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Water Service Feasibility Study
Hamlet of West Hurley

Town of Hurley
Ulster County, New York

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 HYDROGEOLOGIC ASSESSMENT 2
- 2.1 Water Quality and Water Treatment 3

3.0 WATER DISTRIBUTION SYSTEM 4
- 3.1 Water District Boundary 4
- 3.2 Demand 5
- 3.3 Infrastructure 5

4.0 PROJECT COST 7
- 4.1 Construction Cost 7
- 4.2 Cost Recovery 8

5.0 POTENTIAL GRANT OPPORTUNITIES 10

6.0 CONCLUSIONS 12
- 6.1 Acknowledgements 12

APPENDICES

APPENDIX A: NYSDEC Spills Database

APPENDIX B: Water District Schematic

APPENDIX C: Estimated Project Cost

APPENDIX D: 2007 Average Estimated Costs for County and Town Special Improvement Districts

REFERENCES:

1. *Report: Aquifer Protection Study, Town of Hurley,* prepared by Katherine J. Beinkafner, PhD, CPG, Mid-Hudson Geosciences, December 2003.

1.0 INTRODUCTION

C. T. Male Associates P.C. has been retained by the Town of Hurley to perform a water service feasibility study for the Hamlet of West Hurley. The Hamlet of West Hurley is located on the north shore of the Ashokan Reservoir, south of the municipal boundary with the Town of Woodstock. The hamlet contains relatively dense residential and commercial development along the State Routes 28 and 375. There are no public sewers or water systems in the Town (except for a small, well-fed system on Pine Street), and most properties within the study area are serviced by on-site wells and septic systems.

Shallow bedrock in the West Hurley area may affect the performance of the on-site septic systems and private wells. Providing a public water system in this area should have a positive impact on landowners. The purpose of this study is to determine the following:

- A water district with a schematic system layout
- A cost estimate for the capital improvements and resulting user costs
- A summary of potential grant opportunities

A potential source of water was assumed based upon local knowledge. If the project appears feasible, then a future phase of this study would include locating water and determining its quality.

2.0 HYDROGEOLOGIC ASSESSMENT

The surficial geology of the West Hurley area is characterized by relatively shallow glacial till deposits, over a majority of the town boundaries (Surficial Geology Map, Beinkafner, 2003). Soils in these areas are of moderate permeability, generally allowing for relatively rapid groundwater recharge. In the northern portion of the Town is a stratified sub-glacial stream deposit with a relatively low permeability and slow groundwater recharge. Bedrock is encountered below these deposits at a depth of approximately 20 feet; however in most areas within the Town of Hurley, bedrock is present at the surface or a few feet below the surface, particularly in the study area. Bedrock in this area is part of the Hamilton Group, in the Plattekill and Ashokan Formations, consisting of shales and sandstones (Beinkafner, 2003).

Based on information collected from 24 wells in the Hamlet of West Hurley, the average well depth is 169 feet, with an average well yield of 15 gallons per minute (gpm) (Beinkafner, 2003). The maximum yield reported was 45 gpm and the minimum was 1 gpm. There is an unconsolidated aquifer mapped by the USGS, reporting a yield of 1 gpm near the northern portion of the town (USGS Unconsolidated Aquifer Map, Beinkafner, 2003). Wells could be receiving their recharge, in part, from the Ashokan reservoir due to underlying fractures in bedrock. This is suspected based on the presence of drilled wells and their relatively high yield.

Based on a review of existing data, the best potential location for a public water source in West Hurley would be within a bedrock well drilled close to the eastern Town boundary on vacant land off Van Dale Road. While there are no significant fractures identified at the surface in the West Hurley area, based on a NYS Geological Survey map (Geologic Brittle Structures Map, Beinkafner, 2003), the output of some wells in the area suggest that there are deeper and/or more productive fractures supplying these wells that could possibly be hydraulically connected to the nearby Ashokan Reservoir. This general area is recommended for test drilling as the most viable potential source for a productive water supply.

