

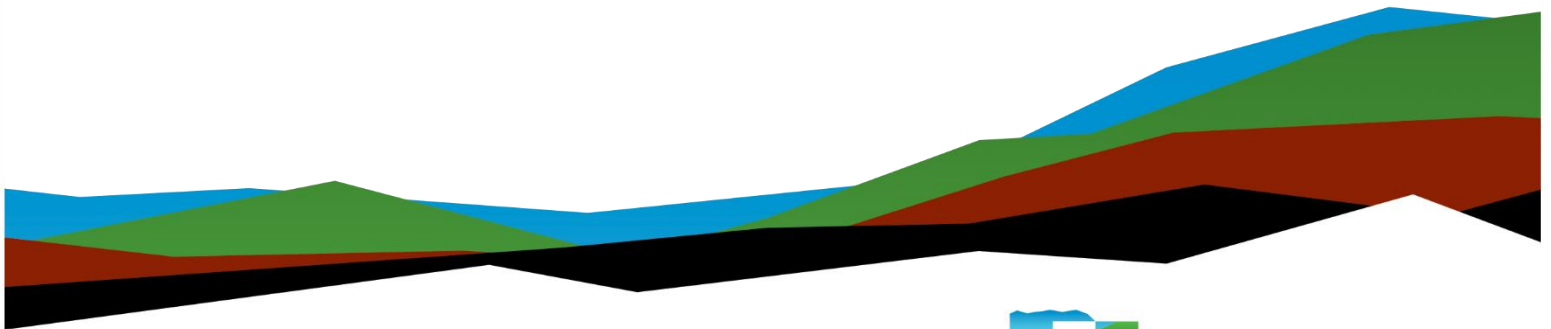
Circle K Retail Store and Shared Access Road

Geologic Hazard Assessment Review Report

February 22, 2023 | Terracon Project No. 23225154

Prepared for:

Land Development Consultants
11811 North Tatum Boulevard,
Suite 1051
Phoenix, Arizona 85028



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February 22, 2023

Land Development Consultants
11811 North Tatum Boulevard, Suite 1051
Phoenix, Arizona 85028

Attn: Michael Scarbrough
P: (602) 684-5210
E: mike@ldcaz.com

Re: Geologic Hazards Assessment Review Report
Circle K Retail Store and Shared Access Road
East of the intersection of Highway 24 and Meridian Road
Falcon, Colorado
Terracon Project No. 23225154

Dear Mr. Scarbrough:

Terracon Consultants, Inc. (Terracon) has completed the scope of services for the project referenced above in general accordance with Terracon proposal No. P23225154, dated November 17, 2022. This report presents the findings of the geologic hazard assessment.

This report has been completed in general accordance with the El Paso County Engineering Criteria Manual Section C.2 under the direction and review of a Professional Engineer. Our review identified the following Geologic Hazards:

- High groundwater table

Introduction

This report presents the results of our services performed for the proposed Shared Access Road and the Meridian Circle K Retail Store to be located east of the intersection of Highway 24 and Meridian Road in Falcon, Colorado. The purpose of these services was to identify geological hazards and provide recommendations as presented in El Paso County Engineering Criteria Manual Section C.2. The geotechnical engineering Scope of Services for these projects included the review of publicly available geologic mapping, and preparation of this report.

Terracon has reviewed the following information to aide in preparation of this report:

- Colorado Landslide Inventory interactive map, Colorado Geological Survey, accessed on January 10, 2023.
- Collapsible Soils of Colorado interactive map, Colorado Geological Survey, accessed on January 10, 2023.
- FEMA 100 -Year Floodplains for Colorado interactive map, Colorado Oil and Gas Conservation Commission, accessed on January 10, 2023
- U.S. Quaternary Faults Map Database, United States Geological Survey Hazards Science Center, accessed on January 10, 2023.
- El Paso County Aggregate Resource Evaluation Map, El Paso County Planning Department, accessed on February 22, 2023.
- Evaluation of Mineral and Fuel Potential of El Paso County State Mineral Lands, Colorado State Land Board, accessed on February 22, 2023.
- Falcon Quadrangle Geologic Map, El Paso County Colorado, Morgan and White, accessed on February 22, 2023.
- Terracon Geotechnical Engineering Report No. 23185069 dated November 30, 2018, for the Circle K. See Figure 2.
- Terracon Geotechnical Engineering Report No. 23225154 dated February 7, 2023 for the Circle K access road. See Figure 2.

