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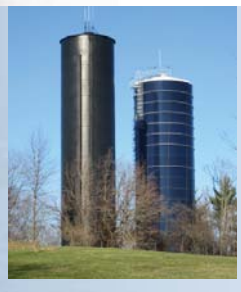
FINAL REPORT



Dwaar Kill - Pine Bush Water Supply Project

FACILITY PLAN

Orange County Department of Planning,

in association with

Orange County Water Authority

and

Orange County Department of Public Works

This work is funded in part by a Shared Municipal Service Incentive Grant from
the New York State Department of State
(Project C-078842)

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EXECUTIVE SUMMARY

As part of the January 2012 Mid-County Water Supply Feasibility Study, the Orange County Water Authority (OCWA), in conjunction with a New York State Department of State Shared Municipal Service Incentive Grant (Project C-078842), had funded the preliminary testing of wells at the Dwaar Kill well field and the development of a conceptual design of a water supply, treatment, and conveyance system. The ultimate goal of the project was to develop the wells to provide sufficient additional supply to meet the projected 2020 average demand of 260 gpm for the Town of Crawford.

The Village of Pine Bush's current average and maximum daily water demands of approximately 200,000 gpd (140 gpm) and 370,000 gpd (257 gpm), respectively, serve a population of 2,100 people plus a central school system of 5,650 individuals. Groundwater is utilized as its potable water source and is supplied via five (5) approved wells, one of which is only used during emergencies due to poor water quality (i.e. hydrogen sulfide). Water quality issues throughout the Village's water supply consists of hardness and the presence of trace levels of Iron (Fe) and Manganese (Mn). If possible, the Village would prefer to switch entirely over to the Dwaar Kill well field, utilizing the existing wells as a supplemental supply. This would provide the needed dependability and redundancy for the Pine Bush Water District.

WATER QUALITY

The use of the Dwaar Kill well field as a potential alternate water supply source for the Village of Pine Bush has been evaluated based on two separate water quality testing events. The initial water quality testing was performed in May and December 2008 on all the potential well supplies and included testing of eleven wells. This testing was performed by SSEC Inc. and its results are summarized in the May 2009 Indigot and Dwaar Kill Groundwater Assessment Report. Additional testing was performed in 2010 by HDR to further evaluate and subsequently determine the level of required treatment. The 2010 testing was limited to the four (4) wells that demonstrated substantial yield during SSEC's 2008 testing (i.e. wells 2 through 5).

Overall, water quality results obtained in 2010 were consistent with those found in 2008:

- The combined maximum contaminant level (MCL) for Fe and Mn 0.5 mg/L is exceeded in well 4, close in well 2 and trace levels were observed in all the wells.

- EPA's Drinking Water Equivalency Level (DWEL or guidance level) of 20 mg/L for Na is exceeded in well 2.

- The groundwater at Dwaar Kill is generally hard (i.e. 150 to 300 mg/L as $CaCO_3$)
- No volatile organics were observed above the individual detection limits in any of the samples.

SAFE YIELD

SSEC's testing results were adequate to prove that the maximum day demand could be achieved with wells 2 through 5. This assessment, however, assumes that some mitigating measures would be employed to address the impacts to the nearby residential wells. This may include deepening/replacing the existing wells or connecting the impacted residents to the municipal water system. In the event that the demand numbers are changed, the test wells are converted, or mitigating measures cannot be employed for the residential wells, additional testing of the safe yield may be required prior to detailed design.

CONCEPTUAL ENGINEER

The New York State Department of Health (NYSDOH), Orange County Department of Health (OCDOH) and New York State Department of Environmental Conservation (NYSDEC) have established general guidelines and requirements to determine the adequacy of supply. The general requirements include:

- The total developed groundwater source capacity shall equal or exceed the design maximum day demand with the largest producing well out of service.
- A minimum of two sources of groundwater shall be provided.
- The system must be provided with a standby power source.

These requirements have been included in the conceptual design and in this facility plan.

Given the current demand and high level of Fe in well 4, developing only wells 2, 3, and 5 is recommended. This would provide a total capacity of 490 gpm. With well 3, the highest yield well, offline, the capacity would be 290 gpm. This arrangement would meet the average demand and the DOH requirements for adequacy of supply. If future demand increases or if there is need to supply water to users outside of the Pine Bush Water District, well 4 could be brought online.

DISTRIBUTION CONNECTION

A new pipeline will be required to connect the well field to the Pine Bush Water District. Using the 595 gpm total yield for the wells (as per SSEC's preliminary testing), an 8" diameter pipe would be sufficient for the potential future development of the well field. Two primary alignments were considered for the connection from the well field to the Pine Bush distribution

system. Both alignments included the connection piping traveling from the well field, northwest on Hill Ave, thence northwest along Rt. 52. The first alignment included the main running west at the intersection of Blackhawk Road and connecting to the existing distribution system east of Blackhawk Road well site. The alternate alignment included the connecting pipe running northwest, within the properties adjacent to Rt. 52, and connecting to the existing distribution system within the commercial development located east of Boniface Drive. Upon review with the Town, it was determined that connection on Blackhawk Road was preferred due to it having fewer environmental and constructability issues (i.e. wetlands, utilities, etc.).

WATER TREATMENT PLANT

A water treatment plant and booster pump station will be required at the Dwaar Kill well field to remove Fe and Mn, chlorinate the treated groundwater, and convey it to the existing Pine Bush distribution system. Green sand filtration has been recommended as it is an operator friendly system to remove Fe and Mn over varying influent flow rate and concentration. Chlorination at the Dwaar Kill site is recommended to allow for nearby homes that may be impacted by the new well field to receive treated water, allow for potential connections by users along the Rt. 52 corridor and allow for a direct tie-in to the Pine Bush distribution system. Due to health and safety concerns associated with chlorine gas, which is corrosive, a liquid sodium hypochlorite system is proposed for chlorination of the well water.

Sanitary Wastewater Treatment

Sanitary flow is not expected to increase significantly with the new treatment plant since the water district is not being expanded. The approximately 6,000 gpd of wastewater generated by the backwash of the green sand filters at the new treatment facility will be recycled to the head of the plant (pending DOH approval). The only potential additional wastewater that could require a disposal option if the wastewater generated by floor drains, emergency eyewashes/showers, and potential sanitary discharges. In January 2013, as part of this facility plan, HDR and the Town of Crawford Highway Department performed three deep test pits and installed three shallow “benched” pits, in which infiltration testing was to be completed. Although all three of the deep test pit locations were deemed to be unsuitable due to various reasons such as shallow groundwater or slow infiltration rate, two of the shallow “benched” pits are worthy of further investigation.

OPINION OF PROBABLE CONSTRUCTION COST

The opinion of probable construction cost (OPCC) of the proposed supply, treatment, and distribution system is $6.1M. The overall cost is broken down in Table 5 below. This cost does

not include booster pump stations along the route, air relief valves, or a storage tank for the new system, as the existing storage in the Pine Bush district would be utilized.

Operating and maintenance (O&M) costs were estimated to be $222,000 per year for the new facility based on typical percentages of construction cost.

An economic analysis to determine the number of users and projected cost of water to the users is suggested in order to determine the viability of the project was presented as part of the January 2012 Mid-County Feasibility Study. The Study assumed an overall project cost of $6.1 M; this cost would result in a doubling of the water rate, i.e., from $4.00 per 1000 gallons to $8.97 per 1000 gallons, however if system demand increases to 250,000 gpd from 2015 to 2024, then the rate is projected to drop to $7.82 per 1000 gallons. In addition, the 2012 study also presented a series of project funding alternatives with a preferred alternative selected. These alternatives are elaborated on below in Section 9.

ENVIRONMENTAL/PERMITTING

Based on the current project understanding, preliminary desktop reviews of the route alignment, and a site visit, the following environmental and construction permits are anticipated:

Agency	Permit/Approval
USACE	Jurisdictional Determination Nationwide Permit (likely)
NYSDEC	Wetland verification SEQRA – Unlisted Action 401 Water Quality Certification Article 24 Freshwater wetlands (potential buffer-only disturbance) Article 15 Protection of Waters (potential) SWPPP – SPDES General Permit SPDES Article 17 Permit
NYSDOT	Highway Work Permit – NYS Route 52
Orange County	Road Opening Permit – Hill Avenue (County Road No. 52)
Town of Crawford	Site Plan Approval – Planning Board review (likely) Building Permit Road Opening Permit – Blackhawk Road

Approving agencies require a demonstration that impacts to regulated resources have been minimized to the greatest extent practicable. Reducing impacts will also reduce the extent of any compensatory mitigation (such as wetlands creation) required by the agencies. Examples of minimization measures that will be incorporated into the proposed project have been discussed below in Section 8.

FINANCIAL & INSTITUTIONAL ARRANGEMENTS

Both this Facility Plan and the Mid-County Water Supply Feasibility Study identified the Dwaarkill-Pine Bush Water Supply Project as highly feasible in terms of implementation. In addition, the Town of Crawford (Pine Bush water district) has expressed interest in receiving as much of their 200,000 gpd demand as possible from the County-owned Dwaar Kill well field. Moreover, the OCWA also owns an easement along the route of the pipeline from the well field along Route 52. The $6.1 M cost of the project will result in a doubling of the water rate, i.e., from $4.00 per 1000 gallons to $8.97 per 1000 gallons, however if demand increases to 250,000 gpd from 2015 to 2024, the rate is projected to drop to $7.82 per 1000 gallons. This is not unreasonable cost for water when compared to other municipalities in the area, and taking the pending need for the upgrading of infrastructure for many of the older water supply systems in Orange County into account. There are numerous financial and organizational\institutional options available for advancing the Dwaar Kill project. The County, the Water Authority and the Town of Crawford have an array of financing, design, construction and operational scenarios to choose from. The preferred option will most likely be based upon the degree of oversight and\or responsibility each of involved entities is willing to assume; four such financing, ownership, and operating options are described below in Table 6.

As noted above, the preferred financial and organizational option selected will most likely be based upon the degree of oversight and\or responsibility each of the involved entities is willing to assume. Based upon recent discussions that have occurred between the Town and the County, the financing option that appears most favorable is Option 3 which is outlined in Table 6 below. This is an arrangement in which the OCWA sells the debt and transfers the proceeds to the local community. The Authority would design and build the water system, own the assets, receive payments from the local community, pay debt service to the bondholders, and provide oversight. The local community would lease the assets from the OCWA, operate and maintain the facilities, pay for operation and maintenance, pay OCWA for debt service, set rates, bill customers, collect payments, and maintain customev,vmr relations. Orange County, with its excellent credit rating, would provide backing to the OCWA bonds, and provide oversight.

Another financing option available to all the Town of Crawford is to secure grant funding from the NYSDOS Local Government Efficiency (LGE) loan program. These grants are available for both feasibility studies and project implementation. Since project feasibility has already been analyzed for Dwaar Kill Project, monies can now be requested to advance the project to the implementation phase. A LGE grant can be requested by the Town in conjunction with the OCDP to begin the facility planning for each of the project. A more refined facility plan will help to further identify project costs, environmental issues, as well as assist in obtaining additional funding.

SCHEDULE

If this project were to proceed through the design stage directly following the issuance of this report, the developed wells, water treatment facility and interconnection could potentially be online by February 2015. This timing is based on the assumption that the project is bid and receives notice to proceed with construction by January 2014.

1.0 INTRODUCTION

As part of the Mid-County Water Supply Feasibility Study, which was issued January 2012, the Orange County Water Authority (OCWA) had funded the preliminary testing of wells at the Dwaar Kill well field and the development of a conceptual design of a water supply, treatment, and conveyance system. The Dwaar Kill well field is located in the Town of Crawford and is southeast of the Village of Pine Bush. Initially, the developed wells would provide potable water to the Village of Pine Bush (a hamlet within the Town of Crawford), improving the system reliability. The wells could also ultimately provide additional supply in the northwestern portion of the County for future development. The ultimate goal was to develop the wells to provide sufficient additional supply to meet the projected 2020 average demand of 260 gpm for the Town of Crawford.

This Facility Plan (FP) provides additional specificity to the previously issued conceptual engineering report that was presented as part of the final draft of the Mid-County Feasibility Study report issued in January 2012. The FP defines the project goals and objectives by focusing on cost, operability, reliability, and constructability of the project. The FP also presents an integrated overview of the project as well as a conceptual project plan. A preliminary cost estimate, which includes a 35% contingency, is included for the proposed project. A preliminary economic analysis was performed to determine the cost of water for the projected users and was included in the analysis presented in the January 2012 feasibility study.

No evaluation of the Village of Walden's required water supply, if needed, has been performed as part of this report. Development of additional wells could be required depending on the needs of Walden.

Acknowledgments

The Project Team worked closely with a number of individuals throughout the course of this study and would like to acknowledge the support and assistance it received along the way. In particular, the team would like to thank the following individuals for their active participation: Town of Crawford Supervisor Charles Carnes, Jolene Roy, Tom Mckelvey, Dave Church, Pete Hammond, Eenika Cruz, County Legislator RJ Smith, the OCWA Board and Carl Ublacker and the New York State Department of State who funded this study in part by a Shared Municipal Service Incentive Grant: Project C-078842.

2.0 BACKGROUND

WATER SUPPLY AND DEMAND

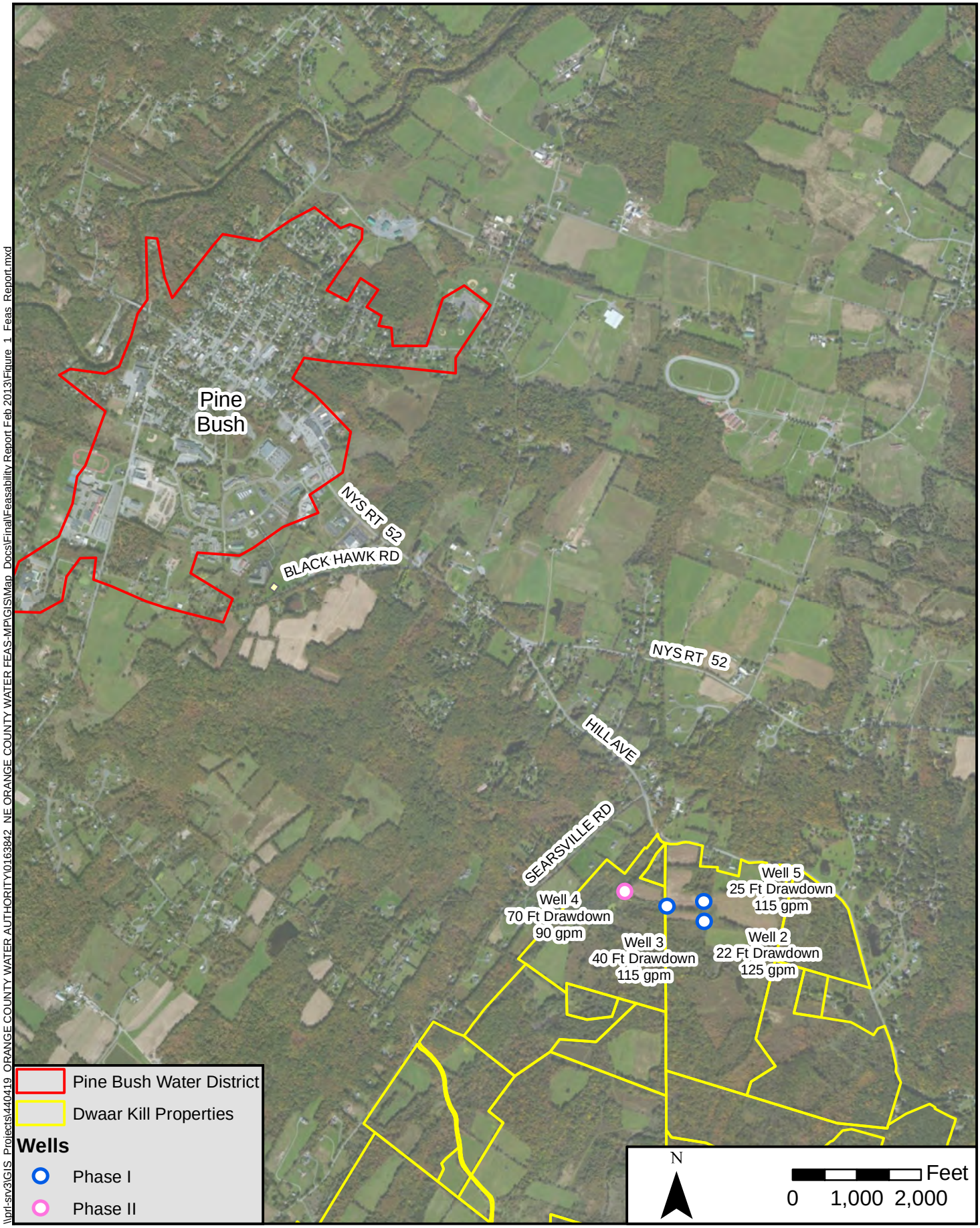
The Village of Pine Bush's average water demand is approximately 200,000 gpd (140 gpm) of potable water, based on interviews with Tom Mckelvey, Water Superintendent of the Town of Crawford in February 2009, October 2010, and February 2011. As of 2011, the supply served a population of 2,100 people plus a central school system of 5,650 individuals. The average annual charge for water during 2011 was $4.00 per 1,000 gallons. The average monthly water demand was listed as 154,848 gallons per day in the minutes of the May 2012 Town Board meeting. Overall, maximum daily demand approaches 370,000 gpd (257 gpm). The Village currently uses groundwater as their only source of potable water, with quantities questionable above 200,000 gpd. The Pine Bush Water District has five (5) approved wells, with four wells typically operational. The fifth well (the Dewitt well, which is a rock well) is only used in emergencies due to presence of sulfur (hydrogen sulfide), which leads to taste and odor complaints. The groundwater all of the wells is considered hard and also requires a sequestering agent due to the presence of trace levels of Iron (Fe) and Manganese (Mn). Investigations of other sites in and just outside of the district have not resulted in any new groundwater sources.

The District has expressed interest in receiving as much of their 200,000 gpd average demand and 370,000 gpd maximum daily demand as possible from Dwaar Kill well field area. If possible, the District prefers switching over entirely to the Dwaar Kill well field and utilizing the existing wells to supplement Dwaar Kill supply as needed. This would provide the needed dependability and redundancy for the Pine Bush Water District.

The Pine Bush Water District currently has two storage tanks which are capable of storing approximately 250,000 gallons of water.

DWAAR KILL WELLFIELD BACKGROUND

Orange County owns approximately 1,300 acres of property in the northern portion of the Town of Crawford, as shown in the attached Figure 1. This figure also shows the approximate locations of the wells relative to the Village of Pine Bush. Eleven wells at the Dwaar Kill site were tested by SSEC, Inc. for the Orange County Department of Public Works (DPW), as described in SSEC's May 2009 Indigot and Dwaar Kill Groundwater Assessment Report, prepared for the OCWA and the DPW. Table 1 summarizes results for the four (4) wells that had sufficient yield to warrant further sampling and evaluation.



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Note: Well locations approximate, yield and draw down fron 2009 SSEC testing.

HDR	DWARR KILL - PINE BUSH WATER SUPPLY PROJECT FEASIBILITY REPORT EAST CRAWFORD, DWAAR KILL PROPERTIES	Figure 1

Table 1: Dwarkill Well Data from May 2009 SSEC Report

Well ID	Depth (ft)	Yield (gpm)	Drawdown (ft)
2	982	160	22
3	930	200	42
4	955	105	70
5	1005	130	25

SSEC tested wells 2 through 5 simultaneously at a total rate of 445 gpm, during which the drawdown data was compiled for each well in addition to wells at nearby residences. The measured drawdown in the test wells suggests that several of the wells could be pumped at a much higher rate. The yield of these wells could be enhanced further if they are converted from 6 inch wells to 8 inch wells. However the wells might be limited by the fact that several residential wells in the area nearby exhibited drawdown (up to 22 ft) that was attributable to the testing. The testing as described in the SSEC May 2009 report was adequate to prove that the maximum daily demand could be achieved with wells 2 through 5, assuming some mitigating measures are employed to address the impacts to the nearby residential wells. This may include deepening/replacing the existing wells or connecting the impacted residents to the municipal water system. In the event that the demand numbers are changed, the test wells are converted, or mitigating measures cannot be employed for the residential wells, additional testing of the safe yield may be required prior to detailed design. This issue will be discussed later in this report.

2.3 WELL SIZING REQUIREMENTS

With a projected average demand of 200,000 gpd (140 gpm), a minimum of two wells, each capable of providing 140 gpm, are required. As shown in Table 1 above, wells 2 and 3 each have the potential to yield the required 140 gpm for the average demand and can also provide supplemental flow during peak demand.

NYSDOH requires that the maximum daily demand can be met with the highest yield well offline. To meet the maximum daily demand of 370,000 gpd (257 gpm) with the highest yield well offline, at least three wells must be developed based on available well yield. Using the available well yield, wells 2 and 5 would provide the required maximum demand with the highest yield well, well 3, offline. Note that well 4 could also be developed to provide added redundancy or capacity for users along Rt. 52. Alternately, the existing Pine Bush water supply

could provide the peak flow. This analysis assumes that the peak flow will be provided by the new well field and that three wells must be developed.

3.0 WATER QUALITY

Water quality and treatment requirements are critical to provide a reasonable opinion of probable cost to be used in the facility planning process. Initial water quality testing was performed on all the potential well supplies in May and December 2008 by SSEC Inc., with the data reports summarized in the 2009 report. To further evaluate and subsequently determine the level of required treatment, as well as complete the conceptual design, additional water quality testing was performed in 2010 at the Dwaar Kill site on the wells that demonstrated substantial yield.

Summary results of the 2008 testing are presented in Table 2 and full results are attached in Appendix A. In addition to the parameters below, samples were also tested for radiological parameters, semi-volatiles, herbicides, PCBs, and coliform bacteria. Radiological analyses were found to be within limits and semi-volatiles, herbicides, and PCBs were non-detect. Wells 4 and 5 tested positive for total coliform bacteria, however all well samples tested negative for *E.coli* bacteria. Corrosivity testing for wells 2, 4, and 5 fell between 0.14 and 0.34, which represents water that is nearly balanced and will have little to no corrosion.

Table2: Dwaar Kill Water Quality Results by SSEC, 2008 Sampling

Well ID	Fe (mg/L)	Mn (mg/L)	Fe and Mn (mg/L)	Na (mg/L)	Hardness (mg/L as $CaCO_3$)	VOCs (ug/L)
2	0.25	0.17	0.42	25.4	166	ND
3	0.16	0.09	0.25	10.4	162	ND
4	0.66	0.17	0.83	11.9	164	ND
5	0.08	0.12	0.20	16.3	176	ND

For the 2010 water quality testing, samples were collected by Kendrick Enterprises, under the supervision of HDR staff, during the month of November. All site work performed by HDR was coordinated through the Orange County Office of Real Property.

Each of the four wells with demonstrated substantial yield were pumped for two (2) hours prior to sampling in order to purge the well and obtain representative samples. Samples were analyzed for VOCs (via EPA method 8260), metals of interest (via EPA methods 200.7 and 200.8), and mercury. A Microscopic Particulate Analysis (MPA) was also completed to determine if

groundwater is under the influence of surface water, which is critical, as influence of surface water would require microfiltration or an alternate treatment. All analysis was performed by Envirotest of Newburgh, NY except for MPA, which was sub-contracted to Environmental Associates of Ithaca, NY. Key findings are presented in Table 3 below and full results of all analyses are attached in Appendix B.

Table 3: Dwaar Kill 2010 Water Quality Results

Well ID	Fe (mg/L)	Mn (mg/L)	Fe and Mn (mg/L)	Na (mg/L)	Hardness (mg/L as $CaCO_3$)	VOCs (ug/L)	MPA (EPA Risk Factor)
2	0.24	0.14	0.38	29	200	ND	0 (low)
3	0.08	0.18	0.26	9	160	ND	0 (low)
4	0.41	0.57	0.98	9	160	ND	0 (low)
5	0.08	0.08	0.16	12	155	ND	0 (low)

In the 2010 analysis, pH readings were approximately 6 for all wells, with water temperature at $10^{o}C$ or slightly lower. All samples collected at Dwaar Kill were clear. At one point during the purging of Well 4, a dark brown discharge was observed, which suggests a possible wetland connection. The water was of high quality, with no volatile organics observed above the individual detection limits in any of the samples. In addition, the wells do not appear to be under the direct influent of surface water, as all samples have a low risk factor.

Overall, water quality results obtained in 2010 were consistent with those found in 2008:

- Fe and Mn

  As per NYS DOH Part 5, Subpart 5-1, Table 1, the maximum contaminant level (MCL) for Fe and Mn is 0.3 mg/L individually, with a combined Fe and Mn MCL of 0.5 mg/L. As shown in Tables 2 and 3, trace Fe and Mn are present in each well. Based on both 2008 and 2010 sampling results, well 4 is above and well 2 is close to the combined limit.

- Na

  Also important to note is the levels Na. Although there is no MCL for Na, EPA's Drinking Water Equivalency Level (DWEL or guidance level) for Na is 20 mg/L. This level is also consistent with the 20 mg/L recommended concentration for those with a severely restricted sodium diet (as per NYS DOH Part 5, Subpart 5-1). This recommended concentration is exceeded in well 2 in both sampling events.

- Hardness

  Hardness is typically classified as follows:

  - Soft: < 50 mg/L as $CaCO_3$
  - Moderately hard 50 to 150 mg/L as $CaCO_3$
  - Hard 150 to 300 mg/L as $CaCO_3$
  - Very Hard > 300 mg/L as $CaCO_3$

  As shown in Tables 2 and 3, the groundwater at Dwaar Kill is generally hard.

- No volatile organics were observed above the individual detection limits in any of the samples.

4.0 WELL FIELD SAFE YIELD

SSEC's well testing included pumping 4 of 5 wells simultaneously at a total rate of 445 gpm. This data is not sufficient, however, to determine the maximum safe yield of the well field. Although the measured drawdowns in the test wells suggest that several of the wells could be pumped at a much higher rate, that rate could be limited by the fact that several residential wells in the area exhibited drawdown (up to 22 ft) during the testing. The safe yield determination would confirm whether this drawdown could be attributable to the testing. Preliminary confirmation of SSEC testing data was performed during HDR's 2010 water quality sampling, as discussed below, as flow rate and drawdown were monitored. The existing data, including the aquifer testing, as described in the SSEC May 2009 report, was adequate to prove that the currently projected average and maximum daily demand could be achieved with wells 2 through 5, with the most productive well removed from the calculation.

This conceptual design is to provide a basis for determining the cost of the water to the future users, and ultimately the project feasibility, associated with developing the wells, treating the water, and installing a distribution system. If the project is considered feasible, the wells could all be pumped simultaneously to determine drawdown at the desired flow and the maximum safe

yield could be determined for the well field to further refine the well output and recovery. Either development of the three wells required for Pine Bush or development of all four wells could be tested for safe yield.

DETERMINATION OF SAFE YIELD

SSEC's previous exploratory drilling program on the Dwaar Kill properties included the installation of eleven test wells, four of which demonstrated substantial yields ranging from 105 gpm to 200 gpm and totaling 595 gpm (see Table 1 above). In addition to this testing, HDR performed preliminary analysis of the well drawdown during the 2010 water quality testing described above. Data observed during the 2010 water quality well testing is presented in Table 4 below.

Table 4: Dwaar Kill drawdown results during 2010 water quality testing

Well ID	Avg Pumping Rate (gpm)	Drawdown (ft)	Specific Capacity (gpm/ft)	Transmissivity (gpd/ft)
2	86	4.05	24	12,450
3	89	8.20	11	5,780
4	79	12.78	7	8,410
5	86	6.11	14	11,620

As shown above, the total drawdown, measured in the Dwaar Kill wells, ranged from 4.05 ft in Well 2 to 12.78 ft in Well 4 and the specific capacity values ranged from approximately 7 gpm/ft to 24 gpm/ft for Wells 2 and 4, respectively. The specific capacity is a relative representation of a well's ability to deliver groundwater, calculated by dividing the pumping rate by the total drawdown (gpm/ft). These values are quite relative however, since there were only 2 hours on which to base the drawdown.

