



## Case Study

### Near-real-time monitoring increased efficiency, reduced costs, and delivered critical insight into groundwater levels

#### CHALLENGE

Reduce municipal groundwater monitoring costs, improve data quality, and achieve greater insight into groundwater resources.

#### SOLUTION

Upgrade existing monitoring network with Diver-NETZ wireless groundwater monitoring system that acquires, transmits and processes groundwater level and quality data in near real-time.

#### RESULTS

Lowered operational costs by more than 90%, acquired nearly 60 times more data points, improved data quality and gained a better understanding of groundwater conditions.



The Diver-HUB webportal provides access to near real-time water data

#### New legislation called for increased groundwater monitoring in The Netherlands

In 2007, The Netherlands introduced the Municipal Water Act — legislation that requires municipalities to eliminate or minimize problems related to elevated groundwater levels, such as flooding, property damage, and unhealthy living conditions caused by damp environments. Better insight into phreatic groundwater levels is essential for municipalities to fulfill these new responsibilities and take appropriate measures to mitigate risks.

Located in the province of North Brabant, the Municipality of Heusden is home to approximately 43,000 residents. In 2008, the municipality started monitoring groundwater levels in 100 phreatic wells to better align their water policy with the new regulations. Groundwater levels in the wells were recorded manually by field personnel every two weeks, using a water-level tape.

To minimize costs, the municipality wanted a new, more efficient data collection system. At the same time, it was also looking for ways to increase the quality and quantity of groundwater data to achieve a better understanding of the hydrological system. It was also necessary to have near-real-time access to water-level data so that the population could be notified as early as possible of emerging groundwater issues.



### Municipality upgraded groundwater monitoring network with wireless system

In October 2013, the municipality chose to upgrade its existing groundwater monitoring network with the near real-time Diver-NETZ wireless groundwater monitoring system. Van Essen Instruments renovated and upgraded a total of 108 monitoring wells and installed an additional twelve wells.

Each well was equipped with a Diver groundwater datalogger which sampled and stored groundwater levels and temperature four times per day. A communication cable connected to each datalogger transferred the data to a Diver-DXT radio device affixed to the top of the well. These radio devices transmitted data wirelessly to neighboring Diver-Gate gateway devices, which automatically transferred the field data to a centralized database via the GPRS cellular network.

As the data was received by the database, it was automatically validated and checked for various errors before it was made available to water authorities and stakeholders via a secure web portal. Near real-time data collection allowed the municipality to quickly identify and mitigate hardware malfunctions and avoid data loss.

In addition, Van Essen Instruments analyzed the collected water-level data and delivered quarterly reports containing key performance indicators and statistical analysis of time-series for each monitoring point.

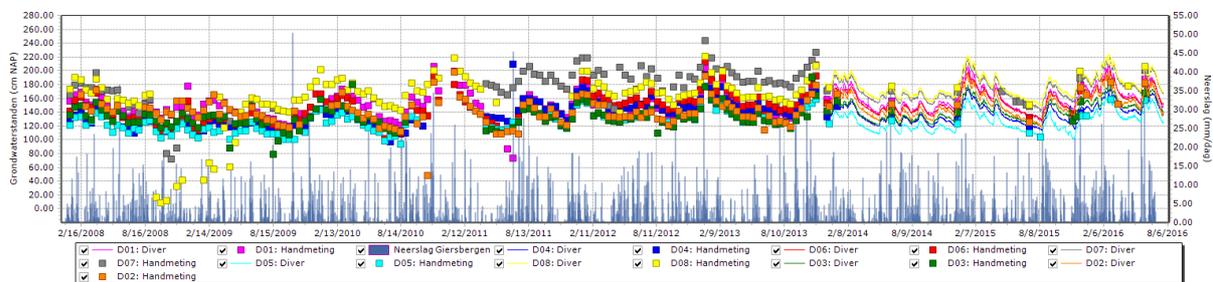


Monitoring point protected by a flush mounted cover in the historic center of Heusden

### Diver-NETZ system increased efficiency and reduced costs

Upgrading the groundwater monitoring network with the Diver-NETZ wireless monitoring system resulted in efficiency gains, cost savings, improved data quality, and a better understanding of overall groundwater conditions in the Heusden region. With automated, near-real-time groundwater monitoring, the municipality is better equipped to proactively identify and mitigate groundwater problems before they have an impact on the local community.

Through the adoption of the Diver-NETZ system, the Municipality of Heusden was able to reduce the number of field visits from 26 to only 2 times per year, which reduced operational costs by more than 90%. More frequent measurements increased the amount of water level data from 24 to more than 1,400 recordings per year at each monitoring point. This increase in data will reveal finer details about the hydrological system and allow water officials to better manage and plan groundwater resources. The total investment in monitoring equipment and modifications to the wells is expected to be recouped within three years.



Validated waterlevels 2008-2016. The first 5 years waterlevels were recorded manually with a water level tape. Since 2014 the water levels are recorded automatic by the Diver-NETZ system.