Geology

Based on the available information (See Figure 3) two geologic units are identified on the site and are described as follows:

Alluvium two (lower Holocene) – Dark gray to brown, poorly to well sorted, moderately consolidated silt, sand gravel, and minor clay and occasional boulders in stream terrace deposits approximately 6-12 feet above the modern flood plain or as non-terrace forming alluvium in valley headwaters. Clasts are subrounded to well rounded and dominant sediment is sandy gravel with a silty sand matrix. Clay seams are poorly to moderately stratified. The unit is subject to occasional flooding and is a potential source of sand and gravel.

Black Squirrel Formation (Paleocene) – gray-green to tan to brownish gray, moderately-well sorted cross-bedded sandy arkoses interbedded with micaceous sandy claystones that contain abundant plant fragments and occasional, fine-to-medium grained massive arkosic beds. Intermittent paleols are developed locally. The exposed upper part of the Black Squirrel formation is gradation with the overlying Dawson Arkose making the location of the contract problematic. The claystones within this unit may be prone to swelling when wet.

Economic Mineral Resources

Based on review of *El Paso County Aggregate Resource Evaluation Map* the site is not mapped within any viable aggregate deposits. Based on review of *Evaluation of Mineral and Fuel Potential of El Paso county, State Mineral Lands* the site is rated as “fair” for oil and gas resources, “poor” for coal resources, “little to no potential” for metals and “fair to good” for industrial metals.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration.

Item	Description
Parcel Information	The project is located East of the intersection of Highway 24 and Meridian Road in Falcon, Colorado. The site is bound by Old Meridian Road to the east and Meridian Road to the west. See Figure 1
Existing Improvements	The alignment of the proposed road is undeveloped.
Current Ground Cover	The vegetation observed on the site generally consisted of low to moderately tall native grasses and weeds.
Existing Topography	The site is relatively flat, with less than 5 feet of elevation change across the planned roadway area. Overall, the site slopes down from the north to the south at less than 5% slope.

Geologic Hazards

Hazard	Evaluation	Estimated Risk Level	Proposed Mitigation
Expansive Soils	Terracon completed swell testing on soils collected as part of projects 23185069 and 23225154; soils were found to have nil to low expansive potential.	Low	<ul style="list-style-type: none"> ■ The earthwork recommendations provided in Terracon Geotechnical Reports No. 23185069 and No. 23225154 should be followed.
Collapsible Soils	The proposed site occupies EG-14 Dune and sheet sand deposits (Figure 4 – Wind Blown Soils Map)	Low	<ul style="list-style-type: none"> ■ Based on our review of the Collapsible Soils of Colorado Interactive map, collapsible soils occupy the proposed development site. ■ Samples taken from the 2018 and 2022 field investigations indicate a low potential for collapse. ■ The earthwork recommendations provided in Terracon Geotechnical Reports No. 23185069 and No. 23225154 should be followed.

Hazard	Evaluation	Estimated Risk Level	Proposed Mitigation
Erodible Soils	Soils with a sandy matrix were encountered on the project site. Sandy soils are susceptible to erosion when exposed.	Medium	<ul style="list-style-type: none"> ■ Follow an erosion control (by others) plan during earthwork construction. ■ Long term seeding/landscape/vegetation may be used to help reduce the risk of soils eroding.
Corrosive Soils	Results of corrosivity testing of on-site soils indicate low corrosion potential	Low	<ul style="list-style-type: none"> ■ Concrete should be designed in accordance with ACI Table 19.3.1.1.
Abandoned Mining Activity	<p>The proposed site does not have any abandoned mining activity documented.</p> <p>(Figure 5 – Map of Mines and Prospects)</p>	Low	<ul style="list-style-type: none"> ■ Based on our review of the USGS Prospect-and mine related features of El Paso County, Colorado interactive map of the proposed development site, the area is free of any abandoned mine related features. ■ The nearest mapped mining activity is approximately 1.3 miles southeast.
Slope Stability	The existing site topography is relatively flat, with site	Low	<ul style="list-style-type: none"> ■ The earthwork recommendations provided in Terracon Geotechnical Reports #23185069 and #23225154 should be followed.

