



The  
NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES

hereby issues

LARGE GROUNDWATER WITHDRAWAL PERMIT

NO. LGWP-2007-0002

to the permittee

GUNSTOCK ACRES VILLAGE DISTRICT  
P.O. BOX 7118  
GILFORD, NH 03247  
(603-293-2236)

for the withdrawal of the following volumes of groundwater from the following on-site wells for the purpose of community water supply located east of Leisure Drive in Gilford, New Hampshire (Town of Gilford Tax Map            ):

GAVD-7C 86,400 gallons over any 24-hour period  
GAVD-7D 86,400 gallons over any 24-hour period  
GAVD-7, GAVD-7A, GAVD-7B, GAVD-7C, GAVD-7D a total of 288,000 gallons over any 24-hour period

Date of Issuance:     September 7, 2007  
Date of Expiration:   September 7, 2017

Pursuant to authority in N.H. RSA 485-C:21, the New Hampshire Department of Environmental Services (NHDES), hereby grants this permit to withdraw groundwater from GAVD-7, GAVD-7A, GAVD-7B, GAVD-7C, GAVD-7D subject to the following conditions:

1. The permittee shall comply with the requirements of Env-Ws 388 and RSA 485-C at all times.
2. Water Conservation: Implement the approved Water Conservation Plan dated June 13, 2007 in accordance with Env-Ws 390.
3. Metering Requirements: Withdrawals from all sources must be metered at all times. The permittee shall read source water meters at least once every 30 days. All meters must be selected, installed, tested, and maintained in accordance with the AWWA M6 manual as referenced in Env-Ws 390. The permittee shall provide NHDES with a certificate of calibration and performance specifications for each meter. The permittee shall document and maintain records of all meter maintenance and calibration activities and submit this information to NHDES in an annual report by January 31 of each year.
4. Monitoring and Requirements
  - a) The permittee shall establish and maintain the monitoring and reporting program as described below and as described in: Comment No. 8 of the letter titled "Response to NHDES Comments – Final Well Siting Report" prepared by Emery & Garrett Groundwater Inc. dated July 5, 2007; and two letters titled "Private Well Monitoring Request" addressed to \_\_\_\_\_, Gilford, NH, and \_\_\_\_\_, Gilford, NH, prepared by C & C Water Services dated August 2007, and incorporated herein by reference.
  - b) Existing Off-site Private Residential Bedrock Wells Water Level Monitoring: The permittee shall install pressure transducers and data loggers and measure water levels at a frequency of at least every four hours in the following private wells starting six months prior to system startup:

Lot	Address
20070002DW01	
20070002DW02	

If a private well owner denies permission to monitor water levels or if the identified well cannot be monitored due to a structural limitation, then the permittee shall propose an alternative monitoring location to NHDES for approval. Upon receiving approval from NHDES, the permittee shall install the monitoring well, if not already available, and monitor water levels at the alternative location at the same frequency as the original monitoring well proposed.

All water level monitoring shall be completed by a person who can demonstrate, by education or experience, competency in collecting and reporting hydrogeologic measurements.

Monitoring well locations and frequencies may be added or changed if the water level data obtained contradict the information provided in the permittee's application, or if additional data points are required to assess the potential for adverse impacts to occur.

All monitoring data shall be submitted to NHDES annually by January 31 of each year. The submittals shall be in an electronic format and hard copy format. The annual report shall note any relevant observations that may affect water level measurements or water quality results and include all field notes documenting the monitoring activities for the preceding year. All field notes shall be signed and dated by the personnel responsible for collecting measurements.

