DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
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RECOMMENDATION OF ACTING CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 9020-3, Hord Family Farms of SD

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Acting Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 9020-3, Hord Family Farms of SD, PO Box 808, Bucyrus OH 44820.

The Acting Chief Engineer is recommending APPROVAL of Application No. 9020-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, 3) the proposed use is a beneficial use and 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board with the following qualifications:

1. The wells approved under Water Permit No. 9020-3 are located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit must control withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

2. Any additional wells or future replacement wells must meet the adequate well construction standard as defined in Administrative Rule of South Dakota (ARSD) 74:02:04:20 and may not be constructed using the alternative construction requirements that are allowed for domestic use wells outlined in ARSD 74:02:04:35.

3. The permit holder must report to the Chief Engineer annually the amount of water withdrawn from the Dakota Aquifer.

4. Water Permit No. 9020-3 authorizes a total annual diversion of up to 86 acre-feet of water.

See report on application for additional information.

Adam Mathiowetz, PE
Acting Chief Engineer
April 08, 2026

Report to the Chief Engineer

On Water Permit Application No. 9020-3

Hord Family Farms of SD

April 8, 2026

Water Permit Application No. 9020-3 proposes to appropriate up to 86 acre-feet of water annually at a maximum combined pump rate of 0.334 cubic feet of water per second (cfs) from up to three wells to be completed into the Dakota aquifer (approximately 960 feet deep) located in the S ½ SW ¼ Section 19-T108N-R56W for commercial use at a swine production facility at the same location. This site is located in Miner County, approximately five and one-half miles southeast of Carthage, SD.

AQUIFER: Dakota (DKOT)

HYDROGEOLOGY:

The Dakota Formation is defined as the first relatively continuous sandstone below the Greenhorn Limestone, extending downward to the top of the Skull Creek Shale in western and central South Dakota (Schoon, 1971). In eastern South Dakota, the Skull Creek Shale is not continuous and when absent, the Dakota Formation directly overlies Precambrian bedrock or the Inyan Kara Group (Schoon, 1971). In western South Dakota, a stratigraphically equivalent formation to the Dakota Formation is the Newcastle Formation, which outcrops in the Black Hills (Bredehoeft and others, 1983). In eastern South Dakota, the Dakota Formation can be separated into three layers: 1) upper layer of fine to medium grained, light to reddish brown, quartz sandstone interbedded with minor gray to dark grey shale layers; 2) a middle layer of silty gray clay interbedded with minor sandstone layers; and 3) a lower layer of medium to coarse grained quartz sandstone (Schoon, 1971).

The Dakota aquifer is comprised of the saturated and permeable portions of the Dakota Formation and is primarily a confined bedrock aquifer throughout most of South Dakota (Schoon, 1971; Water Rights 2026b and 2026d). The Dakota Formation underlies approximately 66,500 square miles of South Dakota and has an average thickness of 150 feet (Schoon, 1971). Using Schoon's (1971) estimates of average thickness (150 feet) and areal extent (66,500 square miles or 42.5 million acres) of the Dakota aquifer, and assuming 15% porosity for the Dakota Formation, approximately 960 million acre-feet of water is stored within the Dakota aquifer in South Dakota.

A well completion report was submitted with this application for one of the wells to be used (Water Rights, 2026d). The report lists, "Top Soil" from 0 to 5 feet, "Yellow Clay" from 5 to 30 feet, "Blue Clay" from 30 to 135 feet, "Chalk" from 135 to 235 feet, "Shale" from 235 to 540 feet, "Greenhorn" from 540 to 580 feet, "Shale" from 580 to 740 feet, and "Dakota" from 740 to 960 feet below the ground surface (Water Rights, 2026d). The well was screened from 900 to 960 feet and had a static water level of approximately 150 feet below top of casing at the time of well completion (December 22nd, 2025) (Water Rights, 2026d).

South Dakota Codified Law (SDCL)

Water Permit Application No. 9020-3 proposes to appropriate water from the Dakota aquifer. The probability of unappropriated water being available from the aquifer can be evaluated by considering *SDCL 46-6-3.1, SDCL 46-2A-9.*

Pursuant to SDCL 46-6-3.1,

> *"No application to appropriate groundwater may be approved if, according to the best information reasonably available, it is probable that the quantity of water withdrawn annually from a groundwater source will exceed the quantity of the average estimated annual recharge of water to the groundwater source. An application may be approved, however, for withdrawals of groundwater from any groundwater formation older than or stratigraphically lower than the greenhorn formation in excess of the average estimated annual recharge for use by water distribution systems."*

The Dakota aquifer is older than and stratigraphically lower than the Greenhorn Formation (Fahrenbach et al., 2010). However, the applicant's proposed use is not for a water distribution system as defined by SDCL 46-1-6(17). Therefore, the average annual recharge and average annual withdrawal rates to and from the Dakota aquifer must be considered.

