

GEOLOGIC HAZARD PLAN CATAMOUNT OUTPOST 33-8 PAD

La Plata County, Colorado



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1.0 INTRODUCTION

Cottonwood Consulting, LLC (Cottonwood) has prepared this geologic hazard plan for Catamount Energy Partner's (Catamount's) proposed natural gas development project in La Plata County, Colorado. Catamount proposes to expand one well pad, construct one temporary tank pad, and drill ten new gas wells. The project is referred to in this geologic hazard plan as the "Outpost 33-8 Pad".

This plan was created to comply with the requirements of Sections 304.b.(7).I and 304.c.(21) of the Colorado Energy and Carbon Management Commission (ECMC) rules. ECMC Rule 304.b.(7).I requires that operators submit a geologic hazard map identifying any geologic hazards within a one-mile radius of the proposed working pad surface. For any identified geologic hazard that extends beyond the one-mile radius, a second map is required to show the extent of that hazard in relation to the proposed location. Per ECMC Rule 304.c.(21), if the any geologic hazards are identified pursuant to Rule 304.b.(7).I, operators will submit a geologic hazard plan describing proposed mitigation measures. The following document serves as the geologic hazard plan and includes the associated mitigation measures.

2.0 LOCATION

The proposed project would be located on private land approximately 3.5 miles southwest of Ignacio, Colorado. The legal description of the project is the northeast quarter of Section 26, Township 33 North Range 8 West, New Mexico Principal Meridian. The elevation of the proposed project is approximately 6,580 feet above mean sea level.

The surface location was selected based on landowner preference and proximity to existing well pads, roads, and pipeline infrastructure, and to avoid impacts to wetlands, ponds, and irrigation ditches. The proposed well pad is located on La Plata County Parcel 595325200071 and is adjacent to an active well pad operated by Red Willow Production Company. The proposed tank pad is located northwest of the proposed well pad on La Plata County Parcel 595327100812.

The well pad would be an expansion and partial pad share of an active well pad operated by Red Willow Production Company (Red Willow; ECMC, 2024a). The tank pad would be located northwest of the well pad. The well pad oil and gas location (OGL) is 7.28 acres, with a working pad surface of 5.30 acres. The tank pad OGL is 5.18 acres, with a working pad surface of 3.20 acres. Access to the well pad is off an existing well pad access road south of County Road 318. Catamount would construct a new access road to access the tank pad.

Figure 1 is a project vicinity map.

3.0 GEOLOGY

The project area is located within the northern portion of the San Juan Basin. The San Juan Basin is an asymmetrical structural basin covering approximately 7,500 square miles within southwestern Colorado and northwestern New Mexico (EPA, 2004). The basin is characterized by a steeply dipping northern flank, a relatively flat basin interior, and a gently dipping southern flank.

Strata along the edges of the basin dip inward much like a bowl-shaped depression. The San Juan Basin is surrounded by a series of uplift on all sides (Brister et al, 2002). The project area is located in the northern portion of the basin just northeast of the Mesa Mountains. The proposed Outpost 33-8 Pad is located on relatively gentle terrain consisting of a south-facing slope with an approximate 5 percent (%) grade.

The surficial geology in the vicinity of the project consists of the San Jose and Animas Formations, undivided (Tsa). The San Jose Formation consists of brown, gray, and grayish-yellow, lenticular, medium- to thick-bedded, crossbedded, local arkosic, conglomeratic to fine-grained sandstone; red, gray, and brown sandy shale; and gray to white tuff beds. The formation is fluvial and lacustrine in origin. The formation conformably overlies the Animas Formation. The Animas Formation consists of olive, brown, gray, red, green, and purple conglomerate, tuffaceous sandstone, lithic tuff, and shale with local carbonaceous to coaly mudstone beds. The formation is volcanogenic and fluvial in origin (Condon, 1992). There are no rock outcrops present at the ground surface in the vicinity of the proposed Outpost 33-8 Pad. A geologic map of the project area is included as Figure 2.

3.1 Geologic Hazards

Based on Section 24-65.1-103(8) C.R.S, a geologic hazard “means a geologic phenomenon which is so adverse to past, current, or foreseeable construction or land use as to constitute a significant hazard to public health, safety, or to property. The term includes, but is not limited to: avalanches, landslides, rockfalls, mudflows, and unstable or potentially unstable slopes; seismic effects; radioactivity; and ground subsidence.” Each category is described in detail below.

Avalanches

The Outpost 33-8 Pad is not located in an area of high avalanche danger. Review of aerial imagery indicates that there are no avalanche paths above or below the project. This area of La Plata County typically does not receive the amount of snowfall that would create a concern for avalanches. The Outpost 33-8 Pad is outside the area monitored by the Colorado Avalanche Information Center and therefore, outside the area that may be impacted by avalanches (CAIC, 2024).