During HDR's 2010 water quality sampling, wells were pumped individually, allowing some limited time to monitor adjacent wells as observation wells. Sufficient water-level measurements were collected from most wells to prepare detailed manual plots during the testing. Approximate transmissivity (T) values in gpd/ft were calculated from the later legs (within 2-hour time frame) of semi-logarithmic drawdown vs. time plots using the Cooper-Jacobs (1946) method. These values provide a relative indication of the aquifer's ability to supply groundwater through the zone of the aquifer represented by the well. Note that SSEC

(2009) values that might be calculated from precise numeric data, if available, would likely yield higher long-term T values. T values (Table 4) from more recent testing for the Dwaar Kill wells ranged from approximately 5,780 gpd/ft to 12,450 gpd/ft for Well 3 and Well 2, respectively.

The limited well data, also summarized in Table 4, tend to corroborate the pumping well data. A T value calculated from the Well 5 plot, as an observation well for Well 2 pumping, was the same as that for the pumping well. The T value at Well 5 during the Well 3 test was relatively high (more than 3 times) than that of the pumping well, which could be somewhat attributable to a less direct interconnection. In both cases the storage coefficient values were less than 10E-4, which indicates a confined system during this length of pumping. The confining unit is likely the less permeable overlying glacial till deposits. Well 4 also showed an approximate 0.5 ft response (insufficient data for time-drawdown plot) to Well 3 pumping. A strong interconnection between the four Dwaar Kill wells is indicated.

SAFE YIELD ANALYSIS

Time drawdown plots should prepared to project the anticipated drawdown out to 180 days assuming no recharge. This would establish the maximum anticipated drawdown under a drought scenario. This analysis would then serve to confirm the previous conclusions and the recharge based analysis. At this time, the apparent limiting factor for the safe yield at the Dwaar Kill site is the impacts to nearby residential wells. An additional component of the safe yield analysis will be an evaluation of the feasibility of mitigating this impact. Obvious mitigating measures include deepening or replacing the impacting wells or hooking the impacted residents to the municipal water supply system.

At a later date, if it becomes necessary to confirm the actual safe yield of the system, the wells to be developed should be tested by pumping simultaneously at the yield noted in Table 1 above, while monitoring drawdown, impact on adjacent wells, and response of the water level in the wells. All testing should follow NYSDEC Recommended Pump Test Procedures for Water Supply Applications - Appendix 10, TOGS 3.2.1 and should be consistent with Appendix 5-D Special Requirements for Wells Serving Public Water Systems.

5.0 CONCEPTUAL ENGINEERING

The New York State Department of Health (NYSDOH), Orange County Department of Health (OCDOH) and New York State Department of Environmental Conservation (NYSDEC) have established general guidelines and requirements to determine the adequacy of supply. The general requirements include:

- The total developed groundwater source capacity shall equal or exceed the design maximum daily demand with the largest producing well out of service.
- A minimum of two sources of groundwater shall be provided.
- The system must be provided with a standby power source.

These requirements have been included in the conceptual design and in this facility plan.

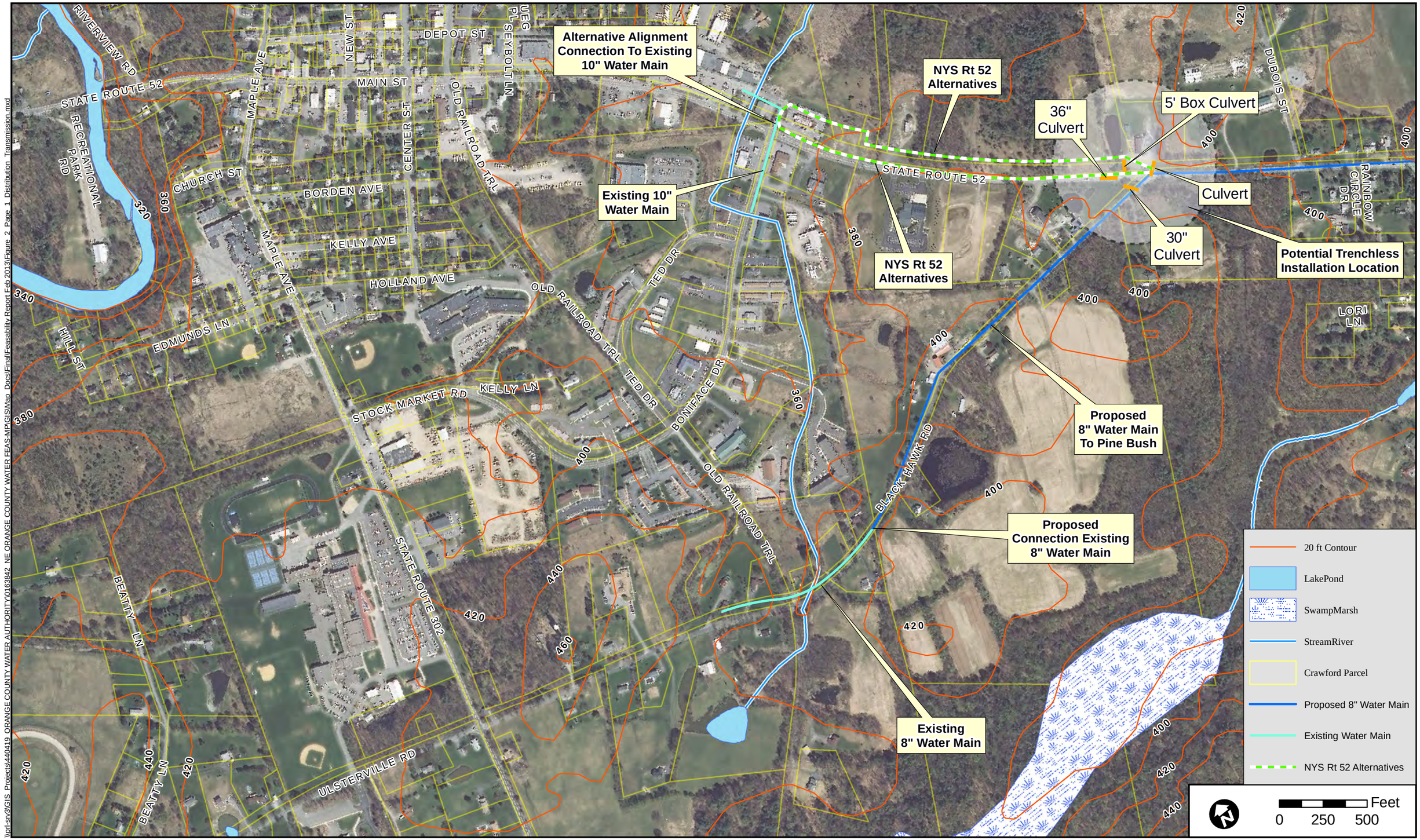
Given the current demand and high level of Fe in well 4, developing only wells 2, 3, and 5 is recommended. This would provide a total capacity of 490 gpm. With well 3, the highest yield well, offline, the capacity would be 290 gpm. This arrangement would meet the average demand and the DOH requirements for adequacy of supply. If future demand increases or if there is need to supply water to users outside of the Pine Bush Water District, well 4 could be brought online.

DISTRIBUTION AND TRANSMISSION SYSTEM

The Dwaar Kill well field is located approximately 2 miles southeast of the Village of Pine Bush. A new pipeline will be required to connect the well field to the Pine Bush Water District. The connection piping will travel northwest on Hill Ave from the well field towards Rt. 52. The pipe will then continue to go northwest along Rt. 52 to its intersection with Blackhawk Road, then continue to the west on Blackhawk Road and interconnect at or near the Town's current Blackhawk Road well, as shown in Figure 2. This alignment will potentially allow water service connections to future developments along this corridor and/or the various potential customers on and adjacent to Rt. 52 that currently utilize private wells. For reference, a mapping of the existing Pine Bush Water District has been included in Figure 3.

A second alternative was also reviewed which included the connecting pipe continuing running northwest on Rt. 52, past Blackhawk Road, and connecting to the Village distribution system within the commercial development located east of Boniface Drive, as shown in Figure 2. To connect to the existing distribution system, the connection piping would be routed either using the existing Rt. 52 right-of-way or through the properties located northeast of Rt. 52. Upon review with the Town, it was determined that connection on Blackhawk Road was preferred over the second alternative. Constructability issues are less in Blackhawk Road and there are fewer utility conflicts. In addition, the alternative to continuing the installation in or adjacent to Rt. 52, north of Blackhawk Road, would require additional permitting efforts due to access and presence of wetlands along Rt. 52.

At this time, sizing of the water main is based solely on the existing Pine Bush water demand. Using the 595 gpm total yield for the wells that were observed during the preliminary testing by SSEC, an 8" diameter pipe connecting Dwaar Kill and Pine Bush would be sufficient for the



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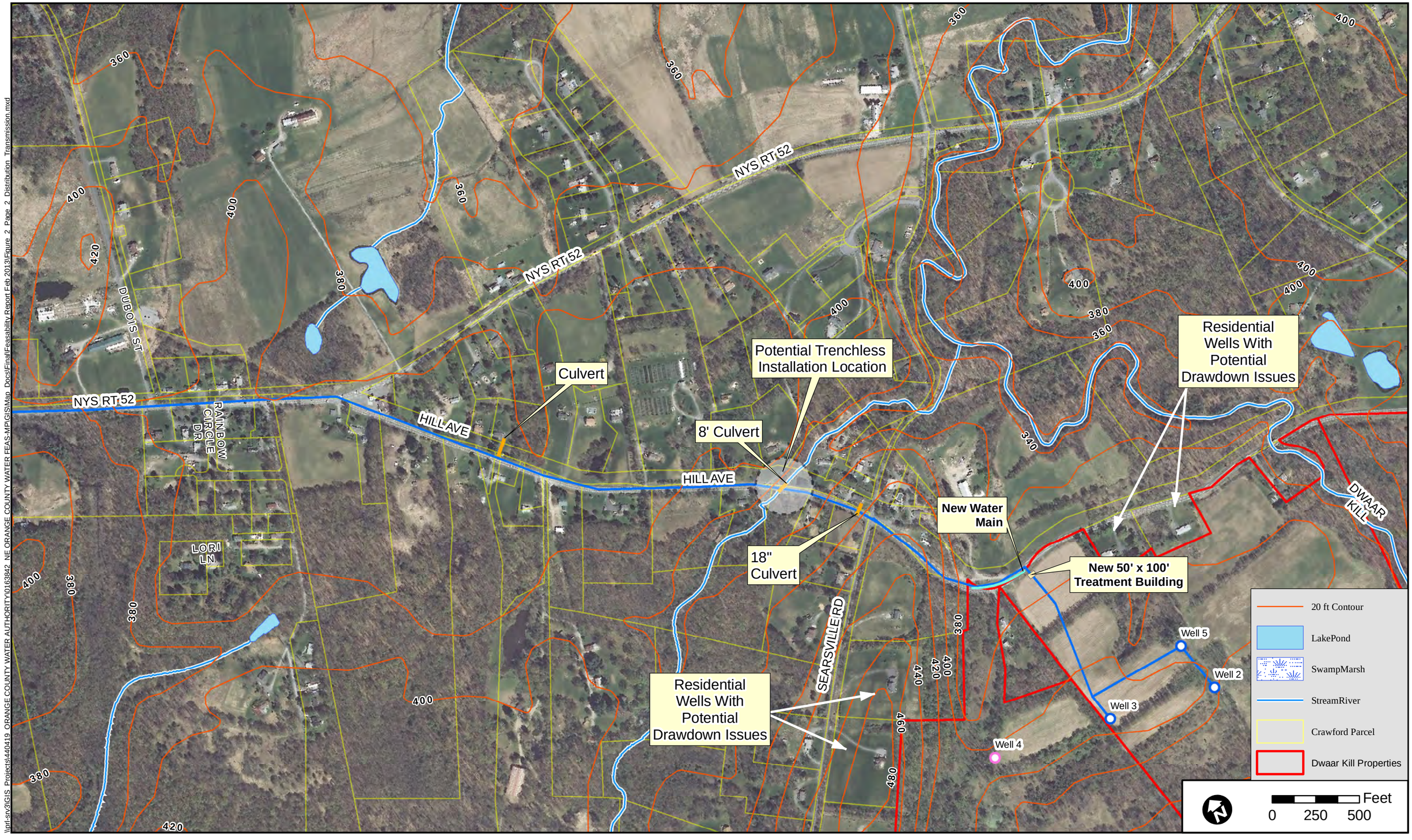
HDR

DWAAR KILL - PINE BUSH WATER SUPPLY PROJECT FEASIBILITY REPORT
PROPOSED DISTRIBUTION & TRANSMISSION SYSTEM

FIGURE 2
PAGE 1



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DWAAR KILL - PINE BUSH WATER SUPPLY PROJECT FEASIBILITY REPORT
PROPOSED DISTRIBUTION & TRANSMISSION SYSTEM

FIGURE 2
PAGE 2

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DWARR KILL - PINE BUSH WATER SUPPLY PROJECT FEASIBILITY REPORT
PINE BUSH EXISTING DISTRIBUTION SYSTEM

Figure 3

potential future development of the well field. This pipe size must however be confirmed during detailed design, as fire flow and pressure requirements will dictate the final pipe size. An 8" pipe is utilized in the cost estimate to match the existing 8" pipe connection on Blackhawk Road in Pine Bush.

WATER TREATMENT PLANT

5.1.1 Fe and Mn treatment

Presence of Fe or Mn above the maximum contaminant level (MCL) requires green sand filtration or an alternative method for Fe and Mn removal. Levels below the MCL may still require the addition of a sequestering agent to limit color issues. As noted above, the wells all show the presence of Fe and Mn, with well 4 above the limit and well 2 near the combined limit. In addition, Fe and Mn concentrations often increase as the well is utilized, which suggests the other wells could approach or exceed the MCL in the future. Sequestering can be successful up to approximately 1 mg/L of Fe and Mn. Given the current levels and since well 4 will not be online, it may be beneficial to utilize sequestering, while maintaining space for future green sand media. This report includes the green sand media filters, which will result in a more conservative cost estimate and will minimize future modifications to the plant that would be required if sequestering were not successful.

Green sand filtration is recommended as it is an operator friendly system to remove Fe and Mn over varying influent flow rate and concentration. The pressure filter is loaded with green sand media that has been dosed with potassium permanganate. The permanganate on the media is absorbed and removes Fe and Mn from the influent stream. Injection of hypochlorite upstream of the green sand filter will oxidize the Fe and Mn and will continuously regenerate the filter, so the filter does not need to be taken off-line for regeneration. The operator does not need to modify chemical dosing to match influent concentrations or flowrate.

Green sand filters are normally sized for a loading rate not to exceed 3 gpm/ft^2 per 10 States Standards, although the rate can be increased if removal rates are satisfactorily demonstrated at the plant. Using the average demand of 140 gpm, two 6-ft diameter columns operating in parallel would be required to meet the 3 gpm/ft^2 requirement. The system would consist of a three column skid, with two filters operating in parallel and with a standby unit. A blower for the backwash air scour will be provided with the skid and a control panel to allow for automatic operation of the green sand filter.

Backwash would be initiated by pressure loss in the vessel. During backwash, plant output would be lowered since only one vessel would be online. The backwash cycle consists of an air scour step followed by the backwash step, which utilizes treated water at a rate of 15 gpm/ft^2 per

10 States Standards. It is anticipated that the filters would be backwashed at most every other day. For a 15 minute backwash at 15 gpm/ft^2, the volume of waste would be approximately 6,000 gallon per day. It is anticipated that the plant booster pumps can be utilized for backwash, although this should be confirmed during detailed design.

The backwash waste will potentially be recycled to the head of the plant and used for makeup water, pending approval by DOH. 10 States Standards section 9.5.5 does not allow recycle of "red water" backwash waste unless approved by the reviewing authority, in this case Orange County DOH. Initial conversations with Orange County DOH suggest recycle will be approved as other plants in NY that utilize green sand are able to recycle the backwash water. A decant tank will be provided to store 2 to 3 backwashes and allow for settling of solids. If recycle is allowed, the decant will be sent to the head of the plant at a rate below 10% of the influent flow, or as required by DOH. Alternately, it could be routed to a State Pollution Discharge Elimination System (SPDES) outfall on the Dwaar Kill, a an approximately 22.3 mile long tributary to the Wallkill River. Settled solids will be brought offsite for disposal.

5.1.2 Chlorination

The new groundwater supply will require disinfection prior to entry into the distribution system. Chlorination at the Dwaar Kill site is recommended to allow for nearby homes that may be impacted by the new well field to receive treated water. In addition, chlorination at the site allows for potential connections by users along the Rt. 52 corridor and allows direct tie-in to the Pine Bush distribution system.

Many municipalities are replacing their gaseous chlorine dosing systems due to health and safety concerns associated with chlorine gas, which is corrosive. Therefore, a liquid sodium hypochlorite system is proposed for chlorination of the well water. A 55 gallon hypochlorite drum, metering pumps, and residual chlorine monitor are required for proper dosing and control.

Chlorine is dosed to maintain a minimum residual chlorine concentration of 0.2 mg/L in the distribution system per 10 States Standards. Control of dosing is typically performed by increasing or decreasing the dose in response from a residual chlorine meter on the main leaving the plant. Actual chlorine dose must be determined during detailed design based on the contact time and distance to the first user in the system. For preliminary sizing, an assumed chlorine dose of 1 mg/L and average demand of 140 gpm were used, which equates to a daily hypochlorite usage of approximately 1.7 gpd assuming 12% hypochlorite. At peak flow, hypochlorite usage would be approximately 3.1 gpd. This usage is low enough that 55 gallon drums would be feasible, which reduces capital costs for spill containment and off-loading. Storage would be greater than 30 days at the 1 mg/L dose for average flow if using 55 gal drums. Two drums should be installed and connected to pumps to provide for constant chlorination. A

storage tank would not be recommended at this low usage since minimum deliveries are typically in the thousands of gallons and hypochlorite can degrade over long storage periods. Actual required chlorine dose should be confirmed during detailed design to ensure proper storage requirements are met.

5.1.3 Treatment Plant Layout and Location

Figure 4 is a preliminary process flow diagram of a potential treatment plant. Each well will require a well pump capable of pumping into the common header to the treatment building and through the treatment processes. Chlorination will be performed prior to the green sand filters. A detailed evaluation of the contact time and distance to first user must be performed to determine if a contact tank is required or if the transfer pipe can be used to provide the required contact time. Additional chlorination points will be identified, as needed, during detailed design of the system.

Booster pumps will likely be required to deliver water to the Pine Bush Water District. A clear well is proposed under the new treatment plant to provide some storage of water for use in the green sand backwash. A storage tank could be provided at the high point near the well site, however the Pine Bush district has approximately 500,000 gallons of combined storage in two tanks, which is sufficient to meet 10 States storage requirements. If a storage tank is desired, the high point of the Dwaar Kill property is in the southern portion of the site north of Ward Ave., which would require significant additional piping. An alternate location that is closer to the wells and distribution system should be investigated if storage is desired. Given the existing storage in Pine Bush, a new storage tank is not recommended.

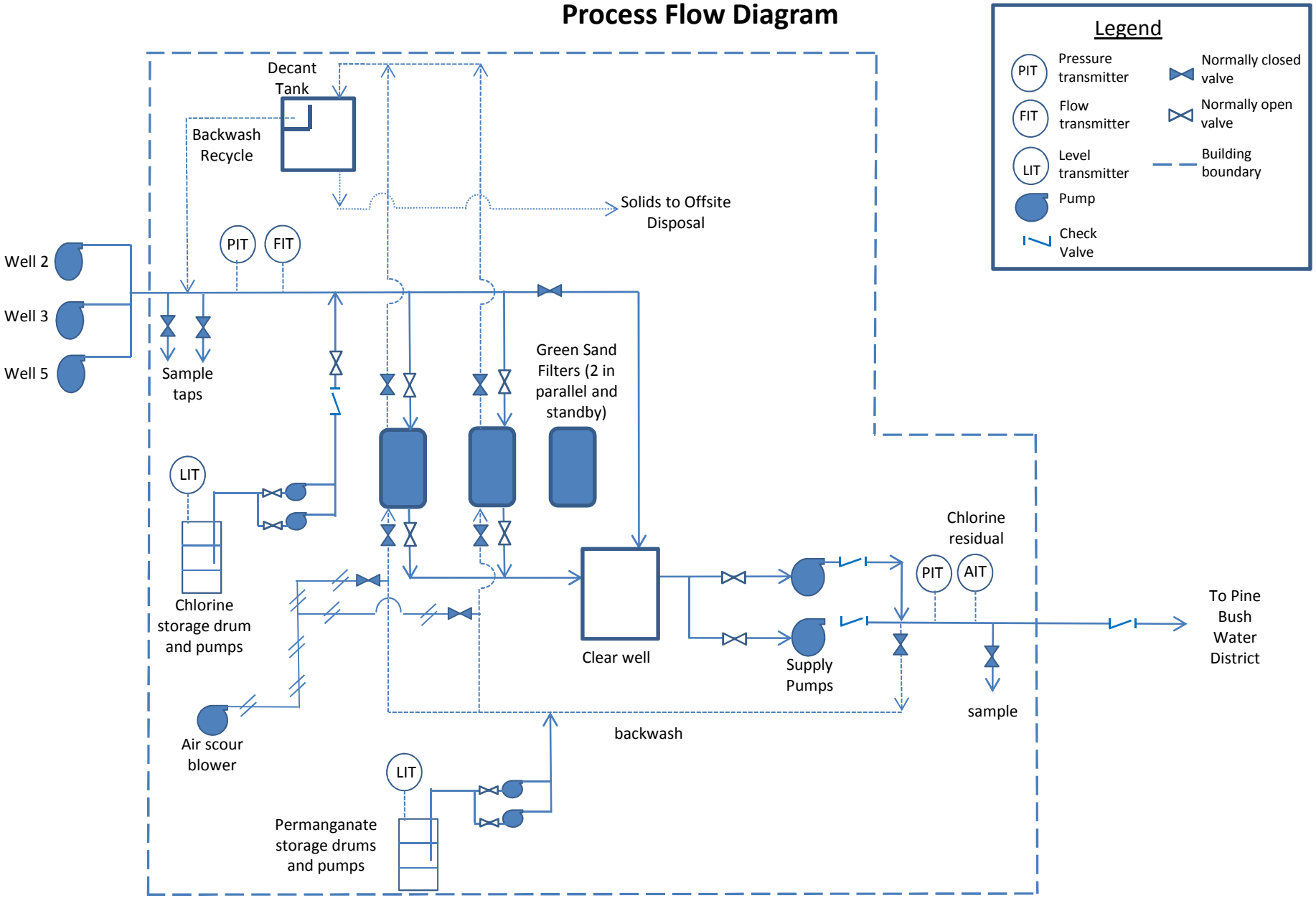
The attached Figure 5 shows the proposed location of the treatment facility and conveyance piping in relation to the wells. The facility is located near Hill Ave, for easy access to the plant for chemical deliveries and maintenance. An emergency generator would be required for the well pumps, treatment process, and chlorination. The generator would be located outdoors in a weather and sound proof enclosure.

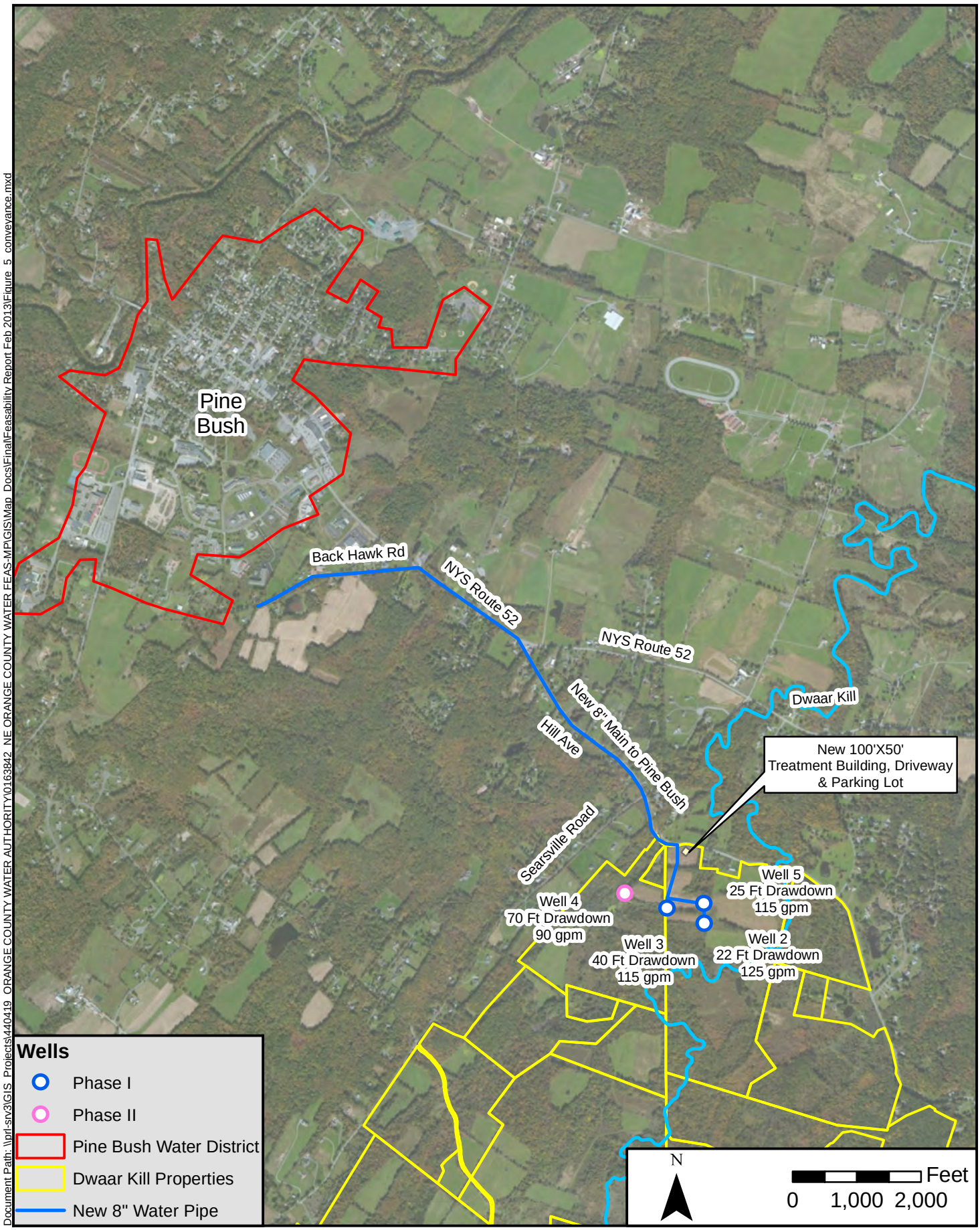
6.0 SANITARY WASTEWATER TREATMENT

Sanitary flow is not expected to increase significantly with the new treatment plant since the water district is not being expanded. The Village operates a 300,000 gpd treatment facility, which currently receives approximately 200,000 gpd.

The new water treatment plant will generate approximately 6,000 gpd of wastewater from backwash of the green sand filters. As described above, the green sand filter backwash will be recycled to the head of the plant.

Figure 4
New Dwaar Kill Groundwater Supply and Connection to Pine Bush Water District
Process Flow Diagram





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Note: Well locations approximate, yield and draw down fron 2009 SSEC testing.

HDR	DWARR KILL - PINE BUSH WATER SUPPLY PROJECT FEASIBILITY REPORT DWAAR KILL TREATMENT FACILITY, CONVEYANCE PIPING & WELLS	Figure 5

In January 2013, as part of this facility plan, HDR and the Town of Crawford Highway Department performed three deep test pits and installed three shallow "benched" pits, in which infiltration testing was to be completed to determine if lagoons would be an option for disposal of the backwash waste. All three of the locations were deemed to be unsuitable due to various reasons such as shallow groundwater or slow infiltration rate. An additional four deep test pits were installed to explore alternate locations. Results for all seven test pit locations are described in Appendix C. Locations of each of the test locations are shown in Figure 6. If disposal options are still being considered, we would recommend Locations 4 and 7 in Figure 6 as being worthy of further investigation based on the preliminary testing that has been conducted. These locations should be considered for disposal of flow from floor drains, emergency eyewashes/showers, and, if required by Pine Bush, sanitary discharge.

7.0 OPINION OF PROBABLE CONSTRUCTION COST AND O&M COST

Appendix D includes a detailed opinion of probable construction cost (OPCC) of the proposed supply, treatment, and distribution system and Table 5 includes a more abbreviated summary.