Pursuant to SDCL 46-2A-9,

> *"A permit to appropriate water may be issued only if there is a reasonable probability that there is unappropriated water available for the applicant's proposed use, that the diversion point can be developed without unlawful impairment of existing domestic water uses and water rights, and that the proposed use is a beneficial use and in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board as defined by SDCL 46-2-9 and 46-2-11."*

This report will address the availability of unappropriated water and the potential for unlawful impairment of existing domestic water uses and water rights within the Dakota aquifer.

HYDROLOGIC BUDGET:

Recharge

Recharge to the Dakota aquifer in South Dakota occurs through upward leakage from underlying aquifers with a higher potentiometric surface than the Dakota aquifer, downward seepage through overlying confining layers, and through the infiltration of precipitation on the Newcastle Formation that outcrops in the Black Hills (Bredehoeft and others, 1983; Water Rights, 2026b). Using computer modeling, Bredehoeft and others (1983) attempted to match Darton's (1909) potentiometric surface map of the Dakota aquifer and developed a recharge estimate of approximately 79.4 cfs (57,500 acre-feet/year) prior to well development. However, assumptions used in Bredehoeft and other's (1983) recharge estimate are now outdated. For example, the recharge estimates used for the Madison and Inyan Kara aquifers in Bredehoeft and others (1983) analysis are much lower than estimates calculated by the more recent research of Carter and others (2002) and Medler and others (2025). While outdated, the Bredehoeft and other's

(1983) estimate is the best information available to give a sense of scale of the recharge to the Dakota aquifer in South Dakota, it is unknown whether the true recharge rate of the Dakota aquifer is higher or lower than the Bredehoeft and others (1983) estimates.

Discharge

Discharge from the Dakota aquifer in South Dakota occurs through well withdrawals, uncontrolled flowing wells, outflow through corroded well casings, and outflow to overlying or adjacent aquifers due to a higher potentiometric surface in the Dakota aquifer (Bredehoeft and others, 1983; Water Rights, 2026d). Currently, there are 260 water rights/permits, and seven future use permits reserving 4,287 acre-feet/year of water from the Dakota aquifer. The future use permits are shown on Table 1 (Water Rights, 2026c).

Table 1. Future use permits reserving water from the Dakota aquifer (Water Rights, 2026c)

Permit No.	Name	County	Use	Priority Date	Amount Reserved (ac-ft/yr)
1262C-3	City of Canton	LN	MUN	03/16/1966	674
5219-3		LN	MUN	12/05/1988	1,175
8400-3	City of Harrisburg	LN	MUN	05/15/2019	550
5101-3	City of Lennox	LN	MUN	08/27/1986	*0
5101A-3		LN	MUN	08/27/2007	*0
5155-3	Lincoln County RWS	LN	RWS	10/21/1987	440
4817-3	South Lincoln RWS	LN	RWS	08/17/1981	1,448
LN: Lincoln; MUN: Municipal; RWS: Rural Water System; *City of Lennox has allocated all the water they had reserved				**TOTAL:**	**4,287**

Of the 260 active water rights/permits, 97 are primarily for water distribution systems (rural water system, municipal, suburban housing development, etc.), 21 for irrigation, 114 for commercial use, 7 for industrial use, 10 for domestic use, 4 for fish and wildlife propagation, 2 for geothermal use, 2 for institutional use, and 3 for recreation (Water Rights, 2026c). The use type determined for each water right/permit was based on the primary use categorized for each water right/permit as some permits have multiple uses (Water Rights, 2026c). Historically, average water use by non-irrigation appropriations limited by an instantaneous diversion rate have been assumed to be pumping 60% of full time at the respective permitted diversion rate. Water rights/permits limited by an annual volume are assumed to withdraw their entire respective annual volume limitation. This is a standard method used by the DANR-Water Rights Program for estimating annual withdrawals by non-irrigation appropriations from an aquifer and is likely an overestimation of average annual withdrawals (Water Rights, 2026c). Additionally, some water rights/permits withdraw from multiple aquifers. As such, only water from the Dakota aquifer for Water Right Nos. 8199-3 & 8252-3 and additionally Water Permit Nos. 2804-2, 6394-3, 8464-3, 8670-3 & 8697-3 will be considered in total estimates for Table 2. Some of the water rights/permits authorized to appropriate water from the Dakota aquifer are identified as being connected to a rural water system (RWS) rather than using their permitted wells, as allowed under ARSD 74:02:01:37(2). Therefore, the annual water use for these water rights/permits has been estimated to be zero acre-feet per year.