#### 5. Mitigation Requirements

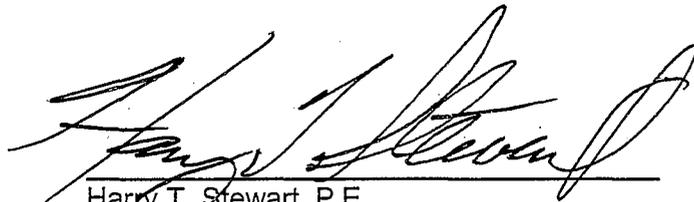
- a) In the event that adverse impacts occur, the permittee shall comply with all of the requirements below and with the impact mitigation and source replacement requirements of Env-Ws 388.
- b) Prior to initiating the large groundwater withdrawal, the permittee shall notify any lot owner with a private or public well within the area identified as "Projected Zone of Influence after 180 Days of Pumping at 200 gpm with No Recharge" on Figure 14, titled "Anticipated Wellhead Protection Area and Zone of Influence Gunstock Acres Village District", included in the final report titled "Final Well Siting Report, Gunstock Acres Village District, Groundwater Development Program, Production Wells GAVD-7C and GAVD-7D" (Final Report), prepared for C & C Water Services and Gunstock Acres Village District by Emery & Garrett Groundwater, Inc., dated March 26, 2007. The permittee shall provide copies of certified returned mail receipts to NHDES. The permittee shall explain to lot owners with wells in the identified area that their well may be influenced by the withdrawal at wells GAVD-7C and GAVD-7D. The permittee shall provide these owners with contact information for both the permittee and NHDES in the event they believe they may be adversely impacted by the withdrawal.
- c) The permittee shall notify NHDES of any adverse impact within 12-hours of receiving such information. Furthermore, the permittee shall provide potable water for drinking and cooking purposes to a well owner that NHDES has determined to be adversely impacted. The permittee shall have 12 hours to provide drinking and cooking water after being notified of an occurrence of an adverse impact. The permittee shall provide potable water for other domestic uses within 36 hours of being notified of an adverse impact (e.g., lower well pump, install higher capacity well pump, drill a new well, or truck bulk water to the property). A permanent alternative water supply that produces water quality that complies with Federal and State drinking water quality requirements and a quantity of water that complies with the requirements of RSA 485-C:21 V-c, shall be provided to an adversely impacted water user within 30 days of NHDES determining that a water user had been adversely impacted.

Contracts with companies capable of providing water and well services (including drilling of new wells) must be developed and maintained prior to and after initiating the withdrawal such that in the event that impacts are noted at private

wells, mitigation steps can be undertaken expeditiously. Copies of these contracts shall be provided to NHDES prior to initiating the large groundwater withdrawal.

- d) Where the status of unanticipated impact is not clear, the permittee shall gather information needed to quantify the impact and determine its status relative to adverse impact criteria defined under RSA 485-C:21 V-c and provide this information to NHDES within 48 hours of being notified by NHDES. A verified adverse impact shall be mitigated as described in paragraph c), above.
  - e) NHDES will routinely review the results of all monitoring data, and if water level monitoring data indicates that groundwater is being extracted at a rate that exceeds natural recharge on average, then NHDES will modify the permit in accordance with Env-Ws 388 in order to prevent adverse impacts from occurring.
6. The permittee shall register its new sources of water under the Registered Water User Program and maintain the water use reporting requirements established by RSA 488.
7. The permittee shall apply for renewal of this permit at least 365 days prior to its expiration date. The permittee shall continue to comply with all conditions in this permit until the permit is renewed or the facility is closed in accordance with all applicable requirements, regardless of whether a renewal application is filed.

Any person aggrieved by any terms or conditions of this permit may appeal in accordance with RSA 21-O:7,IV within 30 days.



Harry T. Stewart, P.E.,  
Director Water Division

## PROJECT NARRATIVE

**Large Well Siting Approval/Large Groundwater Withdrawal Permit LGWP-2007-0002  
Gunstock Acres Village District, EPA 0881020  
Wells GAVD-7C & GAVD-7D  
Gilford, New Hampshire**

### BACKGROUND

Gunstock Acres Village District (GAVD), located in Gilford, NH, has submitted documentation to the New Hampshire Department of Environmental Services (NHDES) requesting approval of two large community water sources and issuance of a large groundwater withdrawal permit for the withdrawal of up to 86,400 gallons per day (gpd) or 60 gallons per minute (gpm) over a 24-hour period from GAVD-7C and 86,400 gpd or 60 gpm over a 24-hour period from GAVD-7D for a total additional supply capacity of 172,800 gpd. GAVD is requesting that these two new bedrock wells be used in combination with the existing bedrock wells near Pumping Station #7, designated GAVD-7, GAVD-7A and GAVD-7B, such that the total production rate for all five wells at the Pumping Station #7 wellfield will be limited to 200 gpm or 288,000 gpd, and that GAVD-7 will not be used for additional capacity, but rather as a mechanical back-up water source. GAVD-7C and GAVD-7D are located 1,350 feet north and 950 feet north, respectively, of Pumping Station #7.