Landslides, Unstable Slopes, and Rockfalls

A landslide hazard map is included as Figure 3 and indicates possible landslide areas within a one-mile radius of the project based on data from the Colorado Geological Survey (CGS; CGS, 2024). These possible landslide areas are located on the slopes of the Mesa Mountains and do not overlap with the Outpost 33-8 Pad, which is located northeast of the Mesa Mountains. The landslide areas do not pose a threat to the Outpost 33-8 Pad based on the distance and the topography that separates the pad from the landslide areas. No evidence of landslides or steep slopes are mapped by the CGS on the proposed Outpost 33-8 Pad. Site-specific review of the proposed pad indicates that the potential for landsliding or rockfalls is low based on the relatively flat topography and the

surrounding terrain. The potential for landslides, unstable slopes, and rockfalls is further reduced based on the mitigation measures and design features identified in Section 4.0 of this report.

Mudflows

The Outpost 33-8 Pad is not located in an area considered high-risk for mudflows. Mudflows in La Plata County are most common in areas of recent wildfires where the vegetation has been removed from the ground surface (La Plata County Local Hazard Mitigation Plan, 2018). Based on review of aerial imagery, there do not appear to be burn scars in the vicinity of the Outpost 33-8 Pad that would result in increased potential for mudflows. Vegetation, including grasses, shrubs, forbs, and pinon-juniper woodlands, appears healthy in the vicinity of the project. Additionally, the CGS typically studies areas of high potential for mudflows and the project area has not been part of a study by CGS to date.

Seismic

Although Colorado is considered a tectonically active state, the Outpost 33-8 Pad is located in an area of relatively low seismic hazard based on the US Geological Survey (USGS) Long-term National Seismic Hazard Map (USGS, 2018). The project is not located within a one-mile radius of a recorded seismic event (USGS, 2024). The nearest recorded seismic events occurred in 1997 and 2002 in an area located more than 20 miles west of the Outpost 33-8 Pad. Figure 4 shows the Outpost 33-8 Pad and the nearest recorded seismic events.

Radioactivity

The Outpost 33-8 Pad is located in an area classified as Zone 2 in the Environmental Protection Agency (EPA) Map of Radon Zones (EPA, 2023). Zone 2 indicates a moderate potential for radon, where the average indoor radon levels may be between 2 and 4 picocuries per liter (pCi/L). However, there are no occupied buildings associated with the proposed project; therefore, the risk posed by radon is considered low.

Ground Subsidence

Collapsible soils consist of loose, dry, low-density soils that collapse and compact under the addition of water or excessive loading. In La Plata County, collapsible soils are often fine-grained valley fill soils derived from the weathering of marine shales (La Plata County Local Hazard Mitigation Plan, 2018). Based on the *Collapsible Soils of Colorado* map viewer provided by CGS, the nearest recorded case of collapsible soil is located approximately 11 miles northeast of the Outpost 33-8 Pad near Bayfield, Colorado. There have been no recorded cases in the immediate vicinity of the project area. The risk of ground subsidence at the Outpost 33-8 Pad is considered low. A map showing the Outpost 33-8 Pad relative to the recorded case of collapsible soil near Bayfield, Colorado is included as Figure 5.

Expansive Soil and Rock

Expansive soils are characterized by clay soils that shrink and swell as they dry or become wet. Based on the Natural Resources Conservation Service (NRCS) Web Soil Survey, the Arboles clay (3 to 12% slopes) comprises 84.4% of the project area, the Zyme-Rock outcrop complex (12 to 65% slopes) comprises 1.0%, and water comprises 14.5% of the project area. However, based on field observations, there is no surface water within the footprint of the Outpost 33-8 Pad. Therefore, if the NRCS-mapped water unit is excluded, the Arboles clay (3 to 12%) comprises 99% of the project area. A soils map is included as Figure 6.

The Arboles clay is characterized by clay found on side slopes and base slopes. The parent material of the unit is fine-textured alluvium derived from shale. The depth to restrictive feature is more than 80 inches and the unit is considered well drained with a high runoff class. The soils are not prone to flooding or ponding and they are not considered prime farmland.

The Arboles clay is considered part of Hydrologic Soil Group C, meaning the soils have slow infiltration rates when thoroughly wetted. These soils consist of a layer that impedes the downward movement of water or soils with moderately fine or fine textures and slow infiltration rates. Soils within Hydrologic Soil Group C do not have a high swelling capacity or potential (NRCS, 2024).

Soils within the vicinity of the Outpost 33-8 Pad do not have the characteristics of expansive soils. The observed stability of the nearby well pads in the surrounding area indicates that the soils within the project area are suitable for maintaining structural integrity. Appropriate construction techniques and design features will further reduce the risk of site instability as outlined in Section 4.0 below.

Mining

Based on data from the Colorado Division of Reclamation, Mining, and Safety (DRMS), there are no mining permits within one mile of the Outpost 33-8 Pad. There are two mining permits located within five miles of the project area, both of which are active sand and gravel pits located east of the Los Pinos River (DRMS, 2024). A mining map is included as Figure 7.