Additionally, the City of Canton purchases 49% of their water from South Lincoln Water System. Therefore, the estimated withdrawals from the City of Canton are adjusted to better reflect the estimated usage from the Dakota aquifer (Friedeman and Settje, 2025). Overall, the estimated average annual withdrawal rate from the Dakota aquifer by the non-irrigation water rights/permits is approximately 24,930 acre-feet per year (Table 2) (Water Rights, 2026c).

Table 2. Estimated annual use for the non-irrigation water right/permits authorized to divert water from the Dakota aquifer (Water Rights, 2026c)

Use Type	Count	Diversion Rate (cfs)	Estimated Diversion Rate Total (ac-ft/yr)	Limited by Volume (ac-ft/yr)	Total Estimated Use (ac-ft/yr)
Commercial	114	11.36	4,936	2,352	7,288
Domestic	10	1.47	640	72	712
Fish and Wildlife Propagation	4	2.73	1,187	0	1,187
Geothermal	2	2.33	1,012	0	1,012
Industrial	7	0.84	367	38	405
Institutional	2	1.34	582	0	582
Municipal	84	5.19	2,253	6,402	8,655
Recreational	3	0.45	195	3.1	199
Rural Water System	6	3.31	1,438	2,005	3,443
Suburban Housing Development	7	3.33	1,447	0	1,447
Total:	**239**	**32.35**	**14,057**	**10,872**	**24,930**
COM: Commercial, DOM: Domestic, FWP: Fish & Wildlife Propagation, GEO: Geothermal, IND: Industrial, INS: Institutional, MUN: Municipal, REC: Recreation, RWS: Rural Water System, SHD: Suburban Housing Development					

Currently, there are 21 irrigation water rights/permits authorized to appropriate water from the Dakota aquifer (Water Rights, 2026c). Irrigation water rights/permits have been typically required to report their annual usage on an irrigation questionnaire since 1979. The estimated average annual withdrawal rate for the Dakota aquifer irrigation water rights/permits that have reported over the period of record (1979 to 2024) is approximately 168 acre-feet per year (Table 3) (Water Rights, 2026a). To reflect the current development of irrigation water rights/permits more accurately, the average annual withdrawal rate for irrigation appropriations from 2015 to 2024, which is approximately 262 acre-feet per year (Table 3), will be used for the hydrologic budget (Water Rights, 2026a).

Water Permit No. 2890-2 was approved in 2025 and has not reported an annual usage; therefore, its withdrawal must be estimated. Generally, crop irrigators in eastern South Dakota apply 10 inches (or less) of water per acre per year (Drennon, K. 2025). Because Water Permit No. 2890-2 is located in western South Dakota, an application rate of one foot per acre per year is used to estimate annual withdrawals. This rate is likely an overestimate, as the water is used to dilute feedlot runoff prior to land application. Therefore, Water Permit No. 2890-2 (assuming an application rate of one foot of water per authorized acre) has an estimated annual withdrawal rate of approximately 95 acre-feet per year. Water Permit No. 2890-2, combined with the reported annual average (2015 to 2024), results in an estimated annual irrigation withdrawal rate of 357 acre-feet per year.

Table 3. Reported historic irrigation use from the Dakota aquifer (Water Rights, 2026a)

Year	No. of Permits	Reported (acre-feet)
1979	2	38
1980	2	110
1981	4	45
1982	5	33
1983	5	64
1984	4	0
1985	5	8
1986	5	239
1987	5	1
1988	4	453
1989	4	265
1990	4	234
1991	5	165
1992	5	40
1993	7	112
1994	7	52
1995	8	31
1996	8	34
1997	9	48
1998	9	176
1999	10	102
2000	10	173
2001	11	161
2002	10	179
2003	10	205
2004	10	154
2005	12	147
2006	13	232
2007	14	200
2008	14	196
2009	15	131
2010	17	172
2011	18	175
2012	18	298
2013	18	257
2014	17	163
2015	17	236
2016	16	196
2017	16	229
2018	16	157
2019	15	108
2020	16	246
2021	16	256
2022	17	483
2023	19	376
2024	18	331
Min	**2**	**0**
Max	**19**	**483**
Avg (1979-2024)	**11**	**168**
Avg (2015-2024)	**17**	**262**

There is one pending application for the Dakota aquifer. Water Permit Application No. 8991-3 for Century Swine RE LLC, if approved, plans to appropriate up to 154 ac-ft/yr at a maximum pump rate of 0.5 cfs from one existing well and up to two additional wells to be completed into the Dakota aquifer for commercial use in Edmunds County.

