sale of water services to all properties within the proposed Zone, with such service to be provided through the water system facilities as described below. The Authority will administer the Zone pursuant to guidelines established by the Service Agreement and collect water revenues. Water service rates will be set annually by the Authority.

## HISTORY

According to available system documentation from the Dutchess County Department of Health, the expansion area contains private wells and one public water supply owned and operated by a private entity. In 2018, the Authority was awarded an Environmental Facilities Corporation (EFC) grant from New York State. The purpose of the grant was to support the interconnection between the Hyde Park Regional Water District and the Pinebrook Estates Water District, with a focus on opportunities to streamline and improve the water quality, water quantity, and service delivery. The grant provided for an engineering design of the interconnection system and consideration of the option to connect all parcels adjacent to the interconnecting. Construction of the interconnection main was completed in 2023. DCWWA is now moving forward with the plan to connect the parcels adjacent to the interconnecting main. The Authority conducted a meeting with the public to discuss the Zone of Assessment creation and the Benefit Assessment on May

6, 2025.

**COUNTY WATER DISTRICT ZONE OF ASSESSMENT "032"**

The proposed Zone delineated on the map and list of tax parcels included in Appendix "A", presently includes a total of sixty-four (64) tax parcels of which sixty (60) are developed residential properties, two (2) are vacant residential lots, and two (2) are sites of developed commercial apartment lots.

**PHYSICAL FACILITIES**

Potable water for the Zone will be supplied through the interconnection between the Hyde Park Regional Water System (PWS ID# NY1302796), which obtains its raw water from the Hudson River and treats said water at its surface water treatment plant facility, and the Pinebrook Estates Water District (PWS ID# NY1322156) which has abandoned all of its existing infrastructure with the exception of the water distribution system. The interconnection has been constructed and in service since 2023. An Engineer's Report titled Pinebrook Water System Hyde Park Regional Water System Interconnection, prepared by MJ Engineering, last revised March 2021, and included in Appendix "D", proposed the supporting documentation to interconnect the Hyde Park Regional Water System to the Pinebrook Estates Water District, which can now provide water to the Zone.

The maximum day demand for the Zone has been calculated at 21,250 gallons per day (GPD).

***Existing Water Supply and Treatment System***

All wells and treatment systems, where existing, are owned and operated by private entities. Upon creation of the Zone, the benefited users may abandon and decommission their existing wells in order to connect to the existing water main, at which point the source of water becomes the Hyde Park Regional Water System (HPRWS). The HPRWS obtains its raw water from the Hudson River where it then provides a series of treatment including coagulation, flocculation, filtration, disinfection, taste and odor control treatment, and corrosion control treatment before entering the water distribution system. Pressure and flow have been determined to substantiate successful connections by benefiting users to the water main.

***Transmission and Distribution***

The distribution system includes approximately 3,800 feet of existing 12-inch ductile iron pipe installed in 2022-2023, and approximately 275 feet of proposed 8-inch ductile iron pipe to be installed along Rothkranz Street to serve adjacent properties and an apartment complex. Service connections will be metered. The water system is designed for and provides fire protection within the Zone of Assessment.

**PROPERTY ISSUES**

The distribution system water mains are generally located within the right-of-way for the roads discussed above. A permanent easement is being sought by the apartment complex, Frantoni Villa Apartments located on Violet Avenue through privately-owned parcel identified by 6163-

02-522919, also identified as 7 Rothkranz Street. The permanent easement is for a water service line between Frantoni Villas Apartments and 7 Rothkranz Street, and the DCWWA is not involved in the easement agreement. There are no anticipated property issues with respect to DCWWA-owned infrastructure.

**SOURCE CAPACITY AND QUALITY EVALUATION**

All wells and treatment systems, where existing, are owned and operated by private entities. Source capacities of each well are unknown at this time. The water quality of the two (2) developed commercial apartment parcels meeting the definition of a Public Water Supply are assumed poor quality. Due to the close vicinity of adjacent public water supply data, it is assumed that the private wells within the Zone of Assessment also have poor water quality, including the inability to meet separation requirements from well to sewage disposal systems on some sites.

The HPRWS from which the Zone will obtain its water, is sourced from the Hudson River. The system provides a series of treatment including coagulation, flocculation, filtration, disinfection, taste and odor control treatment, and corrosion control treatment before entering the water distribution system. The system can treat a maximum of two million one-hundred thousand gallons per day (2,100,000 GPD), with existing daily storage of one and three-quarters of a million gallons (1,750,000 gallons).

**FUTURE DEMAND**

The proposed Zone encapsulates all parcels immediately adjacent to the distribution system. The system has sufficient capacity to serve the Zone of Assessment. The maximum day demand has been calculated at 21,250 GPD, based upon sixty-two (62) developed parcels and two (2) undeveloped parcels at full buildout. The Hyde Park Regional Water system has sufficient capacity to serve the Zone of Assessment. There are no current or anticipated plans to expand the Zone beyond what is currently proposed.

**FUTURE CAPITAL COSTS**

An Engineer's Report titled Pinebrook Water System Hyde Park Regional Water System Interconnection, prepared by MJ Engineering, last revised March 2021, and included in Appendix "D", proposed the supporting documentation to interconnect the HPRWS to the Pinebrook Estates Water District. The water main has been constructed except for Rothkranz Street, of which an extension is proposed as part of the Zone of Assessment creation.

The DCWWA is currently working towards a New York State Environmental Facilities Corporation (NYS EFC) grant application to fund approximately 70% of the total project costs due to the emerging contaminants known as Per- and polyfluoroalkyl substances (PFAS) found in the Frantoni Villas wells. Given the proximity of Frantoni Villas, the proximity of the Pinebrook Community which suffered deteriorating water quality, and the residential response to their water well quality, it is assumed that the area also suffers from deteriorating water wells. The total project cost is estimated at $1,450,000. Given that the NYS EFC is awarding grants to projects that address PFAS contamination at a 70% grant rate, and that the Frantoni Villas

Apartments is currently under a consent order to address the maximum contaminant level exceedance for PFAS, it is anticipated that a grant award of a not-to-exceed amount of $1,015,000 will be obtained with a remaining balance of $435,000 to be financed through the NYS EFC for a 30-year term.

All benefiting users except for Rothkranz Street in the Zone can be connected upon creation; however no funding can be provided unless the grant is awarded, and the most cost-effective project is to perform all construction at the same time for both the water main extension and the individual water service line connections.

***Distribution System***

The existing interconnection water main was constructed in 2022-2023 in full conformance with regulatory standards. The proposed water main on Rothkranz Street will be designed and constructed upon completion of the Zone of Assessment.

The location of the hydrants provides an adequate means of flushing and fire protection in all areas of the system. It is anticipated that at least one additional hydrant will be proposed and installed as part of the Rothkranz Street water main extension.

**CURRENT CAPITAL COSTS AND ALLOCATIONS**

An Engineer's Report titled Pinebrook Water System Hyde Park Regional Water System Interconnection, prepared by MJ Engineering, last revised March 2021, and included in Appendix "D", proposed the supporting documentation to interconnect the HPRWS to the Pinebrook Estates Water District. Construction of the interconnection is complete with a total project cost of $2,116,517 with $1,268,000 funded by a NYS grant, and the remaining $848,517 funded by a loan through the NYS Environmental Facilities Corporation. Annual debt expense for the interconnection of the Hyde Park Regional Water System to the Pinebrook Water District will be allocated equitably among all parcels within the proposed Zone in addition to the existing Pinebrook Water Zone of Assessment "R", through the assignment of benefit units to each parcel included in the two Zones.

The existing annual debt expenses for the previous improvements to the HPRWS will be allocated equitably, through the assignment of benefit units, to each parcel included in the Zone of Assessments that receive water service from the HPRWS, , including Zones of Assessment "A", "B", "C", "D", "I", "L", "R", and "032", all of which benefit from the facility improvements.

The methodology for the assignment of benefit units for the proposed Zone is included as Appendix "C". All benefit units within the Zone will be charged at the same rate. The annual benefit assessment would appear on the respective property owner's yearly property tax bill.

Application of the Benefit Assessment Methodology to the current district parcels results in a total of six hundred and ninety-six (696) benefit units within the proposed Zone. Apportionment of the total anticipated annual capital debt expense of $68,315 across the calculated number of

benefit units results in a per benefit unit cost of ninety-eight dollars and fifteen cents ($98.15), or nine hundred and eighty-two dollars ($982) for a typical single-family residence. It is anticipated that this expense would appear on the 2027 property tax bill (second year of operation).

**OPERATION AND MAINTENANCE (O&M) COSTS**

The operation and maintenance costs for the proposed Zone will be the cost of water produced by the HPRWS 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 HPRWS 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 the proposed Zone, the estimated annual O&M charge would be approximately eight hundred forty-four dollars ($844).

**CONNECTION CHARGES**

The one-time service connection charge for a typical single-family residence with a ¾" meter connection would be one thousand one-hundred and fifty dollars ($1,150.) For a property with a 1" meter connection the one-time service connection charge would be one thousand four hundred dollars ($1,400.) For those properties with connection sizes greater than 1" the connection charge would be determined on a case-by-case basis. These costs are not proposed to be covered under the NYS EFC-sought grant.

**Annual Cost per a Typical Property – First Year: $1,826**

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 a typical property will be a single-family dwelling unit. Given the assumptions and estimates described above, the projected "First Year" total cost for a typical single-family dwelling in the proposed Zone will be one thousand eight hundred and twenty-six dollars ($1,826) dollars for long-term capital charges and O&M expenses A system budget based on these rates will build appropriate fund balances to maintain the public water system in good working order. A table of anticipated annual costs per typical property for the first year is included in Appendix "E". The table will provide a breakdown of the project costs (both with and without the grant award), current capital costs allocations including debt services, and O&M costs.

#####

## APPENDICES

| | |
|---|---|
| Appendix "A" – | Dutchess County Water District, Pinebrook Expansion Water System, Description of Zone (Map & Parcel List) |
| Appendix "B" – | Proposed Operation & Maintenance Costs |
| Appendix "C" – | Proposed Benefit Assessment Methodology |
| Appendix "D" – | Engineer's Report – Pinebrook Water System Hyde Park Regional Water System Interconnection, prepared by MJ Engineering, last revised March 2021 |
| Appendix "E" – | Annual Cost per Typical Property – First Year - Table |

## APPENDIX "A"

Pinebrook Expansion Water System (County District Zone of Assessment "032")

**DUTCHESS COUNTY WATER DISTRICT**
***Pinebrook Expansion Water System***

**DESCRIPTION OF ZONE**
**(Map & Parcel listing)**

The Dutchess County Water District Zone of Assessment "032" 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:

| | | |
|---|---|---|
| 6163-01-450971-0000 | 6164-03-398062-0000 | 6163-02-515902-0000 |
| 6163-01-485783-0000 | 6163-01-431999-0000 | 6163-02-505765-0000 |
| 6163-01-466902-0000 | 6163-01-486902-0000 | 6163-01-495825-0000 |
| 6163-01-477826-0000 | 6163-01-479890-0000 | 6163-01-439973-0000 |
| 6163-02-503782-0000 | 6163-10-481732-0000 | 6163-01-459957-0000 |
| 6163-01-429978-0000 | 6163-01-468888-0000 | 6163-02-501918-0000 |
| 6164-03-448017-0000 | 6163-01-480987-0000 | 6163-02-514726-0000 |
| 6163-01-492838-0000 | 6163-01-458982-0000 | 6163-02-526896-0000 |
| 6163-01-485870-0000 | 6163-01-488890-0000 | 6163-02-503892-0000 |
| 6163-02-501790-0000 | 6163-01-476834-0000 | 6163-01-487858-0000 |
| 6163-01-486773-0000 | 6163-01-483930-0000 | 6163-01-464935-0000 |
| 6163-01-471963-0000 | 6163-01-484878-0000 | 6163-01-490845-0000 |
| 6163-01-471862-0000 | 6164-03-407045-0000 | 6163-01-481804-0000 |
| 6163-01-492916-0000 | 6163-02-503902-0000 | 6163-01-488764-0000 |
| 6163-01-474842-0000 | 6163-01-479816-0000 | 6163-01-483793-0000 |
| 6163-01-467923-0000 | 6164-03-436045-0000 | 6163-01-469875-0000 |
| 6163-01-450992-0000 | 6163-01-475903-0000 | 6163-01-497805-0000 |
| 6163-01-495815-0000 | 6164-03-433061-0000 | 6163-02-558926-0000 |
| 6163-01-461947-0000 | 6163-01-475951-0000 | 6163-02-548915-0000 |
| 6163-02-522919-0000 | 6163-01-495878-0000 | 6164-03-428020-0000 |
| 6163-02-506775-0000 | 6163-02-511919-0000 | 6164-03-417035-0000 |
| 6163-01-473850-0000 | | |


**Pinebrook Expansion 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
— Proposed Water Main
▭ Parcels within Zone

N W E S

0 375 750 1,500 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: February, 2025

DUTCHESS COUNTY WATER AND WASTEWATER AUTHORITY

**APPENDIX "B"**

Pinebrook Expansion Water System (County District Zone of Assessment "032")

**Proposed Operation & Maintenance Costs**

*Adopted Water Rate Schedule – Effective January 1, 2025*

**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:

| Meter/Service Size: | Rate Per Month: |
|---|---|
| 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.

| Meter/Service Size: | Rate Per Month: |
|---|---|
| 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"**

Pinebrook Expansion Water System (County District Zone of Assessment "032")

**COUNTY WATER DISTRICT**
**ZONES OF ASSESSMENT C, D, H, M and U (Not J or K)**

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

**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"**

Pinebrook Expansion Water System (County District Zone of Assessment "032")

**Engineer's Report - Pinebrook Water District Evaluation, prepared by Tighe & Bond, last revised August 2014**


FINAL REPORT

# Pinebrook Water District Evaluation

Prepared For:

**Town of Hyde Park, NY**
**and**
**Dutchess County Water and Wastewater Authority**

August 2014

T&B Engineering, P.C.

This Report was prepared with funds provided by the New York State Department of State under the Shared Municipal Services Incentive Grant Program

T&B Engineering, P.C.

D-0280-1-01
August 21, 2014

Ms. Aileen Rohr, Supervisor
Town of Hyde Park
4383 Albany Post Road
Hyde Park, NY 12538

Mr. Jonathan Churins
Dutchess County Water and Wastewater Authority
27 High Street
Poughkeepsie, NY 12601

Re: Pinebrook Water District Evaluation

Dear Aileen and Jonathan:

T&B Engineering, P.C. (T&B) is pleased to submit to the Town of Hyde Park, NY and the Dutchess County Water and Wastewater Authority our draft report for the Pinebrook Water District Evaluation.

This report was prepared with funds provided by the New York State Department of State under the Shared Municipal Services Incentives Grant Program.

**Executive Summary**

T&B conducted an on-site review and inspection of the Town's Pinebrook Water District, as well as office studies evaluating the existing performance of the District. This report summarizes the results of our evaluation, including what improvements are recommended be made, and the cost of these improvements.

We hope that this report will meet the Town and Authority's goal of understanding the existing condition of the District, and can be used to determine the best path moving forward to upgrade the facilities in order to continue to meet regulatory requirements while keeping the cost impact as low as possible and ensuring a positive outcome for the Town's residents.

Overall, the District is in good condition. There are several mechanical and safety issues that must be addressed in the next 5 years, including new booster pumps and chemical feed system upgrades to address safety concerns, and a new roof will be required in the next 5 years. The District is currently addressing supply and water quality issues. The effectiveness of the existing treatment system will need to be monitored moving forward to determine if additional action will be required.

The following tables summarize the anticipated investment required in the system, and interconnection alternatives for the system, respectively. For additional detail regarding our recommendations, refer to Sections 2 and 3 of the report. Note that the table below includes the estimated total project cost, but does not include escalation. For additional breakout, refer to Appendix D of the report.

| Action Category | Total Capital Cost |
|---|---|
| Urgent | $ 32,700 |
| Short Term Planning/Studies | $ 26,100 |
| Short Term – 5 years or less | $ 271,300 |
| Long Term | $ 556,600 |
| **Total** | **$ 886,700** |

| Interconnection Alternative | Total Capital Cost |
|---|---|
| Interconnection with Greenbush | $ 1,932,900 |
| Interconnection with Arbors | $ 4,653,900 |
| Interconnection with Hyde Park System via Violet Ave | $ 3,402,100 |
| Interconnection with Hyde Park System via Holt Road | $ 1,183,300 |

**Acknowledgments**

We wish to thank the Town of Hyde Park, the Pinebrook Water District Advisory Committee, the Dutchess County Water and Wastewater Authority, and VRI for their assistance throughout the project and the development of this report. We especially acknowledge the assistance provided by you, Wayne Maybe, and Dale Post.

This report was prepared by Tighe & Bond personnel under the general supervision of Paul E. Malmrose, P.E., Vice President. Darleen P. Buttrick, P.E. served as project manager. The field inspection team consisted of Darleen P. Buttrick, P.E. (civil/process), David Sullivan, P.E., (structural), Marek Strojvus (electrical/HVAC/instrumentation and controls), and David Horowitz, P.E. (safety/tanks).

We look forward to reviewing the results of our evaluation with you.

Very truly yours,

**TIGHE & BOND, INC.**

Darleen P. Buttrick, P.E.
Project Manager

Approved by:

Paul E. Malmrose, P.E.
Vice President

Enclosures

# Table of Contents

# Section 1
# Background

## 1.1 Introduction

The Pinebrook Water District (District) is located in the southwest corner of the Town of Hyde Park, NY, as shown in Figure 1-1 below. The District serves approximately 132 residential connections located along Pinebrook Drive and Newington Drive in the Pinebrook Estates condominium development.


**Figure 1-1 Pinebrook Water District**

The District was originally formed in 1987, when three wells were constructed along with the treatment facility, 24 condominium units, and a portion of the water distribution system. In 2001, a new developer purchased the project and completed construction of the remaining units and water distribution system. Also at that time, one of the existing wells was abandoned and a new well installed. In 2010, the Town of Hyde Park acquired the water system, and the Water District Advisory Committee was formed to assist the Town in effective administration of the District

The District's facilities include three wells, two water softening treatment units, two atmospheric storage tanks, two booster pumps, one hydropneumatic tank, and one wellhouse/treatment building. Water is delivered to the distribution system with over 1.5 miles of 6-inch ductile iron water mains.

The Town of Hyde Park has been striving to optimize delivery of water and sewer services to their residents. In working toward this goal, the Town formed Reorganization Study Committees, and joined with the Dutchess County Water and Wastewater Authority (DCWWA) in 2013 to secure funding through a Local Government Efficiency Grant for completion of a facilities evaluation for the system. The goal of this report is to provide the Town with a tool that can be used to understand the condition of the District, what improvements need to be made, and the cost of those improvements.

The results of this report will be used to understand the options for effectively operating the District, with the ultimate goal of improving efficiency, reducing costs and ensuring positive outcomes for the Town's residents.

The project kick-off meeting and field visit were completed on March 11, 2014. A prioritization workshop was conducted with the representatives from the Town, the Reorganization Committee, the Town's engineer, and the DCWWA on April 10, 2014 to review the preliminary findings and further prioritize the needs of the District. The PowerPoint slides from the workshop are available in Appendix A. The scope of work for the evaluation is summarized in Section 1.2 below. The results of the source and treatment evaluation are presented in Section 2, the results of the distribution system evaluation are presented in Section 3, and Section 4 summaries the budgetary costs for the recommended improvements.

## 1.2 Evaluation Scope

### 1.2.1 Source and Treatment Evaluation

The scope of the source and treatment evaluation included the following:

- Determination of current source and treatment system's capacity and surplus/deficit in capacity
- Review of monthly operation reports to determine violations of drinking water standards, required sampling, testing and other system non-compliances
- Evaluation of treatment process versus current standards
- Facilities Evaluation to determine condition of treatment equipment, the facility structure, and support systems. The following items were considered during the facilities evaluation:
    - Civil – Access roads, pavement condition, sidewalks, fencing, gates, and drainage structures
    - Security – Physical protection systems including entrance gates, perimeter fencing, and intrusion detection systems utilizing a security checklist
    - Safety - Safety concerns such as chemical containment and spill prevention, proper ventilation of hazardous areas, suitable walkways and handrails, and protection for electrical equipment, open tanks and manholes.
    - Process/Mechanical – Major mechanical equipment, chemical feed systems, process valves and actuators, equipment accessibility, and compliance with Dutchess County Sanitary Code, New York State Codes,

Rules and Regulations, Title 10 – Part 5 – Subpart 5-1 – Public Water Systems (Part 5), and the Great Lakes Upper Mississippi Board Recommended Standards to Water Works and Wastewater Facilities, also known as the "10 States Standards"

- Structural/Architectural – Windows, doors, roof systems, structural integrity of structures, condition of miscellaneous metals and painted surfaces including handrails, and compliance with DOL Chapter Lab 1400/OSHA safety requirements and the International Building Code (IBC)
- Electrical – Major electrical equipment including generators, panelboards, motors, lightning protection, lighting systems, and compliance with National Electric Code (NEC) and National Fire Protection Association (NFPA) guidelines
- HVAC – Air handling equipment including intake louvers and exhaust fans, unit heaters, and moisture control equipment including dehumidifiers and sump pumps.
- Instrumentation and Controls – Pressure transmitters, analyzers, and other process instrumentation and control equipment

- Identification of short term and long term capital improvements with probable construction and project costs.

### 1.2.2 Distribution System Evaluation

The scope of the source and treatment evaluation included the following:

- Evaluation of current distribution system capacity and pressures, and evaluation of additional future average and peak demands
- Determination of ability to provide fire flow and complete effective distribution system flushing
- Review of adequacy of easements
- Identification of short term and long term capital improvements with probable construction and project costs

### 1.2.3 Exclusions

The scope of work for the District evaluation did not include the following:

- Pump tests for evaluation of pump performance or well yields
- Hydrant flushing to verify system pressures
- Individual review of customer meters
- Underground piping and valves including leak detection testing
- Water quality sampling
- Interior of water storage tanks – inspection was limited to an exterior visual inspection

# Section 2
# Source and Treatment Evaluation

## 2.1 Existing System

The Pinebrook Water District source and treatment system includes three wells, a wellhouse/treatment building, a sodium hypochlorite feed system, a softening treatment system, two atmospheric storage tanks, two booster pumps, and a hydropneumatic tank. Figure 2-1 shows a schematic of the existing system.

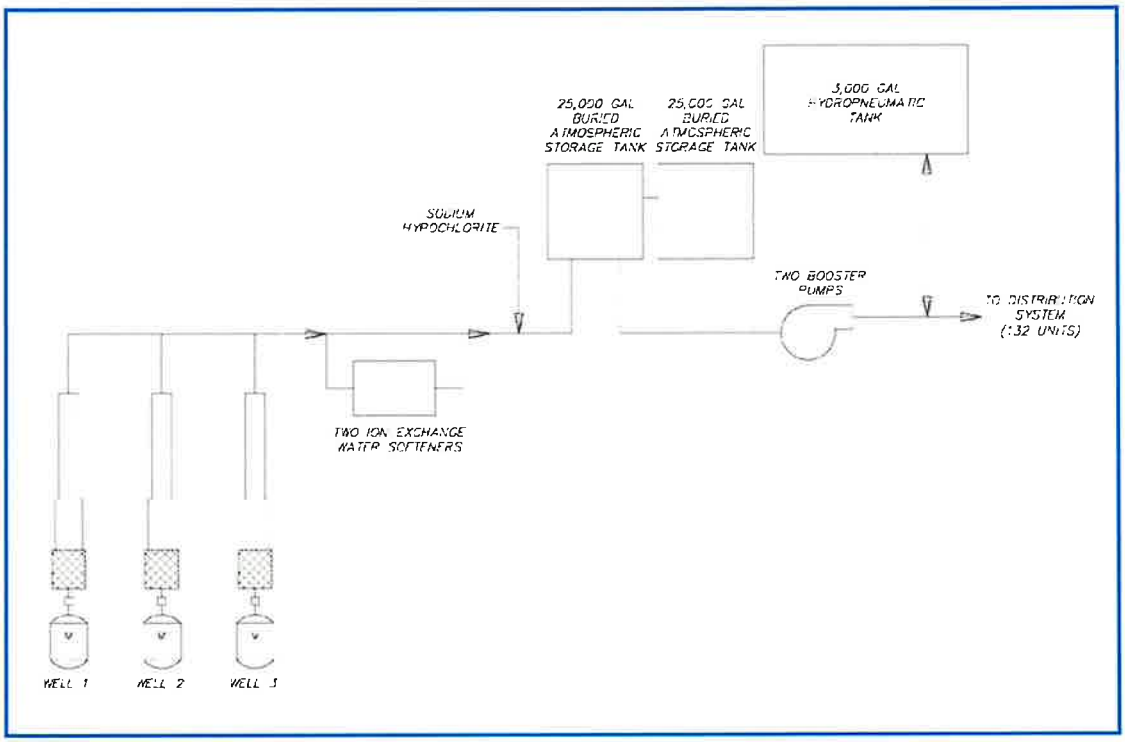


**Figure 2-1 Existing System Schematic**

## 2.2 Capacity Evaluation

The Pinebrook Water District has three onsite groundwater wells. According to system operators, Well 1 is the primary well, and Well 2 is the backup well. Well 3 is operational but not currently connected to the system. Details regarding the construction of the wells were not available.

