REPORT

GEOLOGIC HAZARDS RECONNAISSANCE

GREEN HILLS COUNTRY ESTATES LOT 100R

1330 NORTH MAPLE DRIVE

HUNTSVILLE, WEBER COUNTY, UTAH

Prepared for

Rhett Bonham
Triple Crown Enterprises, Black Diamond Contracting
2964 West 2025 South
West Haven, Utah 84401

April 2, 2018

Prepared by

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Triple Crown Enterprises
Black Diamond Contracting
2964 West 2025 South
West Haven, Utah 84401

SUBJECT: Geologic Hazards Reconnaissance
Green Hills Country Estates Lot 100R
1330 North Maple Drive
Huntsville, Weber County, Utah

Dear Mr. Bonham:

This report presents results of an engineering geology and geologic hazards review and evaluation conducted by Western GeoLogic, LLC (Western GeoLogic) for Lot 100R in the Green Hills Country Estates Phase 6 subdivision at 1330 North Maple Drive in unincorporated Weber County, Utah, Utah (Figure 1 – Project Location). The Project consists of a 4.62-acre parcel identified as Weber County Assessor parcel number 21-085-0004. The site is in Maple Canyon at the eastern margin of Ogden Valley, and is in the SE1/4 Section 4, Township 6 North, Range 2 East (Salt Lake Base Line and Meridian; Figure 1). Elevation of the site ranges from about 5,606 feet to 5,780 feet above sea level.

There are currently no formalized development plans, but based on our prior discussion the property is planned for development of a single-family residential home in the northwest part of the property. The preferred building envelope location is east of the cul-de-sac marking the end of Maple Drive.

PURPOSE AND SCOPE

The purpose and scope of this investigation is to identify and interpret surficial geologic conditions at the site to identify potential risk from geologic hazards to the Project. This investigation is intended to: (1) provide preliminary geologic information and assessment of geologic conditions at the site; (2) identify potential geologic hazards that may be present and qualitatively assess their risk to the intended site use; and (3) provide recommendations for additional site- and hazard-specific studies or mitigation measures, as may be needed based on our findings. Such recommendations could require further multi-disciplinary evaluations, and/or may need design criteria that are beyond our professional scope. No hazard-specific evaluations or subsurface exploration were conducted for this report or within the scope of our study.

The following services were performed in accordance with the above stated purpose and scope:

- A site reconnaissance conducted by an experienced certified engineering geologist to assess the site setting and look for adverse geologic conditions;

- Review of readily-available geologic maps, reports, and air photos; and

- Evaluation of available data and preparation of this report, which presents the results of our study.

The engineering geology section of this report has been prepared in accordance with Bowman and Lund (2016) and current generally accepted professional engineering geologic principles and practice in Utah, and meets specifications provided in Chapter 27 of the Weber County Land Use Code within the above stated scope. We do not include discussion of radon hazard potential, as recommended in Bowman and Lund (2016), because radon gas poses an environmental health hazard and indoor levels are heavily influenced by several post-construction, non-geologic factors. The hazard from radon should be evaluated by long-term testing following construction.

HYDROLOGY

The U.S. Geological Survey (USGS) topographic map of the Browns Hole Quadrangle shows the site is on the eastern margin of Ogden Valley straddling Maple Canyon Creek, which flows to the southwest across the northern half of the site (Figure 1). A smaller drainage also flows southward across the northwest site corner to Maple Canyon Creek. Maple Canyon Creek was flowing at the time of our investigation, but the unnamed drainage was dry. No springs or seeps were observed at the site or are shown in nearby areas on Figure 1.

The site is in Maple Canyon about 2.5 miles northeast of Huntsville. The canyon bottom is likely dominated by alluvial and colluvial fill, whereas the adjacent mountain slopes are mainly in Paleozoic Maple Canyon Formation bedrock overlain by colluvial veneers. No site-specific groundwater information was available for the Project, but groundwater likely mimics seasonal creek flows at or below the creek elevation. Given the above and our site observations, we anticipate the depth to groundwater at the Project is generally greater than 30 feet but may be less than 10 feet in areas in the canyon bottom along the creek. Groundwater depth likely varies seasonally from snowmelt runoff and annually from climatic fluctuations. Such variations would be typical for an alpine environment. Perched conditions above less-permeable, clay-rich layers may also be present in the subsurface that could cause locally shallower groundwater levels.

Avery (1994) indicates groundwater in Ogden Valley occurs under perched, confined, and unconfined conditions in the valley fill to depths of 750 feet or more. A well-stratified lacustrine silt layer forms a leaky confining bed in the upper part of the valley-fill aquifer. The aquifer below the confining beds is the principal aquifer, which is in primarily fluvial and alluvial-fan deposits. The principal aquifer is recharged from precipitation, seepage from surface water, and subsurface inflow from bedrock into valley fill along the valley margins (Avery, 1994). The confined aquifer is typically overlain by a shallow, unconfined aquifer recharged from surface flow and upward leakage. Groundwater flow is generally from the valley margins into the valley fill, and then toward the head of Ogden Canyon (Avery, 1994). Based on topography, we expect groundwater at the site flows toward the creek and then to the southwest toward Ogden Valley.

GEOLOGY

Surficial Geology

The site is located on the eastern margin of Ogden Valley, a sediment-filled intermontane valley within the Wasatch Range, a major north-south trending mountain range marking the eastern boundary of the Basin and Range physiographic province (Stokes; 1977, 1986). Surficial geology of the site is mapped by Coogan and King (2016; Figure 2) as undivided Holocene to Pleistocene landslide and colluvial deposits (unit Qmc) north of Maple Canyon Creek and Maple Canyon Formation bedrock (unit Zmcg) south of the creek.

Coogan and King (2016) describe surficial geologic units in the site area on Figure 2 as follows:

> ***Qal, Qal1, Qal2, Qal2?*** *- Stream alluvium and flood-plain deposits (Holocene and uppermost Pleistocene).* Sand, silt, clay, and gravel in channels, flood plains, and terraces typically less than 16 feet (5 m) above river and stream level; moderately sorted; unconsolidated; along the same drainage Qal2 is lower than Qat2 and has likely been subject to flooding, at least prior to dam building; present in broad plains along the Bear, Ogden, and Weber Rivers and larger tributaries like Deep, Cottonwood, East Canyon, Lost, and Saleratus Creeks, along Box Elder, Heiners, and Yellow Creeks, and in narrower plains of larger tributary streams; locally includes muddy, organic overbank and oxbow lake deposits; composition depends on source area, so in back valleys typically contains many quartzite cobbles recycled from the Wasatch Formation; mostly Holocene, but deposited after regression of Lake Bonneville from the late Pleistocene Provo shoreline; width in Morgan Valley is combined flood plain of Weber River and East Canyon and Deep Creeks; 6 to 20 feet (2-6 m) thick and possibly as much as 50 feet (15 m) along Weber River and thinner in the Kaysville quadrangle; greater thicknesses (>50 feet [15 m]) are reported in Morgan Valley (Utah Division of Water Rights, well drilling database), but likely include Lake Bonneville and older Pleistocene deposits.
>
> Suffixes 1 and 2 indicate ages where they can be separated, with 1 including active channels and 2 including low terraces 10 to 20 feet (3-6 m) above the Weber and Ogden Rivers, and the South Fork Ogden River that may have been in the flood plain prior to damming of these waterways. Qal2 queried in low terraces above Bear River, Saleratus Creek, and Dry Creek where deposits may not be in the flood plain.
>
> ***Qaf, Qafy, Qaf3, Qaf3?, Qaf4, Qaf4?, Qaf5*** *- Alluvial-fan deposits (Holocene and Pleistocene).* Mostly sand, silt, and gravel that is poorly bedded and poorly sorted and that is not close to late Pleistocene Lake Bonneville and is geographically in the Huff Creek and upper Bear River drainages; variably consolidated; includes debris flows, particularly in drainages and at drainage mouths (fan heads); generally less than 60 feet (18 m) thick. Qaf

with no suffix used where age uncertain or for composite fans where portions of fans with multiple ages cannot be shown separately at map scale; toes of some fans have been removed by human disturbances, so their age cannot be determined.