There are domestic wells completed into the Dakota aquifer that do not require a water right/permit, so the withdrawal amount from those wells is unknown (Water Rights, 2026d). Due to their relatively low diversion rates, withdrawals from domestic wells are generally not considered to be a significant portion of the hydrologic budget. Additionally, with the development of rural water systems in areas where the Dakota aquifer is the uppermost aquifer available; it is likely some domestic users may have transitioned to rural water. Therefore, the quantity of water withdrawn by domestic wells is estimated to be negligible to the hydrologic budget for the Dakota aquifer. It is currently unknown how much water is being discharged from the Dakota aquifer through uncontrolled flowing wells. The Water Management Board has previously determined water being discharged through uncontrolled flowing wells is not a beneficial use and does not constitute appropriation pursuant to SDCL 46-6-3.1 (Water Rights, 1987).

Hydrologic Budget Summary

Bredehoeft and others (1983) estimated the recharge rate to be approximately 57,500 acre-feet/year. However, the Bredehoeft and others (1983) recharge estimate relies on outdated assumptions, and the actual recharge rate of the Dakota aquifer could be higher or lower than previously estimated. The estimated average annual withdrawal rate from the Dakota aquifer is approximately 29,814 acre-feet per year (future use: 4,287 acre-feet/year; non-irrigation: 24,930 acre-feet/year; irrigation: 357 acre-feet/year; Water Permit Application No. 9020-3 (if approved, assuming full volume): 86 acre-feet/year; pending Water Permit Application. No. 8991-3 (if approved, assuming full volume): 154 acre-feet/year. Based on the hydrologic budget, there is a reasonable probability unappropriated water is available from the Dakota aquifer for the proposed appropriation.

OBSERVATION WELL DATA:

Administrative Rule of South Dakota (ARSD) 74:02:05:07 requires that the Water Management Board shall rely upon the record of observation well measurements in addition to other data to determine that the quantity of water withdrawn annually from the aquifer does not exceed the estimated average annual recharge of the aquifer.

Observation wells provide data on how the aquifer reacts to regional climatic conditions and local pumping. The DANR-Water Rights Program monitors 46 observation wells completed into the Dakota aquifer (Water Rights, 2026b). The four closest observation wells to the well the applicant provided a well completion report for, are HD-87A (approximately 59 miles northwest), AU-89A (approximately 59 miles southwest), LN-80D (approximately 63 miles southeast), and LN-81F (approximately 66 miles southeast) (Figure 1) (Water Rights, 2026b). Due to an access issue, measurements have not been collected for the last several years at HD-

87A. The data points utilized to construct the hydrographs are measurements of the static water level in the observation wells from the top of the well casing which were then converted to elevation in feet from the NGVD29 vertical datum.