### 2.2.1 Existing Capacity

Existing well capacity was estimated based on historical records and the Dutchess Department of Health (DOH) inspection reports. Pumping capacities are based on information obtained from the DOH Letter dated September 12, 2011. The DOH issued an inspection letter on April 22, 2013 indicated that Well 1 was producing 54 gpm at the

time of the inspection. The estimated pumping capacities from the historical records are summarized in Table 2-1 below.

**Table 2-1**
Groundwater Well Capacities

| Well No. | Capacity[1] | Comments |
|---|---|---|
| Well 1 | 44 gpm | Primary |
| Well 2 | 43 gpm | Online and connected/backup |
| Well 3 | 50 gpm | Operational/not connected |
| Total | 137 gpm | |

(1) Well production based on 2011 Dutchess DPH Letter (2013 DPH Letter did not provide production for each well)

We recommend that flow testing be completed on the wells to confirm their existing capacity. Following this testing, we recommend that well level instrumentation and individual flow meters be installed in order to monitor well production over time and track the need for well redevelopment or improvements.

### 2.2.2 Existing Demands

Each well is equipped with a totalizing flow meter to measure total flow from each well. However, the flow meters do not have a means to measure and record instantaneous flow. As such, monthly operating reports were reviewed in order to evaluate well production for the District. Monthly operating reports from August 2012 through July 2013 were evaluated as well as DOH inspection reports. A summary of the production data during this period is presented in Table 2-2 below.

**Table 2-2**
Production Summary

| Year | Month | Total Monthly Production (gal) | Average Demand (gpd) | Max Day Production in Month (gal/day) |
|---|---|---|---|---|
| 2012 | Aug | 422,100 | 13,616 | 29,200 |
| 2012 | Sept | 412,200 | 13,740 | 27,400 |
| 2012 | Oct | 483,200 | 15,587 | 32,600 |
| 2012 | Nov | 428,000 | 14,267 | 20,700 |
| 2012 | Dec | 488,200 | 15,748 | 48,200[1] |
| 2013 | Jan | 455,400 | 14,690 | 20,500 |
| 2013 | Feb | 340,100 | 12,146 | 22,300 |
| 2013 | Mar | 448,200 | 14,458 | 20,100 |
| 2013 | Apr | 455,100 | 15,170 | 22,200 |
| 2013 | May | 464,600 | 14,987 | 22,200 |
| 2013 | June | 433,000 | 14,433 | 20,000 |
| 2013 | July | 467,000 | 15,065 | 29,200 |

(1) This data point is considered an outlier and not representative of daily production because maximum day demand does not typically occur during December.

As illustrated in Figure 2-2 below, demands have been relatively consistent throughout the period of record. Average day demand during this period was calculated as 14,513 gpd, or 10 gpm. This equates to approximately 110 gallons per residential unit per day, which in our experience is within the reasonable range for domestic demands. The maximum day demand during this period occurred on December 26, 2012, and was 48,200 gpd, or 33 gpm. Maximum day demand does not typically occur during December and the recorded production on other days during December was significantly lower. Therefore, this data point is not considered representative of daily demand for the district. As such, the maximum day demand was calculated based on the next highest demand day, which was October 2, 2012, and was 32,600 gpd, or 23 gpd.

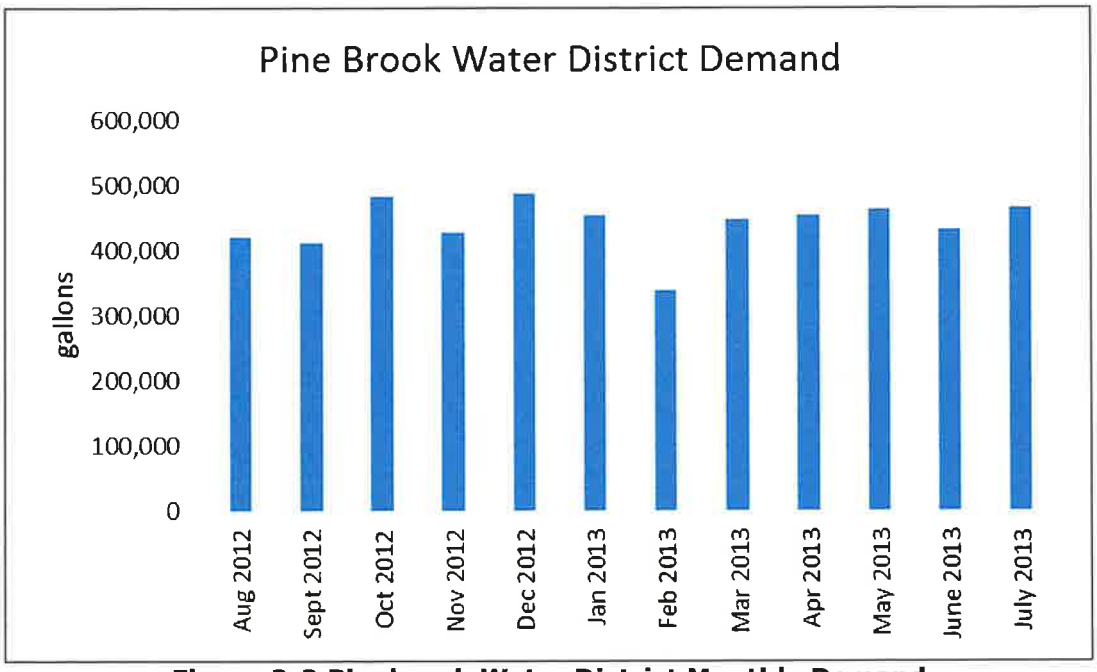


**Figure 2-2 Pinebrook Water District Monthly Demand**

Based on discussions with District representatives, there is no history of significant water main failures, and there is no reason to believe that there is an issue with a high percentage of unaccounted for water in the system that would necessitate leak detection testing for the system.

### 2.2.3 Adequacy of Supply

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. Table 2-3 below summarizes the current system demands and system capacities.

**Table 2-3**
Average and Maximum Day Demand Summary

| Demand Condition | Demand (gal/day) | Demand (gpm) |
|---|---|---|
| Average Day Demand (ADD) | 14,513 | 10 |
| Maximum Day Demand (MDD) | 32,600 | 23 |
| Firm Capacity | 125,280 | 87 |

With the largest production well out of service (Well 3), the total groundwater source capacity is 87 gpm if Wells 1 and 2 are operational. According to recent production data, maximum day demand is 33 gpm, which is less than the individual capacities of Wells 1 or 2. However, Well 1 was noted as the only working well at the time of a DOH inspection conducted on March 12, 2013. A violation was issued in 2013 for failure to provide a second source, which can provide sufficient water to meet the maximum day requirements with Well 1 out of service. The District is currently making improvements to the softening treatment units so that Well 2 can be returned to service. With this improvement, the system has sufficient capacity to meet 10 State Standards requirements.

Based on the average day demand of 14,513 gpd, the average residence time of the tanks is 3.4 days. According to the 10 State Standards, systems should be designed to minimize residence times to maintain treated water quality. Loss of chlorine residual may be a concern at higher residence times. However, we don't typically anticipate groundwater to have negative water quality impacts from a mean residence time of 3.4 days. We would recommend cleaning the tank and checking for the buildup of iron and manganese, which may precipitate out of the groundwater following chlorination. Given that the District does not have redundancy of sources, it is favorable that the District has a total of 50,000 gallons of storage. The water storage tank provides emergency storage. Under max day demand, the current storage would provide water for approximately 1.5 days if none of the groundwater wells were operating.

### 2.2.4 Future Demands

The Pinebrook Water District currently provides water to 132 residential units in Pinebrook Estates. There are no vacant areas to construct additional units within the Pinebrook Estates development. As such, there is no immediate build-out potential for the District.

## 2.3 Water Quality and Treatment Evaluation

### 2.3.1 Introduction

A water quality and regulatory compliance review was completed for the District to evaluate the performance of the treatment system components. Monthly operating reports were reviewed to identify system non-compliance for items such as required sampling and testing, as well as to evaluate water quality data versus existing water quality regulations applicable to the facility. The following were considered as part of the review:

- Dutchess County Sanitary Code
- New York State Codes, Rules and Regulations, Title 10 – Part 5 – Subpart 5-1 – Public Water Systems (Part 5)
- United States Environmental Protection Agency (EPA) Drinking Water Standards

### 2.3.2 Compliance Monitoring

As detailed in the most recent DOH inspection letter dated April 22, 2013 the following is a summary of the sampling requirements for the Pinebrook Water District:

**Table 2-4**
Current Pinebrook Sampling Requirements

| Contaminant | Sampling Frequency |
|---|---|
| Total coliform | 1 sample per month |
| Chloride | 1 sample per year |
| Iron & Manganese | 1 sample per quarter |
| Radiological | 1 sample every 3 years |
| Inorganic Chemicals | 1 sample every 3 years |
| Principal Organic Compounds | Sample each well every six years |
| Sodium | 1 sample per year |
| Asbestos | Waiver received – renewal of waiver due by 2017 |
| Nitrate | 1 sample per year |
| Lead & Copper | 5 samples every 3 years |
| Disinfection byproducts | 1 sample every 3 years |
| Synthetic Organic Chemicals | Waiver received – next sample due 12/31/14 |

In general, the District has performed the required contaminant sampling, with the following exceptions:

- In 2011, a violation was issued for only collecting two quarterly iron and manganese samples. Iron and manganese samples must be collected every quarter.
- Prior to the Town taking ownership of the system, the District did not complete the 2009 annual water supply statement.

In addition, we were unable to confirm whether the following samples requirements are outstanding, as sampling data was not provided:

- 2013 chloride and sodium samples from the "distribution system." Raw water samples were collected from Well 3 on July 30, 2013, but it does not appear that a sample was collected from the "distribution system" in 2013 for chloride and sodium.

- 2013 radiological data
- 2013 principal organic compounds data from each well in 2013 - Only data for Well 3 sampled on July 30, 2013 is available

### 2.3.3 Water Quality

Water quality records from 2004 through 2014 were evaluated versus state and federal requirements. A summary of the most recent water quality results for the required sampling parameters is presented in Table 2-5 below, along with the regulated concentration for each parameter. It is noted that iron and manganese data is summarized in Table 2-6 below.

**TABLE 2-5**
Water Quality Parameters

| Contaminant | Sample Date | Concentration | Regulatory Limit |
|---|---|---|---|
| Total Coliform | 3/12/14 | Absent | No positive sample |
| Nitrate | 1/22/13 | 2.08 mg/L | 10 mg/L |
| Lead | 9/25/13 | 0.002 mg/L | 0.015 mg/L[1] |
| Copper | 9/25/13 | 0.62 mg/L | 1.3 mg/L[1] |
| Combined Radium-226 and Radium-228 | 3/2/2010 | 4.77 PCI/L | 5 PCI/L |
| Gross Alpha | 3/2/2010 | 6 PCI/L | 15 PCI/L |
| Gross Beta Particle Activity | 3/2/2010 | 4.3 PCI/L | 50 PCI/L |
| Uranium | 3/2/2010 | 2.4 PCI/L | 20 PCI/L |
| Barium[3] | 5/14/13 | 0.127 mg/L | 2 mg/L |
| Chloride[4] | 12/7/12 | 230 mg/L | 250 mg/L |
| Sodium[4] | 12/7/12 | 128 mg/L | *See note |
| Disinfection Byproducts | 9/11/12 | TTHM: 56 µg/L<br>HAA5: 20 µg/L | TTHM: 80 µg/L<br>HAA5: 60 µg/L |
| Principal Organic Chemicals | Well 3: 7/30/13<br>Well 1 & 2: 2/16/07 | ND[2] | 0.005 mg/L |
| Specific Organic Chemicals | Well 3: 7/30/13<br>Well 1 & 2: 2/16/07 | ND[2] | Individual Limits[5] |

[1]Lead and copper concentration and limit is for 90th percentile of all samples

[2]ND: Non-Detect

[3]Only detected Primary Inorganic Chemicals are shown

[4]Sodium and chloride samples collected from distribution system in 2012 rather than 2013 samples from Well 3 provided since regulatory samples should be collected from the Distribution System based on the 2013 DOH Letter.

[5]Specific Organic Chemicals have individual regulatory limits

*Water containing 20 mg/L or more of sodium should not be used for drinking by people on severely restricted sodium diets

As shown in the table, the majority of sampling parameters are below the regulatory limits, with the exception of iron, manganese, sodium, and hardness. The District has had historically had issues with high iron and manganese levels, especially in Wells 2 and 3. Recent iron and manganese sampling results are summarized in Table 2-6 below.

**TABLE 2-6**
Iron and Manganese Sampling Data

| Sample Date | Iron (mg/L)* | Manganese (mg/L)* | Total (Fe + Mn) (mg/L)* |
|---|---|---|---|
| 7/1/2011 | 0.035 | 0.027 | 0.062 |
| 8/15/2011 | **1.52**** | **0.575**** | **2.095**** |
| 8/16/2011 | **2.45**** | **0.47**** | **2.92**** |
| 3/23/2012 | 0.02 | 0.14 | 0.16 |
| 6/26/2012 | 0.056 | 0.035 | 0.091 |
| 12/17/2012 | 0.236 | 0.074 | 0.31 |
| 5/14/2013 | 0.036 | 0.028 | 0.064 |

*The standards listed are NY State Drinking Water Standards. The MCL for iron and manganese is 0.3 mg/L. The concentration of both should not exceed 0.5 mg/L.
**Bolded value indicates exceedance of MCL. During this period of time, Well 1 (the good quality well) was out of service for replacement

It is noted that the NY State Drinking Water Standards are more stringent than the Federal USEPA Secondary Standards for iron and manganese. The NY State Drinking Water Standards are considered MCLs and are 0.3 mg/L for iron and 0.3 mg/L for manganese. The total concentration of both iron and manganese should not exceed 0.5 mg/L. The USEPA Secondary Standards for iron and manganese are 0.3 mg/L and 0.05 mg/L, respectively.

Well 1 is typically operated due to its higher quality. However, for a period of time in August 2011, Well 2 was in operation while the pump, motor, and piping for Well 1 were replaced due to a failure of the well pump. As a result, the concentrations of iron and manganese exceeded the MCL for samples collected in August 2011. In September 2011, the District received a violation for exceeding the DOH iron and manganese MCL.

Subsequent samples collected in 2012 for iron and manganese when Well 1 was back in operation were below the DOH MCL, but manganese levels were still above the USEPA Secondary Standard of 0.05 mg/L in some samples. As detailed in the DOH letter dated September 12, 2011, future iron and manganese issues may be avoided by maintaining the softeners in an operational condition. The softeners have reportedly not been operating for years. The District plans to return the softeners to service so that Wells 2 and 3 can be exercised without impacts on water quality.

The District also has issues with elevated hardness. Table 2-7 summarized hardness data collected from various locations. All the hardness numbers are well above 80 mg/L

at which water is considered to be moderately hard. According to District representatives, most customers have home-based softening units installed. The water plant softeners will be able to remove much of the hardness once they are operational. It is recommended that the District continue to monitor both raw and finished water hardness.

**Table 2-7**
Hardness Data

| Sample Location | Sample Date | Hardness (as $CaCO_3$ mg/L) |
|---|---|---|
| Distribution System | 2/8/2005 | 334 MG/L |
| Distribution System | 7/18/2007 | 398 MG/L |
| Well 1 | 8/3/2007 | 400 MG/L |
| Well 2 (In Pump House) | 8/3/2007 | 514 MG/L |
| Distribution System | 10/23/2008 | 446 MG/L |
| Distribution System | 10/24/2008 | 441 MG/L |
| Distribution System | 10/27/2008 | 450 MG/L |

The District also has high sodium levels (52 to 128 mg/L). The NY State Drinking Water Standards note that water containing more than 20 mg/L of sodium should not be used for drinking by people on severely restricted sodium diets. The high sodium levels were noted in the District's Annual Drinking Water Quality Report for 2012.

In addition, the federal secondary limit for Total Dissolved Solids (TDS) is 500 mg/L, which is the sum of the hardness, sodium and other ions. With hardness ranging from 334-514 mg/L and sodium ranging from 52-128 mg/L, secondary TDS is probably exceeded depending on the well in operation.

It should also be noted that on August 15, 2011, a positive coliform sample was collected during routine sampling. The five repeat samples were negative. As noted below in Section 2.4, the sample taps in the treatment building are not smooth nosed. Smooth nosed sample taps are recommended to avoid bacterial contamination during the sampling process with growth that may be present on the threads of the tap. We recommend that the taps be replaced as soon as possible to help prevent a future false positive.

### 2.3.4 Treatment System Review

The system is equipped with two Maclean ion exchange/softening units. The units were not in operation at the time of our field visit, and according to District representatives have not been in operation for many years.

The District was issued two violations in 2013 relative to the treatment system. One violation was related to the inability to operate more than one well at the facility, since treatment is required to operate Well 1 or 3. Also, the DOH noted a violation related to

modifications to the softener backwash system, which the Town disputed, since no modifications were made to the system.

Additional deficiencies related to the treatment system are discussed in more detail in the facility evaluation section below. It is our understanding that, following our visit, modifications were made to the units to repair the backwash system and address the deficiencies noted by DOH. In order to optimize treatment and extend the life of the units, we recommend that, once the units are back online, the District blend the raw water prior to entry into the softening units.

As noted above, the raw water from the wells also has very high levels of hardness and sodium. Based on this information, it is important to note the following:

1. If alternate iron and manganese treatment were installed, the softeners would still be desirable to treat naturally occurring hardness. It must be noted that according to District representatives, the majority of residential units in the development have water softening units. However, regulations do not allow for consideration of customer softeners when comparing water quality to requirements.

2. Softeners (or ion exchange units) similar to those installed at the facility work by removing one mole of iron or manganese and replacing with one mole of sodium. The amount of sodium that is added to the water should be minimal, less than 1 or 2 mg/L. The concentration of naturally occurring sodium in the raw water source is very high (up to approximately 128 mg/L), and so is almost 65 times higher than the quantity that will be added from the softening process.

Because the units have not been in operation for many years, their ability to effectively remove iron and manganese is unknown. However, based on historical records, we believe that this treatment system will be adequate. Once the units are back online, the District should monitor performance to confirm that treatment using the units is sufficient. Also, we recommend that both raw and finished water sodium, hardness, and TDS levels be monitored, to determine the actual amount of sodium added to the finished water via the softening process and to determine if the system is in compliance with the secondary limit for TDS.

### 2.3.5 Regulatory Review

The major drinking water regulations promulgated to date that pertain to the District's treatment facilities include:

- Surface Water Treatment Rule (SWTR)
- Total Coliform Rule (TCR) and Revised Total Coliform Rule (RTCR)
- Groundwater Rule
- Lead and Copper Rule
- Radionuclides and Arsenic Rule
- Stage 2 Disinfectants/Disinfection By-Products Rule (DBPR)

A discussion of applicable drinking water quality regulations follows.

### 2.3.5.1 Surface Water Treatment Rule

The SWTR was promulgated in 1989 and is applicable to all public water systems that use either surface water or groundwater under the direct influence of surface water. The wells are not located near any large surface water bodies and not influenced by surface water such as lakes, rivers, and streams. As such, further evaluation of the District with respect to the Surface Water Treatment Rule was not completed.

### 2.3.5.2 Total Coliform Rule and Revised Total Coliform Rule

The Total Coliform Rule (TCR) was promulgated on June 29, 1989. This rule sets microbial standards and requires routine microbial monitoring of distribution systems. Under the current (1989) TCR, routine monitoring for total coliform bacteria is required. The number of samples that must be collected depends on the population served. If a sample is positive for total coliform, repeat samples must be collected, and the total coliform positive samples must be tested for fecal coliform or *E. coli*. Under the TCR, if a threshold number of total coliform samples is exceeded in any month (5% of samples collected for systems serving >40,000 people), an MCL violation occurs.

The 1989 TCR remains effective until March 31, 2016. PWSs and primacy agencies must comply with the requirements of the Revised Total Coliform Rule (RTCR) beginning April 1, 2016. The RTCR includes some significant changes from the 1989 TCR. The RTCR sets an *E. Coli* MCL; however, under the RTCR there is no longer a monthly MCL violation for multiple total coliform detections. Instead, the RTCR requires systems that have an indication of coliform contamination in the distribution system to assess the problem and take corrective action ("treatment technique"). The treatment technique requirements provide that a PWS that exceeds a specified frequency of total coliform occurrence must conduct a Level 1 or Level 2 assessment to determine if any sanitary defect exists and, if found, to correct the sanitary defect.

The number of samples taken each month will continue to depend upon the population served. If a positive total coliform test occurs, repeat total coliform samples must be taken and *E. coli* tests must be run on the positive total coliform sample and repeat samples. The RTCR specifies the frequency and timing of the microbial testing by water systems based on population served, system type, and source water type.

The RTCR requires public notification when there is a potential health threat as indicated by monitoring results (i.e., a positive *E. coli* test in conjunction with one or more positive total coliform tests), and when the system fails to identify and fix problems as required; however, multiple positive total coliform tests in and of themselves will no longer require public notification.

Systems with groundwater sources not providing 4-log virus inactivation upstream of the first distribution system customer at each source must collect samples from the ground water source(s) in the event of a positive total coliform sample collected during routine monitoring.

As noted above, one sample taken in 2011 was positive for coliform, but repeat samples were negative. Compliance with the RTCR should continue to be monitored by the District.

### 2.3.5.3 Groundwater Rule

The Groundwater Rule became effective December 1, 2009. A letter was sent to the District on November 10, 2009 from the DOH regarding the rule and its effect on the District. This rule addresses microbial pathogen risks through a risk-targeting approach that relies on four major components:

1. Assessment Monitoring - Periodic sanitary surveys of ground water systems that require the evaluation of eight critical elements and the identification of significant deficiencies (e.g., a well located near a leaking septic system). We are not aware of any assessment monitoring that was performed.

2. Source Water Monitoring – Source water monitoring to test for the presence of E. coli, enterococci, or coliphage in the sample. Triggered monitoring will be required for systems that do not already provide treatment that achieves at least 99.99 percent (4-log) inactivation or removal of viruses and that have a total coliform-positive routine sample under Total Coliform Rule sampling in the distribution system. To avoid having to comply with triggered source water monitoring, GW systems may choose to use chemical disinfection to achieve 4-log inactivation of viruses.

3. Corrective actions required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following correction action options:

    - Correct all significant deficiencies,
    - Eliminate the source of contamination,
    - Provide an alternate source of water, or
    - Provide treatment which reliably achieves 99.99 percent (4-log) inactivation or removal of viruses.

4. If a system elects to provide 4-log inactivation or removal of viruses, compliance monitoring is required to ensure that treatment technology installed to treat drinking water reliably achieves at least 99.99 percent (4-log) inactivation or removal of viruses.

As noted above, one sample taken in 2011 was positive for coliform, but repeat samples were negative. Compliance with the GWR should continue to be monitored by the District. We are not aware of any correspondence between DOH and the District regarding the GWR; however, it should be noted that the DOH may require assessment monitoring based on the history of a coliform detection in the system.

