

LEGGETTE, BRASHEARS & GRAHAM, INC.

PROFESSIONAL GROUNDWATER AND ENVIRONMENTAL ENGINEERING SERVICES

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April 25, 2016

Mr. James Napoli
Dutchess County Department of Health
85 Civic Center Plaza, Suite 106
Poughkeepsie, NY 12601

RE: Application for Well Site Approval
Village of Millbrook Well Field
3636 Route 44
Village of Millbrook, New York

Dear Mr. Napoli:

Leggette, Brashears & Graham, Inc. (LBG) and Delaware Engineering, DPC (Delaware) on behalf of the Village of Millbrook have prepared this request for approval to drill and construct up to 3 bedrock test wells on the Village's existing well field located at 3636 Route 44. The location of the well field parcel is shown on the location map in Appendix I. The proposed bedrock test well locations Proposed Wells 1, 2, and 3 are shown on the drawing in Appendix II.

The bedrock test well(s) are proposed to be drilled to determine whether sufficient water is available from the bedrock aquifer to replace the existing sand and gravel infiltration system at the well field which currently supplies water to the Village users. The sand and gravel infiltration system has been determined to be groundwater under the influence of surface water (GWUDI) and the water from this system must be treatment via the Surface Water Treatment Rule. The Dutchess County Health Department (DCDH) has requested that the Village investigate the potential for new sources that would not require treatment for GWUDI. The average water demand for the Village in 2015 was about 225,000 gpd (gallons per day) to 250,000 gpd and the peak day was about 291,000 gpd.

In response to the DCDH request, the Village has identified three bedrock test well locations on their existing well field property. The bedrock test well locations were selected based on the following criteria: the Village of Millbrook owns the property, the locations are in close proximity to the existing treatment and distribution system, and the locations are geologically favorable. The proposed test well locations are within the 100-foot adjacent area of a New York State Department of Environmental Conservation (NYSDEC) regulated wetland, therefore, a Freshwater Wetland Permit application dated April 5, 2016 has been submitted to the NYSDEC. Test well locations outside of the 100-foot adjacent area were considered. However,

locations outside of the adjacent area lacked one or more of the above listed criteria and were not considered favorable to drill.

Bedrock Well Specifications

The proposed bedrock wells will be drilled with an Air or Mud Rotary Drill Rig. The well will be completed with a minimum of 100 feet of 8-inch diameter well casing set into bedrock or a minimum of 10 feet into the top of bedrock, whichever is deeper. The installation of a minimum of 100 feet of casing is intended to seal off shallow water-bearing fractures in the bedrock, potentially reducing the likelihood of GWUDI in the new wells. Prior to the installation of the 8-inch casing, 12-inch outer diameter casing will be driven to 50 feet or the top of bedrock (whichever occurs first) to facilitate the installation of the 8-inch casing through the sand and gravel overburden and allow casing to be grouted into competent rock.

Once the 8-inch casing is in place, a 6-inch borehole will be drilled to a minimum depth of 400 feet. If sufficient water is encountered in the well, the borehole will be reamed to 8-inch diameter. At the completion of drilling, the well will be developed by surging and pumping for a minimum of 4 hours or until the water has visibly cleared.

Grout will be placed between the 12-inch and 8-inch casings. The well drilling contractor will also provide an 8-inch driveshoe for the well and a locking well cap to secure the well after completion. A diagram of the proposed well construction is included in Appendix III.

In addition to the DCDH well site application, the well driller will obtain the necessary well permits with the NYSDEC prior to drilling and will file the well logs after completion. The Village will complete the Dig Safely mark-out request prior to the start of drilling.

Well Site Approval

The proposed well locations were chosen by LBG and Delaware based on the geologic favorability, the proximity of existing treatment and distribution system, and the Village's existing ownership of the property. The proposed wells meet New York State Department of Health (NYSDOH) 100-foot radius of ownership and 200-foot radius of sanitary control well siting requirements.