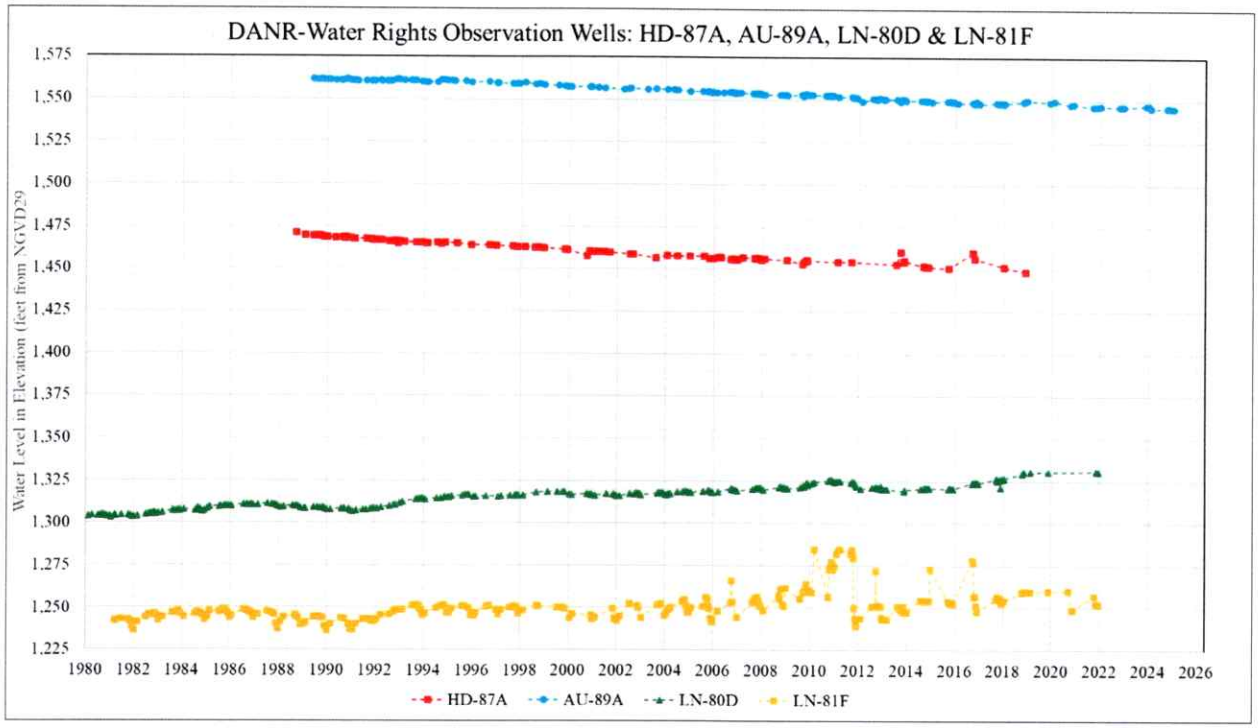

Figure 1. A graph showing the elevation of water levels for observation wells: HD-87A, AU-89A, LN-80D, and LN-81F (Water Rights, 2026b)

In addition to the observation well hydrographs, a record of the potentiometric surface is available through historical accounts. Schoon (1971) developed maps of the potentiometric surface of the Dakota aquifer, and for this particular area, used data modified from Darton (1909), used data modified after Rothrock and Robinson (1936), Erickson (1953-54), and Barkley (1953). Wells that have been completed into the Dakota aquifer in roughly the past thirty-five years and within approximately 10 miles of the proposed diversion point were used to approximate the current potentiometric surface conditions (Table 4) (Water Rights, 2026d).

Table 4. Historic and current approximate water level elevations within approximately 10 miles of the proposed diversion point (Schoon, 1971; Water Rights, 2026d)

Data Source	Year(s)	Approximate potentiometric surface in the vicinity of the existing well (fmsl)
Schoon (1971), after Darton	1909	1,550 to 1,500
Schoon (1971), Modified after Rothrock and Robinson (1936), Erickson (1953-54), and Barkley (1953)	1936 - 1953	1,450 to 1,400
Well Logs Database	1990-Present	1,450 to 1,370

Throughout South Dakota, most of the hydrographs for observation wells completed into the Dakota aquifer, and the potentiometric surface measurements of the Dakota aquifer show a decreasing trend in hydraulic head (Water Rights, 2026b). A decline in water levels in a confined aquifer does not necessarily indicate a significant decrease in water stored in the aquifer, as water levels above the top of the aquifer materials are representative of the hydraulic head (water pressure) inside the aquifer. Additionally, there are uncontrolled, flowing wells discharging water from the Dakota aquifer at ground surface, and it is expected water from the aquifer is also being discharged to other aquifers if wells completed into the Dakota aquifer have experienced casing failure.

The hydrographs in Figure 1 display both declining and stable water levels in the Dakota aquifer in central and south-eastern South Dakota. Several observation wells in the southeast and south-central South Dakota were shown to have water levels that stabilize over time or have recently began stabilizing. The observation wells under the influence of heavy and continuous pumping quickly stabilized after the pumping starts. There has been a long history, back to the late 1800's, of well development into the Dakota aquifer. Concerns have developed over time about the decline in artesian head pressure of the Dakota aquifer. The Water Management Board has concluded and reaffirmed that withdrawals exceeding the average annual recharge cannot be determined solely upon a decline in head pressure, and in theory the Dakota aquifer head is stabilizing relative to withdrawals and discharges (Water Rights, 1987 and 2010). Since discharge from uncontrolled flowing wells is likely to continue until water levels in the aquifer decline to being at or below the ground surface, continuing to allow beneficial pumping to occur reduces the amount of water being discharged to waste. The Water Management Board's decision to optimize development of the Dakota aquifer is favorable to issuance of permits. Therefore, there is a reasonable probability unappropriated water is available for the proposed appropriation.

POTENTIAL FOR UNLAWFUL IMPAIRMENT OF EXISTING WATER RIGHTS:

The closest water right/permit not held by the applicant to the proposed diversion points is Water Right No. 4270-3, which is held by Town of Carthage. The Town of Carthage is currently served by a rural water system (Friedeman, 2026). The diversion point for Water Right No. 4270-3 is located approximately 5.7 miles northwest of the of the existing and proposed well sites for this application (Figure 2) (Table 5) (Water Rights, 2026c).

