



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

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**RECOMMENDATION OF THE CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2913-2, True North Retreat**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 2913-2, Tru North Retreat, 4679 Avenue A, Rapid City, SD 57703.

The Chief Engineer is recommending APPROVAL of Application No. 2913-2 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 well approved under Water Permit No. 2913-2 is located near domestic wells and other wells which may obtain water from the same aquifer. Water withdrawals must be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The well authorized by Permit No. 2913-2 and any future additional or replacement wells must be constructed by a licensed well driller and construction of the well and installation of the pump must comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
3. The permit holder must report to the Chief Engineer annually the amount of water withdrawn from the Crystalline Rock Aquifer.
4. Water Permit No. 2913-2 authorizes a total annual diversion of up to 1.0 acre-feet of water.

See report on application for additional information.

Adam Mathiowetz, PE
Chief Engineer
DANR-Water Rights Program
September 23, 2026

Report to the Chief Engineer
On Water Permit Application No. 2913-2

True North Retreat

September 21, 2026

Water Permit Application No. 2913-2 proposes to appropriate up to 1 acre-foot of water annually at a maximum instantaneous diversion rate of 0.0067 cubic feet per second (cfs) (15 gallons per minute (gpm)) from one well to be completed into the Crystalline Rock aquifer (approximately 390 feet deep) and located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 27-T4S-R4E for commercial and recreational uses at a campground at the same location. The site is located in Custer County approximately six miles south of Custer, South Dakota.

AQUIFER: Crystalline Rock (CRSL)

HYDROGEOLOGY:

The Crystalline Rock aquifer consists of many localized aquifers within the Precambrian-aged, crystalline core of the Black Hills, where extensive fractures and weathering zones allow for the transmission of water (Driscoll and Carter, 2001). The crystalline rock is generally exposed at land surface except where overlain by localized gravel deposits and alluvium along stream beds and topsoil (Martin et al., 2004; Redden et al., 2016). The crystalline rocks that comprise the aquifer have very low primary porosity, so water movement in the aquifer is controlled by secondary porosity, where groundwater flow is through fractures and faults (Rahn, 1979). The nature of secondary porosity is highly variable and unpredictable; therefore, local aquifer characteristics are site specific. The Crystalline Rock aquifer is estimated to have an outcrop area of approximately 574,000 acres (Rahn, 1979). Rahn (1979) estimated the effective porosity of the Crystalline Rock aquifer to be one percent of the outcrop area, while assuming groundwater is only recoverable in fractures and joints that typically only occur within a depth of 500 feet of ground surface, resulting in an estimated 2,900,000 acre-feet of recoverable water in storage for the Crystalline Rock aquifer in western South Dakota. Driscoll and Carter (2001) estimated the outcrop of the "Localized aquifers in the crystalline core area (Precambrian/Tertiary/Other)" to be approximately 616,800 acres.

The geology underlying the general location of the proposed diversion point consists primarily of the Distal Metagraywacke (Xgwd) (schist and siliceous schist containing considerable garnet, staurolite, and sillimanite) (Redden & DeWitt, 2008).

Due to the unpredictable nature of secondary porosity, and the very low primary porosity of crystalline rock, it is very difficult to determine if the aquifer is confined or unconfined at a specific site. Depending on exactly what depth the secondary porosity was encountered in the well bore and the water level in the well compared to the secondary porosity features, the well may change from acting as a confined well to an unconfined well at various water levels that are not comparable to adjacent wells completed into the same aquifer.

Figure 1 displays the location of the proposed diversion point for Water Permit Application No. 2913-2, with the Crystalline Rock aquifer water rights/permits within approximately five miles (Water Rights, 2026b), and the significant fault locations (modified from Redden & DeWitt, 2008). Table 1 lists the water rights/permits displayed in Figure 1. It is highly likely the localized portion of the Crystalline Rock aquifer this application proposes to use is limited by these mapped faults and other significant geological features (such as, synclines and anticlines). Furthermore, the actual areal extent of the localized aquifer is likely even further limited by localized secondary porosity. However, information is not available to delineate an exact extent of the localized aquifer.

