

2021-2022 Sinkhole Filling and Maintenance Project Summary

Project Scope: Filling dangerous sinkholes caused by the collapse of underground mines and extinguishing coal fires on abandoned mine lands.

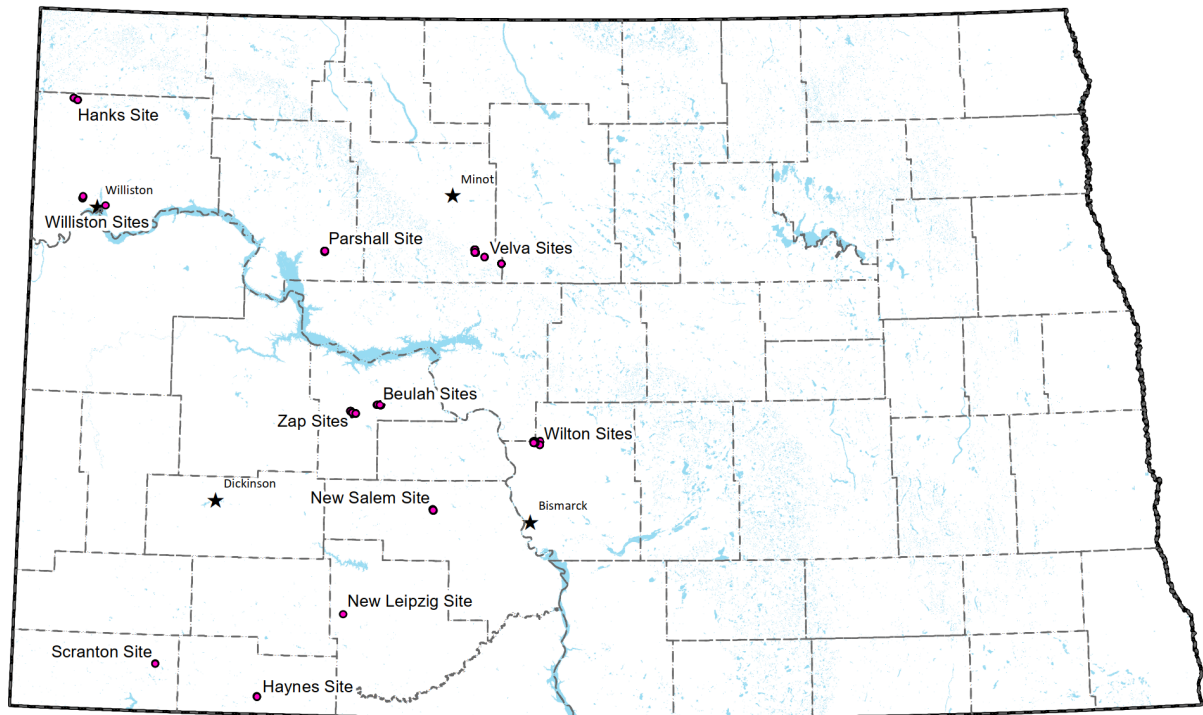
Contractor: Young Gun Construction, LLC of Ludlow, SD

Contract Amounts: North Contract: Amended: \$75,000 Contract Number: AM-853-21

South Contract: \$49,997.02 Contract Number: AM-852-21

North Contract Project Costs: \$64,561.76

South Contract Project Costs: \$28,747.92



2021-2022 Sinkholes Filled
State of North Dakota
Public Service Commission
Abandoned Mine Lands Division

Locations: Beulah, Hanks, Haynes, New Leipzig, New Salem, Parshall, Scranton, Velva, Williston, Wilton, and Zap

2021 - 2022 Sinkhole Filling

Between 2021 and 2022, the North Dakota Public Service Commission (ND PSC) Abandoned Mine Lands (AML) Division filled approximately 223 sinkholes in nine different locations in the western half of North Dakota. Coal refuse fires near Velva and New Leipzig were also extinguished and reclaimed under these contracts.

