

Maintenance of the Kansas Geological Survey's Data Services to the National Groundwater Monitoring Network and Establishment of a Trend Well Network in the Kansas River Alluvial Aquifer

June 14, 2019

Funded by the
U.S. Geological Survey-Grant G17AC00170
07/01/2017 to 06/30/2019



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Kansas Geological Survey Open-File Report 2019-17

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The University of Kansas

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Introduction

The National Ground-water Monitoring Network (NGWMN) is an effort led by the U.S. Geological Survey (USGS) to establish a network of selected monitoring wells across the country to facilitate the planning and management of groundwater resources. The NGWMN serves as a single data portal that retrieves, in real time, construction, lithology, depth-to-water measurements, and water-quality data that are maintained and served to the portal from a variety of participating local, state, and federal sources. The NGWMN can be accessed at the following URL: <http://cida.usgs.gov/ngwmn/>.

In 2016, the USGS provided funding support through Cooperative Agreement G16AC00017 to the Kansas Geological Survey (KGS) to become a data provider to the NGWMN. The project period started January 1, 2016, and ended December 31, 2016. Under this agreement, the KGS evaluated monitoring sites for inclusion in the NGWMN, worked with USGS staff to populate the data portal with monitoring well sites that met a set of minimum data standards, and then developed a series of web services that allowed the NGWMN real-time data access to the state's well construction, lithology, and depth-to-water measurements records.

In 2017, the USGS provided funding support to the KGS through Cooperative Agreement G16AC00363 to maintain persistent data services to the NGWMN. This includes preserving existing web services and applying routine updates to existing network sites, which includes removing well sites that are no longer viable and uploading replacement and new well site locations. The project period started October 10, 2016, and ended September 30, 2017.

In 2018, the KGS was awarded funding from the USGS under Cooperative Agreement G17AC00170 to update the Kansas portion of the well registry, maintain the persistent data services to the NGWMN, and install a network of trend wells in the Kansas River alluvial aquifer, a stream valley in Kansas with major population growth and economic activity that lacks an active water-level observation network at the state level. This two-year project started July 1, 2017, and was completed June 4, 2019. This report serves as the final technical report for the project.

Existing Kansas NGWMN Well Sites

The NGWMN started serving Kansas-based groundwater data in September 2016 from 133 surveillance wells- those that are measured annually during the winter months- and 4 trend wells, which are true observation wells that record water levels in real time throughout the year and across seasons (Wilson, 2016). In 2017, a total of 8 wells were removed either because down-hole access was blocked, the well was plugged, or the site had incomplete or missing lithology; an additional 50 wells sites- 6 trend and 44 surveillance- were reviewed and added to the NGWMN (Wilson, 2017). All of these well sites are part of the larger Kansas Cooperative Water-Level Network (fig. 1), a collection of approximately 1,400 wells measured annually by the KGS in cooperation with the Kansas Department of Agriculture, Division of Water Resources (Miller et al., 1998).

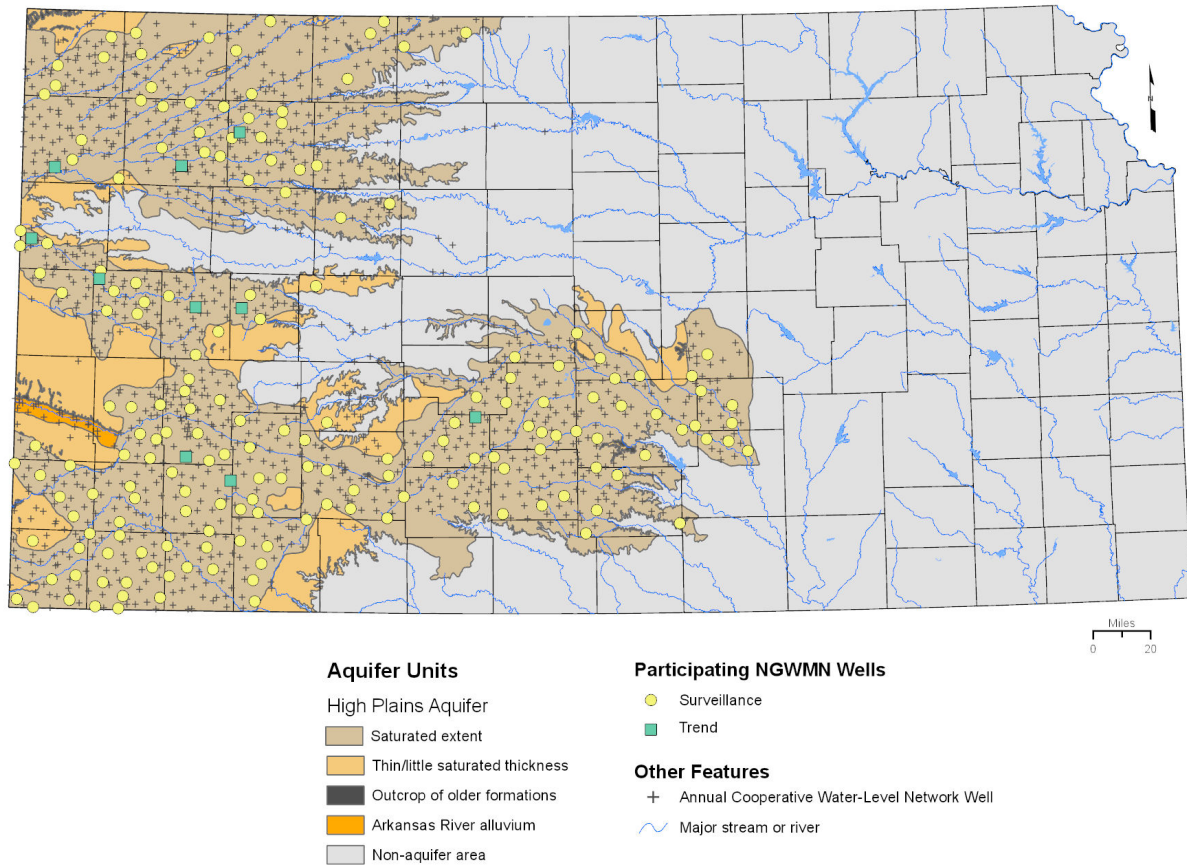


Figure 1. Kansas Cooperative Water-Level Network and participating 2017 High Plains aquifer NGWMN sites.

The vast majority of measurements take place in the month of January, typically in irrigation wells using steel or electric tapes, which have precisions down to hundredths of a foot. Customized software developed by the KGS combined with global positioning systems are used to ensure the same wells are measured each year and to conduct on-site data validations of depth-to-water measurements. The KGS further identifies 7% of the wells, randomly selected each year, to be re-measured by a second person within 24 hours of the initial visit. Referred to as “QA” wells, these extra measurements serve to provide quality assurance of the collected data. Additional statistical and GIS reviews are conducted later on the entire data set to identify abnormal or anomalous measurements. If necessary, well sites are re-measured the same day or within a month, depending on the circumstances.

The Kansas Cooperative Network also consists of a growing collection of continuously monitored wells. Referred to as “index wells,” these sites are equipped with pressure transducers that record water levels every hour and, through the use of telemetry systems, provide real-time access to water-level data throughout the year (Butler et al., 2018). Index wells are also manually measured throughout the calendar year, typically every three to four months.

Depth-to-water measurements are stored in an Oracle-based enterprise-level relational database (RDMS) called the Water Information Storage and Retrieval Database (WIZARD). WIZARD evolved from the U.S. Geological Survey's Ground Water Site Inventory in the mid-1990s (Hausberger et al., 1998) and today represents the largest repository of depth-to-water measurements in Kansas. Measured well sites are used to track temporal changes in water table elevations and estimates of water availability. WIZARD currently consists of more than 57,000 well sites with more than 630,000 water-level measurements. Data can be accessed at the following URL:

<http://www.kgs.ku.edu/Magellan/WaterLevels/index.html>

A key feature to the NGWMN data framework is that participating wells must have associated construction and lithology descriptions. In Kansas, this information can be obtained from the Water Well Completion Records Database (WWC5). Since the mid-1970s, water well drilling companies have been required to provide location, type, use, casing, lithology, and other information to the Kansas Department of Health and Environment any time a well is constructed, re-constructed, or plugged. The KGS stores more than 277,000 WWC5 records (fig. 2) in an Oracle RDMS and serves these data to the public through the following URL:

<http://www.kgs.ku.edu/Magellan/WaterWell/index.html>

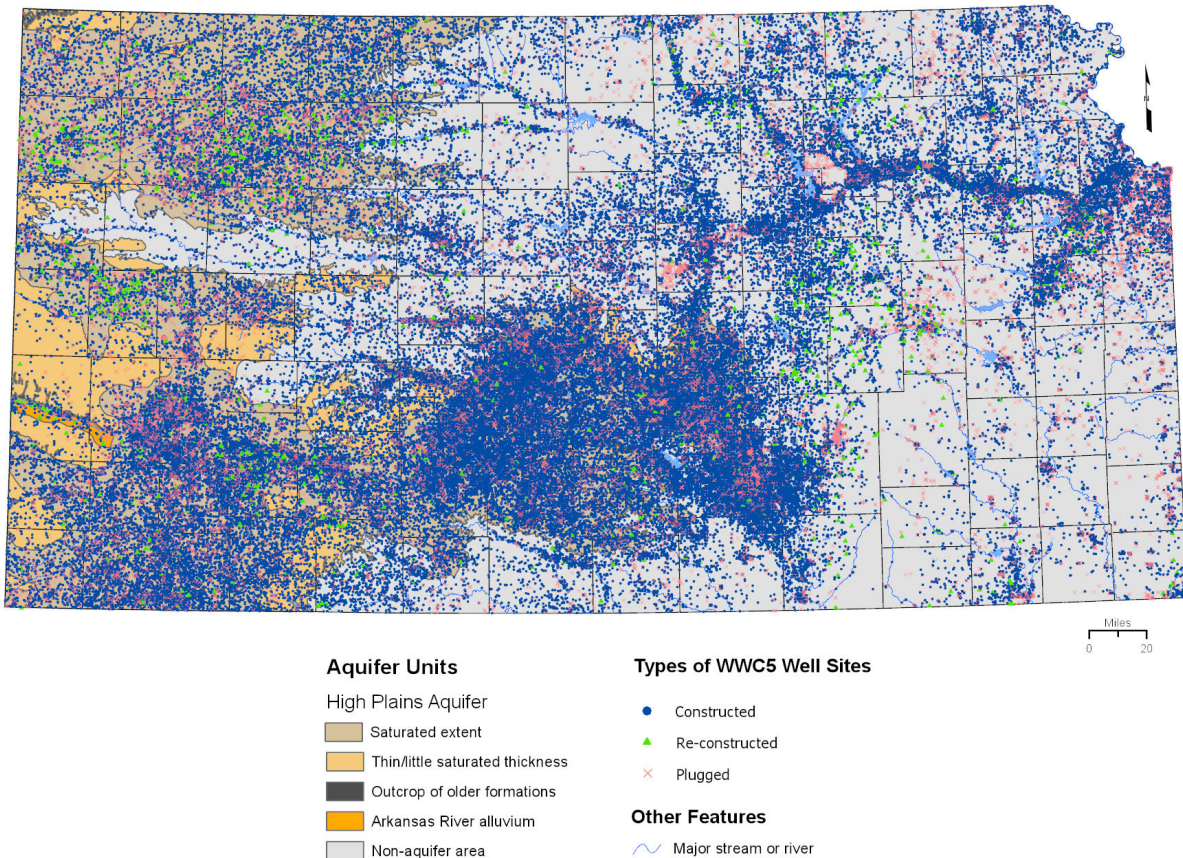


Figure 2. WWC5 well sites.

Existing Kansas NGWMN Data Streams

Data are streamed to the NGWMN through a series of web services, standardized protocols by which data are transmitted and shared across the internet. The Kansas web services were developed as a single Adobe ColdFusion component, stored on a replicated computer cluster that distributes workloads between two Apache web servers. The ColdFusion component has four methods, one representing each service (e.g., water levels, lithology, screens, and casings), supports REST protocol, and returns XML-formatted web documents.

Each of the four methods provided under the Kansas web service is called using a URL-based variable along with a list of one or more site IDs for NGWMN wells. A list of the methods for an example well/site number is shown below.