Where possible, subdivided into relative ages, indicated by letter and number suffixes (like Qa and Qat suffixes) and relative ages only apply to the local drainage, with unit Qafy being the lowest (youngest) fans and unit 3 may or may not post-date Lake Bonneville. Relative ages of these fans are partly based on heights above present drainages at drainage-eroded edge of fan. The relative age is queried where the age is uncertain, generally due to the height not fitting into the typical order of surfaces. The various deposits listed, Qafy and Qaf3 through Qaf5, are 20 to 140 feet (6-40 m) above and west of Saleratus Creek, and also above Yellow Creek and the Bear River. Qafy fans are active, impinge on present-day floodplains, divert active streams, and overlie low terraces.

Qafp, Qafp?, Qafb, Qafb?, Qafpb, Qafpb? - *Lake Bonneville-age alluvial-fan deposits (upper Pleistocene).* Like undivided alluvial fans, but height above present drainages appears to be related to shorelines of Lake Bonneville and is within certain limits (see table 1); these fans are inactive, unconsolidated to weakly consolidated, and locally dissected; fans labeled Qafp and Qafb are related to the Provo (and slightly lower) and Bonneville shorelines of late Pleistocene Lake Bonneville, respectively, while unit Qafpb is used where fans may be related to the Provo or Bonneville shoreline (for example Qafpb is ~40 feet [12 m] above Lost Creek Valley), or where fans of different ages cannot be shown separately at map scale; Qafp fans typically contain well-rounded, recycled Lake Bonneville gravel and sand and are moderately well sorted; generally 10 to less than 60 feet (3-18 m) thick. Lake Bonneville-age fans are queried where relative age is uncertain (see Qaf for details); fans labeled Qafpb? are above the Bonneville shoreline and might be Qafo or like Qafm; see the note under Qao about two possible ages of older alluvium (Qao, Qato, and Qafo).

Most of the Lake Bonneville-age fans in the James Peak quadrangle are far from the Bonneville shoreline and their age is inferred from their stratigraphic relationship(s) to coeval Pinedale glacial outwash (see age equality in Table 3).

The channels (Qafp/Qdlb) on the Weber River delta and Lake Bonneville fines (Qafp on Qlfb) probably record scour and fill during the rapid drawdown of the lake as it fell from the Bonneville shoreline to the Provo shoreline.

Qac - *Alluvium and colluvium (Holocene and Pleistocene).* Unsorted to variably sorted gravel, sand, silt, and clay in variable proportions; includes stream and fan alluvium, colluvium, and, locally, mass-movement deposits too small to show at map scale; typically mapped along smaller drainages that lack flat bottoms; more extensive east of Henefer where Wasatch Formation (Tw) strata easily weather to debris that "chokes" drainages; 6 to 20 feet (2-6 m) thick. Some deposits are "perched" on benches 80 feet (25 m) and more above present-day drainages like Left Fork Heiners Creek (Heiners Creek quadrangle) and Harris Canyon (Henefer quadrangle). In the Devils Slide quadrangle, some deposits are "perched" on benches about 60 to 130 feet (18-40 m) above Quarry Cottonwood Canyon indicating the alluvium is at least partly Lake Bonneville age and older (see Qab and Qao in tables 1 and 2).

Qms, Qms?, Qmsy, Qmsy?, Qmso, Qmso? *- Landslide deposits (Holocene and upper and middle? Pleistocene).* Poorly sorted clay- to boulder sized material; includes slides, slumps, and locally flows and floods; generally characterized by hummocky topography, main and internal scarps, and chaotic bedding in displaced blocks; composition depends on local sources; morphology becomes more subdued with time and amount of water in material during emplacement; Qms may be in contact with Qms when landslides are different/distinct; thickness highly variable, up to about 20 to 30 feet (6-9 m) for small slides, and 80 to 100 feet (25-30 m) thick for larger landslides. Qmsy and Qmso queried where relative age uncertain; Qms queried where classification uncertain. Numerous landslides are too small to show at map scale and more detailed maps shown in the index to geologic mapping should be examined.

Qms without a suffix is mapped where the age is uncertain (though likely Holocene and/or late Pleistocene), where portions of slide complexes have different ages but cannot be shown separately at map scale, or where boundaries between slides of different ages are not distinct. Estimated time of emplacement is indicated by relative-age letter suffixes with: Qmsy mapped where landslides deflect streams or failures are in Lake Bonneville deposits, and scarps are variably vegetated; Qmso typically mapped where deposits are "perched" above present drainages, rumpled morphology typical of mass movements has been diminished, and/or younger surficial deposits cover or cut Qmso. Lower perched Qmso deposits are at Qao heights above drainages (95 ka and older) and the higher perched deposits may correlate with high level alluvium (QTa_) (likely older than 780 ka) (see table 1). Suffixes y and o indicate probable Holocene and Pleistocene ages, respectively, with all Qmso likely emplaced before Lake Bonneville transgression. These older deposits are as unstable as other slides, and are easily reactivated with the addition of water, be it irrigation or septic tank drain fields.

Qmc *- Landslide and colluvial deposits, undivided (Holocene and Pleistocene).* Poorly sorted to unsorted clay- to boulder-sized material; mapped where landslide deposits are difficult to distinguish from colluvium (slope wash and soil creep) and where mapping separate, small, intermingled areas of landslide and colluvial deposits is not possible at map scale; locally includes talus and debris flow and flood deposits; typically mapped where landslides are thin ("shallow"); also mapped where the blocky or rumpled morphology that is characteristic of landslides has been diminished ("smoothed") by slope wash and soil creep; composition depends on local sources; 6 to 40 feet (2-12 m) thick. These deposits are as unstable as other landslide units (Qms, Qmsy, Qmso).

Qls, Qls?, Qlsp, Qlsb, Qlsb? *- Lake Bonneville sand (upper Pleistocene).* Mostly sand with some silt and gravel deposited nearshore below and near the Provo shoreline (Qlsp) and between the Provo and Bonneville shorelines (Qlsb); Qls mapped downslope from slope break below Provo shoreline beach deposits where thin Lake Bonneville regressional sand may overlie transgressional sand; grades downslope into unit Qlf with decreasing sand content and laterally with more gravel into units Qdlp, Qdlb, and upslope with more gravel into unit Qlgb; Qls and Qlsb queried where grain size or unit identification uncertain; may be as much as 75 feet (25 m) thick, and thickest near Ogden; typically less than 20 feet (6 m) thick in Morgan Valley; may include small deltas and deltas that lack typical delta shape.