Table 5: Opinion of Probable Construction Cost Summary

Description	Total
Site Work, New 8" Water Main and Wells 2, 3 and 5 Improvements	$1,483,412
WTP Equipment – Pumps, Meters, Filter, Decant Tank, SCADA and Generator	$657,830
New WTP Building (includes wiring, plumbing, HVAC)	$356,250
Installation – WTP Piping, Equipment, Conduit, Instrumentation and Controls	$328,915
Subtotal	***$2,826,407***
Design Contingency	$989,242
General Conditions, Contractor Overhead and Profit, & Bonds and Insurance	$839,443
Engineering and CM	$931,018
Escalation to Mid-Point Construction and Bid Market Allowance	$465,509
Project Total (Rounded)	***$6,100,000***

The OPCC, totaling $6.1M, includes a 35% design contingency (given the conceptual nature of the design), a 20% estimation for design, permitting and construction management services, and an adjustment for escalation. No land acquisition costs are included as the OCWA has an easement along the proposed water main route to Pine Bush and Orange County owns the Dwaar Kill well field. Although the OPCC includes a typical percentage for engineering, construction, and permitting services costs, a proposal for these services on this specific project would be required for this work, as unusual permitting, geotechnical, or other services could increase the

HDR

DWARR KILL - PINE BUSH WATER SUPPLY PROJECT
FEASIBILITY REPORT
APPROXIMATE PERCOLATION TEST LOCATIONS

Figure 6

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cost. This cost does not include booster pump stations along the route, air relief valves, or a storage tank for the new system, as the existing storage in the Pine Bush district would be utilized.

The overall increase from the previous OPCC provided for this project is approximately $1M. The project revisions that can be attributed to this increase in the probable cost include: 1) trenchless installations, such as directional drilling, being required for two locations along the proposed water main route, 2) increases to equipment costs, specifically the well pumps, green sand filter and metering pumps, and 3) improvements to the water supply system for some adjacent homes being required due to the projects potential drawdown impacts to neighboring wells.

An economic analysis to determine the number of users and projected cost of water to the users to determine the viability of the project was presented as part of the January 2012 Mid-County Feasibility Study. The Study assumed an overall project cost of $6.1M based on the January 2012 conceptual engineering report; this cost would result in a doubling of the water rate, i.e. from $4.00 per 1000 gallons to $8.97 per 1000 gallons, however if system demand increases to 250,000 gpd from 2015 to 2024, then the rate is projected to drop to $7.82 per 1000 gallons. A breakdown of this economic analysis is included in Appendix D. In addition, the 2012 study also presented a series of project funding alternatives with a preferred alternative selected. These alternatives are presented in Section 9.

Operating and maintenance (O&M) costs were estimated for the new facility based on typical percentages of construction cost. Annual O&M costs for the water main, building, and piping are estimated to be 1% of construction. For equipment, the O&M costs are estimated to be 3.5% of construction. Pumping energy costs were estimated based on projected pump horsepower for the well pumps and booster pumps, assuming operation 24 hrs per day, 7 days per week and an electric cost of $0.05 per KW-hr. The O&M costs are estimated to be $222,000 per year. This does not include labor.

8.0 PERMITTING

Approving agencies require a demonstration that impacts to regulated resources have been minimized to the greatest extent practicable. Reducing impacts will also reduce the extent of any compensatory mitigation (such as wetlands creation) required by the agencies. Examples of minimization measures that will be incorporated into the proposed project are as follows:

- Tree clearing should be limited to the greatest extent practicable and construction staging and equipment laydown areas should be sited on previously cleared areas.

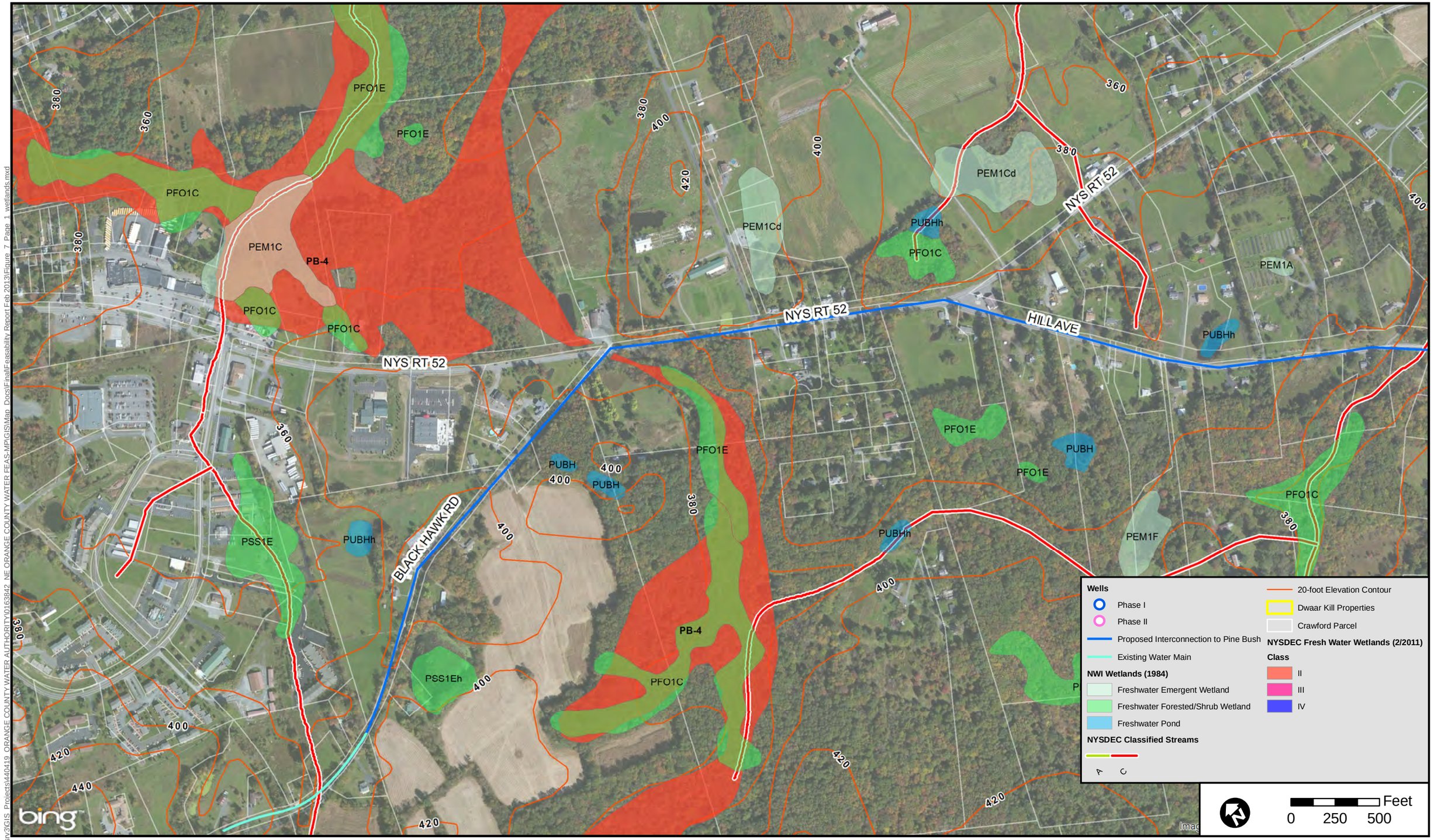
- The majority of the connection piping should be completed using open cut installation by working directly under the existing roadbed or in the right-of-way. Trenchless installation methods will be employed when crossing the unnamed tributary to Dwaar Kill on Hill Avenue and at the intersection of Route 52 and Blackhawk to minimize direct impacts to these water resources.
- New water lines should be located within existing road rights-of-way. Where practicable, utility lines should be installed on the opposite side of the road from wetland resources.
- Assuming that the streams are deemed perennial warm-water fisheries resources by NYSDEC, in-water work may be prohibited from March 1 to July 15 of each calendar year. Reducing in-stream impacts may reduce the potential for work windows. The agencies may also stipulate construction techniques (such as cofferdamming and pumping flow around the work area) to reduce impacts. If needed, temporary stream crossings would be located in areas with low relief and no wetlands bordering the stream banks, and placed perpendicular to the stream to minimize the area of disturbance. No modifications to existing culverts will be necessary.
- Disturbance to wetlands and watercourses should be temporary. If temporary disturbance to wetlands is necessary, soils and vegetation can be stockpiled during construction and be used to return the site to pre-construction conditions.

Based on the current project understanding, preliminary desktop reviews of the route alignment, and a site visit, the following environmental studies and permitting tasks are anticipated:

- Task 1. Wetland and Watercourse Delineation and Agency Verification
- Task 2. Archeological Consultation
- Task 3. Endangered and Threatened Species Assessment
- Task 4. Phase I Environmental Site Assessment and Geotechnical Study
- Task 5. State Environmental Quality Review Act – Environmental Assessment
- Task 6. Wetland and Watercourse Permitting
- Task 7. Stormwater Pollution Prevention Plan
- Task 8. Article 17 (State Pollutant Discharge Elimination Systems) Permit
- Task 9. Permitting Assistance during Construction

A more detailed breakdown of the potential scope of work associated with the environmental permitting and approvals for this proposed project are provided in Appendix E. See Figure 7 for a map of wetlands and watercourses within the vicinity of the proposed project.

Table 6 includes a listing of the anticipated environmental and construction permits for the proposed project. Additional permits could be identified during detailed design, some of which could include:



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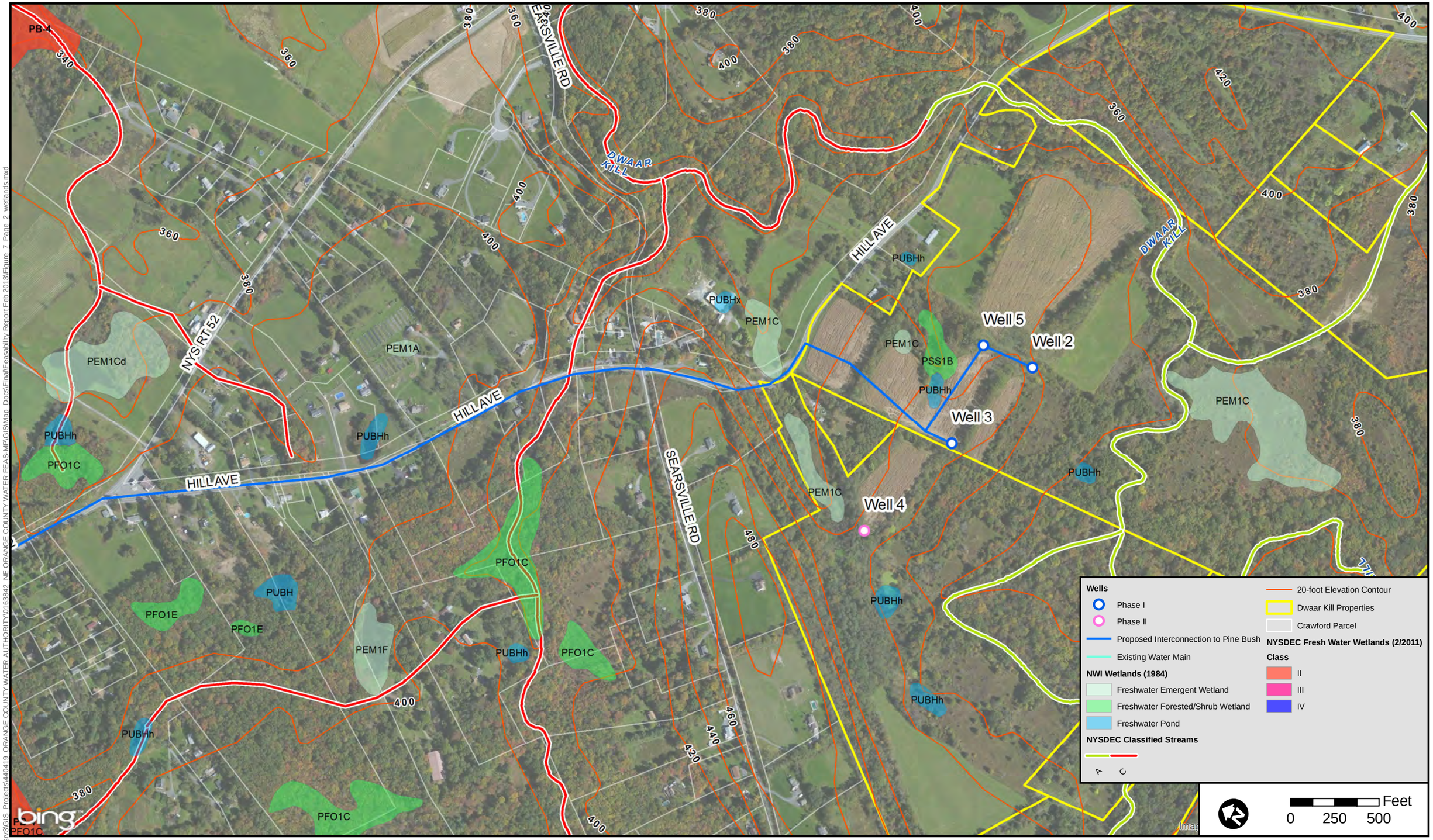
HDR

DWAAR KILL - PINE BUSH WATER SUPPLY PROJECT FEASIBILITY REPORT
WETLANDS AND WATER COURSE MAPPING

FIGURE 7
PAGE 1



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DWAAR KILL - PINE BUSH WATER SUPPLY PROJECT FEASIBILITY REPORT
WETLANDS AND WATER COURSE MAPPING

FIGURE 7
PAGE 2

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- Stormwater, depending on the limits of disturbance
- Town of Crawford Planning Board Site Plan approval
- NYSDEC Water Supply Application

Table 6: Environmental and Construction Permits

Agency	Permit/Approval
NYSDOH/OCDOH	DOH-348 Application for Approval of Plans for Public Water Supply Improvements
USACE	Jurisdictional Determination Nationwide Permit (likely)
NYSDEC	Wetland verification SEQRA – Unlisted Action 401 Water Quality Certification Article 24 Freshwater wetlands (potential buffer-only disturbance) Article 15 Protection of Waters (potential) SWPPP – SPDES General Permit SPDES Article 17 Permit
NYSDOT	Highway Work Permit – NYS Route 52
Orange County	Road Opening Permit – Hill Avenue (County Road No. 52)
Town of Crawford	Site Plan Approval – Planning Board review (likely) Building Permit Road Opening Permit – Blackhawk Road

Additional permitting and water quality conditions will be required if backwash water from the green sand filter is decided to be routed to a SPDES outfall on the Dwaar Kill instead of being recycled to the head of the plant and used for makeup water, as described in Section 5.2.1 above . Since the Dwaar Kill is a Class A stream, discharges to it will be subject to NYSDEC water quality and thermal standards which specify a ten-degree (F) window for the discharge. In addition, it will also require an Article 15 permit from DEC (which is noted as potential permit in Table 5 above as it is also required for any associated disturbance within 50-feet of the watercourse).

9.0 FINANCIAL & INSTITUTIONAL ARRANGEMENTS

Both this Facility Plan and the Mid-County Water Supply Feasibility Study identified the Dwaar Kill-Pine Bush Water Supply Project as highly feasible in terms of implementation. In addition, the Town of Crawford (Pine Bush water district) has expressed interest in receiving as much of their 200,000 gpd demand as possible from the County-owned Dwaar Kill well field. Moreover, the OCWA also owns an easement along the route of the pipeline from the well field along

Route 52. The current opinion of probable cost is $6.1M. Using the $6.1M cost from the conceptual engineering report will result in a doubling of the water rate, i.e., from $4.00 per 1000 gallons to $8.97 per 1000 gallons, however if demand increases to 250,000 gpd from 2015 to 2024, the rate is projected to drop to $7.82 per 1000 gallons. This is not unreasonable cost for water when compared to other municipalities in the area, and taking the pending need for the upgrading of infrastructure for many of the older water supply systems in Orange County into account. There are numerous financial and organizational\institutional options available for advancing the Dwaar Kill project. The County, the Water Authority and the Town of Crawford have an array of financing, design, construction and operational scenarios to choose from. The preferred option will most likely be based upon the degree of oversight and\or responsibility each of the involved entities is willing to assume; four such financing, ownership, and operating options are described below in Table 6.

Table 6: Dwaar Kill - Pine Bush Water Supply Feasibility Study
Financing, Ownership & Operating Options

Option	County	OCWA	Local Community
1	Sells debt/proceeds to OCWA	Designs/builds water treatment & major pipes	Pays the OCWA for debt service and O&M
	Owns the assets	Leases assets from the County	Sets rates/bills local customers/collects payments
	Receives payments from OCWA	Operates/maintains plant & major pipes	Maintains customer relationships
	Pays debt service to bondholders	Pays for O&M	Installs/maintains local water mains
	Provides oversight	Pays the County for debt service on bonds	
		Charges local community for service	
Option	**County**	**OCWA**	**Local Community**
2	Provides backing to OCWA bonds	Sells debt/uses proceeds to construct assets	Pays the OCWA for debt service and O&M
	Optimizes cost of borrowing	Owns the assets	Sets rates/bills local customers/collects payments
	Provides oversight	Designs/builds water treatment & major pipes	Maintains customer relationships
		Operates/maintains plant & major pipes	Installs/maintains local water mains
		Pays for O&M	
		Pays debt service to bondholders	
		Charges local community for service	

Option	County	OCWA	Local Community
3	Provides backing to OCWA bonds	Sells debt/proceeds to local community	Installs/maintains local water mains
	Optimizes cost of borrowing	Owns the assets	Leases assets from the OCWA
	Provides oversight	Receives payments from local community	Operates/maintains plant & major pipes
		Pays debt service to bondholders	Pays for O&M
		Provides oversight	Pays OCWA for debt service
		Designs/builds water treatment & major pipes	Sets rates/bills local customers/collects payments
			Maintains customer relationships
Option	**County**	**OCWA**	**Local Community**
4	Provides oversight	Provides oversight	Sells debt/uses proceeds to construct assets
			Designs/builds water treatment & major pipes
			Owns the assets
			Operates/maintains plant & major pipes
			Pays for O&M
			Pays debt service to bondholders
			Sets rates/bills local customers/collects payments
			Maintains customer relationships
			Installs/maintains local water mains

As noted above, the preferred financial and organizational option selected will most likely be based upon the degree of oversight and\or responsibility each of the involved entities is willing to assume. Based upon recent discussions that have occurred between the Town and the County, the financing option that appears most favorable is Option 3 which is outlined in Table 6 above. This is an arrangement in which the OCWA sells the debt and transfers the proceeds to the local community. The Authority would design and build the water system, own the assets, receive payments from the local community, pay debt service to the bondholders, and provide oversight. The local community would lease the assets from the OCWA, operate and maintain the facilities, pay for operation and maintenance, pay OCWA for debt service, set rates, bill customers, collect payments, and maintain customer relations. Orange County, with its excellent credit rating, would provide backing to the OCWA bonds, and provide oversight.

Another financing option available to all the Town of Crawford is to secure grant funding from the NYSDOS Local Government Efficiency (LGE) loan program. These grants are available for both feasibility studies and project implementation. Since project feasibility has already been analyzed for Dwaar Kill Project, monies can now be requested to advance the project to the implementation phase. A LGE grant can be requested by the Town in conjunction with the OCDP to begin the facility planning for this project. A more refined facility plan will help to further identify project costs, environmental issues, as well as assist in obtaining additional funding.

10.0 SCHEDULE

If this project were to proceed through the design stage directly following the issuance of this report, the developed wells, water treatment facility and interconnection could potentially be online by February 2015. This timing is based on the assumption that the project is bid and receives notice to proceed with construction by January 2014.

11.0 SUMMARY

The existing data including the aquifer testing as described in the SSEC May 2009 report was adequate to prove that the currently projected average and maximum day demand could be achieved with wells 2 through 5 with the most productive well removed from the calculation.

The Dwaar Kill site should initially be developed to provide for average (140 gpm) and maximum day (257 gpm) demand to the Pine Bush Water District. Using existing data, wells 2, 3, and 5 should be developed to provide for the maximum day demand with one well out of service, as required by DOH. Well 4 has the highest combined Fe and Mn concentration and the lowest observed yield, therefore it should be brought online only if additional capacity is required due to future growth.

A water treatment plant and booster pump station will be required at the Dwaar Kill well field to remove Fe and Mn, chlorinate the treated groundwater, and convey it to the existing Pine Bush distribution system. An approximately two mile long 8” distribution main will be required to connect the well field and Pine Bush Water District. The pipe size must be verified during detailed design based on required fire flow and system pressure. The proposed system will allow Pine Bush to switch entirely to the new Dwaar Kill system, with their existing wells to be used only in emergencies. The opinion of probable cost for the system is $6.1M. This cost does not include booster pump stations along the route, air relief valves, or a storage tank for the new system. The existing storage in the Pine Bush district would be utilized. O&M costs are estimated to be $222,000.

Appendix A

SSEC's 2008 Water Quality Data

OCL Analytical Services
35 Goshen Turnpike
Bloomingburg NY 12721

Phone 845-733-1557
Fax 845-733-1944
Web oclanalytical.com

Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/29/2009
Date Received 12/17/2008
Date Complete 1/29/2009

Sample Number 245485-01
Federal ID
Description
Location Dwarkill Well 2
Sample Point

Date Sampled 12/17/08 14:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
502.2 NY VOCs								
1,1,1,2-Tetrachloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1,1-Trichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1,2,2-Tetrachloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1,2-Trichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1-Dichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1-Dichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1-Dichloropropene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,3-Trichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,3-Trichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,4-Trichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,4-Trimethylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2-Dichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2-Dichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2-Dichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,3,5-Trimethylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,3-Dichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,3-Dichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,4-Dichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
2,2-Dichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
2-Chlorotoluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
4-Chlorotoluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Benzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Bromobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Bromochloromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Bromomethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Carbon tetrachloride	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	

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Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/29/2009
Date Received 12/17/2008
Date Complete 1/29/2009

Sample Number 245485-01
Federal ID
Description
Location Dwarkill Well 2
Sample Point

Date Sampled 12/17/08 14:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
502.2 NY VOCs								
Chlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Chloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Chloromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Dibromomethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Dichlorodifluoromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Ethylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Hexachlorobutadiene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Isopropylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Methyl tert-butyl ether	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Methylene chloride	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Styrene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Tetrachloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Toluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Trichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Trichlorofluoromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Vinyl chloride	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
cis-1,2-Dichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
cis-1,3-Dichloropropene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
m,p-Xylene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
n-Butylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
n-Propylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
o-Xylene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
p-Isopropyltoluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
sec-Butylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
tert-Butylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
trans-1,2-Dichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	

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Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/29/2009
Date Received 12/17/2008
Date Complete 1/29/2009

Sample Number 245485-01
Federal ID
Description
Location Dwarkill Well 2
Sample Point

Date Sampled 12/17/08 14:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
502.2 NY VOCs								
trans-1,3-Dichloropropene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
504.1 EDB/DBCP								
1,2-Dibromo-3-chloropropane	< 0.00001	mg/L	EPA 504.1	0.0002	12/22/08 19:00	12/22/08 19:00	CPH-SA	
1,2-Dibromoethane (EDB)	<0.00001	mg/L	EPA 504.1	0.00005	12/22/08 19:00	12/22/08 19:00	CPH-SA	
508 SOC PestPCBs								
Chlordane (tech)	< 0.00010	mg/L	EPA 508	0.002	12/23/08 16:54	12/23/08 16:54	CPH-SA	
PCBs as Aroclors (screen)	Absent	mg/L	EPA 508	0.0005	12/23/08 16:54	12/23/08 16:54	CPH-SA	
Toxaphene	< 0.00025	mg/L	EPA 508	0.003	12/23/08 16:54	12/23/08 16:54	CPH-SA	
515.3 NY Herb								
2,4,5-TP (Silvex)	< 0.0003	mg/L	EPA 515.3	0.01	12/30/08 10:03	12/30/08 10:03	ASC-CV	
2,4-D	< 0.0005	mg/L	EPA 515.3	0.05	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Dalapon	< 0.0030	mg/L	EPA 515.3	0.2	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Dicamba	< 0.0003	mg/L	EPA 515.3		12/30/08 10:03	12/30/08 10:03	ASC-CV	
Dinoseb	< 0.0005	mg/L	EPA 515.3	0.007	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Pentachlorophenol	< 0.0003	mg/L	EPA 515.3	0.001	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Picloram	< 0.0003	mg/L	EPA 515.3	0.5	12/30/08 10:03	12/30/08 10:03	ASC-CV	
525.2 SVOC								
Alachlor	< 0.00011	mg/L	EPA 525.2	0.002	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Aldrin	< 0.00011	mg/L	EPA 525.2	0.005	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Atrazine	< 0.00011	mg/L	EPA 525.2	0.003	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Benzo (a) pyrene	< 0.00011	mg/L	EPA 525.2	0.0002	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Butachlor	< 0.00108	mg/L	EPA 525.2	0.05	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Di(2-ethylhexyl)adipate	< 0.00215	mg/L	EPA 525.2	0.4	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Di(2-ethylhexyl)phthalate	< 0.00215	mg/L	EPA 525.2	0.006	12/31/08 23:38	12/31/08 23:38	RHH-SA	

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1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/29/2009
Date Received 12/17/2008
Date Complete 1/29/2009

Sample Number 245485-01
Federal ID
Description
Location Dwarkill Well 2
Sample Point

Date Sampled 12/17/08 14:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
525.2 SVOC								
Dieldrin	< 0.00011	mg/L	EPA 525.2	0.005	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Endrin	< 0.00011	mg/L	EPA 525.2	0.002	12/31/08 23:38	12/31/08 23:38	RHH-SA	
HCH-gamma (Lindane)	< 0.00011	mg/L	EPA 525.2	0.0002	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Heptachlor	< 0.00011	mg/L	EPA 525.2	0.0004	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Heptachlor epoxide	< 0.00011	mg/L	EPA 525.2	0.0002	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Hexachlorobenzene	< 0.00011	mg/L	EPA 525.2	0.001	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Hexachlorocyclopentadiene	< 0.00011	mg/L	EPA 525.2	0.05	12/31/08 23:38	12/31/08 23:38	RHH-SA	S
Methoxychlor	< 0.00011	mg/L	EPA 525.2	0.04	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Metolachlor	< 0.00108	mg/L	EPA 525.2	0.05	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Metribuzin	< 0.00108	mg/L	EPA 525.2	0.05	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Propachlor	< 0.00108	mg/L	EPA 525.2	0.05	12/31/08 23:38	12/31/08 23:38	RHH-SA	
Simazine	< 0.00011	mg/L	EPA 525.2	0.004	12/31/08 23:38	12/31/08 23:38	RHH-SA	
531.1 Carbamates								
3-Hydroxycarbofuran	< 0.00100	mg/L	EPA 531.1		01/03/09 5:00	01/03/09 5:00	IC-SA	
Aldicarb	< 0.00100	mg/L	EPA 531.1	0.003	01/03/09 5:00	01/03/09 5:00	IC-SA	
Aldicarb sulfone	< 0.00100	mg/L	EPA 531.1	0.002	01/03/09 5:00	01/03/09 5:00	IC-SA	
Aldicarb sulfoxide	< 0.00100	mg/L	EPA 531.1	0.004	01/03/09 5:00	01/03/09 5:00	IC-SA	
Carbaryl	< 0.00100	mg/L	EPA 531.1		01/03/09 5:00	01/03/09 5:00	IC-SA	
Carbofuran	< 0.00100	mg/L	EPA 531.1	0.04	01/03/09 5:00	01/03/09 5:00	IC-SA	
Methomyl	< 0.00100	mg/L	EPA 531.1		01/03/09 5:00	01/03/09 5:00	IC-SA	
Oxamyl	< 0.00100	mg/L	EPA 531.1	0.2	01/03/09 5:00	01/03/09 5:00	IC-SA	
547 Glyphosate								
Glyphosate	< 0.01	mg/L	EPA 547	0.7	12/31/08 0:00	12/31/08 0:00	PLI	
548.1 Endothall								
Endothall	< 9.00	ug/L	EPA 548.1	0.1	12/30/08 0:00	12/30/08 0:00	PLI	H

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Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/29/2009
Date Received 12/17/2008
Date Complete 1/29/2009

Sample Number 245485-01
Federal ID
Description
Location Dwarkill Well 2
Sample Point