- Water Levels Method
 - <http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?method=WaterLevels&sites=371237100455301>
- Lithology Method
 - <http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?method=Lithology&sites=371237100455301>
- Casing Method
 - <http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?method=Casing&sites=371237100455301>
- Screens Method
 - <http://maps.kgs.ku.edu/geohydro/wizard/services/data.cfc?method=Screens&sites=371237100455301>

A more descriptions of each process can be found in the report “Establishing Kansas as a Data Provider to the National Groundwater Monitoring Network” (Wilson, 2016).

Kansas 2018 and 2019 Updates to the NGWMN

At the conclusion of the 2018 and 2019 water-level collection campaigns and subsequent data review and follow-up, the KGS assessed the participating NGWMN wells to make sure the sites were still measurable and to determine whether the annual change in the water table was representative of aquifer conditions for given areas. Table 1 lists wells that were dropped from the NGWMN data portal, the reason for removal, and whether the well was replaced. All of these actions occurred after the 2018 measurement runs.

No wells were identified for removal after the 2019 season; however, the display option for trend well 391244101501901 was turned off in the NGWMN data portal. This leaves the well in the data registry but effectively removes the site from public queries through the NGWMN interface. A review of the continuously collected water levels indicate the well had a poor hydraulic connection to the aquifer caused by fine-grained sediments filling the sump and screens. The well was redeveloped in the fall of 2018, which re-established the hydraulic connection between the well and aquifer. The site will be monitored and visited throughout the summer and fall of 2019. If water levels continue to reflect appropriate responses to barometric pressure and pumping, the well's display option will be turned back on within the NGWMN data portal.

Table 1		
Kansas Wells Removed in 2018 and 2019 From the NGWMN Data Portal		
Site Number	Legal Description	Reason for Removal
395518099104001	01S 16W 31CBB	Dry well. No replacement.
374924100325901	26S 30W 01ABC	Spotty tape. Replaced with 375309100291401.
371252101084201	32S 35W 32DCD	Fear of breaking tape in well. No replacement.
391244101501901	10S 41W 01DAA 01	Poor hydraulic connection. Under further evaluation.

Additional wells from the Kansas Cooperative Water-Level Network were reviewed for inclusion in the NGWMN to enhance distribution and increase the number of wells involved in the program. Sites were selected based on their spatial distribution relative to current participating wells along with the minimum data standards of an established annual measurement history of at least five years and the availability of WWC5 driller logs containing construction, screening, and lithology information.

Fourteen wells within the High Plains aquifer region of Kansas were selected and classified as surveillance wells based on their annual measurement frequencies (Table 2). All of these sites are located in areas that have active groundwater pumping (Fross et al., 2012; Whittemore et al., 2016) and therefore have been designated as part of the "Documented Changes" subnetwork of the NGWMN.

Table 2 Kansas High Plains Aquifer Wells Added in 2018 and 2019 To the NGWMN Data Portal				
Site Number	Legal Description	Well Depth	Local Aquifer	Replaced Well
391516101144801	09S 35W 20DCA 01	187	Ogallala Formation	
391622101311101	09S 38W 13BCC 01	166	Ogallala Formation	
383152101395101	17S 39W 31DAB 01	188	Ogallala Formation	
382202098391202	19S 12W 28DBC 02	35	Pleistocene Pliocene Series	
381649097443602	20S 04W 27DBD 01	126	Pleistocene Pliocene Series	
380057098264301	23S 10W 29DCA 01	88	Quaternary System	
375536100465502	24S 32W 36ABC 01	258	Ogallala Formation	
375309100291401	25S 29W 10DDC 01	295	Ogallala Formation	374924100325901
374111098464801	27S 13W 19A 01	202	Quaternary System	
374141099240301	27S 19W 16DBD 01	185	Quaternary System	
370910100422701	33S 31W 28BBC 01	540	Ogallala Formation	
370434100405203	34S 31W 22BDD 03	215	Ogallala Formation	
370710100530001	34S 33W 02CBA 01	622	Ogallala Formation	
370033100534202	35S 33W 15ABC 02	441	Ogallala Formation	

A second objective of this project was the completion of a trend well network in the Kansas River alluvial aquifer. Located in the northeast portion of the state, the river and its hydraulically connected alluvial aquifer are the primary sources of water for the region. Long-term, historic water-level monitoring is sparse and currently, no organized groundwater monitoring network encompasses the entire extent of the aquifer.

After the notification of award for this contract, which calls for the installation of five continuous water-level recording trend wells in the Kansas River alluvial aquifer, the KGS unexpectedly received additional funds from the Kansas Legislature to study and monitor groundwater resources in the Kansas River alluvium. Together, the USGS NGWMN and state contracts were used to install a total of 10 trend wells in the valley.

Well sites were chosen based on a relatively uniform distribution up and down the Kansas River valley. In addition, the KGS tried to select sites that are near existing USGS stream gages and that supplemented or replaced historically measured wells that were still in existence but determined to be unmeasurable or questionable in terms of their connection to the aquifer. Table 3 lists the site number, other identification number, legal description, well depth, the site number of the replaced observation well, and the nearest USGS stream gaging station (when applicable).

Table 3 Kansas River Alluvial Aquifer Trend Wells					
Site Number	Other ID	Legal Description	Well Depth	Replaced Observation Well	Gaging Station
390843096381401	RL01	10S 07E 34BAA	50	None	None
391053096260901	RL02	10S 09E 17BDD	37	391055096261701	None
391027096165701	WB01	10S 10E 15DDC	37	391029096171301	06887500
390735095575601	SN01	11S 13E 04AAD	46.5	390731095575801	None
390519095445302	SN02	11S 15E 16DCA	64.2	390519095445301	06888990
390418095310801	JF01	11S 17E 27BBB	43	390407095310901	None
390024095224001	DG01	12S 20E 17CCBC	66.5	390006095132301	06891080
385624095093702	DG02	13S 20E 11BAA	70	385624095093701	None
385908094574001	LV01	12S 22E 27BBA	65	None	06892350
390332094455103	WY01	11S 24E 29DDC	65	390319094460802	06892518

The KGS used its Geoprobe direct-push rig to install the Kansas River alluvial observation wells, which are 2 inches in diameter. The first well was installed in August 2017 (fig. 3) followed by installation of the rest of the network during the summer and fall of 2018. Electrical conductivity (EC) profiles, taken with direct-push logging tools, were used to determine subsurface lithology and the screening intervals (see Appendix A of this report). Each well was equipped with a pressure transducer and data telemetry unit to record and transmit hourly water levels. KGS professionally licensed geologists and scientific staff members completed site investigations, landowner contacts, EC profiling, and well drilling and installation.

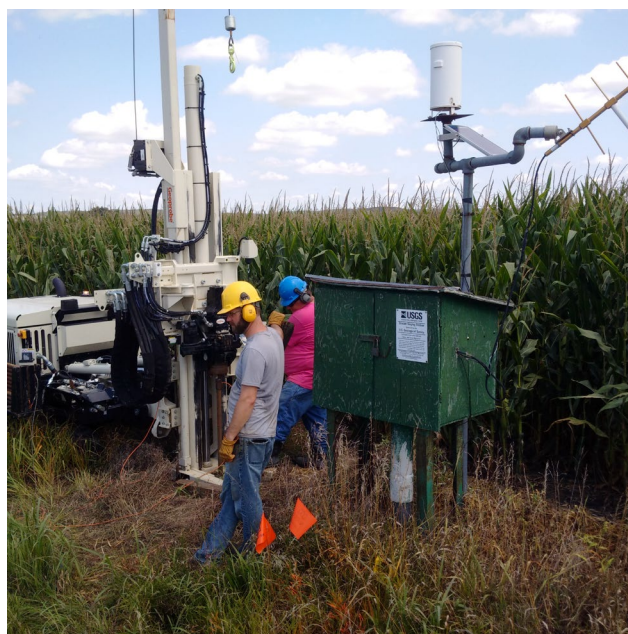


Figure 3. KGS staff operating the Geoprobe direct-push rig to install trend well DG01 (site number 390024095224001). DG01 replaced a USGS well (site number 390006095132301). The green box housing and well in the photo is the USGS well before the equipment was removed and the well plugged.

As of the date of this report, a total of 210 wells are being served from the KGS to the NGWMN system; of those, 192 are surveillance wells and 18 are trend wells (fig. 4). Of the 10 newly installed Kansas River alluvial aquifer wells, only RL1, site number 390843096381401, has not yet been included in the data registry. The KGS has been working with vendors to explore different telemetry options to use with this well and others in the future. Once equipped, the well will be included in the NGWMN.

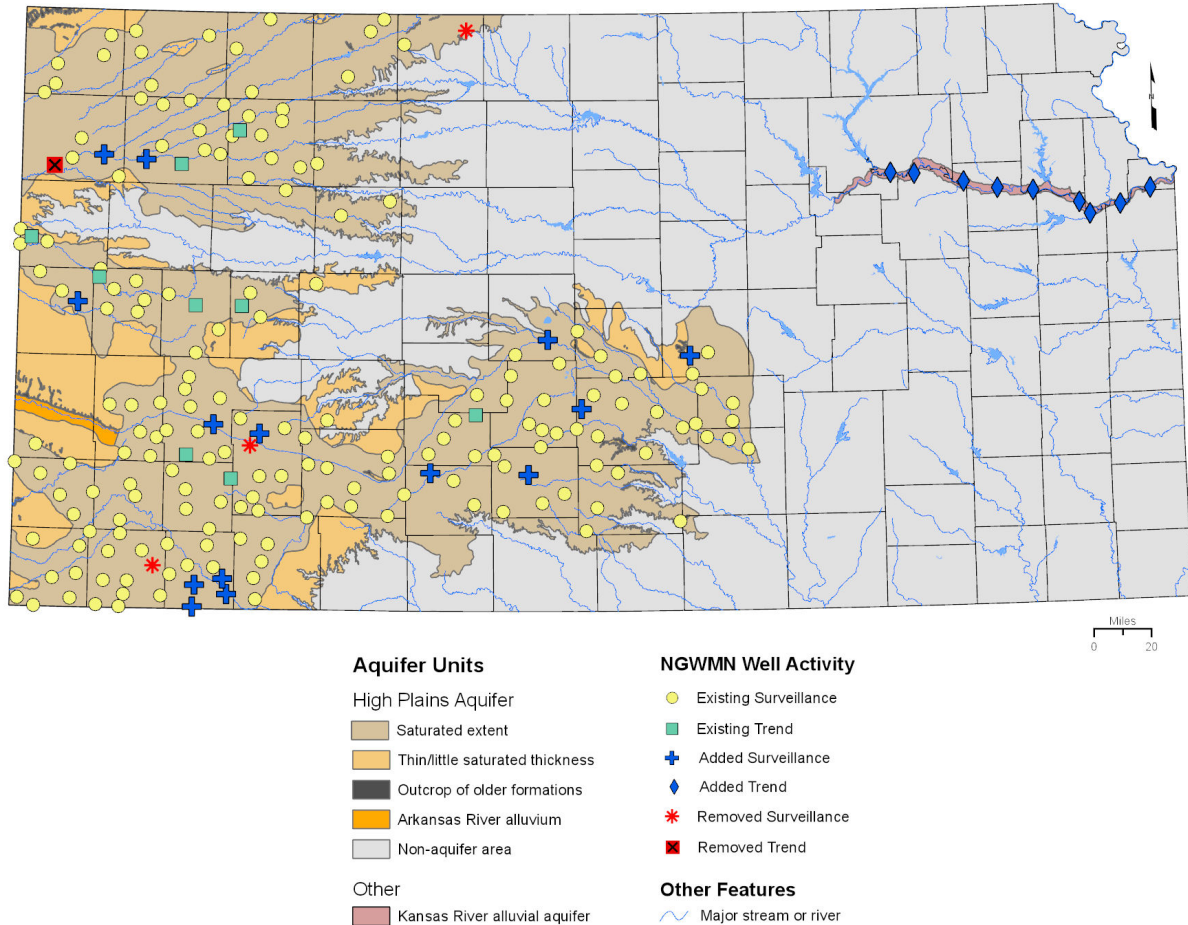


Figure 4. Status and 2018–2019 update activities to KGS-based NGWMN wells.