Qla, Qla? *- Lake Bonneville lacustrine deposits and post- and pre-Lake Bonneville alluvial deposits, undivided (Holocene and upper? Pleistocene).* Mostly poorly sorted and poorly bedded sand, silt, and clay, with some gravel; mapped where Lake Bonneville deposits are reworked by later stream action or covered by thin stream and fan deposits, and where lake deposits are thin and overlie older alluvial deposits; unit queried where may be dominantly alluvium; deposits typically eroded from shallow Norwood Formation; mostly mapped near Bonneville shoreline; also mapped in Peterson quadrangle along upper Deep Creek above Bonneville shoreline where lake deposits seem to indicate landslide dam of creek; thickness uncertain.

Tw, Tw? *- Wasatch Formation (Eocene and upper Paleocene).* Typically red to brownish-red sandstone, siltstone, mudstone, and conglomerate with minor gray limestone and marlstone locally (see Twl); lighter shades of red, yellow, tan, and light gray present locally and more common in uppermost part, complicating mapping of contacts with overlying similarly colored Norwood and Fowkes Formations; clasts typically rounded Neoproterozoic and Paleozoic sedimentary rocks, mainly Neoproterozoic and Cambrian quartzite; basal conglomerate more gray and less likely to be red, and containing more locally derived angular clasts of limestone, dolomite and sandstone, typically from Paleozoic strata, for example in northern Causey Dam quadrangle; sinkholes indicate karstification of limestone beds; thicknesses on Willard thrust sheet likely up to about 400 to 600 feet (120-180 m) in Sharp Mountain, Dairy Ridge, and Horse Ridge quadrangles (Coogan, 2006a-b), about 1300 feet (400 m) in Monte Cristo Peak quadrangle, about 1100 feet (335 m) in northeast Browns Hole quadrangle, about 2200 feet (670 m) in southwest Causey Dam quadrangle, about 2600 feet (800 m) at Herd Mountain in Bybee Knoll quadrangle, and about 1300 feet (400 m) in northwest Lost Creek Dam quadrangle, estimated by elevation differences between pre-Wasatch rocks exposed in drainages and the crests of gently dipping Wasatch Formation on adjacent ridges (King); thickness varies locally due to considerable relief on basal erosional surface, for example along Right Fork South Fork Ogden River, and along leading edge of Willard thrust; much thicker, about 5000 to 6000 feet (1500-1800 m), south of Willard thrust sheet near Morgan. Wasatch Formation is queried (Tw?) where poor exposures may actually be surficial deposits. The Wasatch Formation is prone to slope failures. Other information on the Wasatch Formation is in Tw descriptions under the heading "Sub-Willard Thrust - Ogden Canyon Area" since Tw strata are extensive near Morgan Valley and cover the Willard thrust, Ogden Canyon, and Durst Mountain areas.

Along the South Fork Ogden River, Wasatch strata are mostly pebble, cobble, and boulder conglomerate with a matrix of smaller gravel, sand, and silt in the Browns Hole quadrangle, and coarse-grained sandstone to granule conglomerate as well as siltstone and mudstone to the east in the Causey Dam quadrangle; note thinning t east away from source area. The Wasatch weathers to boulder-covered dip(?) slopes north of the South Fork Ogden River, for example in Evergreen Park. Along the South Fork, the Wasatch Formation is separated from the underlying Hams Fork Member of the Evanston Formation by an angular unconformity of a few degrees, with the Hams Fork containing less siltstone and mudstone than the Wasatch and having a lighter color.

The Herd Mountain surface is developed on the Wasatch Formation at elevations of 7600 to 8600 feet (2300-2620 m) in the Bybee Knoll quadrangle and in remnants in the Huntsville, Browns Hole, and Sharp Mountain quadrangles. The origin of this boulder-strewn surface is debated (see Eardley, 1944; Hafen, 1961; Mullens, 1971). Eardley's (1944) Herd Mountain surface is flat lying or gently east dipping, about the same as the underlying Wasatch Formation, and is strewn with quartzite boulders to pebbles that King thinks are residual and colluvial deposits of uncertain age that were derived from the Wasatch Formation. The other characteristic of this surface is the presence of pimple mounds and, given the elevations of greater than about 7500 feet (2300 m), possible periglacial patterned ground. Photogrammetric dips on the Wasatch Formation under the surface are nearly flat (<3o) and an apparent angular unconformity is present in the Wasatch since dips on older Wasatch strata are greater than 3 degrees. King mapped this unconformity as a marker bed, but Coogan does not agree that this is an unconformity.

Zm, Zm? *- Mutual Formation (Neoproterozoic).* Grayish-red to purplish-gray, medium to thick-bedded quartzite with pebble conglomerate lenses; also reddish-gray, pink, tan, and light-gray in color and typically weathering to darker shades than, but at least locally indistinguishable from, Geertsen Canyon Quartzite; commonly cross-bedded and locally feldspathic; contains argillite beds and, in the James Peak quadrangle, a locally mappable medial argillite unit; 435 to 1200 feet (130-370 m) thick in Browns Hole quadrangle (Crittenden, 1972) and thinnest near South Fork Ogden River (W. Adolph Yonkee, Weber State University, verbal communication, 2006); thicker to northwest, up to 2600 feet (800 m) thick in Huntsville quadrangle (Crittenden and others, 1971) and 2556 feet (780 m) thick in James Peak quadrangle (Blau, 1975); may be as little as 300 feet (90 m) thick south of the South Fork Ogden River (King this report); absent or thin on leading edge of Willard thrust sheet (see unit Zm?c); thins to south and east.

Zi, Zi? *- Inkom Formation (Neoproterozoic).* Overall gray to reddish-gray weathering, poorly resistant, psammite and argillite, with gray-weathering meta-tuff lenses in lower part; upper half dominantly dark green, very fine-grained meta-sandstone (psammite) with lower half olive gray to lighter green-gray, greenish gray-weathering, laminated, micaceous meta-siltstone (argillite); lower greenish-weathering part missing near South Fork Ogden River and the Inkom is less than 200 feet (60 m) thick; in Mantua quadrangle, Inkom typically 300 feet (90 m) thick, and is only less than 200 feet (60 m) thick where faulted (King this report); 360 to 450 feet (110-140 m) thick northeast of Huntsville (Crittenden and others, 1971), and absent on leading edge of Willard thrust sheet (Coogan, 2006a); location of "pinch-out" not exposed.

Zcc, Zcc? *- Caddy Canyon Quartzite (Neoproterozoic).* Mostly vitreous, almost white, cliff-forming quartzite; colors vary and are tan, light-gray, pinkish-gray, greenish-gray, and purplish-gray, that are typically lighter shades than the Geertsen Canyon Quartzite; 1000 to 2500 feet (305-760 m) thick in west part of our map area, thickest near Geertsen Canyon in Huntsville quadrangle (Crittenden and others, 1971; Crittenden, 1972); 1500 feet (460 m) thick near South Fork Ogden River (Coogan and King, 2006); thinner, 725 to 1300 feet (220-400 m) thick, and less vitreous on leading edge of Willard thrust sheet. Lower contact with Kelley Canyon Formation is gradational with brownish-gray quartzite and argillite beds over a few tens to more than 200 feet (3-60 m) (see Crittenden and others, 1971). Where thick, this gradational-transitional zone is what is mapped as the Papoose Creek Formation. Near Geertsen Canyon, this transition zone is 600 feet (180 m) thick and was mapped with and included in the Caddy Canyon Quartzite by Crittenden and others (1971, figure 7), and in the Caddy Canyon and Kelley Canyon Formations by Crittenden (1972, see lithologic column).