The purpose of the two new community bedrock production wells is to supplement the potable water needs of GAVD. GAVD is seeking additional supply capacity of 172,800 gpd to prepare for the potential of an additional 120 new homes that could be added to the system in the future, which would represent full build-out of the development. Currently, GAVD has a total pumping capacity of 317,000 gpd. With the addition of wells GAVD-7C and GAVD-7D, total system capacity will be increased to 489,800 gpd. In addition to Pumping Station #7, GAVD utilizes two other pumping stations designated Pumping Station #1 and Pumping Station #5.

GAVD-7C and GAVD-7D are located in the Poorfarm Brook valley within the Poorfarm Brook watershed. The watershed upgradient of the new wells covers an area of about 5.6 square miles, draining the eastern slopes of Gunstock Mountain and Belknap Mountain and emptying into Lake Winnepesaukee approximately 6,000 feet downstream. The potential impact area associated with GAVD-7C and GAVD-7D is 1.45 square miles which extends approximately 1,300 feet south of the intersection of Mountain Drive and New Hampshire Route 11A to approximately 7,700 feet north of this same intersection to a location where Poorfarm Brook flows into Lake Winnepesaukee.

The watershed of Poorfarm Brook is characterized by moderately steep to steep hillsides mantled with a relatively thin layer of glacial till. A series of stream terraces, alluvial plains, large boulders and occasional bedrock outcrops occur along Poorfarm Brook. It is reported that GAVD-7C encountered about 68 feet of glacial till and boulders, and was completed in bedrock to a depth of 753 feet as a flowing artesian well. GAVD-7D penetrated 71 feet of glacial till and was completed in bedrock to a total depth 750 feet as a flowing artesian well.

## WITHDRAWAL TESTING AND CONCLUSIONS

A withdrawal test program was conducted by Emery & Garrett Groundwater, Inc. (EGGI) from October 1, 2006 to October 31, 2006. The purpose of withdrawal testing is to provide data to estimate long-term sustainable water quantity and quality; observe the response of the aquifer to pumping; evaluate the degree of hydraulic connection between private water supply wells and Poorfarm Brook; and assess the potential for adverse impacts to water resources and users that may result from the proposed withdrawal.

The withdrawal test program included pre-pumping, pumping, and water level recovery periods. The pre-pumping period was from October 1 to October 11. Wells GAVD-7A and GAVD-7B were pumped according to normal operating schedule based on system demand from October 1 to October 4 at 40 gpm each. The pumping period extended from October 11 to October 18. GAVD-7C and GAVD-7D were pumped during the pumping period continuously at 60 gpm each and wells GAVD-7A and 7B were pumped continuously at 40 gpm each for a combined rate of 200 gpm or 288,000 gpd. The recovery period was from October 18 to October 31. Pumping ceased on October 18 at GAVD-7C and GAVD-7D. Wells GAVD-7A and 7B were pumped continuously at 40 gpm each until October 25, when they returned to a normal operating schedule.

Water level measurements were collected during the withdrawal test program at on-site locations consisting of five bedrock wells, five overburden monitoring wells and three surface water monitoring points. Additionally, Poorfarm Brook flow measurements were obtained at locations upstream and downstream of GAVD-7C and GAVD-7D to determine if gains or losses of flow could be observed. Water level measurements were collected off-site at one overburden public supply well and eight bedrock wells consisting of two public water supply wells and six private residential wells. Each of the proposed source wells were metered to maintain a constant rate during the withdrawal test and three water quality samples were collected from each production well during the pumping period.