Date Sampled 12/17/08 14:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
549.2 Diquat								
Diquat	< 0.0008	mg/L	EPA 549.2	0.02	12/23/08 20:40	12/23/08 20:40	IC-SA	
Part V Inorganics								
Total coliform (ONPG)	absence		9223B			12/17/08 16:30	KG	
E. coli	absence		9223B			12/17/08 16:30	KG	
Alkalinity as CaCO3	190	mg/L	2320B			12/22/08 0:00	LM	
Corrosivity Index (LI)	0.150		2330B			12/31/08 0:00	KG	
Color	<5.0		2120B	15		12/18/08 13:45	KG	
Chloride	23.0	mg/L	450Cl-C0	250		12/30/08 0:00	KG	
Fluoride	<0.200	mg/L	EPA 340.2	2.2		12/30/08 0:00	LM	
Hardness as CaCO3, Calcium	166	mg/L	3500CaD			12/18/08 11:45	LM	
Nitrate as N	<0.200	mg/L	Lachat	10		12/19/08 0:00	LM	
Nitrite as N	<0.0100	mg/L	EPA 354.1	1		12/18/08 11:20	KG	
Odor	2.0		2150	3		12/17/08 16:00	LM	
pH	7.68		4500H+B			12/17/08 16:15	KG	
Sulfate	44.0	mg/L	EPA 375.4	250		12/30/08 0:00	KG	
Solids, Dissolved Total	362	mg/L	2540C			12/18/08 0:00	KG	
Turbidity	3.00	mg/L	2130B			12/18/08 11:30	KG	
Cyanide (free)	< 0.010	mg/L	EPA 335.4	0.2	12/23/08 16:25	12/23/08 16:25	CMD-S	
Part V Metals								
Arsenic, As	0.0027	mg/L	EPA 200.8	0.01	12/29/08 13:11	12/29/08 13:11	JRA-CV	
Barium, Ba	0.139	mg/L	EPA 200.8	2.00	12/30/08 14:50	12/30/08 14:50	JRA-CV	
Cadmium, Cd	< 0.0005	mg/L	EPA 200.8	0.005	12/29/08 13:11	12/29/08 13:11	JRA-CV	
Chromium, Cr	< 0.0020	mg/L	EPA 200.8	0.10	12/29/08 13:11	12/29/08 13:11	JRA-CV	
Lead, Pb	< 0.0005	mg/L	EPA 200.8	0.015	12/29/08 13:11	12/29/08 13:11	JRA-CV	
Mercury, Hg	< 0.0002	mg/L	EPA 245.1	0.002	12/29/08 16:05	12/29/08 16:05	KW-CV	

CV - Benchmark Center Valley NELAP 11827 OCL NELAP 10510
SA - Benchmark Sayre NELAP 11216

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1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/29/2009
Date Received 12/17/2008
Date Complete 1/29/2009

Sample Number 245485-01
Federal ID
Description
Location Dwarkill Well 2
Sample Point

Date Sampled 12/17/08 14:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
Part V Metals								
Selenium, Se	< 0.0030	mg/L	EPA 200.8	0.05	12/29/08 13:11	12/29/08 13:11	JRA-CV	
Silver, Ag	< 0.0006	mg/L	EPA 200.8		12/29/08 18:51	12/29/08 18:51	JRA-CV	
Copper, Cu	< 0.0005	mg/L	EPA 200.8	1.3	12/29/08 13:11	12/29/08 13:11	JRA-CV	
Iron, Fe	0.253	mg/L	EPA 200.7	0.3	12/29/08 19:12	12/29/08 19:12	GSR-CV	
Manganese, Mn	0.173	mg/L	EPA 200.7	0.3	12/29/08 19:12	12/29/08 19:12	GSR-CV	
Sodium, Na	25.4	mg/L	EPA 200.7		12/30/08 19:43	12/30/08 19:43	GSR-CV	
Zinc, Zn	< 0.005	mg/L	EPA 200.7		12/29/08 19:12	12/29/08 19:12	GSR-CV	
Antimony, Sb	< 0.0005	mg/L	EPA 200.8	0.006	12/29/08 13:11	12/29/08 13:11	JRA-CV	
Beryllium, Be	< 0.0005	mg/L	EPA 200.8	0.004	12/29/08 13:11	12/29/08 13:11	JRA-CV	
Nickel, Ni	0.0021	mg/L	EPA 200.8		12/29/08 13:11	12/29/08 13:11	JRA-CV	
Thallium, Tl	< 0.0005	mg/L	EPA 200.8	0.002	12/29/08 13:11	12/29/08 13:11	JRA-CV	
Radiologicals								
Gross Alpha	2.65	pCi/L	EPA 900.0	15	01/11/09 0:00	01/11/09 0:00	BPS-CV	
Gross Beta	1.75	pCi/L	EPA 900.0		01/11/09 0:00	01/11/09 0:00	BPS-CV	
Radium 226	0.13	pCi/L	EPA 903.0	5	01/13/09 0:00	01/13/09 0:00	BH-CV	
Radium 228	-0.17	pCi/L	EPA 904.0	5	01/15/09 0:00	01/15/09 0:00	KLE-CV	
Uranium, U	< 0.63	æg/L	EPA 200.8	30	12/29/08 20:09	12/29/08 20:09	JRA-CV	
Uranium (pci/L)	< 0.43	pCi/L	EPA 200.8		12/29/08 20:09	12/29/08 20:09	JRA-CV	

CV - Benchmark Center Valley NELAP 11827 OCL NELAP 10510
SA - Benchmark Sayre NELAP 11216

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Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project	
Date Reported	1/29/2009
Date Received	12/17/2008
Date Complete	1/29/2009

Sample Number	245485-01	Date Sampled	12/17/08 14:30
Federal ID		Sampler	J. Nemeth
Description			
Location	Dwarkill Well 2		
Sample Point			

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers

Qualifiers

H = Holding times for preparation or analysis exceeded
S = Spike Recovery outside accepted recovery limits

Approved By David M Kennedy

David Kennedy
Technical Director

JMS Environmental Services, Inc. 41 Kenosia Avenue
Danbury, Connecticut 06810 | Telephone 203-798-2229

Boyd Artesian Well Co

Mailing Information:

Name: Boyd Artesian Well Co
Address: 1054 Rte 52
City: Carmel
State: NY **Zip:** 10512
Phone: (845) 225-3196 **Fax:** (845) 225-8420

Collector's Information:

Name: Joe
Address of site: Well #3
Darkill
City: Crawford
State: NY **Zip:**
Phone:

JMS ID: 069808

Sample's Information:

Site: Well Head
Preservative: HNO^3
Temperature: <4
Matrix: Water

Date Collected: 5/12/2008
Time Collected: 9:15:00 AM

Date Received: 5/12/2008
Time Received: 11:45:00 AM
Lab No.: J0804806-5009

Date Analyzed	Test Name	Result	MCL	Method
05/28/08	3-Hydroxycarbofuran	ND	N/A	EPA 531
05/28/08	Aldicarb	ND	3 ug/L	EPA 531
05/28/08	Aldicarb Sulfone	ND	2 ug/L	EPA 531
05/28/08	Aldicarb Sulfoxide	ND	4 ug/L	EPA 531
05/28/08	Carbaryl	ND	N/A	EPA 531
05/28/08	Carbofuran	ND	40 ug/L	EPA 531
05/28/08	Methomyl	ND	N/A	EPA 531
05/28/08	Oxamyl (Vydate)	ND	200 ug/L	EPA 531
05/24/08	1,2-Dibromo-3-Chloropropane	ND	N/A	EPA 504.1
05/24/08	1,2-Dibromoethane(EDB)	ND	N/A	EPA 504.1
05/12/08	1,1,1,2-tetrachloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1,1-Trichloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1,2,2-Tetrachloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1,2-Trichloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1-Dichloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1-Dichloroethene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1-Dichloropropene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2,3-Trichlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2,3-Trichloropropane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2,4-Trichlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2,4-Trimethylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2-Dichlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2-Dichloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2-Dichloropropane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,3,5-Trimethylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,3-Dichlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,3-Dichloropropane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,4-Dichlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	2,2-Dichloropropane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	2-Chlorotoluene	<0.5 ug/L	5 ug/L	E 524.2

JMS Environmental Services, Inc. 41 Kenosia Avenue
Danbury, Connecticut 06810 | Telephone 203-798-2229

Boyd Artesian Well Co

Mailing Information:

Name: Boyd Artesian Well Co
Address: 1054 Rte 52
City: Carmel
State: NY **Zip:** 10512
Phone: (845) 225-3196 **Fax:** (845) 225-8420

Collector's Information:

Name: Joe
Address of site: Well #3
Darkill
City: Crawford
State: NY **Zip:**
Phone:

JMS ID: 069808

Sample's Information:

Site: Well Head
Preservative: HNO^3
Temperature: <4
Matrix: Water

Date Collected: 5/12/2008
Time Collected: 9:15:00 AM

Date Received: 5/12/2008
Time Received: 11:45:00 AM
Lab No.: J0804806-5009

Date Analyzed	Test Name	Result	MCL	Method
05/12/08	4-Chlorotoluene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Benzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Bromobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Bromochloromethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Bromodichloromethane	<0.5 ug/L	N/A	E 524.2
05/12/08	Bromoform	<0.5 ug/L	N/A	E 524.2
05/12/08	Bromomethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Carbon tetrachloride	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Chlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Chloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Chloroform	<0.5 ug/L	N/A	E 524.2
05/12/08	Chloromethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	cis-1,2-Dichloroethene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	cis-1,3-Dichloropropene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Dibromochloromethane	<0.5 ug/L	N/A	E 524.2
05/12/08	Dibromomethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Dichlorodifluoromethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Ethylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Hexachlorobutadiene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Isopropylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Methylene Chloride	<0.5 ug/L	N/A	E 524.2
05/12/08	MTBE	<0.5 ug/L	10 ug/L	E 524.2
05/12/08	Naphthalene	<0.5 ug/L	N/A	E 524.2
05/12/08	n-Butylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	n-Propylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	p-Isoproplytoluene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	sec-Butylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Styrene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	tert-Butylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Tetrachloroethene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Toluene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Total Trihalomethanes	<0.5 ug/L	80 ug/L	E 524.2

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Collector's Information:

Name: Joe
Address of site: Well #3
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City: Crawford
State: NY **Zip:**
Phone:

JMS ID: 069808

Sample's Information:

Site: Well Head
Preservative: HNO^3
Temperature: <4
Matrix: Water

Date Collected: 5/12/2008
Time Collected: 9:15:00 AM

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Lab No.: J0804806-5009

Date Analyzed	Test Name	Result	MCL	Method
05/12/08	Total Xylenes	<0.5 ug/L	15 ug/L	E 524.2
05/12/08	trans-1,2-Dichloroethene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	trans-1,3-Dichloropropene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Trichloroethene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Trichlorofluoromethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Vinyl chloride	<0.5 ug/L	5 ug/L	E 524.2
05/28/08	2,4,5-TP	ND	50 ug/L	EPA 515.1
05/28/08	2,4-D	ND	70 ug/L	EPA 515.1
05/28/08	Dalapon	ND	200 ug/L	EPA 515.1
05/28/08	Dicamba	ND	N/A	EPA 515.1
05/28/08	Dinoseb	ND	7 ug/L	EPA 515.1
05/28/08	Pentachlorophenol	ND	1 ug/L	EPA 515.1
05/28/08	Picloram	ND	500 ug/L	EPA 515.1
05/16/08	Dioxin	ND		1613B
05/15/08	Beryllium	0.05 ppm	4 ppm	200.7/6010
05/15/08	Chromium	0.05 ppm	100 ppm	200.7/6010
05/15/08	Silver	0.05 ppm	100 ppm	200.7/6010
05/15/08	Thallium	0.05 ug/L	2 ug/L	200.9
05/15/08	Arsenic	0.01 ug/L	10 ug/L	206.2
05/15/08	Antimony	0.05 ppm	N/A	6010/200.7
05/15/08	Selenium	0.05 ppm	N/A	6010/200.7
05/15/08	Barium	0.13 ppm	N/A	6010/E200.7
05/15/08	Cadmium	0.05 ppm	N/A	6010/E200.7
05/15/08	Mercury	<0.0005 ppm	N/A	7470/E245.1
05/29/08	Total Cyanide	<0.01 ppm	N/A	9010/335.3
05/26/08	Endothall	ND	100 ug/L	EPA 548
05/20/08	Glyphosate	ND	700 ug/L	EPA547
05/29/08	Diquat	ND	20 ug/L	EPA549
05/12/08	Color	5 Units	15 Units	SMWW 2120 B
05/12/08	**Turbidity**	***5.37 ntu**	**5 ntu**	**SMWW 2130 B**

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State: NY **Zip:** 10512
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Collector's Information:

Name: Joe
Address of site: Well #3
Darkill
City: Crawford
State: NY **Zip:**
Phone:

JMS ID: 069808

Sample's Information:

Site: Well Head
Preservative: HNO^3
Temperature: <4
Matrix: Water

Date Collected: 5/12/2008
Time Collected: 9:15:00 AM

Date Received: 5/12/2008
Time Received: 11:45:00 AM
Lab No.: J0804806-5009

Date Analyzed	Test Name	Result	MCL	Method
05/12/08	Odor	ND	3 TON	SMWW 2150 B
05/15/08	Hardness	162 mg/L	N/A	SMWW 2340 C
05/15/08	Copper	<0.05 ppm	1.3 ppm	SMWW 3111B
05/15/08	Iron	0.157 ppm	0.3 ppm	SMWW 3111B
05/15/08	**Manganese**	***0.088 ppm**	**0.05 ppm**	**SMWW 3111B**
05/15/08	Nickel	<0.05 ppm	0.1 ppm	SMWW 3111B
05/15/08	Sodium	10.4 ppm	28 ppm	SMWW 3111B
05/15/08	Zinc	<0.05 ppm	N/A	SMWW 3111B
05/16/08	Pb	1.09 ppb	15 ppb	SMWW 3113 B
05/12/08	Chloride	16.1 ppm	250 ppm	SMWW 4110 B
05/12/08	Nitrate	0.57 ppm	10 ppm	SMWW 4110 B
05/12/08	Nitrite	<0.05 ppm	1 ppm	SMWW 4110 B
05/12/08	Sulfate	25.3 ppm	250 ppm	SMWW 4110 B
05/15/08	Fluoride	0.2 mg/L	4 mg/L	SMWW 4500 F B,D
05/12/08	pH		6.4-10 S.U.	SMWW 4500 H B
05/12/08	Chlorine Free Residual	<0.1 mg/L	N/A	SMWW 4500CIG
05/12/08	E. Coli	Absent	Absent	SMWW 9223 B
05/12/08	Total Coliform	Absent	Absent	SMWW 9223 B
05/22/08	PCB-1016	ND	N/A	EPA 508
05/22/08	PCB-1221	ND	N/A	EPA 508
05/22/08	PCB-1232	ND	N/A	EPA 508
05/22/08	PCB-1242	ND	N/A	EPA 508
05/22/08	PCB-1248	ND	N/A	EPA 508
05/22/08	PCB-1254	ND	N/A	EPA 508
05/22/08	PCB-1260	ND	N/A	EPA 508
05/22/08	Total PCB's	ND	0.5 ug/L	EPA 508
05/30/08	Alachlor (lasso)	ND	2 ug/L	EPA 525
05/30/08	Aldrin	ND	N/A	EPA 525
05/30/08	Atrazine	ND	3 ug/L	EPA 525
05/30/08	Benzo(a)pyrene	ND	330 ug/L	EPA 525

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City: Carmel
State: NY **Zip:** 10512
Phone: (845) 225-3196 **Fax:** (845) 225-8420

Collector's Information:

Name: Joe
Address of site: Well #3
Darkill
City: Crawford
State: NY **Zip:**
Phone:

JMS ID: 069808

Sample's Information:

Site: Well Head
Preservative: HNO^3
Temperature: <4
Matrix: Water

Date Collected: 5/12/2008
Time Collected: 9:15:00 AM

Date Received: 5/12/2008
Time Received: 11:45:00 AM
Lab No.: J0804806-5009

Date Analyzed	Test Name	Result	MCL	Method
05/30/08	Di-(2-ethylhexyl)adipate	ND	400 ug/L	EPA 525
05/30/08	Di-(2-ethylhexyl)phthalate	ND	6 ug/L	EPA 525
05/30/08	Dieldrin	ND	N/A	EPA 525
05/30/08	Endrin	ND	2 ug/L	EPA 525
05/30/08	Heptachlor	ND	0.4 ug/L	EPA 525
05/30/08	Heptachlor epoxide	ND	0.2 ug/L	EPA 525
05/30/08	Hexachlorobenzene	ND	1 ug/L	EPA 525
05/30/08	Hexachlorocyclopentadiene	ND	50 ug/L	EPA 525
05/30/08	Lindane (gamma -BHC)	ND	0.2 ug/L	EPA 525
05/30/08	Methoxychlor	ND	40 ug/L	EPA 525
05/30/08	Metolachlor (Dual)	ND	N/A	EPA 525
05/30/08	Metribuzin (Sencor)	ND	N/A	EPA 525
05/30/08	Propachlor	ND	N/A	EPA 525
05/30/08	Simazine	ND	4 ug/L	EPA 525

Comments: ***ABOVE MCL**
At the time of the analysis the sample was Acceptable for Total Coliform
At the time of the analysis the sample was Acceptable for E. Coli

CFU = Coliform Forming Units
N/A = Not Applicable
ppb = parts per billion
TON = Threshold Odor Number
MCL = Maximum Contaminant Level
ND = None Detected
ppm = parts per million
ug/L = micrograms per liter
mg/L = milligrams per Liter
ntu = Nephelopmetric Turbidity Unit
S.U. = Standard Unit
Units = Units

Signature: Michael Lapman
Michael Lapman
President

Reviewed By: Sharon Houlahan
Sharon Houlahan, Director

State #: PH-0218 ELAP #: 11715 Ref Lab(s): 11301

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Boyd Artesian Well Co

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Address: 1054 Rte 52
City: Carmel
State: NY **Zip:** 10512
Phone: (845) 225-3196 **Fax:** (845) 225-8420

Collector's Information:

Name: Joe
Address of site: Well #3
Karkill
City: Crawford
State: NY **Zip:**
Phone:

JMS ID: 071948

Sample's Information:

Site: Well Head
Preservative: N/A
Temperature: <4
Matrix: Water

Date Collected: 5/12/2008
Time Collected: 9:15:00 AM

Date Received: 5/12/2008
Time Received: 11:45:00 AM
Lab No.: J0805009

Date Analyzed	Test Name	Result	MCL	Method
05/22/08	Asbestos	<4.28 MFL		EPA 600/4-83-043
05/30/08	Alkalinity	170 mg/L	N/A	SMWW 2320 B

MCL = Maximum Contaminant Level **MFL = Million Fibers per Liter** **mg/L = milligrams per Liter**
N/A = Not Applicable

Signature: Michael Lapman
Michael Lapman
President

Reviewed By: Sharon Houlahan
Sharon Houlahan, Director

State #: PH-0218 ELAP #: 11715

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Mailing Information:

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Address: 1054 Rte 52
City: Carmel
State: NY **Zip:** 10512
Phone: (845) 225-3196 **Fax:** (845) 225-8420

Collector's Information:

Name: Joe
Address of site: Well #3 Rarkill
City: Crawford
State: NY **Zip:**
Phone:

JMS ID: 071948

Sample's Information:

Site: Well Head
Preservative: N/A
Temperature: <4
Matrix: Water
Date Collected: 5/12/2008
Time Collected: 9:15:00 AM
Date Received: 5/12/2008
Time Received: 11:45:00 AM
Lab No.: J0805009

Date Analyzed	Test Name	Result	MCL	Method
05/22/08	Asbestos	<4.28 MFL		EPA 600/4-83-043
05/30/08	Alkalinity	170 mg/L	N/A	SMWW 2320 B

MCL = Maximum Contaminant Level
N/A = Not Applicable
MFL = Million Fibers per Liter
mg/L = milligrams per Liter

Signature: Michael Lapman
Michael Lapman
President

Reviewed By: Sharon Houlahan
Sharon Houlahan, Director

State #: PH-0218 ELAP #: 11715

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Sample's Information:

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Matrix: Water

Date Collected: 5/12/2008
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Date Analyzed	Test Name	Result	MCL	Method
05/28/08	3-Hydroxycarbofuran	ND	N/A	EPA 531
05/28/08	Aldicarb	ND	3 ug/L	EPA 531
05/28/08	Aldicarb Sulfone	ND	2 ug/L	EPA 531
05/28/08	Aldicarb Sulfoxide	ND	4 ug/L	EPA 531
05/28/08	Carbaryl	ND	N/A	EPA 531
05/28/08	Carbofuran	ND	40 ug/L	EPA 531
05/28/08	Methomyl	ND	N/A	EPA 531
05/28/08	Oxamyl (Vydate)	ND	200 ug/L	EPA 531
05/24/08	1,2-Dibromo-3-Chloropropane	ND	N/A	EPA 504.1
05/24/08	1,2-Dibromoethane(EDB)	ND	N/A	EPA 504.1
05/12/08	1,1,1,2-tetrachloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1,1-Trichloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1,2,2-Tetrachloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1,2-Trichloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1-Dichloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1-Dichloroethene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,1-Dichloropropene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2,3-Trichlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2,3-Trichloropropane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2,4-Trichlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2,4-Trimethylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2-Dichlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2-Dichloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,2-Dichloropropane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,3,5-Trimethylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,3-Dichlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,3-Dichloropropane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	1,4-Dichlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	2,2-Dichloropropane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	2-Chlorotoluene	<0.5 ug/L	5 ug/L	E 524.2

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Lab No.: J0804806-5009

Date Analyzed	Test Name	Result	MCL	Method
05/12/08	4-Chlorotoluene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Benzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Bromobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Bromochloromethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Bromodichloromethane	<0.5 ug/L	N/A	E 524.2
05/12/08	Bromoform	<0.5 ug/L	N/A	E 524.2
05/12/08	Bromomethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Carbon tetrachloride	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Chlorobenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Chloroethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Chloroform	<0.5 ug/L	N/A	E 524.2
05/12/08	Chloromethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	cis-1,2-Dichloroethene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	cis-1,3-Dichloropropene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Dibromochloromethane	<0.5 ug/L	N/A	E 524.2
05/12/08	Dibromomethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Dichlorodifluoromethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Ethylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Hexachlorobutadiene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Isopropylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Methylene Chloride	<0.5 ug/L	N/A	E 524.2
05/12/08	MTBE	<0.5 ug/L	10 ug/L	E 524.2
05/12/08	Naphthalene	<0.5 ug/L	N/A	E 524.2
05/12/08	n-Butylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	n-Propylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	p-Isoproplytoluene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	sec-Butylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Styrene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	tert-Butylbenzene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Tetrachloroethene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Toluene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Total Trihalomethanes	<0.5 ug/L	80 ug/L	E 524.2

JMS Environmental Services, Inc.
WATER, SOIL AND AIR ANALYSIS
41 Kenosia Avenue
Danbury, Connecticut 06810 | Telephone 203-798-2229

Boyd Artesian Well Co

Mailing Information:

Name: Boyd Artesian Well Co
Address: 1054 Rte 52
City: Carmel
State: NY **Zip:** 10512
Phone: (845) 225-3196 **Fax:** (845) 225-8420

Collector's Information:

Name: Joe
Address of site: Well #3 Darkill
City: Crawford
State: NY **Zip:**
Phone:

JMS ID: 069808

Sample's Information:

Site: Well Head
Preservative: HNO^3
Temperature: <4
Matrix: Water

Date Collected: 5/12/2008
Time Collected: 9:15:00 AM

Date Received: 5/12/2008
Time Received: 11:45:00 AM
Lab No.: J0804806-5009

Date Analyzed	Test Name	Result	MCL	Method
05/12/08	Total Xylenes	<0.5 ug/L	15 ug/L	E 524.2
05/12/08	trans-1,2-Dichloroethene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	trans-1,3-Dichloropropene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Trichloroethene	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Trichlorofluoromethane	<0.5 ug/L	5 ug/L	E 524.2
05/12/08	Vinyl chloride	<0.5 ug/L	5 ug/L	E 524.2
05/28/08	2,4,5-TP	ND	50 ug/L	EPA 515.1
05/28/08	2,4-D	ND	70 ug/L	EPA 515.1
05/28/08	Dalapon	ND	200 ug/L	EPA 515.1
05/28/08	Dicamba	ND	N/A	EPA 515.1
05/28/08	Dinoseb	ND	7 ug/L	EPA 515.1
05/28/08	Pentachlorophenol	ND	1 ug/L	EPA 515.1
05/28/08	Picloram	ND	500 ug/L	EPA 515.1
05/16/08	Dioxin	ND		1613B
05/15/08	Beryllium	0.05 ppm	4 ppm	200.7/6010
05/15/08	Chromium	0.05 ppm	100 ppm	200.7/6010
05/15/08	Silver	0.05 ppm	100 ppm	200.7/6010
05/15/08	Thallium	0.05 ug/L	2 ug/L	200.9
05/15/08	Arsenic	0.01 ug/L	10 ug/L	206.2
05/15/08	Antimony	0.05 ppm	N/A	6010/200.7
05/15/08	Selenium	0.05 ppm	N/A	6010/200.7
05/15/08	Barium	0.13 ppm	N/A	6010/E200.7
05/15/08	Cadmium	0.05 ppm	N/A	6010/E200.7
05/15/08	Mercury	<0.0005 ppm	N/A	7470/E245.1
05/29/08	Total Cyanide	<0.01 ppm	N/A	9010/335.3
05/26/08	Endothall	ND	100 ug/L	EPA 548
05/20/08	Glyphosate	ND	700 ug/L	EPA547
05/29/08	Diquat	ND	20 ug/L	EPA549
05/12/08	Color	5 Units	15 Units	SMWW 2120 B
05/12/08	**Turbidity**	***5.37 ntu**	**5 ntu**	**SMWW 2130 B**

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Address: 1054 Rte 52
City: Carmel
State: NY **Zip:** 10512
Phone: (845) 225-3196 **Fax:** (845) 225-8420

Collector's Information:

Name: Joe
Address of site: Well #3 Darkill
City: Crawford
State: NY **Zip:**
Phone:

JMS ID: 069808

Sample's Information:

Site: Well Head
Preservative: HNO^3
Temperature: <4
Matrix: Water

Date Collected: 5/12/2008
Time Collected: 9:15:00 AM

Date Received: 5/12/2008
Time Received: 11:45:00 AM
Lab No.: J0804806-5009

Date Analyzed	Test Name	Result	MCL	Method
05/12/08	Odor	ND	3 TON	SMWW 2150 B
05/15/08	Hardness	162 mg/L	N/A	SMWW 2340 C
05/15/08	Copper	<0.05 ppm	1.3 ppm	SMWW 3111B
05/15/08	Iron	0.157 ppm	0.3 ppm	SMWW 3111B
05/15/08	**Manganese**	***0.088 ppm**	**0.05 ppm**	**SMWW 3111B**
05/15/08	Nickel	<0.05 ppm	0.1 ppm	SMWW 3111B
05/15/08	Sodium	10.4 ppm	28 ppm	SMWW 3111B
05/15/08	Zinc	<0.05 ppm	N/A	SMWW 3111B
05/16/08	Pb	1.09 ppb	15 ppb	SMWW 3113 B
05/12/08	Chloride	16.1 ppm	250 ppm	SMWW 4110 B
05/12/08	Nitrate	0.57 ppm	10 ppm	SMWW 4110 B
05/12/08	Nitrite	<0.05 ppm	1 ppm	SMWW 4110 B
05/12/08	Sulfate	25.3 ppm	250 ppm	SMWW 4110 B
05/15/08	Fluoride	0.2 mg/L	4 mg/L	SMWW 4500 F B,D
05/12/08	pH		6.4-10 S.U.	SMWW 4500 H B
05/12/08	Chlorine Free Residual	<0.1 mg/L	N/A	SMWW 4500CIG
05/12/08	E. Coli	Absent	Absent	SMWW 9223 B
05/12/08	Total Coliform	Absent	Absent	SMWW 9223 B
05/22/08	PCB-1016	ND	N/A	EPA 508
05/22/08	PCB-1221	ND	N/A	EPA 508
05/22/08	PCB-1232	ND	N/A	EPA 508
05/22/08	PCB-1242	ND	N/A	EPA 508
05/22/08	PCB-1248	ND	N/A	EPA 508
05/22/08	PCB-1254	ND	N/A	EPA 508
05/22/08	PCB-1260	ND	N/A	EPA 508
05/22/08	Total PCB's	ND	0.5 ug/L	EPA 508
05/30/08	Alachlor (lasso)	ND	2 ug/L	EPA 525
05/30/08	Aldrin	ND	N/A	EPA 525
05/30/08	Atrazine	ND	3 ug/L	EPA 525
05/30/08	Benzo(a)pyrene	ND	330 ug/L	EPA 525