Zkc, Zkc? *- Kelley Canyon Formation (Neoproterozoic).* Dark-gray to black, gray to olive-gray-weathering argillite to phyllite, with rare metacarbonate (for example basal meta-dolomite); grades into overlying Caddy Canyon quartzite with increasing quartzite; gradational interval mapped as Papoose Creek Formation (Zpc); 1000 feet (300 m) thick in Mantua quadrangle (this report), where Papoose Creek Formation is mapped separately, and reportedly 2000 feet (600 m) thick near Huntsville (Crittenden and others, 1971, figure 7), but only shown as about 1600 feet (500 m) thick to Papoose Creek transition zone by Crittenden (1972). The Kelley Canyon Formation is prone to slope failures.

Zmcg, Zmcg? *– Maple Canyon Formation, Lower (green arkose) member (Neoproterozoic).* Grayish-green, fine-grained arkosic (feldspathic) meta-sandstone and sandy argillite (meta-graywacke), with local quartzite lenses up to 200 feet (60 m) thick; weathers darker gray to brown to greenish-gray and greenish-brown; 500 to 1000 feet (150-305 m) thick and lower thickness would eliminate the need for faulting in southwest part of Huntsville quadrangle. This unit is prone to slope failures.

Citations, tables, and/or figures referenced above are not provided herein but are in Coogan and King (2016).

Seismotectonic Setting
The property is located at the eastern margin of Ogden Valley, a roughly 40-square mile back valley described by Gilbert (1928) as a structural trough similar to Cache and Morgan Valleys to the north and south, respectively. The back valleys of the northern Wasatch Range are in a transition zone between the Basin and Range and Middle Rocky Mountains provinces (Stokes, 1977, 1986). The Basin and Range is characterized by a series of generally north-trending elongate mountain ranges, separated by predominately alluvial and lacustrine sediment-filled valleys and typically bounded on one or both sides by major normal faults (Stewart, 1978). The boundary between the Basin and Range and Middle Rocky Mountains provinces is the prominent, west-facing escarpment along the Wasatch fault zone at the base of the Wasatch Range. Late Cenozoic normal faulting, a characteristic of the Basin and Range, began between

about 17 and 10 million years ago in the Nevada (Stewart, 1980) and Utah (Anderson, 1989) portions of the province. The faulting is a result of a roughly east-west directed, regional extensional stress regime that has continued to the present (Zoback and Zoback, 1989; Zoback, 1989). The back valleys are morphologically similar to valleys in the Basin and Range, but exhibit less structural relief (Sullivan and others 1988).

Ogden Valley occupies a structural trough created by up to 2,000 feet of vertical displacement on normal faults bounding the east and west sides of the valley. The Ogden Valley northeastern margin fault not mapped on Figure 2, but Black and others (2003) show the fault about one mile southwest of the Project. The most recent movement on this fault is pre-Holocene (Sullivan and others, 1986). The site is also situated near the central portion of the Intermountain Seismic Belt (ISB). The ISB is a north-south-trending zone of historical seismicity along the eastern margin of the Basin and Range province which extends for approximately 900 miles from northern Arizona to northwestern Montana (Sbar and others, 1972; Smith and Sbar, 1974). At least 16 earthquakes of magnitude 6.0 or greater have occurred within the ISB since 1850, with the largest of these events the M_S 7.5 1959 Hebgen Lake, Montana earthquake. However, none of these events have occurred along the Wasatch fault zone or other known late Quaternary faults in the region (Arabasz and others, 1992; Smith and Arabasz, 1991). The closest of these events to the site was the 1934 Hansel Valley (M_S 6.6) event north of the Great Salt Lake and south of the town of Snowville.

Lake Bonneville History

Lakes occupied nearly 100 basins in the western United States during late-Quaternary time, the largest of which was Lake Bonneville in northwestern Utah. The Bonneville basin consists of several topographically closed basins created by regional extension in the Basin and Range (Gwynn, 1980; Miller, 1990), and has been an area of internal drainage for much of the past 15 million years. Lake Bonneville consisted of numerous topographically closed basins, including the Salt Lake and Cache Valleys (Oviatt and others, 1992). Portions of Ogden Valley were inundated by Lake Bonneville at its highstand. Sediments from Lake Bonneville are not mapped at the site but are shown at lower elevations to the southwest on Figure 2.

Timing of events related to the transgression and regression of Lake Bonneville is indicated by calendar age estimates of significant radiocarbon dates in the Bonneville Basin (Oviatt, 2015). Approximately 30,000 years ago, Lake Bonneville began a slow transgression (rise) to its highest level of 5,160 to 5,200 feet above mean sea level. The lake rise eventually slowed as water levels approached an external basin threshold in northern Cache Valley at Red Rock Pass near Zenda, Idaho. Lake Bonneville reached the Red Rock Pass threshold and occupied its highest shoreline, termed the Bonneville beach, around 18,000 years ago. During the transgression and highstand, major drainages that emanate from within the Wasatch Range (such as the Weber River) formed large deltaic complexes in the lake at their canyon mouths. Headward erosion of the Snake River-Bonneville basin drainage divide then caused a catastrophic incision of the threshold and the lake level lowered by roughly 360 feet in fewer than two months (Jarrett and Malde, 1987; O'Conner, 1993). The Project is above the elevation for the lake highstand.

Following the Bonneville flood, the lake stabilized and formed a lower shoreline referred to as the Provo shoreline between about 16,500 and 15,000 years ago. Climatic factors then caused the lake to regress rapidly from the Provo shoreline, and by about 13,000 years ago the lake had eventually dropped below historic levels of Great Salt Lake. Oviatt and others (1992) deem this low stage the end of the Bonneville lake cycle. Great Salt Lake then experienced a brief transgression around 11,600 years ago to the Gilbert level at about 4,250 feet before receding to and remaining within about 20 feet of its historic average level (Lund, 1990). Drainages that fed Lake Bonneville began downcutting through stranded deltaic complexes and near-shore deposits as the lake receded.

SITE CHARACTERIZATION

Empirical Observations

On March 23, 2018 Mr. Bill D. Black of Western GeoLogic conducted a reconnaissance of the property. Weather at the time of the site reconnaissance was cloudy with intermittent snow and temperatures in the 30's (°F). Slopes at the site were mantled in places by patchy snow cover at the time of our reconnaissance. Slopes overlooking Maple Canyon Creek on the north appeared vegetated by oak brush, sage brush, and grasses; whereas slopes on the south were mainly vegetated by grasses with decreasing oak brush stands upslope.

The site is in Maple Canyon and straddles Maple Canyon Creek, which flows to the southwest into Ogden Valley. The creek was flowing at the time of our reconnaissance. A small ephemeral drainage also flows toward the northwest corner of the property into a storm drain on the north side of the cul-de-sac (east end of Maple Drive). This drainage appeared dry and lacking an obvious channel. An existing home is to the west of the Project, and the area adjacent to Maple Drive appeared disturbed by cuts and fills. Surficial soils at the site appeared to consist of stony sandy to clayey gravel (GW/GM) with quartzite boulders up to 10 feet across in places.

Slopes bounding Maple Canyon Creek on the northwest show a roughly 4:1 to 5:1 (horizontal:vertical) gradient toward the creek and to the southwest. Slopes southeast of the creek show an overall 1.5 to 2:1 gradient and dip toward the creek. The creek has an overall roughly 7:1 to 8:1 southwest gradient as it flows across the property. A concrete retaining wall was observed along the north side of the eastward continuation of Maple Drive north of the Project. The retaining wall showed no evidence for distress, and no evidence for prior or ongoing slope instability or landslides was observed at the site or on adjacent slopes. Several debris levees that we infer are from Holocene debris flows in Maple Canyon were observed along the north side of the creek below Maple Drive. The levees are marked by steps in the slope mantled by boulders on the upslope side. The old road up Maple Canyon is slightly above the creek on the north; the road (jeep trail) was abandoned when Maple Drive was installed. No other evidence for springs, seeps, bedrock outcrops, active faults, or other geologic hazards was observed.