There are no known sources of potential pollution listed in the NYSDOH Sanitary Code Part 5 Subpart 5-1 Appendix 5-D within 200 feet of the proposed test well locations. The 100-foot radius of ownership and 200-foot radius of sanitary control for all proposed well

locations is contained within the property boundary. There are no 100-year flood elevation or floodways near the proposed well locations.

The test wells will be drilled in accordance the NYSDOH, Dutchess County Health Department (DCDH) regulations and the American Water Works Association (AWWA) Standards for public water-supply wells. A minimum of 100 feet of casing will be installed in each well drilled. The total depth of the wells will be determined based on the conditions encountered during drilling, particularly the depth and yield of the water-bearing fractures encountered in the bedrock.

Any wells that are drilled and determined to have insufficient yield, will either be maintained as water-level monitor wells equipped with water-tight caps or be abandoned in accordance with NYSDOH and DCDH protocols in the future.

Future Yield Testing and Water-Quality Sampling

Once the well drilling is completed, assuming sufficient yields are obtained from the wells, LBG will coordinate a 72-hour pumping test program to document the stabilized yield of the wells. The pumping test program will be designed in accordance with the NYSDEC "Pumping Test Procedures for Water Withdrawal Applications", February 2015 and with the NYSDOH Sanitary Code Appendix 5-D requirements.

As part of the pumping test program, water samples will be collected from the test wells and analyzed for parameters listed in the NYSDOH Sanitary Code Part 5, Subpart 5-1 for community, public water-supply wells. In addition, microscopic particulate analysis (MPA) samples and giardia and cryptosporidium samples will be collected from the wells as part of the GWUDI assessment.

If the results of the 72-hour pumping test program demonstrate adequate well yields, an application to amend the Village's NYSDEC Water Withdrawal Application to include the new wells will be prepared and submitted. In addition, plans and specifications detailing the connection of the new wells to the existing water system and decommissioning of the infiltration galleries, if warranted, will be prepared and submitted to the DCDH and NYSDOH.

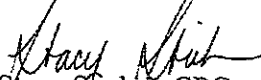
The following documents are enclosed with this application:

- Application to Construct or Abandon a Water Well Form;
- A check for the \$45 application fee;
- Appendix I – Site Location Map
- Appendix II – Proposed Well Locations;
- Appendix III – Standard Well Profile
- Appendix IV – Property Card for the Village of Millbrook Well Field

Should you have any questions, please contact me.

Very truly yours,

LEGGETTE, BRASHEARS & GRAHAM, INC.


Stacy Stieber, CPG
Associate/Hydrogeologist

Reviewed by:



Thomas P. Cusack, CPG
Senior Vice President

SS:nv

Enclosures

cc: William Bright – Delaware Engineering
Brock Rogers - NYSDOH

H:\Millbrook (V)\Cover letter.doc

AGENDA

- 1.) **Original Design of Water Facility**
 - 1.1 Infiltration Galleries approximately 1931 - 1934 located in Town of Washington
 - 1.2 Preforated Clay Pipe installed 12 ft. below grade within 30'-40' gravel deposit with clay cap.
 - 1.3 Two Bunkers piped to 40,000 Gallon clear well under pump house.
 - 1.4 Two original bunker were rebuilt over past several years
 - 1.5 Third bunker added in the mid 1930's, with approx. 200' clay pipe, rebuilt 2015
 - 1.6 A series of new bunkers added 1996 across stream in wetland -
 - 1.7 Subject to droughts over the years and potential for contamination from upstreams. 350,000 GPD

- 2.) **Ground Water Under the Direct Influence (GWUDI)**
 - 2.1 Surface Water Treatment Rule Requires Filtration to >log 5 for Cryptosporidium and Giardia
 - 2.2 Pathogenic protozoan found in surface water. Test for indicator organism of similar size 1 micron

- 3.) **Original Filtration Plant design included on sight storage, 150,000 Gallons for Chlorine Contact**
 - 3.1 Storage tank provided emergency storage in the event of contamination or distribution issues.
 - 3.2 Required additional pumping facilities, controls and building foot print
 - 3.3 Cost exceeded \$2M, if tank rehab included \$2.6M
 - 3.4 Filtration concept on hold as alternatives were investigated.