There are currently 12 open spills listed in the West Hurley area based on information obtained from the NYSDEC database (NYSDEC, 2007), and most are due to underground storage tank failures. Due to the relatively high permeability of soils and the possible presence of bedrock fractures in the West Hurley area, any

contamination could rapidly infiltrate groundwater sources in these areas. Three of the spills reportedly have impacted water wells. Appendix A summarizes the information on all the open spills in the Hamlet of West Hurley obtained from the NYSDEC database. Included in Appendix A is a spills chart and corresponding spills map, which shows the unconsolidated aquifer in the West Hurley area, as well as the area suggested for test drilling. It should be noted that the suggested well area is not located within the boundary of the unconsolidated aquifer. The well could be drilled into bedrock and may likely receive recharge from the Ashokan Reservoir through bedrock fissures.

2.1 Water Quality and Water Treatment

The type of water treatment needed depends on the quality of the water discovered during the test drilling phase of this project.

Based upon the findings in the Aquifer Protection Study, it is likely that the well field will be connected hydraulically to the Ashokan Reservoir. Therefore the water source may be classified as groundwater under the influence of surface water. New York State regulations governing public water systems require treatment of such groundwater (through practices like filtration or UV disinfection) to remove or inactivate pathogens that are present in surface water sources.

If the groundwater source is not under the influence of surface water, pathogens are likely not present and State regulations do not require such treatment. At a minimum the Town will be required to chlorinate the water from the wells (regardless of source classification), and the Town Board may decide to require fluoridation of the water. Additionally, there are a variety of other potential treatment scenarios which could be required depending on the quality of the water discovered.

3.0 WATER DISTRIBUTION SYSTEM

The proposed water district map is found in Appendix B. This map shows the proposed water district boundary, tank and well location, and water main location/size. The district boundary includes the area considered to be in most need of water.

3.1 Water District Boundary

Initially, a large water district was studied, which included 820 properties and included most of the properties in the Hamlet of West Hurley south of the Town of Woodstock municipal limit, north of State Route 28 and east of Maverick Road. The total project cost to construct this district was estimated to be $24.5 million, and the estimated annual bond repayment cost per household was $1,671.

The proposed West Hurley Water District includes properties in densely developed area north of State Route 28, east of Pine Street and west of Van Dale Road. The proposed water district includes 260 parcels. The reason the smaller district is recommended is related to the total project cost. The larger district's project cost is nearly four times the proposed district's cost. It will be easier for the Town to obtain project funding and grants sufficient to bring costs into the affordable range for the smaller district. Both cost estimates and project boundaries can be found in Appendices B and C.

Within the proposed water district, the majority of the properties are residential (238), and the remainder includes: 14 vacant lots, five commercial lots, the West Hurley Library, the West Hurley Fire House, and the West Hurley Elementary School. By incorporating only the densest portion of the hamlet, the cost per user is reduced to the maximum extent practicable. Several iterations of the water district boundary were estimated prior to proposing the district boundary included herein. There are additional residences and commercial properties to the north and west of the proposed water district boundary that could be included in the district; however, the additional cost for infrastructure to serve these areas has the impact of increasing the user cost.

The proposed water district also maximizes its proximity to the proposed well field. The well could be located on the elementary school property, just west of Van Dale

Road, depending on results of test drilling. By having the well field close to the system users, the cost associated with transporting water to the users is minimized.

3.2 Demand

The estimated water use for the proposed water district is 95,000 gallons per day (gpd). This estimate is based upon an average water use of 300 gpd per single family home, 4,500 gpd for the elementary school, 1,000 gpd per commercial property, and 10,000 gpd to account for future development of the vacant land within the district. The peak water usage associated with this district would be 265 gpm, assuming a peaking factor of 4. Tank storage would be utilized to provide peak flows, and provide adequate fire protection for the system. A 150,000 gallon water storage tank has been included to provide the required storage for the proposed district.