Air Photo Observations

Black and white aerial photography from 1997, orthophotography from 2006, and 1-meter bare earth DEM LIDAR from 2011 available from the Utah AGRC were reviewed to obtain information about the geomorphology of the Project area (Figures 3A-C, respectively). The

Project is in Maple Canyon and straddles Maple Canyon Creek. The canyon bottom is dominated by Holocene alluvium and debris flow sediments deposited as flows proceeded downslope into Ogden Valley. North of the creek, the slopes are mantled by Pleistocene- to Holocene-age alluvium and colluvium mainly from mass wasting (gravity) processes with a lesser water component (slope wash, small slumps, slope creep, etc.). No discrete landslides are evident on the air photos, and no evidence for debris flow channels, levees, or other characteristic morphology appears associated with the unnamed drainage. Further north and south of the creek, the slopes are underlain by Maple Canyon Formation bedrock with thin colluvial veneers. Bedrock slope areas appear undeformed and no outcrops were evident. No other evidence of geologic hazards was observed on the air photos at the site.

GEOLOGIC HAZARDS

Assessment of potential geologic hazards and the resulting risks imposed is critical in determining the suitability of the site for development. Table 1 below shows a summary of the geologic hazards reviewed at the site, as well as a relative (qualitative) assessment of risk to the Project for each hazard. A "high" hazard rating (H) indicates a hazard is present at the site (whether currently or in the geologic past) that is likely to pose significant risk and/or may require further study or mitigation techniques. A "moderate" hazard rating (M) indicates a hazard that poses an equivocal risk. Moderate-risk hazards may also require further studies or mitigation. A "low" hazard rating (L) indicates the hazard is not present, poses little or no risk, and/or is not likely to significantly impact the Project. Low-risk hazards typically require no additional studies or mitigation. We note that these hazard ratings represent a conservative assessment for the entire site and risk may vary in some areas. Careful selection of development areas can minimize risk by avoiding known hazard areas.

Table 1. *Geologic hazards summary.*

Hazard	H	M	L	...Hazard Rating
Earthquake Ground Shaking	X			
Surface Fault Rupture			X	
Liquefaction and Lateral-spread Ground Failure			X	
Tectonic Deformation			X	
Seismic Seiche and Storm Surge			X	
Stream Flooding		X		
Shallow Groundwater		X		
Landslides and Slope Failures			X	
Debris Flows and Floods		X		
Rock Fall			X	
Problem Soil			X	

Earthquake Ground Shaking

Ground shaking refers to the ground surface acceleration caused by seismic waves generated during an earthquake. Strong ground motion is likely to present a significant risk during moderate to large earthquakes located within a 60 mile radius of the project area (Boore and others, 1993). Seismic sources include mapped active faults, as well as a random or "floating" earthquake source on faults not evident at the surface. Mapped active faults within this distance include the East and West Cache fault zones; the Brigham City, Weber, Salt Lake, and Provo segments of the Wasatch fault zone; the East Great Salt Lake fault zone; the Morgan fault; the West Valley fault zone; the Oquirrh fault zone; and the Bear River fault zone (Black and others, 2003).

The extent of property damage and loss of life due to ground shaking depends on factors such as: (1) proximity of the earthquake and strength of seismic waves at the surface (horizontal motions are the most damaging); (2) amplitude, duration, and frequency of ground motions; (3) nature of foundation materials; and (4) building design (Costa and Baker, 1981). Based on 2015 IBC provisions, a site class of D (stiff soil), and a risk category of I-III, USGS calculated uniform-hazard and deterministic ground motion values with a 2% chance of exceedance in 50 years are as follows:

Table 2. *Seismic hazards summary.*
(Site Location: 41.282591 ° N, -111.724010 ° W)

S_S	*0.776 g*
S_1	*0.257 g*
S_{MS} (F_a x S_S)	*0.923 g*
S_{M1} (F_v x S_1)	*0.485 g*
S_{DS} (2/3 x S_{MS})	*0.615 g*
S_{D1} (2/3 x S_{M1})	*0.324 g*
Site Coefficient, F_a	*= 1.190*
Site Coefficient, F_v	*= 1.885*

Given the above information, earthquake ground shaking poses a high risk to the site. The hazard from earthquake ground shaking can be adequately mitigated by design and construction of homes in accordance with appropriate building codes. The Project geotechnical engineer, in conjunction with the builder or architect, should confirm and evaluate the seismic ground-shaking hazard and provide appropriate seismic design parameters as needed.

Surface Fault Rupture

Movement along faults at depth generates earthquakes. During earthquakes larger than Richter magnitude 6.5, ruptures along normal faults in the intermountain region generally propagate to the surface (Smith and Arabasz, 1991) as one side of the fault is uplifted and the other side down dropped. The resulting fault scarp has a near-vertical slope. The surface rupture may be expressed as a large singular rupture or several smaller ruptures in a broad zone. Ground displacement from surface fault rupture can cause significant damage or even collapse to structures located on an active fault.

The nearest active fault to the site is the Weber segment of the Wasatch fault zone about 11 miles to the southwest, and no evidence of active surface faulting is mapped or was evident at the site. Based on the above, the existing hazard from surface faulting is rated as low.

Liquefaction and Lateral-spread Ground Failure

Liquefaction occurs when saturated, loose, cohesionless, soils lose their support capabilities during a seismic event because of the development of excessive pore pressure. Earthquake-induced liquefaction can present a significant risk to structures from bearing-capacity failures to structural footings and foundations, and can damage structures and roadway embankments by triggering lateral spread landslides. Earthquakes of Richter magnitude 5 are generally regarded as the lower threshold for liquefaction. Liquefaction potential at the site is a combination of expected seismic (earthquake ground shaking) accelerations, groundwater conditions, and presence of susceptible soils.

Soils in the area of the proposed home at the site are mapped by the NRC (https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx) as well-drained stony loam on mainly 30 to 70 percent slopes. Weber County GIS mapping also shows the site in a very low liquefaction hazard zone (zone 1). Given the above, we do not anticipate that conditions conducive to liquefaction are present and we rate the risk as low.

Tectonic Deformation

Tectonic deformation refers to subsidence from warping, lowering, and tilting of a valley floor that accompanies surface-faulting earthquakes on normal faults. Large-scale tectonic subsidence may accompany earthquakes along large normal faults (Lund, 1990). Tectonic subsidence is believed to mainly impact those areas immediately adjacent to the downthrown side of active normal faults. No active (Holocene) faults are mapped in the site area, as discussed above. Based on this, the risk from tectonic subsidence is rated as low.

Seismic Seiche and Storm Surge

Earthquake-induced seiche presents a risk to structures within the wave-oscillation zone along the edges of large bodies of water, such as the Great Salt Lake. Given the elevation of the subject property and distance from large bodies of water, the risk to the subject property from seismic seiches is rated as low.

Stream Flooding

Stream flooding may be caused by direct precipitation, melting snow, or a combination of both. In much of Utah, floods are most common in April through June during spring snowmelt. High flows may be sustained from a few days to several weeks, and the potential for flooding depends on a variety of factors such as surface hydrology, site grading and drainage, and runoff.