### 2.3.5.4 Lead and Copper Rule

The Lead and Copper Rule was promulgated in June 1991 and went into effect in December 1992. The rule developed MCLGs and action levels for both lead and copper in drinking water. The major difference between this regulation and most others is that the monitoring requirements apply to samples collected at the customer's tap, not the treatment plant discharge point. For compliance, the samples at the customer's tap must not exceed the following action levels:

- Lead: 0.015 mg/L detected in the 90th percentile of all samples
- Copper: 1.3 mg/L detected in the 90th percentile of all samples

If action levels are exceeded, water systems are required to collect source water samples and submit all data to the State with a treatment recommendation to reduce concentrations below the action level. In addition, if the lead action level is exceeded, the water system is required to present a public education program to its customers within 60 days of the action level exceedance. The education program must be continued until the samples are found to be below the lead action levels.

In 1999, minor revisions to the lead and copper rule were promulgated to streamline requirements and to reduce some burdens on water systems. No changes to the action levels or MCLGs were made. Small changes were made to reduce the frequency of monitoring for systems with low lead and copper tap levels, as well as to update the analytical methods used for compliance.

Compliance with the Lead and Copper Rule has not been an issue of concern for the District and it is not anticipated that future compliance will be an issue.

### 2.3.5.5 Radionuclides and Arsenic Rule

The original radionuclides rule was proposed in July 1991. However, court action delayed the final promulgation of the rule until June 2001. The rule is applicable to all community water systems of all size categories, with the purpose of reducing exposure to radionuclides that are classified as carcinogens. Table 2-8 lists the existing MCLs for regulated radionuclides.

**TABLE 2-8**

Regulated Contaminants Under the Radionuclides Rule

| Contaminant | MCL | MCLG |
|---|---|---|
| Beta/Photon Emitters[1] | 4 mrem/yr | 0 |
| Gross alpha particle | 15 pCi/L | 0 |
| Combined Radium 226/228 | 5 pCi/L | 0 |
| Uranium | 30 μg/L | 0 |

[1]A total of 168 individual beta particle and photon emitters may be used to calculate compliance with the MCL.

The final Arsenic Rule was promulgated in January 2001. The EPA lowered the arsenic standard for drinking water to 10 μg/L to protect consumers against the effects of long-term, chronic exposure to arsenic. The new standard applies to all community water systems and became effective on January 23, 2006.

Compliance with the Radionuclides and Arsenic Rules has not been an issue of concern for the District and it is not anticipated that future compliance will be an issue.

#### 2.3.5.6 Stage 2 Disinfectants/Disinfection By-Products Rule (DBPR)

Stage 1 of the Disinfectants and Disinfection By-Products Rule (DBPR) was finalized in December 1998. This rule established MCLs of 80 µg/L for total trihalomethanes (TTHMs) and 60 µg/L for five haloacetic acids (HAA5). The Stage 1 DBPR also sets maximum residual disinfectant levels (MRDL). Chlorine is limited to 4.0 mg/L as $Cl_2$, based on a running annual average. Samples for chlorine are required to be taken at the same points in the distribution system.

The Stage 2 DBPR was proposed in the *Federal Register* on August 18, 2003 and promulgated in January 2006. The final rule sets forth a phased approach to implementing the Stage 2 DBPR requirements. Completion of an initial distribution system evaluation (IDSE) was required on a staggered schedule. Small systems serving less than 500 people were granted a waiver from the IDSE.

Under the Stage 2 DBPR, MCLs for TTHMs and HAA5 remain the same as the Stage 1 running annual averages of 80 and 60 µg/L. Instead of reducing the MCLs, the Stage 2 DBPR is intended to reduce DBP occurrence peaks in the distribution system by changing the compliance monitoring provisions. Compliance with the MCLs will be determined based on a locational running annual average (LRAA) at each identified sample location under the IDSE. The Stage 2 DBPR also established operational evaluation requirements that are initiated by the TTHM and HAA5 levels found during the Stage 2 compliance monitoring. These requirements are not anticipated to affect the District. The District began compliance with the Stage 2 monitoring requirements in October 2013.

The District is currently following a reduced DBP sampling schedule as a result of having exceptional water quality, and so DBP sampling is conducted once every three years.

## 2.4 Facility Evaluation

### 2.4.1 Introduction

On March 11, 2014, a facility inspection was conducted to review existing conditions at the site. Figure 2-3 shows a general layout of these structures at the site. The following buildings/structures were visually inspected:

- Wellhouse/Treatment Building and Well 1 (1)
- Well 2 (2)
- Well 3 (3) (formerly Well 4. The original Well 3 was abandoned)
- Hydropneumatic tank (4) and atmospheric tanks (5)

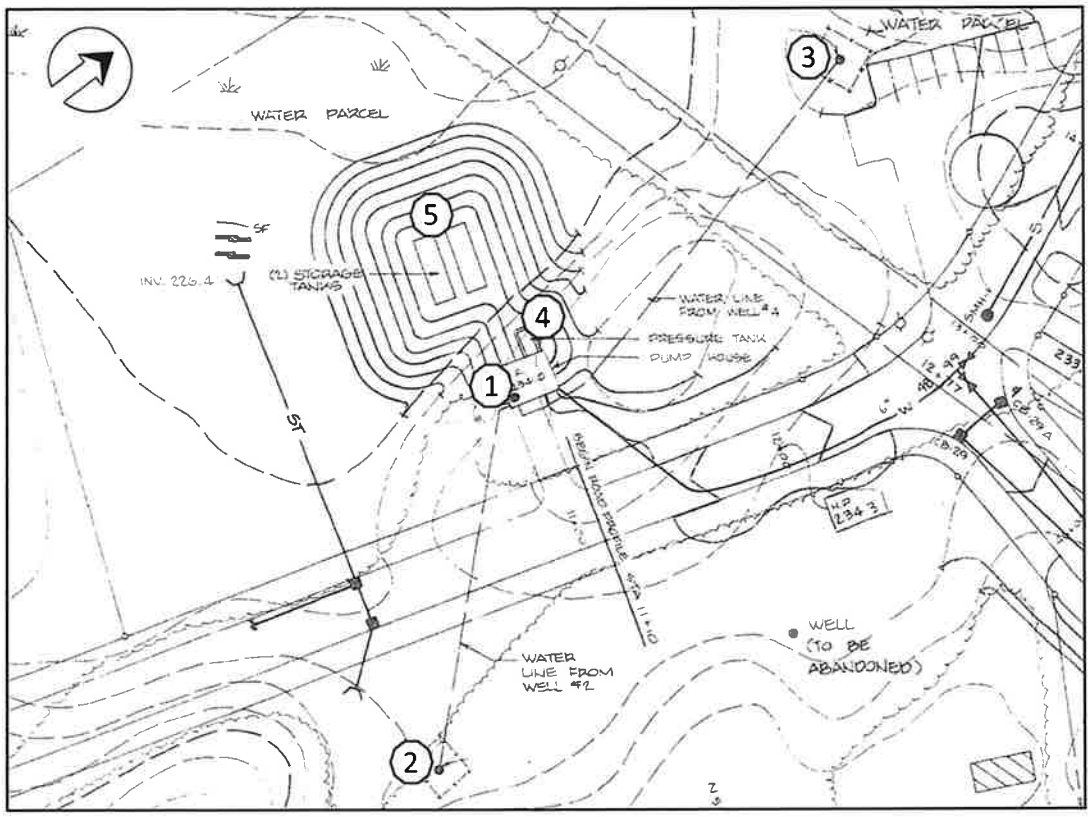


**Figure 2-3 Pinebrook Water District System**

Recommended improvements are discussed below, with a summary of the recommendations presented in Section 2.5 below. Major observations are discussed below and organized per discipline as follows:

- Site/Civil/Security
- Safety
- Process/Mechanical and Instrumentation/Controls
- Structural/Architectural
- Electrical and HVAC

Appendix B contains photographs taken during the inspections that are referenced throughout this Section. Appendix C contains a detailed facility inspection report, checklists, and worksheets for each facility visually inspected. Appendix D includes detailed budgetary cost estimates for the recommended improvements.

Overall, the existing system is in good condition. There are several mechanical and safety issues that must be addressed in the next 5 years, including new booster pumps and chemical feed system upgrades to address safety concerns, and a new roof will be required in the next 5 years. Additional details are provided below.

## 2.4.2 Useful Life of Equipment

The service life of equipment as presented in this section is based upon our discussions with equipment manufacturers and representatives as well as T&B's experience over the years. Table 2-9 summarizes the expected equipment life for the equipment found at the facility. Recommendations for replacement are often based on the expected equipment life; however, it must be noted that some equipment units have longer or shorter operating lives depending upon the original quality of the equipment and installation, the specific environment and service conditions, and notable operation and maintenance difficulties. Additional details regarding equipment service lives are presented below.

**Pumps and Valves** –The typical average design life for pumps is approximately 20-30 years, although pumps are often in service for a longer period of time. According to our discussions with pump manufacturer representatives, pumps can be rebuilt one or two times; however, following the second rebuild, the pumps should be replaced due to a loss in operating efficiency. The typical design life for process valves by today's standards is 25 to 30 years. The average design life of cast iron valves is expected to be longer.

**Chemical Feed Equipment** - The typical average design life for diaphragm-style metering pumps is approximately 5 to 10 years; however this may vary depending on the chemical being pumped. According to system operators, the existing pumps typically operate for 2 to 5 years, which is on the very low end of this range. Wet and/or poorly ventilated atmospheres may decrease the longevity of the pumps in these service conditions as well. The typical design life of a polyethylene tank is about 15 to 20 years; however, this is often reduced when sodium hypochlorite is being stored, or if the materials of construction are of lower quality.

**Electrical** - As electrical equipment ages, the equipment becomes obsolete and repair parts are no longer available off the shelf. As a result, if an existing part fails, the part may need to be replaced with a refurbished part (if available) or a custom part, and it could possibly take several weeks to either track down a suitable refurbished part or build a replacement part. In addition, replacement parts may not fit the way the original part did, which could lead to problems or even failure down the road.

Successful operation of switches and breakers is critical to the safe operation of a facility. If a circuit breaker does not open when there is a short circuit on the line it is protecting, serious equipment damage and possibly a fire or explosion could result.

As such, there is considerable risk involved in the "wait and see" approach for aging electrical equipment. Only proactive replacement of electrical equipment will provide assurance of long term reliability. As a result, recommendations for electrical equipment replacement are typically age driven, and wet/corrosive atmospheres or exposure to flooding may further reduce the recommended service life for a particular piece of equipment. Replacement of electrical equipment should be given the highest priority at critical facilities such as water supply facilities.

Panelboards, transformers, and transfer switches have design life expectancies of 30 years. Electrical wiring, under the best conditions, has a typical life expectancy of 50

**TABLE 2-9**

Equipment Life Expectancy Summary [1]

Pinebrook Water District Evaluation

| Item No. | Equipment | Typical Life Expectancy (Years) | Source |
|---|---|---|---|
| 1. | Pumps | 20 to 30 [2] | Tighe & Bond experience/Equipment Manufacturers |
| 2. | Metering Pumps - Positive Displacement | 5 to 10 | Tighe & Bond experience/Equipment Manufacturers |
| 3. | Process Valves - Cast Iron | > 30 | Tighe & Bond experience/Equipment Manufacturers |
| 4. | Compressors | 20 | Equipment Manufacturers |
| 5. | Hydropneumatic Tanks | 20 | Equipment Manufacturers |
| 6. | Process Piping and Valves - Chemical Systems | 15 | Tighe & Bond experience/Equipment Manufacturers |
| 7. | Tanks - High Density Polyethylene | 15 to 20 | Tighe & Bond experience/Equipment Manufacturers |
| 8. | Unit Heaters (Electric or Gas) | 15 | ASHRAE/Tighe & Bond experience |
| 9. | Exhaust Fans | 20 | ASHRAE/Tighe & Bond experience |
| 10. | Ventilation Louver Actuators | 20 to 25 | Tighe & Bond experience/Equipment Manufacturers |
| 11. | HVAC Thermostats | 20 | Tighe & Bond experience/Equipment Manufacturers |
| 12. | Standby Generators | 15 to 30 | Equipment Manufacturers |
| 13. | Panelboards | 30 | Tighe & Bond experience/Equipment Manufacturers |
| 14. | Transformers | 30 | Tighe & Bond experience/Equipment Manufacturers |
| 15. | Automatic Transfer Switches | 30 | Tighe & Bond experience/Equipment Manufacturers |
| 16. | Wiring | 50 | Equipment Manufacturers |
| 17. | Incandescent/Fluorescent Lights | 30 | Tighe & Bond experience/Equipment Manufacturers |
| 18. | Smoke Detectors | 15 | Tighe & Bond experience/Equipment Manufacturers |

1. Equipment life expectancies will vary greatly depending on a multitude of factors such as moisture, heat, chemical delivered, hourly use, and maintenance frequency.

2. Pumps can be rebuilt one or two times; however, following the second rebuild, the pumps should be replaced due to a loss of operating efficiency.

years. Incandescent and fluorescent lights have a useful service life of approximately 30 years, with more energy efficient fixtures often the driver for early replacement.

**Heating and Ventilation Equipment** – Unit heaters have life expectancies of 15 years, and ventilation fans have life expectancies of 20 or more years depending upon their duty cycle and exposure to corrosive elements. Similar to electrical equipment, HVAC equipment is, in general, age driven. Considerations such as the criticality of the facility, location/remoteness of the buildings, and frequency of patrol of the facilities also factor into prioritization of equipment replacement. For example, a remote facility that is inspected once per week, where there is one unit heater and the risk of freezing is unacceptable, may receive higher priority for replacement over a facility that is inspected more frequently or has multiple unit heaters.

### 2.4.3 Site/Civil/Security

The Pinebrook Water District water treatment facility is located just off of Pinebrook Drive near the entrance to the condominiums at Violet Avenue. A small bituminous concrete pulloff is available for vehicle parking and is in good condition.

There is no perimeter fencing or other security measures for the facility. Due to the location of the building relative to the road, and small parking area in front, perimeter fencing would not be feasible without blocking the pulloff area. As such, at a minimum, we recommend that door contacts and an alarm system be provided for the facility.

Additional security should also be provided for the remote wells and storage tanks, as detailed in section 2.4.5 below.

**Figure 2-4 Pinebrook Treatment Facility**

#### 2.4.3.1 Easement Adequacy

The treatment facility is located on a 1.48 acre site owned by the Water District/Town of Hyde Park, as shown in Figure 2-5 below. The two remote wells (Well Nos. 2 and 3) are

also located on 2.5 acre and 1.13 acre parcels, respectively, that are owned by the Water District/Town of Hyde Park. Based on our review of available documents, ownership does not appear to be a concern for the District.

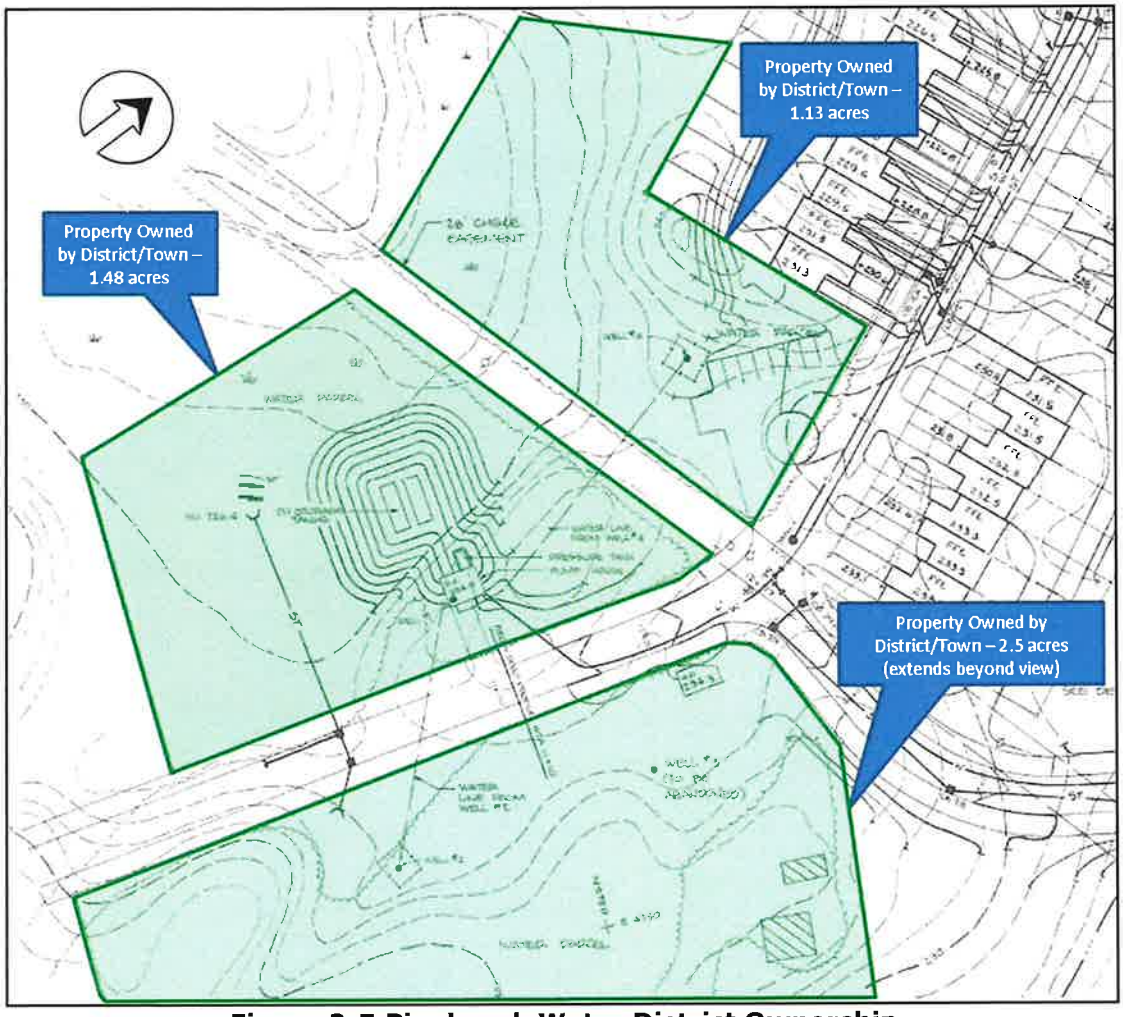


**Figure 2-5 Pinebrook Water District Ownership**

Current DOH standards for water wells require ownership of a 100 foot radius surrounding public water supply wells. However, the regulations allow for exceptions of this rule if the wells were approved with less than a 100 foot radius prior to December 1, 2005. The ownership radius for Wells 1 and 2 meet and exceed this ownership requirement. Well 3 meets this requirement on three sides of the well, but does not meet the requirement on the North side, with less than 100 feet north of the well. It should also be noted that, per New York State regulations, all areas within a 200-foot radius of the wells require legally enforceable control by the water system.

### 2.4.4 Safety

The Pinebrook Water District facilities were evaluated for compliance with general health and safety practices as well as OSHA CFR 1910. Although OSHA does not have direct jurisdiction over municipality-owned public utilities in New York, the town 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. As such, working environments are evaluated versus the OSHA standards, and we recommend that the health and safety concerns identified be addressed as expeditiously as possible.

The following health & safety concerns were identified at the facility:

- A generator is located within the building. The tank associated with the generator set, which stores the diesel fuel, is vented within the building. This vent should extend outside the building at a height no less than 10' above finished grade.

- The generator located within the facility was not operating during our observation. Consideration should be given to evaluating and addressing hearing conservation as it applies to working in the building during generator operation. Minimally, signage should be added to notify staff that hearing protection is required during generator operation.

- To address hazard communication, labels should be added to all chemical storage tanks. A written hazard communication program including a labeling program should be developed and implemented. VRI staff indicated that a formal hazard communications program has been developed. However, that program was not available during our observation.

- To limit chemical exposure concerns, all chemicals should be stored on secondary containment pallets. The hazard communication plan noted above should include descriptions, maintenance and inspections of secondary containment.

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

- A fire extinguisher was not observed in the facility. The facility should be equipped with a fire extinguisher that is inspected on a monthly basis and tested on an annual basis.

### 2.4.5 Process/Mechanical and Instrumentation/Controls

Much of the mechanical equipment in the treatment building is original to the facility and is in fair condition, with the majority of equipment approaching the end of its useful service life. The chemical feed system components were upgraded more recently and are in good condition. The atmospheric and hydropneumatic tanks appear to be in good condition for their age.

### 2.4.5.1 Piping and Booster Pumps

The piping inside the building consists of a mixture of steel pipe and sections of PVC repair piping, isolation vales, totalizing flow meters for each well, a master totalizing flow meter, and chemical feed lines. Overall, the piping is in fair condition, with corrosion observed in many locations. The supports for the water piping are in poor condition, with several missing. These deficiencies were also noted in the DOH's 2013 inspection report. The supports should be replaced immediately, and the District should budget for replacement of portions of the corroded piping in the next 5 years. In particular, piping for the hydropneumatic tank was in poor condition at the time of our visit, with leakage observed. It is our understanding that piping improvements have been made following our visit to address these issues. The District should budget for replacement of all of the piping inside the facility as a long term project.

The flow meters (Kent T3000 Turbine Meters) are beyond their useful service life and are in fair condition. According to the 2011 DOH inspection report, the master meter is inoperable. We recommend that the meters be replaced with more modern meters that meet current standards. Also, consideration should be given to providing instantaneous meters with chart recorders to track well production over time.

Two booster pumps are used to pump water from atmospheric storage to the hydropneumatic tank. According to the DOH inspection letter dated September 12, 2011, the pumps have the ability to produce 80 gpm. The pumps appear to be original to the facility, with the liquid ends of the pumps are in poor condition, with heavy corrosion present. The operations staff noted that there are issues with the pumps that require attention approximately once every two months that require attention. We recommend that the pumps be replaced with new, more energy efficient pumps in the next 0 to 5 years.

### 2.4.5.2 Wells

Well 1 is located inside the treatment facility, and Wells 2 and 3 are remote to the facility. Well 2 is located east of the treatment building, across Pinebrook Drive, and is the primary well due to its higher quality. According to the September 12, 2011 DOH inspection report, Well 2 was replaced with a new pump, motor, wiring, and discharge piping in August 2011. All three wells are located more than three feet above the 100 year flood elevation for the area.

Well Nos. 2 and 3 are operated less often due to issues with iron and manganese in the wells. The District is currently in the process of bringing the water softening units back online, so that the wells can be cycled and exercised without impacting water quality. Well 3 was not in operation at the time of our visit, and the piping was not connected. The September 2011 DOH inspection report noted this as a deficiency of the system. The necessary work to bring Well 3 into an active status should be completed as soon as possible. The District should budget for replacement of the Well 2 and 3 pumps as a long term item.

The New York Department of Health (DOH) is responsible for overseeing the design and operation of all public water systems in the State of New York. DOH reviews systems to verify compliance with guidelines as outlined in the 10 State Standards. The wellhouse and well checklists in Appendix C were used to compare the system with these

guidelines. Overall, the Wellhouse/Well 1 and Well Nos. 2 and 3 conform to the guidelines, with the following exceptions:

- There is no security fencing or other measures to protect Wells 2 and 3 from vandalism. We recommend that the District consider lockable caps for the exterior wells, or other security measures to protect the wells.

- None of the wells are equipped with level instrumentation, instantaneous flow meters, or individual pressure gauges on their discharge lines. We recommend that these devices be provided for each well to monitor performance over time.

- The ground around Well 2 is not graded to allow surface drainage away from the well. We recommend that grading improvements be made at the well.

- Well 2 has a split top well cap, which does not meet DOH standards. This deficiency was noted in the April 2013 inspection report. Following the report, the Town requested an exemption to this requirement, due to the excessive cost of replacing the cap, which would also require replacement of the pump. The DOH subsequently approved this exemption. The District should keep this request in mind when the pump is replaced in the future. We have included a pump replacement cost as a long term budgetary item.

The following additional observations were noted for the wells:

- The April 2013 DOH inspection report noted that the wells should each be labeled. At the time of our visit, the wells were labeled with marker. A more permanent label should be provided for each well, such as a permanently mounted sign or placard.

- The casing for Well 1 was noted as a deficiency in the April 2013 inspection report. The corrosion and issues related to the casing appear to have been addressed, with a new epoxy coating observed on the well casing. Also, the sodium hypochlorite system has been relocated out of the room.

- Each well is equipped with an individual sample tap; however, the following deficiencies were noted and should be addressed:

    - The sample tap on Well 1 does not have a handle, and is not smooth nosed. The tap should be replaced, and the plastic repair coupling next to the tap should be replaced with a new section of pipe.

    - The sample tap on Well 2 is not smooth nosed and the handle is broken. The sample tap should be replaced.