3.3 Infrastructure

The proposed water district would include 8 and 12-inch ductile iron water mains, fire hydrants, valves, corporation stops and curb boxes, a water tank, a well field and a treatment system.

The water tank included in the project cost is a 150,000 gallon double ellipsoidal elevated tank with a minimum water level of 100 feet, located west of Van Dale Road atop a hill on the elementary school property. The well field pumps would pump water to the tank, and the tank would drain and fill based upon system demand. The hydraulic elevation of the tank would provide pressures in the system ranging from 40 psi for the customers in the Overlook Drive area, who are at the highest elevation in the system, to 100 psi for the customers along the northern end of Pleasant Ridge Drive, who are at the lowest elevation in the system. This pressure range is satisfactory for a public water system. The proposed tank elevation would also provide satisfactory pressures to the larger water system studied; therefore the tank would be feasible if the water district were expanded in the future.

Traditional guidance dictates that the distribution storage be the total of the average daily demand plus fire flow. If a 1,000 gpm fire flow is assumed for two hours, the storage requirement is 120,000 gallons for fire flow plus 95,000 gallons for domestic usage totaling 215,000 gallons. It should be noted that the surrounding area will at least, for the near future, continue to be on private wells, therefore the fire department

will have to continue to rely on tanker operations for much of their fire fighting supply. It is also not known at this time how capable the well source will be for providing additional water during a fire.

The storage tank style included is a multi-legged type tank which is the least expensive style. The size included is 150,000 gallons, which is appropriate for the required storage and reduces costs. If cost were not an issue for this project, a 250,000 gallon pedestal tank would be included.

The required components of the well field and treatment system at this time are not fully known, since no test drilling or water quality testing has been performed. Given the potential for the groundwater to be hydraulically connected to the Ashokan Reservoir, treatment of the water will likely be required. Regardless of the water quality or source, chlorination of finished water is required. The most feasible method of removing pathogens from the water for this project is inactivation through UV disinfection, in which water is pumped through a structure with lights emitting UV rays. Pathogens are inactivated at a rate depending on the time of contact and intensity of the lights. The finished water would then be chlorinated before entering the distribution system.

A total of 20,000 feet of 8-inch ductile iron water main, and 5,000 feet of 12-inch ductile iron water main are proposed to serve the properties within the water district. The 12-inch spine that runs through the center of the system connects the well field, tank and the distribution system, and provides for better system performance during fire flow conditions. The 12-inch spine also provides for a future expansion of the water district along Route 375 to potentially serve the parcels within the larger studied water district. The remainder of the distribution system will include 8-inch water mains. It is estimated that at least 70 hydrants will be installed within the system. Gate valves will be installed at all intersections, and in locations pertinent for maintenance. Water service corporations and curb stops will be installed for each property. A ¾-inch copper water service will be extended to the property line, and it will be the responsibility for the property owner to install the water service to their structure.

4.0 PROJECT COST

The estimated project cost is broken into several components: the construction cost, design fees, construction administration and contingencies. Based upon the estimated project cost, an assumed interest rate and bond period, the annual tax increase to an average homeowner within the district (to pay back the loan to build the water system) was calculated. The estimated project cost spreadsheet is available in Appendix C.

4.1 Construction Cost

The construction cost is based upon current market and bid prices for labor and materials to construct and install the components within the water system. The cost estimate was broken into twelve line items, some of which contain multiple components.

- The water tank price includes the structure, piping, foundation and site work.
- The well drilling and pumps price is a conservative estimate given the fact that the well field conditions are not known at this time.
- The water treatment system price includes UV disinfection, chlorination, piping, a 20' x 25' building to house the facility and all associated site work.
- The water main unit prices include material, bedding and backfill.
- The bedrock removal quantity is based upon the assumption that the average bedrock depth in the West Hurley area is 2.5 feet below grade, which is consistent the Ulster County Soil Survey. The unit price for bedrock removal assumes that the bedrock is hard (like sandstone) and can be removed using a rock trencher, rock saw or blasting.
- Pavement restoration on roads is based upon a 9 foot width of disturbance for a water main. The pavement cost will rise if the Town or State requests, or if project conditions warrant, that the entire width of the road be repaired as part of this project. It is assumed that all water mains (other than the mains from the well to the tank to the elementary school) will be beneath existing roads.