Hazard	Evaluation	Estimated Risk Level	Proposed Mitigation
	<p>grades generally 5% slopes or flatter. Proposed slopes for the access road are 3H:1V or flatter</p>		
<p>Landfills, Uncontrolled, and or Undocumented Fill Activity</p>	<p>The proposed site does not have any landfill, and minimal uncontrolled and/or undocumented fill activity.</p>	<p>Low</p>	<ul style="list-style-type: none"> ■ Up to 1 foot of existing fill was encountered in Boring No. P-1 in our 2018 exploration. Recommendations in our 2018 geotechnical report call for the overexcavation and re-working of the encountered fill material.
<p>Landslides</p>	<p>The proposed site does not have any landslides in the vicinity. (Figure 6 – Landslide Inventory)</p>	<p>Low</p>	<ul style="list-style-type: none"> ■ Based on our review of the Potential Areas of Landslide Susceptibility in Falcon, El Paso County, Colorado, the proposed site development area is not considered to be within the area of susceptibility. ■ The nearest mapped landslide activity is approximately 5.3 miles northwest.
<p>Shallow Groundwater</p>	<p>The proposed site has a shallow ground water table with groundwater as shallow as 5½ feet encountered</p>	<p>High</p>	<ul style="list-style-type: none"> ■ According to the field investigations, performed in 2018 and 2022, the site has a shallow ground water table groundwater was observed from depth ranging from about 5½ to 8 feet below existing site grades. ■ Underground storage tanks should be designed for buoyant uplift forces.

Hazard	Evaluation	Estimated Risk Level	Proposed Mitigation
	during the exploration. (Figure 7 – Depth to Groundwater)		<ul style="list-style-type: none"> ■ Temporary dewatering may be required during site construction. ■ The earthwork and Geotechnical recommendations provided in Terracon Geotechnical Reports #23185069 and #23225154 should be followed.
Flood Prone Areas	The proposed site is within 100 feet of a mapped flood area. (Figure 8 – 100-year floodplain map)	High	<ul style="list-style-type: none"> ■ Based on our review of the Colorado Geological Survey NFHL Hazard Zones interactive map, El Paso County, Colorado, the proposed development area is adjacent to a FEMA flood-prone area. ■ Adequate drainage structures and flood mitigation techniques should be used to reduce the risk of flooding on the proposed development area. ■ The earthwork recommendations provided in Terracon Geotechnical Reports #23185069 and #23225154 should be followed.
Radiation	Radon Gas is commonly found in the bedrock of El Paso County	Low	<ul style="list-style-type: none"> ■ Radon testing was beyond the scope of services ■ Radon can be evaluated and mitigated utilizing common local construction practices.
Seismicity	The major structural feature of this region is the Rampart Range Fault System which is located approximately	Low	<ul style="list-style-type: none"> ■ Terracon Geotechnical Reports recommend seismic site class D. ■ Structures should be designed to the most current approved building codes.

Hazard	Evaluation	Estimated Risk Level	Proposed Mitigation
	15 miles west of the site.		

General Comments

Our analysis and geologic opinions are based upon our understanding of the project, the data obtained from our site explorations, and review of the referenced documents.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

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We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon



William A. Modrall, P.E.
Department Manager

A handwritten signature in blue ink, appearing to read "Kurt F. Stauder".

Kurt F. Stauder, P.G.
Project Geologist

Project Review by: Scott B. Myers, P.E.

Attachments:

- Site Location Plan
- Exploration Plan (2018 and 2022 Explorations)
- Regional Geology Map
- Map of Windblown Deposits
- Mines and Prospects
- Landslide Inventory
- Depth to Groundwater
- 100-year Floodplain

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Figure 1 - Site Location Plan