- 4.) **Village Board authorized a search to determine if deep well aquifers could resolve GWUDI issues**
 - 4.1 LBG was retained to study the possibility of sighting a series of wells at 500' deep
 - 4.2 test well locations were selected 1,2 & 3
 - 4.3 Test well #1 would be drilled to 500+ feet and tested for water quality and volume

- 5.) **Test Well #1 was drilled to about 700' through fractured limestone**
 - 5.1 water quality appeared good visually
 - 5.2 rock was highly fractured which is normally good for water bearing
 - 5.3 driller estimates put at 75-100 GPM 108,000 to 144,000 GPD ÷ 12 hrs = 54,000 - 72,000 GPD (1/3rd of demand)
 - 5.4 Well collapsed several times during drilling and required additional work to secure
 - 5.5 Casing developed a seal issue, well was lined with 6" well casing and sealed.
 - 5.6 Pump tested and sampled for water quality, initial testing was good
 - 5.7 24 hr. pump test collected full Part-5 test. QUESTION - DO WE PROCEED TO DRILL TEST WELL #2?

- 6.) **Water Quality Test Results**

- 7.) **Alternative to well and original Filtration Design - DIRECT FILTRATION**
 - 7.1 Review revised process flow schematic
 - 7.2 Review preliminary budget estimates
 - 7.3 Review impact on water rate

- 8.) **Emergency Generator Project**
 - 8.1 Generator cost <\$40,000.00
 - 8.2 Install generator and new electric service to 400 AMP three phase 460V \$133,500.00 \$173,500.00
 - 8.3 Tax Reform Stabilization Grant \$200,000.00 from Dutchess County; project to be completed by med July
very tight timeline

- 9.) **Water Storage Tank relining both inside and outside with some cost covered by Verizon as part of rental agreement for cell tower.**

MILLBROOK WATER FILTRATION FACILITY

Septic Leaching Pit (needs replacement)