    - The sample tap on Well 3 is not smooth nosed, and the fittings around the tap are corroded. The tap and sections of piping on either side of the tap should be replaced.

- There is no signaling apparatus in place to notify the system operators of well status or failure. The District was in the process of installing low and high pressure alarms for the facility.

- The wellhouse has a small floor drain located in the center of the floor. According to the District staff, the drain discharges to the sewer. During the manhole inspections completed for the sewer district evaluation, a small 2" pipe was found discharging into the manhole nearest the treatment building, which is likely the flood drain. As such, we believe that this confirms that floor drain does not discharge within 50 feet of the water supply wells, in accordance with DOH regulations.

### 2.4.5.3 Atmospheric Tanks

Two 25,000 gallon atmospheric storage tanks are used for storage and disinfection contact time. The tanks are located behind the treatment building in a buried, mounded area. Similar to the wellhouse and wells, the atmospheric tanks were evaluated versus 10 State Standards, utilizing the checklist available in Appendix C. Overall, the following compliance issues were noted:

- The covers for the access manholes are bolted to the frames. There are no locks on the covers. Because there is no additional security (i.e. perimeter fencing) for the tanks, locks should be provided on the manhole covers. We also recommend that the corroded bolts be replaced with new bolts at the same time.

- We were unable to confirm that an overflow exists for the tanks. An overflow should be provided as part of any future tank upgrades, in accordance with 10 State Standards.

- We were unable to confirm whether any protective interior or exterior coatings are present on the tank, to prevent interior and exterior corrosion and the leaching of substances into the water. Protective coatings should be provided for any future tank upgrades.

- We were unable to confirm that the inlet/outlet pipes of the tanks are located to prevent flow of sediment into the distribution system.

- The tank vents are equipped with screens, but the screens appear to be wedged into place. Because the vents are also acting as overflows, the screens should be secured into place in a workmanlike manner.

- There is only one level device used to control the starting of the well pumps. As such, the tanks cannot individually be taken off line for servicing. Tank control and level devices should be considered as part of any future tank upgrades.

We were unable to inspect the interior or exterior condition of the tanks. Based on the typical lifetime for a buried steel tank, we recommend that the District budget for replacement in the next 10-15 years.

### 2.4.5.4 Hydropneumatic Tank

Water from the atmospheric tanks is pumped to the 6,000 gallon hydropneumatic tank before entering the distribution system. The exterior of the hydropneumatic tank that is visible inside the treatment building has areas where the painting system has failed, leaving the tank vulnerable to corrosion. Some minor areas of corrosion were observed. This deficiency was noted by the DOH in their 2013 inspection report. The tank should be surface prepped and painted in the next 5 years.

In addition, the 6,000 gallon hydropneumatic tank was evaluated versus 10 State Standards, utilizing the checklist available in Appendix C. Overall, the following compliance issues were noted:

- According to the Recommended Standards for Water Works, hydropneumatic tanks should be located above normal ground surface and be completely housed. Based on the age and condition of the tank, we recommend that the District budget for replacement of the tank as a long term item, and when the tank is replaced it be located above grade, in accordance with 10 State Standards. As an alternate, the District could consider removal of the hydropneumatic tank, and replacement with a pressure based pumping system, with jockey pumps to satisfy low flows and larger pumps for larger demands.

### 2.4.5.5 Softening System

The two Maclean water softeners are original and appear to be in fair condition. As noted above, the existing softeners have not been in service for many years. In their April 2013 inspection report, a deficiency was noted relevant to the softeners, stating that the units must be operational, the backwash feature must be restored, and air gaps must be installed on the backwash and tank drain.

At the time of our inspection, the District was in the process of upgrading the piping and controls for the system, including the backwash feature, in an effort to bring the units back online. It is our understanding that the units are scheduled to be online very soon. The District plans to blend water from several wells prior to sending through the softening units.

### 2.4.5.6 Chemical Feed Systems

The wellhouse/treatment building houses a sodium hypochlorite chemical feed system. An inventory of the equipment is available in Appendix C. The chemical feed system includes one small 35 gallon day tank on a stand, carboys to transport chemical, and one metering pump.

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 polyethylene tanks, the tank will be due for replacement in 6-10 years. The stand appeared to be in good condition.

The New York Department of Health (DOH) is responsible for overseeing the design and operation of all public water systems in the State of New York. DOH reviews systems to verify compliance with guidelines as outlined in the 10 State Standards. The chemical checklist in Appendix C was used to compare the system with these guidelines. Overall,

the chemical feed system at the facility conforms to the guidelines, with the following exceptions:

- The day tank and totes were not properly labeled. The day tank had "chlorine" in marker on the tank, and the labels were missing on a majority of the totes. Permanent labels indicating chemical and concentration should be added to the tank and totes. Also, labels indicating chemical and flow direction should be provided for the injection lines.

- The day tank and totes do not have secondary containment. There was staining on the floor from the day tank to the floor drain, indicating that some chemical may have spilled in the area in the past, and drained into the floor drain. At a minimum, containment trays capable of containing 110% of the largest tank or tote size should be provided to capture spills during transfer from the totes to the day tank, and for the event of a tank failure. We also recommend that the District considering using a small drum pump for transfer of chemical from the totes to the day tank to reduce the volume of spills during transfer.

- The chemical feed system guidelines note that, where chemical feed is necessary for the protection of the supply, such as chlorination, a minimum of two feeders shall be provided. A redundant in-line spare metering pump and piping should be provided.

- Flow pacing is not currently provided for the metering pump. The pump is set at a constant rate and is activated when the well pump turns on. Flow pacing should be provided, especially since the District plans to operate multiple wells now that the softening system is being re-activated.

The following additional observations were noted during inspection of the chemical feed systems:

- According to the 2013 DOH inspection report, the chlorine injection point was located such that if Wells 2 and 3 were in operation, they would not be disinfected. At the time of our inspection, the injection point appeared to be located immediately prior to entry to the atmospheric storage tank, after blending of the three wells. As such, it appears that this issue has been rectified.

- As mentioned in section 2.4.4 above, currently only a small hand bottle eye wash exists for use in the event of a chemical exposure. Safety stations (combination eye wash and shower) should be provided for the treatment building. It should also be noted that for large water systems we recommend flow switches for safety stations. In the event that the station is activated, an alarm would be sent to the headquarters facility notifying them of an incident. Also, the recently updated safety standard by ANSI Z358.1-2009 requires that all emergency fixtures be fed with tepid water between 60 and 100 degrees F. While ANSI Z358.1 is considered a voluntary standard, safety officials often use it as a guide when inspecting facilities. Consideration should be given to installation of an instant water heater for the eyewash station. Alternatively, a self-contained eyewash station could be installed. Self-contained units cost significantly less to install, but require routine maintenance to assure functionality.

- The floor drain cover is in poor condition, with one area completely corroded, most likely from chemical exposure. The floor drain cover should be replaced.

#### 2.4.5.7 Instrumentation

Currently, the well pumps are activated by a Warrick Controls level device that is mounted in an access port to the atmospheric storage tanks. The level device appeared to be in fair condition at the time of our inspection, with visible aging of the conduit and enclosure noted.

No additional instrumentation or alarms were active at the time of our inspection. A new monitoring system was in the process of being installed, and will monitor the system for high and low pressure conditions.

### 2.4.6 Structural/Architectural

The Pinebrook Water District treatment building is a single story structure with concrete walls and slab on grade with an asphalt shingle roof. The roof framing members were not visible due to the presence of gypsum sheathing as an architectural ceiling. Based on the roof geometry, timber roof framing is assumed. The interior dimensions of the building are 30'-0" by 20'-0", the floor to ceiling height varies from 10-5" to 13-5".

Overall the visible portions of the structure are in satisfactory condition. The following structural/architectural observations were noted for the facility.

- The asphalt shingle roofing has uneven and deteriorated shingles. The roofing appears to be at the end of its useful service life. The existing roofing system should be removed and replaced in the next 5 years.

- The paint on the timber eave trim is in poor condition. The eave trim should be repainted.

- The gutter at the west side of the building has been removed. The gutter should be replaced.

- The concrete walls are in good condition with an isolated crack emanating from the tank. The crack should be monitored for any changes in size, and if any changes are noted the crack should be repaired. There are isolated hairline cracks in the concrete slab on grade.

- There is moderate rust on the hollow metal door and heavy rust with section loss at the base of the hollow metal door frame. The door and frame should be removed and replaced.

- At the rear of the building there is a small room partitioned by unpainted CMU walls. The concrete floor slab in this area has deteriorated due to chemical exposure. The steel lintel over the abandoned door has heavy surface rust. The floor slab should be repaired, and the lintel should be cleaned and painted.

## 2.4.7 Electrical and HVAC

The existing distribution system at the Pinebrook water facility consists of a an underground utility service, utility meter, diesel generator, two panelboards, manual transfer switch, pump control panel and three well pump starters. All this equipment is original to the facility and is reaching the end of its useful life, and is recommended for replacement in the next 5 years.

The generator is a diesel fuel fired 10 kW Katolight generator, with a double walled diesel fuel storage tank. The generator is located inside the facility, and appears to be sized to operate only one well pump and one booster pump. The generator is not equipped with sound attenuation. The generator does not have proper ventilation for cooling and engine combustion.

The generator should be replaced in the next 5 years, and we recommend replacement with an outside unit, which will address concerns related to interior noise, cooling, combustion air as well as exhaust control. The generator size should be evaluated at the time of replacement to determine if a larger generator is necessary. Our costs have assumed a 25kW generator and all ancillary equipment, capable of operating one well and two booster pumps. Also, we recommend that the possibility of natural gas or propane be considered to reduce the potential for fuel spills in this environmentally sensitive area. Natural gas is utilized at the nearby sewer plant.

The following additional observations were noted:

- Electrical issues relative to Well 3 were noted in the DOH's 2013 inspection report. According to District representatives, these issues have been resolved.
- The existing building is not equipped with door contacts. We recommend that contacts and alarm system be provided for the treatment building, to improve security at the facility.
- The metering pump was plugged into an extension cord that was looped and mounted on the door frame of the old hypochlorite room. The extension cord was plugged in to a non-GFI rated plug. A new, GFI rated plug should be provided near the metering pump. Also, the remaining outlets in the facility should be replaced with GFI rated receptacles.
- The conduit to the booster pumps is in fair condition and should be replaced back to the junction boxes on the West wall when the pumps are replaced. Also, quick disconnects for the pumps in lieu of hard wiring should be considered, to facilitate maintenance on the pumps when necessary.
- The exhaust fan is original to the facility, but appears to be in good condition. The District should budget for replacement of the fan in the next 6 to 10 years.
- The unit heaters are new and are in good condition. The heater will require replacement again in the next 10-15 years.

- There is no dehumidification for the building. The building did not seem to have moisture issues at the time of inspection or evidence of significant moisture issues.
- The building does not currently have fire/heat/smoke detection. The facility is not required to have a fire protection system. However, installing a smoke/heat detector and connecting to the communications system should be considered.

## 2.5 Recommended Improvements

The following urgent (recommended immediately), short tern (<5 years), and long term (6 to 15 years) are recommended for the Pinebrook Water District.

### 2.5.1 Urgent Improvements

All Items - Ops budget

- Provide secondary containment for chemical storage
- Provide labels for tanks
- Provide eye wash/shower station
- Provide vent for generator fuel tank to building exterior
- Provide fire extinguisher
- Provide GFI receptacle for metering pump
- Replace sample taps and portions of piping

### 2.5.2 Short Term Improvements

- Replace/provide pipe supports Ops. Budget
- Replace individual well and master meters Ops. Budget
- Replace booster pumps and wiring Ops. Budget
- Provide permanent labels for wells Ops. Budget
- Improve security for wells Ops. Budget
- Provide second metering pump and flow pacing Ops. Budget
- Replace floor drain Ops. Budget
- Provide level instrumentation, pressure gauges, and instantaneous flow meters for wells Capital Project
- Improve grading around Well 1 Ops. Budget

- Provide locks and new bolts for atmospheric tank manways Ops. Budget
- Secure atmospheric tank vent screens Ops. Budget
- Replace booster pumps Ops. Budget
- Surface prep and paint hydropneumatic tank inside building Ops. Budget
- Provide signage and hearing protection for mounting next to generator Ops Budget
- Remove existing roofing and install new asphalt shingle roof Facility Project with trim
- Repaint eave trim or replace with maintenance free trim Facility project with Roof
- Replace gutter at west side of building Ops. Budget
- Monitor crack in concrete wall by tank for change in width
- Remove and replace door and frame with corrosion resistant door Ops. Budget
- Repair floor slab in former chlorine room Ops. Budget
- Clean and paint interior door lintel Ops. Budget
- Replace receptacles with GFI receptacles Ops. Budget
- Provide security and fire detection system and provide remote alarm Capital Project
- Replace electrical distribution equipment including panelboards, manual transfer switch, and generator. Capital Project

### 2.5.3 Long Term Improvements

- Replace Well Pump 2 and provide premium vented well cap Ops. Budget
- Replace Well Pump 3 Ops Budget
- Replace atmospheric storage tanks with one new tank Capital Project w/ HP Tank & Piping
- Replace polyethylene hypochlorite chemical day tank Ops. Budget
- Replace hydropneumatic tank Capital Project with Storage Tank & Piping
- Replace piping inside treatment building Capital Project with Storage Tank & HP Tank
- Replace exhaust fan Ops. Budget
- Replace unit heater Ops. Budget

### 2.5.4 Recommended Studies

- Conduct flow testing study on wells

# Section 3
# Distribution System Evaluation

The Pinebrook Water District distribution system includes approximately 3,800 feet of 6-inch ductile iron pipe. According to 10 State Standards, the minimum acceptable size of water main in a distribution system is 3-inches. Service laterals include ¾-inch copper to the individual condominium units within Pinebrook Estates. Figure 3-1 illustrates the existing distribution system.

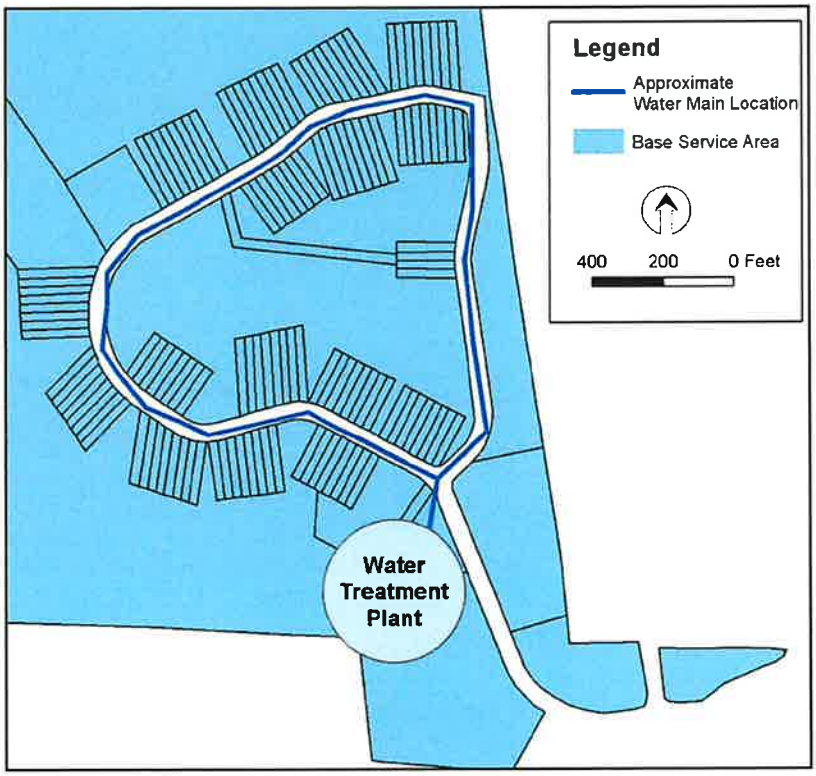


**Figure 3-1 Model of Existing Distribution System**

A hydraulic model of the distribution system was developed using InfoWater Suite 10.0 software package (Innovyze, Arcadia, CA). The model was developed based on as-built drawings of the existing system. Water mains were digitized based on distribution system drawings. Water mains were assigned size, material, and friction factors, which were estimated, based on the water main material. Nodes were created between pipe segments. Nodes carry essential information including how the pipes are connected to each other, as well as system demands and elevations. Elevations were added to the nodes using 2-ft contour data. Demands were assigned to the nodes using the August 2012 through July 2013 production data. The groundwater wells were modeled based on information provided in DOH inspection letters regarding well discharge pressures. Fire hydrant flow testing was not conducted to calibrate the model.

# 3.1 Distribution System Performance

## 3.1.1 System Capacity

The system capacity includes a combination of the three production wells and the two 25,000 gallon atmospheric storage tanks. Refer to Section 2 above for the evaluation of the adequacy of the system capacity.

## 3.1.2 System Pressures

The hydraulic model was used to evaluate existing system pressures to determine if they meet the recommended standards for distribution systems. Steady state model simulations were prepared to determine system pressures under average and maximum demand conditions. Model predicted pressures and required pressures are summarized in Table 3-1 below.

**TABLE 3-1**
System Pressure Summary

| Demand Condition | Model Predicted Pressures (psi) | Required Pressure (psi)[1] |
|---|---|---|
| Average day demand | 46 - 61 | 35 - 80 |
| Max day demand | 46 - 61 | 35 - 80 |

[1] Required pressures according to the New York State Building and Plumbing Codes

Model predicted pressures ranged from 46 to 61 psi, which is adequate and falls within the pressure range required by 10 State Standards. However, it should be noted that these model predicted pressures are at the ground elevations of the buildings. The condominium units have several floors, and according to District representatives, some of the condominiums at higher elevations have reported low pressures in the past. PC of NYS requires a typical minimum pressure of 8 psi at the highest outlet (shower head) in a residential unit. The current system pressures are on the low end of the acceptable range; as such, the District could consider increasing system pressures slightly when the booster pumps are replaced to alleviate the low pressure complaints. However, this would then require pressure reduction at lower facilities. As such, this is not recommended.

## 3.1.3 Fire Flow Capacity

The ability of the existing atmospheric storage tanks (combined 50,000 gallons) and booster pumping system to provide fire flow to the system was evaluated. The estimated ISO needed fire flow for condominiums varies depending on the fire suppression building features, with flows anywhere from 750 to 3500 gpm required for 2-3 hours (90,000 to 630,000 gallons).

We were unable to collect information on the building fire suppression features to confirm whether the requirement falls on the low or high end of the range. A summary of the estimated fire flow and current fire flow capacities is available in Table 3-2 below. The two booster pumps can provide approximately 160 gpm of fire flow. Even though

the groundwater well pumping capacity of all three wells is only 137 gpm, the difference of 23 gpm (160 gpm – 137 gpm) can be made up by the atmospheric storage.

**TABLE 3-2**
Estimated Needed Fire Flow and Fire Flow Capacity

| | |
|---|---|
| Estimated ISO Needed Fire Flow | Up to 3,500 gpm and 630,000 gallons of storage |
| Fire Flow Capacity | 160 gpm |
| Sufficient? | No |

Regardless of the level of fire flow required, the existing fire flow is not sufficient for fire protection, and the building is not properly constructed to be UL rated. According to District representatives, the fire department currently uses alternate measures to provide fire protection for the system.

Available fire flow could be improved by installing additional atmospheric storage with larger booster pumps. However, this is not likely cost effective. Prior to increasing fire storage, we would recommend that a fire protection official review the construction of the condominiums to determine the actual protection required. Depending on the volume required, the estimated hydraulic residence time in a tank should be evaluated because water quality can be affected at very high residence times.

### 3.1.4 Flushing Capacity

The ability to adequately flush the system was evaluated using the distribution system model. There are currently nine flushing hydrants located in the system, as shown in Figure 3-2 below. The locations of the hydrants provide a means of flushing all areas of the system.

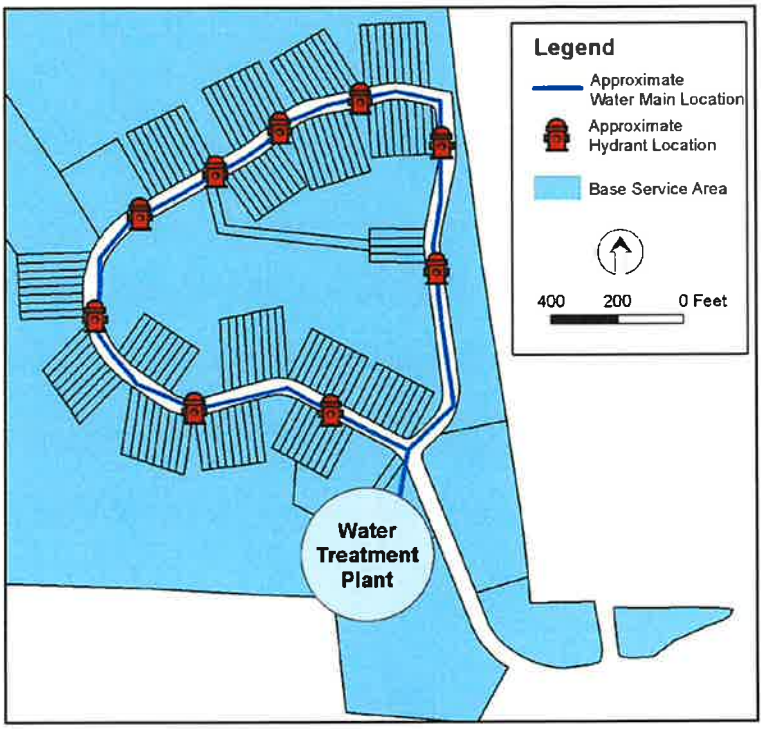


**Figure 3-2 Flushing Hydrant Locations**

According to the modeled flushing scenarios, an average flushing velocity of approximately 1.8 ft/s is possible to the system. A flushing velocity of at least 2 ft/s is considered acceptable to achieve adequate scouring during flushing. As such, the flushing velocity is below the recommended scouring velocity. It is likely possible to achieve some level of scouring in the pipe. However, if larger booster pumps are provided, flushing efficacy will likely be improved.

## 3.2 Distribution System Condition

A detailed assessment of the distribution system condition and inventory of customer meters were not included in the scope for these evaluations. However, the following is a summary of our review of information presented in historical documentation as well as information provided by District representatives during our assessment regarding the condition of the distribution system components.

### 3.2.1 Water Main Condition

The Pinebrook water district distribution system was constructed in the 1980s, and includes mostly 7,900 feet of 6-inch ductile iron pipe. Ductile iron pipe of this era can be expected to have a lifetime of at least 50 years under good conditions. There has been no significant history of water main failures in the system, and so there is no reason to believe that the pipe will require replacement prior to its expected useful life.

## 3.3 Potential Interconnections

Three primary interconnections were evaluated for the Pinebrook Water District, including connection to the following Water Districts:

- Greenbush Water District
- Arbors Water District
- DCWWA Hyde Park Water District

Figures showing the potential interconnections and details regarding the potential interconnections are presented below. Note that, although not discussed or presented in this report, the other water districts (Greenbush and Arbors) are also currently considering interconnections with the DCWWA Hyde Park System. The benefits including economic savings associated with shared interconnections and associated efforts are not detailed in this report, but should be considered for any interconnection pursued.

Based on the information detailed below, the interconnection to the DCWWA Hyde Park System via Holt Road appears to be the most beneficial and cost effective interconnection alternative. This alternative has the added benefit of serving many additional homes along Holt Road where water quality issues are currently a problem due to failing septic systems, and does not require construction of water main along a state highway. While the interconnection with the Greenbush system is a shorter length, the interconnection requires construction along a state highway, and hydraulically would require a pressure reducing station. The District could also elect to connect all three (DCWWA/Pinebrook/Greenbush) to DCWWA for the greatest combined benefit.

### 3.3.1 Interconnection with Greenbush Water District

The interconnection with Greenbush Water District is shown on Figure 3-3 below. The length of the water main is approximately 2,800 feet. A portion of the water main is on a State Highway (Route 9G). A 12-inch water main is recommended (orange segment) to provide adequate fire flow capacity between the systems. The hydraulic grade of the Pinebrook District (yellow) is approximately 346 feet while the hydraulic grade of the Greenbush system (green) is approximately 416 feet. This difference in hydraulic grade is acceptable, but requires consideration of pressure reduction. The interconnection could improve pressures in the system, which as detailed above, may be desired.