There are domestic wells on file with the DANR-Water Rights Program that are completed into the Dakota aquifer, with the closest domestic well on file (not held by the applicant) located approximately 1.2 miles south of the proposed diversion points (Water Rights, 2026d). There could potentially be other domestic wells completed into the Dakota aquifer near the diversion points the applicant proposes to use that are not on file with the DANR-Water Rights Program. The location of the domestic wells in the well completion report database maintained by the Water Rights Program is based on the location listed by the driller on the well completion report.

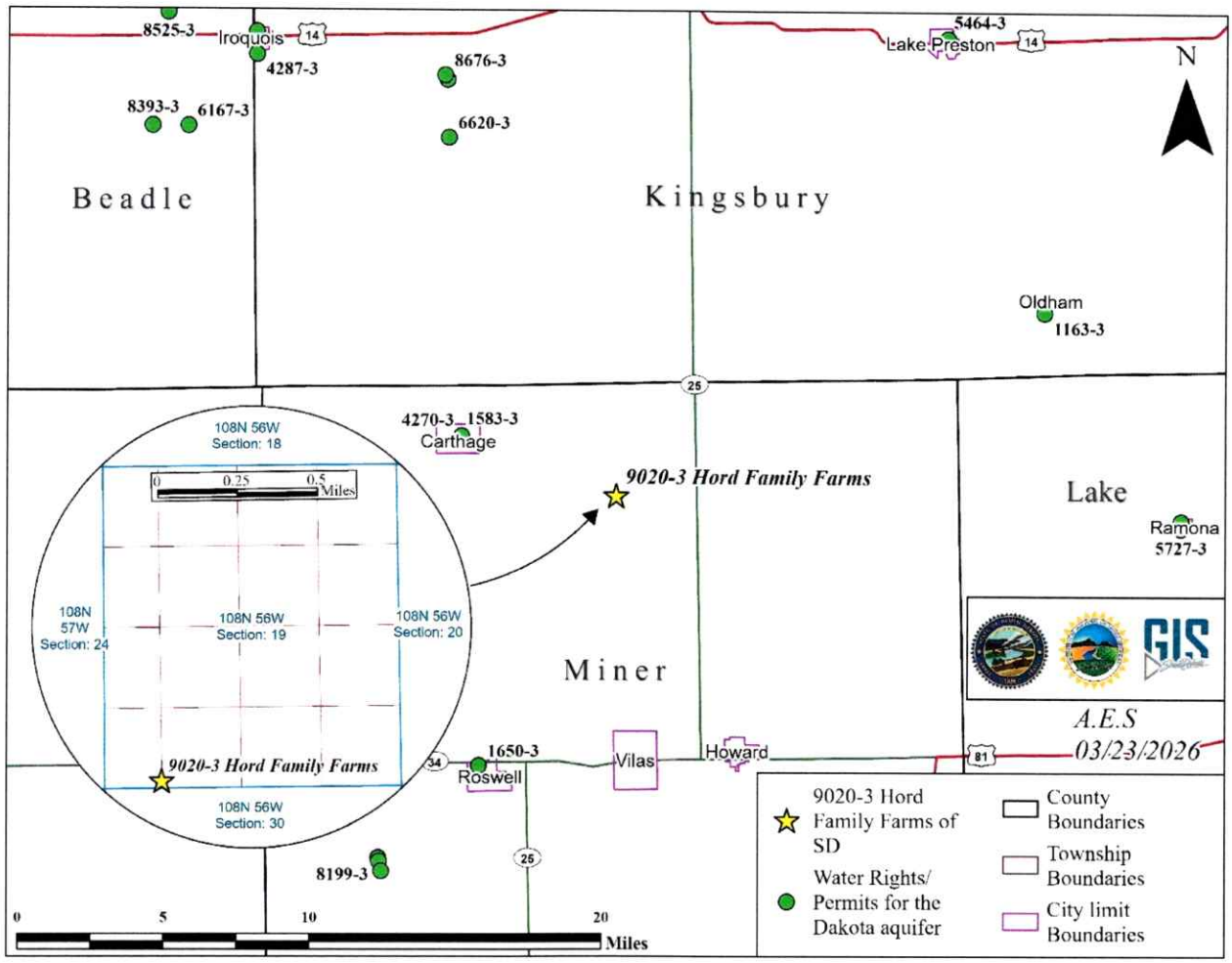

Figure 2. Water rights/permits authorized to withdraw from the Dakota aquifer within approximatly 20 miles of the proposed diversion points for Water Permit Application No. 9020-3 (Water Rights, 2026b and 2026c)