Bunker #3

Bunker #2

Bunker #1

New Bunkers

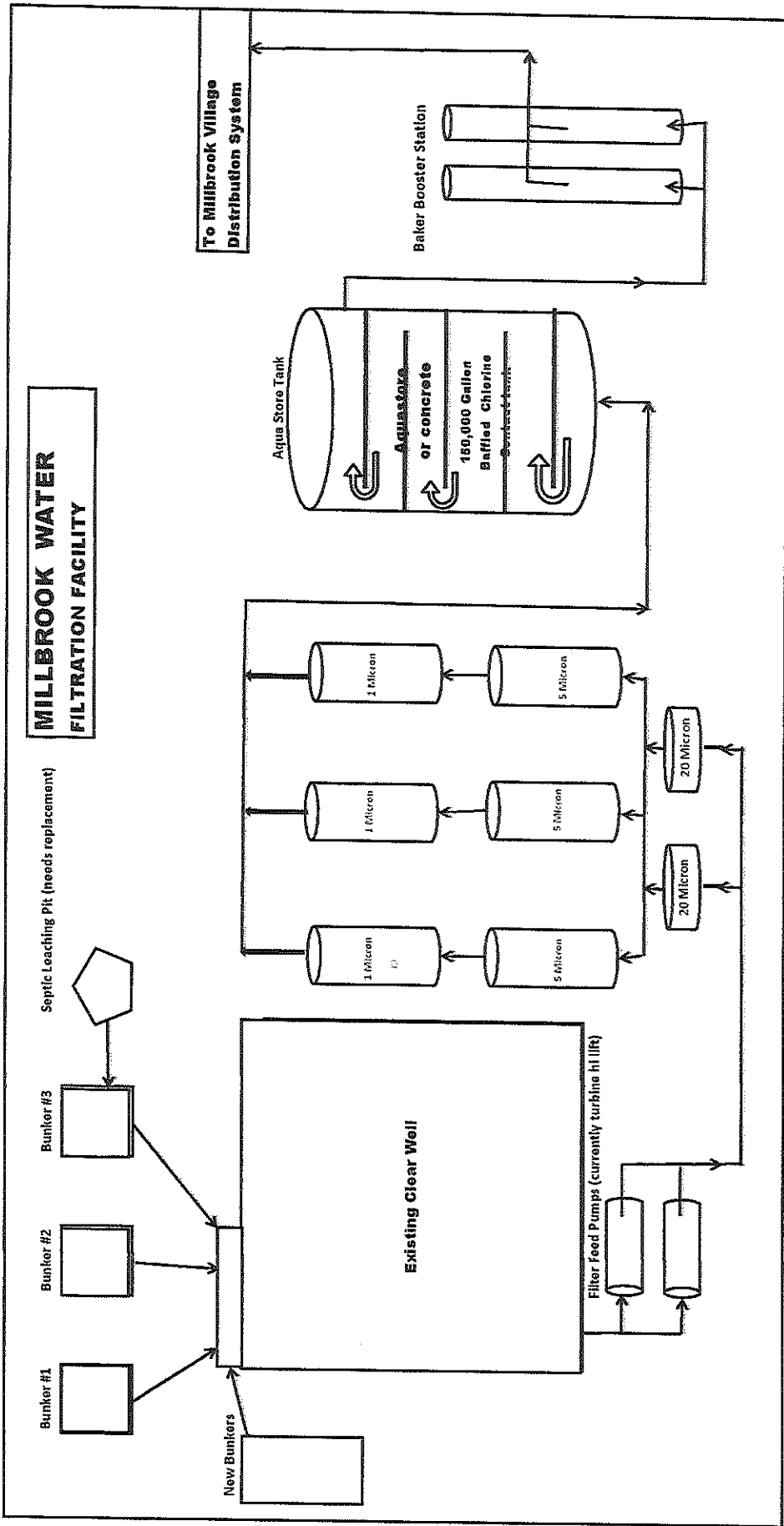
Existing Clear Well

Filter Feed Pumps (currently turbine hi lift)