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Address: 1054 Rte 52
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State: NY **Zip:** 10512
Phone: (845) 225-3196 **Fax:** (845) 225-8420

Collector's Information:
Name: Joe
Address of site: Well #3
Darkill
City: Crawford
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Phone:

JMS ID: 069808

Sample's Information:

Site: Well Head
Preservative: HNO^3
Temperature: <4
Matrix: Water

Date Collected: 5/12/2008
Time Collected: 9:15:00 AM

Date Received: 5/12/2008
Time Received: 11:45:00 AM
Lab No.: J0804806-5009

Date Analyzed	Test Name	Result	MCL	Method
05/30/08	Di-(2-ethylhexyl)adipate	ND	400 ug/L	EPA 525
05/30/08	Di-(2-ethylhexyl)phthalate	ND	6 ug/L	EPA 525
05/30/08	Dieldrin	ND	N/A	EPA 525
05/30/08	Endrin	ND	2 ug/L	EPA 525
05/30/08	Heptachlor	ND	0.4 ug/L	EPA 525
05/30/08	Heptachlor epoxide	ND	0.2 ug/L	EPA 525
05/30/08	Hexachlorobenzene	ND	1 ug/L	EPA 525
05/30/08	Hexachlorocyclopentadiene	ND	50 ug/L	EPA 525
05/30/08	Lindane (gamma -BHC)	ND	0.2 ug/L	EPA 525
05/30/08	Methoxychlor	ND	40 ug/L	EPA 525
05/30/08	Metolachlor (Dual)	ND	N/A	EPA 525
05/30/08	Metribuzin (Sencor)	ND	N/A	EPA 525
05/30/08	Propachlor	ND	N/A	EPA 525
05/30/08	Simazine	ND	4 ug/L	EPA 525

Comments: *ABOVE MCL
At the time of the analysis the sample was Acceptable for Total Coliform
At the time of the analysis the sample was Acceptable for E. Coli

CFU = Coliform Forming Units
N/A = Not Applicable
ppb = parts per billion
TON = Threshold Odor Number
MCL = Maximum Contaminant Level
ND = None Detected
ppm = parts per million
ug/L = micrograms per liter
mg/L = milligrams per Liter
ntu = Nephelopmetric Turbidity Unit
S.U. = Standard Unit
Units = Units

Signature: Michael Lapman
Michael Lapman
President

Reviewed By: Sharon Houlahan
Sharon Houlahan, Director

State #: PH-0218 ELAP #: 11715 Ref Lab(s): 11301

OCL Analytical Services
35 Goshen Turnpike
Bloomingburg NY 12721

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Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/22/2009
Date Received 12/17/2008
Date Complete 1/22/2009

Sample Number 245483-01
Federal ID
Description
Location Dwarkill Well 4
Sample Point

Date Sampled 12/17/08 15:00
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
502.2 NY VOCs								
1,1,1,2-Tetrachloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1,1-Trichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1,2,2-Tetrachloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1,2-Trichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1-Dichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1-Dichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1-Dichloropropene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,3-Trichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,3-Trichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,4-Trichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,4-Trimethylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2-Dichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2-Dichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2-Dichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,3,5-Trimethylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,3-Dichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,3-Dichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,4-Dichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
2,2-Dichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
2-Chlorotoluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
4-Chlorotoluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Benzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Bromobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Bromochloromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Bromomethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Carbon tetrachloride	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	

OCL Analytical Services
35 Goshen Turnpike
Bloomingburg NY 12721

Phone 845-733-1557
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Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/22/2009
Date Received 12/17/2008
Date Complete 1/22/2009

Sample Number 245483-01
Federal ID
Description
Location Dwarkill Well 4
Sample Point

Date Sampled 12/17/08 15:00
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
502.2 NY VOCs								
Chlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Chloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Chloromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Dibromomethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Dichlorodifluoromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Ethylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Hexachlorobutadiene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Isopropylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Methyl tert-butyl ether	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Methylene chloride	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Styrene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Tetrachloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Toluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Trichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Trichlorofluoromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Vinyl chloride	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
cis-1,2-Dichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
cis-1,3-Dichloropropene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
m,p-Xylene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
n-Butylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
n-Propylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
o-Xylene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
p-Isopropyltoluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
sec-Butylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
tert-Butylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
trans-1,2-Dichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	

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Certificate of Analysis

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1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/22/2009
Date Received 12/17/2008
Date Complete 1/22/2009

Sample Number 245483-01
Federal ID
Description
Location Dwarkill Well 4
Sample Point

Date Sampled 12/17/08 15:00
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
502.2 NY VOCs								
trans-1,3-Dichloropropene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
504.1 EDB/DBCP								
1,2-Dibromo-3-chloropropane	< 0.00001	mg/L	EPA 504.1	0.0002	12/22/08 16:46	12/22/08 16:46	CPH-SA	
1,2-Dibromoethane (EDB)	< 0.00001	mg/L	EPA 504.1	0.00005	12/22/08 16:46	12/22/08 16:46	CPH-SA	
508 SOC PestPCBs								
Chlordane (tech)	< 0.00010	mg/L	EPA 508	0.002	12/23/08 15:02	12/23/08 15:02	CPH-SA	
PCBs as Aroclors (screen)	Absent	mg/L	EPA 508	0.0005	12/23/08 15:02	12/23/08 15:02	CPH-SA	
Toxaphene	< 0.00025	mg/L	EPA 508	0.003	12/23/08 15:02	12/23/08 15:02	CPH-SA	
515.3 NY Herb								
2,4,5-TP (Silvex)	< 0.0003	mg/L	EPA 515.3	0.01	12/30/08 10:03	12/30/08 10:03	ASC-CV	
2,4-D	< 0.0005	mg/L	EPA 515.3	0.05	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Dalapon	< 0.0030	mg/L	EPA 515.3	0.2	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Dicamba	< 0.0003	mg/L	EPA 515.3		12/30/08 10:03	12/30/08 10:03	ASC-CV	
Dinoseb	< 0.0005	mg/L	EPA 515.3	0.007	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Pentachlorophenol	< 0.0003	mg/L	EPA 515.3	0.001	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Picloram	< 0.0003	mg/L	EPA 515.3	0.5	12/30/08 10:03	12/30/08 10:03	ASC-CV	
525.2 SVOC								
Alachlor	< 0.00011	mg/L	EPA 525.2	0.002	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Aldrin	< 0.00011	mg/L	EPA 525.2	0.005	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Atrazine	< 0.00011	mg/L	EPA 525.2	0.003	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Benzo (a) pyrene	< 0.00011	mg/L	EPA 525.2	0.0002	12/31/08 21:15	12/31/08 21:15	RHH-SA	S
Butachlor	< 0.00110	mg/L	EPA 525.2	0.05	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Di(2-ethylhexyl)adipate	< 0.00220	mg/L	EPA 525.2	0.4	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Di(2-ethylhexyl)phthalate	< 0.00220	mg/L	EPA 525.2	0.006	12/31/08 21:15	12/31/08 21:15	RHH-SA	

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Project
Date Reported 1/22/2009
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Date Complete 1/22/2009

Sample Number 245483-01
Federal ID
Description
Location Dwarkill Well 4
Sample Point

Date Sampled 12/17/08 15:00
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
525.2 SVOC								
Dieldrin	< 0.00011	mg/L	EPA 525.2	0.005	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Endrin	< 0.00011	mg/L	EPA 525.2	0.002	12/31/08 21:15	12/31/08 21:15	RHH-SA	
HCH-gamma (Lindane)	< 0.00011	mg/L	EPA 525.2	0.0002	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Heptachlor	< 0.00011	mg/L	EPA 525.2	0.0004	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Heptachlor epoxide	< 0.00011	mg/L	EPA 525.2	0.0002	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Hexachlorobenzene	< 0.00011	mg/L	EPA 525.2	0.001	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Hexachlorocyclopentadiene	< 0.00011	mg/L	EPA 525.2	0.05	12/31/08 21:15	12/31/08 21:15	RHH-SA	S
Methoxychlor	< 0.00011	mg/L	EPA 525.2	0.04	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Metolachlor	< 0.00110	mg/L	EPA 525.2	0.05	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Metribuzin	< 0.00110	mg/L	EPA 525.2	0.05	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Propachlor	< 0.00110	mg/L	EPA 525.2	0.05	12/31/08 21:15	12/31/08 21:15	RHH-SA	
Simazine	< 0.00011	mg/L	EPA 525.2	0.004	12/31/08 21:15	12/31/08 21:15	RHH-SA	
531.1 Carbamates								
3-Hydroxycarbofuran	< 0.00100	mg/L	EPA 531.1		01/03/09 5:00	01/03/09 5:00	IC-SA	
Aldicarb	< 0.00100	mg/L	EPA 531.1	0.003	01/03/09 5:00	01/03/09 5:00	IC-SA	
Aldicarb sulfone	< 0.00100	mg/L	EPA 531.1	0.002	01/03/09 5:00	01/03/09 5:00	IC-SA	
Aldicarb sulfoxide	< 0.00100	mg/L	EPA 531.1	0.004	01/03/09 5:00	01/03/09 5:00	IC-SA	
Carbaryl	< 0.00100	mg/L	EPA 531.1		01/03/09 5:00	01/03/09 5:00	IC-SA	
Carbofuran	< 0.00100	mg/L	EPA 531.1	0.04	01/03/09 5:00	01/03/09 5:00	IC-SA	
Methomyl	< 0.00100	mg/L	EPA 531.1		01/03/09 5:00	01/03/09 5:00	IC-SA	
Oxamyl	< 0.00100	mg/L	EPA 531.1	0.2	01/03/09 5:00	01/03/09 5:00	IC-SA	
547 Glyphosate								
Glyphosate	< 0.01	mg/L	EPA 547	0.7	12/31/08 0:00	12/31/08 0:00	PLI	
548.1 Endothall								
Endothall	< 9.00	ug/L	EPA 548.1	0.1	12/30/08 0:00	12/30/08 0:00	PLI	H

OCL Analytical Services
35 Goshen Turnpike
Bloomingburg NY 12721

Phone 845-733-1557
Fax 845-733-1944
Web oclanalytical.com

Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/22/2009
Date Received 12/17/2008
Date Complete 1/22/2009

Sample Number 245483-01
Federal ID
Description
Location Dwarkill Well 4
Sample Point

Date Sampled 12/17/08 15:00
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
549.2 Diquat								
Diquat	< 0.0008	mg/L	EPA 549.2	0.02	12/23/08 20:40	12/23/08 20:40	IC-SA	
Part V Inorganics								
Total coliform (ONPG)	presence		9223B			12/17/08 16:30	KG	
E. coli	absence		9223B			12/17/08 16:30	KG	
Alkalinity as CaCO3	163	mg/L	2320B			12/22/08 0:00	LM	
Corrosivity Index (LI)	0.240		2330B			12/31/08 0:00	KG	
Color	<5.0		2120B	15		12/18/08 13:45	KG	
Chloride	12.0	mg/L	450Cl-C0	250		12/30/08 0:00	KG	
Fluoride	<0.200	mg/L	EPA 340.2	2.2		12/30/08 0:00	LM	
Hardness as CaCO3, Calcium	164	mg/L	3500CaD			12/18/08 11:45	LM	
Nitrate as N	<0.200	mg/L	Lachat	10		12/19/08 0:00	LM	
Nitrite as N	<0.0100	mg/L	EPA 354.1	1		12/18/08 11:20	KG	
Odor	5.0		2150	3		12/17/08 16:00	LM	
pH	7.80		4500H+B			12/17/08 16:15	KG	
Sulfate	36.0	mg/L	EPA 375.4	250		12/30/08 0:00	KG	
Solids, Dissolved Total	226	mg/L	2540C			12/18/08 0:00	KG	
Turbidity	15.0	mg/L	2130B			12/18/08 11:30	KG	
Cyanide (free)	< 0.010	mg/L	EPA 335.4	0.2	12/23/08 16:25	12/23/08 16:25	CMD-S	
Part V Metals								
Arsenic, As	< 0.0050	mg/L	EPA 200.8	0.01	12/31/08 12:46	12/31/08 12:46	JRA-CV	
Barium, Ba	0.124	mg/L	EPA 200.8	2.00	12/29/08 18:45	12/29/08 18:45	JRA-CV	
Cadmium, Cd	< 0.0006	mg/L	EPA 200.8	0.005	12/29/08 18:45	12/29/08 18:45	JRA-CV	
Chromium, Cr	< 0.0100	mg/L	EPA 200.8	0.10	12/31/08 12:46	12/31/08 12:46	JRA-CV	
Lead, Pb	< 0.0006	mg/L	EPA 200.8	0.015	12/29/08 18:45	12/29/08 18:45	JRA-CV	
Mercury, Hg	< 0.0002	mg/L	EPA 245.1	0.002	12/31/08 16:05	12/31/08 16:05	KW-CV	

CV - Benchmark Center Valley NELAP 11827 OCL NELAP 10510
SA - Benchmark Sayre NELAP 11216

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1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/22/2009
Date Received 12/17/2008
Date Complete 1/22/2009

Sample Number 245483-01
Federal ID
Description
Location Dwarkill Well 4
Sample Point

Date Sampled 12/17/08 15:00
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
Part V Metals								
Selenium, Se	< 0.0038	mg/L	EPA 200.8	0.05	12/31/08 12:46	12/31/08 12:46	JRA-CV	
Silver, Ag	< 0.0006	mg/L	EPA 200.8		12/29/08 18:45	12/29/08 18:45	JRA-CV	
Copper, Cu	0.0016	mg/L	EPA 200.8	1.3	12/31/08 12:46	12/31/08 12:46	JRA-CV	
Iron, Fe	0.659	mg/L	EPA 200.7	0.3	12/29/08 23:52	12/29/08 23:52	GSR-CV	X
Manganese, Mn	0.165	mg/L	EPA 200.7	0.3	12/30/08 20:24	12/30/08 20:24	GSR-CV	
Sodium, Na	11.9	mg/L	EPA 200.7		12/29/08 23:52	12/29/08 23:52	GSR-CV	
Zinc, Zn	0.010	mg/L	EPA 200.7		12/29/08 23:52	12/29/08 23:52	GSR-CV	
Antimony, Sb	< 0.0050	mg/L	EPA 200.8	0.006	12/29/08 18:45	12/29/08 18:45	JRA-CV	
Beryllium, Be	< 0.0006	mg/L	EPA 200.8	0.004	12/31/08 12:46	12/31/08 12:46	JRA-CV	QC
Nickel, Ni	0.0039	mg/L	EPA 200.8		12/31/08 12:46	12/31/08 12:46	JRA-CV	
Thallium, Tl	< 0.0006	mg/L	EPA 200.8	0.002	12/29/08 18:45	12/29/08 18:45	JRA-CV	
Radiologicals								
Gross Alpha	0.88	pCi/L	EPA 900.0	15	01/11/09 0:00	01/11/09 0:00	BPS-CV	
Gross Beta	1.54	pCi/L	EPA 900.0		01/11/09 0:00	01/11/09 0:00	BPS-CV	
Radium 226	0.13	pCi/L	EPA 903.0	5	01/13/09 0:00	01/13/09 0:00	BH-CV	
Radium 228	-0.17	pCi/L	EPA 904.0	5	01/15/09 0:00	01/15/09 0:00	KLE-CV	
Uranium, U	< 0.63	æg/L	EPA 200.8	30	12/29/08 20:09	12/29/08 20:09	JRA-CV	
Uranium (pci/L)	< 0.43	pCi/L	EPA 200.8		12/29/08 20:09	12/29/08 20:09	JRA-CV	

CV - Benchmark Center Valley NELAP 11827 OCL NELAP 10510
SA - Benchmark Sayre NELAP 11216

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Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project	
Date Reported	1/22/2009
Date Received	12/17/2008
Date Complete	1/22/2009

Sample Number	245483-01
Federal ID	
Description	
Location	Dwarkill Well 4
Sample Point	

Date Sampled	12/17/08 15:00
Sampler	J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers

Qualifiers
H = Holding times for preparation or analysis exceeded
S = Spike Recovery outside accepted recovery limits

Approved By David M Kennedy
David Kennedy
Technical Director

CV - Benchmark Center Valley NELAP 11827 OCL NELAP 10510
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Carmel, NY 10512

Project	
Date Reported	12/29/2008
Date Received	12/17/2008
Date Complete	12/29/2008

Sample Number	245447-01
Federal ID	
Description	
Location	Dwarkill Well 4
Sample Point	

Date Sampled	12/17/08 11:15
Sampler	Client

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
GIARDIA (cubit)								
Giardia/Cryptosporidia (Potab	see attached						OL	
MPA								
Microscopic Particulate Analys	see attached						OL	

Approved By David M Kennedy

David Kennedy
Technical Director

MOHAWK VALLEY WATER AUTHORITY

Final Result Report for
OCL ANALYTICAL SERVICES

Sample ID:	**12/17/08 OCL – BOYD WELL #4**
LIMS #:	**27037**
Client:	**#591 – OCL Analytical Services**
Source:	**Boyd Artesian Dwarkill Well #4**

Method 1623 QUALITY CONTROL

Weekly Method Blank	***Giardia* Count: 0**	***Cryptosporidium* Count: 0**
Weekly OPR Sample	***Giardia* % Recovery: 58.0**	***Cryptosporidium* % Recovery: 51.5**

SAMPLE RESULTS

	Method	Total FA Count	Volume Analyzed	# cysts/L
Giardia	EPA 1623	0	10.0 L	0.000
Cryptosporidium	EPA 1623	0	10.0 L	0.000

	Method	Result
MPA	NYSDOH Modified MPA	Negative *(see attached report)*

MATRIX SPIKE RESULTS

	# Spiked:	# Recovered:	% Recovery
Giardia	N/A		
Cryptosporidium	N/A		

Approved: Philip A. Tangorra

Philip A. Tangorra
QA Officer

1 Kennedy Plaza • PO Box 345 • Utica, NY 13503-0345 • Telephone (315) 792-0301 • Fax (315) 792-5201

MEMBER OF:
American Waterworks Association (AWWA) • AWWA Research Foundation • Underground Facilities Protective Organization

MVWA WATER QUALITY LABORATORY

One Kennedy Plaza
Utica, NY 13502

Phone: (315) 792-0338
Fax: (315) 792-5201

Report of Examination

Microscopic Examination for Microorganisms (MPA)

Sample : OCL- Boyd Artesian Well Dwarkill well 4
Sample Date: 12-17-08
Date completed: 12-22-08

Sample was analyzed using modified MPA and examined using phase contrast and epifluorescence microscopy.

10000.0 ml of the sample was examined.

Organisms seen:

No organisms were observed that exhibited characteristics of chlorophyll fluorescence.

Note:

Copious debris may have hindered the identification of organisms containing chlorophyll

A sample blank was prepared using distilled water and no organisms were observed in the blank.

A positive control culture of *Selenestrum sp* exhibited characteristics of chlorophyll fluorescence.

F-2

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Project
Date Reported 1/19/2009
Date Received 12/17/2008
Date Complete 1/19/2009

Sample Number 245484-01
Federal ID
Description
Location Dwarkill Well 5
Sample Point

Date Sampled 12/17/08 13:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
502.2 NY VOCs								
1,1,1,2-Tetrachloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1,1-Trichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1,2,2-Tetrachloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1,2-Trichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1-Dichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1-Dichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,1-Dichloropropene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,3-Trichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,3-Trichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,4-Trichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2,4-Trimethylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2-Dichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2-Dichloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,2-Dichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,3,5-Trimethylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,3-Dichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,3-Dichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
1,4-Dichlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
2,2-Dichloropropane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
2-Chlorotoluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
4-Chlorotoluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Benzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Bromobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Bromochloromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Bromomethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Carbon tetrachloride	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	

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Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/19/2009
Date Received 12/17/2008
Date Complete 1/19/2009

Sample Number 245484-01
Federal ID
Description
Location Dwarkill Well 5
Sample Point

Date Sampled 12/17/08 13:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
502.2 NY VOCs								
Chlorobenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Chloroethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Chloromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Dibromomethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Dichlorodifluoromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Ethylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Hexachlorobutadiene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Isopropylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Methyl tert-butyl ether	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Methylene chloride	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Styrene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Tetrachloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Toluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Trichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Trichlorofluoromethane	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
Vinyl chloride	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
cis-1,2-Dichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
cis-1,3-Dichloropropene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
m,p-Xylene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
n-Butylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
n-Propylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
o-Xylene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
p-Isopropyltoluene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
sec-Butylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
tert-Butylbenzene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
trans-1,2-Dichloroethene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	

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1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/19/2009
Date Received 12/17/2008
Date Complete 1/19/2009

Sample Number 245484-01
Federal ID
Description
Location Dwarkill Well 5
Sample Point

Date Sampled 12/17/08 13:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
502.2 NY VOCs								
trans-1,3-Dichloropropene	< 0.0005	mg/L	EPA 524.2	.005	12/24/08 20:16	12/24/08 20:16	MTB-C	
504.1 EDB/DBCP								
1,2-Dibromo-3-chloropropane	< 0.00001	mg/L	EPA 504.1	0.0002	12/22/08 16:12	12/22/08 16:12	CPH-SA	
1,2-Dibromoethane (EDB)	< 0.00001	mg/L	EPA 504.1	0.00005	12/22/08 16:12	12/22/08 16:12	CPH-SA	
508 SOC PestPCBs								
Chlordane (tech)	< 0.00010	mg/L	EPA 508	0.002	12/30/08 9:06	12/30/08 9:06	CPH-SA	
PCBs as Aroclors (screen)	Absent	mg/L	EPA 508	0.0005	12/30/08 9:06	12/30/08 9:06	CPH-SA	
Toxaphene	< 0.00026	mg/L	EPA 508	0.003	12/30/08 9:06	12/30/08 9:06	CPH-SA	
515.3 NY Herb								
2,4,5-TP (Silvex)	< 0.0003	mg/L	EPA 515.3	0.01	12/30/08 10:03	12/30/08 10:03	ASC-CV	
2,4-D	< 0.0005	mg/L	EPA 515.3	0.05	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Dalapon	< 0.0030	mg/L	EPA 515.3	0.2	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Dicamba	< 0.0003	mg/L	EPA 515.3		12/30/08 10:03	12/30/08 10:03	ASC-CV	
Dinoseb	< 0.0005	mg/L	EPA 515.3	0.007	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Pentachlorophenol	< 0.0003	mg/L	EPA 515.3	0.001	12/30/08 10:03	12/30/08 10:03	ASC-CV	
Picloram	< 0.0003	mg/L	EPA 515.3	0.5	12/30/08 10:03	12/30/08 10:03	ASC-CV	
525.2 SVOC								
Alachlor	< 0.00011	mg/L	EPA 525.2	0.002	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Aldrin	< 0.00011	mg/L	EPA 525.2	0.005	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Atrazine	< 0.00011	mg/L	EPA 525.2	0.003	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Benzo (a) pyrene	< 0.00011	mg/L	EPA 525.2	0.0002	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Butachlor	< 0.00106	mg/L	EPA 525.2	0.05	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Di(2-ethylhexyl)adipate	< 0.00213	mg/L	EPA 525.2	0.4	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Di(2-ethylhexyl)phthalate	< 0.00213	mg/L	EPA 525.2	0.006	12/31/08 20:40	12/31/08 20:40	RHH-SA	

CV - Benchmark Center Valley NELAP 11827 OCL NELAP 10510
SA - Benchmark Sayre NELAP 11216

OCL Analytical Services
35 Goshen Turnpike
Bloomingburg NY 12721

Phone 845-733-1557
Fax 845-733-1944
Web oclanalytical.com

Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/19/2009
Date Received 12/17/2008
Date Complete 1/19/2009

Sample Number 245484-01
Federal ID
Description
Location Dwarkill Well 5
Sample Point

Date Sampled 12/17/08 13:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
525.2 SVOC								
Dieldrin	< 0.00011	mg/L	EPA 525.2	0.005	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Endrin	< 0.00011	mg/L	EPA 525.2	0.002	12/31/08 20:40	12/31/08 20:40	RHH-SA	
HCH-gamma (Lindane)	< 0.00011	mg/L	EPA 525.2	0.0002	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Heptachlor	< 0.00011	mg/L	EPA 525.2	0.0004	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Heptachlor epoxide	< 0.00011	mg/L	EPA 525.2	0.0002	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Hexachlorobenzene	< 0.00011	mg/L	EPA 525.2	0.001	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Hexachlorocyclopentadiene	< 0.00011	mg/L	EPA 525.2	0.05	12/31/08 20:40	12/31/08 20:40	RHH-SA	S
Methoxychlor	< 0.00011	mg/L	EPA 525.2	0.04	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Metolachlor	< 0.00106	mg/L	EPA 525.2	0.05	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Metribuzin	< 0.00106	mg/L	EPA 525.2	0.05	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Propachlor	< 0.00106	mg/L	EPA 525.2	0.05	12/31/08 20:40	12/31/08 20:40	RHH-SA	
Simazine	< 0.00011	mg/L	EPA 525.2	0.004	12/31/08 20:40	12/31/08 20:40	RHH-SA	
531.1 Carbamates								
3-Hydroxycarbofuran	< 0.00100	mg/L	EPA 531.1		01/03/09 5:00	01/03/09 5:00	IC-SA	
Aldicarb	< 0.00100	mg/L	EPA 531.1	0.003	01/03/09 5:00	01/03/09 5:00	IC-SA	
Aldicarb sulfone	< 0.00100	mg/L	EPA 531.1	0.002	01/03/09 5:00	01/03/09 5:00	IC-SA	
Aldicarb sulfoxide	< 0.00100	mg/L	EPA 531.1	0.004	01/03/09 5:00	01/03/09 5:00	IC-SA	
Carbaryl	< 0.00100	mg/L	EPA 531.1		01/03/09 5:00	01/03/09 5:00	IC-SA	
Carbofuran	< 0.00100	mg/L	EPA 531.1	0.04	01/03/09 5:00	01/03/09 5:00	IC-SA	
Methomyl	< 0.00100	mg/L	EPA 531.1		01/03/09 5:00	01/03/09 5:00	IC-SA	
Oxamyl	< 0.00100	mg/L	EPA 531.1	0.2	01/03/09 5:00	01/03/09 5:00	IC-SA	
547 Glyphosate								
Glyphosate	< 0.01	mg/L	EPA 547	0.7	12/31/08 0:00	12/31/08 0:00	PLI	
548.1 Endothall								
Endothall	< 9.00	ug/L	EPA 548.1	0.1	12/30/08 0:00	12/30/08 0:00	PLI	H

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Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/19/2009
Date Received 12/17/2008
Date Complete 1/19/2009

Sample Number 245484-01
Federal ID
Description
Location Dwarkill Well 5
Sample Point

Date Sampled 12/17/08 13:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
549.2 Diquat								
Diquat	< 0.0008	mg/L	EPA 549.2	0.02	12/23/08 20:40	12/23/08 20:40	IC-SA	
Part V Inorganics								
Total coliform (ONPG)	presence		9223B			12/17/08 16:30	KG	
E. coli	absence		9223B			12/17/08 16:30	KG	
Alkalinity as CaCO3	168	mg/L	2320B			12/22/08 0:00	LM	
Corrosivity Index (LI)	0.340		2330B			12/31/08 0:00	KG	
Color	<5.0		2120B	15		12/18/08 13:45	KG	
Chloride	10.0	mg/L	450Cl-C0	250		12/30/08 0:00	KG	
Fluoride	<0.200	mg/L	EPA 340.2	2.2		12/30/08 0:00	LM	
Hardness as CaCO3, Calcium	176	mg/L	3500CaD			12/18/08 11:45	LM	
Nitrate as N	<0.200	mg/L	Lachat	10		12/19/08 0:00	LM	
Nitrite as N	<0.0100	mg/L	EPA 354.1	1		12/18/08 11:20	KG	
Odor	10		2150	3		12/17/08 16:00	LM	
pH	7.86		4500H+B			12/17/08 16:15	KG	
Sulfate	30.0	mg/L	EPA 375.4	250		12/30/08 0:00	KG	
Solids, Dissolved Total	236	mg/L	2540C			12/18/08 0:00	KG	
Turbidity	0.930	mg/L	2130B			12/18/08 11:30	KG	
Cyanide (free)	< 0.010	mg/L	EPA 335.4	0.2	12/23/08 16:25	12/23/08 16:25	CMD-S	
Part V Metals								
Arsenic, As	0.0015	mg/L	EPA 200.8	0.01	12/29/08 13:28	12/29/08 13:28	JRA-CV	
Barium, Ba	0.131	mg/L	EPA 200.8	2.00	12/30/08 15:07	12/30/08 15:07	JRA-CV	
Cadmium, Cd	< 0.0005	mg/L	EPA 200.8	0.005	12/29/08 13:28	12/29/08 13:28	JRA-CV	
Chromium, Cr	< 0.0020	mg/L	EPA 200.8	0.10	12/29/08 13:28	12/29/08 13:28	JRA-CV	
Lead, Pb	< 0.0005	mg/L	EPA 200.8	0.015	12/29/08 13:28	12/29/08 13:28	JRA-CV	
Mercury, Hg	< 0.0002	mg/L	EPA 245.1	0.002	12/29/08 16:02	12/29/08 16:02	KW-CV	