Table 1. Water rights/permits authorized to appropriate water from the Crystalline Rock aquifer within approximately five miles of the proposed diversion point, as shown in Figure 1 (Water Rights, 2026b)

Permit No.	Name	Status	Use	Authorized Diversion Rate (cfs)	LC/PE Annual Volume (acre-feet/year)
1916-2	Mineral Technology Corp	LC	IND	0.03	N/A
1936-2	Custer/Mt Rushmore KOA	LC	COM, DOM	0.27	120
1937-2	Gray Rocks LLC	LC	COM	0.05	N/A
1970-2	Westward Ho Trailer Court	LC	COM	0.04	N/A
2000-2	Summit Properties of Canby LLC	LC	COM	0.34	N/A
2060-2	Robert N Wittrock	LC	COM	0.033	N/A
2243-2	Custer County Airport	LC	COM	0.015	N/A
2255-2	Wild Bills Antique Mall	LC	COM	0.02	N/A
2264-2	SD Dept of Corrections	LC	INS	0.18	N/A
2265-2	Nielsen Entities LLC	LC	INS	0.09	N/A
2332-2	First Baptist Church	LC	INS	0.022	N/A
2336-2	Roger C & Mary Krogman	LC	COM	0.033	N/A
2079A-2	T&E Enterprises	LC	COM	0.06	N/A
2504-2	Beaver Lake Campground	LC	SHD	0.122	N/A
2579-2	Pacer Corporation	LC	COM	0.022	N/A
2591-2	Daniel Riggs	LC	COM	0.055	N/A
2817-2	Aspen Meadows Horse & RV Campground	PE	COM, DOM	0.1	1.4
2867-2	Robert and Carol Jorgensen	PE	COM	0.67	4
LC: Licensed Water Right; PE: Water Permit; COM: Commercial; DOM: Domestic;					
IND: Industrial; INS: Institutional; SHD: Suburban Housing Development					