While most sinkholes in North Dakota occur in agricultural fields and pastures, the AML Division advises against the development of any land containing underground mines. Some towns including Williston, Beulah, New Salem, and Garrison have abandoned underground mines within city limits and nearby developed property. The surface is inherently unstable and could collapse without warning. You can find more information in the AML Division's "Ask Before You Build" flyer at: <https://www.psc.nd.gov/public/consinfo/jurisdiction.php>. Anyone with concerns or questions about historic mines in North Dakota may contact the Public Service Commission AML Division for further information. The AML Division maintains an inventory of abandoned coal mines in North Dakota.



Beulah

These sites included North Dakota Game and Fish property as well as private land. The picture below is on pastureland just north of Beulah. The excavator is positioned on top of a knoll used as a borrow area, which provides the fill material. A truck delivers the fill material to the sinkholes.

Then the excavator compacts the fill material in lifts in the sinkhole. When sinkhole filling is done, the borrow area is also reclaimed. Thirty-five sinkholes were filled at the Beulah sites.



Hanks

In June 2021, AML staff met with the renter about hazardous sinkholes in a field which made planting and harvesting difficult. A total of eight sinkholes were in the field. Another five sinkholes were filled in a nearby pasture. One sinkhole in the pasture measured 10 feet in diameter with an average depth of about 12 feet.



Haynes

The Haynes site is approximately 9 miles east of Hettinger. The Ihle Coal Mine was both an underground and surface mine. The surface mine was reclaimed by the AML Division in 1996. The AML Division also extinguished a coal refuse fire in 2011. During a recent site investigation, a landowner pointed out a sinkhole that had recently opened to approximately 20 feet in diameter and 25 feet deep with straight sides.

While working to fill a different sinkhole, the surface collapsed under the contractor's truck tire to reveal the sinkhole in the photo.



New Salem

A sinkhole does not need to be large to cause damage to farm equipment or cause an injury. The sinkhole pictured in the photo was in a farmer's field and presented a hazard to the farmer and his equipment. Six sinkholes were filled in or adjacent to cropland.



Parshall

Sinkholes were found in tree rows adjacent to a rural residence. Some of these had been filled before but continued to collapse. The landowner wanted to preserve the trees, so the contractor carefully excavated and filled those sinkholes.



Scranton

Scranton, North Dakota was aptly named after the coal mining town of Scranton, Pennsylvania. A sinkhole had opened on the Scranton Equity Exchange bypass road. The Scranton Equity Exchange filled the sinkhole, but the collapse continued. The AML Division filled this sinkhole and two additional holes in the road ditch. The Scranton Equity Exchange can be seen in the background.



Velva

Most underground AML sites have had multiple sinkhole filling projects in North Dakota. The AML Division had not completed any reclamation work on these two sites for many years. As a result, approximately fifty-two sinkholes were filled in October of 2021. The photo shows a nearly completed borrow area that has been reclaimed. Six shallow sinkholes were reclaimed within this borrow area.



Williston

In December 2020 the AML Division received a report of a sinkhole in a pasture east of Williston. Staff then contacted other landowners around Williston where sinkholes have been filled previously. The AML Division filled 7 sinkholes on three properties near Williston. One of the sinkholes was located about 30 feet from a gas pipeline.



Wilton

Wilton was once the site of one of the largest underground lignite coal mines in the world. Several drilling and grouting projects have been conducted in the area to protect roads and farmsteads, but sinkholes will continue to be a problem. The sinkhole shown was less than 4 feet in diameter at the surface, but excavation revealed a significantly larger hole. Forty-two sinkholes were filled near Wilton in 2021.



Zap

Forty-two sinkholes were filled for three landowners in September 2021. This is an example of one of the many hazardous sinkholes. Numerous sinkholes were 10 to 20 feet deep, and many had small surface openings making them difficult to see.