To Millbrook Village Distribution System

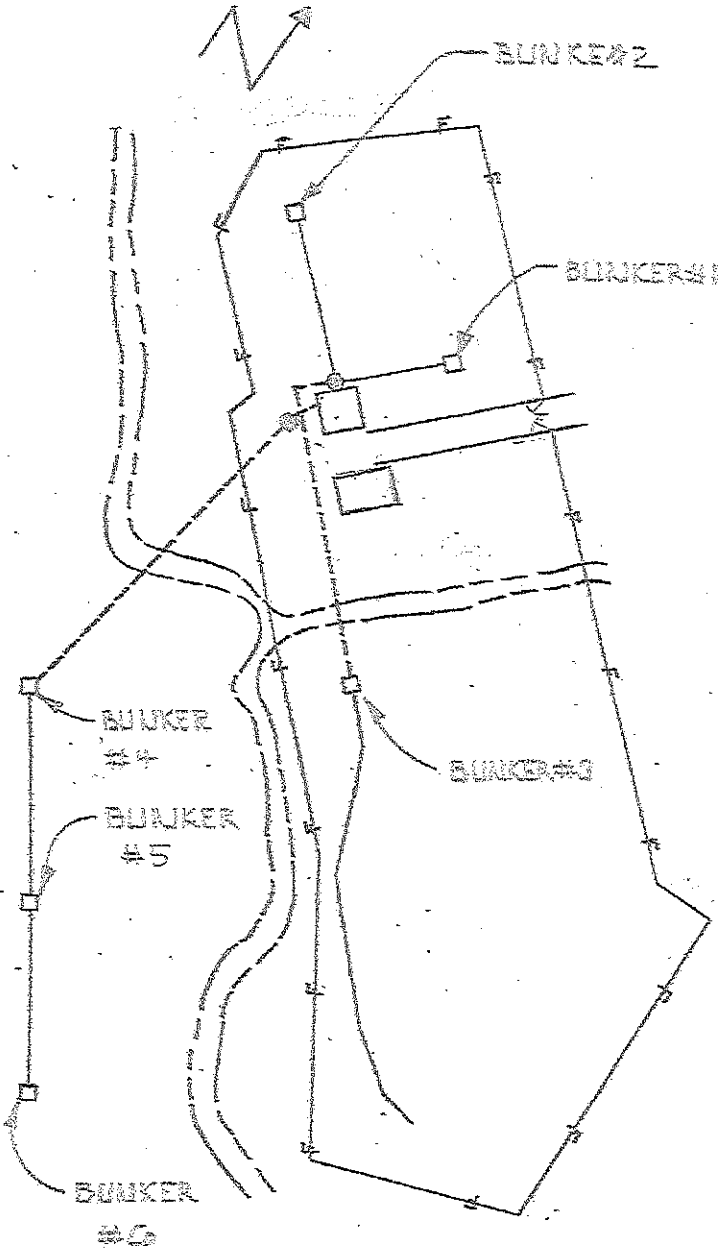
Baker Booster Station

Aqua Store Tank
Aquasafe
or concrete
150,000 Gallon
Baffled Chlorine
Contact Tank



VILLAGE of MILLBROOK
BLINKER PROJECT @
MILLBROOK WTP

BACK FILL SCHEDULE
2
HUNDRED YEAR FLOOD
PROTECTION PLAN



LEGEND

- BUNKER
- COMBINED RAW WATER ACCESS
- TRANSMISSION PIPE
- COLLECTION PIPE
- FENCE
- X GATE

REVISION
R: NUMBERED BUNKERS

NOTE:

ALL BUNKERS ARE ENCLOSED
BY SECURITY FENCE

VRI
DECEMBER 2012

**MILLBROOK WATER
FILTRATION FACILITY** 6/27/2017

Septic Leaching Pit (needs replacement)