Finally, some small adjustments to the Kansas NGWMN web services were made during this project period. At the request of the USGS, the “Lithology” and “WaterLevels” methods of the Kansas NGWMN web service were slightly modified to better clarify units of measures related to lithologic descriptions and accuracy of water-level measurements. In addition, the KGS web services were updated to include the computed daily average depth to water for the newly established trend well network in the Kansas River alluvial aquifer and a pressure transducer in well 373925100395301, one of the first trend wells included in the NGWMN, was replaced

Future Developments

The KGS has entered into a fourth grant and cooperative agreement with the USGS. This two-year project, slated to start July 15, 2019, will work to continue to maintain the Kansas-based web services to the NGWMN, making any needed changes and well additions after the Kansas Cooperative Network measurements are made in the winters of 2020 and 2021. In addition, this new project will load all appropriate Kansas Cooperative Water-Level Network wells into the NGWMN to support the USGS High Plains aquifer water-level study. The third objective of this project will be to provide funds to redevelop four trend wells that have been in operation for more than a decade to assure continued quality hydraulic connections to the High Plains aquifer.

Acknowledgments

The author acknowledges and is grateful for the funding and project support of the USGS, specifically Daryll Pope and Candice Hopkins for their assistance, counsel, and review of this project; Keith Hunsinger for his guidance on web service development; Dana Adkins-Heljeson for all his data efforts, especially taking WWC5 forms from images to database-accessible records; and Julie Tollefson, KGS editor who reviewed this final report.

References

- Butler, J. J., Jr., Whittemore, D. O., Reboulet, E., Knobbe, S., Wilson, B. B., and Bohling, G. C., 2018, High Plains Aquifer Index Well Program: 2017 Annual Report: Kansas Geological Survey Open-File Report 2018-17, 60 p.
- Fross, D., Sophocleous, M., Wilson, B. B., and Butler, J. J., Jr., 2012, Kansas High Plains Aquifer Atlas: Kansas Geological Survey, http://www.kgs.ku.edu/HighPlains/HPA_Atlas/index.html.
- Hausberger, G., Davis, J., Miller, R., Look, K., Adkins-Heljeson, D., Ross, G., Bennet, B., Schloss, J., and Bohling, G., 1998, WISARD: Water Information Storage and Retrieval Database: Kansas Geological Survey Open-File Report 1998-13, 42 p.
- Miller, R. D., Buchanan, R. C., and Brosius, L., 1998, Measuring water levels in Kansas: Kansas Geological Survey Public Information Circular 12, 4 p.
- Whittemore, D. O., Butler, J. J., Jr., and Wilson, B. B., 2016, Assessing the major drivers of water level declines: New insights into the future of heavily stressed aquifers: *Hydrological Science Journal*, v. 61, no. 1, p. 134–145, doi: 10.1080/02626667.2014.959958.
- Wilson, B. B., 2016, Establishing Kansas as a data provider to the National Ground-water Monitoring Network: Kansas Geological Survey Open-File Report 2016-28, 12 p.
- Wilson, B. B., 2017, Maintenance of the Kansas Geological Survey's data services to the National Groundwater Monitoring Network of water levels over the Kansas High Plains aquifer: Kansas Geological Survey Open-File Report 2017-49, 8 p.

Appendix A- Kansas River Alluvial Aquifer Wells-Water Well Completion Records and Electrical Conductivity Profiles.

390843096381401, RL01

http://www.kgs.ku.edu/Hydro/WWC5/E/10S7/522405.pdf

WATER WELL RECORD Form WWC-5 Division of Water Resources App. No. _____ Well ID **KAW-RL01**

Original Record Correction Change in Well Use

1 LOCATION OF WATER WELL: County: Riley Fraction NE 1/4 NE 1/4 NW 1/4 1/4 Section Number 34 Township Number T 10 S Range Number R 7 E W

2 WELL OWNER: Last Name: First: Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here:
 Business: Kansas Geological Survey Address: University of Kansas 3800 S. 20th St., Manhattan, KS
 Address: 1930 Constant Ave City: Lawrence State: KS ZIP: 66047

3 LOCATE WELL WITH "X" IN SECTION BOX: N E W S

4 DEPTH OF COMPLETED WELL: 50 ft. Depth(s) Groundwater Encountered: 1) _____ ft. 2) _____ ft. 3) _____ ft. or 4) Dry Well
 WELL'S STATIC WATER LEVEL: 24 ft. below land surface, measured on (mo-day-yr) 07-18-18 above land surface, measured on (mo-day-yr) _____
 Pump test data: Well water was _____ ft. after _____ hours pumping _____ gpm Well water was _____ ft. after _____ hours pumping _____ gpm
 Estimated Yield: _____ gpm Bore Hole Diameter: 3.25 in. to 50 ft. and _____ in. to _____ ft.

5 Latitude: 39.145327 (decimal degrees) **Longitude:** -96.637193 (decimal degrees)
 Horizontal Datum: WGS 84 NAD 83 NAD 27
 Source for Latitude/Longitude: GPS (unit make/model: _____) (WAAS enabled? Yes No) Land Survey Topographic Map Online Mapper: Google Earth Pro

6 Elevation: 1037 ft. Ground Level TOC
 Source: Land Survey GPS Topographic Map Other State Lidar Data

7 WELL WATER TO BE USED AS:
 1. Domestic: Household Lawn & Garden Livestock
 2. Irrigation Feedlot Industrial
 5. Public Water Supply: well ID _____
 6. Dewatering: how many wells? _____
 7. Aquifer Recharge: well ID _____
 8. Monitoring: well ID **KAW-RL01**
 9. Environmental Remediation: well ID _____
 Air Sparge Soil Vapor Extraction Recovery Injection
 10. Oil Field Water Supply: lease _____
 11. Test Hole: well ID _____
 Cased Uncased Geotechnical
 12. Geothermal: how many bores? _____
 a) Closed Loop Horizontal Vertical
 b) Open Loop Surface Discharge Inj. of Water
 13. Other (specify): _____

Was a chemical/bacteriological sample submitted to KDHE? Yes No If yes, date sample was submitted: _____
 Water well disinfected? Yes No

8 TYPE OF CASING USED: Steel PVC Other _____ CASING JOINTS: Glued Clamped Welded Threaded
 Casing diameter: 2 in. to 50 ft. Diameter: 38 in. to _____ ft. Diameter: _____ in. to _____ ft.
 Casing height above land surface: _____ ft. Weight: 0.698 lbs./ft. Wall thickness or gauge No. Sch. 40
 TYPE OF SCREEN OR PERFORATION MATERIAL: Steel Stainless Steel Fiberglass PVC Other (Specify) _____
 Brass Galvanized Steel Concrete tile None used (open hole)
 SCREEN OR PERFORATION OPENINGS ARE:
 Continuous Slot Mill Slot Gauze Wrapped Torch Cut Drilled Holes Other (Specify) _____
 Louvered Shutter Key Punched Wire Wrapped Saw Cut None (Open Hole)
 SCREEN-PERFORATED INTERVALS: From 45 ft. to 50 ft. From _____ ft. to _____ ft. From _____ ft. to _____ ft.
 GRAVEL PACK INTERVALS: From 20 ft. to 50 ft. From _____ ft. to _____ ft. From _____ ft. to _____ ft.

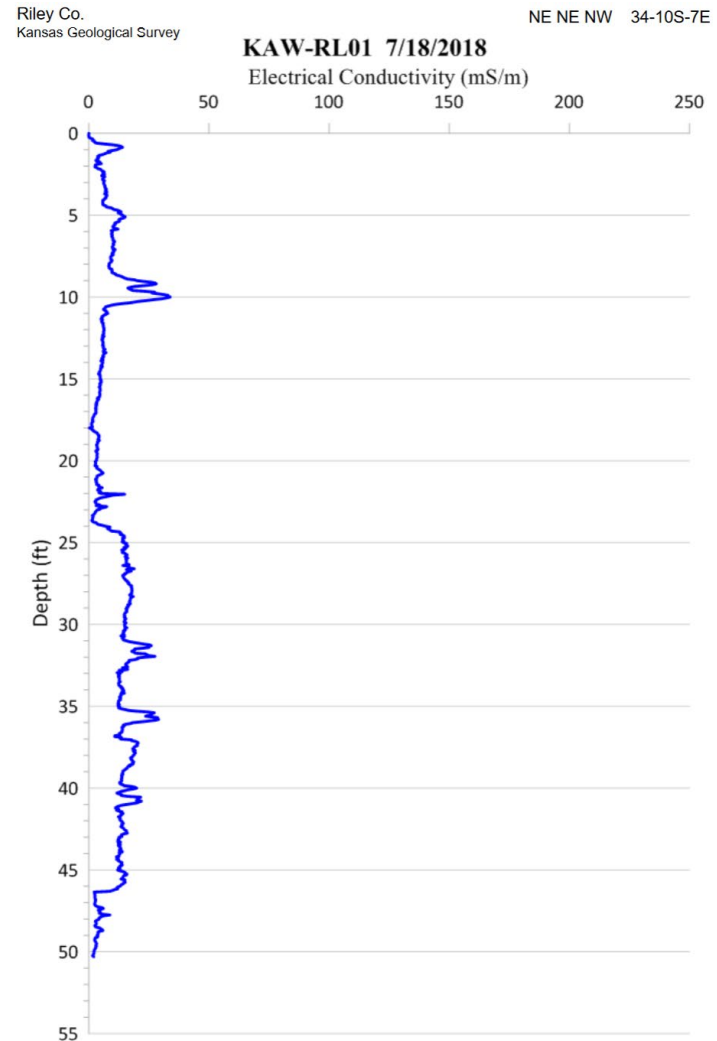
9 GROUT MATERIAL: Neat cement Cement grout Bentonite Other _____
 Grout Intervals: From 0 ft. to 20 ft. From _____ ft. to _____ ft. From _____ ft. to _____ ft.
 Nearest source of possible contamination:
 Septic Tank Lateral Lines Pit Privy Livestock Pens Insecticide Storage
 Sewer Lines Cess Pool Sewage Lagoon Fuel Storage Abandoned Water Well
 Watertight Sewer Lines Seepage Pit Feedyard Fertilizer Storage Oil Well/Gas Well
 Other (Specify) _____
 Direction from well? Southwest Distance from well? 1500 ft.

10 FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	5	Soils			
5	8.5	Sand			
8.5	10.5	Silt			
10.5	20	Sand			
20	45	Sand with Minor Silt lenses			
45	50.25	Sand			
		Bedrock - Refusal (Limestone)			

Notes: See Attached Electrical Conductivity Log

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-yr) 05-15-2018... and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. _____ This Water Well Record was completed on (mo-day-yr) 05-22-2018... under the business name of **Kansas Geological Survey** Signature _____

Mail 1 white copy along with a fee of \$3.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWTS Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524. Visit us at <http://www.kdheks.gov/waterwell/index.html> KSA 82a-1212 Revised 7/10/2015



391053096260901, RL02

http://www.kgs.ku.edu/Hydro/WWC5/E/10S9/515527.pdf

KAW-RL02 5/15/2018

WATER WELL RECORD Form WWC-5 Division of Water Resources App. No. [] Well ID **KAW-RL02**

Original Record Correction Change in Well Use

1 LOCATION OF WATER WELL: Fraction Section Number Township Number Range Number
 County: Riley SE 1/4 SE 1/4 SE 1/4 NW 1/4 17 T 10 S R 9 E W

2 WELL OWNER: Last Name: First: Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here:
 Business: Kansas Geological Survey Address: University of Kansas 4400 River Rd
 Address: 1930 Constant Ave City: Lawrence State: KS ZIP: 66047

3 LOCATE WELL WITH "X" IN SECTION BOX: N
 W E
 S
 1 mile

4 DEPTH OF COMPLETED WELL: 37 ft.
 Depth(s) Groundwater Encountered: 1) ft.
 2) ft. 3) ft. or 4) Dry Well
WELL'S STATIC WATER LEVEL: 20.23 ft.
 below land surface, measured on (mo-day-yr) 05-15-18
 above land surface, measured on (mo-day-yr)
 Pump test data: Well water was ft. after hours pumping gpm
 Well water was ft. after hours pumping gpm
 Estimated Yield: gpm
 Bore Hole Diameter: 3.25 in. to 37 ft. and in. to ft.

