
Canisteo and Hill Annex Legacy Mine Pits Status Report

As required by 2020 Minn. Laws 5th Sp. Sess. Chap. 3 Art. 1 Sec. 7 Subd. 4.

09/07/2021

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As requested by 2020 Minnesota Law 5th Special Session Chap. 3 Art. 1 Sec. 7 Subd. 4: This report cost approximately \$1,000 to prepare.

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Purpose

The 2020 Minnesota State Legislature, in its 5th special session ending in October of 2020, directed the Minnesota Department of Natural Resources (DNR) as follows:

2020 Minn. Laws 5th Sp. Sess. Chap. 3 Art. 1 Sec. 7 Subd. 4.

Canisteo and Hill Annex Open-Pit Mine Groups

\$2,000,000

(a) For predesign, design, and engineering of projects to mitigate the threat to property, public safety, and water quality from rising water levels at the Canisteo and Hill Annex mine complexes. The commissioner must give priority to work that addresses the most immediate risks to public safety. If the predesign, design, and engineering for the Canisteo and Hill Annex mine complexes is complete, the commissioner may use any remaining money from this appropriation to construct mitigation measures at the Canisteo or Hill Annex mine complex.

(b) The commissioner, in cooperation with the Department of Iron Range Resources and Rehabilitation, Western Mesabi Mine Planning Board, and Itasca County, shall provide a status report on this project to the chairs and ranking minority members of the legislative committees with jurisdiction over capital investment and environment and natural resources finance by February 15, 2021, April 15, 2021, July 1, 2021, and September 1, 2021. This report must include but is not limited to recommendations on lease ownership and costs, the findings of the pit wall stability study, final engineering, and design work, including cost estimates to complete the outlet and recommendations on ownership, operations, and maintenance of the constructed outlet.

The first status report containing background information relative to the project was submitted to the legislature February 16, 2021. All subsequent reports have provided/will provide progress updates

DNR water monitoring

The DNR Division of Lands and Minerals actively monitors the Canisteo and Hill Annex water levels and surrounding groundwater levels to understand the rate of pit water level increase and groundwater flow through the subsurface materials. Hydrologic information gathered near these pit locations aids in the assessment of the need for an engineered outlet structure to prevent future flooding or other impacts.

Canisteo water level

As of September 1, 2021, water levels in the Canisteo are estimated to be at an elevation of 1309 feet, 15 feet from what would be an unmanaged natural overflow if the water level reached an elevation of 1324 feet. Should the pit water level rise continue at a rate of 5 feet per year, water may begin naturally overflowing as soon as 2024. There are two natural overflow locations at elevation 1324 feet along the pit rim, one of which is located directly north of the city of Bovey. Groundwater monitoring data indicate groundwater outflow from the pit moves to the south and toward the City of Bovey. Data show a correlation in rising pit water level and increasing groundwater levels. In 2011, a drain tile system was installed in the City of Bovey to alleviate impacts to the community because of the rising pit water level. The current hydrologic conditions in nearby communities demonstrate the need to design and construct an engineered outlet for the Canisteo.

Hill Annex water level

As of September 1, 2021, the Hill Annex water level is 50 feet below the unmanaged natural overflow elevation, which is 1368 feet (Figure 2). The pit water level has risen approximately 68 feet since pumping ceased in 2009. The rate of water level rise from 2009 through 2014 was approximately 7 feet per year, but has declined to approximately 5 feet per year from 2014 to present. Water may begin naturally overflowing in 7 to 10 years, should current rates of rise continue. There are three natural outflow locations at elevation 1368 feet along the pit rim. As Hill Annex continues to gain water, additional work is needed to understand possible hydrologic impacts to nearby communities. The installation of additional groundwater wells is needed in the area to monitor for groundwater outflow from the pit to the surrounding communities.

Canisteo and Hill Annex outlet projects

The DNR received \$2,000,000 in a 2020 legislative appropriation to be used for predesign, design, and engineering of outlets for the Canisteo and Hill Annex. A portion of these funds was used to hire Barr Engineering (Barr) to work on updating the previous engineering and design for the Canisteo outlet as needed. The majority of the previous design is still usable. Once all of the necessary data collection and modeling have been completed at the Hill Annex, the DNR will move towards pre-engineering and design of an outlet. For needed work that cannot be funded by bonding dollars, the DNR secured a grant for \$442,500 from the Iron Range Resources and Rehabilitation Board (IRRRB). These funds only partially cover necessary work. The DNR estimated it would need \$885,000 to conduct work prior to starting the engineering and design that cannot be paid for by bonding dollars. Beyond this, additional funding would be needed to secure leases, construct outlets, and pay for operation and maintenance.