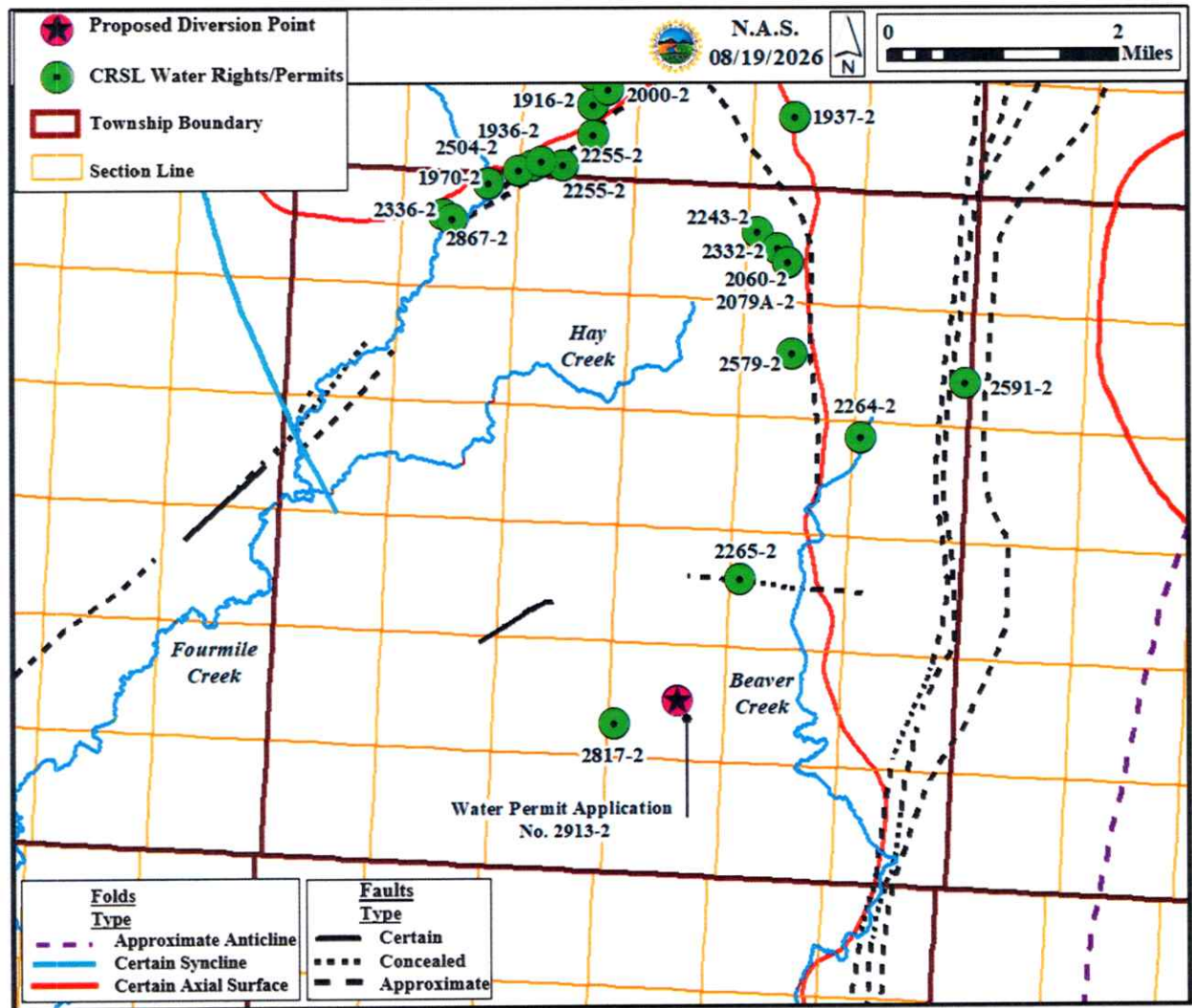


Figure 1. Location of the proposed diversion point for Water Permit Application No. 2913-2 with the Crystalline Rock aquifer water rights/permits within approximately five miles (Water Rights, 2026b), and the significant fault locations (modified from Redden & DeWitt, 2008)

According to the South Dakota Geological Survey (SDGS) “Current Projects – Geologic Mapping in the Black Hills at 1:24,000 (24k) scale” webpage for the 7.5 Minute Series Geologic Quadrangle Map for Cicero Peak (mapping of area that encompasses proposed diversion point location) is still in progress (SDGS, 2026). Therefore, the 24k structure data is not available to determine if the wells authorized by Water Right No. 2028-2 are withdrawing from the same localized fracture/aquifer as the proposed diversion point, and the structure data from Redden & Dewitt (2008) was utilized for the area outside of the available 24k mapping data from the SDGS.

As shown in Figure 1, the proposed diversion point location for this application, and Water Permit No. 2817-2 are separated from the other nearby water rights/permits by several faults (modified from Redden & DeWitt, 2008; Water Rights, 2026b).

South Dakota Codified Law (SDCL) 46-2A-9

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 Crystalline Rock aquifer.

WATER AVAILABILITY:

Water Permit Application No. 2913-2 proposes to appropriate water from the Crystalline Rock aquifer. The probability of unappropriated water being available from the aquifer can be evaluated by considering SDCL 46-6-3.1, which requires “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 Crystalline Rock aquifer is older than and stratigraphically lower than the Greenhorn Formation (Fahrenbach et al., 2010); however, the applicant’s proposed use is not for use in 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 Crystalline Rock aquifer must be considered.

HYDROLOGIC BUDGET:

Recharge

Recharge to the Crystalline Rock aquifer is through the infiltration of precipitation and streamflow losses (Driscoll and Carter, 2001). Driscoll and Carter (2001) estimated the average annual recharge rate, over the water years 1950 to 1998, to the Crystalline Rock aquifer in its entirety within the core of the Black Hills, must be at least equal to the average withdrawal rate of 3,600 acre-feet per year. Driscoll and Carter (2001) further concluded that the recharge to the Crystalline Rock aquifer must be much larger than the estimated 3,600 acre-feet per year to account for discharge to streams. Driscoll and Carter (2001) stated, in regard to the Crystalline Rock aquifer, “Recharge conditions are highly transient and have large spatial variability; thus, quantification is not attempted.” While looking at faults and other significant geological features may allow for some limiting of the areal extent, there is not sufficient data available to attempt a delineation of the localized Crystalline Rock aquifer near the proposed diversion point with any level of certainty. Furthermore, the spatial variability and transient nature of the recharge means that even if there was a delineation for this Crystalline Rock aquifer at the applicant’s proposed location, simply applying the 3,600 acre-feet per year equally over the entirety of the aquifer is inappropriate. However, by utilizing Driscoll and Carter’s (2001) estimated recharge rate of