4.0 MITIGATION MEASURES

Based on analysis of the geologic hazards presented in Section 3.1, there are no geologic hazards associated with the proposed project. However, as a best management practice (BMP), the following mitigation measures and design features will be implemented during the project:

- 1) The Outpost 33-8 Pad will be constructed by compacting multiple lifts to ensure stability of the pads in areas of fill.
- 2) The pad surfaces will consist of a compacted gravel surface to stabilize the working area.
- 3) A ditch and berm drainage system will be installed around the pads to prevent stormwater run-on and to appropriately establish drainage around the perimeter of the well pad.
- 4) Stormwater control measures, including sediment control logs, will be installed around the pads and topsoil storage areas.

- 5) Surface roughening would occur on the cut slope to minimize erosion.
- 6) Interim reclamation would occur following drilling and consist of stabilizing the ground surface through re-vegetation with seed and mulch. The tank pad would be reclaimed following drilling and completion of the gas wells.
- 7) A Stormwater Management Plan would be created for the project per Colorado Department of Public Health and Environment regulations. As part of the plan, routine site inspections would occur at the site to evaluate conditions including the stability of the pads. If inspection results indicate site stabilization issues, Catamount would develop a plan to mitigate the impacts accordingly through additional BMPs and design features.

5.0 CONCLUSION

Based on a review of the geologic hazards discussed in Section 3.1, there is little to no risk to the Outpost 33-8 Pad from avalanches, landslides, unstable slopes, rockfalls, mudflows, seismic activity, radioactivity, ground subsidence, or expansive soil and rock. Catamount will implement the mitigation measures and design features listed in Section 4.0 to further reduce the risk of any potential geologic hazards in the project area.

6.0 LIMITATIONS

This geologic evaluation is limited to the hazards outlined in Section 3.1 for the Outpost 33-8 Pad.

7.0 CERTIFICATION

This Geohazard Plan was prepared by Kyle Siesser, PG. Mr. Siesser is a registered professional geoscientist having met the educational requirements and professional work experience required by Section 23-41-208(b) C.R.S. Mr. Siesser has over 22 years of professional experience in geologic assessments and environmental consulting. Mr. Siesser's contact information is listed as follows:

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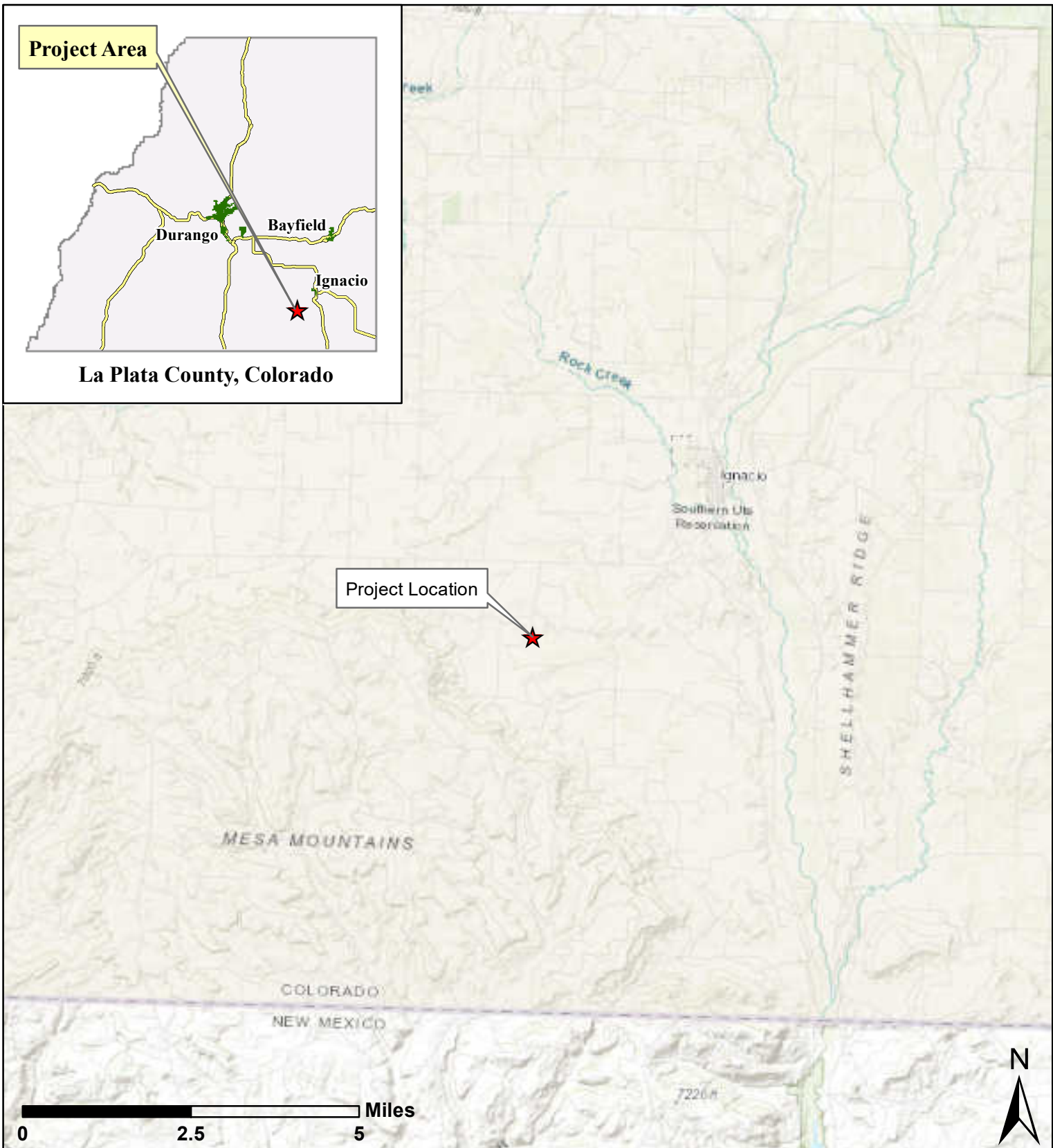