In-progress Canisteo work

A stakeholder group was established with the Western Mesabi Mine Planning Board (WMMPB), Itasca County, Arbo Township, IRRRB, City of Bovey, and DNR to discuss and develop bill language for the Canisteo project. These discussions included engineering and design review, and funding for construction, leasing, and operation and maintenance costs.

The DNR has continued discussions with landowners (Itasca County, Arbo Township, State of Minnesota, Glacier Park Iron Ore Properties, and Prairie River Minerals LLC) along the outlet route to determine lease costs and language. Lease costs have been agreed upon with each individual landowner, totaling \$400,000. Discussions with each individual landowner continue to finalize lease language.

Construction costs are estimated at \$5,100,000. Operation and maintenance costs are estimated at \$850,000 for the term of the leases. Figure 3 shows a preliminary design plan for the proposed outlet route. Barr has completed a site visit, pit slope topographic surveys, infrastructure surveys, review of existing slope stability models, and assessment of current slope stability. As of June 1, 2021 Barr has completed the wetland delineation along the proposed route.

Bill language was introduced during the 2021 legislative session for funds to complete the Canisteo outlet project. Funding is needed for construction, leasing, and operation and maintenance costs. The 2021 legislative session ended without passing a bonding bill; therefore, no funding was received. As the Canisteo water level continue to rise, the DNR has initiated contingency planning to assess the management of pit water level. Projections of pit water level rise show the water level reaching the unmanaged overflow elevation of 1324 feet as soon as 2024. Maintenance pumping may be required to keep the pit water level below an unmanaged natural overflow if an outlet is not constructed.

The DNR assessed pit water level and nearby groundwater data to determine a trigger elevation of 1315 feet at which pumping should be initiated to manage the pit water level if an outlet is not constructed timely. This trigger elevation of 1315 feet was determined to ensure the integrity of the drain title system located in the City

of Bovey and reduce pumping costs. The drain tile system was designed to divert increasing groundwater inflow away from existing private property, which includes businesses and residences. As the pit water level continues to rise, outflow from the pit to the aquifer increases, raising local groundwater levels. In 2012, the Canisteo water level rose to a maximum-recorded elevation of 1318 feet. At that elevation, no significant impacts to the drain tile system were observed. Impacts to the drain tile system above an elevation of 1318 feet are unknown.

The pit water level is predicted to reach a target elevation of 1315 feet as early as 2022. Contingency planning includes the following scenarios: 1) maintenance pumping to hold the water level elevation at or below 1315 feet and 2) dewatering to facilitate construction of the outlet. A minimum of two years would be needed to pump water from the target elevation to the proposed outlet elevation of 1305 feet.

In order to finalize the contingency plan, the DNR continues to work with potential contractors to obtain estimates for infrastructure as well as annual costs for pumping and maintenance. A number of tasks and expenses will need to be funded, such as:

- Secure control of property
- Property/landowner agreement costs
- Obtain a water appropriation permit
- Infrastructure needed for pumping
- Ongoing maintenance, monitoring and staff time
- Contractor services costs
- Initiate power on-site
- Ongoing fuel or electric costs to run pumps

In-progress Hill Annex work

Existing groundwater monitoring data are limited to four wells located in Calumet (Figure 4). Increasing the spatial distribution of groundwater wells along the southern pit rim will aid in assessment of water outflow through the surficial sediment and potential impacts to the local groundwater system.

The DNR scoped sites for installation of surficial and bedrock monitoring wells south of the Hill Annex (Figure 4). As of early May 2021, all six surficial wells were installed in the cities of Calumet and Marble. The project scope for the bedrock wells was posted for bid and a contractor (Cascade Drilling, L.P.) was hired. The DNR is actively working with the contractor to schedule drilling for the bedrock wells. Estimated completion of these wells is expected to occur by spring 2022. The estimated cost to complete drilling of all 10 wells is \$430,000. The IRRRB grant will be used for these non-bondable expenses.

Additional data collection and work will assist in future modeling efforts, inform potential outlet route decisions, and help assess possible impacts from rising water levels. Potential work may include bathymetric surveys, pit wall stability analysis, wetland delineations, groundwater modeling. Following the necessary data collection, the DNR will start the predesign, design, and engineering at the Hill Annex.