5 Latitude: 39.181389 (decimal degrees)
Longitude: -96.435834 (decimal degrees)
 Horizontal Datum: WGS 84 NAD 83 NAD 27
 Source for Latitude/Longitude:
 GPS (unit make/model):
 (WAAS enabled? Yes No)
 Land Survey Topographic Map
 Online Mapper: Google Earth Pro

6 Elevation: 998 ft. Ground Level TOC
 Source: Land Survey GPS Topographic Map
 Other Google Earth Pro

7 WELL WATER TO BE USED AS:
 1. Domestic: Household Lawn & Garden Livestock
 2. Irrigation
 3. Feedlot Industrial
 4. Industrial
 5. Public Water Supply: well ID
 6. Dewatering: how many wells?
 7. Aquifer Recharge: well ID
 8. Monitoring: well ID **KAW-RL02**
 9. Environmental Remediation: well ID
 Air Sparge Soil Vapor Extraction
 Recovery Injection
 10. Oil Field Water Supply: lease
 11. Test Hole: well ID
 Cased Uncased Geotechnical
 12. Geothermal: how many bores?
 a) Closed Loop Horizontal Vertical
 b) Open Loop Surface Discharge Inj. of Water
 13. Other (specify):

Was a chemical/bacteriological sample submitted to KDHE? Yes No If yes, date sample was submitted:

Water well disinfected? Yes No

8 TYPE OF CASING USED: Steel PVC Other CASING JOINTS: Glued Clamped Welded Threaded
 Casing diameter in. to ft., Diameter in. to ft.
 Casing height above land surface in. Weight lbs./ft. Wall thickness or gauge No. Sch 40
 TYPE OF SCREEN OR PERFORATION MATERIAL:
 Steel Stainless Steel Fiberglass PVC Other (Specify)
 Brass Galvanized Steel Concrete tile None used (open hole)

SCREEN OR PERFORATION OPENINGS ARE:
 Continuous Slot Mill Slot Gauge Wrapped Torch Cut Drilled Holes Other (Specify)
 Louvered Shutter Key Punched Wire Wrapped Saw Cut None (Open Hole)

SCREEN-PERFORATED INTERVALS: From 27 ft. to 37 ft., From ft. to ft., From ft. to ft.
 GRAVEL PACK INTERVALS: From 20 ft. to 37 ft., From ft. to ft., From ft. to ft.

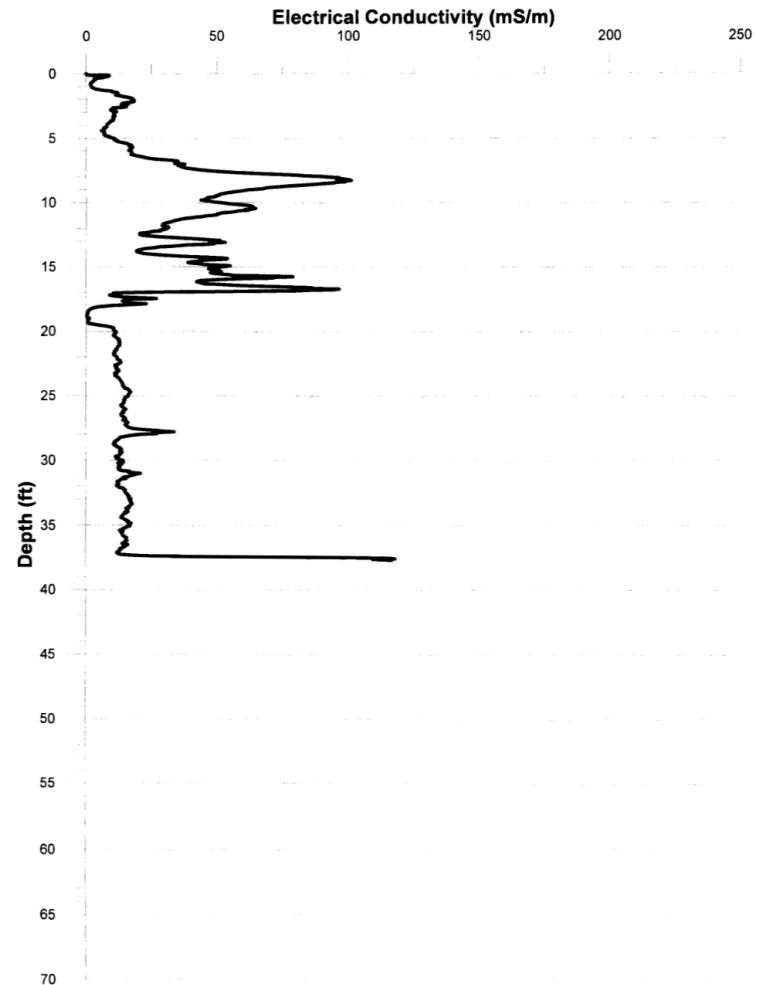
9 GROUT MATERIAL: Neat cement Cement grout Bentonite Other
 Grout Intervals: From ft. to 20 ft., From ft. to ft., From ft. to ft.

Nearest source of possible contamination:
 Septic Tank Lateral Lines Pit Privy Livestock Pens Insecticide Storage
 Sewer Lines Cess Pool Sewage Lagoon Fuel Storage Abandoned Water Well
 Watertight Sewer Lines Seepage Pit Feedyard Fertilizer Storage Oil Well/Gas Well
 Other (Specify)

Direction from well? North Distance from well? 350 ft.

10 FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	6	Sandy Soil			
6	17	Silty Clay			
17	18	Silt			
18	27.5	Sands			
27.5	28	Silt			
28	37.2	Sand			
37.2		Shale - Refusal			Notes: See Attached Electrical Conductivity Log

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) 05-15-2018, and this record is true to the best of my knowledge and belief.
 Kansas Water Well Contractor's License No. This Water Well Record was completed on (mo-day-year) 05-22-2018, under the business name of Kansas Geological Survey.
 Mail 1 white copy along with a fee of \$5.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWTS Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524.
 Visit us at <http://www.kdheks.gov/waterwell/index.html> KSA 82a-1212 Revised 7/10/2015



391027096165701, WB01

http://www.kgs.ku.edu/Hydro/WWC5/E/10S10/515529.pdf

KAW-WB01 5/10/2018

WATER WELL RECORD Form WWC-5 Division of Water Resources App. No. Well ID **KAW-WB01**

Original Record Correction Change in Well Use

1 LOCATION OF WATER WELL: County: Wabaunsee Section Number 15 Township Number T 10 S Range Number R 10 E W
SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ $\frac{1}{4}$

2 WELL OWNER: Last Name: University of Kansas
Business: Kansas Geological Survey
Address: University of Kansas
City: Lawrence State: KS ZIP: 66047
Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here:
800 feet East of the intersection of River Rd and W Boundary Rd on North side of road

3 LOCATE WELL WITH "X" IN SECTION BOX: N
NW NE
W SE E
S

4 DEPTH OF COMPLETED WELL: Depth(s) Groundwater Encountered: 1) 37 ft.
2) ft. 3) ft. 4) Dry Well
WELL'S STATIC WATER LEVEL: 23 ft.
 below land surface, measured on (mo-day-yr) 05-10-18
 above land surface, measured on (mo-day-yr)
Pump test data: Well water was gpm after hours pumping
Well water was gpm after hours pumping
Estimated Yield: gpm
Bore Hole Diameter: 3.25 in. to 37 ft. and in. to ft.

5 Latitude: 39.174223 (decimal degrees)
Longitude: -96.282614 (decimal degrees)
Horizontal Datum: WGS 84 NAD 83 NAD 27
Source for Latitude/Longitude: GPS (unit make/model:) (WAAS enabled? Yes No)
 Land Survey Topographic Map
 Online Mapper: Google Earth Pro

6 Elevation: 972 ft. Ground Level TOC
Source: Land Survey GPS Topographic Map
 Other: Google Earth Pro

7 WELL WATER TO BE USED AS:
1. Domestic: Household Lawn & Garden Livestock Irrigation Feedlot Industrial
2. Public Water Supply: well ID
3. Dewatering: how many wells?
4. Aquifer Recharge: well ID
5. Monitoring: well ID KAW-WB01
6. Environmental Remediation: well ID
7. Air Sparge Soil Vapor Extraction Recovery Injection
8. Oil Field Water Supply: lease
9. Test Hole: well ID
10. Cased Uncased Geotechnical
11. Geothermal: how many bores?
a) Closed Loop Horizontal Vertical
b) Open Loop Surface Discharge Inj. of Water
12. Other (specify):

Was a chemical/bacteriological sample submitted to KDHE? Yes No If yes, date sample was submitted:
Water well disinfected? Yes No

8 TYPE OF CASING USED: Steel PVC Other CASING JOINTS: Glued Clamped Welded Threaded
Casing diameter 37 in. to 37 ft. Diameter 37 ft. to 37 ft. Diameter 37 in. to 37 ft.
Casing height above land surface 36 in. Weight 0.998 lbs./ft. Wall thickness or gauge No. Sch 40
TYPE OF SCREEN OR PERFORATION MATERIAL: Steel Stainless Steel Fiberglass PVC
 Brass Galvanized Steel Concrete tile None used (open hole) Other (Specify)
SCREEN OR PERFORATION OPENINGS ARE:
 Continuous Slot Mill Slot Gauze Wrapped Torch Cut Drilled Holes Other (Specify)
 Louvered Shutter Key Punched Wire Wrapped Saw Cut None (Open Hole)
SCREEN-PERFORATED INTERVALS: From 22 ft. to 37 ft. From ft. to ft. From ft. to ft. From ft. to ft.
GRAVEL PACK INTERVALS: From 16.5 ft. to 37 ft. From ft. to ft. From ft. to ft. From ft. to ft.

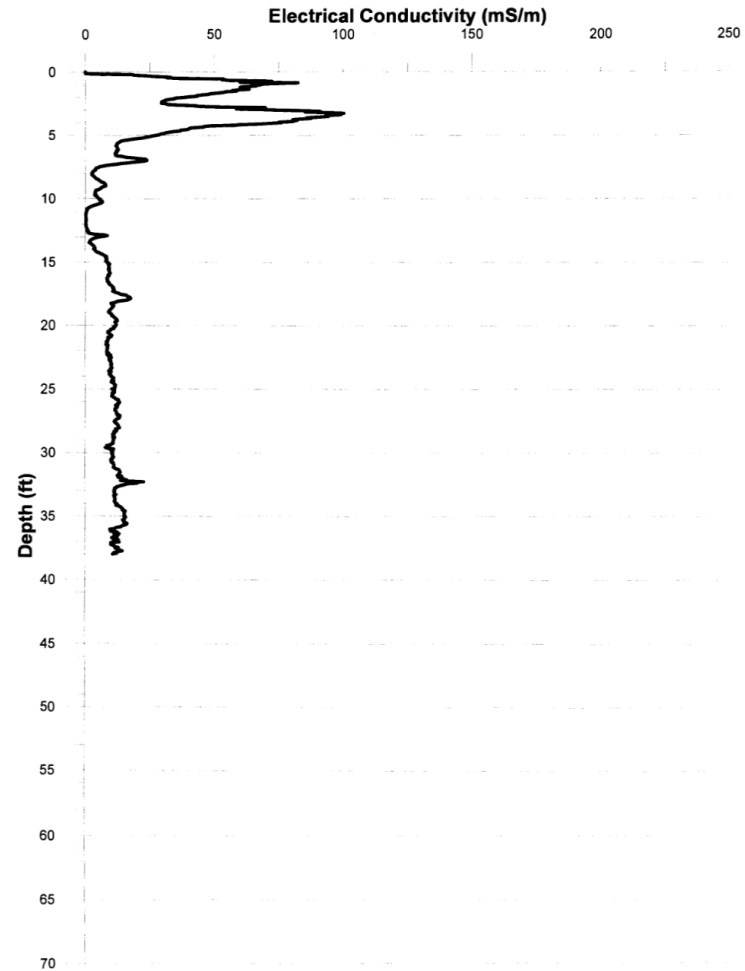
9 GROUT MATERIAL: Neat cement Cement grout Bentonite Other
Grout intervals: From 0 ft. to 16.5 ft. From ft. to ft. From ft. to ft.
Nearest source of possible contamination:
 Septic Tank Lateral Lines Pit Privy Livestock Pens Insecticide Storage
 Sewer Lines Cess Pool Sewage Lagoon Fuel Storage Abandoned Water Well
 Watertight Sewer Lines Seepage Pit Feedyard Fertilizer Storage Oil Well/Gas Well
 Other (Specify) Creek
Direction from well? South Distance from well? 400 ft.

