

LEAP LEBANON

EXECUTIVE SUMMARY

Wabash Regional Water Supply Yield Analysis for Site #1



Indiana
Economic Development Corp

This executive summary highlights the results of the first phase of aquifer testing along the Wabash River by the IEDC. The testing was done by INTERA, Inc. to determine the potential yield of one or two radial collector wells producing water from the Alluvial Aquifer adjacent to the Wabash River. The aquifer testing included drilling exploratory boreholes, conducting a geophysical survey of the region, creating a conceptual geologic model of the aquifer, two aquifer pumping tests, and creating a groundwater flow model to estimate the amount of water that can be sustainably withdrawn from new wells constructed along the river.

LOCATION AND SCOPE OF TESTING

The hydrogeologic investigation was focused on a single 70-acre parcel on the south bank of the river more than six miles downstream West Lafayette, Indiana. Seventeen (17) exploratory boreholes were drilled to examine the lithology of the unconsolidated material at the site and each was finished as a monitoring well. Three (3) shallow piezometers were also installed to measure water levels closer to the river. Finally, two 12-inch diameter test wells were drilled and constructed. Two separate aquifer tests were conducted by pumping each well at a constant rate for 72 hours. Each of the monitoring wells and piezometers were equipped with a pressure transducer to record water levels before, during, and after each 72-hour pumping tests. A geophysical survey was also completed throughout the region to fill in data gaps between previously collected well log information.

FIELD DATA / AQUIFER TEST RESULTS

The drilling showed that the aquifer at the site was generally composed of sand and gravel from about 15 feet below the ground down to the bedrock / clay layer at the base of the aquifer with no intervening clay or silt layers. Three key findings were identified from the drilling and aquifer testing:

- 1. There is a uniform, thick aquifer at the site** – There are no intervening clay layers, so the aquifer is not separated into multiple units. The hydraulic conductivity of this aquifer is in the range of 500 ft/day – which is on the high end for aquifers in Indiana. This finding was also supported by the preliminary results of the geophysical survey.
- 2. The Wabash River is well connected to the aquifer** – The hydraulic resistance of the riverbed determines how well the river is connected to the aquifer. Testing showed that water can move easily between the river and the aquifer below.
- 3. The regional aquifer is discharging to the river** – Flows in the Wabash River vary seasonally but the yield estimates remain high due to the buffering effect of the regional aquifer.

The data collected in the field was used to construct a groundwater flow model that was then used to estimate how much water could be sustainably withdrawn from new collector wells.



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ESTIMATES OF SUSTAINABLE PUMPING RATES AND EFFECTS OF WITHDRAWAL

The groundwater model was calibrated with data from the two aquifer tests. Due to the uniform characteristics of the aquifer described above, the calibrated model was nearly a perfect match with the data collected from the test. The model was used to evaluate collector wells with a range of values for uncertain parameters that can affect the results. The estimates reflect the data collected during testing and informed by previous experience with other similar well designs. The primary results are as follows:

- 1. Two collector wells at the site will sustainably produce more than 30 million gallons per day (MGD).** Some of the model scenarios suggest much higher pumping rates can be sustained, but until more detailed design modeling is performed, the upper bound is not yet defined.
- 2. Minimal impacts on home-owner wells.** Large wells next to the Wabash River get much of their water from the river, not the aquifer. Any homeowner impacts can be mitigated with a pre-construction survey of homeowner wells near the site.
- 3. This aquifer-river system may be a critical economic resource for the State.** Indiana has some historic and current experience with radial collector wells, but most of the capacity was developed decades ago for industrial purposes. The results of this effort suggest that more could be done to manage these systems to improve regional water availability.
- 4. These results only apply to this site.** While current mapping indicates other sites will show similar results, the next step will be to conduct similar testing at a second site to determine a more thorough yield for the river-aquifer system