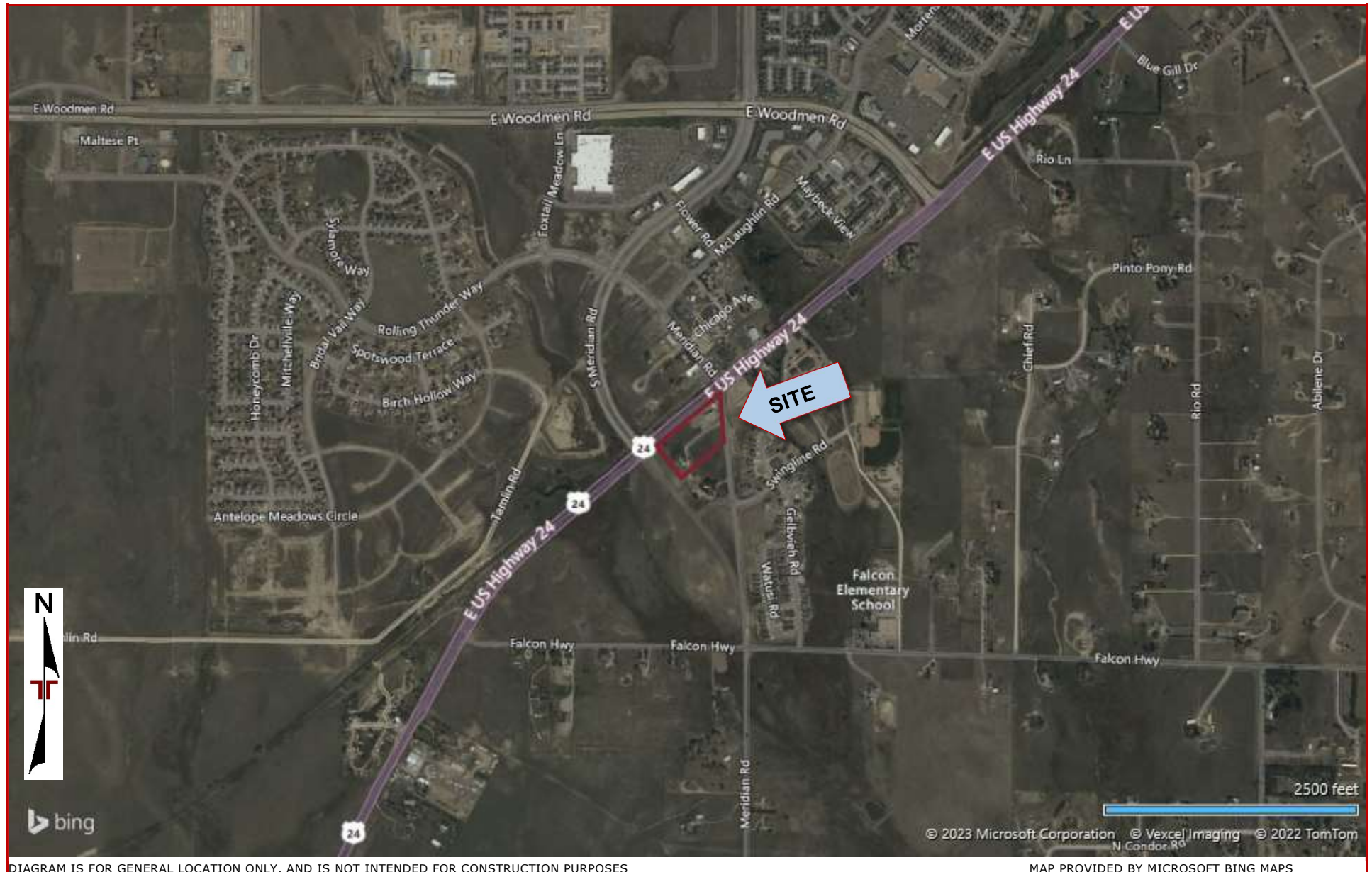


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Figure 2 - Exploration Plan



Figure 3 – Regional Geology Map (Morgan and White, 2012)