Table 5. Water rights/permits authorized to withdraw water from the Dakota aquifer within approximately 20 miles of Water Permit Application No. 9020-3 as shown in Figure 2 (Water Rights, 2026c)

Permit No.	Name	Status	Use	Authorized Diversion Rate (cfs)	Licensed/Permitted Volume (ac-ft/yr)
1163-3*	City Of Oldham	LC	MUN	0.51	**
1583-3*	Town Of Carthage	LC	MUN	0.20	**
1650-3*	Town Of Roswell	LC	MUN	0.06	**
4270-3*	Town Of Carthage	LC	MUN	0.18	**
4287-3*	City Of Iroquois	LC	MUN	2.50	**
5464-3*	City Of Lake Preston	LC	MUN	0.33	**
5727-3*	City Of Ramona	LC	MUN	0.33	**
6167-3	Pearl Creek Httrn Brth	LC	COM, LCO	0.15	**
6620-3	Riverview LLP	LC	COM, LCO	0.13	**
8199-3	Donahue Farms	LC	COM, DOM	0.15	72.6
8393-3	Pearl Creek Httrn Brth	PE	COM, LCO	0.13	7.7
8525-3	Banner Farms Re LLC	LC	COM, LCO	0.20	130.0
8676-3	Kingston LLC	PE	COM, LCO	0.29	155.0
LC: License; PE: Permit; COM: Commercial; DOM: Domestic; LCO: Livestock Confinement Operation; MUN: Municipal; *Identified as being connected to a rural water system and currently do not use their well except for emergency purposes; ** Limited by diversion rate					

The Dakota aquifer generally is under confined conditions. In a confined aquifer, drawdown from a pumping well can extend some distance from the well. Based on the well completion report submitted with Water Permit Application No. 9020-3, there is expected to be at least 220 feet of saturated aquifer thickness at the time of drilling and the artesian head pressure of 590 feet above the top of the aquifer materials at the time of drilling. Any drawdown as a result of the diversion for this application is not expected to unlawfully impair nearby adequate wells. In the counties of Miner, Kingsbury, Lake, and Sanborn; there are no complaints on file with the DANR-Water Rights Program regarding well interference for adequate wells completed into the Dakota aquifer (Water Rights, 2026e).

The Water Management Board recognizes that putting water to beneficial use requires a certain amount of drawdown to occur. The Board has developed rules to allow water to be placed to maximum beneficial use without the necessity of maintaining artesian head pressure for domestic use. The Water Management Board defined an "adversely impacted domestic well" in ARSD 74:02:04:20(7) as:

> *"A well in which the pump intake was set at least 20 feet below the top of the aquifer at the time of construction or, if the aquifer is less than 20 feet thick, is as near to the bottom of the aquifer as is practical and the water level of the aquifer has declined to a level that the pump will no longer deliver sufficient water for the well owner's needs."*

The Water Management Board considered the delivery of water by artesian head pressure versus maximum beneficial use during the issuance of Water Right No. 2313-2 for Coca-Cola Bottling Company of the Black Hills. The Board adopted the Findings of Facts and Conclusions of Law that noted the reservation of artesian head pressure for delivery of water would be inconsistent with SDCL 46-1-4 which states, "general welfare requires that the water resources of the state be put to beneficial use to the fullest extent of which they are capable..." (Water Rights, 1995). Furthermore, the Water Management Board found if increased cost or decreased production as a result of impacts on artesian head pressure by legitimate users is to be considered as an unlawful impairment, it would also conflict with SDCL 46-1-4 (Water Rights, 1995). With that in mind, some existing well owners may need to install or lower pumps depending on the specific characteristics of the Dakota aquifer at their location. However, when considering the statutes (SDCL 46-1-4 and 46-6-6.1), rules (ARSD 74:02:04:20(6) and (7)), the saturated thickness of the Dakota aquifer in Miner County, and the lack of substantiated well interference complaints for adequate wells completed into the Dakota aquifer in Miner County or the surrounding counties (Water Rights, 2026e), any drawdown created from the proposed diversion is not expected to cause an unlawful impairment to existing water right/permit holders or domestic users with adequate wells. Therefore, there is a reasonable probability that any interference from the proposed appropriation will not impose unlawful impairments to existing users with adequate wells.

Special Consideration: Well Construction

The existing well for this application meets the adequate well definition in the well construction standards, ARSD 74:02:04:20(6):

> *"A well constructed or rehabilitated to allow various withdrawal methods to be used, to allow the inlet to the pump to be placed not less than 20 feet into the saturated aquifer or formation material when the well is constructed, or to allow the pump to be placed near to the bottom of the aquifer as is practical if the aquifer thickness is less than 20 feet."*

Any future replacement or additional wells shall meet the adequate well construction standard as defined in ARSD 74:02:04:20(6). Replacement or additional wells may not be constructed using the alternative construction requirements that are allowed for domestic use wells outlined in ARSD 74:02:04:35.

