

## WSF 2023 Final Report # 5313

**PROJECT:** Lower Loup NRD Nance County Aquifer Mapping – WSF  
Application #5313 (awarded December 15, 2021)

**DATE:** MARCH 17, 2023  
(FINAL REPORT)

### See Application 5313 Section A #7 For Project Tasks and Timeline

#### PROJECT PROGRESS APRIL 2022 TO PROJECT END:

Aqua Geo Frameworks (AGF) acquired Airborne Electromagnetic Survey (AEM) data over the Lower Loup NRD (LLNRD), commencing August 19, 2022, and finishing on August 21, 2022. Approximately 531 line-miles of AEM survey were acquired over the LLNRD. During processing approximately 462 line-miles (87%) of survey data were retained and utilized to develop the final AEM product. The resulting survey area covers approximately 316 square miles of the LLNRD.

The final AEM report from AGF was delivered on February 27, 2023. The report defines the AEM data collection methodologies, provides AEM results and interpretations, outlines a hydrogeological framework of the surveyed area, estimates aquifer volume and water in storage. Key findings include a thorough understanding of the hydrogeology in this critical area providing sustainable groundwater management practices, thus preventing water supply issues, and potentially reducing landowner conflicts.

Other deliverables include images of the interpreted cross-sections and 3D profiles, voxels, and supporting geographic information systems (GIS) data and Google Earth KMZ files of the flight lines and interpreted data. This dataset allows hydrogeologic information to be expediently retrieved from the report, including depth to groundwater, aquifer thickness, depth to bedrock, and cross-section image of the flight line. The datasets also provide a location, availability, and separation of quaternary and Ogallala aquifer material across the study area.

#### ANTICIPATED ACTIVITIES FROM NOW UNTIL NEXT ANNUAL REPORT:

N/A, this report serves as the final report for the Lower Loup NRD Nance County Aquifer Mapping WSF Application #5313 (awarded December 2021)

#### ANTICIPATED CASH FLOW FOR REMAINDER OF THE PROJECT:

**\$0** – As of March 28, 2023, the LLNRD and Water Sustainability Fund (WSF) met their funding obligations towards this project (\$417,000 total project costs) under grant award # 5313.

#### LIKELIHOOD THAT BENEFITS PROJECTED IN APPLICATION 5313 WILL BE REALIZED:

Benefits of the LLNRD Nance County Aquifer Mapping Project were realized. A complete hydrogeologic framework was developed in the surveyed area of Nance County. The LLNRD is now positioned to make educated decisions on groundwater management planning in this area of the LLNRD. The completed aquifer mapping provides profile data sets that identify aquifer material and associated depths as well as water levels from 2022 that help the LLNRD speculate aquifer availability for development

The collection of AEM data across this portion of the state now will have applicable, real-world data to be used by LLNRD, NDNR, CSD, USGS and other entities for upgrading water modeling efforts and providing valuable aquifer characteristics. The data will be incorporated into the Nebraska GeoCloud by the Conservation and Survey and U.S. Geological Survey (CSD and USGS).