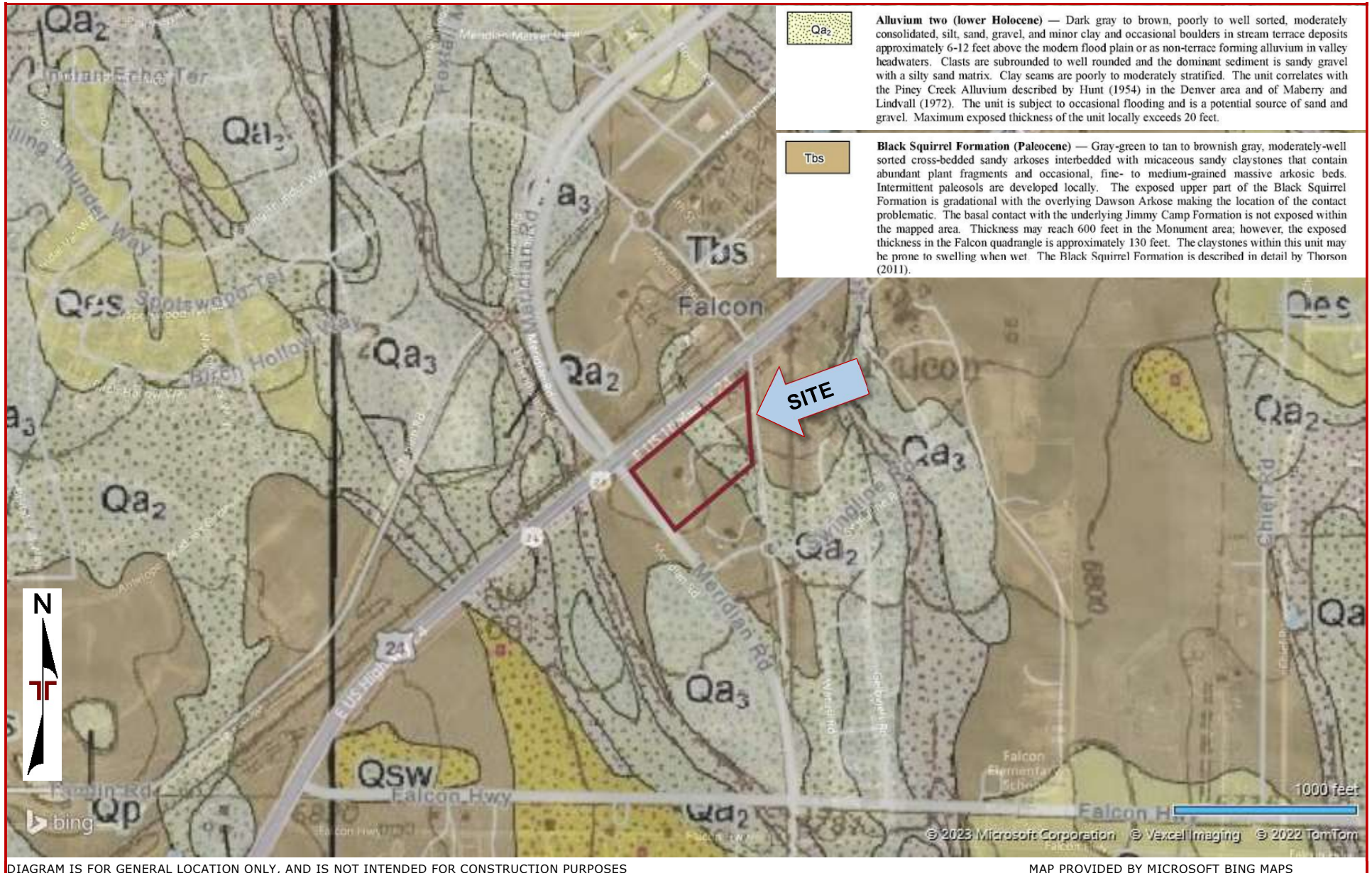


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Figure 4 – Map of Windblown Deposits