Maple Canyon Creek flows southwestward across the north part of the Project and areas adjacent to the creek likely have a high risk from stream flooding. However, the proposed building envelope is about 25 feet above the creek elevation (Figure 3D) and likely has a low risk. An ephemeral drainage also flows to a storm drain on the north side of the cul-de-sac at the east end of Maple Drive. This drainage was dry at the time of reconnaissance, showed no obvious downcut channel, and appears to be rarely active. Given the above local variability, the overall risk from stream flooding to the Project is rated as moderate. Site hydrology and runoff should be addressed in the civil engineering design and grading plan for the Project in accordance with all applicable local government guidelines.

Shallow Groundwater
No springs or seeps are shown on the topographic map for the site or were reported or observed, and no site-specific groundwater information was available for the Project. We anticipate groundwater is likely greater than 30 feet in the area of the proposed building envelope, although shallower depths may be found along the creek. Groundwater depth at the site likely also varies locally, seasonally, and annually mimicking creek flows. Such variations would be typical for an alpine environment. Perched conditions above less-permeable, clay-rich layers may also be present in the subsurface that could cause locally shallower groundwater levels. Given all of the above, we rate the risk from shallow groundwater as moderate. However, we do not anticipate shallow groundwater will pose a significant development constraint. Increasing the distance and elevation difference from the creek reduces the risk from shallow groundwater.

Landslides and Slope Failures
Slope stability hazards such as landslides, slumps, and other mass movements can develop along moderate to steep slopes where a slope has been disturbed, the head of a slope loaded, or where increased groundwater pore pressures result in driving forces within the slope exceeding restraining forces. Slopes exhibiting prior failures, and also deposits from large landslides, are particularly vulnerable to instability and reactivation.

No landslides are mapped at the site, and no evidence for recent or ongoing landsliding or slope instability was observed on air photos or during our reconnaissance. Given this and anticipated subsurface conditions, the existing hazard from landsliding to the proposed building envelope appears to be low. However, steep slopes underlain by landslide-prone bedrock underlie portions of the site, and the inclusive Green Hills Country Estates subdivision has experienced slope instability issues, both naturally and from man-made slope modifications. The Project geotechnical engineer should therefore assess if a need exists for evaluating slope stability, based on the development plan (once formalized) and subsurface information obtained during the geotechnical engineering evaluation. If a stability evaluation is conducted and factors of safety are determined to be unsuitable, the evaluation should provide recommendations for reducing the risk from landsliding. Care should also be taken that site grading does not destabilize slopes in this area without prior geotechnical analysis and grading plans, and that proper drainage is maintained. We note that the stability evaluation may require further geologic characterization.

Debris Flows
Debris flow hazards are typically associated with unconsolidated alluvial fan deposits at the mouths of large range-front drainages, such as those along the Wasatch Front. Debris flows have historically significant damage in the Wasatch Front area.

Maple Canyon Creek flows across the north part of the site and appears to have experienced one or more debris flow events in Holocene time (Figures 3A-D). The creek appears to be a zone of transport and partial deposition. However, the proposed building envelope is about 25 feet above the creek elevation and the highest debris flow levee observed in our reconnaissance (discussed in the Empirical Observations section above) is roughly 18 feet above the creek (Figure 3D). Given the above, the risk to the proposed building envelope appears to be low. The risk would increase if the home (or a subgrade entryway) is placed at or below 18 feet above the creek elevation. The unnamed drainage that flows toward the northwest site corner has a drainage basin that is small (less than 40 acres) and appears incapable of generating significant flows, and no evidence for debris flows from this drainage basin was observed during our reconnaissance or on air photos. However, we note that a high-intensity (cloudburst) rainstorm in this drainage basin could produce flooding that overwhelms the stormwater infrastructure. Recommendations to reduce this risk would be within the scope of the civil engineering design and grading plan for the Project, as discussed in the Stream Flooding section above. Typical stream setbacks under Weber County development guidelines will also reduce the risk from debris flows.

Rock Fall
No bedrock outcrops were observed at the site or in higher slopes that could present a source area for rock fall clasts. Based on the above, we rate the hazard from rock falls as low.

Swelling and Collapsible Soils
Surficial soils that contain certain clays can swell or collapse when wet. A geotechnical engineering evaluation should be performed to address soil conditions and provide specific recommendations for site grading, subgrade preparation, and footing and foundation design.

CONCLUSIONS AND RECOMMENDATIONS

Earthquake ground shaking poses a high relative risk to the site, but is a widespread and common hazard for all Wasatch Front areas. Stream flooding, shallow groundwater, and debris flows/floods also pose moderate-risk hazards, either because the hazard is equivocal or only affects portions of the property. The following recommendations are provided with regard to the geologic characterizations in this report:

- ***Seismic Design*** – All habitable structures developed at the property should be constructed to current seismic hazards to reduce the risk of damage, injury, or loss of life from earthquake ground shaking.

- ***Site Grading and Drainage*** – No unplanned cuts should be made in the slopes at the site without prior geotechnical analyses, and proper site drainage should be maintained.

- ***Stream Flooding, Shallow Groundwater, and Debris Flows*** – The civil engineering design for the development should assess site hydrology and surface drainage, in accordance with all applicable local government guidelines. The preferred building envelope on higher slopes in the northwest part of the Project appears to have a low relative risk from all three hazards, but this risk will increase if the home is located closer to Maple Canyon Creek at a lower elevation relative to the creek.

- ***Geotechnical Investigation*** - A design-level geotechnical engineering study should be conducted after formalization of development plans, but prior to construction to: (1) address soil conditions at the site for use in foundation design, site grading, and drainage; and (2) provide recommendations regarding building design to reduce risk from seismic acceleration. The geotechnical study will require site-specific data from subsurface exploration and may require further geologic characterization. Once subsurface conditions have been confirmed, the Project geotechnical engineer should assess if a need also exists to evaluate stability of slopes at the site. If a stability evaluation is conducted and factors of safety are found to be unsuitable, recommendations should be provided to reduce the risk of landsliding.

- ***Availability of Report*** - The report should be made available to architects, building contractors, and in the event of a future property sale, real estate agents and potential buyers. This report should be referenced for information on technical data only as interpreted from observations and not as a warranty of conditions throughout the site. The report should be submitted in its entirety, or referenced appropriately, as part of any document submittal to a government agency responsible for planning decisions or geologic review. Incomplete submittals void the professional seals and signatures we provide herein. Although this report and the data herein are the property of the client, the report format is the intellectual property of Western Geologic and should not be copied, used, or modified without express permission of the authors.

LIMITATIONS

This investigation was performed at the request of the Client using the methods and procedures consistent with good commercial and customary practice designed to conform to acceptable industry standards. The analysis and recommendations submitted in this report are based upon the data obtained from site-specific observations and compilation of known geologic information. This information and the conclusions of this report should not be interpolated to adjacent properties without additional site-specific information. In the event that any changes are later made in the location of the proposed site, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or approved in writing by the engineering geologist.

This report has been prepared by the staff of Western GeoLogic for the Client under the professional supervision of the principal and/or senior staff whose seal(s) and signatures appear hereon. Neither Western GeoLogic, nor any staff member assigned to this investigation has any interest or contemplated interest, financial or otherwise, in the subject or surrounding properties, or in any entity which owns, leases, or occupies the subject or surrounding properties or which may be responsible for environmental issues identified during the course of this investigation, and has no personal bias with respect to the parties involved.