10 FROM TO LITHOLOGIC LOG FROM TO LITHO. LOG (cont.) or PLUGGING INTERVALS

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	7	Soils			
7	38	Sands			

Notes: See Attached Electrical Conductivity Log

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) 05-10-2018 and this record is true to the best of my knowledge and belief.
Kansas Water Well Contractor's License No. This Water Well Record was completed on (mo-day-year) 05-22-2018
under the business name of Kansas Geological Survey
Mail 1 white copy along with a fee of \$5.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWIS Section,
1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone: 785-296-5524
Visit us at <http://www.kdheks.gov/waterwell/index.html> KSA 82a-1212 Revised 7/10/2015



390735095575601, SN01

http://www.kgs.ku.edu/Hydro/WWC5/E/11S13/515528.pdf

WATER WELL RECORD Form WWC-5 Division of Water Resources App. No. _____ Well ID **KAW-SN01**

Original Record Correction Change in Well Use

1 LOCATION OF WATER WELL: County: **Shawnee** Fraction **SE 1/4 NE 1/4 NE 1/4** Section Number **4** Township Number **T 11 S** Range Number **R 13 E**

2 WELL OWNER: Last Name: **Kansas Geological Survey** First: _____ Street or Rural Address where well is located: **4431 NW Capper Rd**
 Address: **University of Kansas** (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here:
 Address: **1930 Constant Ave**
 City: **Lawrence** State: **KS** ZIP: **66047**

3 LOCATE WELL WITH "X" IN SECTION BOX: N
 W E
 S E
 S
 1 mile

4 DEPTH OF COMPLETED WELL: ...**46.5**... ft.
 Depth(s) Groundwater Encountered: 1) ft.
 2) ft. 3) ft., or 4) Dry Well
 WELL'S STATIC WATER LEVEL:**18.4**... ft.
 below land surface, measured on (mo-day-yr) **05-16-18**
 above land surface, measured on (mo-day-yr)
 Pump test data: Well water was ft. after hours pumping gpm
 Well water was ft. after hours pumping gpm
 Estimated Yield: gpm
 Bore Hole Diameter: **3.25** in. to **46.5** ft. and in. to ft.

5 Latitude: **39.126524** (decimal degrees)
Longitude: **-95.965556** (decimal degrees)
 Horizontal Datum: WGS 84 NAD 83 NAD 27
 Source for Latitude/Longitude:
 GPS (unit make/model:)
 (WAAS enabled? Yes No)
 Land Survey Topographic Map
 Online Mapper: **Google Earth Pro**

6 Elevation: **929** ft. Ground Level TOC
 Source: Land Survey GPS Topographic Map
 Other: **Google Earth Pro**

7 WELL WATER TO BE USED AS:
 1. Domestic: Household Lawn & Garden Livestock
 2. Irrigation Feedlot Industrial
 3. Public Water Supply: well ID
 4. Dewatering: how many wells?
 5. Aquifer Recharge: well ID
 6. Monitoring: well ID **KAW-SN01**
 7. Environmental Remediation: well ID
 8. Air Sparge Soil Vapor Extraction Recovery Injection
 9. Oil Field Water Supply: lease
 10. Test Hole: well ID
 11. Cased Uncased Geotechnical
 12. Geothermal: how many bores?
 a) Closed Loop Horizontal Vertical
 b) Open Loop Surface Discharge Inj. of Water
 13. Other (specify):

Was a chemical/bacteriological sample submitted to KDHE? Yes No If yes, date sample was submitted:

Water well disinfected? Yes No

8 TYPE OF CASING USED: Steel PVC Other CASING JOINTS: Gued Clamped Welded Threaded
 Casing diameter **46.5** in. to ft. Diameter in. to ft.
 Casing height above land surface in. Weight: **0.698** lbs./ft. Wall thickness or gauge No. **Sch. 40**
 TYPE OF SCREEN OR PERFORATION MATERIAL:
 Steel Stainless Steel Fiberglass PVC
 Brass Galvanized Steel Concrete tile None used (open hole) Other (Specify)

SCREEN OR PERFORATION OPENINGS ARE:
 Continuous Slot Mill Slot Gauze Wrapped Torch Cut Drilled Holes Other (Specify)
 Louvered Shutter Key Punched Wire Wrapped Saw Cut None (Open Hole)

SCREEN-PERFORATED INTERVALS: From **36.5** ft. to **46.5** ft. From ft. to ft. From ft. to ft.
 GRAVEL PACK INTERVALS: From **20** ft. to **46.5** ft. From ft. to ft. From ft. to ft.

9 GROUT MATERIAL: Neat cement Cement grout Bentonite Other
 Grout Intervals: From **0** ft. to **20** ft. From ft. to ft.

Nearest source of possible contamination:
 Septic Tank Lateral Lines Pit Privy Livestock Pens Insecticide Storage
 Sewer Lines Cess Pool Sewage Lagoon Fuel Storage Abandoned Water Well
 Watertight Sewer Lines Seepage Pit Feedyard Fertilizer Storage Oil Well/Gas Well
 Other (Specify) **Pond** Distance from well? **350** ft.

10 FROM TO LITHOLOGIC LOG FROM TO LITHO. LOG (cont.) or PLUGGING INTERVALS

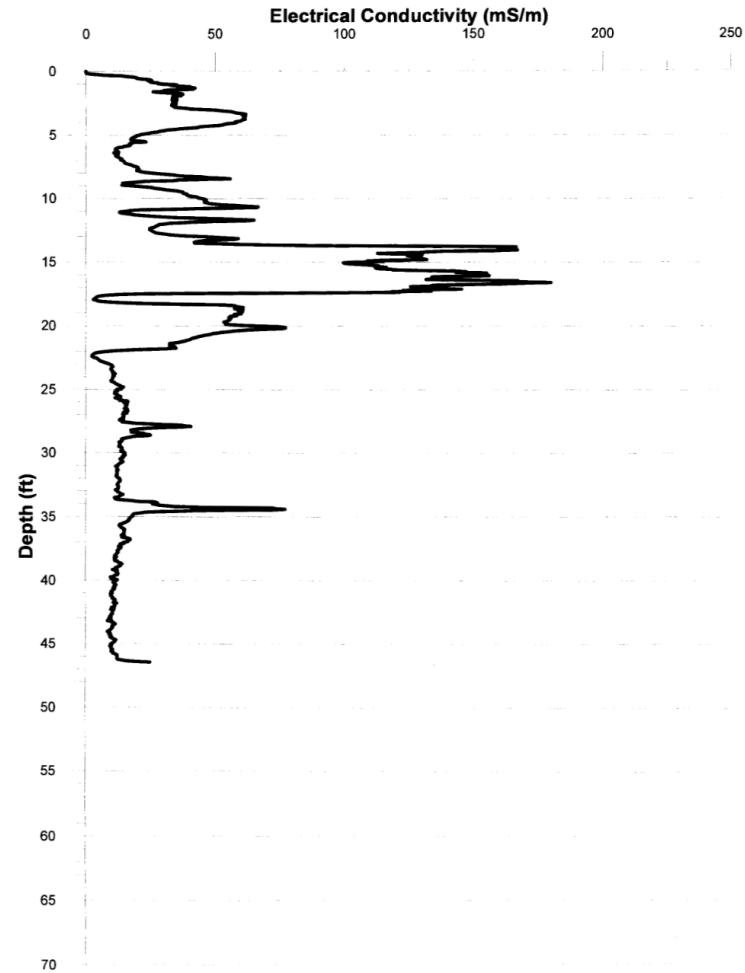
0	5	Soils		
5	8	Sands		
8	13.5	Silty Sands		
13.5	17.5	Clay		
17.5	18.3	Sands		
18.3	21.9	Silty Sands		
21.9	46.5	Sands with silty lenses		
46.5		Bedrock - Refusal		

Notes: See Attached Electrical Conductivity Log

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) **05-16-2018** ... and this record is true to the best of my knowledge and belief.
 Kansas Water Well Contractor's License No. This Water Well Record was completed on (mo-day-year) **05-22-2018** ...
 under the business name of **Kansas Geological Survey**

Mail 1 white copy along with a fee of \$5.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWTS Section,
 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524.
 Visit us at <http://www.kdheks.gov/waterwell/index.html> KSA 82a-1212 Revised 7/10/2015

KAW-SN01 5/16/2018



390519095445302, SN02

http://www.kgs.ku.edu/Hydro/WWC5/E/11S15/522406.pdf

WATER WELL RECORD Form WWC-5

Original Record Correction Change in Well Use

Division of Water Resources App. No. _____ Well ID **KAW-SN02**

1 LOCATION OF WATER WELL: Fraction _____ Section Number **16** Township Number **T 11 S** Range Number **R 15 E** W

County: **Shawnee**

2 WELL OWNER: Last Name: _____ First: _____ Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here:
 Business: **Kansas Geological Survey** Address: **University of Kansas** **260 Feet South of NW 24th St on West side of NW Menoken Rd**
 Address: **1930 Constant Ave** City: **Lawrence** State: **KS** ZIP: **66047**

3 LOCATE WELL WITH "X" IN SECTION BOX: N _____ E _____ S _____ W _____

4 DEPTH OF COMPLETED WELL: **64.2** ft.
 Depth(s) Groundwater Encountered: 1) ft.
 2) ft. 3) ft. or 4) Dry Well
 WELL'S STATIC WATER LEVEL: **39.15** ft.
 below land surface, measured on (mo-day-yr) **10/18/18**
 above land surface, measured on (mo-day-yr)
 Pump test data: Well water was ft. after hours pumping gpm
 Well water was ft. after hours pumping gpm
 Estimated Yield: gpm
 Bore Hole Diameter: **3.25** in. to **64.5** in. to in. to ft.

5 Latitude: **39.0889763** (decimal degrees)
Longitude: **-95.748469** (decimal degrees)
 Horizontal Datum: WGS 84 NAD 83 NAD 27
 Source for Latitude/Longitude: _____
 GPS (unit make/model: _____) (WAAS enabled? Yes No)
 Land Survey Topographic Map
 Online Mapper: **Google Earth Pro**

6 Elevation: **898** ft. Ground Level TOC
 Source: Land Survey GPS Topographic Map
 Other: **Google Earth Pro**

7 WELL WATER TO BE USED AS:
 1. Domestic: Household Lawn & Garden Livestock Irrigation Feedlot Industrial
 5. Public Water Supply: well ID
 6. Denaturing: how many wells?
 7. Aquifer Recharge: well ID
 8. Monitoring: well ID **KAW-SN02**
 9. Environmental Remediation: well ID
 Air Sparge Soil Vapor Extraction Recovery Injection
 10. Oil Field Water Supply: lease
 11. Test Hole: well ID
 Cased Uncased Geotechnical
 12. Geothermal: how many bores?
 a) Closed Loop Horizontal Vertical
 b) Open Loop Surface Discharge Inj. of Water
 13. Other (specify):

Was a chemical/bacteriological sample submitted to KDHE? Yes No If yes, date sample was submitted:

Water well disinfected? Yes No

8 TYPE OF CASING USED: Steel PVC Other CASING JOINTS: Glued Clamped Welded Threaded
 Casing diameter **2** in. to **64.2** in. to ft. Diameter in. to ft. Diameter in. to ft.
 Casing height above land surface **36** in. Weight **0.698** lbs./ft. Wall thickness or gauge No. **Sch 40**

TYPE OF SCREEN OR PERFORATION MATERIAL:
 Steel Stainless Steel Fiberglass PVC Other (Specify)
 Brass Galvanized Steel Concrete tile None used (open hole)

SCREEN OR PERFORATION OPENINGS ARE:
 Continuous Slot Mill Slot Gauze Wrapped Torch Cut Drilled Holes Other (Specify)
 Louvered Sluiter Key Punched Wire Wrapped Saw Cut None (Open Hole)

SCREEN-PERFORATED INTERVALS: From **44** ft. to **64** ft. From ft. to ft. From ft. to ft.
 GRAVEL PACK INTERVALS: From **33** ft. to **64** ft. From ft. to ft. From ft. to ft.

9 GROUT MATERIAL: Neat cement Cement grout Bentonite Other
 Grout Intervals: From **0** ft. to **33** ft. From ft. to ft. From ft. to ft.

Nearest source of possible contamination:
 Septic Tank Lateral Lines Pit Privy Livestock Pens Insecticide Storage
 Sewer Lines Cess Pool Sewage Lagoon Fuel Storage Abandoned Water Well
 Watertight Sewer Lines Seepage Pit Feedyard Fertilizer Storage Oil Well/Gas Well
 Other (Specify)

Direction from well? **North** Distance from well? **20** ft.