Date: 5/19/2025

8.0 REFERENCES

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- Condon, S.M. 1992. Geologic framework of pre-Cretaceous rocks in the Southern Ute Indian Reservation and adjacent areas, southwestern Colorado and northwestern New Mexico. https://ngmdb.usgs.gov/Prodesc/proddesc_4911.htm
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FIGURES



Legend

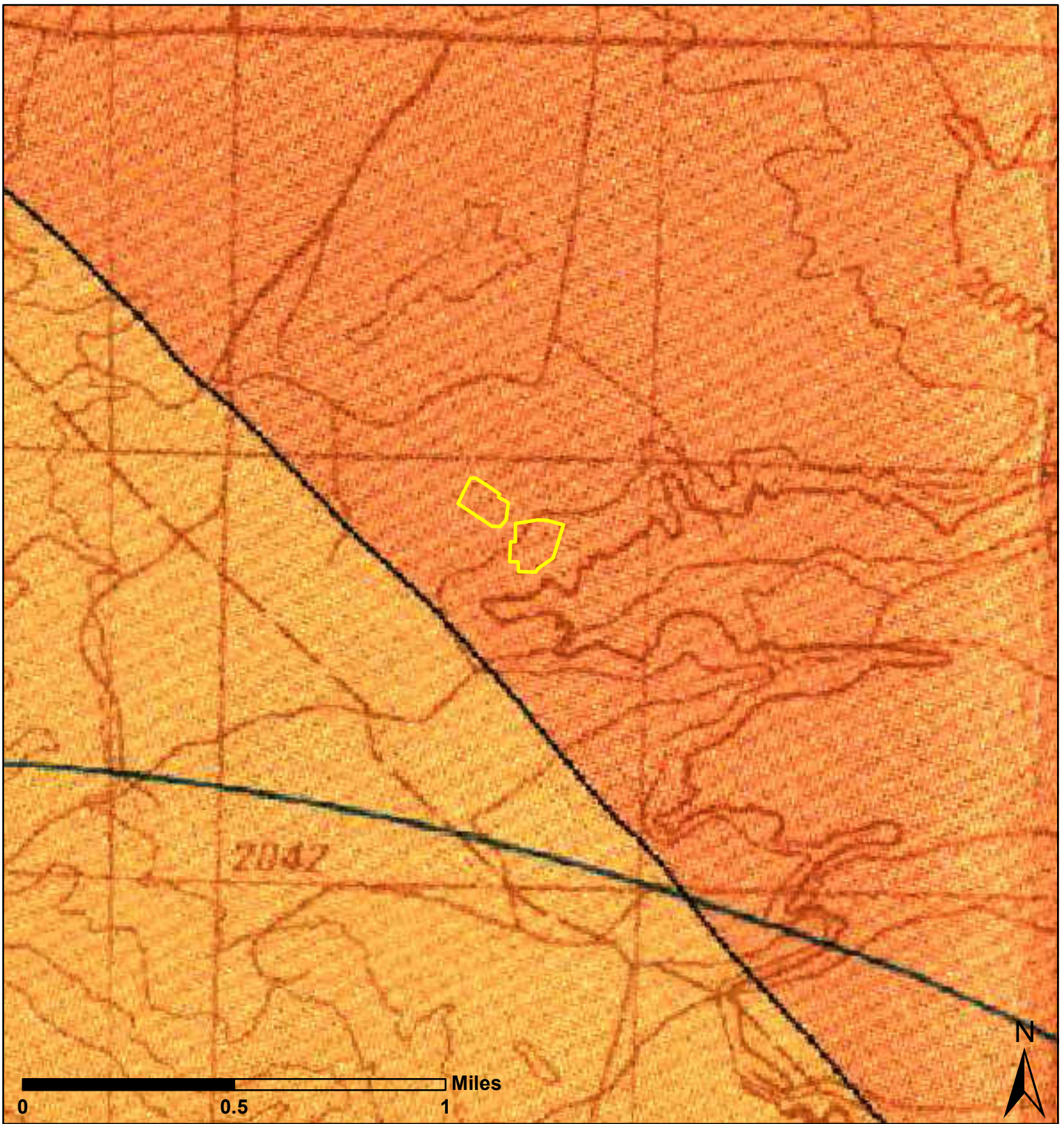