Bunker #3

Bunker #2

Bunker #1

New Bunkers

Existing Clear Well

Filter Feed Pumps, existing turbine lift

Chlorine + other Chem feeds

Additional Chlorine
Contact Time
Baffled Pressure Tank
OR
additional water main

To Millbrook Village
Distribution System

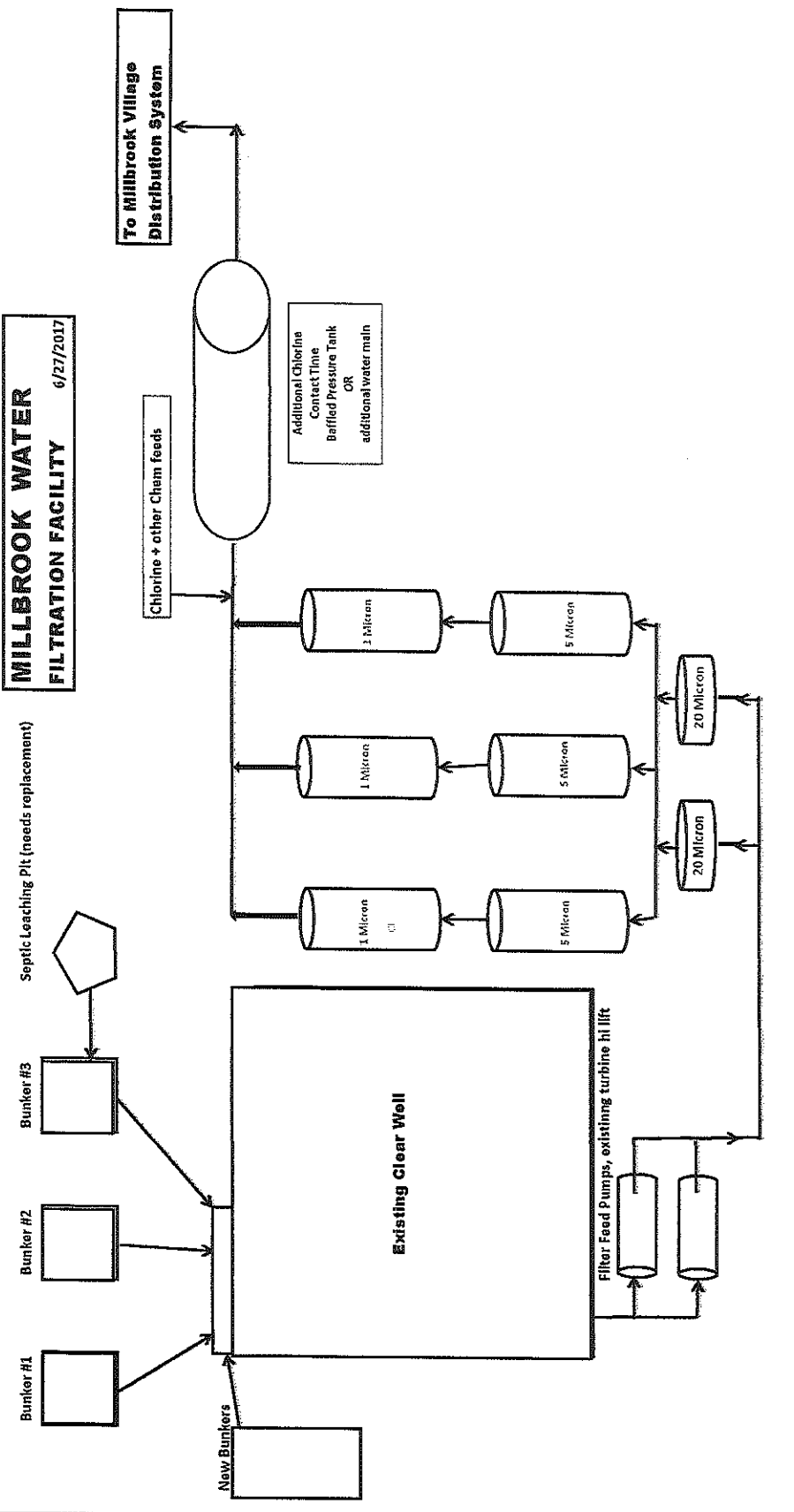


Table 1
 Millbrook, NY
 Water System Upgrade Project
 Project Cost Estimate -
 500K Tank Included
 June 7, 2017