CV - Benchmark Center Valley NELAP 11827 OCL NELAP 10510
SA - Benchmark Sayre NELAP 11216

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1054 Route 52
Carmel, NY 10512

Project
Date Reported 1/19/2009
Date Received 12/17/2008
Date Complete 1/19/2009

Sample Number 245484-01
Federal ID
Description
Location Dwarkill Well 5
Sample Point

Date Sampled 12/17/08 13:30
Sampler J. Nemeth

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers
Part V Metals								
Selenium, Se	< 0.0030	mg/L	EPA 200.8	0.05	12/29/08 13:28	12/29/08 13:28	JRA-CV	
Silver, Ag	< 0.0006	mg/L	EPA 200.8		12/29/08 18:40	12/29/08 18:40	JRA-CV	
Copper, Cu	< 0.0005	mg/L	EPA 200.8	1.3	12/29/08 13:28	12/29/08 13:28	JRA-CV	
Iron, Fe	0.084	mg/L	EPA 200.7	0.3	12/29/08 19:58	12/29/08 19:58	GSR-CV	
Manganese, Mn	0.115	mg/L	EPA 200.7	0.3	12/29/08 19:58	12/29/08 19:58	GSR-CV	
Sodium, Na	16.3	mg/L	EPA 200.7		12/29/08 19:58	12/29/08 19:58	GSR-CV	
Zinc, Zn	< 0.005	mg/L	EPA 200.7		12/29/08 19:58	12/29/08 19:58	GSR-CV	
Antimony, Sb	< 0.0005	mg/L	EPA 200.8	0.006	12/29/08 13:28	12/29/08 13:28	JRA-CV	
Beryllium, Be	< 0.0005	mg/L	EPA 200.8	0.004	12/29/08 13:28	12/29/08 13:28	JRA-CV	
Nickel, Ni	0.0019	mg/L	EPA 200.8		12/29/08 13:28	12/29/08 13:28	JRA-CV	
Thallium, Tl	< 0.0005	mg/L	EPA 200.8	0.002	12/29/08 13:28	12/29/08 13:28	JRA-CV	
Radiologicals								
Gross Alpha	3.40	pCi/L	EPA 900.0	15	01/11/09 0:00	01/11/09 0:00	BPS-CV	
Gross Beta	2.48	pCi/L	EPA 900.0		01/11/09 0:00	01/11/09 0:00	BPS-CV	
Radium 226	0.26	pCi/L	EPA 903.0	5	01/13/09 0:00	01/13/09 0:00	BH-CV	
Radium 228	-0.18	pCi/L	EPA 904.0	5	01/15/09 0:00	01/15/09 0:00	KLE-CV	
Uranium, U	3.23	æg/L	EPA 200.8	30	01/08/09 18:34	01/08/09 18:34	JRA-CV	
Uranium (pci/L)	2.16	pCi/L	EPA 200.8		01/08/09 18:34	01/08/09 18:34	JRA-CV	

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Certificate of Analysis

Boyd Artesian Well Co.
1054 Route 52
Carmel, NY 10512

Project	
Date Reported	1/19/2009
Date Received	12/17/2008
Date Complete	1/19/2009

Sample Number	245484-01	Date Sampled	12/17/08 13:30
Federal ID		Sampler	J. Nemeth
Description			
Location	Dwarkill Well 5		
Sample Point			

Test	Result	Units	Method	MCL	Prep Date	Test Date	Analyst	Qualifiers

Qualifiers

H = Holding times for preparation or analysis exceeded
S = Spike Recovery outside accepted recovery limits

Approved By David M Kennedy

David Kennedy
Technical Director

CV - Benchmark Center Valley NELAP 11827 OCL NELAP 10510
SA - Benchmark Sayre NELAP 11216

Appendix B

HDR 2010 Water Quality Data

EnviroTest Laboratories Inc.

ANALYTICAL REPORT

Job Number: 420-39732-1

SDG Number: 131452/OCWA/PineBush

Job Description: HDR Inc. GW Project

For:
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Attention: Mr. Thomas Fowler

Debra Bayer
Customer Service Manager
dbayer@envirotestlaboratories.com
12/23/2010

METHOD SUMMARY

Client: HDR Inc.

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Description	Lab Location	Method	Preparation Method
Matrix: Water			
ICP Metals by 200.7	EnvTest	EPA 200.7 Rev 4.4	
Total Metals Digestion for 200.7	EnvTest		EPA 200.7
ICPMS Metals by 200.8	EnvTest	EPA 200.8	
Total Metals Digestion for 200.8	EnvTest		EPA 200.8
Mercury in Water by CVAA	EnvTest	EPA 245.1	
Digestion for CVAA Mercury in Waters	EnvTest		EPA 245.1
Volatile Organic Compounds by GC/MS	EnvTest	SW846 8260B	
Purge-and-Trap	EnvTest		SW846 5030B
General Sub Contract Method	Env.Assoc.	Subcontract	

Lab References:

Env.Assoc. = Environmental Associates

EnvTest = EnviroTest

Method References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

SAMPLE SUMMARY

Client: HDR Inc.

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
420-39732-1	DW 5	Water	11/15/2010 1030	11/15/2010 1430
420-39732-2	DW 15	Water	11/15/2010 1100	11/15/2010 1430
420-39732-4	DW 2	Water	11/15/2010 1315	11/15/2010 1430

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Client Sample ID: DW 5
Lab Sample ID: 420-39732-1

Date Sampled: 11/15/2010 1030
Date Received: 11/15/2010 1430
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Method: 8260B			Date Analyzed:	11/16/2010 1524		
Prep Method: 5030B			Date Prepared:	11/16/2010 1524		
1,1,1,2-Tetrachloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,1-Trichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,2,2-Tetrachloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,2-Trichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
1,2,3-Trichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,2,4-Trichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2,4-Trimethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dibromo-3-Chloropropane	5.0	U	ug/L	5.0	5.0	1.0
1,2-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloroethene, Total	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,3,5-Trimethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
1,3-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,3-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,4-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
2,2-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
2-Chlorotoluene	1.0	U	ug/L	1.0	1.0	1.0
4-Chlorotoluene	1.0	U	ug/L	1.0	1.0	1.0
4-Isopropyltoluene	1.0	U	ug/L	1.0	1.0	1.0
Benzene	1.0	U	ug/L	1.0	1.0	1.0
Bromobenzene	1.0	U	ug/L	1.0	1.0	1.0
Bromoform	1.0	U	ug/L	1.0	1.0	1.0
Bromomethane	1.0	U	ug/L	1.0	1.0	1.0
Carbon tetrachloride	1.0	U	ug/L	1.0	1.0	1.0
Chlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
Bromochloromethane	1.0	U	ug/L	1.0	1.0	1.0
Dibromochloromethane	1.0	U	ug/L	1.0	1.0	1.0
Chloroethane	1.0	U	ug/L	1.0	1.0	1.0
Chloroform	1.0	U	ug/L	1.0	1.0	1.0
Chloromethane	1.0	U	ug/L	1.0	1.0	1.0
cis-1,2-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
cis-1,3-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
Dibromomethane	1.0	U	ug/L	1.0	1.0	1.0
Bromodichloromethane	1.0	U	ug/L	1.0	1.0	1.0
Dichlorodifluoromethane	1.0	U	ug/L	1.0	1.0	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Client Sample ID: DW 5
Lab Sample ID: 420-39732-1

Date Sampled: 11/15/2010 1030
Date Received: 11/15/2010 1430
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Ethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Hexachlorobutadiene	1.0	U	ug/L	1.0	1.0	1.0
Isopropylbenzene	1.0	U	ug/L	1.0	1.0	1.0
m-Xylene & p-Xylene	1.0	U	ug/L	1.0	1.0	1.0
Methyl tert-butyl ether	1.0	U	ug/L	1.0	1.0	1.0
Methylene Chloride	1.0	U	ug/L	1.0	1.0	1.0
n-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
N-Propylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Naphthalene	5.0	U	ug/L	5.0	5.0	1.0
o-Xylene	1.0	U	ug/L	1.0	1.0	1.0
sec-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Styrene	1.0	U	ug/L	1.0	1.0	1.0
tert-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Xylenes, Total	1.0	U	ug/L	1.0	1.0	1.0
Vinyl chloride	1.0	U	ug/L	1.0	1.0	1.0
Trichlorofluoromethane	1.0	U	ug/L	1.0	1.0	1.0
Trichloroethene	1.0	U	ug/L	1.0	1.0	1.0
trans-1,3-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
trans-1,2-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
Toluene	1.0	U	ug/L	1.0	1.0	1.0
Tetrachloroethene	1.0	U	ug/L	1.0	1.0	1.0
Method: 200.7 Rev 4.4			Date Analyzed:	11/19/2010 1445		
Prep Method: 200.7			Date Prepared:	11/17/2010 1018		
Fe	81		ug/L	60	60	1.0
Al	200	U	ug/L	200	200	1.0
Ca	45000		ug/L	5000	5000	1.0
K	5000	U	ug/L	5000	5000	1.0
Mg	10000		ug/L	5000	5000	1.0
Na	12000		ug/L	200	200	1.0
Method: 200.8			Date Analyzed:	11/17/2010 1256		
Prep Method: 200.8			Date Prepared:	11/16/2010 0941		
Pb	1.0	U	ug/L	1.0	1.0	1.0
Ag	1.0	U	ug/L	1.0	1.0	1.0
As	1.4	U	ug/L	1.4	1.4	1.0
Be	0.30	U	ug/L	0.30	0.30	1.0
Cd	1.0	U	ug/L	1.0	1.0	1.0
Co	1.0	U	ug/L	1.0	1.0	1.0
Cr	1.0	U	ug/L	1.0	1.0	1.0
Cu	1.0	U	ug/L	1.0	1.0	1.0
Mn	76		ug/L	1.0	1.0	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Client Sample ID: DW 5
Lab Sample ID: 420-39732-1

Date Sampled: 11/15/2010 1030
Date Received: 11/15/2010 1430
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Ni	1.3		ug/L	0.50	0.50	1.0
Sb	0.40	U	ug/L	0.40	0.40	1.0
Tl	0.30	U	ug/L	0.30	0.30	1.0
V	1.0	U	ug/L	1.0	1.0	1.0
Zn	27		ug/L	10	10	1.0
Ba	110		ug/L	2.0	2.0	1.0
Se	2.0	U	ug/L	2.0	2.0	1.0
Method: 245.1			Date Analyzed:	11/19/2010 1038		
Prep Method: 245.1			Date Prepared:	11/18/2010 1115		
Mercury	0.20	U	ug/L	0.20	0.20	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
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Pearl River, NY 10965

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Client Sample ID: DW 15
Lab Sample ID: 420-39732-2

Date Sampled: 11/15/2010 1100
Date Received: 11/15/2010 1430
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Method: 8260B			Date Analyzed:	11/16/2010 1559		
Prep Method: 5030B			Date Prepared:	11/16/2010 1559		
1,1,1,2-Tetrachloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,1-Trichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,2,2-Tetrachloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,2-Trichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
1,2,3-Trichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,2,4-Trichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2,4-Trimethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dibromo-3-Chloropropane	5.0	U	ug/L	5.0	5.0	1.0
1,2-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloroethene, Total	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,3,5-Trimethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
1,3-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,3-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,4-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
2,2-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
2-Chlorotoluene	1.0	U	ug/L	1.0	1.0	1.0
4-Chlorotoluene	1.0	U	ug/L	1.0	1.0	1.0
4-Isopropyltoluene	1.0	U	ug/L	1.0	1.0	1.0
Benzene	1.0	U	ug/L	1.0	1.0	1.0
Bromobenzene	1.0	U	ug/L	1.0	1.0	1.0
Bromoform	1.0	U	ug/L	1.0	1.0	1.0
Bromomethane	1.0	U	ug/L	1.0	1.0	1.0
Carbon tetrachloride	1.0	U	ug/L	1.0	1.0	1.0
Chlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
Bromochloromethane	1.0	U	ug/L	1.0	1.0	1.0
Dibromochloromethane	1.0	U	ug/L	1.0	1.0	1.0
Chloroethane	1.0	U	ug/L	1.0	1.0	1.0
Chloroform	1.0	U	ug/L	1.0	1.0	1.0
Chloromethane	1.0	U	ug/L	1.0	1.0	1.0
cis-1,2-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
cis-1,3-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
Dibromomethane	1.0	U	ug/L	1.0	1.0	1.0
Bromodichloromethane	1.0	U	ug/L	1.0	1.0	1.0
Dichlorodifluoromethane	1.0	U	ug/L	1.0	1.0	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Client Sample ID: DW 15
Lab Sample ID: 420-39732-2

Date Sampled: 11/15/2010 1100
Date Received: 11/15/2010 1430
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Ethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Hexachlorobutadiene	1.0	U	ug/L	1.0	1.0	1.0
Isopropylbenzene	1.0	U	ug/L	1.0	1.0	1.0
m-Xylene & p-Xylene	1.0	U	ug/L	1.0	1.0	1.0
Methyl tert-butyl ether	1.0	U	ug/L	1.0	1.0	1.0
Methylene Chloride	1.0	U	ug/L	1.0	1.0	1.0
n-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
N-Propylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Naphthalene	5.0	U	ug/L	5.0	5.0	1.0
o-Xylene	1.0	U	ug/L	1.0	1.0	1.0
sec-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Styrene	1.0	U	ug/L	1.0	1.0	1.0
tert-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Xylenes, Total	1.0	U	ug/L	1.0	1.0	1.0
Vinyl chloride	1.0	U	ug/L	1.0	1.0	1.0
Trichlorofluoromethane	1.0	U	ug/L	1.0	1.0	1.0
Trichloroethene	1.0	U	ug/L	1.0	1.0	1.0
trans-1,3-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
trans-1,2-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
Toluene	1.0	U	ug/L	1.0	1.0	1.0
Tetrachloroethene	1.0	U	ug/L	1.0	1.0	1.0
Method: 200.7 Rev 4.4			Date Analyzed:	11/19/2010 1453		
Prep Method: 200.7			Date Prepared:	11/17/2010 1018		
Fe	77		ug/L	60	60	1.0
Al	200	U	ug/L	200	200	1.0
Ca	43000		ug/L	5000	5000	1.0
K	5000	U	ug/L	5000	5000	1.0
Mg	9800		ug/L	5000	5000	1.0
Na	11000		ug/L	200	200	1.0
Method: 200.8			Date Analyzed:	11/17/2010 1300		
Prep Method: 200.8			Date Prepared:	11/16/2010 0941		
Ag	1.0	U	ug/L	1.0	1.0	1.0
Pb	1.0	U	ug/L	1.0	1.0	1.0
As	1.4	U	ug/L	1.4	1.4	1.0
Be	0.30	U	ug/L	0.30	0.30	1.0
Cd	1.0	U	ug/L	1.0	1.0	1.0
Co	1.0	U	ug/L	1.0	1.0	1.0
Cr	1.0	U	ug/L	1.0	1.0	1.0
Cu	1.0	U	ug/L	1.0	1.0	1.0
Mn	76		ug/L	1.0	1.0	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Client Sample ID: DW 15
Lab Sample ID: 420-39732-2

Date Sampled: 11/15/2010 1100
Date Received: 11/15/2010 1430
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Ni	1.5		ug/L	0.50	0.50	1.0
Sb	0.40	U	ug/L	0.40	0.40	1.0
Tl	0.30	U	ug/L	0.30	0.30	1.0
V	1.0	U	ug/L	1.0	1.0	1.0
Zn	27		ug/L	10	10	1.0
Ba	100		ug/L	2.0	2.0	1.0
Se	2.0	U	ug/L	2.0	2.0	1.0
Method: 245.1			Date Analyzed:	11/19/2010 1146		
Prep Method: 245.1			Date Prepared:	11/18/2010 1115		
Mercury	0.20	U	ug/L	0.20	0.20	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Client Sample ID: DW 2
Lab Sample ID: 420-39732-4

Date Sampled: 11/15/2010 1315
Date Received: 11/15/2010 1430
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Method: 8260B			Date Analyzed:	11/16/2010 1711		
Prep Method: 5030B			Date Prepared:	11/16/2010 1711		
1,1,1,2-Tetrachloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,1-Trichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,2,2-Tetrachloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,2-Trichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
1,2,3-Trichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,2,4-Trichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2,4-Trimethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dibromo-3-Chloropropane	5.0	U	ug/L	5.0	5.0	1.0
1,2-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloroethene, Total	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,3,5-Trimethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
1,3-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,3-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,4-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
2,2-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
2-Chlorotoluene	1.0	U	ug/L	1.0	1.0	1.0
4-Chlorotoluene	1.0	U	ug/L	1.0	1.0	1.0
4-Isopropyltoluene	1.0	U	ug/L	1.0	1.0	1.0
Benzene	1.0	U	ug/L	1.0	1.0	1.0
Bromobenzene	1.0	U	ug/L	1.0	1.0	1.0
Bromoform	1.0	U	ug/L	1.0	1.0	1.0
Bromomethane	1.0	U	ug/L	1.0	1.0	1.0
Carbon tetrachloride	1.0	U	ug/L	1.0	1.0	1.0
Chlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
Bromochloromethane	1.0	U	ug/L	1.0	1.0	1.0
Dibromochloromethane	1.0	U	ug/L	1.0	1.0	1.0
Chloroethane	1.0	U	ug/L	1.0	1.0	1.0
Chloroform	1.0	U	ug/L	1.0	1.0	1.0
Chloromethane	1.0	U	ug/L	1.0	1.0	1.0
cis-1,2-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
cis-1,3-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
Dibromomethane	1.0	U	ug/L	1.0	1.0	1.0
Bromodichloromethane	1.0	U	ug/L	1.0	1.0	1.0
Dichlorodifluoromethane	1.0	U	ug/L	1.0	1.0	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Client Sample ID: DW 2
Lab Sample ID: 420-39732-4

Date Sampled: 11/15/2010 1315
Date Received: 11/15/2010 1430
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Ethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Hexachlorobutadiene	1.0	U	ug/L	1.0	1.0	1.0
Isopropylbenzene	1.0	U	ug/L	1.0	1.0	1.0
m-Xylene & p-Xylene	1.0	U	ug/L	1.0	1.0	1.0
Methyl tert-butyl ether	1.0	U	ug/L	1.0	1.0	1.0
Methylene Chloride	1.0	U	ug/L	1.0	1.0	1.0
n-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
N-Propylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Naphthalene	5.0	U	ug/L	5.0	5.0	1.0
o-Xylene	1.0	U	ug/L	1.0	1.0	1.0
sec-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Styrene	1.0	U	ug/L	1.0	1.0	1.0
tert-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Xylenes, Total	1.0	U	ug/L	1.0	1.0	1.0
Vinyl chloride	1.0	U	ug/L	1.0	1.0	1.0
Trichlorofluoromethane	1.0	U	ug/L	1.0	1.0	1.0
Trichloroethene	1.0	U	ug/L	1.0	1.0	1.0
trans-1,3-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
trans-1,2-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
Toluene	1.0	U	ug/L	1.0	1.0	1.0
Tetrachloroethene	1.0	U	ug/L	1.0	1.0	1.0
Method: 200.7 Rev 4.4			Date Analyzed:	11/19/2010 1500		
Prep Method: 200.7			Date Prepared:	11/17/2010 1018		
Fe	240		ug/L	60	60	1.0
Al	200	U	ug/L	200	200	1.0
Ca	54000		ug/L	5000	5000	1.0
K	5000	U	ug/L	5000	5000	1.0
Mg	15000		ug/L	5000	5000	1.0
Na	29000		ug/L	200	200	1.0
Method: 200.8			Date Analyzed:	11/17/2010 1303		
Prep Method: 200.8			Date Prepared:	11/16/2010 0941		
Ag	1.0	U	ug/L	1.0	1.0	1.0
Pb	1.0		ug/L	1.0	1.0	1.0
As	1.9		ug/L	1.4	1.4	1.0
Be	0.30	U	ug/L	0.30	0.30	1.0
Cd	1.0	U	ug/L	1.0	1.0	1.0
Co	1.0	U	ug/L	1.0	1.0	1.0
Cr	1.0	U	ug/L	1.0	1.0	1.0
Cu	2.7		ug/L	1.0	1.0	1.0
Mn	140		ug/L	1.0	1.0	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Client Sample ID: DW 2
Lab Sample ID: 420-39732-4

Date Sampled: 11/15/2010 1315
Date Received: 11/15/2010 1430
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Ni	1.4		ug/L	0.50	0.50	1.0
Sb	0.40	U	ug/L	0.40	0.40	1.0
Tl	0.30	U	ug/L	0.30	0.30	1.0
V	1.0	U	ug/L	1.0	1.0	1.0
Zn	44		ug/L	10	10	1.0
Ba	150		ug/L	2.0	2.0	1.0
Se	2.0	U	ug/L	2.0	2.0	1.0
Method: 245.1			Date Analyzed:	11/19/2010 1148		
Prep Method: 245.1			Date Prepared:	11/18/2010 1115		
Mercury	0.20	U	ug/L	0.20	0.20	1.0

DATA REPORTING QUALIFIERS

Client: HDR Inc.

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Lab Section	Qualifier	Description
GC/MS VOA		
	U	The analyte was analyzed for but not detected at or above the stated limit.
Metals		
	U	The analyte was analyzed for but not detected at or above the stated limit.

EnviroTest Laboratories, Inc.

CHAIN OF CUSTODY

Lab Name: EnviroTest Laboratories
Address & Phone: 315 Fullerton Avenue, Newburgh, New York 12550 845-562-0890

REPORT# (Lab Use Only): 39732

PROJECT REFERENCE: 131452	PROJECT NO.	PROJECT LOCATION: DCWA
ENVIROTEST PROJECT MANAGER: Debra Bayer	P.O. NUMBER	TOWN: Pine Bush
CLIENT (SITE) PM: Thomas Fowler	CLIENT PHONE: Cell: 845-499-3107	CLIENT FAX: 845-735-3466
CLIENT NAME: HDR, Inc.	thomas.fowler@hdrinc.com	
CLIENT ADDRESS: One Blue Hill Plaza, Pearl River, NY 10965		
COMPANY CONTRACTING THIS WORK (if applicable):		

PAGE 1 of 1

TURNAROUND TIME: NORMAL ____ QUICK ____ VERBAL ____

#OF COOLERS: 1

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	D (Drinking Water) or W (Waste Water) Indicate	SOLID OR SEMISOLID	OTHER Specify	Total # of Containers	40ml Vials HCL	Liter Amber HCL	250ml Amber Sulfuric	Liter Amber	250ml Plastic Nitric Acid	250ml Plastic Sulfuric Acid	Liter Plastic	250ml Plastic Sodium Hyd.	125ml Plastic Sterile	250 plain plastic	10 L Bladder	REMARKS
11/15/10	1030	DW5						5	3				1						1	VOA 8260, TAL Metals, MPA
11/15/10	1100	DW15						5	3				1						1	VOA 8260, TAL Metals, MPA
11/15/10	0800	Trip Blank						3	3											VOA 8260
11/15/10	1315	DW2						5	3				1						1	VOA 8260 TAL Met, MPA

NUMBER OF CONTAINERS SUBMITTED

RELINQUISHED BY: (SIGNATURE)	COMPANY: HDR	DATE: 11/15/10	TIME: 2:30	RECEIVED BY: (SIGNATURE) / COMPANY / DATE / TIME
SAMPLED BY: (SIGNATURE)	COMPANY	DATE	TIME	RECEIVED BY: (SIGNATURE) / COMPANY / DATE / TIME
RELINQUISHED BY: (SIGNATURE)	COMPANY	DATE	TIME	RECEIVED BY: (SIGNATURE) / COMPANY / DATE / TIME

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES NO	Cooler Temp:	LABORATORY REMARKS: ICE ✓ pH____ CL2____ Reveiwed by____
	11/15/10	2:30p		5.4	

12/23/2010

LOGIN SAMPLE RECEIPT CHECK LIST

Client: HDR Inc.

Job Number: 420-39732-1
Sdg Number: 131452/OCWA/PineBush

Login Number: 39732

Question	T/F/NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	NA	
The cooler's custody seal, if present, is intact.	NA	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

EnviroTest Laboratories Inc.

ANALYTICAL REPORT

Job Number: 420-39759-1

SDG Number: 131452/OC NY/PineBush/Mt.Hope

Job Description: HDR Inc. GW Project

For:
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Attention: Mr. Thomas Fowler

Debra Bayer
Customer Service Manager
dbayer@envirotestlaboratories.com
12/23/2010

METHOD SUMMARY

Client: HDR Inc.

Job Number: 420-39759-1
Sdg Number: 131452/OC NY/PineBush/Mt.Hope

Description	Lab Location	Method	Preparation Method
Matrix Water			
ICP Metals by 200.7	EnvTest	EPA 200.7 Rev 4.4	
Total Metals Digestion for 200.7	EnvTest		EPA 200.7
ICPMS Metals by 200.8	EnvTest	EPA 200.8	
Total Metals Digestion for 200.8	EnvTest		EPA 200.8
Mercury in Water by CVAA	EnvTest	EPA 245.1	
Digestion for CVAA Mercury in Waters	EnvTest		EPA 245.1
Volatile Organic Compounds by GC/MS	EnvTest	SW846 8260B	
Purge-and-Trap	EnvTest		SW846 5030B
General Sub Contract Method	Env.Assoc.	Subcontract	

Lab References:

Env.Assoc. = Environmental Associates

EnvTest = EnviroTest

Method References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

SAMPLE SUMMARY

Client: HDR Inc.