The information contained in this report has received appropriate technical review and approval. The conclusions represent professional judgment and are founded upon the findings of the investigations identified in the report and the interpretation of such data based on our experience and expertise according to the existing standard of care. No other warranty or limitation exists, either expressed or implied.

The investigation was prepared in accordance with the approved scope of work outlined in our proposal for the use and benefit of the Client; its successors, and assignees. It is based, in part, upon documents, writings, and information owned, possessed, or secured by the Client. Neither this report, nor any information contained herein shall be used or relied upon for any purpose by any other person or entity without the express written permission of the Client. This report is not for the use or benefit of, nor may it be relied upon by any other person or entity, for any purpose without the advance written consent of Western GeoLogic.

In expressing the opinions stated in this report, Western GeoLogic has exercised the degree of skill and care ordinarily exercised by a reasonable prudent environmental professional in the same community and in the same time frame given the same or similar facts and circumstances. Documentation and data provided by the Client, designated representatives of the Client or other interested third parties, or from the public domain, and referred to in the preparation of this assessment, have been used and referenced with the understanding that Western GeoLogic assumes no responsibility or liability for their accuracy. The independent conclusions represent our professional judgment based on information and data available to us during the course of this assignment. Factual information regarding operations, conditions, and test data provided by the Client or their representative has been assumed to be correct and complete. The conclusions presented are based on the data provided, observations, and conditions that existed at the time of the field exploration.

It has been a pleasure working with you on this project. Should you have any questions, please call.

Sincerely,
Western GeoLogic, LLC

Reviewed by:

Bill. D. Black, P.G.
Senior Engineering Geologist

Craig V. Nelson, P.G.
Principal Engineering Geologist

ATTACHMENTS

Figure 1. Location Map (8.5"x11")
Figure 2. Geologic Map (8.5"x11")
Figure 3A. 1997 Air Photo (8.5"x11")
Figure 3B. 2006 Air Photo (8.5"x11")
Figure 3C. 2011 LIDAR Image (8.5"x11")
Figure 3D. Topographic Profiles (8.5"x11")
Appendix. Photographic Record of Site Reconnaissance

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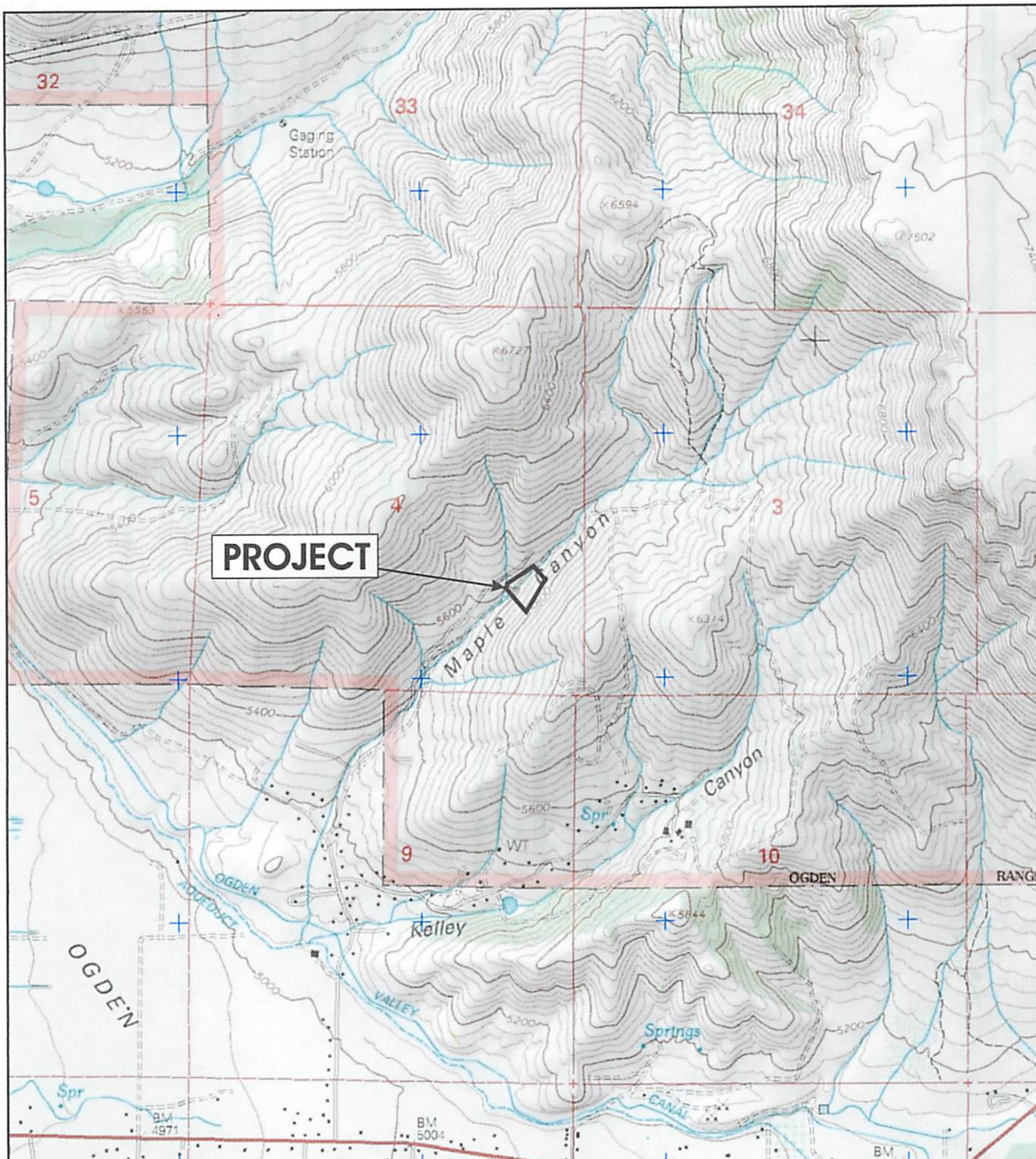
FIGURES



Source: U.S. Geological Survey 7.5 Minute Series Topographic Maps, Utah - Browns Hole, 1998;
Project location SE1/4, Section 4, T6N, R2E (SLBM).