Item	Unit	4/22/2014 PER Est. Cost	6/7/17 Value Eng. Include 500K Tank	Comments
A. Construction				
1. GENERAL CONTRACT				
Sitework:	lump sum	\$ 140,000	\$ 30,000	Includes tank sitework
Yard Piping:	lump sum	\$ 30,000	\$ 20,000	
Excavation & Backfill:	lump sum	\$ 45,000	\$ 30,000	
150,000 gallon Water Storage	lump sum	\$ 355,000	\$ -	
Tank Construction/Installation:				
Accessories:	lump sum	\$ 50,000	\$ 20,000	
Site Restoration:	lump sum	\$ 25,000	\$ 15,000	
Stormwater Facilities				
(per NYSDEC General Permit):	lump sum	\$ 100,000	\$ 5,000	Maybe reduced
Mobilization/Demob/Bonds/insurance:	lump sum	\$ 20,000	\$ 20,000	
New Water Treatment Building:	sq ft	\$ 485,000	\$ 150,000	2,412 sq.ft. - @ \$200/sqft. REV- 750 sq.ft.
Filtration Equipment (Filters):	lump sum	\$ 200,000	\$ 250,000	
Chemical Feed Equipment:	lump sum	\$ 20,000	\$ 20,000	
New WTP Pumps:	lump sum	\$ 50,000	\$ 15,000	
Process Piping and Valves:	lump sum	\$ 80,000	\$ 35,000	
Existing Retrofit WTP Pumps:	lump sum	\$ 50,000	\$ 7,500	
SUBTOTAL GENERAL CONSTRUCTION:		\$ 1,650,000	\$ 617,500	
2. ELECTRICAL CONTRACT - Water Treatment Plant				
Mobilization/Demob/Bonds/insurance:	lump sum	\$ 15,000	\$ 15,000	
Sitework (New Service, etc.):	lump sum	\$ 50,000	\$ -	
Site Restoration:	lump sum	\$ 15,000	\$ -	
Electrical Work:	lump sum	\$ 50,000	\$ 25,000	
SCADA System Work:	lump sum	\$ 80,000	\$ 25,000	
New Emergency Generator:	lump sum	\$ 100,000	\$ -	Diesel Generator
SUBTOTAL ELECTRICAL CONSTRUCTION:		\$ 310,000	\$ 65,000	
3. HVAC CONTRACT - Water Treatment Plant				
Mobilization/Demob/Bonds/insurance:	lump sum	\$ 3,000	\$ 3,000	
Sitework (New Service, etc.):	lump sum	\$ -	\$ -	
Site Restoration:	lump sum	\$ -	\$ -	
HVAC Work:	lump sum	\$ 75,000	\$ 30,000	
SUBTOTAL ELECTRICAL CONSTRUCTION:		\$ 78,000	\$ 33,000	
4. EXISTING WATER STORAGE TANK REHABILITATION CONTRACT				
Mobilization/Demob/Bonds/insurance:	lump sum	\$ 20,000	\$ 20,000	
Sitework (Scaffolding, Tenting, etc.):	lump sum	\$ 100,000	\$ 100,000	
Site Restoration:	lump sum	\$ 20,000	\$ 20,000	
Tank Recoating Work:	lump sum	\$ 600,000	\$ 400,000	- REV-no lead
SUBTOTAL TANK REHABILITATION WORK:		\$ 740,000	\$ 540,000	Standard Coating System
SUBTOTAL CONSTRUCTION (1+2+3+4):		\$ 2,778,000	\$ 1,255,500	

Table 1
 Millbrook, NY
 Water System Upgrade Project
 Project Cost Estimate -
 500K Tank Included
 June 7, 2017

Item	Unit	4/22/2014 PER Est. Cost	6/7/17 Value Eng. Include 500K Tank	Comments
B. Other Costs				
1) Professional Services				
a. Site Surveying:				
- Topo Survey		\$ 8,000	\$ 5,000	
- Construction Layout & As-Built Survey		\$ 3,500	\$ 3,500	
b. Geotechnical Investigation:				
		\$ 9,500	\$ 6,000	
c. Engineering				
-Preliminary Engineering Report:		\$ 40,000	\$ -	
-Preliminary Design:		\$ 10,000		
-Stormwater Pollution Prevention Plan (SWPPP):		\$ 40,000	\$ 20,000	
-Final Design:		\$ 100,000	\$ 68,000	
-Bidding/Award:		\$ 8,000	\$ 8,000	
-Construction Administration:		\$ 50,000	\$ 41,667	Based on 6 months construction
-On-Site Inspection (2 months full time 2 months part time)		\$ 45,900	\$ 45,900	
-As-Built Drawings:		\$ 3,000	\$ 3,000	
d. SEQR/Environmental Review		\$ 10,000	\$ 10,000	Uncoordinated review Short EAF no SHPO
SUBTOTAL PROFESSIONAL SERVICES:		\$ 327,900	\$ 211,067	
2) Legal & Misc.				
-Legal:		\$ 15,000	\$ 15,000	
-Financing Cons./Bookkeeping & Reporting Admin.:		\$ 10,000	\$ 10,000	
-Single Audits:		\$ -	\$ -	
SUBTOTAL LEGAL & MISC.:		\$ 25,000	\$ 25,000	
3) Project Financing				
-Bond Counsel		\$ 15,000	\$ 15,000	TBD
-Short Term Financing/Net Interest		\$ 20,000	\$ 20,000	TBD
SUBTOTAL PROJECT FINANCING:		\$ 35,000	\$ 35,000	
4) Village Administration Costs				
		\$ 10,000	\$ 10,000	
SUBTOTAL VILLAGE ADMINISTRATION COSTS:		\$ 10,000	\$ 10,000	
SUBTOTAL OTHER COSTS:		\$ 397,900	\$ 281,067	
C. Contingency (10%)				
Contingency (15%):		\$ 317,590	\$ 153,657	
Village of Millbrook Water System Rehabilitation Estimated Budget Cost		\$ 3,493,490.00	\$ 1,690,223.70	awaiting paint supplier pricing Includes unconfirmed tank estimate