3,600 acre-feet per year, or 0.07 inches per year, for the Crystalline Rock aquifer (estimated areal extent of 616,800 acres), a general sense of the minimum average annual recharge rate is provided. It must be emphasized that, due to the transient and variable nature of the recharge conditions, this number is not necessarily reliable. Furthermore, Driscoll and Carter (2001) noted that average annual recharge rate must be much greater to account for discharge from the Crystalline Rock aquifer to streamflow. Therefore, there is no estimated average annual recharge rate available for the localized Crystalline Rock aquifer the applicant proposes to use.

Carter and Driscoll (2001) also estimated average annual yield potential. The average annual yield potential is essentially how much precipitation is left after subtracting evapotranspiration. Carter and Driscoll (2001) utilized a recharge factor to estimate how much of the annual yield could infiltrate and recharge a bedrock aquifer in the Black Hills, such as the Madison and Minnelusa aquifers. However, Carter and Driscoll (2001) did not estimate a recharge factor for the crystalline core of the Black Hills because the localized Crystalline Rock aquifers are not extensive regional aquifers and are highly variable in nature.

Figure 2 displays a map of the estimated annual yield potential from Carter and Driscoll's (2001) report, with the location of the proposed diversion point for Water Permit Application No. 2913-2, and the location of the Crystalline Rock aquifer observation wells in western South Dakota (Water Rights, 2026a). The Crystalline Rock aquifer near the proposed diversion point for this application has an estimated average annual yield potential of approximately less than one inch per year (Driscoll and Carter, 2001). Average annual yield potential is not appropriate to use as a recharge rate for the Crystalline Rock aquifer, but it does provide a general sense of an upper limit of a possible recharge rate.