- The overland restoration price assumes a 30 foot width of disturbance for the water main, and includes all seeding and mulching costs.
- The line items for miscellaneous valves and tees include all valves and tees at intersections and corporation and curb stops.
- The line item for general restoration includes items such as: driveway and lawn restoration, fence and mailbox repair, protection and replacement of trees and landscaping.
- The line item for environmental protection includes protection of wetlands and other waters of the U.S., erosion and sediment controls, and stabilization of steep slopes and other environmentally sensitive areas.

The total estimated construction cost is $4.5 million. One third of the construction cost is associated with bedrock removal. If the assumptions made regarding the costs are inaccurate, the actual costs may be less than the estimates.

An approximate contingency of 20% was added to the construction cost, given the study phase of this project. It is estimated that engineering, administration, legal and construction observation will cost 25% of the estimated construction cost. The hydrogeologic investigation for this project, including test drilling, water sampling and analysis is estimated at $75,000.

The total project cost is estimated at $6.6 million.

4.2 Cost Recovery

The project cost of $6.6 million will be financed through borrowing, and the annual repayment costs for which will be assessed to properties within the District. The taxpayers in the water district should be assessed an annual tax to pay back the loan. A standard loan to a municipality is 30-years at a 5% interest rate. The annual loan payment would be $429,000.

The corresponding annual payment per household in the water district is $1,554 annually. This amount based on use of benefit units, where a single-family residential property is assessed 5 benefit units, and the school 10 benefit units, etc. The Town of

Hurley may decide to use a different cost recovery structure, such as taxing based upon assessed property value.

The annual payment does not include annual water use fees or the cost to connect to the water main. In this area, water use fees may range from $2.00/1,000 gallons to $4.00/1,000 gallons, depending on operational costs. An average household can expect to pay $200-400 per year depending on water use. The estimated cost to install a ¾" copper water service connection to an average home 50 feet off the street is $3,000, due to the high bedrock.

The New York State Comptroller's Office must approve all Town and County improvement districts if the average estimated cost to homeowners is above a specified threshold. The threshold for 2007 Town water projects is $603 (see Appendix D). The estimated annual cost for the average homeowner for this project is 2.5 times the comptroller's threshold. The Town should strive to keep the annual district tax at or below $600 per year, as to not burden district users. A way to reduce the project costs is through grants, which are described in the next section

5.0 POTENTIAL GRANT OPPORTUNITIES

In order to offset the high cost of providing water to residents within the proposed Hamlet of West Hurley Water District, the Town of Hurley should apply for grants and low interest loans. Without grants, it is unlikely that providing water service to this area will be financially feasible, given the high construction cost due to shallow bedrock.

The following grant opportunities may be available for this project:

Federal:

- US Dept. of Commerce, Economic Development Agency - Public Works & Infrastructure Development Grants:

Provides project grants to promote long-term economic development and assist in the construction of public works and development facilities. The EPA will fund up to 80% of a project cost in severely distressed areas.

- U.S. EPA, Watershed Protection Program Grants:

Provides grants to fund the development of effective and comprehensive programs for watershed protection, restoration and management. Since the Hamlet of West Hurley is located within the Ashokan Reservoir watershed, this grant may be applicable for this project.

New York State:

- NYS Dept. of State, Environmental Protection Fund (EPF):

Provides grants for capital projects related to environmental protection, like public water system improvements.

- NYS Dept. of State, Water Quality Planning & Implementation Grants (PIGWQ):

Provides grants for communities within the New York City watershed (including the Ashokan Reservoir) to assist in the development and implementation of community land use tools to protect water quality and resources. This grant provides up to $50,000 for implementation projects and up to $25,000 for planning projects.