★ Project Location







Mapping by: E. Millar, 5/19/2025
 Coordinate System:
 NAD 1983 UTM Zone 13 N

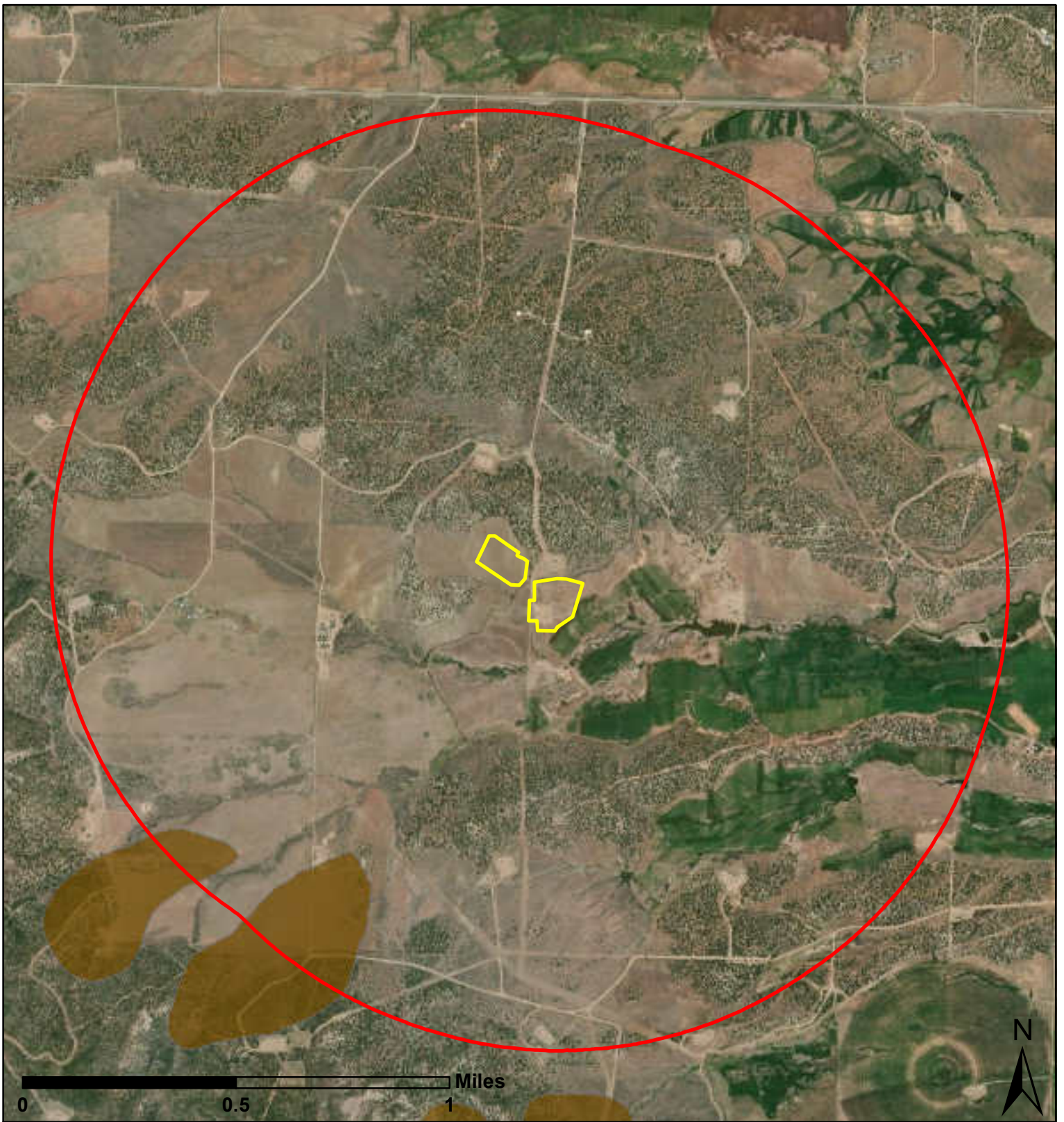
Location: Section 26 T33N R8W NMPM

Figure 1
Project Vicinity Map
Outpost Pad Geologic Hazard Plan
Catamount Energy Partners LLC






Notes: Basemap is the Geologic and Structure Contour Map of the Southern Ute Indian Reservation and Adjacent Areas (Condon, 1990).