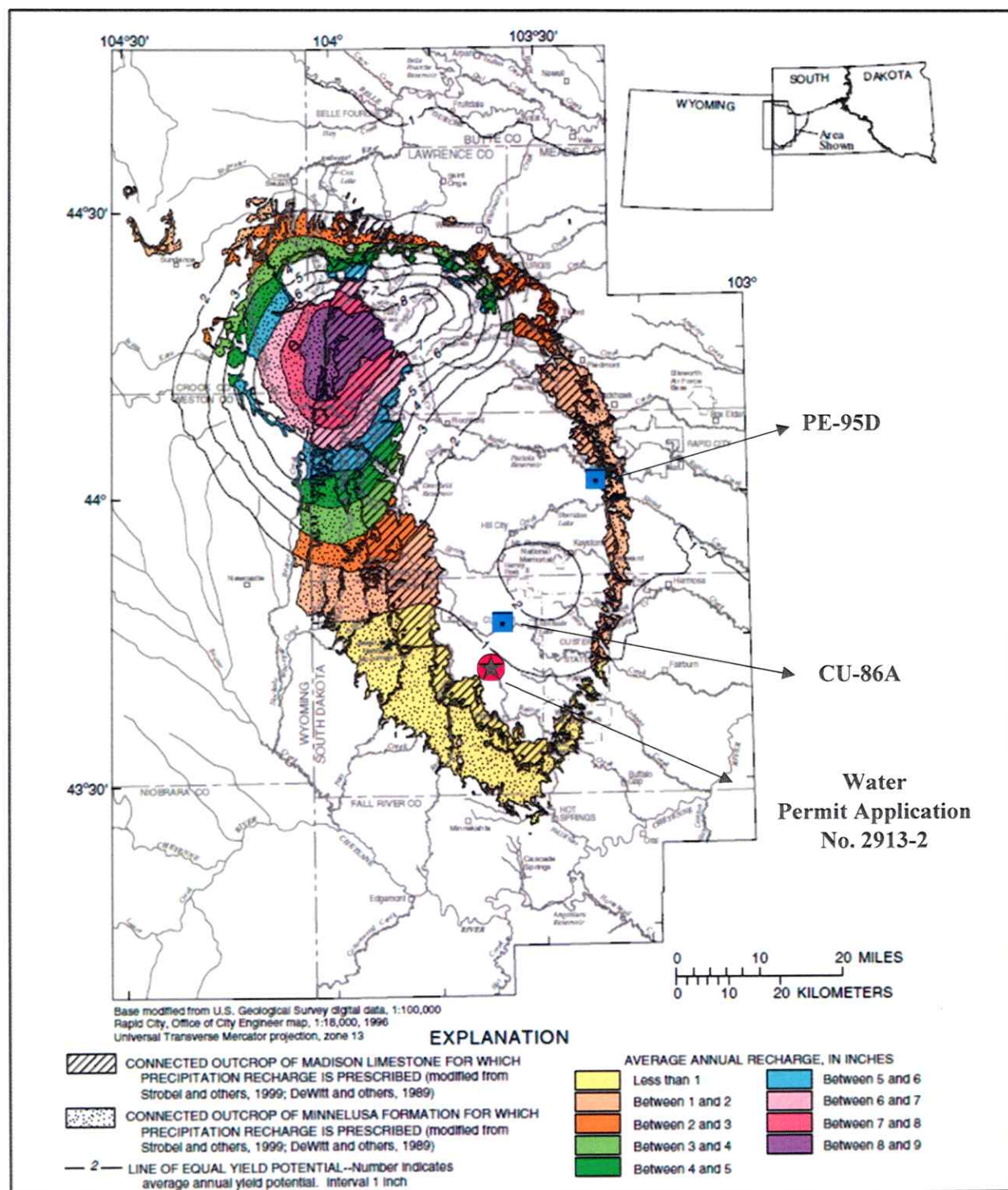


Figure 2. Estimated annual yield potential for the Black Hills in South Dakota and Wyoming for water years 1950 to 1998 (modified from Carter, J. M., Driscoll, D. G., Hamade, G. R., & Jarrell, G.J., 2001), with the location of the proposed diversion point for Water Permit Application No. 2913-2, and the Crystalline Rock aquifer observation wells in western South Dakota (Water Rights, 2026a)

Discharge

Discharge from the Crystalline Rock aquifer is primarily through well withdrawals (Water Rights, 2026b and 2026c), seepage to streams (Driscoll and Carter, 2001), and evapotranspiration where the static water level of the aquifer is at or near the ground surface.

As shown in Figure 1, the proposed diversion point location for this application, and Water Permit No. 2817-2 are separated from the other nearby water rights/permits by several faults (modified from Redden & DeWitt, 2008; Water Rights, 2026b). Water Permit No. 2817-2 is the only nearby water right/permit that is expected to be withdrawing from the same localized aquifer as the proposed diversion point.

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, and historically accepted by the Water Management Board, for estimating annual withdrawals by non-irrigation appropriations from an aquifer and is likely an overestimation of average annual withdrawals (Water Rights, 2026b). Overall, the estimated average annual withdrawal rate from the localized Crystalline Rock aquifer (including the estimated use for Water Permit Application No. 2913-2 (if approved) and Water Permit No. 2817-2 (assuming full volume for each)) is approximately 2.4 acre-feet per year.

There are a number of domestic wells completed into the Crystalline Rock aquifer within the area of the proposed diversion point on file with the Water Right Program that do not require a water right/permit, so the withdrawal amount from those wells is unknown (Water Rights, 2026c). There could potentially be other domestic wells completed into the Crystalline Rock aquifer near the proposed diversion point that are not on file with the DANR-Water Rights Program. As noted earlier in the report, it is difficult to determine the areal extent of the localized Crystalline Rock aquifer due to the unpredictable nature of secondary porosity, therefore it is difficult to determine exactly how large a component of the hydrologic budget domestic use may represent.

However, in the past, the Water Rights Program has used, and the Water Management Board has accepted, a domestic water use estimation using the following assumptions: 1) 2.5 residents per rural dwelling, and 2) either the average water use per capita by self-serve well users for the county of interest or an average use from across the state if county specific data is not available in the Carter and Neitzert (2008) report on estimated water use in South Dakota. For Custer County, self-supplied domestic water users withdraw approximately 69 gallons per day per capita. That is equivalent to approximately 0.19 acre-feet per year for each rural dwelling, assuming each dwelling has one well, using the previously mentioned assumptions, and that the dwelling is occupied year-round. There were 19 domestic wells identified within one mile of the proposed diversion point that are separated from the other nearby well logs on file by several faults (modified from Redden & DeWitt, 2008; Water Rights, 2026c). The DANR-Water Rights Program Well Completion Report database maps the reports at the centroid of the smallest

geographic division provided on the report submitted by the well driller. Therefore, the locations as mapped are not the exact locations of the well. However, the data provides a sense of how many wells are in the general area.