Future funding needs

Additional funds will be needed for the Canisteo outlet project to secure leases, construct the outlet, and pay for operation and maintenance. Funds in the amount of \$5,500,000 will be needed for construction and lease costs. Operation and maintenance costs totaling \$850,000 for 40 years would need to be funded with non-bonding dollars. If the Canisteo water level continues to rise at a rate similar to those in recent years, water may begin to naturally overflow by 2024. Thus, prioritizing funding and resources to complete this project is crucial as it mitigates the imminent threat to public safety, property, and water quality from the rising Canisteo water level. Construction of the Canisteo outlet is estimated to take one year to complete.

Any remaining funds from the Canisteo appropriation will be spent on the predesign, design and engineering at the Hill Annex. If the Hill Annex water level continues to rise at a rate similar to those in recent years, water may begin to naturally overflow by 2028-2031. Considerable work and data collection, as stated above, are needed to evaluate potential outlet routes and inform decisions. Though the expected timeline for the Hill Annex to naturally overflow is 7-10 years, it is important to continue momentum on this project.

Per 2020 Minn. Laws 5th Sp. Sess. Chap. 3 Art. 1 Sec. 7 Subd. 4., this is the final status report for work done with the funding provided under this provision.

Canisteo Mine Pit Water Levels

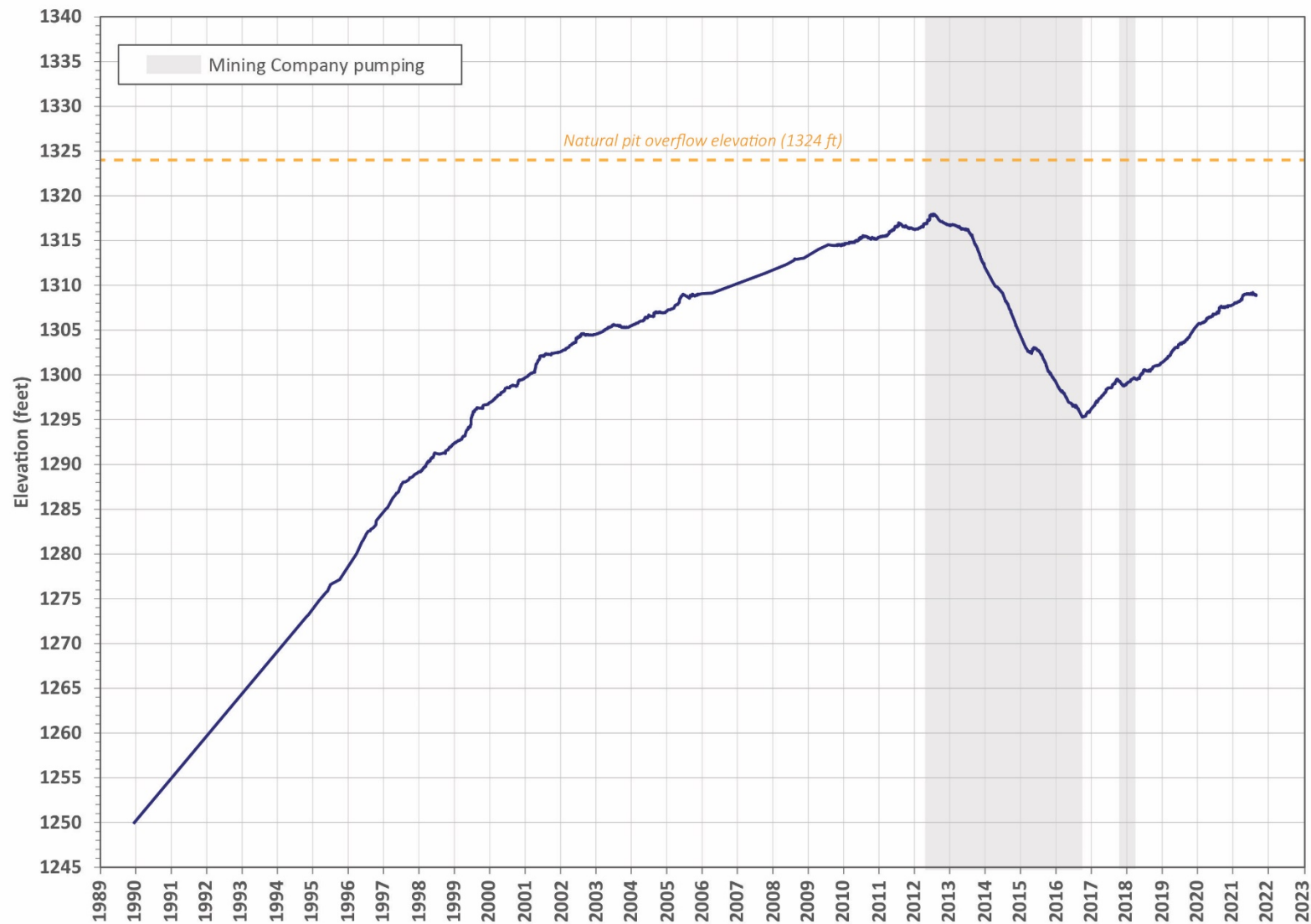


Figure 1 - Canisteo water level relative to the natural pit overflow elevation of 1324 feet. Grey shading represents mining company dewatering, including pumping from 2012 to 2016 by Magnetation LLC and from late 2017 to early 2018 by ERP Iron Ore LLC.

Hill Annex Pit Water Levels

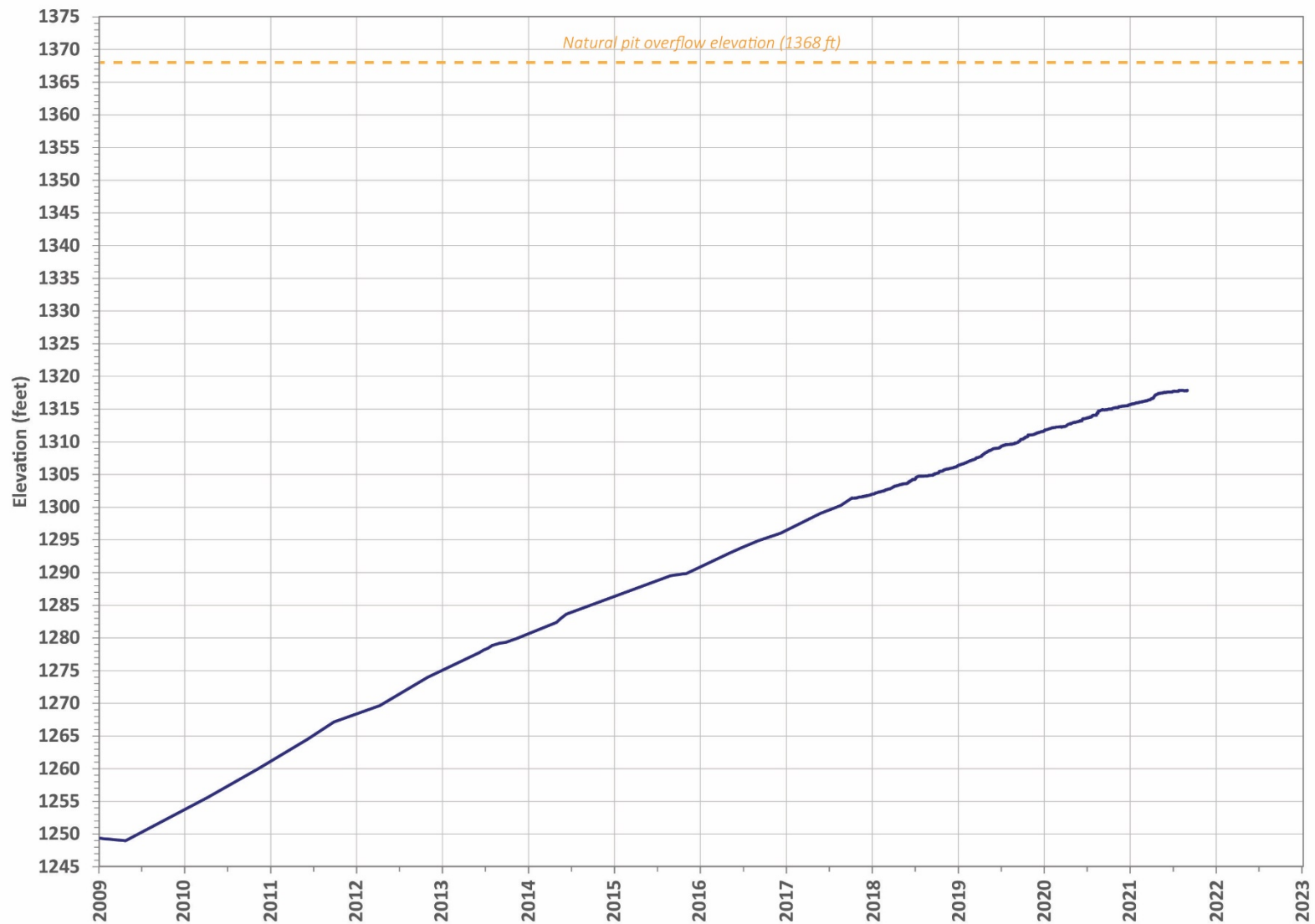


Figure 2 - Hill Annex water level relative to the natural pit overflow elevation of 1368 feet