- NYS DEC, Clean Water Environmental Bond Act:

Provides low interest loans and grants to fund municipal water supply systems and water quality improvement projects.

- NYS DEC/EFC, Clean Water Environmental Bond Act:

Provides grants for the protection and enhancement of water quality, and drinking water source protection.

These potential grant opportunities should be researched further if the project is to be implemented, to determine if the Town of Hurley is a candidate for recipient of these grants, and the amount of grant money available.

6.0 CONCLUSIONS

The project to provide public water service to residents in the Hamlet of West Hurley is feasible from an engineering standpoint, assuming an adequate water source can be located within or proximal to the proposed water district boundaries. The most reasonable water district has been researched and would include properties north of State Route 28, east of Pine Street and west of Van Dale Road. There is likely groundwater available in close proximity to the area, and it is possible to locate the required infrastructure elements within the project area. A larger water district was studied, with user costs slightly higher than the recommended district; however, the high total project cost could be prohibitive to obtaining sufficient outside funding.

The limiting factor of this project is the high construction cost. This high construction cost corresponds to a high project cost that must be assessed on residents of the district through a district tax. This estimated annual tax is $1,554, which is likely to be prohibitive for the majority of property owners. The water district formation must be approved by the impacted users, and the cost will likely discourage approval of the project. The New York State Comptroller's Office recommends a maximum annual tax increase of $603 for municipal water projects, which should be a user cost the Town should strive to meet, through grant monies. Grants are available to aid in financing public water projects, and should be further investigated.

It is our recommendation that the Town of Hurley move ahead with discussions with State and Federal officials on possible sources of grant monies to finance this project. If these discussions are promising, then the Town should move forward with test drilling and water quality analysis, which would better define the proposed well source.

6.1 Acknowledgements

We wish to acknowledge the help of Town of Hurley Supervisor Michael Shultis in providing guidance in the preparation of this report. We also wish to thank the Town of Hurley Town Board in placing their confidence in C.T. Male Associates, P.C.

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Appendix A
NYSDEC Spills Database

West Hurley, New York
NYSDEC Spills Database
Open Spills as of February 1, 2007

NYSDEC Spill #	Material Spilled	Quantity Spilled	Description of Spill
0610615	Waste Oil	? Gallons	Tank failure, Hoyt Inc., Willams Lane
0506661	Hydraulic Oil	10 Gallons	Commercial Vehicle Equipment Failure, Roadway - 31 Tanglewood Rd.
0506428	Gasoline	? Gallons	Traffic Accident, Getty #98440, 305 Rt. 375
0235009	Cutting Oil	? Gallons	Abandoned Drums, Former Precision Gage, Basin Rd.
	Solvents	? Gallons	
0035004	Unknown Petroleum	? Gallons	Unknown Source, Schultz Residence, 76 Cedar St., Wells impacted w/ MTBE
0006732	#2 Fuel Oil	? Gallons	Tank failure, Potter Residence, 43 Fieldstone Rd.
0003273	#2 Fuel Oil	? Gallons	Tank test failure, Private Residence, 28 Pine Tree Ln.
9905999	Gasoline	? Gallons	Tank overfill, Old Citgo Station, Rt 28 at Zena Rd.
9713492	Gasoline	? Gallons	550 gal. tank overfill, West Hurley Service Station, 305 Rt. 375
	MTBE	? lbs.	
9208578	Gasoline	? Gallons	1520 tank, Exxon Service Station, Rt. 28 & Rt. 375
	MTBE	? lbs.	
8807579	Gasoline	? Gallons	550 gal. tank, Owens, off Rt 28., odor reported in water
	MTBE	? lbs.	
8806253	#2 Fuel Oil	? Gallons	Tank failure, private dwelling - Krauss, Zena Rd., fuel oil found in water