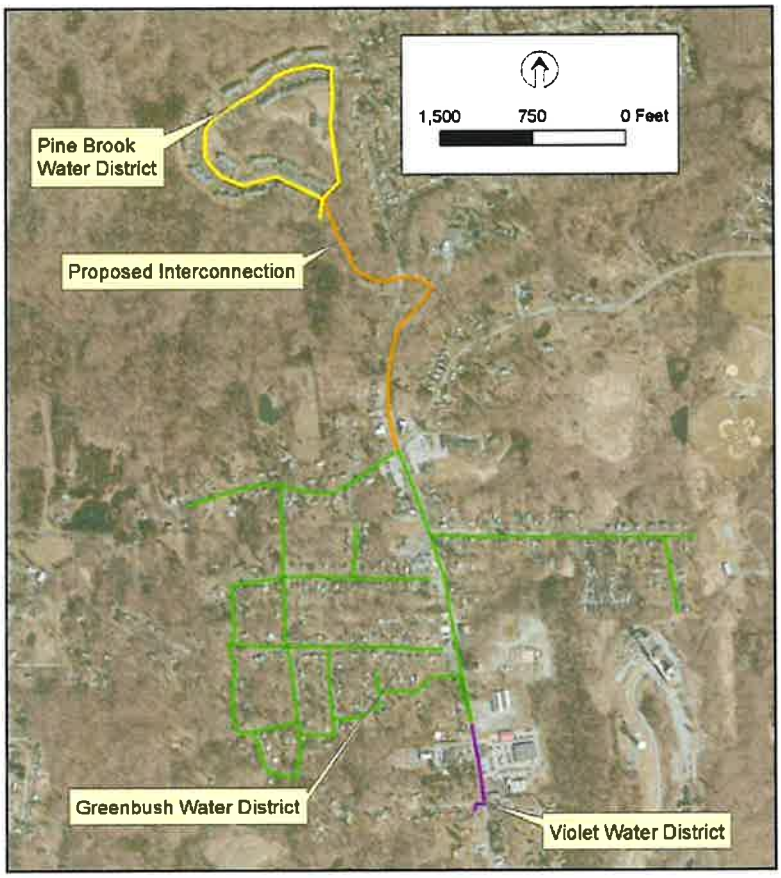


**Figure 3-3 Potential Interconnection with Greenbush Water District**

### 3.3.2 Interconnection with Arbors Water District

The interconnection with Arbors Water District would require connecting to Greenbush plus a connection between Greenbush and Arbors. The interconnection is shown on Figure 3-4 below. As discussed above, the length to connect to Greenbush (orange) is 2,800 feet. The additional water main length to connect Greenbush to Arbors (blue) is approximately 4,600 feet. A 12-inch water main is recommended to provide adequate fire flow capacity between the systems. The hydraulic grade of the Pinebrook District (yellow) is approximately 346 feet while the hydraulic grade of the Greenbush and Arbors system is approximately 416 feet. This difference in hydraulic grade is acceptable, and may improve pressures in the system, which as detailed above may be desired.

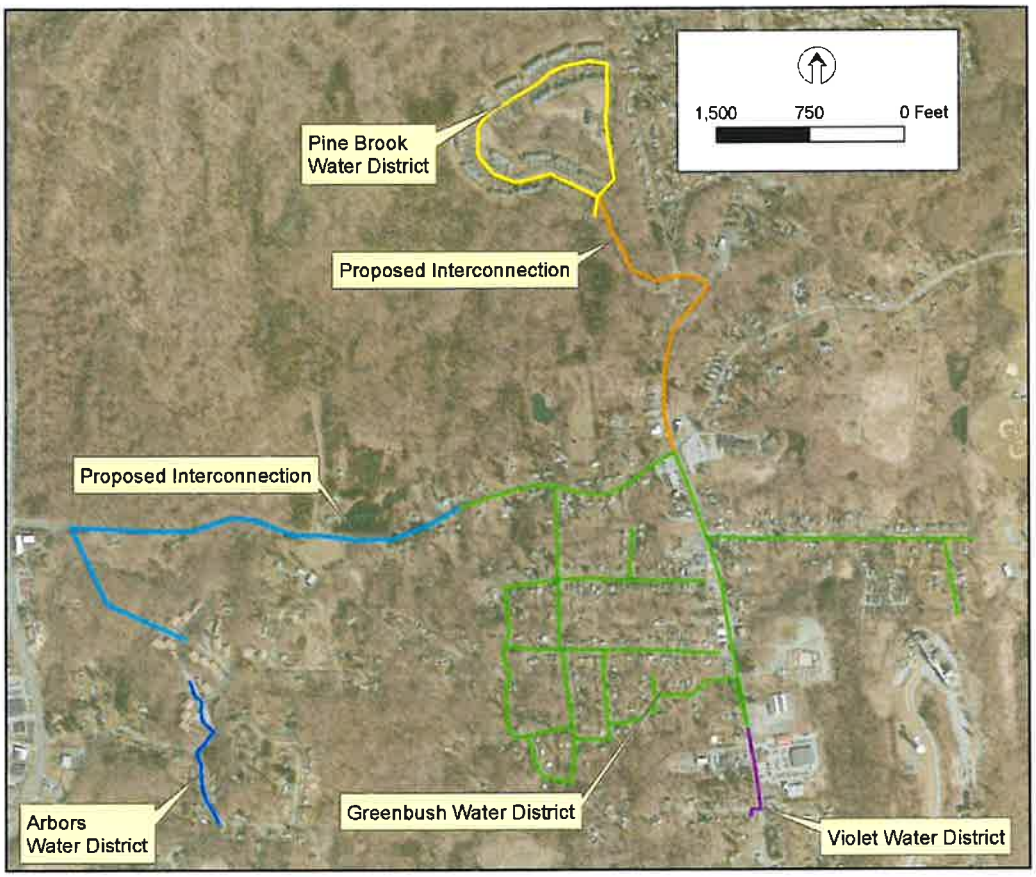


**Figure 3-4 Potential Interconnections with Greenbush & Arbors Water Districts**

### 3.3.3 Interconnection with DCWWA Hyde Park System

The Pinebrook Water District is located approximately one mile from the existing DCWWA Hyde Park Distribution System – St. Andrews Road (DCWWA Hyde Park). The feasibility of an interconnection with DCWWA Hyde Park was evaluated. Two potential alternatives were evaluated:

- Interconnection via Violet Avenue
- Interconnection via Holt Road

The two potential alternatives are discussed in more detail below.

#### 3.3.3.1 Interconnection via Violet Avenue

Figure 3-5 below illustrates one possible interconnection route between the District and DCWWA Hyde Park, via Violet Avenue/9G.

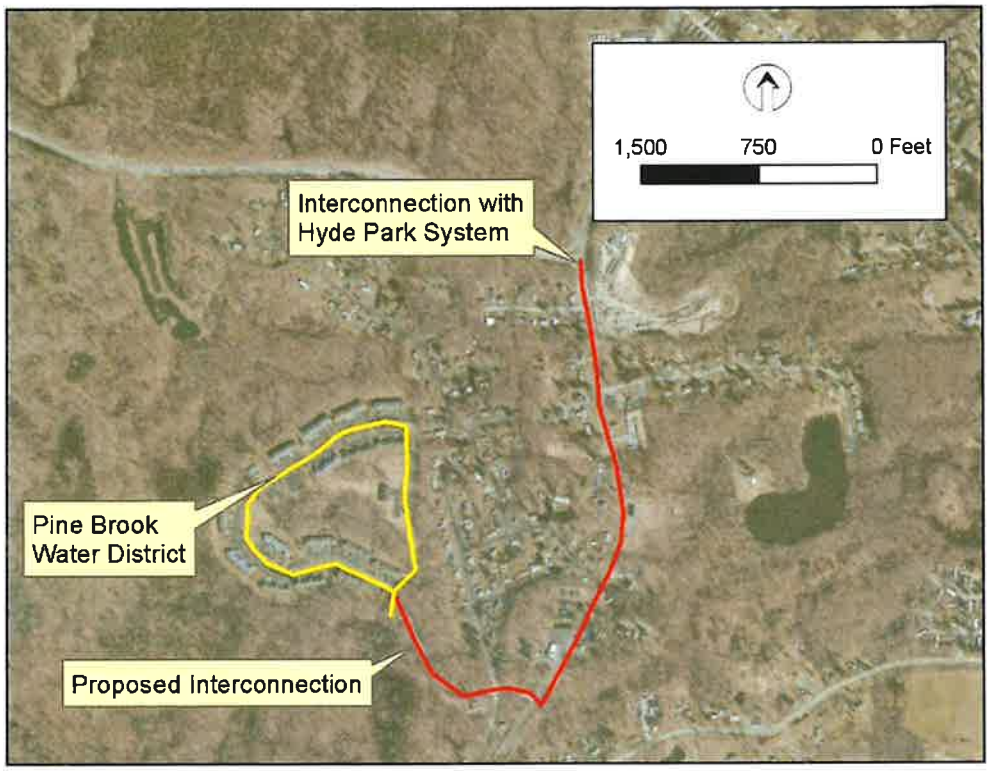


**Figure 3-5 Potential Interconnection with DCWWA in Hyde Park**

The connection point to the District system would be at the intersection of Pinebrook Drive and Newington Drive (6-inch main), and to the DCWWA Hyde Park system at the intersection of St. Andrews Road and Violet Avenue (16-inch main).

The distribution system model was used to evaluate the required length and size of water main required for the interconnection, as well as to compare the existing hydraulic grades of the two systems. Also, the water main was sized to be able to accommodate future fire flows, if the interconnection system is able to provide fire flow in the future. The results of this evaluation are presented in Table 3-3 below.

**Table 3-3**
Interconnection via Violet Avenue Summary

| | |
|---|---|
| Length of Water Main | 4,500 feet |
| Hydraulic Grade of Pinebrook | 346 feet |
| Hydraulic Grade of DCWWA | 355 feet |

Approximately 4,500 feet of 12-inch water main would be required to connect the two systems. The hydraulic grade of DCWWA in Hyde Park is 355 feet, which is approximately 9 feet higher than the existing hydraulic grade of the District system (346

feet). This hydraulic grade is sufficient to provide adequate pressures to the existing District system, and would not require additional pumping or pressure reducing chamber.

### 3.3.3.2 Interconnection via Holt Road

Figure 3-6 illustrates another possible interconnection route between the District and DCWWA in Hyde Park, via Holt Road (Segment shown in Red). As shown in Figure 3-6, this route to connect to DCWWA in Hyde Park would also provide the ability to expand the system to serve additional customers (Segments in Blue).

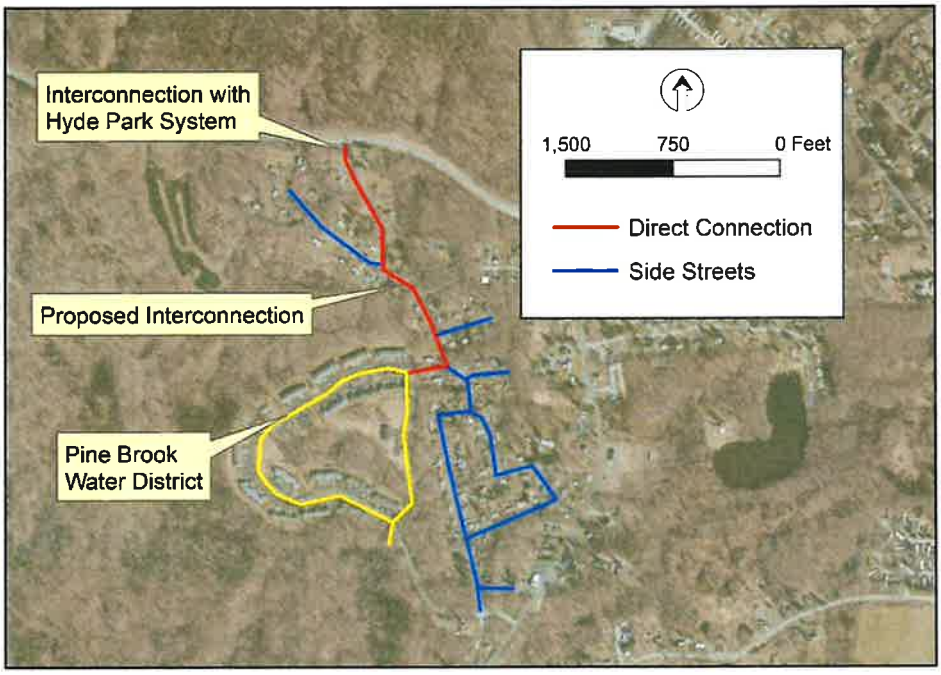


**Figure 3-6 Potential Interconnection with DCWWA Hyde Park**

The distribution system model was used to evaluate the required length and size of water main required for the interconnection, as well as to compare the existing hydraulic grades of the two systems. Also, the water main was sized to be able to accommodate future fire flows, if the interconnection system is able to provide fire flow in the future. The results of this evaluation are presented in Table 3-4 below.

**Table 3-4**
Interconnection via Holt Road Summary

| | |
|---|---|
| Length of Water Main | 2,000 feet |
| Hydraulic Grade of Pinebrook | 346 feet |
| Hydraulic Grade of DCWWA | 355 feet |

Approximately 2,000 feet of water main would be required to connect the two systems. The water main is a combination of 8 and 12 inch pipe where the 12 inch pipe serves as the main conduit capable of providing adequate fire flow capacity. The hydraulic grade of DCWWA in Hyde Park is 355 feet, which is approximately 9 feet higher than the existing hydraulic grade of the District system (346 feet). This hydraulic grade is sufficient to provide adequate pressures to the existing District system, and would not require additional pumping or pressure reducing chamber.

As noted above, service could be provided to additional customers along Holt Road from the interconnection. Up to 5,600 feet of water main could also be provided to extend service to these customers, at an estimated total project cost of up to $3,130,000.

#### 3.3.3.3 Comparison of Alternatives

The Holt Road alternative has several key advantages compared to the Violet Avenue alternative. First, the alternative does not require construction of water main along a state highway. Secondly, the alternative will allow the DCWWA to expand services to the homes located along Holt Road and surrounding neighborhoods, where water quality is currently an issue. However, this alternative would require an easement from St. Andrews Road to Holt W. The interconnection route via Violet Avenue would not require easements, but is costlier and does not have as high a density of potential new customers.

## 3.4 Recommended Improvements

As summarized above, there are no immediate, short term, or long term items recommended for the District beyond those recommended in Section 2.

# Section 4
# Cost Summary

Recommendations for the District are organized by the priority level assigned to the recommendation. The recommendations for system upgrades for the district are categorized into one of three groups:

- **Urgent** items represent those issues that should be addressed immediately (implementation recommended in 6 months or less), including security concerns, OSHA safety, fire/smoke protection, sanitary concerns, and electrical code violations.
- **Short Term** items represent items that are recommended be addressed in the next 5 or fewer years (implementation recommended prior to 2019).
- **Long Term** items represent items that are recommended be addressed in the next 6 to 15 years (implementation recommended between 2020 and 2029).

Conceptual cost estimates have been prepared for each of these recommendations which include the following components:

1. **Activity or Construction Cost:** The budgetary cost estimates are based on Class 4 level construction cost estimates, as defined by the Association for the Advancement of Cost Engineering (AACE) International Recommended Practices and Standards. According to AACE International Recommended Practices and Standards, the estimate class designators are labeled Class 1, 2, 3, 4, and 5, where a Class 5 estimate is based on the lowest level of project definition and a Class 1 estimate is closest to full project definition and maturity. The end usage for a Class 4 estimate is conceptual studies or feasibility. The expected accuracy range of a Class 4 estimate is between +50% and -30%. The level of project definition for a Class 4 estimate is between 1% and 15%. The costs include equipment costs, demolition/removal of existing equipment, temporary provisions (if applicable), facilities and bypasses (if necessary to complete the work), and costs regarding installation and start-up of improvements. This cost also includes a contractor general conditions cost factor of 10%. The costs are based upon recently completed project bid forms, quotes from equipment manufacturers and data contained in R.S. Means Construction Cost Data. The budgetary costs are based on the May 2014 ENR Construction Cost Index of 9800.4.
2. **Activity or Construction Contingency (25%):** In accordance with standard engineering practice and DCWWA standards, a 25% contingency on the Activity/Construction Cost to provide a Total Construction Cost.
3. **Consultant Fees:** In accordance with standard engineering practice and DCWWA standards, a percentage has been applied to the Total Construction Cost to estimate profession consultant fees. The fees include: Architecture (1%), Construction Administration (8%), Engineering (10%), Environment & Archeological (4%) and Surveying (2%). These percentages are only applied where appropriate.

4. **Owner Fees:** In accordance with DCWWA standards, a percentage has been applied to the Total Construction Cost and Consultant Costs to estimate cost born by the Owner. These fees include: Administration (1% - Construction Costs Only), Project Management (3%), Legal (0.5%), and Land and Easement Acquisition (varies). These percentages are only applied where appropriate.
5. **Total Project Costs:** The total project costs are the sum of the total construction cost, consultant and owner fees.
6. **Escalation:** As previously described short term costs are anticipated to be completed in the next 5 years, long term costs in the next 15, thus the conceptual cost estimates have been presented with adjustments for inflation. An inflation factor of 2.7% per year has been used, based on T&B's evaluation of trends in the Engineering News Record (ENR) Construction Cost Indices from June 2009 through June 2014, as well as the ENR annual escalation rate, which is updated monthly. Note that the ENR now publishes an updated annual escalation rate every month which is very similar to the rate calculated by T&B.

Detailed conceptual cost estimates have been provided in Appendix D. Each of the recommended activities fall into one of three categories:

- Evaluation or planning
- Operation and maintenance
- Comprehensive construction project

Additional cost data has been provided for the comprehensive construction project in the form of a 2004 CSI Division format estimate. This estimate can be used for reference as the project progresses to design and construction phase.

Table 4-1 provides a summary of the recommended improvements and their associated 2014 costs. A list of the recommended improvements was provided at the end of Section 2. Detailed breakdowns of the budgetary cost estimates are presented in Appendix D.

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**TABLE 4-1**
Pinebrook Water District
Recommended Improvements

| Item | Activity Cost | 25% Activity Contingency | Consultant Cost | Owner Cost | 10% Project Contingency | Total Project Cost |
|---|---|---|---|---|---|---|
| Urgent Improvements | $18,000 | $4,500 | $5,800 | $1,400 | $3,000 | $32,700 |
| Short Term Improvements | $151,200 | $37,800 | $47,400 | $10,200 | $24,700 | $271,300 |
| Long Term Improvements | $310,200 | $77,600 | $97,200 | $21,000 | $50,600 | $556,600 |
| Planning/Studies | $16,500 | $4,200 | $2,100 | $900 | $2,400 | $26,100 |
| Interconnection to Greenbush Water District | $1,078,000 | $269,500 | $337,000 | $72,600 | $175,800 | $1,932,900 |
| Interconnection to Arbors Water District | $2,596,000 | $649,000 | $811,300 | $174,500 | $423,100 | $4,653,900 |
| Interconnection to Hyde Park System via Violet Avenue | $1,897,500 | $474,400 | $593,200 | $127,700 | $309,300 | $3,402,100 |
| Interconnection to Hyde Park System via Holt Road | $659,900 | $165,000 | $206,300 | $44,500 | $107,600 | $1,183,300 |

# Appendix A
# Slides – Prioritization Workshop

# Town of Hyde Park
# Dutchess County Water and Wastewater Authority

## Water and Sewer District Evaluations

## Prioritization Workshop

April 10, 2014

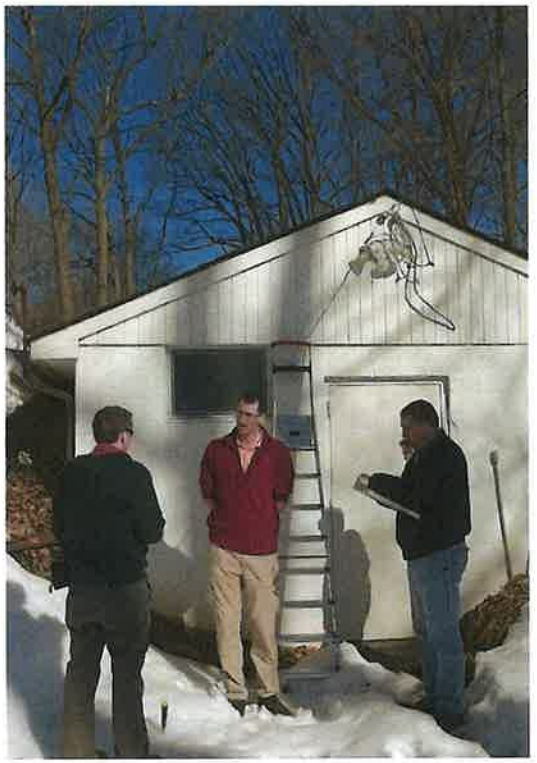
**Darleen Buttrick, P.E.** Project Manager / Water Facilities
**Erin Moore, P.E.** Wastewater Facilities
**Paul Malmrose, P.E.** Principal

T&B Engineering, P.C.

CLARK ENGINEERING & SURVEYING, P.C.