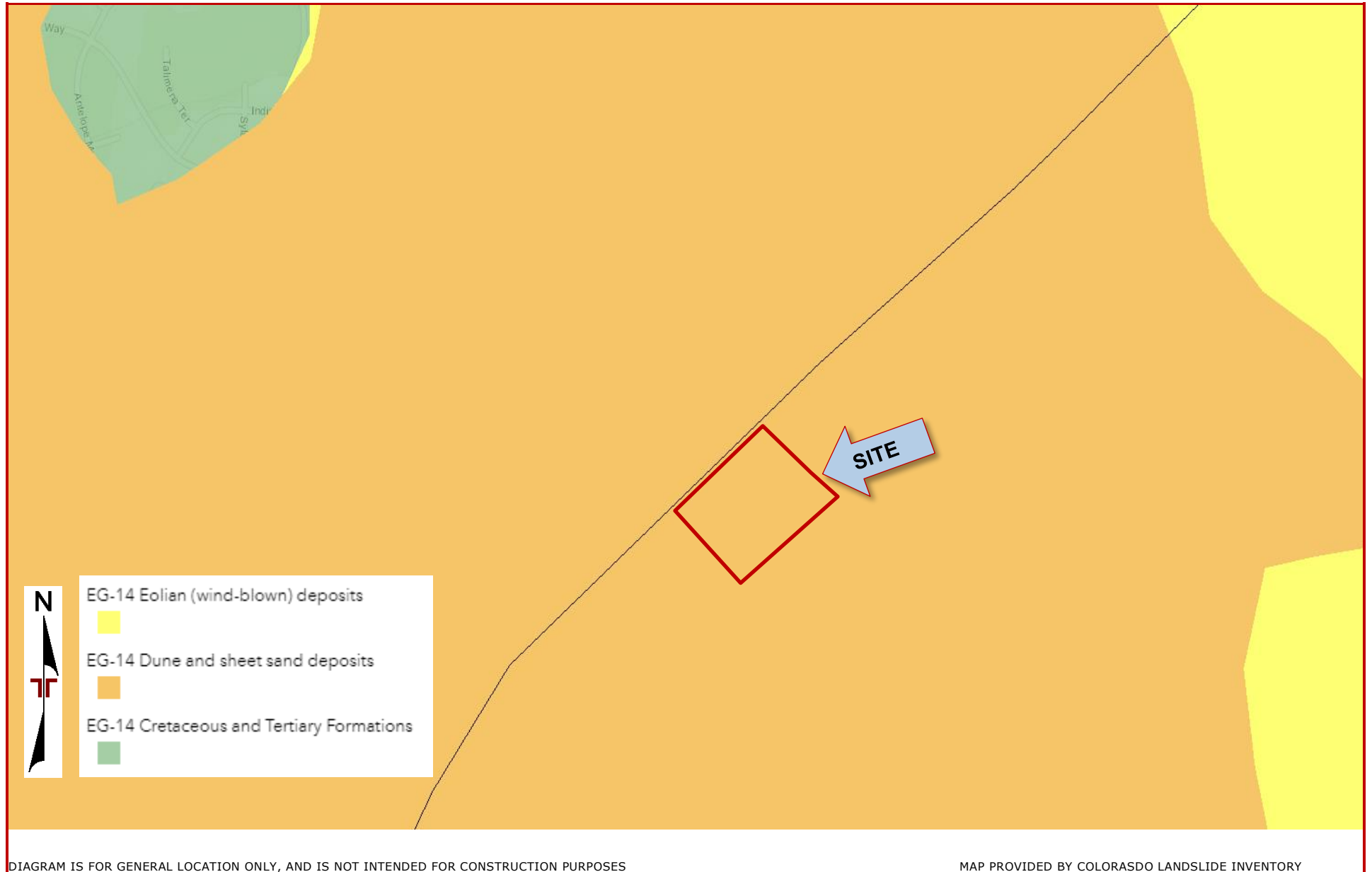


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MAP PROVIDED BY COLORASDO LANDSLIDE INVENTORY

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Figure 5 – Mines and Prospects



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MAP PROVIDED BY COLORADO LANDSLIDE INVENTORY

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Figure 6 – Landslide Inventory