It is unlikely each of the domestic wells within the same fault complex (as the water rights/permits being included in the discharge analysis) as the proposed diversion point are completed into the same fracture system and thus, withdrawing from the same localized portion of the Crystalline Rock aquifer as the applicant's proposed diversion point location (Water Rights, 2026c). However, to somewhat overestimate the domestic use withdrawal rate in this area, assuming 0.2 acre-feet per year for each rural dwelling, the 19 domestic wells estimated use equates to approximately 3.8 acre-feet per year. This estimate for domestic use is provided to give a sense of scale to local domestic use from the Crystalline Rock aquifer rather than be an estimate for the use of each domestic well that may be present but not on record with the Water Rights Program.

Hydrologic Budget Summary

There is no specific estimated average annual recharge rate available for the localized Crystalline Rock aquifer. However, to provide a general sense of minimum and maximum recharge to the aquifer, Driscoll and Carter (2001) estimated a minimum recharge rate of 3,600 acre-feet per year, or 0.07 inches per year. It must be emphasized that, due to the transient and variable nature of the recharge conditions, this number is not necessarily reliable. Thus, it cannot be applied evenly across the entire outcrop of the crystalline rock in the Black Hills, and it does not account for other sources of recharge. Additionally, the average annual recharge rate must be much greater to account for losses from the Crystalline Rock aquifer to streamflow (Driscoll and Carter, 2001). Utilizing average annual yield potential, Driscoll and Carter (2001) provided broadly a general sense of an upper limit on a possible recharge rate to the Crystalline Rock aquifer of less than one inch per year in the area of this application.

The estimated average annual withdrawal rate from the localized aquifer this application proposes to withdraw from (includes the estimated use for Water Permit Application No. 2913-2 (if approved) and Water Permit No. 2817-2 (assuming full volume for each)) is approximately 2.4 acre-feet per year. The estimated average annual withdrawal for the 19 domestic wells identified on file within approximately one mile of the proposed diversion point for Water Permit Application No. 2913-2 that are likely to be withdrawing from the same localized portion of the Crystalline Rock aquifer as the applicant's proposed diversion point is approximately 3.8 acre-feet per year.

Collectively, the estimated average annual withdrawal rate from the localized aquifer this application proposes to withdraw from is approximately 6.2 acre-feet per year.

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.

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 two observation wells that have been historically considered as completed into the Crystalline Rock aquifer in western South Dakota (Water Rights, 2026a). These observation wells are PE-95D (approximately 27 miles northeast of the proposed diversion point) and CU-86A (approximately 7 miles northeast of the proposed diversion point) (Water Rights, 2026a). Kilts (2018) determined that observation well PE-95D is open to both the Deadwood Formation and the Crystalline Rock, so it is uncertain how representative observation well PE-95D is of either the Deadwood or Crystalline Rock aquifer. Therefore, only observation well CU-86A will be used in this analysis. The hydrograph for observation well CU-86A is displayed in Figure 3 (Water Rights, 2026a). 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 datum.