# Site Visits and Evaluations

- **Facility Site Visits on March 11th**
- **Field Evaluations Conducted:**
  - Civil/Site Infrastructure
  - Safety
  - Process/Mechanical Equipment
  - Buildings/Structures
  - Building Support Systems
    - » Heating, ventilation, electrical, fire
  - Instrumentation
  - Sewer manhole inspections



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# Office Evaluations

- Capacity and demand evaluations
- Water quality/treatment evaluations
- Fire flow and pressure evaluations
- Interconnection evaluations

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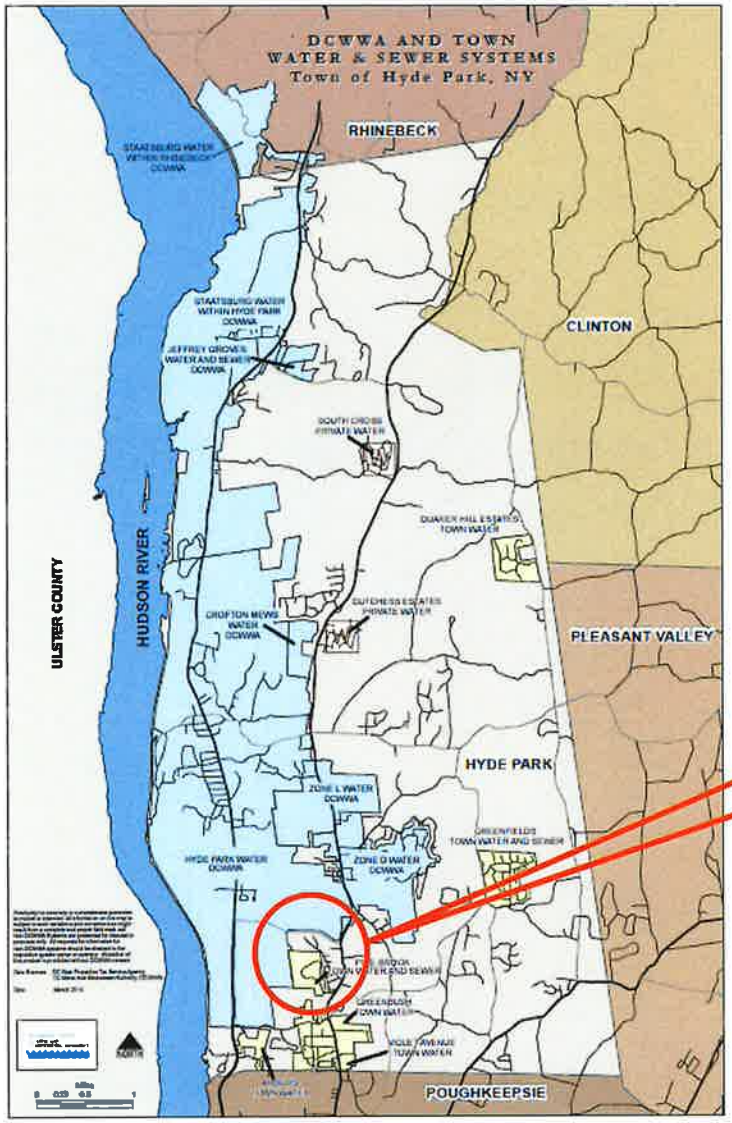
# Pine Brook District

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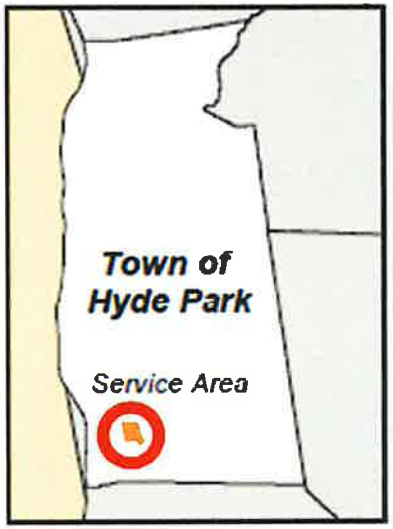
# Pine Brook Water District

- **Pine Brook Water District: 132 Residential Units**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# Pine Brook Water District
# Source Evaluation

- **Current Source: Groundwater**
- **Capacity(1)**
  - Well 1: 44 gpm (Online and connected/backup)
  - Well 2: 43 gpm (Primary)
  - Well 3: 50 gpm (Operational/not connected)
  - Two 25,000 gal atmospheric storage tanks
- **Demand**
  - Average day demand = 14,513 gal/day (10 gpm)
  - Maximum day demand = 48,200 gal/day (33 gpm)
  - No immediate build-out potential

(1) Well production based on 2011 Dutchess Dept. of Health Letter (2013 Dept. of Health Letter did not provide production for each well)

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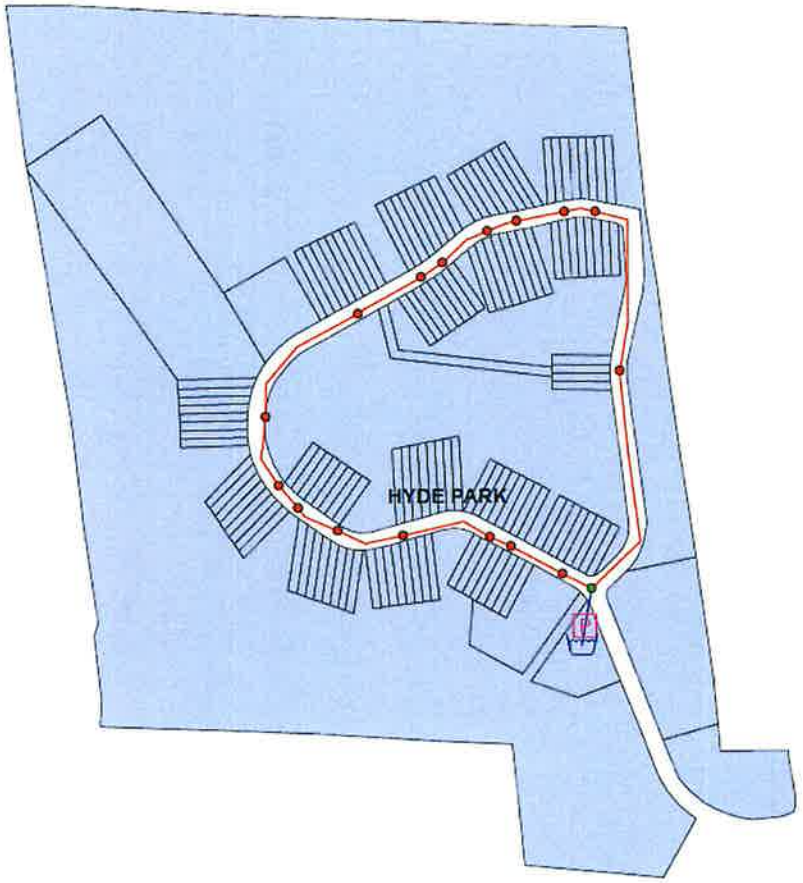
# Pine Brook Water District Distribution System Evaluation

- **Pressure:**
  - System pressures: 46 – 61 psi
  - Maintained via 10,000 gal hydropneumatic tank
  - Two 80 gpm booster pumps
- **Flushing Capacity**
  - No flushing hydrants
  - System capable of 0.35 ft/s (2 ft/s desired)

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# Pine Brook Water District
# Distribution System Evaluation

- **Fire flow not available**
  - ISO requirement unknown
    - » Fire suppression features of condos
    - » 750 to 3500 gpm for 2-3 hours (90,000 – 630,000 gal)
    - » 8” main sufficient to carry flow; but no hydrants
  - Currently 50,000 gallons of storage
- **Fire flow using tank/pumping**
  - Elevated tank or ground storage with pumps
  - Source capacity
  - Water age
  - Cost/long term maintenance

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# Pine Brook Water District
# Water Quality Evaluation

## Issues with Iron and Manganese

| Sample Date | Iron (mg/L) | Manganese (mg/L) | Total (Fe + Mn) (mg/L) |
|---|---|---|---|
| 7/1/2011 | 0.035 | 0.027 | 0.062 |
| 8/15/2011 | 1.52 | 0.575 | 2.095 |
| 8/16/2011 | 2.45 | 0.47 | 2.92 |
| 3/23/2012 | 0.02 | 0.14 | 0.16 |
| 6/26/2012 | 0.056 | 0.035 | 0.091 |
| 12/17/2012 | 0.236 | 0.074 | 0.31 |
| 5/14/2013 | 0.036 | 0.028 | 0.064 |

MCL for iron and manganese is 0.3 mg/L. The concentration of both should not exceed 0.5 mg/L.

## Treatment

- Re-activating softening units to allow cycling of wells
- Conduct additional sampling of individual wells and combined effluent to confirm issue prior to evaluating alternate treatment

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# Pine Brook Water District
# Water Quality Evaluation

## Other Water Quality Considerations

- High sodium levels (52 to 128 mg/L)
- Expect 1-2 mg/L sodium per 1-2 mg of Fe/Mn removed
- Options: Desalination or alternate source development
- Perform additional sampling prior to evaluating possible course of action

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# Pine Brook Water District
# Conditions Assessment

## Site/Civil

- Add door contacts and no trespassing signs
- Provide locking mechanism for tank access manholes
- Consider additional security for remote wells

## Safety

- Interior standby generator
  - » Flammable combustible storage must be vented to exterior and lacks signage
  - » Conduct noise audit during operation and provide appropriate hearing protection if necessary

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# Pine Brook Water District
# Conditions Assessment

## Process/Mechanical

- Short Term
  - » Replace tank piping (in process)
  - » Replace sample tap
  - » Add/replace pipe supports
  - » Provide permanent tank labels (Immediate)
  - » Provide containment pallets
  - » Provide redundant pump and flow pacing
- Long Term
  - » Replace transfer pumps
  - » Replace chemical tanks
  - » Replace piping

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# Pine Brook Water District
# Conditions Assessment

## Structural

- Replace asphalt shingle roof
- Clean and paint eave trim
- Replace deteriorated door frame
- Repair deteriorated areas of concrete floor
- Door frame chlorine room in failed condition, replace if door required at opening; clean/paint lintel

## HVAC/Electrical

- Replace electrical distribution equipment
- Replace generator – locate outdoors
- Replace exhaust fan

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# Pine Brook Water District

## Potential Interconnection

- Pine Brook to Hyde Park
  - » 4,500 feet of water main from Hyde Park system to Pine Brook System
  - » Route overlaps Greenbush-Hyde Park interconnection route
  - » Along state highway
  - » Hydraulic grade is similar to Hyde Park – no PRV or PS
- Estimated cost appx. $1.3 million
- Cost effectiveness will depend on treatment upgrade needs


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# Thank You!

**Darleen Buttrick, P.E.** Project Manager / Water Facilities
**Erin Moore, P.E.** Wastewater Facilities
**Paul Malmrose, P.E.** Principal

T&B Engineering, P.C.
CLARK ENGINEERING & SURVEYING, P.C.

# Appendix B
# Photographs

# PINE BROOK WATER DISTRICT PHOTOS

Evidence of Past Chemical Spills to Floor Drain

Deteriorated Asphalt Shingle Roof

Paint on eave trim in poor condition and no gutter present

Corrosion on door frame

Crack present in concrete wall

Deterioration of concrete floor slab in old chlorine room

Chemical tanks lack labels


Emergency eyewash bottle

Flow meters

Heavy Corrosion on Water End of Booster pumps

Well 3 lacking level instrumentation and labeling

Access Manhole Cover Bolted to the Frames

Electrical Equipment inside Wellhouse/Treatment Building

12.5 kVA Katolight Generator

Exhaust fan – original to facility

Heater is new

Metering pumps plugged into extension cords; new receptacle should be provided

J:\D\D0280 Duchess County Hyde Park\Documents\Reports\Pine Brook Water\Appendices\Facility Photos.doc

# Appendix C
# Inspection Reports, Checklists, and Inventories

# FACILITY INSPECTION REPORT

## Duchess County Hyde Park

InspectID:4

*Facility:* Pinebrook Water
*Address:*

*Inspection Date:* 03/11/2014
*Inspected By:* David Sullivan
Darleen Buttrick
Marek Strojvus
David Horowitz

## GENERAL INFORMATION

*Year Facility Constructed:* 2000
*Year Facility Modified:* 2009
*Approximate Dimensions:* 20'x30'x10'5"
*Facility Description:* Feeds Condominiums

*Identification Signage:*
*Number of Stories:*

## CIVIL INSPECTION

*Access Road:* *Bituminous* ☑ *Overall Condition:* Good
*Gravel* ☐
*Other* ☐

*Fence:* *Chainlink* ☐ *Overall Condition:*
*Aluminum* ☐ No perimeter fencing
*Other* ☐
*Height:*
Gate: *Type:*
*Size:*
*Barbed Wire:*
*Approximate Age:*

*Grounds Condition:* Muddy, rutting - OK

*Exterior Stairs:* *Concrete* ☐ *Overall Condition:*
*Wood* ☐ NA
*Steel* ☐
*Other* ☐

*Handrail:* *Overall Condition:*
NA

# FACILITY INSPECTION REPORT

## Duchess County Hyde Park

InspectID:4

*Facility:* Pinebrook Water
*Address:*

*Inspection Date:* 03/11/2014
*Inspected By:* David Sullivan
Darleen Buttrick
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David Horowitz

### *STRUCTURAL / ARCHITECTURAL INSPECTION*

*Below Grade Vault:*

| | | |
|---|---|---|
| *Precast Concrete* | ☐ | N/A |
| *Cast In Place Concrete* | ☐ | |
| *Other* | ☐ | |
| *Interior Dimensions* | | *L:* _____ *W:* _____ *H:* _____ |
| *Hatch Type:* | | |
| *Sump Pit:* | | |
| *General Assessment:* | | |

### *BUILDING STRUCTURE*

*Roofing Type:*

| | | |
|---|---|---|
| *Membrane* | ☐ | *Overall Condition:* Fair |
| *Shingle* | ☑ | Condition: Fair/Poor |
| *Tar and Gravel* | ☐ | Uneven, peeling at peak |
| *Other* | ☐ | Gutter failed at west end |

*Roof Structure:*

| | | |
|---|---|---|
| *Precast Plank* | ☐ | *Overall Condition:* |
| *Cast-in-Place Concrete* | ☐ | Not visible |
| *Wood* | ☐ | No access opening |
| *Other* | ☐ | |
| *Unknown* | ☑ | |

*Exterior Wall Type:*

| | | |
|---|---|---|
| *Single Wythe Masonry* | ☐ | *Overall Condition:* |
| *Double Wythe Masonry* | ☐ | Timber form liner finish |
| *Reinforced Concrete* | ☑ | Isolated tight cracks |
| *Precast Concrete* | ☐ | Paint fair |
| *Wood Frame* | ☐ | *Load Bearing:* Yes |
| *Other* | ☐ | |

*Interior Wall Type:*

| | | |
|---|---|---|
| *Gypsum/Stud Walls* | ☐ | *Overall Condition:* |
| *Masonry* | ☐ | Isolated tight cracks<br>Open crack at tank |
| *Reinforced Concrete* | ☐ | *Load Bearing:* Yes |
| *Other* | ☐ | |
| *Not Applicable* | ☐ | |

*Foundation:*

# FACILITY INSPECTION REPORT

## Duchess County Hyde Park

InspectID:4

*Facility:* Pinebrook Water
*Address:*

*Inspection Date:* 03/11/2014
*Inspected By:* David Sullivan
Darleen Buttrick
Marek Strojvus
David Horowitz

| | | | |
|---|---|---|---|
| | *Stone Masonry* | ☐ | *Overall Condition:* |
| | *Reinforced Concrete* | ☐ | Not visible |
| | *Cement Masonry Units* | ☐ | |
| | *Other* | ☐ | |
| *Interior Floor:* | | | |
| | *Reinforced Concrete* | ☑ | *If Reinforced Concrete:* Structural Slab |
| | *Steel with Metal Deck* | ☐ | *Overall Condition:* |
| | *Wood* | ☐ | Diagonal cracks to floor drain |
| | *Other* | ☐ | Floor drain cover failed |
| *Floor Covering:* | | | |
| | *Paint* | ☐ | *Overall Condition:* |
| | *Tile* | ☐ | |
| | *Chemical Coating* | ☐ | |
| | *Other* | ☐ | |
| | *Not Applicable* | ☑ | |
| *Interior Columns:* | | | |
| | *Reinforced Concrete* | ☐ | *Overall Condition:* |
| | *Steel* | ☐ | Chlorine room: Door lintel heavy rust |
| | *Wood* | ☐ | Abadoned door frame failed |
| | *Other* | ☐ | Concrete floor scaled acreas |
| | *Not Applicable* | ☐ | |
| *Structural Frame:* | | | |
| | *Reinforced* | ☐ | *Overall Condition:* Good |
| | *Steel* | ☐ | *Braced:* |
| | *Other* | ☑ | Concrete shear walls |
| | *Not Applicable* | ☐ | |
| *Interior Paint:* | None | | *Overall Condition:* |
| *Doors:* | *Hollow Metal* | ☑ | *Overall Condition:* Poor |
| | *Wood* | ☐ | Double doors. Heavy rust at base of frame; moderate rust on door interior |
| | *Other* | ☐ | |
| *Windows:* | Wood double hung | | *Overall Condition:* Satisfactory |
| *Stairs:* | None | | *Overall Condition:* |

T&B Engineering, P.C.

**Facility:** Pine Brook Water
**Address:** Hyde Park, NY

**Inspection Date:**
**Inspected By:** D. Buttrick
M. Strojvus
D. Sullivan
D. Horowitz

Potential Code Issues:

Notes:

**BUILDING SUPPORT SYSTEMS INSPECTION**

| | | | |
|---|---|---|---|
| Boiler: | None | Overall Condition: | |
| Fuel Source: | Electric | Capacity: | |
| Heating Type: | Electric Unit Heater | Overall Condition: | New 2012 |
| Ventilation Type: | Electric Fan & Louver | Overall Condition: | Cools |
| AC System Type: | None | Overall Condition: | |
| Dehumidification: | None | Overall Condition: | |
| Sump Pumps: | None | Overall Condition: | |

Notes:

# Security Checklist

Location: Pine Brook Water

Key:
✓ Yes
* No - potential concerns
- Not applicable
? Unable to be determined or confirm

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| Question | Status | Comments |
|---|---|---|
| Is access to critical components restricted to authorized personnel only? | ✓ | |
| Are all facilities fenced and are gates locked where appropriate? | * | No perimeter fencing |
| Are all doors, windows, and other points of entry such as tank and roof hatches and vents kept closed and locked? | ✓ | |
| Is there external lighting? | ✓ | Street lights and exterior building lights |
| Are warning signs (tampering, unauthorized access, etc.) posted on all critical components of the facility? | ✓ | Private property sign posted |
| Does the Owner patrol and inspect all components of the facility? | ✓ | Daily |
| Are all areas around the facility free of objects that may be used for breaking and entering? | ✓ | |
| Are the entry points to all of the facilities visible? | ✓ | |
| Is there an alarm system to detect unauthorized entry? | * | No door contacts |
| Is there key control and accountability policy? | ✓ | Limited authorized personnel |
| Are there entry codes and keys limited to water personnel only? | - | |
| Are cameras or motion detectors installed? | * | Not likely necessary |
| Are tank ladders, access hatches, and entry points secured? | - | N/A |
| Are vents and overflow pipes properly protected with screens and/or grates? | - | N/A |

# Chemicals Checklist

Chemical Name: Sodium Hypochlorite
Location: Pine Brook Water

**Key:**
✓ **Conforms with Guidelines**
* **Does not conform to Guidelines**
\- **Not applicable**
? **Unable to be determined or confirm**

T&B Engineering, P.C.

| 10 State Standards Guideline[1] | Compliance Status | Comments |
|---|---|---|
| **Tanks** | | |
| Size of Tanks | - | One 35-gal tank on small stand, carboys (unlabeled) for transport |
| Tank Labels | * | Labeled "chlorine" with marker; carboys not labeled |
| Overflows - bulk | - | |
| Overflows - day | - | |
| Level instrumentation - bulk tank | - | |
| Level instrumentation - day tank (scale?) | * | Visual only; checked daily |
| No incompatible chemicals next to EO (note what adjacent) | - | No other chemicals |
| **Other** | | |
| Secondary containment? | * | None; evidence of spills during transfers from carboy to tank |
| Height of berm | - | |
| Coating system - presence, adequacy | - | |
| Fill Stations - presence, adequacy | - | |
| Eyewash - presence | * | Small hand eyewash |
| Eyewash - flow switches and alarms | - | NA |
| Eyewash - tempered water | - | NA |
| Location of chem injection/carrier water needed? | ✓ | Inject at location; no carrier water needed |
| Float switches/alarms in containment | - | |
| All flow pacing chemicals? | * | No; recommended |
| Minimum 2 metering pumps | * | Only one, no spare onsite |

Notes:
(1) Based on *Recommended Standards for Water Works, 2012 Edition*
(2) Well 1 on - best quality well
(2) Wells 2&3 can be used - worse in terms of quality, but health departmet wants them to cycle these in

# Storage Tank Design and Construction Guidelines

Storage Tank (s): 2-Atmospheric, 1-Hydropneumatic
Capacity: 2-25,000 gal atm; 1-6,000 gal hyd.
Location: Pine Brook Water

**Key:**
- ✓ **Conforms with Guidelines**
- ✱ **Does not conform to Guidelines**
- \- **Not applicable**
- ? **Unable to be determined or confirm**

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| 10 State Standards Guideline[1] | Compliance Status | Comments |
|---|---|---|
| **Location** | | |
| Fencing, locks on manholes, and other precautions to prevent trespassing, vandalism, and sabotage | ✱ | None; recommend locks on manholes |
| Buried and partially buried storage tanks located at least 50 feet from any part of a subsurface sewage disposal system, sanitary sewer, and other sources of possible contamination | ✓ | |
| **General Design and Construction Considerations** | | |
| Constructed to protect stored water from birds, animals, insects, and excessive dust | ✓ | |
| Tanks are watertight and have no openings except for properly installed pipes, appurtenances, and equipment | ✓ | Each atm - one MH and each has a vent |
| Sloped roof to facilitate drainage when basin is covered with earthen material; grading to drain surface runoff at least 50 feet away from tank roof | ✓ | Slopes away (buried) |
| Impermeable membrane roof covering with buried tanks | - | Steel tanks |
| Top of ground level and partially buried reservoirs to be at least 2 feet above normal ground surface | ✓ | |
| Area surrounding partially buried and ground level tanks to be graded to drain surface runoff away from the storage tank | ✓ | |
| Bottom of tank placed above groundwater table when located below normal ground surface; at least 50 percent of water depth above grade | ✓ | |
| Capability to isolate tanks from distribution system | ✓ | |
| Protection from trespassers (e.g., locked fencing, locks on access manholes, etc.) | ✱ | No, bolts on top of access pt, but not able to lock, add provisions for locking mechanishm |
| **Materials** | | |
| Tank materials and products in contact with stored water are compatible with finished water quality | ✓ | |
| Metallic materials protected against internal and external corrosion | ? | No cathodic protection noted |
| **Coating and Cathodic Protection** | | |
| Coatings and cathodic protection conform to applicable AWWA standards and industry standards | ? | Unable to determine |
| Interior coatings properly applied and cured to prevent leaching of substances into stored water (use 100% solids coating systems whenever possible) | ? | Unable to determine |
| Cathodic protection system used and access plates are sealed watertight | ? | Unable to determine |
| **Appurtenances** | | |
| Overflow pipe properly sized to permit waste of excess water in excess of the maximum storage tank fill rate | ✱ | Vents only |
| Overflow pipes open downward and are screened | - | |
| Overflows are not directly connected to any sanitary sewer or storm drainage system | - | |
| Overflows for buried tanks to discharge to daylight and be provided with an air gap 12-24" above the flood rim of the drain inlet, basin, splash pad, or equivalent drainage structure | - | |
| Vents are not used as an overflow and are located above overflow elevation | ✱ | Vents appear to be operating as overflow |
| Vents on buried basins to terminate in an inverted "J" manner 24 inches above grade or tank roof | ✓ | 4' above grade |
| Vents and overflows equipped with minimum 24-mesh noncorrodible screen (may also be equipped with a flap valve or duckbill valve) for buried tanks; 4-mesh noncorrodible screen for elevated standpipes | ✓ | Screen stuffed into vent, could be better installed |

# Storage Tank Design and Construction Guidelines

Storage Tank (s): 2-Atmospheric, 1-Hydropneumatic
Capacity: 2-25,000 gal atm; 1-6,000 gal hyd.
Location: Pine Brook Water

**Key:**
- ✓ **Conforms with Guidelines**
- ✱ **Does not conform to Guidelines**
- \- **Not applicable**
- ? **Unable to be determined or confirm**

T&B Engineering, P.C.

| 10 State Standards Guideline[1] | Compliance Status | Comments |
|---|---|---|
| Vents properly designed to exclude animals, dust, rainwater, etc. | ✓ | See note above |
| Means to monitor water level | ✓ | Warwick level monitoring device |
| Convenient access to the interior for inspection, cleaning, painting, and maintenance (i.e., access hatches and/or manholes); at least two manholes at each water compartment | ✓ | One manhole - 24" with 28" cover |
| Roof hatches with a frame that extends at least 4 inches above roof and fitted with watertight gasketed cover overlapping frame at least 2 inches | ✓ | 26" above |
| Manholes sealed with watertight gasket for buried tanks and elevated at least 24 inches above top or covering sod | ✓ | Sealed |
| Concrete manhole risers watertight and monolithic | ✓ | Steel riser |
| Access hatches and manholes are locked | ✱ | Not locked, but bolts very corroded, would be difficult to access. Recommend new bolts and locking device |
| Provision for drainage to daylight with 24-mesh noncorrodible screen, flap valve, duckbill valve, or removable cap/plug | - | no overflow |
| Drains are not directly connected to sanitary sewer, storm drain, or sump | - | |
| Discharge pipes are located to prevent flow of sediment into distribution system | ? | Unable to confirm |
| Smooth-nosed sample taps to allow for collection of water quality samples | ✓ | Old |
| Separate taps on inlet and outlet pipes, if separate inlet and outlet is available | ✱ | No sample on inlet, only outlet before pumps. Sample tops on wells. |
| Controls to maintain levels and alarms for high and low water level indication (float switches with mercury are prohibited) | ✓ | Adding currently |
| High and low water level alarms with alarms located where 24 hour surveillance available | ✓ | Adding currently |

Notes:
(1) Based on *Recommended Standards for Water Works, 2003 Edition*

# Well Checklist

Name: Pinebrook Well #1
Location: Across road from wellhouse/treatment building

**Key:**
✓ **Conforms with Guidelines**
* **Does not conform to Guidelines**
\- **Not applicable**
? **Unable to be determined or confirm**

T&B Engineering, P.C.