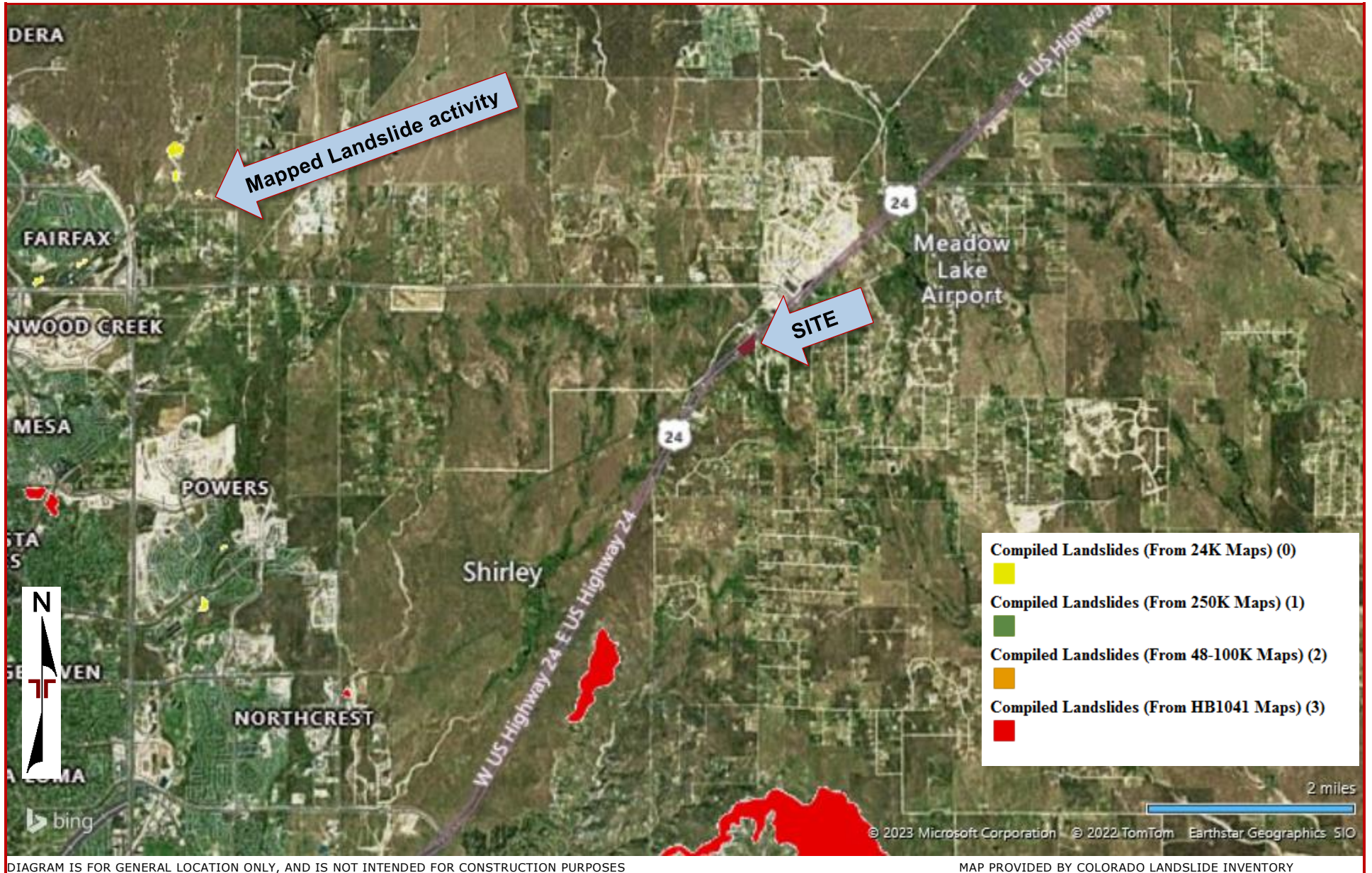


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MAP PROVIDED BY COLORADO LANDSLIDE INVENTORY

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Figure 7 – Depth to Groundwater

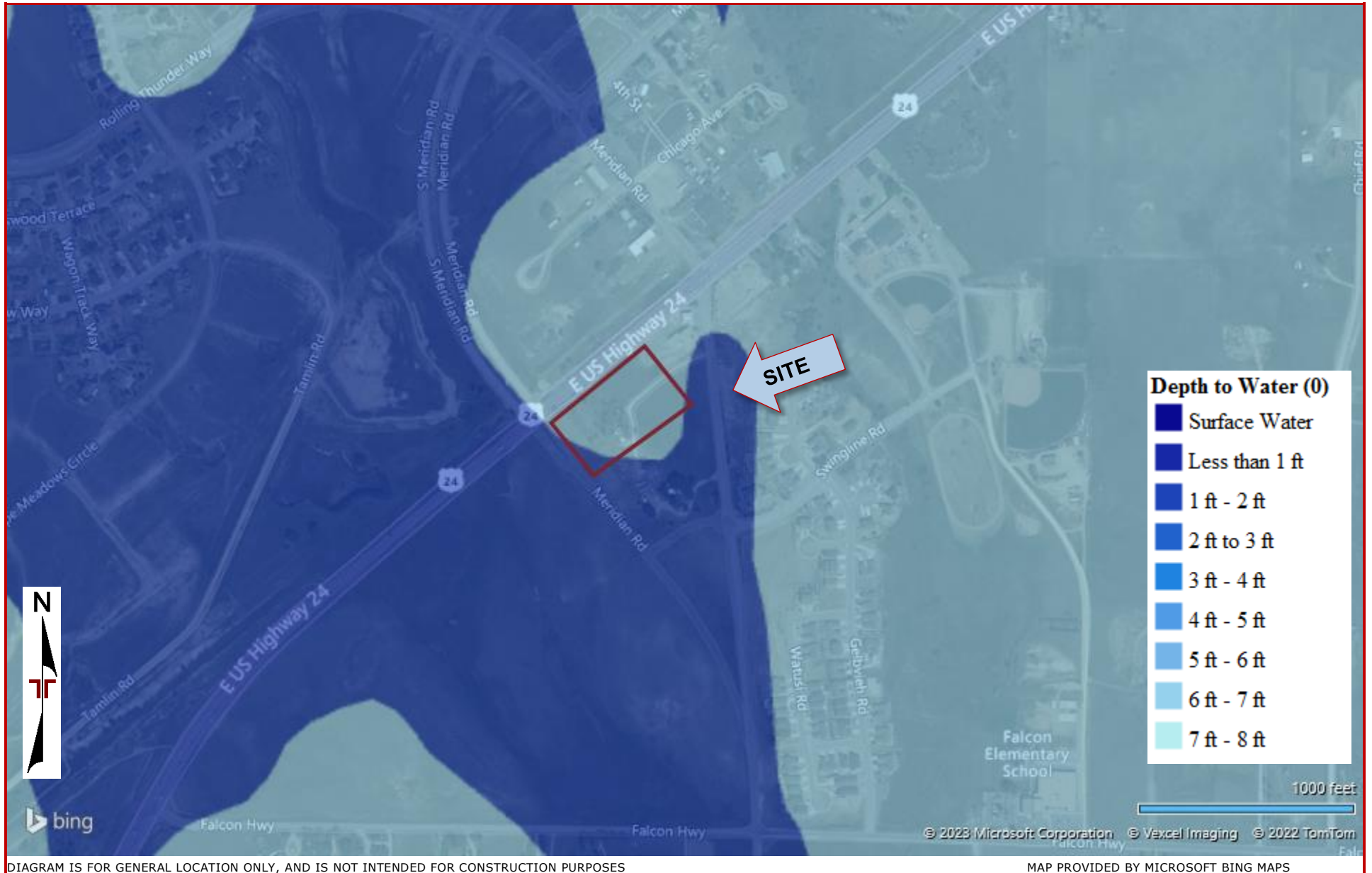


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Figure 8 – 100-year Floodplain m