Results of water level measurements collected during the withdrawal test program indicate that the six off-site residential bedrock wells and one of the public water supply wells responded to the pumping of the four production wells. The pumping-induced drawdown of water levels ranged from 1.55 feet to 14.94 feet in these wells. The five on-site overburden monitoring wells did not respond to pumping, indicating that the glacial till overlying bedrock at this location has low vertical permeability and may isolate shallow groundwater flow from the effects of pumping within the bedrock aquifer. In addition, no significant differences in Poorfarm Brook streamflow were observed during the testing period suggesting that there is limited, direct hydraulic connection between Poorfarm Brook and the four production wells at the Site.

Withdrawal test monitoring results presented in the final report indicate that wells GAVD-7C and GAVD-7D can sustain a withdrawal rate of 86,400 gpd each (60 gpm) and that wells GAVD-7A and GAVD-7B can sustain a withdrawal rate of 57,600 gpd each (40 gpm) for a combined production volume of 288,000 gpd (200 gpm). This proposed production volume, when combined with the production from GAVD's existing sources, will meet this system's projected water supply demand anticipated at full build-out of the development.

Results of water quality sampling during the withdrawal testing program indicate that each parameter, with the exception of fluoride, was below applicable Maximum Contaminant Level (MCL) and Secondary Maximum Contaminant Level (SMCL). The SMCL for fluoride is 2.0

milligrams per liter (mg/l). Results indicate fluoride in the range of; 3.7 – 3.9 mg/l at GAVD-7C, and 4.8 – 5.5 mg/l at GAVD-7D. NHDES concurs with GAVD's proposal to treat water supplied from GAVD-7C and GAVD-7D for removal of fluoride using the existing treatment system.

## **PUBLIC INVOLVEMENT**

Pursuant to RSA 485-C:21-II through V-a, materials submitted in support of the large volume groundwater withdrawal permit (the preliminary permit application, final report, supplemental materials etc.) were sent (via certified mail) to the municipality and public water suppliers in the potential impact area. The entities that were sent copies of the above-referenced materials are the Town of Gilford- Department of Planning and Land Use, Chalet Village Association and Cherry Valley Condo Owners Association. No public meetings were requested by any of the entities notified, and no public meetings were held regarding the application for this large groundwater withdrawal permit.

## **LARGE GROUNDWATER WITHDRAWAL PERMIT PUBLIC NOTIFICATION, MONITORING, REPORTING AND WITHDRAWAL REQUIREMENTS**

The large groundwater withdrawal permit requires GAVD to notify any lot owner with a private or public well within an area surrounding GAVD-7C and GAVD-7D identified as the zone of influence after 180 days of pumping at 200 gpm with no recharge. As part of this notification, GAVD must explain to the lot owners with wells in the identified area that their well may be influenced by the withdrawal at wells GAVD-7C and GAVD-7D and provide them with contact information at GAVD and NHDES in the event they believe they may be adversely impacted by the withdrawal. More information concerning this requirement is provided in the large groundwater withdrawal permit (LGWP-2007-0002) under condition No. 5.b).

GAVD is required to conduct a water level monitoring program that includes the monitoring of two off-site private residential bedrock wells affected during the pumping test to assess the potential for and/or detect the occurrence of adverse impacts. An impact mitigation program would be implemented in accordance with conditions of the large volume groundwater withdrawal permit and Env-Ws 388 if an adverse impact is observed and verified. The program would implement actions necessary to mitigate the impact including reduction of the withdrawal volume, implementation of water use limitations, replacement of impacted sources with an alternative water supply at no initial capital cost to the user, and increases in the monitoring frequency of the withdrawal monitoring network to assess performance of the mitigation program.

GAVD is required to submit an annual report in hard copy format and electronic format to NHDES by January 31 of each year. As stipulated in the permit, the annual report will include a summary of trends and variability observed in the site monitoring network, all monitoring data and records required by the permit, and an assessment of the potential impacts associated with the withdrawal. The annual report will be made available to the public for review. A complete description of monitoring and reporting requirements is presented in more detail in the large groundwater withdrawal permit (LGWP-2007-0002) under condition No. 4.