| 10 State Standards Guideline[1] | Compliance Status | Comments |
|---|---|---|
| **Well Considerations** | | |
| Located a minimum of three feet above the 100-year flood elevation or flood of highest record | ✓ | |
| Well accesible and maintained to facilitate maintenance and other activities | ✓ | Walkable, drivable without snow |
| Grading around well/wellhouse to lead surface drainage away | ✓ | Possible, no mound though |
| Well casing sealed with one piece watertight, vermin-proof cap, lockable cap | ✓ | With hex nut |
| Well casing terminates 18" above finished grade, or 12" above wellhouse floor | ✓ | 18"-19" above grade |
| Contains well casing vent with downward turning vent and screen | ✓ | Integ |
| Casing vent terminates 12" above grade or 6" above wellhouse floor | ✓ | |
| Fencing and other precautions to prevent trespassing, vandalism, and sabotage | * | No fencing or other security |
| **Wellhouse General Design and Construction Considerations** | | |
| Durable construction, fire and weather resistant, with outward-opening doors | - | |
| Floor elevation at least six inches above finished grade | - | |
| Floors sloped to sump or drain | - | |
| Openings in floor or roofs for equipment removal | - | |
| Adequate dehumidification to prevent excessive moisture | - | |
| **Equipment** | | |
| Automatic signaling apparatus reporting when station is out of service | * | In process of installing LP/HP but no well status |
| Check valve on discharge side of pump between pump and shut-off valve | ✓ | Internal, submersible pump with pitless adapter |
| Watertight joints on piping | - | |
| Piping protected against water hammer and suitable restraints provided | - | |
| Standard pressure gauge on discharge line | * | None inside wellhouse |
| Individual sample tap | ✓ | sample tap not smooth nosed |
| Instrumentation for well level | * | None |
| Station has means of measuring discharge flow | ✓ | Kent T3000; no instantaneous |
| Electrical controls located above grade | ✓ | In building, but no remote disconnect |
| Standby power provided | ✓ | Yes, at wellhouse |

Notes:
(1) Based on *Recommended Standards for Water Works, 2012 Edition*

# Well/Wellhouse Checklist

Station Name: Well #2 and Wellhouse
Location: Inside Treatment Butilding

**Key:**
- ✓ **Conforms with Guidelines**
- ✱ **Does not conform to Guidelines**
- \- **Not applicable**
- ? **Unable to be determined or confirm**

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| 10 State Standards Guideline[1] | Compliance Status | Comments |
|---|---|---|
| **Well Considerations** | | |
| Located a minimum of three feet above the 100-year flood elevation or flood of highest record | ✓ | |
| Well accesible and maintained to facilitate maintenance and other activities | ✓ | Inside wellhouse |
| Grading around well/wellhouse to lead surface drainage away | ✓ | Slight with a capped FD, immediately next to well |
| Well casing sealed with one piece watertight, vermin-proof cap, lockable cap | * | 2-piece, but exempted by DOH |
| Well casing terminates 18" above finished grade, or 12" above wellhouse floor | ✓ | 13" above wellhouse floor |
| Contains well casing vent with downward turning vent and screen | ✓ | |
| Casing vent terminates 12" above grade or 6" above wellhouse floor | ✓ | 42" |
| Fencing and other precautions to prevent trespassing, vandalism, and sabotage | - | NA - inside wellhouse |
| **Wellhouse General Design and Construction Considerations** | | |
| Durable construction, fire and weather resistant, with outward-opening doors | ✓ | See Note 2 |
| Floor elevation at least six inches above finished grade | * | No, only ~1" |
| Floors sloped to sump or drain | ✓ | To sewer |
| Openings in floor or roofs for equipment removal | ✓ | Yes,plywood patch, not a hatch |
| Adequate dehumidification to prevent excessive moisture | - | None, but no moisture issues at the time of inspection |
| **Equipment** | | |
| Automatic signaling apparatus reporting when station is out of service | * | In process of putting in alarm system, HP-LP, but no well status. |
| Check valve on discharge side of pump between pump and shut-off valve | ✓ | Internal to the well |
| Watertight joints on piping | ✓ | |
| Piping protected against water hammer and suitable restraints provided | * | No restraints at meter, corrosion at meter and shutoff |
| Standard pressure gauge on discharge line | * | None |
| Instrumentation for well level | * | None |
| Station has means of measuring discharge flow | ✓ | Kent T3000 |
| Electrical controls located above grade | ✓ | |
| Standby power provided | ✓ | |

Notes:

(1) Based on *Recommended Standards for Water Works, 2012 Edition*

## Well/Wellhouse Checklist

Station Name: Well #2 and Wellhouse
Location: Inside Treatment Butilding

**Key:**
- ✓ Conforms with Guidelines
- ✱ Does not conform to Guidelines
- \- Not applicable
- ? Unable to be determined or confirm

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| 10 State Standards Guideline[1] | Compliance Status | Comments |
|---|---|---|

(2) Piping inside ok, hydropneumatic piping corroded

# Well Checklist

Station Name: Pinebrook Well #3
Location: Outside next to wellhouse/treatment building

**Key:**
- ✓ **Conforms with Guidelines**
- ★ **Does not conform to Guidelines**
- \- **Not applicable**
- ? **Unable to be determined or confirm**

T&B Engineering, P.C.

| 10 State Standards Guideline[1] | Compliance Status | Comments |
|---|---|---|
| **Well Considerations** | | |
| Located a minimum of three feet above the 100-year flood elevation or flood of highest record | ✓ | |
| Well accesible and maintained to facilitate maintenance and other activities | ✓ | |
| Grading around well/wellhouse to lead surface drainage away | ✓ | Small mound |
| Well casing sealed with one piece watertight, vermin-proof cap, lockable cap | ✓ | |
| Well casing terminates 18" above finished grade, or 12" above wellhouse floor | ✓ | 29" |
| Contains well casing vent with downward turning vent and screen | ✓ | |
| Casing vent terminates 12" above grade or 6" above wellhouse floor | ✓ | |
| Fencing and other precautions to prevent trespassing, vandalism, and sabotage | ★ | No fencing or other security |
| **Wellhouse General Design and Construction Considerations** | | |
| Durable construction, fire and weather resistant, with outward-opening doors | - | |
| Floor elevation at least six inches above finished grade | - | |
| Floors sloped to sump or drain | - | |
| Openings in floor or roofs for equipment removal | - | |
| Adequate dehumidification to prevent excessive moisture | - | |
| **Equipment** | | |
| Automatic signaling apparatus reporting when station is out of service | ★ | In process of putting in alarm system, HP-LP, but no well status |
| Check valve on discharge side of pump between pump and shut-off valve | ✓ | |
| Watertight joints on piping | - | |
| Piping protected against water hammer and suitable restraints provided | - | |
| Standard pressure gauge on discharge line | ★ | None |
| Instrumentation for well level | ★ | None |
| Station has means of measuring discharge flow | ✓ | |
| Electrical controls located above grade | ✓ | Yes, in station - no remote disconnect |
| Standby power provided | ✓ | At wellhouse |

Notes:
(1) Based on *Recommended Standards for Water Works, 2012 Edition*

T&B Engineering, P.C.

## Hyde Park Capital Improvements Plan
### Liquid Chemical Feed Systems Inventory - Pine Brook Water

| Location | Chemical | Storage | | |
|---|---|---|---|---|
| | | Type | Number | Volume |
| Pine Brook Water | Sodium Hypochlorite | Day Tank - LPE | 1 | 35 gal |

| Location | Chemical | Feed/Metering/Transfer Pumps | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Mfg / Type | Number | Model | Serial Number | Motor | Max. Output (gph) | Max. Discharge Press.(psig) |
| Pine Brook Water | Sodium Hypochlorite | Pulsafeeder - Electronic Metering Pump | 1 | LPD4SA-VVC9-U03 | 386215 | 0.1 hp | 0.92 | 150 |

| Location | Chemical | Equipment Age | Condition | Eyewash Station | Comments/Observations |
|---|---|---|---|---|---|
| Pine Brook Water | Sodium Hypochlorite | Day Tank - 2000s Pump - 07/12 | Fair | A bottle system | Provide secondary containment, spare metering pump, flow pacing |

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Major Equipment Inventory - Electrical

| Equipment | Manufacturer | Model # | Serial # | Quantity | Approximate Year Installed | Condition | Notes |
|---|---|---|---|---|---|---|---|
| Panelboard | General Electric | Loadcenter | | 2 | 1988 | Good | 120/208V |
| Generator | Katolight | G10 FPW4 | | 1 | 1988 | Fair | 10 kW, 120/208 V |
| Manual Transfer Switch | General Electric | TC35362 | | 1 | 1988 | Good | 600 VAC, 60 A |
| Starters | Furnas | 12050C | | 3 | 1988 | Good | |
| TVSS | Hubbell | HBL4W100B | | 1 | 1988 | Good | |
| Pump CP | Furnas | - | | 1 | 1988 | Good | |
| Exhaust Fan | Emerson Electric | - | - | 1 | 1988 | Good | |
| Electric Unit Heater | Dayton | - | | 2 | 2014 | New | |
| Indoor Light Fixtures | - | - | | 6 | - | Good | Industrial fluorescent tyoe fixtures |
| Exterior Light Fixture | - | - | | 1 | - | Good | HID type downlight fixture |

# Appendix D
# Supporting Documentation – Budgetary Cost Estimates

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Urgent Improvements
## Town of Hyde Park, NY

| ITEM | DESCRIPTION | | | | TOTAL |
|---|---|---|---|---|---|
| | **CONSTRUCTION ACTIVITIES** | | | | |
| 1.1 | **Urgent Improvements Total** | | | | **$16,300** |
| | Interior Signage/Labeling/Fire Extinguisher/Misc. | | | | $500 |
| | Emergency Eyewash Shower | | | | $6,000 |
| | Provide vent for fuel tank to building exterior | | | | $5,000 |
| | Provide GFI Receptacle for metering pump | | | | $500 |
| | Sample Tap Replacement | | | | $2,300 |
| | Containment Pallets | | | | $2,000 |
| 1.2 | **General Conditions** | | | | **$1,700** |
| | 10% of Construction Activities | % | 10 | --- | $1,700 |
| 2.0 | **Total Activity Costs** | | | | **$22,500** |
| | Activity Subtotal | | | | $18,000 |
| | Contingency on Activities @ 25% | | | | $4,500 |
| 3.0 | **Consultants** | | | | **$5,800** |
| | Architectural @ 1% | | | | $300 |
| | Construction Administration @ 8% | | | | $1,800 |
| | Engineering @ 10% | | | | $2,300 |
| | Environmental & Archeological @ 4% | | | | $900 |
| | Survey @ 2% | | | | $500 |
| 4.0 | **Owner** | | | | **$1,400** |
| | Administration @ 1% Activities | | | | $300 |
| | Project Management @ 3% | | | | $900 |
| | Legal @ 0.5% | | | | $200 |
| | Land & Easement Acquisition | | | | n/a |
| 5.0 | **Total Project Costs** | | | | **$32,700** |
| | Subtotal (Activities + Consultants + Owner) | | | | $29,700 |
| | Project Contingency @ 10% Activities + Consultants + Owner | | | | $3,000 |
| 6.0 | **Total Project Costs with Escalation (at 2.7% annually)** | | | | |
| | 5/2014 - 5/2015 | | | | $32,700 |
| | 5/2015 - 5/2016 | | | | $33,600 |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Urgent Improvements
## Town of Hyde Park, NY

| SECTION | DESCRIPTION | UNITS | QTY | UNIT PRICE | TOTAL |
|---|---|---|---|---|---|
| **DIVISION 10 - SPECIALTIES** | | | | | |
| 101402 | Interior Signage/Labeling/Fire Extinguisher/Misc. | LS | 1 | $500 | $500 |
| **SUBTOTAL - DIVISION 10** | | | | | **$500** |
| **DIVISION 22 - PLUMBING** | | | | | |
| 224533 | Emergency Eyewash Shower | EA | 1 | $6,000 | $6,000 |
| **SUBTOTAL - DIVISION 22** | | | | | **$6,000** |
| **DIVISION 23 - HVAC** | | | | | |
| 235123 | Provide vent for fuel tank to building exterior | LS | 1 | $5,000 | $5,000 |
| **SUBTOTAL - DIVISION 23** | | | | | **$5,000** |
| **DIVISION 26 - ELECTRICAL** | | | | | |
| 260500 | Provide GFI Receptacle for metering pump | LS | 1 | $500 | $500 |
| **SUBTOTAL - DIVISION 26** | | | | | **$500** |
| **DIVISION 33 - Utilities** | | | | | |
| 331000 | Replace sample taps with smooth-nosed taps | EA | 3 | $750 | $2,300 |
| **SUBTOTAL - DIVISION 33** | | | | | **$2,300** |
| **DIVISION 44 - WATER POLLUTION CONTROL EQUIPMENT** | | | | | |
| 444133 | Containment Pallets | EA | 2 | $1,000 | $2,000 |
| **SUBTOTAL - DIVISION 44** | | | | | **$2,000** |
| **SUBTOTAL** | | | | | **$16,300** |
| Division 1 - General Conditions (10%) | | | | | $1,630 |
| | | | | | |
| **Probable Construction Cost** | | | | | **$17,930** |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## ShortTerm Improvements
## Town of Hyde Park, NY

| ITEM | DESCRIPTION | | | | TOTAL |
|---|---|---|---|---|---|
| | **CONSTRUCTION ACTIVITIES** | | | | |
| 1.1 | **Short Term Improvements Total** | | | | **$137,350** |
| 1.2 | **General Conditions** | | | | **$13,800** |
| | 10% of Construction Activities | % | 10 | --- | $13,800 |
| 2.0 | **Total Activity Costs** | | | | **$188,950** |
| | Activity Subtotal | | | | $151,150 |
| | Contingency on Activities @ 25% | | | | $37,800 |
| 3.0 | **Consultants** | | | | **$47,400** |
| | Architectural @ 1% | | | | $1,900 |
| | Construction Administration @ 8% | | | | $15,200 |
| | Engineering @ 10% | | | | $18,900 |
| | Environmental & Archeological @ 4% | | | | $7,600 |
| | Survey @ 2% | | | | $3,800 |
| 4.0 | **Owner** | | | | **$10,200** |
| | Administration @ 1% Activities | | | | $1,900 |
| | Project Management @ 3% | | | | $7,100 |
| | Legal @ 0.5% | | | | $1,200 |
| | Land & Easement Acquisition | | | | n/a |
| 5.0 | **Total Project Costs** | | | | **$271,250** |
| | Subtotal (Activities + Consultants + Owner) | | | | $246,550 |
| | Project Contingency @ 10% Activities + Consultants + Owner | | | | $24,700 |
| 6.0 | **Total Project Costs with Escalation (at 2.7% annually)** | | | | |
| | 5/2014 - 5/2015 | | | | $271,250 |
| | 5/2015 - 5/2016 | | | | $278,600 |
| | 5/2016 - 5/2017 | | | | $286,200 |
| | 5/2017 - 5/2018 | | | | $294,000 |
| | 5/2018 - 5/2019 | | | | $302,000 |
| | 5/2019 - 5/2020 | | | | $310,200 |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Short Term Improvements
## Town of Hyde Park, NY

| SECTION | DESCRIPTION | UNITS | QTY | UNIT PRICE | TOTAL |
|---|---|---|---|---|---|
| **DIVISION 3 - CONCRETE** | | | | | |
| 033000 | Repair concrete floor slab | LS | 1.0 | $3,000 | $3,000 |
| **SUBTOTAL - DIVISION 3** | | | | | **$3,000** |
| **DIVISION 7 - Thermal and Moisture Protection** | | | | | |
| 072119 | Insulation Fiberglass | SF | 450 | $5 | $2,250 |
| 073113 | Asphalt Shingles | SF | 750 | $15 | $11,300 |
| 077123 | Replace Gutter | LS | 1 | $1,000 | $1,000 |
| **SUBTOTAL - DIVISION 7** | | | | | **$14,550** |
| **DIVISION 8- OPENINGS** | | | | | |
| 081113 | New door and frame | EA | 1 | $4,000 | $4,000 |
| 087153 | Security locks/new bolts for hatches | LS | 1 | $500 | $500 |
| **SUBTOTAL - DIVISION 8** | | | | | **$4,500** |
| **DIVISION 9 - FINISHES** | | | | | |
| 099000 | Repaint eave trim | LS | 1 | $5,000 | $5,000 |
| 099000 | Paint interior door lintel | LS | 1 | $1,000 | $1,000 |
| 099000 | Surface prep/painting of hydropneumatic tank | LS | 1 | $5,000 | $5,000 |
| **SUBTOTAL - DIVISION 9** | | | | | **$11,000** |
| **DIVISION 10 - SPECIALTIES** | | | | | |
| 101402 | Interior Signage/ hearing protection for generator | LS | 1 | $500 | $500 |
| 101402 | Signage for wells | EA | 2 | $500 | $1,000 |
| **SUBTOTAL - DIVISION 10** | | | | | **$1,500** |
| **DIVISION 22 - PLUMBING** | | | | | |
| 220500 | Replace floor drain cover | EA | 1 | $500 | $500 |
| 221200 | Storage Tanks - secure screens | EA | 2 | $150 | $300 |
| 221123 | Booster Pump System Skid | LS | 1 | $15,000 | $15,000 |
| **SUBTOTAL - DIVISION 22** | | | | | **$15,800** |
| **DIVISION 26 - ELECTRICAL** | | | | | |
| 260500 | Metering Pump Wiring (flow pacing) | EA | 2 | $1,500 | $3,000 |
| 260500 | Panelboard | LS | 1 | $5,500 | $5,500 |
| 260500 | Automatic Transfer Switch | LS | 1 | $3,500 | $3,500 |
| 260500 | Pump Starters | LS | 1 | $3,000 | $3,000 |
| 260500 | Surge Protection Device for well pumps | LS | 1 | $1,000 | $1,000 |
| 260500 | GFI Receptacles | LS | 1 | $1,500 | $1,500 |
| 263200 | Packaged Generator | LS | 1 | $27,500 | $27,500 |
| **SUBTOTAL - DIVISION 26** | | | | | **$45,000** |
| **DIVISION 28 - ELECTRONIC SAFETY AND SECURITY** | | | | | |
| 280500 | Security/Door Contacts | LS | 1 | $1,000 | $1,000 |
| 283100 | Fire Detection System | LS | 1 | $500 | $500 |
| **SUBTOTAL - DIVISION 28** | | | | | **$1,500** |
| **DIVISION 31 - EARTHWORK** | | | | | |
| 312216 | Grading of areas around Well 1 | LS | 1 | $2,500 | $2,500 |
| **SUBTOTAL - DIVISION 31** | | | | | **$2,500** |

## Pinebrook Water District
## Short Term Improvements
## Town of Hyde Park, NY

| SECTION | DESCRIPTION | UNITS | QTY | UNIT PRICE | TOTAL |
|---|---|---|---|---|---|
| **DIVISION 40 - PROCESS INTERCONNECTIONS** | | | | | |
| 400000 | Well 3 Reconnection into active service | LS | 1 | $1,000 | $1,000 |
| 407100 | New flow Meter with chart recorder | EA | 4 | $3,000 | $12,000 |
| 402414 | Replacement of Corroded Pipe and Supports | LS | 1 | $10,000 | $10,000 |
| 407000 | Instrumentation for wells- Flow meter, pressure gauges | LS | 1 | $10,500 | $10,500 |
| **SUBTOTAL - DIVISION 40** | | | | | **$33,500** |
| **DIVISION 43 - PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT** | | | | | |
| 432300 | Provide spare Metering Pump | EA | 1 | $3,000 | $3,000 |
| 434143 | New Day Tank | EA | 1 | $1,500 | $1,500 |
| **SUBTOTAL - DIVISION 43** | | | | | **$4,500** |
| **SUBTOTAL** | | | | | **$137,350** |
| Division 1 - General Conditions (10%) | | | | | $13,800 |
| **Probable Construction Cost** | | | | | **$151,150** |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Long Term Improvements
## Town of Hyde Park, NY

| ITEM | DESCRIPTION | | | | TOTAL |
|---|---|---|---|---|---|
| | **CONSTRUCTION ACTIVITIES** | | | | |
| 1.1 | **Long Term Improvements** | | | | **$282,000** |
| 1.2 | **General Conditions** | | | | **$28,200** |
| | 10% of Construction Activities | % | 10 | --- | $28,200 |
| 2.0 | **Total Activity Costs** | | | | **$387,750** |
| | Activity Subtotal | | | | $310,200 |
| | Contingency on Activities @ 25% | | | | $77,550 |
| 3.0 | **Consultants** | | | | **$97,200** |
| | Architectural @ 1% | | | | $3,900 |
| | Construction Administration @ 8% | | | | $31,100 |
| | Engineering @ 10% | | | | $38,800 |
| | Environmental & Archeological @ 4% | | | | $15,600 |
| | Survey @ 2% | | | | $7,800 |
| 4.0 | **Owner** | | | | **$21,000** |
| | Administration @ 1% Activities | | | | $3,900 |
| | Project Management @ 3% | | | | $14,600 |
| | Legal @ 0.5% | | | | $2,500 |
| | Land & Easement Acquisition | | | | n/a |
| 5.0 | **Total Project Costs** | | | | **$556,550** |
| | Subtotal (Activities + Consultants + Owner) | | | | $505,950 |
| | Project Contingency @ 10% Activities + Consultants + Owner | | | | $50,600 |
| 6.0 | **Total Project Costs with Escalation (at 2.7% annually)** | | | | |
| | 5/2014 - 5/2015 | | | | $556,550 |
| | 5/2015 - 5/2016 | | | | $571,600 |
| | 5/2016 - 5/2017 | | | | $587,000 |
| | 5/2017 - 5/2018 | | | | $602,800 |
| | 5/2018 - 5/2019 | | | | $619,100 |
| | 5/2019 - 5/2020 | | | | $635,800 |
| | 5/2020 - 5/2021 | | | | $653,000 |
| | 5/2021 - 5/2022 | | | | $670,600 |
| | 5/2022 - 5/2023 | | | | $688,700 |
| | 5/2023 - 5/2024 | | | | $707,300 |
| | 5/2024 - 5/2025 | | | | $726,400 |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Long Term Improvements
## Town of Hyde Park, NY

| SECTION | DESCRIPTION | UNITS | QTY | UNIT PRICE | TOTAL |
|---|---|---|---|---|---|
| **DIVISION 23 - HVAC** | | | | | |
| 236200 | Replace Exhaust Fan | EA | 1 | $4,000 | $4,000 |
| 238239 | Replace Unit Heater | EA | 1 | $3,000 | $3,000 |
| **SUBTOTAL - DIVISION 23** | | | | | **$7,000** |
| **DIVISION 33 - Utilities** | | | | | |
| 331600 | New Hydropneumatic Tank (exterior with insulation) | LS | 1 | $55,000 | $55,000 |
| **SUBTOTAL - DIVISION 33** | | | | | **$55,000** |
| **DIVISION 40 - PROCESS INTERCONNECTIONS** | | | | | |
| 402414 | Replace interior piping | LS | 1 | $20,000 | $20,000 |
| **SUBTOTAL - DIVISION 40** | | | | | **$20,000** |
| **DIVISION 43 - PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT** | | | | | |
| 432500 | New Well Pump (Well 2) and well cap | EA | 1 | $30,000 | $30,000 |
| 432500 | New Well Pump (Well 3) | EA | 1 | $20,000 | $20,000 |
| 434111 | New Atmospheric storage tank (steel with insulation) | EA | 1 | $150,000 | $150,000 |
| **SUBTOTAL - DIVISION 43** | | | | | **$200,000** |
| **SUBTOTAL** | | | | | **$282,000** |
| Division 1 - General Conditions (10%) | | | | | $28,200 |
| | | | | | |
| **Probable Construction Cost** | | | | | **$310,200** |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Short Term Improvements - Study/Planning Activities
## Town of Hyde Park, NY

| ITEM | DESCRIPTION | UNITS | QTY | UNIT PRICE | TOTAL |
|---|---|---|---|---|---|
| | **EVALUATION ACTIVITIES** | | | | |
| **1.1** | | | | | **$15,000** |
| | Conduct Flow Testing for wells | LS | 1 | $15,000 | $15,000 |
| **1.2** | **General Conditions** | | | | **$1,500** |
| | 10% of Construction Activities | % | 10 | --- | $1,500 |
| **2.0** | **Total Activity Costs** | | | | **$20,700** |
| | Activity Subtotal | | | | $16,500 |
| | Contingency on Activities @ 25% | | | | $4,200 |
| **3.0** | **Consultants** | | | | **$2,100** |
| | Architectural @ 1% | | | | n/a |
| | Construction Administration @ 8% | | | | n/a |
| | Engineering @ 10% | | | | $2,100 |
| | Environmental & Archeological @ 4% | | | | n/a |
| | Survey @ 2% | | | | n/a |
| **4.0** | **Owner** | | | | **$900** |
| | Construction Administration @ 1% Activities | | | | n/a |
| | Project Management @ 3% | | | | $700 |
| | Legal @ 0.5% | | | | $200 |
| | Land & Easement Acquisition | | | | n/a |
| **5.0** | **Total Project Costs** | | | | **$26,100** |
| | Subtotal (Activities + Consultants + Owner) | | | | $23,700 |
| | Project Contingency @ 10% Activities + Consultants + Owner | | | | $2,400 |
| **6.0** | **Escalation (at 3% annually)** | | | | |
| | 5/2014 - 5/2015 | | | | $26,100 |
| | 5/2015 - 5/2016 | | | | $26,900 |
| | 5/2016 - 5/2017 | | | | $27,700 |
| | 5/2017 - 5/2018 | | | | $28,500 |
| | 5/2018 - 5/2019 | | | | $29,300 |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Interconnection to Greenbush Water District
## Town of Hyde Park, NY