<p>Legend</p> <ul style="list-style-type: none">  Oil and Gas Location  Tsa; San Jose and Animas Formation, undivided  Tsj; San Jose Formation 	<p>Cottonwood CONSULTING </p> <p>Mapping by: E. Millar, 5/19/2025 Coordinate System: NAD 1983 UTM Zone 13 N</p> <p>Location: Section 26 T33N R8W NMPM</p>	<p>Figure 2 Geologic Map Outpost Pad Geologic Hazard Plan Catamount Energy Partners LLC</p>
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Notes: Landslide data from the Colorado Geological Survey.

Legend

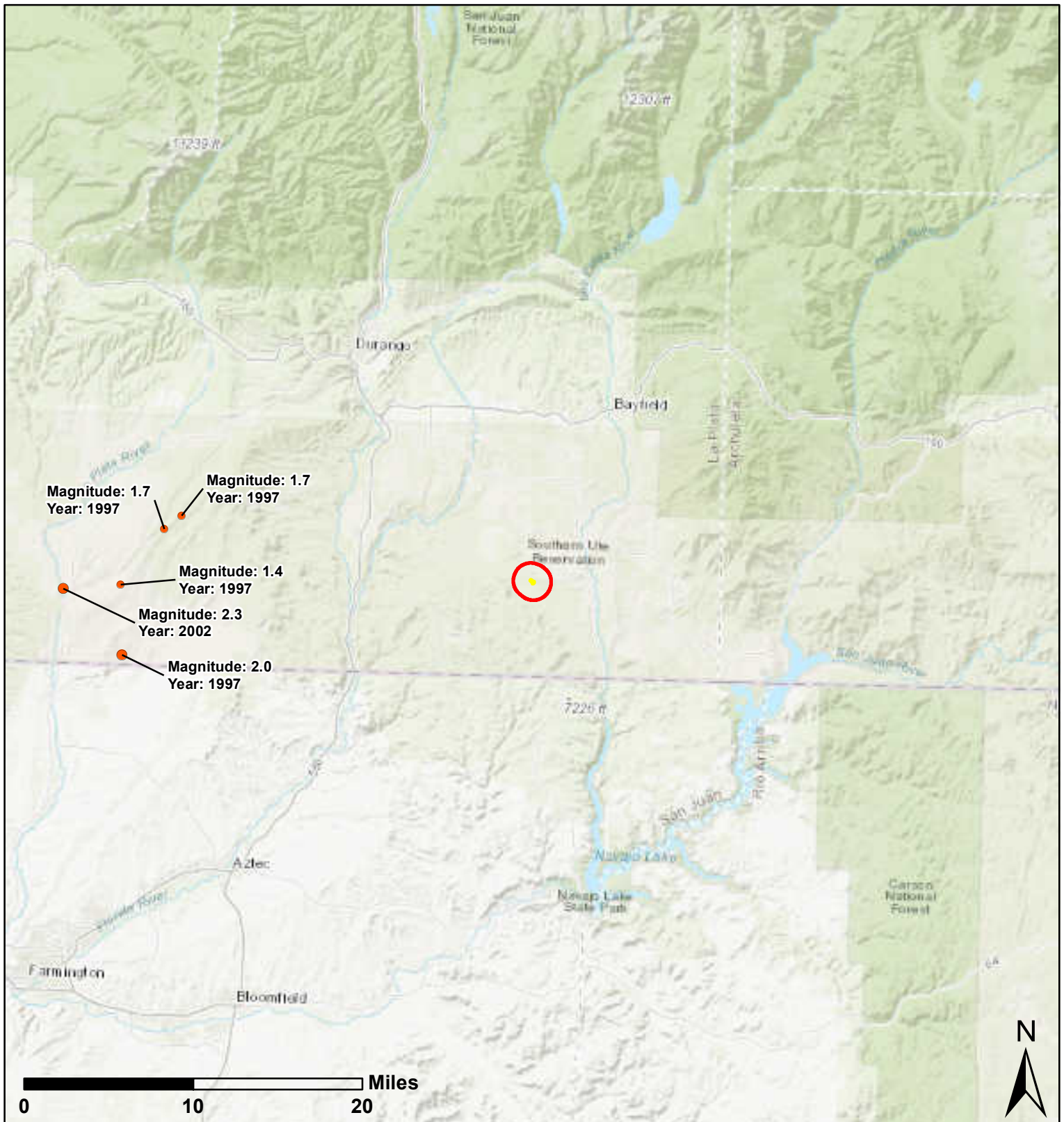
-  Oil and Gas Location
-  Possible Landslide Area
-  1 Mile Buffer



Mapping by: E. Millar, 5/19/2025
Coordinate System:
NAD 1983 UTM Zone 13 N





Location: Section 26 T33N R8W NMPM

Figure 3
Landslide Hazard Map
Outpost Pad Geologic Hazard Plan
Catamount Energy Partners LLC



Notes: Seismicity data from the Colorado Geological Survey.