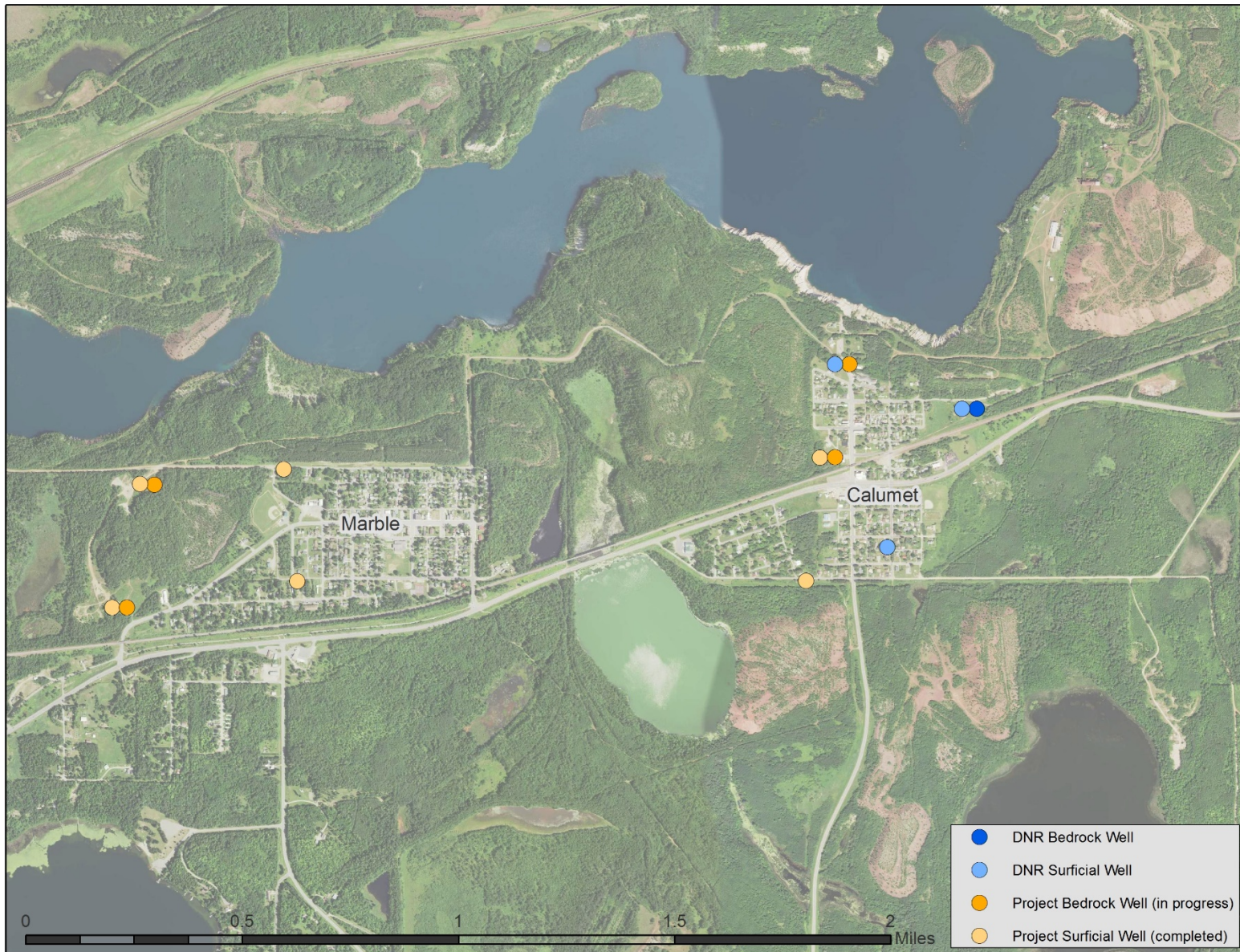


Figure 4 - Locations for additional groundwater well installations, south of the Hill Annex pit. All six surficial wells were completed as of April 2021. The four bedrock wells are contracted for installation late fall 2021 to spring 2022.