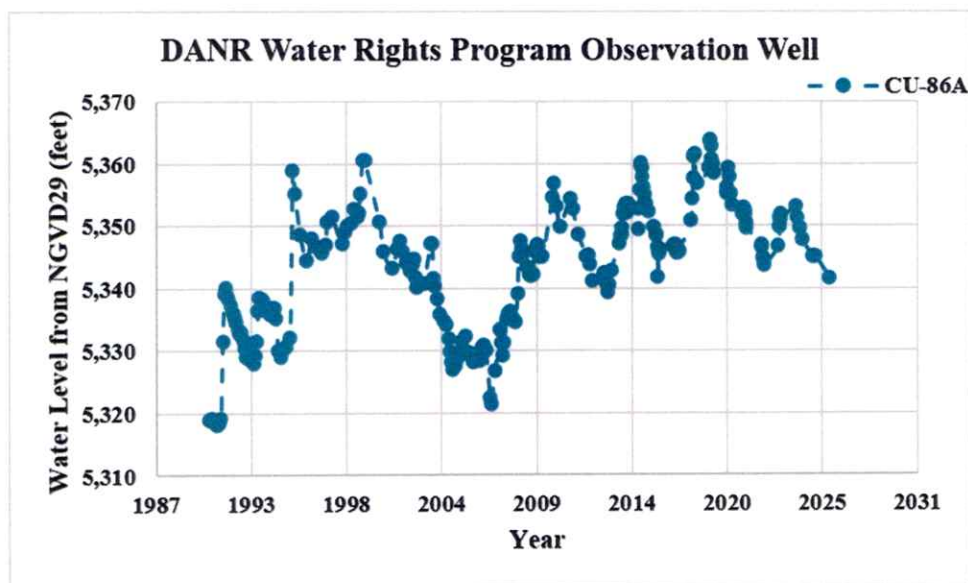


Figure 3. Hydrograph for observation well CU-86A (Water Rights, 2026a)

The hydrograph for CU-86A indicates the aquifer responds well to climatic conditions because water levels are rising during wetter periods (early spring snowmelt and precipitation) and declining to a stable water level during drier periods. Over the period of record, the water levels displayed on the hydrograph for observation well CU-86A have fluctuated approximately 45 feet in response to climatic conditions (Water Rights, 2026a). An examination of the hydrograph shows that any effects caused by pumping on the water levels of CU-86A are masked by climatic

conditions indicating that changes in water levels are governed by natural conditions, that is to say recharge to and natural discharge from the aquifer. Both recharge to and natural discharge from an aquifer can be captured for pumping. Although observation well CU-86A is located approximately seven miles northeast of the proposed diversion point, the hydrograph still documents that recharge to the Crystalline Rock aquifer has occurred over the period of record (Water Rights, 2026a).

Driscoll and Carter (2001) stated that recharge to the Crystalline Rock aquifer must be much greater than the estimated 3,600 acre-feet per year to account for the groundwater discharge that contributes to the base flow to many streams and this statement is supported by the hydrograph for observation well CU-86A (Figure 3), which displays the water level generally rising over its period of record despite increased development of the localized aquifer in the area of the observation well.

When considering the hydrograph for observation well CU-86A, Driscoll's and Carter's (2001) commentary regarding recharge to the Crystalline Rock aquifer, and the relatively small annual appropriation requested by this application, there is a reasonable probability unappropriated water is available for this proposed appropriation.

POTENTIAL FOR UNLAWFUL IMPAIRMENT OF EXISTING WATER RIGHTS:

As shown in Figure 1, the proposed diversion point location for this application, and Water Permit No. 2817-2 are separated from the other nearby water rights/permits by several faults (modified from Redden & DeWitt, 2008; Water Rights, 2026b). Water Permit No. 2817-2 is the only nearby water right/permit that is expected to be withdrawing from the same localized aquifer as the proposed diversion point. This is also the closest Crystalline Rock aquifer water right/permit to the proposed diversion point, located 0.5 miles southwest and held by Aspen Meadows Horse & RV Campground (Water Rights, 2026b).

In Pennington County, there has been one complaint submitted to the DANR-Water Rights Program regarding potential well interference for wells completed into the Crystalline Rock aquifer (Water Rights, 2026d). The complaint involved Water Right No. 2572-2, held by Sheridan Lake Highlands HOA, during the initial development of the permit. In October of 2006, the Chief Engineer limited Water Right No. 2572-2 to a maximum diversion rate of 18 gallons per minute, which is also known as the limit for reasonable domestic use detailed in ARSD 74:02:01:01(7) (Water Rights, 2026b and 2026d). Additionally, a new well was constructed in 2019 without proper permitting (resulted in Water Permit No. 2572A-2) and there were concerns of potential well interference by neighbors. The permitting issue and well interference complaint were heard at the February 2020 Water Management Board meeting and the Board concluded the permit holders had satisfied each of the factors set forth in SDCL 46-2A-12 for amending a water right/permit; additionally, no well interference complaints have been reported since that hearing (Water Rights, 2026b and 2026d). The diversion points authorized by Water Right No. 2572-2 and Water Permit No. 2572A-2 are located approximately 25 miles northeast of the proposed diversion point (Water Rights, 2026b). There have been no other complaints submitted to the

DANR-Water Rights Program regarding well interference for adequate wells completed into the Crystalline Rock aquifer within Pennington County (Water Rights, 2026d).