Job Number: 420-39759-1
Sdg Number: 131452/OC NY/PineBush/Mt.Hope

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
420-39759-1	DW 4	Water	11/16/2010 1000	11/16/2010 1345
420-39759-2	DW 3	Water	11/16/2010 1240	11/16/2010 1345

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39759-1
Sdg Number: 131452/OC NY/PineBush/Mt.Hope

Client Sample ID: DW 4
Lab Sample ID: 420-39759-1

Date Sampled: 11/16/2010 1000
Date Received: 11/16/2010 1345
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Method: 8260B			Date Analyzed:	11/16/2010 2046		
Prep Method: 5030B			Date Prepared:	11/16/2010 2046		
1,1,1,2-Tetrachloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,1-Trichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,2,2-Tetrachloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,2-Trichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
1,2,3-Trichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,2,4-Trichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2,4-Trimethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dibromo-3-Chloropropane	5.0	U	ug/L	5.0	5.0	1.0
1,2-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloroethene, Total	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,3,5-Trimethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
1,3-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,3-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,4-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
2,2-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
2-Chlorotoluene	1.0	U	ug/L	1.0	1.0	1.0
4-Chlorotoluene	1.0	U	ug/L	1.0	1.0	1.0
4-Isopropyltoluene	1.0	U	ug/L	1.0	1.0	1.0
Benzene	1.0	U	ug/L	1.0	1.0	1.0
Bromobenzene	1.0	U	ug/L	1.0	1.0	1.0
Bromoform	1.0	U	ug/L	1.0	1.0	1.0
Bromomethane	1.0	U	ug/L	1.0	1.0	1.0
Carbon tetrachloride	1.0	U	ug/L	1.0	1.0	1.0
Chlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
Bromochloromethane	1.0	U	ug/L	1.0	1.0	1.0
Dibromochloromethane	1.0	U	ug/L	1.0	1.0	1.0
Chloroethane	1.0	U	ug/L	1.0	1.0	1.0
Chloroform	1.0	U	ug/L	1.0	1.0	1.0
Chloromethane	1.0	U	ug/L	1.0	1.0	1.0
cis-1,2-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
cis-1,3-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
Dibromomethane	1.0	U	ug/L	1.0	1.0	1.0
Bromodichloromethane	1.0	U	ug/L	1.0	1.0	1.0
Dichlorodifluoromethane	1.0	U	ug/L	1.0	1.0	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39759-1
Sdg Number: 131452/OC NY/PineBush/Mt.Hope

Client Sample ID: DW 4
Lab Sample ID: 420-39759-1

Date Sampled: 11/16/2010 1000
Date Received: 11/16/2010 1345
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Ethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Hexachlorobutadiene	1.0	U	ug/L	1.0	1.0	1.0
Isopropylbenzene	1.0	U	ug/L	1.0	1.0	1.0
m-Xylene & p-Xylene	1.0	U	ug/L	1.0	1.0	1.0
Methyl tert-butyl ether	1.0	U	ug/L	1.0	1.0	1.0
Methylene Chloride	1.0	U	ug/L	1.0	1.0	1.0
n-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
N-Propylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Naphthalene	5.0	U	ug/L	5.0	5.0	1.0
o-Xylene	1.0	U	ug/L	1.0	1.0	1.0
sec-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Styrene	1.0	U	ug/L	1.0	1.0	1.0
tert-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Xylenes, Total	1.0	U	ug/L	1.0	1.0	1.0
Vinyl chloride	1.0	U	ug/L	1.0	1.0	1.0
Trichlorofluoromethane	1.0	U	ug/L	1.0	1.0	1.0
Trichloroethene	1.0	U	ug/L	1.0	1.0	1.0
trans-1,3-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
trans-1,2-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
Toluene	1.0	U	ug/L	1.0	1.0	1.0
Tetrachloroethene	1.0	U	ug/L	1.0	1.0	1.0
Method: 200.7 Rev 4.4			Date Analyzed:	11/19/2010 1425		
Prep Method: 200.7			Date Prepared:	11/17/2010 1018		
Fe	410		ug/L	60	60	1.0
Al	200	U	ug/L	200	200	1.0
Ca	46000		ug/L	5000	5000	1.0
K	5000	U	ug/L	5000	5000	1.0
Mg	11000		ug/L	5000	5000	1.0
Na	9000		ug/L	200	200	1.0
Method: 200.8			Date Analyzed:	11/22/2010 1416		
Prep Method: 200.8			Date Prepared:	11/17/2010 1021		
Pb	1.0	U	ug/L	1.0	1.0	1.0
Ag	1.0	U	ug/L	1.0	1.0	1.0
As	2.8		ug/L	1.4	1.4	1.0
Be	0.30	U	ug/L	0.30	0.30	1.0
Cd	1.0	U	ug/L	1.0	1.0	1.0
Co	1.0	U	ug/L	1.0	1.0	1.0
Cr	1.0	U	ug/L	1.0	1.0	1.0
Cu	2.0		ug/L	1.0	1.0	1.0
Mn	570		ug/L	1.0	1.0	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39759-1
Sdg Number: 131452/OC NY/PineBush/Mt.Hope

Client Sample ID: DW 4
Lab Sample ID: 420-39759-1

Date Sampled: 11/16/2010 1000
Date Received: 11/16/2010 1345
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Ni	1.6		ug/L	0.50	0.50	1.0
Sb	0.40	U	ug/L	0.40	0.40	1.0
Tl	0.30	U	ug/L	0.30	0.30	1.0
V	1.0	U	ug/L	1.0	1.0	1.0
Zn	42		ug/L	10	10	1.0
Ba	130		ug/L	2.0	2.0	1.0
Se	2.0	U	ug/L	2.0	2.0	1.0
Method: 245.1			Date Analyzed:	11/19/2010 1150		
Prep Method: 245.1			Date Prepared:	11/18/2010 1115		
Mercury	0.20	U	ug/L	0.20	0.20	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
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Pearl River, NY 10965

Job Number: 420-39759-1
Sdg Number: 131452/OC NY/PineBush/Mt.Hope

Client Sample ID: DW 3
Lab Sample ID: 420-39759-2

Date Sampled: 11/16/2010 1240
Date Received: 11/16/2010 1345
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Method: 8260B			Date Analyzed:	11/16/2010 2158		
Prep Method: 5030B			Date Prepared:	11/16/2010 2158		
1,1,1,2-Tetrachloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,1-Trichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,2,2-Tetrachloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1,2-Trichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
1,1-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
1,2,3-Trichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,2,4-Trichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2,4-Trimethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dibromo-3-Chloropropane	5.0	U	ug/L	5.0	5.0	1.0
1,2-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloroethane	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloroethene, Total	1.0	U	ug/L	1.0	1.0	1.0
1,2-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,3,5-Trimethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
1,3-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
1,3-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
1,4-Dichlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
2,2-Dichloropropane	1.0	U	ug/L	1.0	1.0	1.0
2-Chlorotoluene	1.0	U	ug/L	1.0	1.0	1.0
4-Chlorotoluene	1.0	U	ug/L	1.0	1.0	1.0
4-Isopropyltoluene	1.0	U	ug/L	1.0	1.0	1.0
Benzene	1.0	U	ug/L	1.0	1.0	1.0
Bromobenzene	1.0	U	ug/L	1.0	1.0	1.0
Bromoform	1.0	U	ug/L	1.0	1.0	1.0
Bromomethane	1.0	U	ug/L	1.0	1.0	1.0
Carbon tetrachloride	1.0	U	ug/L	1.0	1.0	1.0
Chlorobenzene	1.0	U	ug/L	1.0	1.0	1.0
Bromochloromethane	1.0	U	ug/L	1.0	1.0	1.0
Dibromochloromethane	1.0	U	ug/L	1.0	1.0	1.0
Chloroethane	1.0	U	ug/L	1.0	1.0	1.0
Chloroform	1.0	U	ug/L	1.0	1.0	1.0
Chloromethane	1.0	U	ug/L	1.0	1.0	1.0
cis-1,2-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
cis-1,3-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
Dibromomethane	1.0	U	ug/L	1.0	1.0	1.0
Bromodichloromethane	1.0	U	ug/L	1.0	1.0	1.0
Dichlorodifluoromethane	1.0	U	ug/L	1.0	1.0	1.0

Mr. Thomas Fowler
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Pearl River, NY 10965

Job Number: 420-39759-1
Sdg Number: 131452/OC NY/PineBush/Mt.Hope

Client Sample ID: DW 3
Lab Sample ID: 420-39759-2

Date Sampled: 11/16/2010 1240
Date Received: 11/16/2010 1345
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Ethylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Hexachlorobutadiene	1.0	U	ug/L	1.0	1.0	1.0
Isopropylbenzene	1.0	U	ug/L	1.0	1.0	1.0
m-Xylene & p-Xylene	1.0	U	ug/L	1.0	1.0	1.0
Methyl tert-butyl ether	1.0	U	ug/L	1.0	1.0	1.0
Methylene Chloride	1.0	U	ug/L	1.0	1.0	1.0
n-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
N-Propylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Naphthalene	5.0	U	ug/L	5.0	5.0	1.0
o-Xylene	1.0	U	ug/L	1.0	1.0	1.0
sec-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Styrene	1.0	U	ug/L	1.0	1.0	1.0
tert-Butylbenzene	1.0	U	ug/L	1.0	1.0	1.0
Xylenes, Total	1.0	U	ug/L	1.0	1.0	1.0
Vinyl chloride	1.0	U	ug/L	1.0	1.0	1.0
Trichlorofluoromethane	1.0	U	ug/L	1.0	1.0	1.0
Trichloroethene	1.0	U	ug/L	1.0	1.0	1.0
trans-1,3-Dichloropropene	1.0	U	ug/L	1.0	1.0	1.0
trans-1,2-Dichloroethene	1.0	U	ug/L	1.0	1.0	1.0
Toluene	1.0	U	ug/L	1.0	1.0	1.0
Tetrachloroethene	1.0	U	ug/L	1.0	1.0	1.0
Method: 200.7 Rev 4.4			Date Analyzed:	11/19/2010 1432		
Prep Method: 200.7			Date Prepared:	11/17/2010 1018		
Fe	78		ug/L	60	60	1.0
Al	200	U	ug/L	200	200	1.0
Ca	46000		ug/L	5000	5000	1.0
K	5000	U	ug/L	5000	5000	1.0
Mg	11000		ug/L	5000	5000	1.0
Na	9200		ug/L	200	200	1.0
Method: 200.8			Date Analyzed:	11/22/2010 1419		
Prep Method: 200.8			Date Prepared:	11/17/2010 1021		
Ag	1.0	U	ug/L	1.0	1.0	1.0
Pb	1.0	U	ug/L	1.0	1.0	1.0
As	1.4	U	ug/L	1.4	1.4	1.0
Be	0.30	U	ug/L	0.30	0.30	1.0
Cd	1.0	U	ug/L	1.0	1.0	1.0
Co	1.0	U	ug/L	1.0	1.0	1.0
Cr	1.0	U	ug/L	1.0	1.0	1.0
Cu	1.0		ug/L	1.0	1.0	1.0
Mn	180		ug/L	1.0	1.0	1.0

Mr. Thomas Fowler
HDR Inc.
One Blue Hill Plaza
PO BOX 1509
Pearl River, NY 10965

Job Number: 420-39759-1
Sdg Number: 131452/OC NY/PineBush/Mt.Hope

Client Sample ID: DW 3
Lab Sample ID: 420-39759-2

Date Sampled: 11/16/2010 1240
Date Received: 11/16/2010 1345
Client Matrix: Water

Analyte	Result/Qualifier		Unit	RL	RL	Dilution
Ni	1.4		ug/L	0.50	0.50	1.0
Sb	0.40	U	ug/L	0.40	0.40	1.0
Tl	0.30	U	ug/L	0.30	0.30	1.0
V	1.0	U	ug/L	1.0	1.0	1.0
Zn	47		ug/L	10	10	1.0
Ba	110		ug/L	2.0	2.0	1.0
Se	2.0	U	ug/L	2.0	2.0	1.0

Method: 245.1 Date Analyzed: 11/19/2010 1152
Prep Method: 245.1 Date Prepared: 11/18/2010 1115

Mercury	0.20	U	ug/L	0.20	0.20	1.0

DATA REPORTING QUALIFIERS

Client: HDR Inc.

Job Number: 420-39759-1
Sdg Number: 131452/OC NY/PineBush/Mt.Hope

Lab Section	Qualifier	Description
GC/MS VOA		
	U	The analyte was analyzed for but not detected at or above the stated limit.
Metals		
	U	The analyte was analyzed for but not detected at or above the stated limit.

EnviroTest Laboratories, Inc.

CHAIN OF CUSTODY

Lab Name: EnviroTest Laboratories
Address & Phone: 315 Fullerton Avenue, Newburgh, New York 12550 845-562-0890

REPORT# (Lab Use Only): 39759

PROJECT REFERENCE: 131452
PROJECT NO.:
PROJECT LOCATION: OC NY
ENVIROTEST PROJECT MANAGER: Debra Bayer
P.O. NUMBER:
TOWN: Pine Bush / Mt Hope
CLIENT (SITE) PM: Thomas Fowler
CLIENT PHONE: Cell: 845-499-3107
CLIENT FAX: 845-735-7466
CLIENT NAME: HDR, Inc.
thomas.fowler@hdrinc.com
CLIENT ADDRESS: One Blue Hill Plaza, Pearl River, NY 10965
COMPANY CONTRACTING THIS WORK (if applicable):

PAGE 1 of 1

TURNAROUND TIME: NORMAL ____ QUICK ____ VERBAL ____

#OF COOLERS: 1

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	D (Drinking Water) or W (Waste Water) Indicate	SOLID OR SEMISOLID	OTHER Specify	Total # of Containers	40ml Vials HCL	Liter Amber HCL	250ml Amber Sulfuric	Liter Amber	250ml Plastic Nitric Acid	250ml Plastic Sulfuric Acid	Liter Plastic	250ml Plastic Sodium Hyd.	125ml Plastic Sterile	250 plain plastic	10 L Bladder	REMARKS
11/16/10	1000	DW4		✓				5	3				1						1	VOA 8260, TAL Metals, MPA
11/16/10	1240	DW3		✓				5	3				1						1	VOA 8260, TAL Metals, MPA
TF		Trip Blank						3	3											VOA 8260

RELINQUISHED BY: (SIGNATURE)	COMPANY	DATE	TIME	RECEIVED BY: (SIGNATURE)	COMPANY	DATE	TIME
Tom Fowler	HDR	11/16/10					
SAMPLED BY: (SIGNATURE)	COMPANY	DATE	TIME	RECEIVED BY: (SIGNATURE)	COMPANY	DATE	TIME
"		11/16/10	12:40				
RELINQUISHED BY: (SIGNATURE)	COMPANY	DATE	TIME	RECEIVED BY: (SIGNATURE)	COMPANY	DATE	TIME

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	Cooler Temp.	LABORATORY REMARKS: ICE____ pH____ CL2____ Reveiwed by____
	11/16/10	1345	YES / NO	1.7C	

12/23/2010

LOGIN SAMPLE RECEIPT CHECK LIST

Client: HDR Inc.

Job Number: 420-39759-1
Sdg Number: 131452/OC NY/PineBush/Mt.Hope

Login Number: 39759

Question	T/F/NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	NA	
The cooler's custody seal, if present, is intact.	NA	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

Appendix C

Percolation Test Results

HDR | ONE COMPANY *Many Solutions*℠

Memo

To:	File		
From:	HDR Collin Mills/Scott Englert	Project:	Mid-County Water Supply Feasibility Study
CC:	Mike Principe, Ginger Modafferi, Scott Davis		
Date:	January 2012	Job No:	147-1331452

Re: Percolation Testing at the Dwaar Kill Wellfield

Introduction

On 1/3/2013 HDR and Town of Crawford Highway Department performed three deep test pits and installed three shallow "benched" pits in which infiltration testing was to be completed. All three of the locations were deemed to be unsuitable due to various reasons such as shallow groundwater or slow infiltration rate. On 1/4/2013 an additional four deep test pits were installed to explore alternate locations. Results for all seven test pit locations are described below.

TP-1

Total Depth: 8.5 ft bgs

Comments: In the deep test pit, water seep was observed at 3.5 ft, and at 8 ft. After about 10 – 15 minutes the hole caved in on itself. In the shallow working pit, an approximately 1.5 foot wide channel of cobbles was encountered at about 3 ft through which significant water seepage was observed. Due to water depth in both holes and material encountered during excavation this location was abandoned.

Depth (ft)	Soil Description	Comments
0 To 1.0	Brown silty fine sand. Topsoil material with root mass from agriculture.	Dry.
1.0 To 8.5	Brown silty fine sand, trace to little clay, trace coarse sand to gravel, cobbles.	Generally dry, moisture increasing with depth. Moisture seeps at 3.5' and 8'. Material is generally uniform throughout deep test hole. Material in benched excavation was consistent with material encountered in the deep test hole except for the cobble channel as described in comments. Silty material forms firm, angular peds.

TP-2

Total Depth: 8.5 ft bgs

Comments: Minimal water seep encountered at about 8ft in the deep test hole. Bench hole was installed adjacent to the deep hole to a depth of 3ft such that the testing interval would be 3-5ft. Both holes remained dry and the deep pit was backfilled. After approximately an hour the shallow hole had about 3 inches of water in it. A small 1' x 1' x 1' hole was dug in the center of the pit and more water accumulated over time. The hole was left open overnight (secured with caution tape around the perimeter

of the work area) and about 5 inches of water filled the bottom of the benched work area at 3' deep. Location was determined to be not suitable and was abandoned (backfilled).

Depth (ft)	Soil Description	Comments
0 To 1.5	Brown silty fine sand. Topsoil material with root mass from agriculture.	Dry.
1.5 To 6	Brown to light brown silty fine sand, trace to little clay.	Mottling observed starting around 3 to 4 ft bgs. Moisture increasing with depth. Silty material forms firm, angular peds.
6 To 8	Brown to light brown fine sandy silt, trace to little clay, slightly higher clay content than previous interval (1.5 to 6).	Dry, minor seep at around 8 to 8.5 ft bgs. Silty material forms firm, angular peds.

TP-3

Total Depth: 8 ft bgs

Comments: No groundwater seeps were observed in the deep test hole therefore the benched pit depth was set at 4' such that the testing interval was 4-6' bgs. Material was very difficult to dig through by hand to install the 1' x 1' x 2' deep testing hole and was also difficult digging utilizing the machine during excavation of the bench and deep test pits. Test hole was completed and pre-soaked in accordance with DOH guidelines and was found to still contain nearly all of the pre-soak water the following morning (1/4/2013). This location was determined to be unsuitable and was backfilled and abandoned.

Depth (ft)	Soil Description	Comments
0 To 1.5	Brown silty fine sand. Topsoil material with root mass from agriculture.	Dry.
1.5 To 6	Brown to light brown silty fine sand, trace to little clay.	Mottling observed starting around 3 to 4 ft bgs. Moisture increasing with depth. Silty material forms firm, angular peds. Difficult digging (hard material).
6 To 8	Brown to light brown fine sandy silt, trace to little clay, slightly higher clay content than previous interval (1.5 to 6).	Dry, minor seep at around 8 to 8.5 ft bgs. Silty material forms firm, angular peds.

TP-4

Total Depth: 8.5 ft bgs

Comments: This test pit was installed near break in tree-line in the vicinity of TP-1 to the NNW.

Depth (ft)	Soil Description	Comments
0 To 3	Brown to light brown silty loam with roots present.	Dry.
3 To 8.5	Brown silty clay loam. Increasing fine grain material content with depth. Trace fine gravel.	Dry with increasing moisture content with depth. Seep at 7' bgs. Some mottling observed starting around 4'. Peds form firm, angular blocks.

TP-5

Total Depth: 8 ft bgs

Comments: Located near cut in trees on the south side of the larger field where TP-3 is located and the smaller, narrow field where TP-2 is located.

Depth (ft)	Soil Description	Comments
0 To 1.0	Brown silty loam. Topsoil like material with roots.	Dry.
1.0 To 2.0	Light brown/ tan-ish silty loam.	Dry.
2.0 To 6.5	Brown to gray/brown silty loam.	Dry. Moisture content increasing with depth. Some mottling at depth. Minor seep at 5.5ft. Peds form firm, angular blocks.
6.5 To 8.0	Brown silty clay loam. Mottling present.	Mottling observed. Moisture increasing with depth. Increasing fine grain material with depth. Minor seep at 7.5ft. Peds form firm, angular blocks.

TP-6

Total Depth: 8 ft bgs

Comments: Located in southwest corner of the longer, narrow field that TP-2 is located in.

Depth (ft)	Soil Description	Comments
0 To 1.5	Brown silty loam. Topsoil like material with roots.	Dry.
1.5 To 3.0	Light brown/ tan-ish silty loam. Trace fine gravel to cobble.	Dry.
3.0 To 8.0	Brown silty clay loam. Mottling present.	Mottling observed. Moisture increasing with depth. Increasing fine grain material with depth. Minor seeps at 6ft and 7-7.5 ft. Peds form firm, angular blocks. A cobble @ 6.5ft bgs.

TP-7

Total Depth: 8 ft bgs

Comments: Located east of access road along Hill Ave set back from road about 50 ft.

Depth (ft)		
0 To 1.0	Brown silty loam, trace coarse sand up to cobble.	Dry
1.0 To 2.5	Tan/Brown silty fine sand to coarse sand, trace cobbles.	Dry

2.5 To 4.0	Brown silty loam, trace medium to coarse sand, trace fine gravel	Dry
4.0 To 8.0	Brown to dark brown fine to medium sand, trace coarse sand, trace to little silt, trace fine gravel to cobbles.	Dry

Appendix D

Opinion of Probable Construction Cost (OPCC)

Dwaar Kill - Pine Bush Water Supply Project Feasibility Plan
Treatment Facility, Conveyance Piping and Wells
Opinion of Probable Cost
CONCEPTUAL LEVEL ESTIMATE

Category	Description	Unit	Quantity	Unit Cost in 2010	Escalate Rate	Unit Cost in 2012	Subtotal	Total
Site/Distribution Main								***$ 1,483,412***
	Misc site work (clearing, grubbing)	LS	1			$ 50,000.00	$ 50,000.00	
	Paving for Parking	SY	1,620			$ 18.93	$ 30,666.29	
	Site Grading	SY	4,374			$ 4.29	$ 18,764.27	
	New 8" well piping to pump house, wells 2, 3, and 5, installed	LF	2,000			$ 60.49	$ 120,980.00	
	Air relief valves	EA	-	$2,500	0.0%	$ 2,500.00	$ -	
	8" Fittings, well field	EA	10			$ 941.32	$ 9,413.20	
	8" Valves, well field	EA	3			$ 2,697.08	$ 8,091.24	
	New 8" distribution main to Pine Bush, option 1: Rt52/Black Hawk Rd					$ -	$ -	
	New 8" DIP Distribution Main	LF	10,600			$ 41.60	$ 440,960.00	
	Directional drilling under 8-ft culvert on Hill Ave	LF	50			$ 1,296.26	$ 64,813.00	
	Directional drilling under storm drains at intersection of Black Hawk and Rt 52	LF	50			$ 1,296.26	$ 64,813.00	
	8" Fittings, distribution pipe	EA	30			$ 941.32	$ 28,239.60	
	8" Valves, distribution pipe	EA	20			$ 2,697.08	$ 53,941.60	
	Excavation, backfilling, compaction	CY	11,200			$ 13.24	$ 148,288.00	
	Underground tape and markers	LF	12,600			$ 5.65	$ 71,190.00	
	Paving restoration for force main	SY	4,711			$ 40.15	$ 189,151.11	
	Job conditions, traffic control	% of piping	10%				$ 119,988.08	
	Service connection for houses adjacent to the site impacted by drawdown							
	3/4" Pressure relief valves	EA	5			$ 113.39	$ 566.95	
	3/4" Water Supply Meter	EA	5			$ 145.05	$ 725.25	
	3/4" Curb Stop	EA	5			$ 104.74	$ 523.70	
	3/4" Corporation Stop	EA	5			$ 80.22	$ 401.10	
	3/4" Copper Tubing	LF	90			$ 21.06	$ 1,895.40	
	Well prep	EA	3	$20,000	0.0%	$ 20,000.00	$ 60,000.00	
	Booster pump station	EA	0	$50,000	0.0%	$ 50,000.00	$ -	
	Storage tower, site work, and piping	LS	0	$250,000	0.0%	$ 250,000.00	$ -	
Equipment								***$ 657,830***
	Well Pumps (1 per well)	EA	3			$ 18,000.00	$ 54,000.00	
	Supply/Booster pumps in WTP	EA	2			$ 22,000.00	$ 44,000.00	
	Green sand filter skid (3 x 6' diam with blower)	EA	1			$ 345,630.00	$ 345,630.00	
	Decant tank (20,000 gal)	GAL	20000			$ 2.00	$ 40,000.00	
	Hypo drum area containment	LS	1			$ 8,000.00	$ 8,000.00	
	Metering pumps	EA	2			$ 12,500.00	$ 25,000.00	
	Flow meter	EA	1			$ 6,500.00	$ 6,500.00	
	Online chlorine meter	EA	1			$ 2,700.00	$ 2,700.00	
	Online turbidity meter	EA	1			$ 2,000.00	$ 2,000.00	
	SCADA/PLC system	LS	1			$ 55,000.00	$ 55,000.00	
	Emergency generator + pad	EA	1	$75,000	0.0%	$ 75,000.00	$ 75,000.00	
Building								***$ 356,250***
	New treatment building (includes wiring, plumbing, HVAC)	SF	1,250	$285	0.0%	$ 285	$ 356,250.00	
Installation								***$ 328,915***
	Misc piping and equipment installation	% of equip	25%				$ 164,457.50	
	Electrical conduit, instrumentation, and controls installation	% of equip	25%				$ 164,457.50	

	Sub-Total	***$***	***2,826,407***
Contingency	35%	$	989,242
Contingency for safe yield study		$	-
	Sub-total	***$***	***3,815,649***
General Conditions	10%	$	381,565
Contractor Overhead and Profit	10%	$	381,565
Bonds and Insurance	2%	$	76,313
	Sub-total	***$***	***4,655,092***
Engineering and CM	20%	$	931,018
Escalation to Mid-Point Construction	5%	$	232,755
Bid Market Allowance	5%	$	232,755
	Project Total	**$**	**6,100,000**

New Well Field at Orange County Dwaarkill Site
Opinion of Probable Operation and Maintenance (O&M) Cost
CONCEPTUAL LEVEL ESTIMATE

Category	Description	% of Cost[1]	Direct Const. Cost	Estimated Const. Cost	Estimated Annual O&M
Site/Force Main		1.0%	$ 1,433,411.79	$ 2,596,912.14	***$ 25,969.12***
Equipment		3.5%	$ 657,830.00	$ 1,191,790.61	***$ 41,712.67***
Pump Energy Costs[2,3]					***$ 141,351.18***
Building		1.0%	$ 356,250.00	$ 645,418.13	***$ 6,454.18***
Miscellaneous Piping		1.0%	$ 328,915.00	$ 595,895.31	***$ 5,958.95***
	Estimated System Annual O&M Cost				***$ 222,000.00***

Rounded

1. O&M Cost estimated as a percentage of Total Construction Cost, per HDR 2004 Cost Estimating Guide developed for EPA Guidance Manual's Cost Estimates
2. Combined Horse Power for Well and Supply/Booster Pumps estimated from Previous HDR Design Project (PS-173) as 60 hp
3. Cost based on Pumping on a 24/7 basis, 365 days a year. Cost per KWh of $0.05 from to Central Hudson Gas & Electric residential rate for 2010 to 2012

Dwaar Kill - Pine Bush Water Supply Project Feasibility Plan
Treatment Facility, Conveyance Piping and Wells
Opinion of Probable Cost
CONCEPTUAL LEVEL ESTIMATE

ASSUMPTIONS

1 One gate valve about every 500 ft.
2 The trench for the 8" DIP main is 3' wide, 5' deep.
3 Assume every bend will be mechanical joints with restrained pipe.
4 Total project cost does not include sales tax, legal costs, permitting, O&M, land acquisition, environmental impact, and unusual geotechnical costs.
5 18' copper tubing for service connection to each house.
6 A contingency of 35% of the direct construction cost is assumed. Other indirect costs are assumed as follows:
   a. General Contractor overhead and profit , OH&P: 10%
   b. General Conditions including mobilization, testing, bonds: 10%
   c. Escalation to mid-point construction: 5%
   d. Bid Market Allowance: 5%
   e. Engineering and Construction Management: 20%

Orange County Water Supply Feasibility Study
Conceptual Cost Estimate

								SFR Cost Based on Total Sales		Rates Based on Total Sales	
Project	**Upfront Capital Investment (A.)**	**Interest During Construction (B.)**	**Cost of Debt Issuance (C.)**	**Total Debt Issued (D.)**	**Annual Debt Service (E.)**	**Annual O&M Costs (F.)**	**Total Annual Costs Year 1 (G.)**	**Cost Per 80K gals, Year 1 (H.)**	**Cost Per 80K gals, Year 10 (I.)**	**Rate Per 1,000, Year 1 (J.)**	**Rate Per 1,000, Year 10 (K.)**
1. Blackhawk	$6,100,000	$162,667	$93,940	$6,356,607	$461,801	$193,084	$654,884	$717.68	$625.74	$8.97	$7.82

Assumptions:

(A.) Inflated by HDR to the midpoint of construction (2014) at 3% per year.
(B.) Assumes that interest costs during construction are capitalized at the rate of 2% annually using 2/3 of construction costs as the average amount outstanding for two years.
(C.) Issuance costs are assumed to be 1.5% of needed funds. Issuance costs would be higher if revenue bonds are used, typically requiring deposits for reserve funds.
(D.) Total debt issued is the sum of (A.) plus (B.) plus (C.).
(E.) Annual debt service is based on a 30 year term of the bonds, an assumed interest rate of 6.0% (current rates are lower) and level principal & interest payments.
(F.) Annual O&M costs reflect a 3% per year inflator from the current (2013) HDR estimate to 2015 (2 years), the first year of operation.
(G.) Total annual costs are presented in 2015 dollars and equal debt service (E.) plus O&M costs (F.)
(H.) Total annual costs divided by the total sales in year 1 (2015); expressed as $ per 80,000 gallons which may be a reasonable annual quantity for a single family household.
(I.) Total annual costs divided by the total sales in year 10 (2024); O&M cost has increased, debt service remains the same; expressed as $ per 80,000 gallons.
(J.) Total annual costs divided by the total sales in year 1 (2015); expressed as a rate per million gallons (MG).
(K.) Total annual costs divided by the total sales in year 10 (2024); expressed as a rate per million gallons (MG).
(L.) SFR = Single Family Residential customer.
(M.) Design/construction is assumed to begin in 2013, with completion in 2015. The facilities are assumed to last 30+ years.
(N.) The initial customer demand is assumed to be 0.20 million gallons per day (MGD) in Year 1, increasing to 0.25 MGD in Year 10. These figures represent Total Water Sales.
(O.) The annual debt service, the annual O&M costs & the projected rates and charges do not include any other costs of the water system that are unrelated to the above project.