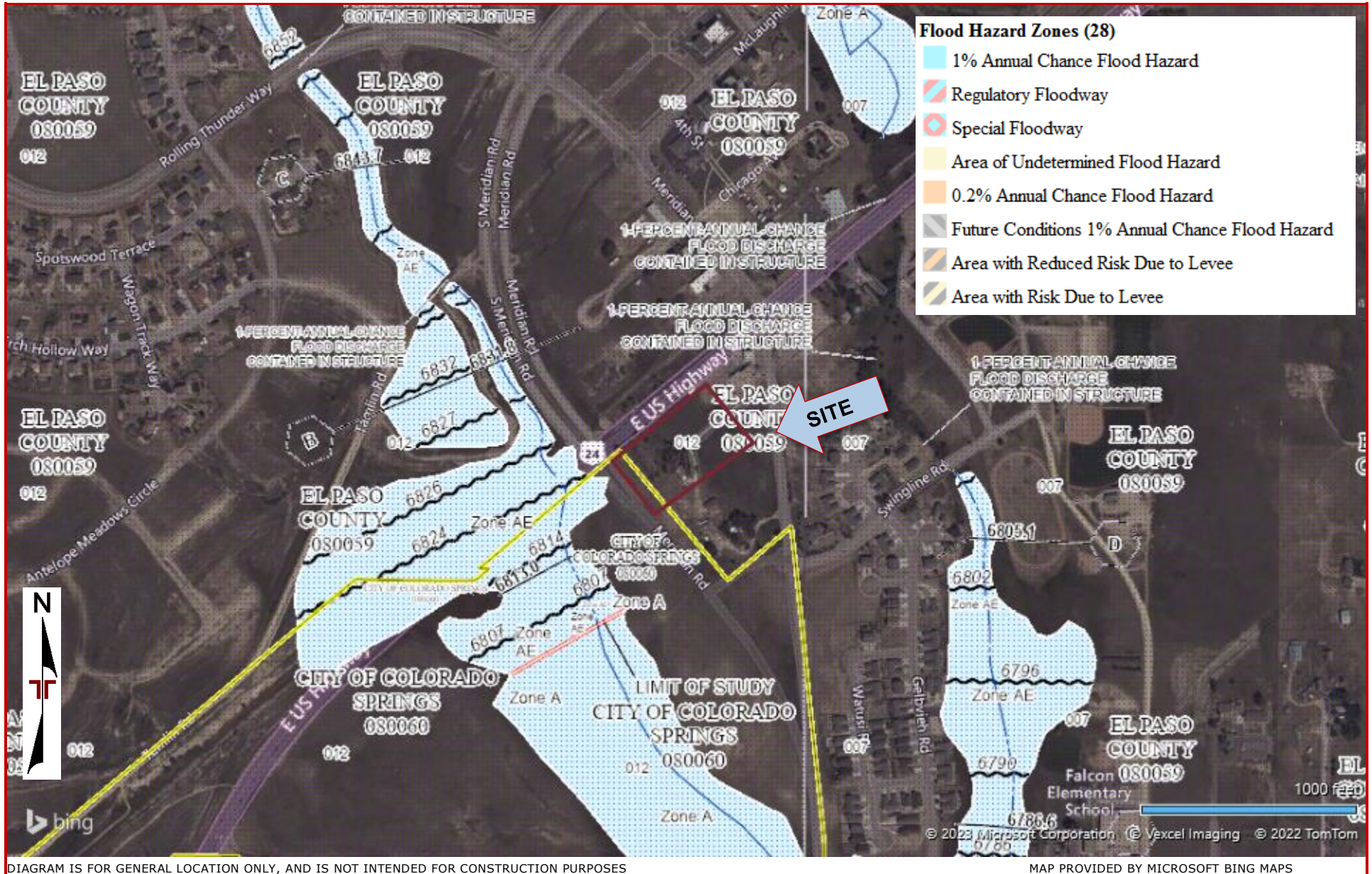


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