In May of 2021, the Chief Engineer received a complaint regarding a number of entities near Rockerville, South Dakota (Pennington County) that were suspected of using water without proper permitting. Since then, the entities mentioned in this complaint have obtained the proper permitting necessary for their respective water withdrawals (Mathiowetz, 2021a and 2021b; Water Rights, 2026c).

In Custer County, development of both appropriative and domestic use wells has continued without any complaints submitted to the DANR-Water Rights Program regarding well interference for adequate wells completed into the Crystalline Rock aquifer (Water Rights, 2026d). Additionally, Water Permit Application No. 2913-2 is requesting a relatively limited diversion rate, appropriative volume, and the Crystalline Rock aquifer has large natural fluctuations of water levels that often mask or exceed drawdown caused by well pumping. Therefore, there is a reasonable probability these applications can be developed without unlawful impairment of existing water right/permit holders or domestic users with adequate wells (Water Rights 2026b, 2026c, and 2026d).

An adequate well as defined in 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 as near to the bottom of the aquifer as is practical if the aquifer thickness is less than 20 feet.”

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.”

Due to the very low primary porosity of the Crystalline Rock aquifer, and the highly variable and uneven nature of secondary porosity, 20 feet of saturated thickness above the pump inlet may not be sufficient for a dependable water supply. Without conducting an aquifer performance test, the precise drawdown effects caused by pumping a well cannot be determined. Over the period of record, the water levels shown on the hydrograph for observation well CU-86A (Figure 3) have fluctuated approximately 45 feet due to climatic conditions. Pump depth requirements for a well are detailed in ARSD 74:02:04:60(2). The rule requires the depth of the pump placement be

determined by dividing the specific capacity of the well into the required yield and adding at minimum 10 additional feet. Regardless of the pump placement calculated using ARSD 74:02:04:60, the well is not an adequate well unless it meets or exceeds the requirements found in ARSD 74:02:04:20(6), the adequate well ruling. However, having 20 feet of saturated aquifer above the inlet to the pump, and an adequate well per ARSD 74:02:04:20(6) may not be reliable for water delivery.

There is a reasonable probability that the proposed diversions by Water Permit Application No. 2913-2 will not unlawfully impair adequate wells for existing water rights/permits and domestic users because:

- Continued development of the Crystalline Rock aquifer has occurred without a significant history of well interference complaints (Water Rights, 2026d);
- The hydrograph for observation well CU-86A (Figure 3) showing natural fluctuations in water levels over the period of record (Water Rights, 2026a), along with Driscoll's and Carter's (2001) commentary, indicate there is natural recharge to the Crystalline Rock aquifer;
- Adequate domestic wells are protected under South Dakota Codified Water Law; and
- Water Permit Application No. 2913-2 seeks to appropriate a relatively small annual volumes of water

If this application is approved, qualifications requiring the applicant to control their water withdrawals should be included, so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

CONCLUSIONS:

1. Water Permit Application No. 2913-2 proposes to appropriate up to 1 acre-foot of water annually at a maximum instantaneous diversion rate of 0.0067 cfs (15 gpm) from one well to be completed into the Crystalline Rock aquifer (approximately 390 feet deep) and located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 27-T4S-R4E for commercial and recreational uses at a campground at the same location. The site is located in Custer County approximately six miles south of Custer, South Dakota.
2. There is a reasonable probability that the proposed diversions by Water Permit Application No. 2913-2 will not unlawfully impair adequate wells for existing water rights/permits and domestic users.
3. If this application is approved, qualifications requiring the applicant to control their water withdrawals, so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights, should be included.

Nakaila Steen

Nakaila Steen
Natural Resources Engineer III
SD DANR - Water Rights Program

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