Velva Coal Refuse Fire

In the summer of 2017, the AML Division was notified of a coal refuse fire near the abandoned DePue Mine south of Velva. The local fire department attempted to extinguish the fire with water. This slowed but did not extinguish the fire. With the nearest home nearly two miles away, it posed little threat to the surrounding area as it smoldered and slowly burned between two water-filled pits. The AML Division monitored the fire by visiting the site periodically. In 2021 a drought significantly dried the two ponds, and the fire began advancing toward a stand of trees. It became necessary to extinguish the fire to avoid a potential wildfire. As excavation began, the contractor uncovered a shallow coal seam.

The water table was also shallow, so a moat was created around the burning refuse pile. The burning material was then excavated and stockpiled in the center of the moat. Spoil material from a nearby abandoned surface mine was hauled in, and the refuse pile was capped to prevent the fire from spreading to the coal seam. The AML Division will continue to monitor the site.



Wilton Emergency

In July 2022, the AML Division was notified of a sinkhole with an exposed fiber optic line and within 75 feet of ND Highway 36. The bell-shaped sinkhole was approximately 12 feet in diameter and 15 feet deep. The AML Division worked with the telecommunications company to ensure the protection of the fiber optic line while

reclaiming the sinkhole. The hole was filled with about 77 cubic yards of soil. Eight additional hazardous sinkholes in the area were filled. Work was completed on August 19, 2022.





New Leipzig Coal Fire

In the fall of 2022, the AML Division was notified of a coal fire in the New Leipzig city landfill. The AML Division had reclaimed part of the abandoned underground coal mine in the 1980s. A 2012 Exploratory Drilling project revealed additional mine workings; however, no additional AML reclamation had been done. The site of the fire was in a refuse pit near known mine workings. A trench was excavated, and all burning material was piled in the middle of the trench and covered with overburden. The site is being monitored by AML staff. Work was completed on November 22 and 23, 2022.

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|---------------------------|----------------------------------|---------------|
| Project Dates | August 3, 2021—November 23, 2022 | |
| Total Work Days | 40 | |
| Sinkhole locations: | Number of sinkholes | Cost per site |
| Beulah (ND014) | 35 | \$10,893.17 |
| Hanks (ND147) | 13 | \$2,687 |
| Haynes (ND124) | 5 | \$2,066.80 |
| New Leipzig (ND030) | Fire | \$3,162.50 |
| Parshall (ND090) | 9 | \$2,687 |
| New Salem (ND054) | 6 | \$1,687 |
| Scranton (ND528) | 3 | \$1,750 |
| Velva (ND004) | 52 + refuse fire | \$44,788.35 |
| Williston (ND046 & ND044) | 7 | \$2,687 |
| Wilton (ND001) | 42 | \$6,582.54 |
| Wilton Emergency (ND001) | 9 | \$5,129.87 |
| Zap (ND014) | 42 | \$9,118.45 |

The AML Division follows these steps to reclaim sinkholes:

1. Remove and stockpile topsoil or other suitable plant growth material from around/within the sinkhole and borrow areas.
2. Excavate the sinkhole (as directed) with a backhoe or excavator.
3. Backfill sinkhole with approved fill material; if trucks are used, compaction with a backhoe bucket and wheels is required between dumps. If a scraper is used, holes shall be ramped into and filled in such a way as to achieve maximum compaction.
4. Grade the area to blend with adjacent topography and re-establish drainage.
5. Respread topsoil evenly over disturbed areas and finish grade.
6. Till all areas with a Harley Box Rake (or equivalent equipment) sufficiently to break up all clods, prepare the seedbed and cover all seed.
7. Seed the disturbed areas with the required mixture.
8. Fill material may be taken only from approved borrow areas determined in consultation with the property owner. Borrow areas are located as near as possible to the sinkholes, but haul distances may vary.

AML sinkhole filling projects reduced the likelihood of death or injuries to property owners and the public. However, new hazardous sinkholes are reported each year. Sinkhole filling projects such as these have been conducted annually in North Dakota and will likely continue into the foreseeable future.