10 FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0.0	5.0	Soils			
5.0	15.5	Heavy Clay with Streaks of Silt			
15.5	28.0	Silty Clay			
28.0	32.5	Heavy Clay with Streaks of Silt			
32.5	65.0	Sand & Gravel			
65.0	66.0	Silty Sand Lens			
66.0	68.0	Sand			

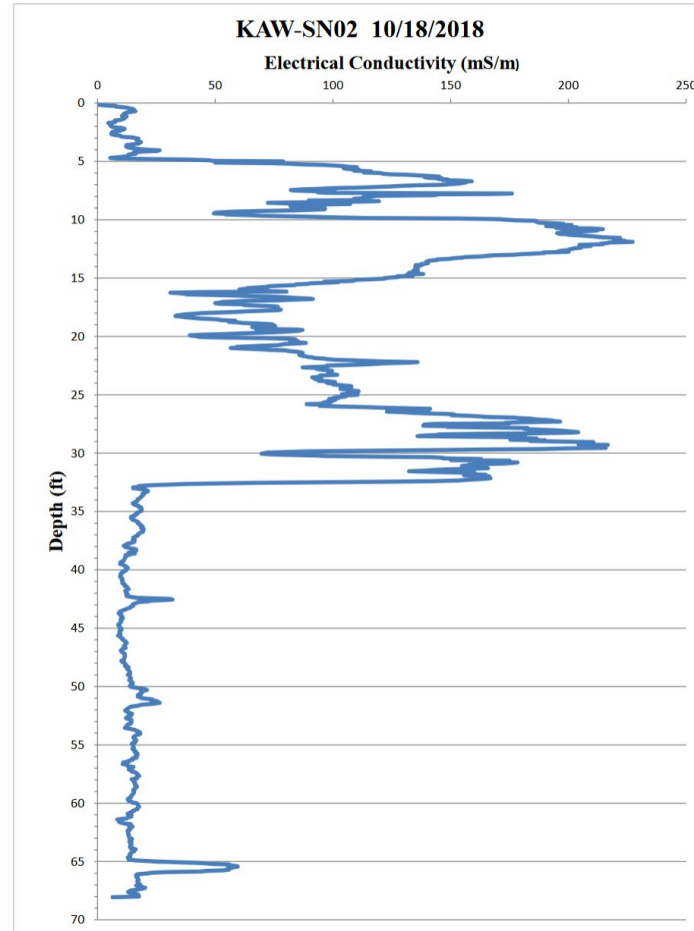
Notes: See Attached Electrical Conductivity Log
 Replaces Well 390519095445301

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-yr) **10/18/2018**, and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. This Water Well Record was completed on (mo-day-yr) **10/19/2018** under the business name of **Kansas Geological Survey**. Signature _____

Mail 1 white copy along with a fee of \$5.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWTS Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524. Visit us at <http://www.kdheks.gov/waterwell/index.html> KSA 82a-1212 Revised 7/10/2015

Shawnee Co.
 Kansas Geological Survey

S2 SW 16-11-15E



390418095310801, JF01

http://www.kgs.ku.edu/Hydro/WWC5/E/11S17/515525.pdf

WATER WELL RECORD Form WWC-5
 Original Record Correction Change in Well Use

Division of Water Resources App. No. _____ Well ID **KAW-JF01**

1 LOCATION OF WATER WELL: Fraction NW ¼ NW ¼ NW ¼ ¼ Section Number **27** Township Number **T 11 S** Range Number **R 17 E W**
 County: **Jefferson**

2 WELL OWNER: Last Name: _____ First: _____
 Business: **Kansas Geological Survey**
 Address: **University of Kansas**
1930 Constant Ave
 City: **Lawrence** State: **KS** ZIP: **66047**
 Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here:
50 feet East of the intersection of Decatur Rd and 17th St, South side of road

3 LOCATE WELL WITH "X" IN SECTION BOX:
 N

X			

 W E
 S
 1 mile

4 DEPTH OF COMPLETED WELL: **43** ft.
 Depth(s) Groundwater Encountered: 1) ft.
 2) ft. 3) ft. or 4) Dry Well
 WELL'S STATIC WATER LEVEL: **27** ft.
 below land surface, measured on (mo-day-yr) **05-14-18**
 above land surface, measured on (mo-day-yr)
 Pump test data: Well water was ft.
 after hours pumping gpm
 Well water was ft.
 after hours pumping gpm
 Estimated Yield: gpm
 Bore Hole Diameter: **3.25** in. to **4.7** in. and
 in. to in. ft.

5 Latitude: **39.071666** (decimal degrees)
Longitude: **-95.516797** (decimal degrees)
 Horizontal Datum: WGS 84 NAD 83 NAD 27
 Source for Latitude/Longitude:
 GPS (unit make/model:)
 (WAAS enabled? Yes No)
 Land Survey Topographic Map
 Online Mapper: **Google Earth Pro**

6 Elevation: **862** ft. Ground Level TOC
 Source: Land Survey GPS Topographic Map
 Other: **Google Earth Pro**

7 WELL WATER TO BE USED AS:
 1. Domestic: Household Lawn & Garden Livestock
 2. Irrigation
 3. Feedlot Air Sparge Industrial
 4. Recovery Injection
 5. Public Water Supply: well ID
 6. Dewatering: how many wells?
 7. Aquifer Recharge: well ID
 8. Monitoring: well ID **KAW-JF01**
 9. Environmental Remediation: well ID
 10. Oil Field Water Supply: lease
 11. Test Hole: well ID
 12. Geothermal: how many bores?
 a) Closed Loop Horizontal Vertical
 b) Open Loop Surface Discharge Inj. of Water
 13. Other (specify):

Was a chemical/bacteriological sample submitted to KDHE? Yes No If yes, date sample was submitted:

Water well disinfected? Yes No

8 TYPE OF CASING USED: Steel PVC Other CASING JOINTS: Glued Clamped Welded Threaded
 Casing diameter **2** in. to **4.3** ft. Diameter in. to ft.
 Casing height above land surface **36** in. Weight **0.698** lbs./ft. Wall thickness or gauge No. **Sch. 40**

TYPE OF SCREEN OR PERFORATION MATERIAL:
 Steel Stainless Steel Fiberglass PVC Other (Specify)
 Brass Galvanized Steel Concrete tile None used (open hole)

SCREEN OR PERFORATION OPENINGS ARE:
 Continuous Slot Mill Slot Gauze Wrapped Torch Cut Drilled Holes Other (Specify)
 Louvered Shutter Key Punched Wire Wrapped Saw Cut None (Open Hole)

SCREEN-PERFORATED INTERVALS: From **33** ft. to **43** ft. From ft. to ft.
 GRAVEL PACK INTERVALS: From **23** ft. to **43** ft. From ft. to ft.

9 GROUT MATERIAL: Neat cement Cement grout Bentonite Other
 Grout Intervals: From **0** ft. to **23** ft. From ft. to ft. From ft. to ft.

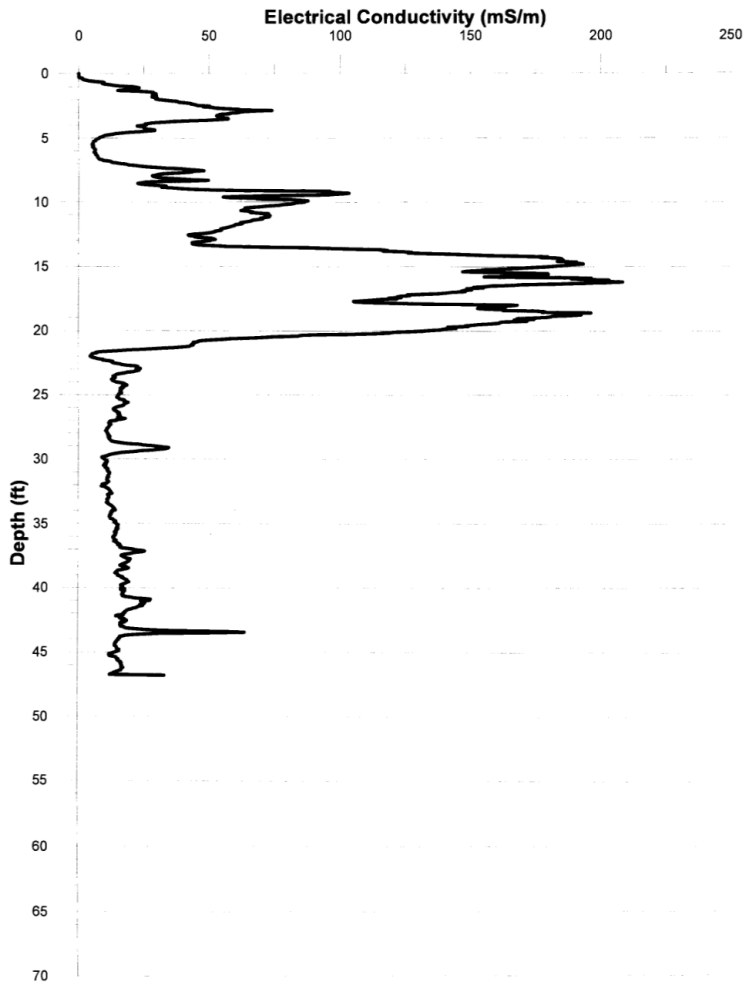
Nearest source of possible contamination:
 Septic Tank Lateral Lines Pit Privy Livestock Pens Insecticide Storage
 Sewer Lines Cess Pool Sewage Lagoon Fuel Storage Abandoned Water Well
 Watertight Sewer Lines Seepage Pit Feedyard Fertilizer Storage Oil Well/Gas Well
 Other (Specify) **Creek**
 Direction from well? Distance from well? **1600** ft.

10 FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	4	Soils	46.65		Bedrock - Refusal
4	7	Sands			
7	13	Silts & Sands			
13	20.5	Clay			
20.5	28.5	Sands			
28.5	29.5	Silt Lens			
29.5	43	Sands			
43	44	Silt Lens			
44	46.65	Sands			

Notes: See Attached Electrical Conductivity Log

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) **05-14-2018**... and this record is true to the best of my knowledge and belief.
 Kansas Water Well Contractor's License No. This Water Well Record was completed on (mo-day-year) **05-22-2018**...
 under the business name of **Kansas Geological Survey**.....
 Mail 1 white copy along with a fee of \$5.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWTS Section,
 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524
 Visit us at <http://www.kdheks.gov/waterwell/index.html> **KSA 82a-1212** **Revised 7/10/2015**

KAW-JF01 5/14/2018



390024095224001, DG01

http://www.kgs.ku.edu/Hydro/WWC5/E/12S20/511959.pdf

WATER WELL RECORD Form WWC-5 Division of Water Resources App. No. [] Well ID **KAW-DG01**

Original Record Correction Change in Well Use

1 LOCATION OF WATER WELL: County: Douglas Fraction SW 1/4 NW 1/4 SW 1/4 SW 1/4 Section Number 17 Township Number T 12 S Range Number R 20 E W

2 WELL OWNER: Last Name: Kansas Geological Survey Business Address: University of Kansas 1930 Constant Ave City: Lawrence State: KS ZIP: 66047 Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here: E 1500 Road, 675 feet North of intersection with US Highway 40 Lawrence, KS

3 LOCATE WELL WITH "X" IN SECTION BOX: [Diagram showing a 36-acre section box with an 'X' in the SW corner]

4 DEPTH OF COMPLETED WELL: 1) 66.5 ft. 2) ft. 3) ft. or 4) Dry Well WELL'S STATIC WATER LEVEL: 19.3 ft. below land surface, measured on (mo-day-yr) 08-15-17. above land surface, measured on (mo-day-yr) Pump test data: Well water was ft. after hours pumping gpm Well water was ft. after hours pumping gpm Estimated Yield: gpm Bore Hole Diameter: 3.25 in. to 66.5 ft. and in. to ft.