Legend

-  1 Mile Buffer
-  Oil and Gas Location
- Magnitude**
-  1.0-1.9
-  2.0-2.9



Mapping by: E. Millar, 5/19/2025
 Coordinate System:
 NAD 1983 UTM Zone 13 N





Location: Section 26 T33N R8W NMPM

Figure 4
Seismic Map
Outpost Pad Geologic Hazard Plan
Catamount Energy Partners LLC



Notes: Collapsible soil data from the EG-14 Collapsible Soils of Colorado (White and Greenman, 2008).

Legend

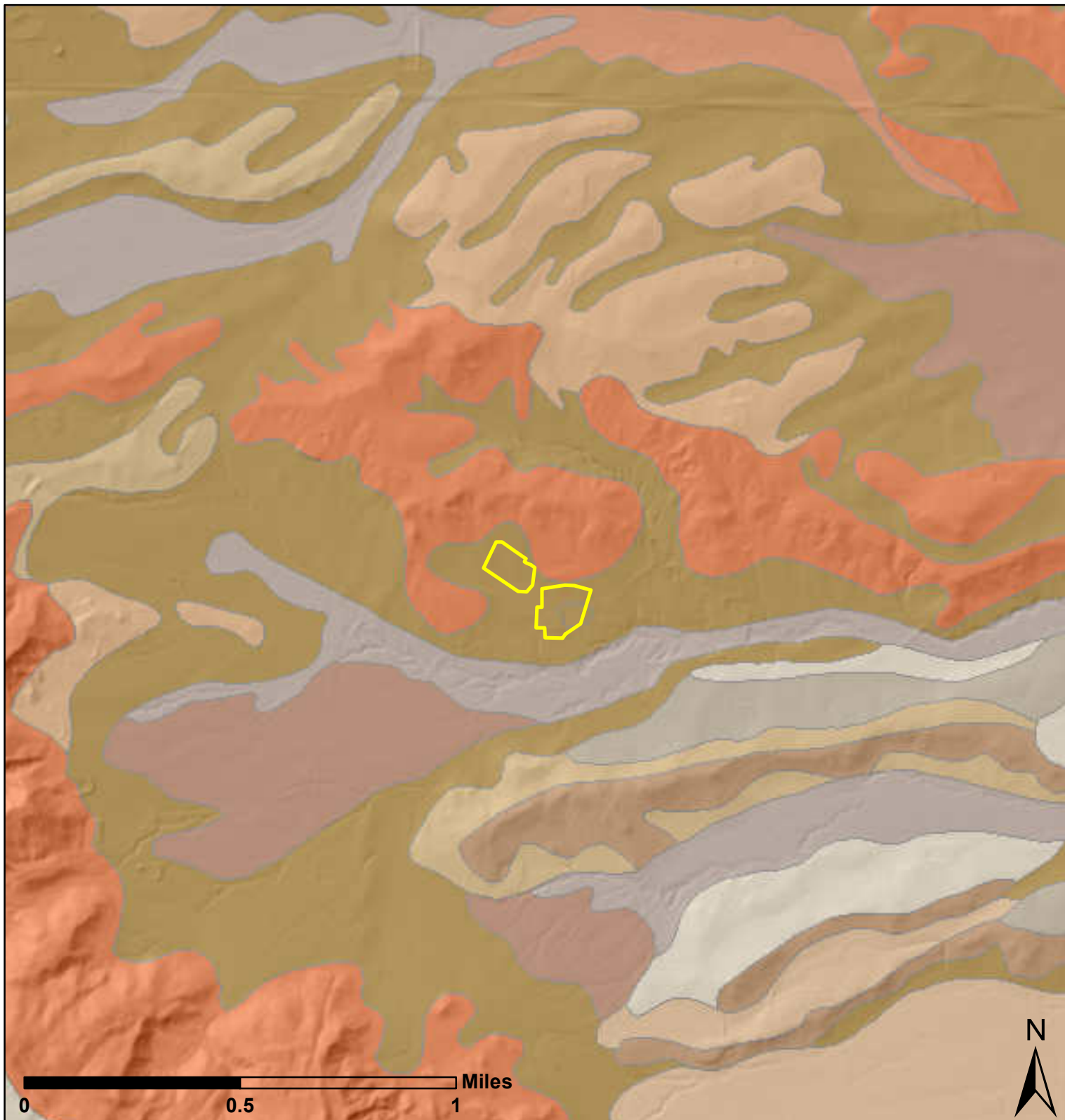
-  Oil and Gas Location
-  1 Mile Buffer
-  Cretaceous and Tertiary Formations
-  Collapsible Soil Incident



Mapping by: E. Millar, 5/19/2025
 Coordinate System:
 NAD 1983 UTM Zone 13 N


Location: Section 26 T33N R8W NMPM

Figure 5
Collapsible Soils Map
Outpost Pad Geologic Hazard Plan
Catamount Energy Partners LLC





Notes: Soil data from the NRCS. Only soil in the project area included in the legend. Water shown on the NRCS layer on the well pad removed based on field observations.

