

LEGGETTE, BRASHEARS & GRAHAM, INC.

PROFESSIONAL GROUND-WATER AND ENVIRONMENTAL ENGINEERING SERVICES

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July 13, 1999

Mr. Joseph T. Vespo
Vespo Marketing Associates
P.O. Box 60
Thompson Ridge, NY 10985

RE: Exploration Drilling
73-Acre Site
17K - Montgomery

Dear Mr. Vespo:

Leggette, Brashears & Graham, Inc. (LBG) has completed the site visit to locate possible locations to develop high-yielding wells for water supply for the above-referenced property. The site visits and study to target locations to develop high-yielding bedrock wells was limited to locations on the study parcel and the immediate surrounding area. The potential well sites are designated on the "Ground-Water Resource of Orange County, New York, Orange County Water Authority, Goshen, New York" (GWRS) map sets prepared by Leggette, Brashears & Graham, Inc. (LBG).

This report included fracture-trace maps which were interpreted with additional layers of topography, bedrock geology (including faults), geologic contracts, existing wells, sand and gravel deposits, and State and Federal wetlands in addition to data collected in the field during a recent site visit (Plate 1).

Locations which exhibit more than one of the above features are considered to be the most promising locations for drilling high-yielding bedrock wells. These features frequently are indications of fractured or weathered zones within the bedrock, are a useful tool in identifying major fracture conduits for ground-water recharge and aid in selecting favorable well sites to develop high-yielding bedrock wells.

ST. LOUIS, MISSOURI
FREEPORT, ILLINOIS
WHITE PLAINS, NEW YORK

RAMSEY, NEW JERSEY
SIOUX FALLS, SOUTH DAKOTA
AUSTIN, TEXAS

ST. PAUL, MINNESOTA
WEST CHESTER, PENNSYLVANIA
MADISON, WISCONSIN

TAMPA, FLORIDA
CHELMSFORD, MASSACHUSETTS
HOUSTON, TEXAS

Proposed areas for further exploration should consider favorable geologic data, proposed distribution system, regulatory requirements, existing and potential ground-water contamination areas and waste-water discharge locations. The above data were included on the respective fracture-trace maps of the study area and favorable target locations for development of high-yielding bedrock wells were designated. Exploration for water from bedrock sources is an inexact science in which not all test wells can be expected to produce enough water for use.

Higher-yielding bedrock wells would likely be developed on more significant lineaments in the region which most likely represent possible fractures or fault zones in bedrock units. However, linear traces less than one mile are also useful to target locations for high-yielding bedrock locations. Higher yields are generally found at the intersection of two or more fracture-trace patterns.

Federal and State wetland delineations are mapped (Plate 1) to indicate wetland areas which would likely recharge underlying bedrock units and possibly indicate fracture zones in the underlying bedrock. Although the majority of the unconsolidated material underlying a wetland consists of low-permeable silt or clayey material, the unit is usually saturated and readily recharges underlying permeable bedrock units. Therefore, wetlands of large areal extent may afford excellent recharge to the underlying permeable bedrock aquifers. Fracture traces and faults likely follow large, elongated wetland patterns. The fracture zones in bedrock underlying wetlands are expected to be more deeply weathered and decomposed. Two high yield bedrock wells drilled for the Town of Montgomery yielded 200 and 230 gpm (gallons per minute), respectively, and were targeted in wetland areas.

Drilling in a buffer zone (100 feet from wetland) or a wetland will require applicable permits. Federal, State and Town (if applicable) wetland regulations should be reviewed prior to drilling in a buffer zone or a wetland in Orange County. LBG recommends you contact Lance Kolts of the New York State Department of Environmental Conservation (NYSDEC) to delineate the wetland boundary in areas to proposed well sites.

The GWRS and the attached map (Plate 1) prepared by LBG indicate the study area is underlain by the Martinsburg Formation (On). In Orange County, wells drilled at favorable well sites would likely yield between 25 and 100 gpm. The GWRS indicates average and median yields of 56 gpm and 30 gpm, respectively. The yield ranges reported are 3 to 230 gpm. As discussed in the field during our recent site visit, LBG has supervised the drilling of several wells in the study area. The wells yielded between 1 gpm to as high as 230 gpm.

Several primary locations are mapped on Plate 2 for the possible development of high-yielding wells in order of preference following the recent site visit. To best determine if it is feasible to develop high-yielding bedrock wells, at least one to two wells should be drilled to evaluate the potential yield of the bedrock unit in the area of the study parcel. At the present time there are no projected water demands for this undeveloped site. Available data indicate the site

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has good potential to develop high-yielding bedrock wells. Subsequently, if the ground-water exploration program develops one to three successfully high-yielding bedrock wells, LBG estimates the yield potential of the wells to be about 150,000 to 250,000 gallons per day.

Following delineation of the wetland area by the NYSDEC, LBG recommends that the project team select the site(s) to be drilled and stake the location in the field. Most of the locations are accessible, but will require some excavation to prepare access roads for drilling equipment. Drilling any well in a regulated wetland will require the appropriate regulatory permits.


As requested, the following are recommendations for two well drillers in Orange County LBG has worked with on other similar projects.

- Turnbull Well Drilling Associates
Harriman, New York
(914) 783 - 4188
- David H. Tompkins and Sons, Inc.
Montgomery, New York
(914) 457 - 3611

Should you have any additional questions, please do not hesitate to contact me.

Very truly yours,

LEGGETTE, BRASHEARS & GRAHAM, INC.


Thomas P. Cusack
Associate