**Village of Millbrook Water Improvement Project
Preliminary Rate Impact**

Customers	786
No Commercial Class for high usage	
Annual Average Usage Billed (1)	63,000
(includes commercial usage)	173 GPD
Average Annual water bill	\$260.19
(1) there is no commercial rate class, average home owner actual usage should be less	
(2) do we want to bond for more then 20 years when the coating will only be warrantied for 20 yrs?	
Filtration Project Cost:	
Interest:	\$1,096,223.70
Annual Payment:	2.50%
Term:	\$52,374.98
Impact per 1,000 gallons	30 years
Annual impact per Average usage	\$1.06
Monthly Water Cost	\$66.78
	\$5.57
Tank Rehab Project Cost:	
Interest:	\$540,000.00
Annual Payment:	2.50%
Term: (2)	\$25,799.93
Impact per 1,000 gallons	30 years
Annual impact per Average usage	\$0.52
Monthly Water Cost	\$32.82
	\$2.74
Filtration & Tank Project Cost:	
Interest:	\$1,690,223.70
Annual Payment:	2.50%
Term: (2)	\$80,754.90
Impact per 1,000 gallons	30 years
Annual impact per Average usage	\$1.58
Additional Monthly Water Cost	\$99.60
	\$8.30
Water Loss (1/2015)	
Totals Gallons Billed	49,518,000.00
Total GPD Billed	135,666
Annual Reciepts through water use	\$204,509.34
Average GPD Produced (6/2017)	180,000
Average GPD Unaccounted	44,334
Estimated Annual unbilled water los	\$66,831.28

**Village of Millbrook Water Filtration and Storage Tank Rehab
Preliminary - Rate Impact**

Rate Impact	Current	Filtration	Tank & Filtration
Current Village Water Rate per 1,000 gallons	\$4.13	\$5.19	\$5.71
Average annual Water Cost Village Customer	\$260.19	\$326.97	\$359.79
Current Town Water Rate per 1,000 gallons	\$7.34	\$8.40	\$8.92
Average annual Water Cost Town Customer	\$462.42	\$529.20	\$562.02
Additional Monthly Water Cost Average Customer		\$5.57	\$8.30

Sarah Witt

From: RBMayor <RBMayor@villageofmillbrookny.com>
Sent: Friday, June 30, 2017 10:16 AM
To: Sarah Witt
Subject: FW: Village Meeting 27 June, 2017

-----Original Message-----

From: karin shrubsole [mailto:kshrubsole@aol.com]
Sent: Monday, June 26, 2017 6:08 PM
To: RBMayor@villageofmillbrookny.com
Subject: Village Meeting 27 June, 2017

The following are matters I would like discussed at tomorrow's Meeting

1. Year round pick up of brush from the streets. Trees and shrubs grow during the summer and need to be pruned. There should be pick up at least twice a month - and on designated days as garbage pick up is.
2. The repainting of the yellow lines on the west side of Friendly Lane which have not been done for several years.
3. Discussion of invasive weeds in the Village and on Franklin Avenue.

Thank you, Karin Martin Shrubsole