Legend

 Oil and Gas Location

Soil Type

 5; Arboles clay 3-12% slopes

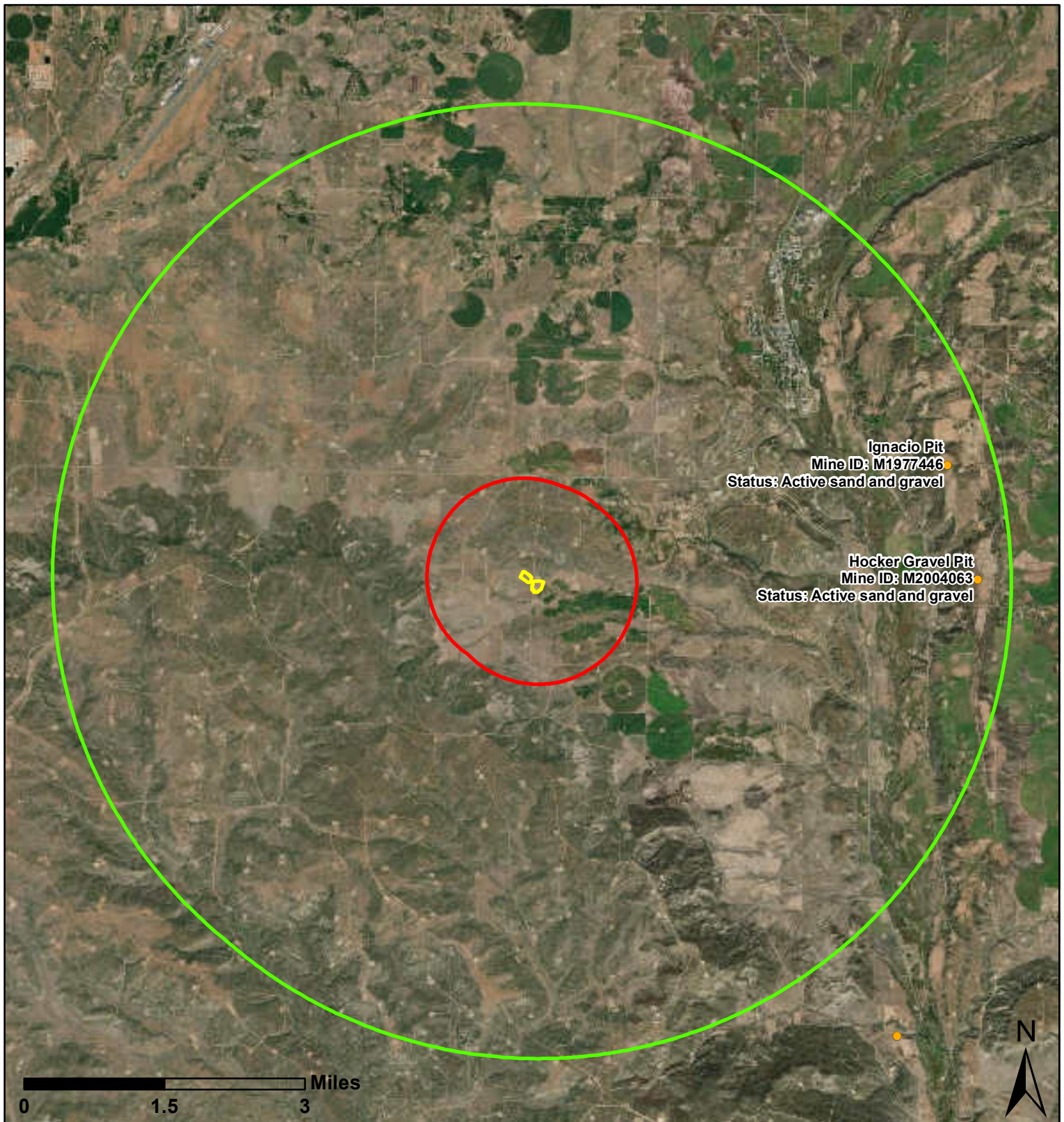
 82; Zyme-rock outcrop complex, 12-65% slopes



Mapping by: E. Millar, 5/19/2025
 Coordinate System:
 NAD 1983 UTM Zone 13 N





Location: Section 26 T33N R8W NMPM

Figure 6
Soil Map
Outpost Pad Geologic Hazard Plan
Catamount Energy Partners LLC



Notes: Mining data from Colorado Division of Reclamation, Mining, and Safety.

Legend

-  Oil and Gas Location
-  1 Mile Buffer
-  5 Mile Buffer
-  Mining Permit



Mapping by: E. Millar, 5/19/2025
 Coordinate System:
 NAD 1983 UTM Zone 13 N

Location: Section 26 T33N R8W NMPM

Figure 7
Mining Map
Outpost Pad Geologic Hazard Plan
Catamount Energy Partners LLC