Appendix E

Permitting

DWAAR KILL – PINE BUSH WATER SUPPLY PROJECT

SCOPE OF WORK FOR ENVIRONMENTAL SERVICES DURING DESIGN

DECEMBER 2012

1.0 INTRODUCTION

The purpose of this document is to outline required environmental services for the proposed Pine Bush-Crawford Water Main Installation project. The Dwaarkill well field is located approximately 2 miles southeast of the Village of Pine Bush. A new distribution system would be required to connect the well field to the Pine Bush Water District. The connection piping is anticipated to travel northwest on Hill Avenue from the Dwaarkill wellfield, thence northwest along Rt. 52 to Blackhawk Road. The piping would then terminate on Blackhawk Road at connection point to an existing main, approximately halfway between Route 52 and Route 300. A small pumphouse and water treatment facility will be needed at the wellfield, which requires additional connection piping for conveyance to the facility and for discharge of backwash.

Approving agencies require a demonstration that impacts to regulated resources have been minimized to the greatest extent practicable. Reducing impacts will also reduce the extent of any compensatory mitigation (such as wetlands creation) required by the agencies. Examples of minimization measures that will be incorporated into the proposed project are as follows:

- Tree clearing should be limited to the greatest extent practicable and construction staging and equipment laydown areas should be sited on previously cleared areas.
- The majority of the connection piping should be completed using open cut installation by working directly under the existing roadbed or in the right-of-way. Trenchless installation methods will be employed when crossing the unnamed tributary to Dwaarkill on Hill Avenue and at the intersection of Route 52 and Blackhawk to minimize direct impacts to these water resources.
- New water lines should be located within existing road rights-of-way. Where practicable, utility lines should be installed on the opposite side of the road from wetland resources.
- Assuming that the streams are deemed perennial warm-water fisheries resources by NYSDEC, in-water work may be prohibited from 1 March to 15 July of each calendar year. Reducing in-stream impacts may reduce the potential for work windows. The agencies may also stipulate construction techniques (such as cofferdamming and pumping flow around the work area) to reduce impacts. If needed, temporary stream crossings would be located in areas with low relief and no wetlands bordering the stream banks, and placed perpendicular to the stream to minimize the area of disturbance. No modifications to existing culverts will be necessary.
- Disturbance to wetlands and watercourses should be temporary. If temporary disturbance to wetlands is necessary, soils and vegetation can be stockpiled during construction and be used to return the site to pre-construction conditions.

The following environmental and construction permits are anticipated:

Agency	***Permit/Approval***
USACE	Jurisdictional Determination Nationwide Permit (likely)
NYSDEC	Wetland verification SEQRA – Unlisted Action 401 Water Quality Certification Article 24 Freshwater wetlands (potential buffer-only disturbance) Article 15 Protection of Waters (potential) SWPPP – SPDES General Permit SPDES Article 17 Permit
NYSDOT	Highway Work Permit – NYS Route 52
Orange County	Road Opening Permit – Hill Avenue (County Road No. 52)
Town of Crawford	Site Plan Approval – Planning Board review (likely) Building Permit Road Opening Permit – Blackhawk Road

Based on the current project understanding, preliminary desktop reviews of the route alignment, and a site visit, the following environmental studies and permitting tasks are anticipated:

- Task 1. Wetland and Watercourse Delineation and Agency Verification
- Task 2. Archeological Consultation
- Task 3. Endangered and Threatened Species Assessment
- Task 4. Phase I Environmental Site Assessment and Geotechnical Study
- Task 5. State Environmental Quality Review Act – Environmental Assessment
- Task 6. Wetland and Watercourse Permitting
- Task 7. Stormwater Pollution Prevention Plan
- Task 8. Article 17 (State Pollutant Discharge Elimination Systems) Permit
- Task 9. Permitting Assistance during Construction

2.0 ENVIRONMENTAL STUDIES AND PERMITTING DURING DESIGN

Task 1. Wetland and Watercourse Delineation and Agency Verification

Objective:

To delineate the jurisdictional boundaries of wetlands and watercourses occurring within a 100-foot buffer of the project area, and receive agency verification of the boundary lines.

Activities:

- "Waters of the United States" are wetlands and watercourses that are under the jurisdiction of the U.S. Army Corps of Engineers (USACE). The New York State Department of Environmental Conservation (NYSDEC) regulates wetlands generally larger than 12.4 acres, as well as a 100-foot regulated adjacent area upgradient of the wetland boundary under Article 24 of New York's Environmental Conservation Law. In addition, any wetland within 50 meters of a state-regulated wetland boundary with a surface water connection is also subject to NYSDEC regulation under Article 24, with the corresponding 100-foot adjacent area. NYSDEC also regulates streams that are classified as C(t) or higher (under Article 15).

- Based on a review of the NYSDEC Environmental Resource Mapper, the National Wetlands Inventory (NWI) Wetlands Mapper and observations during the site visit, there are several federally regulated wetlands and stream segments along the route and near Well 2. In addition, a wetland that is both state-and federally regulated (PB-4; Class 2) occurs along the proposed route at the Route 52/Blackhawk Road intersection. No state-regulated watercourses are mapped crossing the proposed route. However at the wellfield, there is one state-regulated stream (Dwaar Kill; Class A) that may be affected by the project.

- The boundaries of wetlands and watercourses within 100 feet of the project boundaries will be delineated (mapped) following the methodologies described in the Regional Supplement for the Northcentral/Northeast Region to the 1987 USACE Wetland Delineation Manual (2011). The location of the wetland and watercourse flags will be surveyed with a survey-grade GPS unit. Delineations will be conducted during the growing season, roughly April through September.

- Following field delineations, a Wetland and Watercourse Delineation report will be prepared, which will include descriptions and maps of all delineated wetlands and watercourses, soil descriptions, wetland delineation forms, and photo logs for these areas. A draft report will be provided to OCWA for review.

- Upon OCWA approval of the Wetland and Watercourse Delineation report, it will be sent to the NYSDEC along with a request for wetland verification to confirm the delineated boundaries, state classifications, and state jurisdiction over these water resources.

- The report along with a request for a preliminary Jurisdictional Determination will be submitted to the USACE. If Waters of the US are suspected to be non-jurisdictional (i.e., disturbance to these wetlands would not require a USACE permit), then a request for an Approved Jurisdictional Determination may be warranted. The proximity of wetlands to

waterbodies, their general characteristics, and flow relationships are used to evaluate the jurisdictional determination.

- Separate site visits will be coordinated with USACE and NYSDEC to verify the wetland boundaries, and will require a wetland scientist on site. A field crew will re-hang any missing flags in preparation for the agency site visits. A memo documenting the agency field visits and topics discussed will be prepared and circulated electronically.

- Wetland boundary verifications by USACE and NYSDEC are valid for five and ten years, respectively, from the date of the agency's verification letter.

Deliverables:

- Draft Request for Wetland Verification, which includes the draft Wetland and Watercourse Delineation report, to OCWA for review (electronic)
- Request for Wetland Verification to NYSDEC – up to 3 copies
- Response to NYSDEC comments – up to 3 copies
- Draft Request for Jurisdictional Determination to OCWA for review (electronic)
- Request for Jurisdictional Determination to USACE – up to 3 copies
- Response to USACE comments – up to 3 copies

Task 2. Archeological Consultation

Objective:

To determine the presence of historic and/or archeological resources within the project area.

Activities:

Based on a review of the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) online database, there are no listed historic sites along the proposed route. However, virtually the entire route is located within mapped Archeologically Sensitive areas.

- OPRHP will be consulted during design. With the route located along existing roadways in areas that have undergone substantial prior disturbance, it is assumed that OPRHP will concur that the route would have no significant effect on historic or archeological resources.
- If the potential exists for disturbance of listed archeological or historical sites (including changes to the viewshed from a historic site), OPRHP will require an assessment by a qualified archeologist. Concurrence by OPRHP is a prerequisite for obtaining Federal permits.

Deliverables:

- Submit request for ORPHP review of project.

Task 3. Endangered and Threatened Species Assessment

Objective:

To evaluate potential impacts to federal and state listed endangered/threatened species and their associated habitats that may occur due to the proposed project.

Activities:

Federally-listed endangered/threatened species (ETS) are managed by the U. S. Fish and Wildlife Service (USF&WS); state-listed species are managed by NYSDEC. Concurrence that the project would not result in adverse impacts to ETS and that it would be suitable for a Nationwide Permit (Task 6) by USF&WS is a prerequisite for obtaining Federal permits. A consultation letter was sent to NYSDEC Natural Heritage Program (NHP) during the feasibility phase. The response to this letter will be used for correspondence with USF&WS and developing the species assessment narrative for the EAF (described under Task 5).

The USF&WS database lists the following four species for Orange County: the small whorled pogonia (a plant), the Indiana bat, bog turtle, and the dwarf wedge mussel. Based on habitat requirements, the Indiana bat and bog turtle could potentially occur along the proposed route, but impacts to their habitat are unlikely. Dwarf wedge mussels have been reported only from the Neversink River drainage in Orange County. The small whorled pogonia was recently (August 2010) reported in Orange County.

In addition to the federally-listed species, the timber rattlesnake, a state-threatened species, may also be found in the project area. The brook floater, a state-threatened mussel, has been found in the Shawangunk Kill, which is downstream of the project area and has the potential to be affected by backwash discharges. The NYSDEC Environmental Resource Mapper depicts circular habitat areas where rare species have been documented but does not identify the species. There were records for the bald eagle and pied-billed grebe (NYS – threatened species) on the northern portion of the proposed route.

- Following the new USF&WS protocols for project reviews, a submission will be made that includes the NHP correspondence. This coordination will follow the new 7 step process that USF&WS has recently established.
- Conduct a site visit to evaluate potential endangered species habitat along the route. It may be possible to conduct this field assessment concurrent with the wetland delineation task.
- Develop a narrative that describes agency consultation and potential project impacts on the protected species or their habitat for use in the EAF.

- Evaluate whether the likelihood that an Article 11 (Incidental Take) permit would be needed based on species, habitat, and the scope of the project.

Deliverables:

- Submit request for USF&WS review.
- Draft write-up for SEQRA review

Task 4. Phase I Environmental Site Assessment and Geotechnical Study

Objective:

To evaluate soil suitability that will inform the design and the SEQRA EA.

Activities:

- Soil borings and an associated geotechnical report will be provided by a Soil Boring Sub-Contractor (to be pre-approved by OCWA) and used to determine foundation requirements for water treatment plant. Performing a geotechnical study adjacent to regulated waters and wetlands is either exempt from requiring permits or agency notification is not required because the action is deemed minimally intrusive.
- A Phase I Environmental Site Assessment (ESA) would be required as part of the SEQRA review and will be prepared for the route and the wellfield. The objective of this task is to determine to what extent any Recognized Environmental Conditions (RECs) exist or may have existed on or in the immediate vicinity of the property that would impact the proposed work effort as defined under the American Society for Testing and Materials (ASTM) 1527-05 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (AAI). Work will be performed by an Environmental Professional as defined within the ASTM standard. As standard procedure under the ASTM Standard, HDR will perform the following activities:
    - Engage a database research firm to conduct a regulatory database review search on the route, wellfield and surrounding properties that will include: federal standards, state standards, federal supplemental, state supplemental, local and brownfields databases within a regulatory minimum-search distance of the property. If available, the database report will also include Sanborn, city directory, and historical topographical maps. If necessary, HDR will complete further analysis of sites and orphan sites in the databases that, in the view of an environmental professional, may pose an impact to the subject property.
    - Complete historical land-use research, which is reasonably ascertainable as stated in ASTM standards, such as aerial-photograph review, USGS 7.5-minute topographic maps, fire-insurance maps, a local street-directories search, property-tax files, building-department records, recorded land title/deed records, and zoning/land-use records.

    - Review regional and local geology/soil conditions.
    - Review site-related floodplain maps.
    - Perform a site reconnaissance of the route and wellfield. The site inspection will be conducted in order to observe any potential RECs located on the property or surrounding properties that may impact the anticipated project.
    - Conduct interviews with the property owners and/or people with knowledge of the route and wellfield as appropriate. If conditions warrant interviews with surrounding property owners will be conducted.
    - Conduct, as appropriate, interviews with local government officials who would have specific information on the property, including the local fire department, health department, planning department and historical society/library to determine any additional information on the historical land usage of the property and surrounding properties
- As stated in the ASTM standard, no invasive site work, quantitative chemical analysis, asbestos, lead-based paint, components of building materials, radon, asbestos and lead based paint will be included in the Phase I ESA. HDRs assessment will not include a real estate assessment.
- HDR anticipates a low risk for the presence of hazardous materials on and in the vicinity of the project, however any additional work necessary due to RECs identified during the Phase I ESA will be further investigated through a Phase II ESA under a separate scope and is not included. Remediation is also not included as part of this scope of work.

Deliverables:

- Geotechnical report (electronic and up to 2 hard copies)
- Draft Phase I ESA for OCWA review (electronic)
- Final Phase I ESA (electronic and up to 2 hard copies)

Task 5. State Environmental Quality Review Act – Environmental Assessment

Objective:

A State Environmental Quality Review Act (SEQRA) Long Form Environmental Assessment Form (EAF) and related documentation will be prepared for the proposed project.

Activities:

The Proposed Project would likely be considered an Unlisted Action pursuant to SEQRA and would therefore require the preparation of an EAF to be used as the basis for determining whether one or more significant adverse environmental impacts may result from its authorization. The goal of the EAF will be to provide a sufficient level of analysis to determine whether the potential for significant adverse environmental impacts would warrant the preparation of an Environmental Impact Statement.

- Up to two project meetings during the State Environmental Quality Review process will be used to define the purpose and need and scope the potential impacts associated with the project. A site visit will also be conducted.

- Project Description: A description of the proposed action and its background, purpose, public need and benefits, including required approvals and public actions will be developed. Enough information will be provided to allow an assessment of potential project impacts.

  A general description will be included of the methods and timetable anticipated to be followed in developing the Proposed Project, identification of the anticipated first full year of operation of the facility (the "Build Year"), and identification of the SEQRA lead agency. A list of anticipated discretionary approvals (assumed to be limited to the funding and undertaking construction), will be included. It is assumed that the revised EAF Long Form (revised 2013) will be available for use in this assessment.

- Impact Categories to be Analyzed in the EAF:

  1. *Land Use*

  Land uses and zoning classifications within a ¼-mile of the project site will be identified, based on information provided the by the Orange County Department of Planning. Land uses will be verified in a field survey. Consistency with recommendations of adopted local land use plans will be evaluated.

  2. *Water Quality*

  Results of Task 1 "Wetland and Watercourse Mapping and Agency Verification" will be summarized in the EAF. Potential impacts to groundwater quality and quantity will be identified.

  3. *Air Quality*

  Based on thresholds provided in Part 2, Section 7 of the SEQRA Full Environmental Assessment Form, it is not anticipated that a quantified air quality assessment will be required for inclusion in the EAF.

  4. *Threatened or Endangered Species*

  Results of Task 3 "Endangered and Threatened Species" will be incorporated into the EAF.

  5. *Agricultural Resources*

  Potential use of agricultural land and disruption of agricultural activities will be identified.

  6. *Aesthetic resources*

  A detailed evaluation of potential impacts on visual resources is not anticipated since the Proposed Action is not expected to result in the construction of new structures.

7. *Historic and Archaeological Resources*

Results of Task 2 "Archeological Assessments" will be summarized in the EAF.

8. *Open Space and Recreation*

Existing and planned publicly accessible open space resources will be inventoried based on information from the Orange County Department of Planning. Direct impacts to open space resources will be identified. An assessment of demand on open space resources is not anticipated since the Proposed Action itself would not add new population, and is proposed in response to anticipated population growth by 2020.

9. *Critical Environmental Areas*

Established Critical Environmental Areas within the project area will be identified, along with potential impacts to those areas due to the Proposed Action.

10. *Transportation*

No new vehicle trips or changes to the existing transportation system are anticipated during the operational phase of the Proposed Project. Therefore, it is not anticipated that a transportation assessment would be required for inclusion in the EAF. Any construction-period effects are expected to be short-term, less than two years, and therefore would not warrant a quantitative assessment.

11. *Energy*

A description of energy usage related to the operation of the proposed water supply system will be provided in the EAF. Proposed energy usage will be compared to baseline energy use in Orange County based on data provided by the Orange County Department of Planning.

12. *Noise and Odor*

Since the Proposed Project entails the implementation of a water supply system within existing transportation rights-of-way, no operational-period noise, odor, or vibration effects are anticipated. It is assumed that no blasting would occur within 1,500 feet of a hospital, school or other vibration-sensitive facilities. Any construction-period noise effects are expected to be short-term, less than two years, and therefore would not warrant a quantitative noise assessment.

13. *Public Health*

It is not anticipated that the Proposed Project will have any significant adverse environmental impacts on noise and air. The results of the Task 4 Phase I ESA will be summarized in the EAF.

14. *Growth and Community or Neighborhood Character*

The Proposed Project involves the implementation of a new water supply system in Orange County in response to projected demand in 2020. Therefore, the Proposed Action itself is not anticipated to contribute to population growth or demand on existing community facilities or services.

Deliverables:

- Preliminary draft EAF Long Form and narrative will be submitted for OCWA review (electronic)
- Draft EAF will be submitted to Lead Agency & OCWA for review – up to 10 copies
- Final EAF – up to 10 copies

Task 6. Wetland and Watercourse Permitting

Objective:

Develop the appropriate State, Federal and local permits for impacts to wetlands, watercourses and regulated adjacent areas of the project area, based on the findings of Task 1. Wetland and Watercourse Delineation effort.

Activities:

Federal Permits for the project would likely consist of one or multiple Nationwide Permits (NWP) from USACE. Potentially applicable Nationwide Permits for the proposed project are NWP 12 (Utility Line Activities) and/or NWP 33 (Temporary Construction Activities). If permanent structures are proposed below the Ordinary High Water Mark of the receiving stream, such as to pipe discharges from the water treatment plant, a USACE Nationwide Permit 7 (Outfall Structures) may be applicable. There are several thresholds for the use of NWPs, including a maximum disturbance of a half-acre of Waters of the US. Acreage/linear footage disturbance calculations will consider the temporary and permanent cumulative ("single and complete project") impacts for the water line routes, access needed for the well locations, and the disturbances associated with the water treatment plant.

The proposed work areas are located within the Town of Crawford. A review of the municipal websites found references to state-regulated wetlands, but no citation of local wetlands protection plans or ordinances; however, the project will likely require review by the Town's Planning Board.

- Prior to the preparation of permit application materials, a pre-permit application meeting with the USACE New York District will be arranged for and attended.
- A Joint Application for Permit (JAP) will be prepared to apply for federal and state approvals.
- Given the anticipated disturbance, the project is assumed to be within the threshold for a Nationwide Permit and would be able to meet the permit-specific conditions; therefore, an Individual Permit from USACE does not appear necessary. In this case, the JAP will be filed as a Preconstruction Notification (PCN) with USACE New York District (Western Permits). The timeline for verification of Nationwide Permits (from USACE's receipt of a complete PCN) is generally 45 days; and can be longer due to consultation

with USF&WS and ORPHP. With the proposed route, we assume that permanent disturbance to water resources will be limited to 0.1 acres or less through avoidance and by conducting restoration plantings to off-set temporary disturbances.

- For state approvals, the JAP will address water resource concerns associated with Freshwater Wetlands (Article 24) and 401 Water Quality Certification (as a condition of a Nationwide Permit). If discharges associated with the water treatment plant are proposed to NYSDEC Class A watercourses, an Article 15 (Protection of Waters) Permit will be required.
- A pre-application meeting with Town representatives will be coordinated to discuss the project and potential permitting requirements.
- The JAP will be modified and submitted as the Town application. As part of the site plan approval process with the Planning Board, up to 4 meetings and one public hearing are anticipated.
- Up to 2 presentation boards will be developed for town meetings. Because the water treatment facility is located away from developed areas and significant viewsheds, a rendering is not included in this scope of work.

Deliverables:

- Draft JAP for OCWA review (electronic)
- JAP for USACE and NYSDEC review (up to 8 copies)
- Response to USACE and NYSDEC comments (up to 8 copies)
- Draft Town application for OCWA review (electronic)
- Town application for review (up to 15 copies)
- Response to town comments (x4 up to 15 copies)

Task 7. Stormwater Pollution Prevention Plan

Objective:

Prior to the construction of the proposed water main, water treatment plant and ancillary driveway and parking surfaces, a Stormwater Pollution Prevention Plan (SWPPP) will need to be prepared. The SWPPP must be prepared to obtain a New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from a Construction Activity (GP-0-10-001).

Activities:

Installation of approximately 10,560 linear feet (approximately 2 miles) of water main from the Dwaar Kill well field in the Town of Crawford to the Village of Pine Bush is anticipated to disturb greater than one acre of total area and result in the construction of impervious cover to accommodate a small water treatment plant. As such, a NYSDEC SPDES General Permit for

Stormwater Discharges from Construction Activity will be required. A SWPPP will be prepared to include:

- Background information about the project
- Soil map and narrative description
- Hydrologic and Hydraulic Analysis of pre and post construction conditions
- Description and design of stormwater management practices
- Construction phasing plan and narrative
- Narrative describing erosion and sediment control practices including maintenance
- Erosion and sediment control plans
- Inspection schedule
- Discussion of additional pollution prevention measures
- Construction Drawings (e.g. Existing Conditions Plans, Grading/Utility Plans, Erosion & Sediment Control Plans, Profiles, Details)
- Notice of Intent (NOI) form

A one-day site visit by up to two engineers will be conducted prior to SWPPP preparation to evaluate the site conditions and contributory drainage area along the water main route, site of the water treatment plan, and accompanying design features.

The SWPPP will contain a hydrologic and hydraulic analysis of pre-construction and post-construction conditions, including supporting calculations and figures. It is assumed that there will be a net increase of stormwater runoff from pre-construction conditions due to the new impervious areas being created through the construction of the water treatment plant and associated driveway and parking facilities. All other pre-construction land uses outside of the water treatment plan (e.g. for the water main utility) will be replaced in kind, which means there will be not change in land use between pre- and post-construction conditions. Due to the net increase of stormwater runoff from the pre-construction condition, stormwater quantity, quality, and runoff reduction volume requirements will need to be met. Permanent post-construction stormwater management or best management practices, such as dry wells, rain gardens, bioretention areas, or other applicable stormwater management practices, will be designed. Pollutant loading calculations are not anticipated to be required.

Electronic copies of the draft SWPPP will be submitted to OCWA for review prior to submittal to the NYSDEC. The SWPPP may be revised based on comments from the OCWA and NYSDEC. It is anticipated that there will be only one round of comments from OCWA.

<u>Deliverables:</u>

- Draft SWPPP for OCWA review (electronic).
- SWPPP for NYSDEC review (electronic and up to 3 hard copies).
- Revised SWPPP for NYSDEC approval (electronic and up to 3 hard copies).

<u>Assumptions and Key Understandings</u>

- Erosion and sediment control design will be in conformance with the latest available version of the *NYS Standards and Specifications for Erosion and Sediment Control*.
- SWPPP requires a post-construction stormwater practice plan (PCSM).
- Site does not fall in a 303(d) listed watershed.
- Site is not located in a Municipal Separate Storm Sewer System (MS4).
- Site does not adversely effect a listed or eligible to be listed historic site.
- The project is anticipated to disturb greater than one acre of total area and result in the construction of impervious cover to accommodate a small water treatment plant. As such, a permanent stormwater management practice will need to be constructed.
- Project is anticipated to have less than 5 acres of total land disturbance. As such, a Phasing Plan will not be required.
- Final Submittal of the Notice of Intent to NYSDEC will be made by the Construction Contractor.

Task 8. Article 17 (State Pollutant Discharge Elimination Systems) Permit

Objective:

To obtain a SPDES permit for the point source discharges that will result from the proposed project.

Activities:

Article 17 (State Pollutant Discharge Elimination Systems) permits will be required for any point source discharges (backwash) from the water treatment plant to surface waters. Key issues associated with the SPDES permit application will be the volume and frequency of the discharge, characteristics of the receiving water body (ephemeral, intermittent or perennial watercourse and flow rate), and any pretreatment of the discharge water to meet stream (Class C) standards.

- A pre-application meeting with NYSDEC to discuss the aspects of the SPDES permit will be held during the early design phases. Monitoring requirements during the operational phase (frequency of testing and parameters) will be identified at this meeting.
- Application materials for the SPDES permit will consist of the completed NYSDEC application form (NYSDEC Form NY-2C), location map (USGS acceptable), a site plan (property lines, topography, discharge lines and proposed outfall locations), SEQRA information (addressed above), proof of correspondence with NYS OPRHP, and, at NYSDEC's discretion, an Engineer's Report and/or a Waste Assimilative Capacity Study. The application would also include information on the chemistry of the discharge, process flow diagrams and descriptions, proposed volume and frequency of the discharge, and thermal characteristics of both the discharge and the receiving water body. NYSDEC allows an up to five degree (F) temperature increase or decrease attributable to a discharge to the receiving body water body for non-trout waters.

- The outfall location(s) and need for any work (splash pads) within existing watercourses will dictate if any other permits are required for the discharge.
- Following construction of the water treatment plant, the SPDES permit will require discharge water to be sampled for baseline parameters. A one-time full parameter water quality test would be conducted onsite to monitor the effluent. Samples would be sent to a contracted NYS certified laboratory. The data report would be submitted to NYSDEC with the appropriate forms.

Deliverables:

- Draft SPDES permit to OCWA for review (electronic)
- SPDES permit to NYSDEC – up to 3 copies
- Response to NYSDEC comments – up to 3 copies
- Data report of onsite baseline effluent to NYSDEC – up to 3 copies

Task 9. Permitting Assistance during Construction

Objective:

To assist County with permitting compliance activities and reduce the potential for violations during construction.

Activities:

- Prepare an Environmental Compliance Summary Document for use by OCWA and the Construction Contractor to compliance activities, environmental commitments, and track permit expiration dates for permits obtained during design.
- Coordinate and participate in a brief pre-construction meeting with the Town of Crawford to discuss schedule and potential reporting requirements.
- Prepare written correspondence to regulatory agencies to either request permit extensions or minor modifications due to changed field conditions, which may occur during construction.
- Assist Construction Contractor in obtaining County and/or local Road opening permits and New York State Department of Transportation work permits.

Deliverables:

- Draft Environmental Compliance Summary Document to OCWA (electronic)
- Up to 2 revisions of the compliance document throughout the duration of construction
- Up to 4 requests for permit modification and/or extensions

3.0 INFORMATION TO BE PROVIDED BY OTHERS

1. Zoning classification and land uses, including open space resources within a ¼-mile of the project site and proposed piping alignment will be provided the by the Orange County Department of Planning. Land use and open space data will be provided in ArcGIS supported format.
2. Baseline energy data for Orange County will be provided by the Orange County Department of Planning.

4.0 KEY UNDERSTANDINGS AND ASSUMPTIONS

1. Water main could be installed with minimal surface disturbance, such as directional drilling or other comparable technique. Therefore, it is assumed that permanent wetland and watercourse disturbances can be limited to less than 0.5 acres and a USACE Nationwide Permit (or permits) would be applicable.
2. It is assumed that no mitigation for impacts to water resources is necessary. Compensatory mitigation would be required for permanent disturbance of 0.1 acres or more to Waters of the US.
3. With the route located along existing roadways in areas that have undergone substantial prior disturbance, it is assumed that OPRHP will concur that the either route would have no significant effect on historic or archeological resources.
4. No regulatory floodplains and floodways occur within the proposed project area.
5. Preparation of or conducting season-specific studies to assess state or federally listed species in the project area is not included.
6. No public involvement activities are assumed are part of Task 5 "SEQRA Environmental Assessment"

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