| ITEM | DESCRIPTION | UNITS | QTY | UNIT PRICE | TOTAL |
|---|---|---|---|---|---|
| | **CONSTRUCTION ACTIVITIES** | | | | |
| 1.1 | **Interconnection to Greenbush Water District** | | | | **$980,000** |
| | 12" Pipe on state-owned road | LF | 1400 | $400 | $560,000 |
| | 12" piper on town-owned roads | LF | 1400 | $300 | $420,000 |
| 1.2 | **General Conditions** | | | | **$98,000** |
| | 10% of Construction Activities | % | 10 | --- | $98,000 |
| 2.0 | **Total Activity Costs** | | | | **$1,347,500** |
| | Activity Subtotal | | | | $1,078,000 |
| | Contingency on Activities @ 25% | | | | $269,500 |
| 3.0 | **Consultants** | | | | **$337,000** |
| | Architectural @ 1% | | | | $13,500 |
| | Construction Administration @ 8% | | | | $107,800 |
| | Engineering @ 10% | | | | $134,800 |
| | Environmental & Archeological @ 4% | | | | $53,900 |
| | Survey @ 2% | | | | $27,000 |
| 4.0 | **Owner** | | | | **$72,600** |
| | Administration @ 1% Activities | | | | $13,500 |
| | Project Management @ 3% | | | | $50,600 |
| | Legal @ 0.5% | | | | $8,500 |
| | Land & Easement Acquisition | | | | n/a |
| 5.0 | **Total Project Costs** | | | | **$1,932,900** |
| | Subtotal (Activities + Consultants + Owner) | | | | $1,757,100 |
| | Project Contingency @ 10% Activities + Consultants + Owner | | | | $175,800 |
| 6.0 | **Total Project Costs with Escalation (at 2.7% annually)** | | | | |
| | 5/2014 - 5/2015 | | | | $1,932,900 |
| | 5/2015 - 5/2016 | | | | $1,985,100 |
| | 5/2016 - 5/2017 | | | | $2,038,700 |
| | 5/2017 - 5/2018 | | | | $2,093,800 |
| | 5/2018 - 5/2019 | | | | $2,150,400 |
| | 5/2019 - 5/2020 | | | | $2,208,500 |
| | 5/2020 - 5/2021 | | | | $2,268,200 |
| | 5/2021 - 5/2022 | | | | $2,329,500 |
| | 5/2022 - 5/2023 | | | | $2,392,400 |
| | 5/2023 - 5/2024 | | | | $2,457,000 |
| | 5/2024 - 5/2025 | | | | $2,523,400 |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Interconnection to Arbors Water District
## Town of Hyde Park, NY

| ITEM | DESCRIPTION | | | | TOTAL |
|---|---|---|---|---|---|
| | **CONSTRUCTION ACTIVITIES** | **UNITS** | **QTY** | **UNIT PRICE** | |
| 1.1 | **Interconnection to Arbors Water District** | | | | **$2,360,000** |
| | 12" pipe on state-owned road | LF | 1400 | $400 | $560,000 |
| | 12" pipe on town-owned roads | LF | 6000 | $300 | $1,800,000 |
| 1.2 | **General Conditions** | | | | **$236,000** |
| | 10% of Construction Activities | % | 10 | --- | $236,000 |
| 2.0 | **Total Activity Costs** | | | | **$3,245,000** |
| | Activity Subtotal | | | | $2,596,000 |
| | Contingency on Activities @ 25% | | | | $649,000 |
| 3.0 | **Consultants** | | | | **$811,300** |
| | Architectural @ 1% | | | | $32,500 |
| | Construction Administration @ 8% | | | | $259,600 |
| | Engineering @ 10% | | | | $324,500 |
| | Environmental & Archeological @ 4% | | | | $129,800 |
| | Survey @ 2% | | | | $64,900 |
| 4.0 | **Owner** | | | | **$174,500** |
| | Administration @ 1% Activities | | | | $32,500 |
| | Project Management @ 3% | | | | $121,700 |
| | Legal @ 0.5% | | | | $20,300 |
| | Land & Easement Acquisition | | | | n/a |
| 5.0 | **Total Project Costs** | | | | **$4,653,900** |
| | Subtotal (Activities + Consultants + Owner) | | | | $4,230,800 |
| | Project Contingency @ 10% Activities + Consultants + Owner | | | | $423,100 |
| 6.0 | **Total Project Costs with Escalation (at 2.7% annually)** | | | | |
| | 5/2014 - 5/2015 | | | | $4,653,900 |
| | 5/2015 - 5/2016 | | | | $4,779,600 |
| | 5/2016 - 5/2017 | | | | $4,908,700 |
| | 5/2017 - 5/2018 | | | | $5,041,300 |
| | 5/2018 - 5/2019 | | | | $5,177,500 |
| | 5/2019 - 5/2020 | | | | $5,317,300 |
| | 5/2020 - 5/2021 | | | | $5,460,900 |
| | 5/2021 - 5/2022 | | | | $5,608,400 |
| | 5/2022 - 5/2023 | | | | $5,759,900 |
| | 5/2023 - 5/2024 | | | | $5,915,500 |
| | 5/2024 - 5/2025 | | | | $6,075,300 |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Interconnection to Hyde Park System via Violet Ave
## Town of Hyde Park, NY

| ITEM | DESCRIPTION | | | | TOTAL |
|---|---|---|---|---|---|
| | **CONSTRUCTION ACTIVITIES** | **UNITS** | **QTY** | **UNIT PRICE** | |
| 1.1 | **Interconnection to Hyde Park System via Violet Ave** | | | | **$1,725,000** |
| | 12" pipe on state-owned road | LF | 3000 | $400 | $1,200,000 |
| | 12" pipe on town-owned roads | LF | 1500 | $300 | $450,000 |
| | Pressure Reducing Station | LS | 1 | $75,000 | $75,000 |
| 1.2 | **General Conditions** | | | | **$172,500** |
| | 10% of Construction Activities | % | 10 | --- | $172,500 |
| 2.0 | **Total Activity Costs** | | | | **$2,371,900** |
| | Activity Subtotal | | | | $1,897,500 |
| | Contingency on Activities @ 25% | | | | $474,400 |
| 3.0 | **Consultants** | | | | **$593,200** |
| | Architectural @ 1% | | | | $23,800 |
| | Construction Administration @ 8% | | | | $189,800 |
| | Engineering @ 10% | | | | $237,200 |
| | Environmental & Archeological @ 4% | | | | $94,900 |
| | Survey @ 2% | | | | $47,500 |
| 4.0 | **Owner** | | | | **$127,700** |
| | Administration @ 1% Activities | | | | $23,800 |
| | Project Management @ 3% | | | | $89,000 |
| | Legal @ 0.5% | | | | $14,900 |
| | Land & Easement Acquisition | | | | n/a |
| 5.0 | **Total Project Costs** | | | | **$3,402,100** |
| | Subtotal (Activities + Consultants + Owner) | | | | $3,092,800 |
| | Project Contingency @ 10% Activities + Consultants + Owner | | | | $309,300 |
| 6.0 | **Total Project Costs with Escalation (at 2.7% annually)** | | | | |
| | 5/2014 - 5/2015 | | | | $3,402,100 |
| | 5/2015 - 5/2016 | | | | $3,494,000 |
| | 5/2016 - 5/2017 | | | | $3,588,400 |
| | 5/2017 - 5/2018 | | | | $3,685,300 |
| | 5/2018 - 5/2019 | | | | $3,784,900 |
| | 5/2019 - 5/2020 | | | | $3,887,100 |
| | 5/2020 - 5/2021 | | | | $3,992,100 |
| | 5/2021 - 5/2022 | | | | $4,099,900 |
| | 5/2022 - 5/2023 | | | | $4,210,600 |
| | 5/2023 - 5/2024 | | | | $4,324,300 |
| | 5/2024 - 5/2025 | | | | $4,441,100 |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Interconnection to Hyde Park System via Holt Road
## Town of Hyde Park, NY

| ITEM | DESCRIPTION | | | | TOTAL |
|---|---|---|---|---|---|
| | **CONSTRUCTION ACTIVITIES** | **UNITS** | **QTY** | **UNIT PRICE** | |
| **1.1** | **Interconnection to Hyde Park System via Holt Road** | | | | **$599,900** |
| | 12" pipe for Holt Rd (Direct Connection) - town owned roads | LF | 1755 | $300 | $526,500 |
| | 8" pipe Holt Rd Extension (Direct Connection) -town-owned roads | LF | 267 | $275 | $73,400 |
| **1.2** | **General Conditions** | | | | **$60,000** |
| | 10% of Construction Activities | % | 10 | --- | $60,000 |
| **2.0** | **Total Activity Costs** | | | | **$824,900** |
| | Activity Subtotal | | | | $659,900 |
| | Contingency on Activities @ 25% | | | | $165,000 |
| **3.0** | **Consultants** | | | | **$206,300** |
| | Architectural @ 1% | | | | $8,300 |
| | Construction Administration @ 8% | | | | $66,000 |
| | Engineering @ 10% | | | | $82,500 |
| | Environmental & Archeological @ 4% | | | | $33,000 |
| | Survey @ 2% | | | | $16,500 |
| **4.0** | **Owner** | | | | **$44,500** |
| | Administration @ 1% Activities | | | | $8,300 |
| | Project Management @ 3% | | | | $31,000 |
| | Legal @ 0.5% | | | | $5,200 |
| | Land & Easement Acquisition | | | | n/a |
| **5.0** | **Total Project Costs** | | | | **$1,183,300** |
| | Subtotal (Activities + Consultants + Owner) | | | | $1,075,700 |
| | Project Contingency @ 10% Activities + Consultants + Owner | | | | $107,600 |

| ITEM | DESCRIPTION | TOTAL |
|---|---|---|
| **6.0** | **Total Project Costs with Escalation (at 2.7% annually)** | |
| | 5/2014 - 5/2015 | $1,183,300 |
| | 5/2015 - 5/2016 | $1,215,300 |
| | 5/2016 - 5/2017 | $1,248,200 |
| | 5/2017 - 5/2018 | $1,282,000 |
| | 5/2018 - 5/2019 | $1,316,700 |
| | 5/2019 - 5/2020 | $1,352,300 |
| | 5/2020 - 5/2021 | $1,388,900 |
| | 5/2021 - 5/2022 | $1,426,500 |
| | 5/2022 - 5/2023 | $1,465,100 |
| | 5/2023 - 5/2024 | $1,504,700 |
| | 5/2024 - 5/2025 | $1,545,400 |

# CONCEPTUAL COST ESTIMATE
## Pinebrook Water District
## Interconnection via Holt Road - Additional Customers Along Side Streets
## Town of Hyde Park, NY

| ITEM | DESCRIPTION | | | | TOTAL |
|---|---|---|---|---|---|
| | **CONSTRUCTION ACTIVITIES** | **UNITS** | **QTY** | **UNIT PRICE** | |
| 1.1 | **Interconnection to Hyde Park System via Holt Road** | | | | **$1,586,800** |
| | Side Street Tie Ins | | | | |
| | Holt Rd (Northern segment) - 8" | LF | 849 | $275 | $233,500 |
| | Holt Rd (Center Segment) -12" | LF | 394 | $300 | $118,200 |
| | Holt Rd (Southern Segment) - 8" | LF | 1,064 | $275 | $292,600 |
| | Dogwood Ln - 8" | LF | 405 | $275 | $111,400 |
| | Gary Dr - 8" | LF | 687 | $275 | $188,900 |
| | Madison Ave - 12" | LF | 1,631 | $300 | $489,200 |
| | Madison Ave Extension - 8" | LF | 246 | $275 | $67,700 |
| | Rothkrantz Dr - 8" | LF | 310 | $275 | $85,300 |
| 1.2 | **General Conditions** | | | | **$158,700** |
| | 10% of Construction Activities | % | 10 | --- | $158,700 |
| 2.0 | **Total Activity Costs** | | | | **$2,181,900** |
| | Activity Subtotal | | | | $1,745,500 |
| | Contingency on Activities @ 25% | | | | $436,400 |
| 3.0 | **Consultants** | | | | **$545,700** |
| | Architectural @ 1% | | | | $21,900 |
| | Construction Administration @ 8% | | | | $174,600 |
| | Engineering @ 10% | | | | $218,200 |
| | Environmental & Archeological @ 4% | | | | $87,300 |
| | Survey @ 2% | | | | $43,700 |
| 4.0 | **Owner** | | | | **$117,500** |
| | Administration @ 1% Activities | | | | $21,900 |
| | Project Management @ 3% | | | | $81,900 |
| | Legal @ 0.5% | | | | $13,700 |
| | Land & Easement Acquisition | | | | n/a |
| 5.0 | **Total Project Costs** | | | | **$3,129,700** |
| | Subtotal (Activities + Consultants + Owner) | | | | $2,845,100 |
| | Project Contingency @ 10% Activities + Consultants + Owner | | | | $284,600 |

| ITEM | DESCRIPTION | TOTAL |
|---|---|---|
| **6.0** | **Total Project Costs with Escalation (at 2.7% annually)** | |
| | 5/2014 - 5/2015 | $3,129,700 |
| | 5/2015 - 5/2016 | $3,214,300 |
| | 5/2016 - 5/2017 | $3,301,100 |
| | 5/2017 - 5/2018 | $3,390,300 |
| | 5/2018 - 5/2019 | $3,481,900 |
| | 5/2019 - 5/2020 | $3,576,000 |
| | 5/2020 - 5/2021 | $3,672,600 |
| | 5/2021 - 5/2022 | $3,771,800 |
| | 5/2022 - 5/2023 | $3,873,700 |
| | 5/2023 - 5/2024 | $3,978,300 |
| | 5/2024 - 5/2025 | $4,085,800 |

**APPENDIX "E"**

Pinebrook Expansion Water System (County District Zone of Assessment "032")

**Technical Memorandum – Frantoni Villas Feasibility Investigation, prepared by Tighe & Bond, last revised February 2025**

# Frantoni Villas Feasibility Investigation

**TO:** Vanessa Kichline, DCWWA

**FROM:** Daniel Valentine, PE, Tighe & Bond
Eric Moody, PE, Tighe & Bond

**COPY:** Jonathan Churins, DCWWA
Jerry Gilnack DCWWA
Richard Winchester, DCWWA
Alain Petit, DCWWA

**DATE:** February 25, 2025

The Frantoni Villas Community at the intersection of Route 9G and Prince Road in Hyde Park, NY has interest in receiving water service from the Hyde Park Regional Water System (HPRWS) and abandoning their existing water supply. Currently, the closest water main in the HPRWS to the Frantoni Villas Community is a 12-inch ductile iron water main that runs along Holt Road. According to record drawings, there is an existing 12"x8" tee and 8" gate valve with a cap near the intersection of Holt Road and Rothkranz Drive. The Dutchess County Water and Wastewater Authority (DCWWA) is considering extending service to the Frantoni Villas Community by extending the water main from Holt Road to the end of Rothkranz Drive.

Tighe & Bond, whose services in New York are provided by T&B Engineering and Landscape Architecture, P.C. (Tighe & Bond), has prepared this memorandum and opinion of probable cost (OPC) for extending water service to the Frantoni Villas Community. The proposed extension is discussed in greater detail in the section that follows:

## Extension of Holt Road Water Main

The proposed water main extension consists of connecting to the 8-inch stub near the intersection of Holt Road and Rothkranz Drive and extending the 8-inch ductile iron water main via open cut installation in the paved road approximately 300 feet to the end of Rothkranz Drive. A hydrant will be installed at the end of Rothkranz Drive.

## Assumptions

Tighe & Bond made the following assumptions when developing the opinion of probable cost:

1. No geotechnical borings or rock probes have been performed to date. Therefore, we have based the OPC on soil types shown in the United States Department of Agriculture (USDA) Natural Resources Conservation Service soil maps. We have also included an assumed quantity of rock excavation for the open cut portions.
2. There are no service connections for the houses along Rothkranz Drive.
3. Frantoni Villas will be responsible for the cost of installing a meter pit with backflow prevention and installation of the service line from the end of Rothkranz Dive to their property/buildings. Installation of the service line will cross private property not owned by Frantoni Villas.

## Opinion of Probable Cost

An opinion of probable cost (OPC) has been prepared for the proposed extension. The opinion of probable cost includes the following components:

- **Construction Cost:** The budgetary cost estimate is based on Class 5 level construction cost estimate, as defined by the Association for the Advancement of Cost Engineering (AACE) International Recommended Practices and Standards. According to AACE International Recommended Practices and Standards, the estimate class designators are labeled Class 1, 2, 3, 4, and 5, where a Class 5 estimate is based on the lowest level of project definition and a Class 1 estimate is closest to full project definition and maturity. The end usage for a Class 5 estimate is screening or feasibility. The expected accuracy range of a Class 5 estimate is between +50% to -30%. The level of project definition for a Class 5 estimate is between 0% and 2%. The costs include material and installation costs, traffic control, mobilization and demobilization, and contractor's general conditions. The unit costs are based upon recently bid projects, quotes from contractors, quotes from equipment manufacturers/vendors, and data contained in R.S. Means Construction Cost Data.
- **Engineering (20%):** Engineering fees have been estimated at 20% of the construction costs. The 20% for engineering fees can generally be broken down further as: Engineering Design (8%) and Construction Administration/Observation (12%).
- **Contingency (30%):** A 30% general contingency has been applied to the estimated construction costs. This contingency is in-line with the current level of project definition.
- **Escalation (4%/year):** A 4% per year cumulative escalation has been applied to the estimated construction costs. This escalation accounts for changes in construction costs from the time this estimate was developed (2025) to the time the project is anticipated to be constructed (2026).
- **Opinion of Probable Cost:** The total project costs are the sum of the construction costs, engineering costs, contingency, and escalation.

The OPC is summarized in Table 1 and the detailed cost estimate is attached to this memorandum.

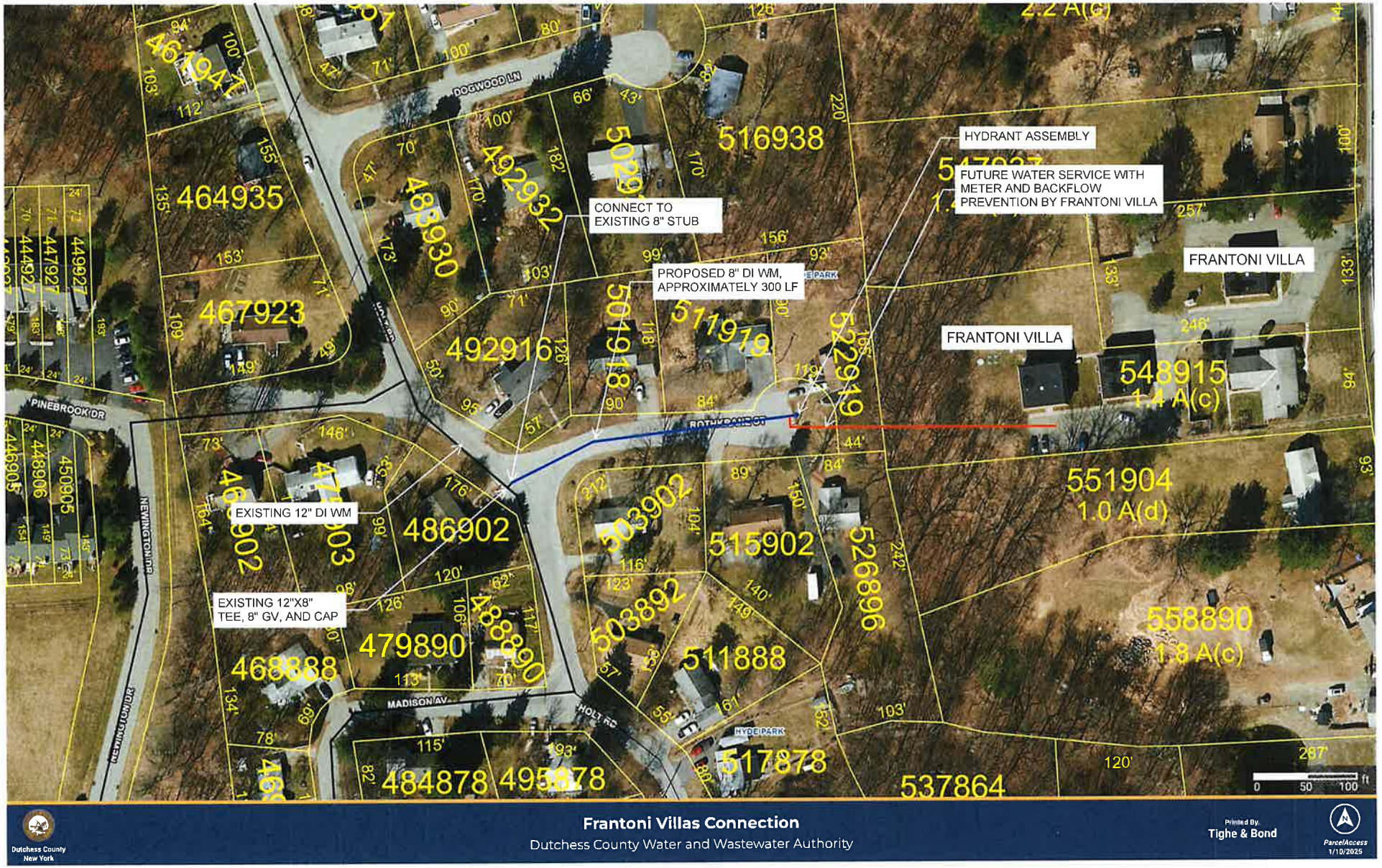
**TABLE 1**
Summary of Costs

| | Description | OPC |
|---|---|---|
| Extension of Holt Road Water Main | Open cut installed 8-inch DI water main to the end of Rothkranz Drive | $188,000 |

## Attachments

- Frantoni Villas Connection Sketch
- Detailed Opinion of Probable Cost

"\\tighebond.com\data\Data\Projects\D\D0280 DCWWA\07-On Call\007I - Frantoni Villas Water Main Extension\Frantoni Villas Task Order Memo.docx"




**Frantoni Villas Connection**

Dutchess County Water and Wastewater Authority

Dutchess County New York

Printed By: Tighe & Bond

ParcelAccess 1/10/2025

Tighe&Bond

**ENGINEER'S OPINION OF PROBABLE COST**
**Frantoni Villas Feasibility Investigation**
Hyde Park Regional Water System, Hyde Park, NY

Date: **1/13/2025**
ENR CCI: **13731.60**

| Item Description | Unit Cost | Units | Quantity | Cost |
|---|---|---|---|---|
| 8-inch DI Water Main | $200 | LF | 300 | $60,000 |
| Bituminous Concrete Trench Pavement Repair | $80 | SY | 270 | $21,600 |
| Hydrant Assemby | $8,500 | EA | 1 | $8,500 |
| Rock Excavation (Open Cut) | $400 | CY | 20 | $8,000 |
| Traffic Control (3%) | $3,000 | LS | 1 | $3,000 |
| Mobilization/Demobilization (5%) | $5,000 | LS | 1 | $5,000 |
| Contractor General Conditions (15%) | $14,800 | LS | 1 | $14,800 |
| | | | Subtotal Construction Costs | $121,000 |
| | | | Engineering (20%) | $25,000 |
| | | | Contingency (30%) | $37,000 |
| | | | Escalation (4%/year for 1 years) | $5,000 |
| | | | **Opinion of Probable Cost** | **$188,000** |

**NOTES:** This is an engineer's Opinion of Probable Cost (OPC). Tighe & Bond has no control over the cost or availability of labor, equipment or materials, or over market conditions or the Contractor's method of pricing, and that the estimates of probable construction costs are made on the basis of Tighe & Bond's professional judgment and experience. Tighe & Bond makes no guarantee nor warranty, expressed or implied, that the bids or the negotiated cost of the Work will not vary from this estimate of the Probable Cost.