5 Latitude: 39.002397 (decimal degrees) **Longitude:** 95.223993 (decimal degrees) Horizontal Datum: WGS 84 NAD 83 NAD 27 Source for Latitude/Longitude: GPS (unit make/model:) (WAAS enabled? Yes No) Land Survey Topographic Map Online Mapper: Google Earth Pro

6 Elevation: 833 ft. Ground Level TOC Source: Land Survey GPS Topographic Map Other Google Earth Pro

7 WELL WATER TO BE USED AS: 1. Domestic: Household Lawn & Garden Livestock 2. Irrigation Feedlot Industrial 3. Public Water Supply: well ID 4. Dewatering: how many wells? 5. Aquifer Recharge: well ID 6. Monitoring: well ID **KAW-DG01** 7. Environmental Remediation: well ID 8. Air Sparge Soil Vapor Extraction Recovery Injection 9. Oil Field Water Supply: lease 10. Test Hole: well ID 11. Cased Uncased Geotechnical 12. Geothermal: how many bores? a) Closed Loop Horizontal Vertical b) Open Loop Surface Discharge Inj. of Water 13. Other (specify):

Was a chemical/bacteriological sample submitted to KDHE? Yes No If yes, date sample was submitted:

Water well disinfected? Yes No

8 TYPE OF CASING USED: Steel PVC Other CASING JOINTS: Glued Clamped Welded Threaded Casing diameter 2 in. to 66.5 ft. Diameter in. to ft. Diameter in. to ft. Casing height above land surface 37.4 in. Weight 0.698 lbs./ft. Wall thickness or gauge No. Sch 40

TYPE OF SCREEN OR PERFORATION MATERIAL: Steel Stainless Steel Fiberglass PVC Other (Specify) Brass Galvanized Steel Concrete tile None used (open hole)

SCREEN OR PERFORATION OPENINGS ARE: Continuous Slot Mill Slot Gauze Wrapped Torch Cut Drilled Holes Other (Specify) Louvered Shutter Key Punched Wire Wrapped Saw Cut None (Open Hole)

SCREEN-PERFORATED INTERVALS: From 46.5 ft. to 66.5 ft. From ft. to ft. From ft. to ft. GRAVEL PACK INTERVALS: From 30 ft. to 66.5 ft. From ft. to ft. From ft. to ft.

9 GROUT MATERIAL: Neat cement Cement grout Bentonite Other Grout Intervals: From 0 ft. to 30 ft. From ft. to ft. From ft. to ft.

Nearest source of possible contamination: Septic Tank Lateral Lines Pit Privy Livestock Pens Insecticide Storage Sewer Lines Cess Pool Sewage Lagoon Fuel Storage Abandoned Water Well Watertight Sewer Lines Seepage Pit Feedyard Fertilizer Storage Oil Well/Gas Well Other (Specify)

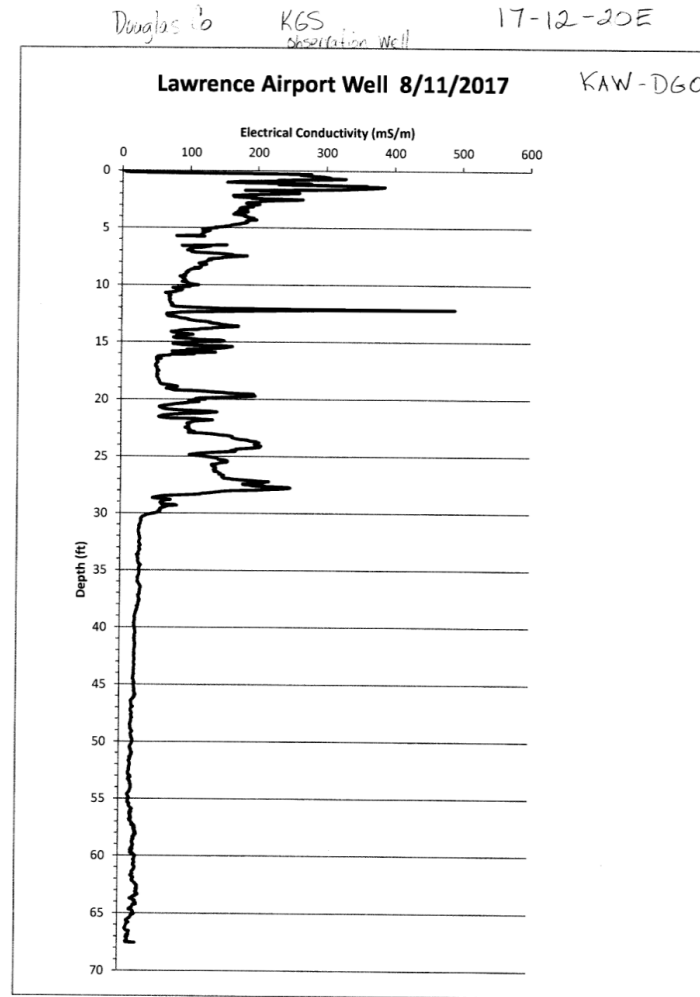
Direction from well? Distance from well? ft.

10 FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	3	Soils			
3	16	Clays & Silts			
16	19	Silt			
19	30	Clays & Silts			
30	67.5	Sands			

Notes: See Attached Electrical Conductivity Log
Replaces USGS Well 390006095132301

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) 08/11/2017, and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. This Water Well Record was completed on (mo-day-year) 08/22/2017, under the business name of Kansas Geological Survey. Signature:

Mail 1 white copy along with a fee of \$5.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWTS Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524. Visit us at <http://www.kdheks.gov/waterwell/index.html> KSA 82a-1212 Revised 7/10/2015



385624095093702, DG02

http://www.kgs.ku.edu/Hydro/WWC5/E/13S20/522411.pdf

WATER WELL RECORD Form WWC-5 Division of Water Resources App. No. Well ID **KAW-DG02**

Original Record Correction Change in Well Use

1 LOCATION OF WATER WELL: County: Douglas Fraction NE 1/4 NE 1/4 NE 1/4 NW 1/4 Section Number 11 Township Number T 13 S Range Number R 20 E W

2 WELL OWNER: Last Name: First: Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here:
 Business: Kansas Geological Survey Address: University of Kansas 1930 Conant Ave City: Lawrence State: KS ZIP: 66047 100 feet south of intersection of N 1400 RD and E 1850 Rd

3 LOCATE WELL WITH "X" IN SECTION BOX: N
 W E
 S
 1 mile

4 DEPTH OF COMPLETED WELL: 70.00 ft.
 Depth(s) Groundwater Encountered: 1) ft.
 2) ft. 3) ft. or 4) Dry Well
 WELL'S STATIC WATER LEVEL: 27.01 ft.
 below land surface, measured on (mo-day-yr) 7/25/18
 above land surface, measured on (mo-day-yr)
 Pump test data: Well water was ft. after hours pumping gpm
 Well water was ft. after hours pumping gpm
 Estimated Yield: gpm
 Bore Hole Diameter: 3.25 in. to 70.00 ft. and in. to ft.

5 Latitude: 38.942311 (decimal degrees)
Longitude: -95.158268 (decimal degrees)
 Horizontal Datum: WGS 84 NAD 83 NAD 27
 Source for Latitude/Longitude: GPS (unit make/model)
 (WAAS enabled? Yes No)
 Land Survey Topographic Map
 Online Mapper: Google Earth Pro

6 Elevation: 818 ft. Ground Level TOC
 Source: Land Survey GPS Topographic Map
 Other Google Earth Pro

7 WELL WATER TO BE USED AS:
 1. Domestic: Household Lawn & Garden Livestock Irrigation Feedlot Industrial
 2. Public Water Supply: well ID
 3. Dewatering: how many wells?
 4. Aquifer Recharge: well ID
 5. Monitoring: well ID KAW-DG02
 6. Environmental Remediation: well ID
 7. Air Sparge Soil Vapor Extraction Recovery Injection
 8. Oil Field Water Supply: lease
 9. Test Hole: well ID
 10. Cased Uncased Geotechnical
 11. Geothermal: how many bores?
 a) Closed Loop Horizontal Vertical
 b) Open Loop Surface Discharge Inj. of Water
 12. Other (specify):

Was a chemical/bacteriological sample submitted to KDHE? Yes No If yes, date sample was submitted:

Water well disinfected? Yes No

8 TYPE OF CASING USED: Steel PVC Other CASING JOINTS: Glued Clamped Welded Threaded
 Casing diameter 2 in. to 70 ft. Diameter in. to ft. Diameter in. to ft.
 Casing height above land surface 36 in. Weight 0.698 lbs./ft. Wall thickness or gauge No. Sch 40
 TYPE OF SCREEN OR PERFORATION MATERIAL: Steel Stainless Steel Fiberglass PVC Brass Galvanized Steel Concrete tile None used (open hole)
 SCREEN OR PERFORATION OPENINGS ARE: Continuous Slot Mill Slot Gauze Wrapped Torch Cut Drilled Holes Other (Specify)
 Louvered Shutter Key Punched Wire Wrapped Saw Cut None (Open Hole)
 SCREEN-PERFORATED INTERVALS: From 55 ft. to 70 ft. From ft. to ft. From ft. to ft.
 GRAVEL PACK INTERVALS: From 34 ft. to 70 ft. From ft. to ft. From ft. to ft.

9 GROUT MATERIAL: Neat cement Cement grout Bentonite Other
 Grout Intervals: From 0 ft. to 34 ft. From ft. to ft. From ft. to ft.

Nearest source of possible contamination:
 Septic Tank Lateral Lines Pit Privy Livestock Pens Insecticide Storage
 Sewer Lines Cess Pool Sewage Lagoon Fuel Storage Abandoned Water Well
 Watertight Sewer Lines Seepage Pit Feedyard Fertilizer Storage Oil Well/Gas Well
 Other (Specify)

Direction from well? Northwest Distance from well? 300 ft.

10 FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0.0	5.5	Soils			
5.5	21.0	Heavy Clay with Streaks of Silt			
21.0	27.0	Clay with Silt			
27.0	37.0	Silt with Sand, Fining Upwards			
37.0	62.0	Sand & Gravel			
62.0	72.0	Sand & Gravel with Silts			

Notes: See Attached Electrical Conductivity Log
 Replaces Well 385624095093701

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) 7/17/18, and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. This Water Well Record was completed on (mo-day-year) 7/27/18, under the business name of Kansas Geological Survey. Signature

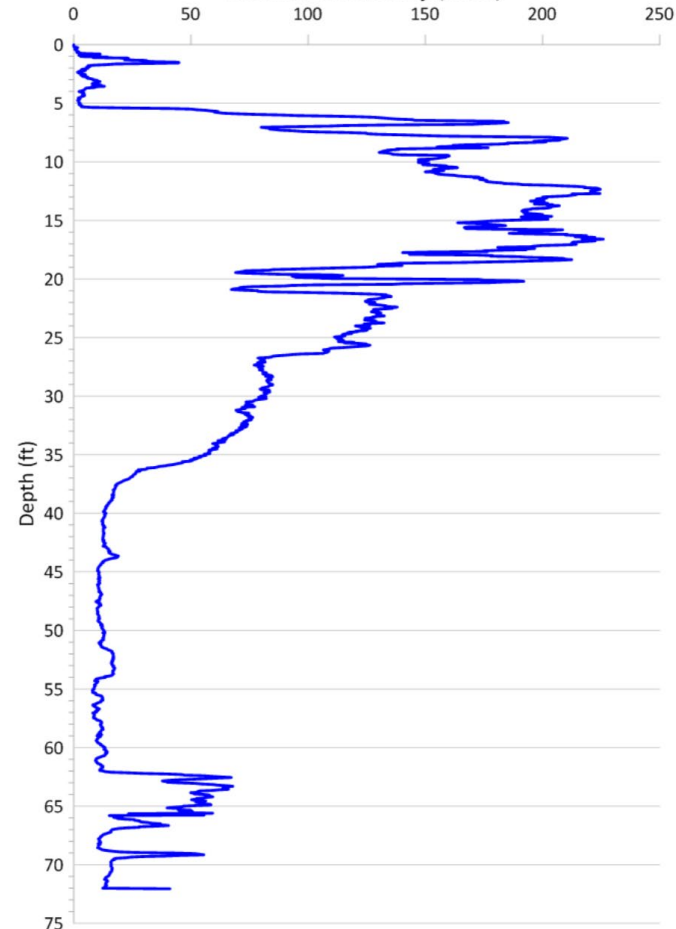
Mail 1 white copy along with a fee of \$5.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWTS Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367 Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524. Visit us at <http://www.kdheks.gov/waterwell/index.html> KSA 82a-1212 Revised 7/10/2015

Douglas Co.
 Kansas Geological Survey

NE NE NE NW 11-13S-20E

KAW-DG02 7/17/2018

Electrical Conductivity (mS/m)



385908094574001, LV01

http://www.kgs.ku.edu/Hydro/WWC5/E/12S22/515526.pdf

WATER WELL RECORD Form WWC-5 Division of Water Resources App. No. _____ Well ID **KAW-LV01**

Original Record Correction Change in Well Use

1 LOCATION OF WATER WELL: County: Leavenworth Fraction NW ¼ NE ¼ NW ¼ NE ¼ Section Number 27 Township Number T 12 S Range Number R 22 E W

2 WELL OWNER: Last Name: _____ First: _____ Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here:
 Business: Kansas Geological Survey Address: University of Kansas 7909 Wyandotte St, De Soto, KS 66018
 Address: 1930 Constant Ave City: Lawrence State: KS ZIP: 66047

3 LOCATE WELL WITH "X" IN SECTION BOX:
 N
 W X E
 S
 1/4 mile

4 DEPTH OF COMPLETED WELL: 65 ft.
 Depth(s) Groundwater Encountered: 1) ft.
 2) ft. 3) ft. or 4) Dry Well
 WELL'S STATIC WATER LEVEL: 16.6 ft.
 below land surface, measured on (mo-day-yr) 05-08-18
 above land surface, measured on (mo-day-yr)
 Pump test data: Well water was ft. after hours pumping gpm
 Well water was ft. after hours pumping gpm
 Estimated Yield: gpm
 Bore Hole Diameter: 3.25 in. to 65 ft. and in. to ft.