CONCLUSIONS:

1. Water Permit Application No. 9020-3 proposes to appropriate up to 86 acre-feet of water annually at a maximum combined pump rate of 0.334 cfs from up to three wells to be completed into the Dakota aquifer (approximately 960 feet deep) located in the S ½ SW ¼ Section 19-T108N-R56W for commercial use at a swine production facility at the same location. This site is located in Miner County, approximately five and one-half miles southeast of Carthage, SD.

2. The Water Management Board's position has been that beneficial use of water from the Dakota aquifer may reduce the amount of water discharged from uncontrolled flowing wells.

3. Based on observation well data and the hydrologic budget, there is a reasonable probability that unappropriated water is available from the Dakota aquifer to supply to the proposed appropriation. The Water Management Board has concluded and reaffirmed that withdrawals exceeding the average annual recharge cannot be determined solely upon a decline in head pressure for confined aquifers. Declining head pressure may indicate the aquifer is reaching equilibrium under current recharge and discharge from the aquifer.

4. There is reasonable probability that the diversion by Water Permit Application No. 9020-3 will not unlawfully impair adequate wells for existing water rights/permits holders or domestic users with adequate wells.

5. Any future replacement or additional wells shall meet the adequate well construction standard as defined in ARSD 74:02:04:20(6). Replacement or additional wells may not be constructed using the alternative construction requirements that are allowed for domestic use wells outlined in ARSD 74:02:04:35.

Austin Settje
Natural Resources Engineer I
SD DANR - Water Rights Program

References

Bredehoeft, J.D., Neuzil, C.E., and Milly, P.C., 1983. Regional Flow in the Dakota Aquifer: A Study of the Role of Confining Layers. Alexandria, Virginia: U.S. Geological Survey, 1983. Water- Supply Paper 2237.

Carter, J.M., Driscoll, D.G., Williamson, J.E., and Lindquist, V.A., 2002. Atlas of Water Resources in the Black Hills area, South Dakota. Rapid City South Dakota: U.S. Geological Survey, 2002. Hydrologic Investigations Atlas HA-747.

Darton, H.H., 1909. Geology and Underground Waters of South Dakota. Water Supply Paper 227. Y.S. Geological Survey, Washington D.C.

Drennon, K. 2025. Second Report on the Five-Year Review of Water Availability in the East James Management Unit of the Tulare Aquifer. File for Held Application No. 8082-3. SD DANR-Water Rights Program. Pierre, SD.

Fahrenbach, M.D., Steece, F.V., Sawyer, J.F., McCormick, K.A., McGillivray, G.L., Schulz, L.D., and Redden, J.A. 2010. South Dakota Stratigraphic Correlation Chart. Oil and Gas Investigations 3. SD DANR-Geological Survey, Vermillion, SD.

Friedeman, B. and Settje, A.E. 2025. Personal communication on status of public water systems August 6, 2025.

Friedeman, B. and Mathiowetz, A. 2026. Personal communication on status of public water systems April 8, 2026.

Medler, C.J., Anderson, T.M., and Eldridge, W.G., 2025. Hydrologic Budgets and Water Availability of Six Bedrock Aquifers in the Black Hills Area, South Dakota and Wyoming 1931-2022. Reston, Virginia: U.S. Geological Survey, 2025. Scientific Investigations Report 2025-5067.

Schoon, R.A., 1971. Geology and Hydrogeology of the Dakota Formation in South Dakota. South Dakota Geological Survey Report of Investigations No. 104. Vermillion, SD.

Water Rights, 1995. Findings of Fact, Conclusions of Law, and Final Decision in the Matter of Water Permit Application No. 2313-2, Coca-Cola Bottling Company of the Black Hills. DANR-Water Rights Program file for Water Right No. 2313-2. Pierre, SD.

Water Rights, 2010. Finding of Fact, Conclusions of Law, and Final Decision in the Matter of Water Permit Application No. 7165-3, Paul Buckneberg. SD DANR-Water Rights Program file for Cancelled Water Permit No. 7165-3. Pierre, SD.

Water Rights, 2026a. "1979-2024 Irrigation Summaries by Aquifer", SD DANR-Water Rights Program, Joe Foss Building, Pierre, SD.

Water Rights, 2026b. Observation Well Data, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.

Water Rights, 2026c. Water Right/Permit Files, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.

Water Rights, 2026d. Well Completion Reports, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.

Water Rights, 2026e. County Files, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.