5 Latitude: 38.985578 (decimal degrees)
Longitude: -94.961118 (decimal degrees)
 Horizontal Datum: WGS 84 NAD 83 NAD 27
 Source for Latitude/Longitude:
 GPS (unit make/model:)
 (WAAS enabled? Yes No)
 Land Survey Topographic Map
 Online Mapper: Google Earth Pro

6 Elevation: 788 ft. Ground Level TOC
 Source: Land Survey GPS Topographic Map
 Other: Google Earth Pro

7 WELL WATER TO BE USED AS:
 1. Domestic: Household Lawn & Garden Livestock
 2. Irrigation Feedlot Industrial
 3. Public Water Supply: well ID
 4. Dewatering: how many wells?
 5. Aquifer Recharge: well ID
 6. Monitoring: well ID **KAW-LV01**
 7. Environmental Remediation: well ID
 8. Air Sparge Soil Vapor Extraction Recovery Injection
 9. Oil Field Water Supply: lease
 10. Test Hole: well ID
 11. Cased Uncased Geotechnical
 12. Geothermal: how many bores?
 a) Closed Loop Horizontal Vertical
 b) Open Loop Surface Discharge Inj. of Water
 13. Other (specify):

Was a chemical/bacteriological sample submitted to KDHE? Yes No If yes, date sample was submitted:

Water well disinfected? Yes No

8 TYPE OF CASING USED: Steel PVC Other CASING JOINTS: Glued Clamped Welded Threaded
 Casing diameter 2 in. to 65 ft. Diameter in. to ft. Diameter in. to ft.
 Casing height above land surface 36 in. Weight 0.698 lbs./ft. Wall thickness or gauge No. Sch. 40

TYPE OF SCREEN OR PERFORATION MATERIAL:
 Steel Stainless Steel Fiberglass PVC
 Brass Galvanized Steel Concrete tile None used (open hole) Other (Specify)

SCREEN OR PERFORATION OPENINGS ARE:
 Continuous Slot Mill Slot Gauze Wrapped Torch Cut Drilled Holes Other (Specify)
 Louvered Shutter Key Punched Wire Wrapped Saw Cut None (Open Hole)

SCREEN-PERFORATED INTERVALS: From 45 ft. to 65 ft. From ft. to ft. From ft. to ft.
 GRAVEL PACK INTERVALS: From 25 ft. to 65 ft. From ft. to ft. From ft. to ft.

9 GROUT MATERIAL: Neat cement Cement grout Bentonite Other
 Grout Intervals: From 0 ft. to 25 ft. From ft. to ft. From ft. to ft.

Nearest source of possible contamination:
 Septic Tank Lateral Lines Pit Privy Livestock Pens Insecticide Storage
 Sewer Lines Cess Pool Sewage Lagoon Fuel Storage Abandoned Water Well
 Watertight Sewer Lines Seepage Pit Feedyard Fertilizer Storage Oil Well/Gas Well
 Other (Specify)

Direction from well? SE Distance from well? 100 ft.

10 FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHO. LOG (cont.) or PLUGGING INTERVALS
0	2.5	Soil			
2.5	10	Silty Sand			
10	16	Sand			
16	20	Silty Sand			
20	26	Sand			
26	66.1	Sands			

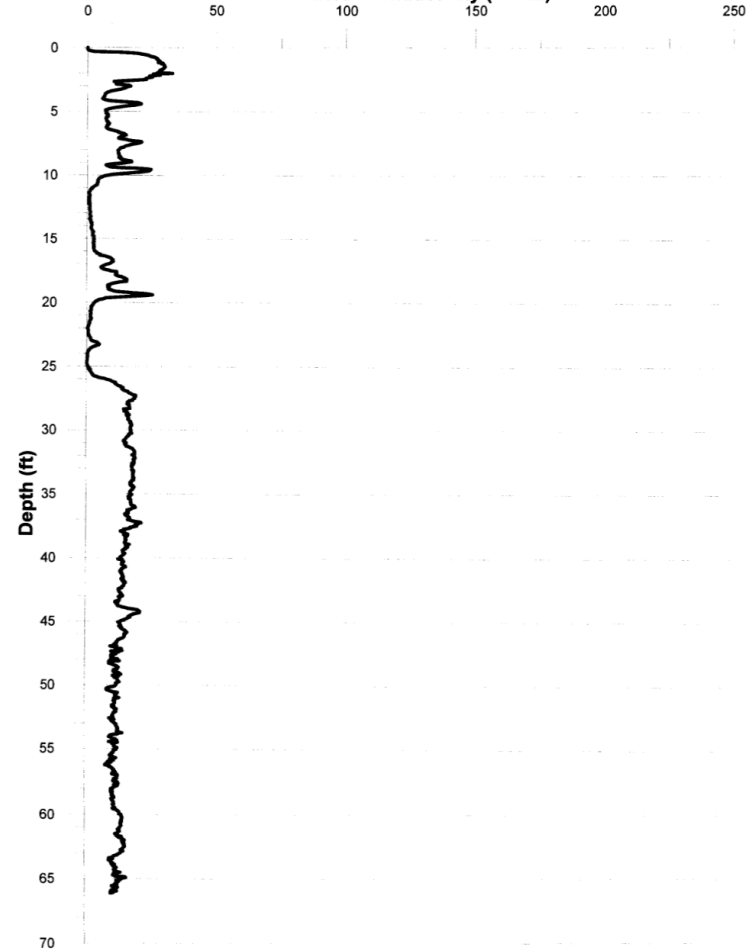
Notes: See Attached Electrical Conductivity Log

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) 05-08-2018, and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. This Water Well Record was completed on (mo-day-year) 05-21-2018, under the business name of Kansas Geological Survey. *[Signature]*

Mail 1 white copy along with a fee of \$5.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWTS Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5524. Visit us at <http://www.kdheks.gov/waterwell/index.html> KSA 82a-1212 Revised 7/10/2015

KAW-LV01 5/8/2018

Electrical Conductivity (mS/m)



390332094455103, WY01

http://www.kgs.ku.edu/Hydro/WWC5/E/11S24/515530.pdf

KAW-WY01 5/9/2018

WATER WELL RECORD Form WWC-5 Division of Water Resources App. No. _____ Well ID **KAW-WY01**

Original Record Correction Change in Well Use

1 LOCATION OF WATER WELL: County: **Wyandotte** Fraction: _____ Township Number: **29** Range Number: **24** Section Number: **11** Range: **E** Direction: **W**

2 WELL OWNER: Last Name: _____ First: _____ Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here:
 Business: **Kansas Geological Survey** Address: **University of Kansas** **1300 feet SE on gravel drive off S 78 St, 1900 feet SE of Douglas Ave and S 78 St**
 Address: **1930 Constant Ave** City: **Lawrence** State: **KS** ZIP: **66047**

3 LOCATE WELL WITH "X" IN SECTION BOX:

4 DEPTH OF COMPLETED WELL: **65** ft.
 Depth(s) Groundwater Encountered: 1) ft.
 2) ft. 3) ft. or 4) Dry Well
WELL'S STATIC WATER LEVEL: **45.2** ft.
 below land surface, measured on (mo-day-yr) **05-09-18**
 above land surface, measured on (mo-day-yr)
 Pump test data: Well water was ft. after hours pumping gpm
 Well water was ft. after hours pumping gpm
 Estimated Yield: gpm
 Bore Hole Diameter: **3.25** in. to **65** ft. and in. to ft.

5 Latitude: **39.058812** (decimal degrees)
Longitude: **-94.764252** (decimal degrees)
 Horizontal Datum: WGS 84 NAD 83 NAD 27
 Source for Latitude/Longitude: GPS (unit make/model:)
 WAAS enabled? Yes No
 Land Survey Topographic Map
 Online Mapper: **Google Earth Pro**

6 Elevation: **769** ft. Ground Level TOC
 Source: Land Survey GPS Topographic Map
 Other: **Google Earth Pro**

7 WELL WATER TO BE USED AS:
 1. Domestic: Household Lawn & Garden Livestock Irrigation Feedlot Industrial
 2. Public Water Supply: well ID
 3. Dewatering: how many wells?
 4. Aquifer Recharge: well ID
 5. Monitoring: well ID **KAW-WY01**
 6. Environmental Remediation: well ID
 7. Air Sparge Soil Vapor Extraction Recovery Injection
 8. Oil Field Water Supply: lease
 9. Test Hole: well ID
 10. Cased Uncased Geotechnical
 11. Geothermal: how many bores?
 a) Closed Loop Horizontal Vertical
 b) Open Loop Surface Discharge Inj. of Water
 12. Other (specify):

Was a chemical/bacteriological sample submitted to KDHE? Yes No
 Water well disinfected? Yes No If yes, date sample was submitted:

8 TYPE OF CASING USED: Steel PVC Other CASING JOINTS: Glued Clamped Welded Threaded
 Casing diameter: **2** in. to **65** ft. Diameter in. to ft. Diameter in. to ft. Diameter in. to ft.
 Casing height above land surface: **36** ft. Weight: **0.698** lbs./ft. Wall thickness or gauge No. **Sch 40**

TYPE OF SCREEN OR PERFORATION MATERIAL:
 Steel Stainless Steel Fiberglass PVC
 Brass Galvanized Steel Concrete tile None used (open hole) Other (Specify)

SCREEN OR PERFORATION OPENINGS ARE:
 Continuous Slot Mill Slot Gauze Wrapped Torch Cut Drilled Holes Other (Specify)
 Louvered Shutter Key Punched Wire Wrapped Saw Cut None (Open Hole)

SCREEN-PERFORATED INTERVALS: From **50** ft. to **65** ft. From ft. to ft. From ft. to ft.
GRAVEL PACK INTERVALS: From **41** ft. to **65** ft. From ft. to ft. From ft. to ft.

9 GROUT MATERIAL: Neat cement Cement grout Bentonite Other
 Grout intervals: From **0** ft. to **41** ft. From ft. to ft. From ft. to ft.

Nearest source of possible contamination:
 Septic Tank Lateral Lines Pit Privy Livestock Pens Insecticide Storage
 Sewer Lines Cess Pool Sewage Lagoon Fuel Storage Abandoned Water Well
 Watertight Sewer Lines Seepage Pit Feedyard Fertilizer Storage Oil Well/Gas Well
 Other (Specify) **Kansas River** Distance from well? **500** ft.

10 LITHOLOGIC LOG

FROM	TO	LITHOLOGIC LOG	FROM	TO	LITHOLOGIC LOG (cont.) or PLUGGING INTERVALS
0	4.5	Soils			
4.5	12	Sands			
12	16	Silt & Clay			
16	29.5	Sand			
29.5	33	Clay with Sand Streaks			
33	37.5	Sand			
37.5	38.5	Silty Lens			
38.5	67.9	Sand			

Notes: See Attached Electrical Conductivity Log

11 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was constructed, reconstructed, or plugged under my jurisdiction and was completed on (mo-day-year) **05-09-2018**, and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. This Water Well Record was completed on (mo-day-year) **05-21-2018** under the business name of **Kansas Geological Survey** Signature: _____

Mail 1 white copy along with a fee of \$5.00 for each constructed well to: Kansas Department of Health and Environment, Bureau of Water, GWIS Section, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367. Mail one to Water Well Owner and retain one for your records. Telephone 785-296-5234. Visit us at <http://www.kdheks.gov/waterwell/index.html> KSA 82a-1212 Revised 7/10/2015