WESTERN GEOLOGIC

N W E S

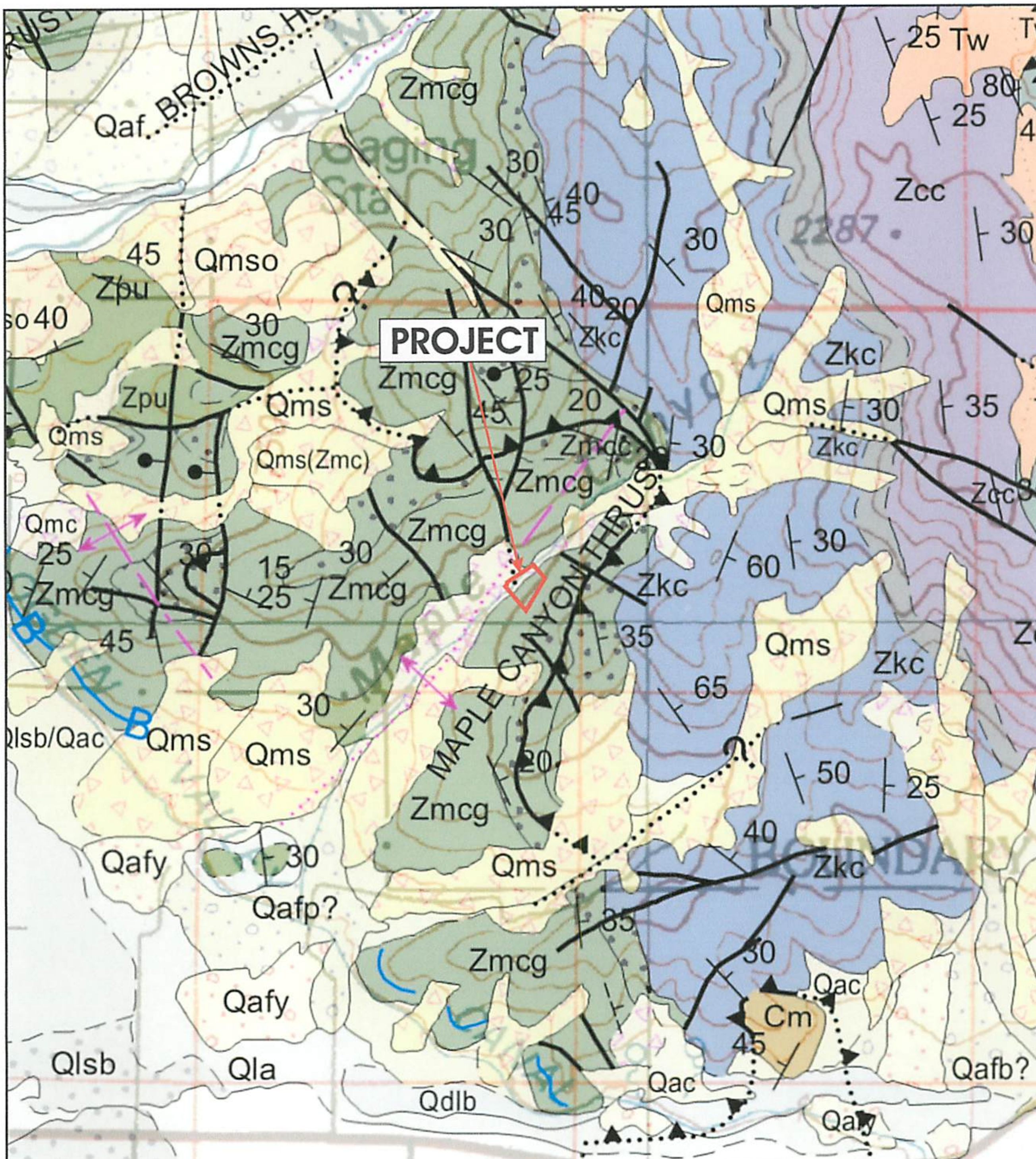
0 1000 2000 feet

Scale 1:24,000
(1 inch = 2000 feet)

LOCATION MAP

GEOLOGIC HAZARDS RECONNAISSANCE
Green Hill Country Estates Lot 100R
1330 North Maple Drive
Huntsville, Weber County, Utah

FIGURE 1



Source: Coogan and King (2016), original map scale 1:100,000.
See text for explanation of nearby surficial geologic units.

N
W E
S

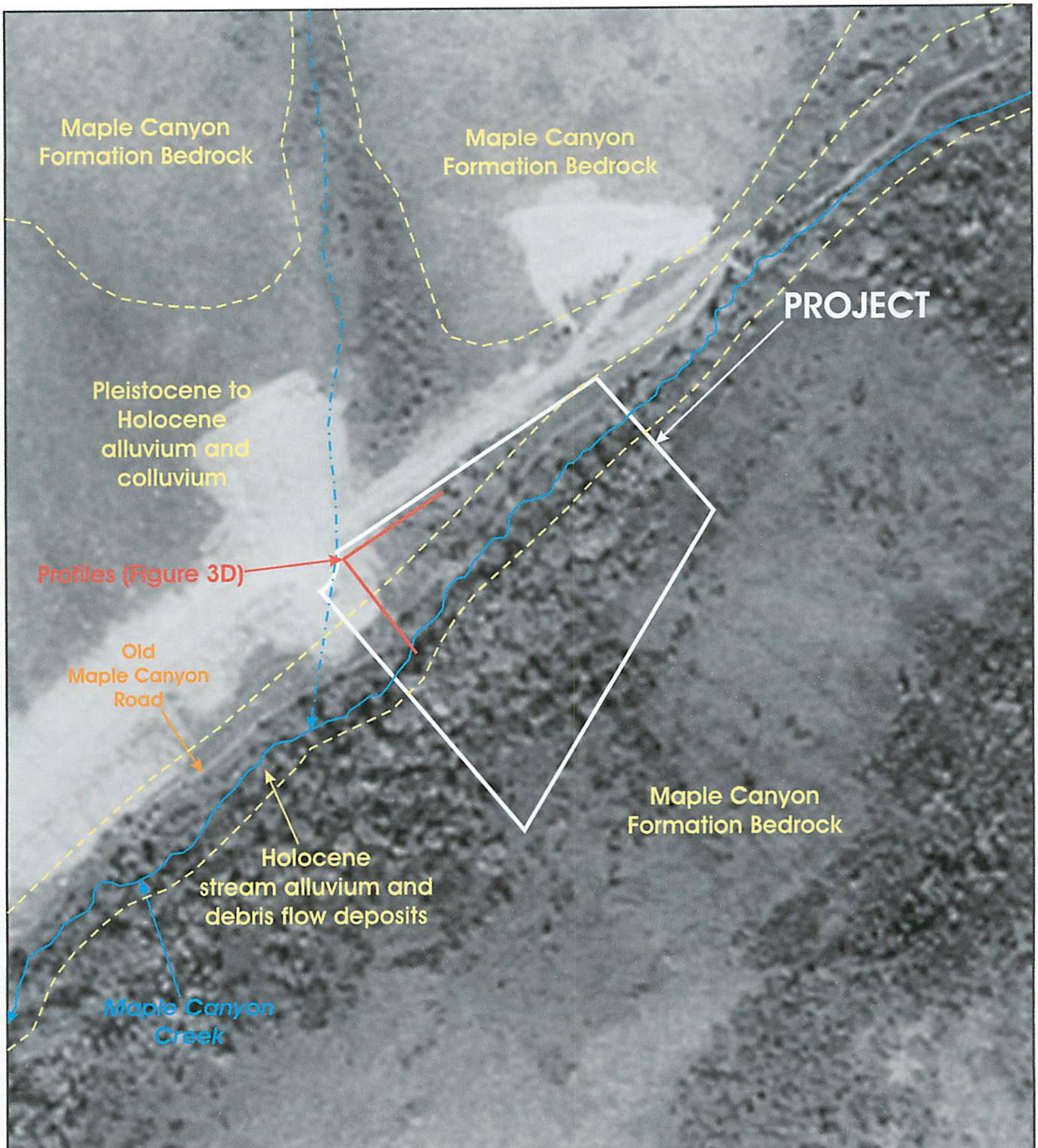
0 1000 2000 feet
Scale 1:24,000
(1 inch = 2000 feet)

WESTERN GEOLOGIC

GEOLOGIC MAP

GEOLOGIC HAZARDS RECONNAISSANCE
Green Hill Country Estates Lot 100R
1330 North Maple Drive
Huntsville, Weber County, Utah

FIGURE 2



Source: Utah AGRC Digital Orthophoto Quadrangle.

WESTERN GEOLOGIC

N W E S

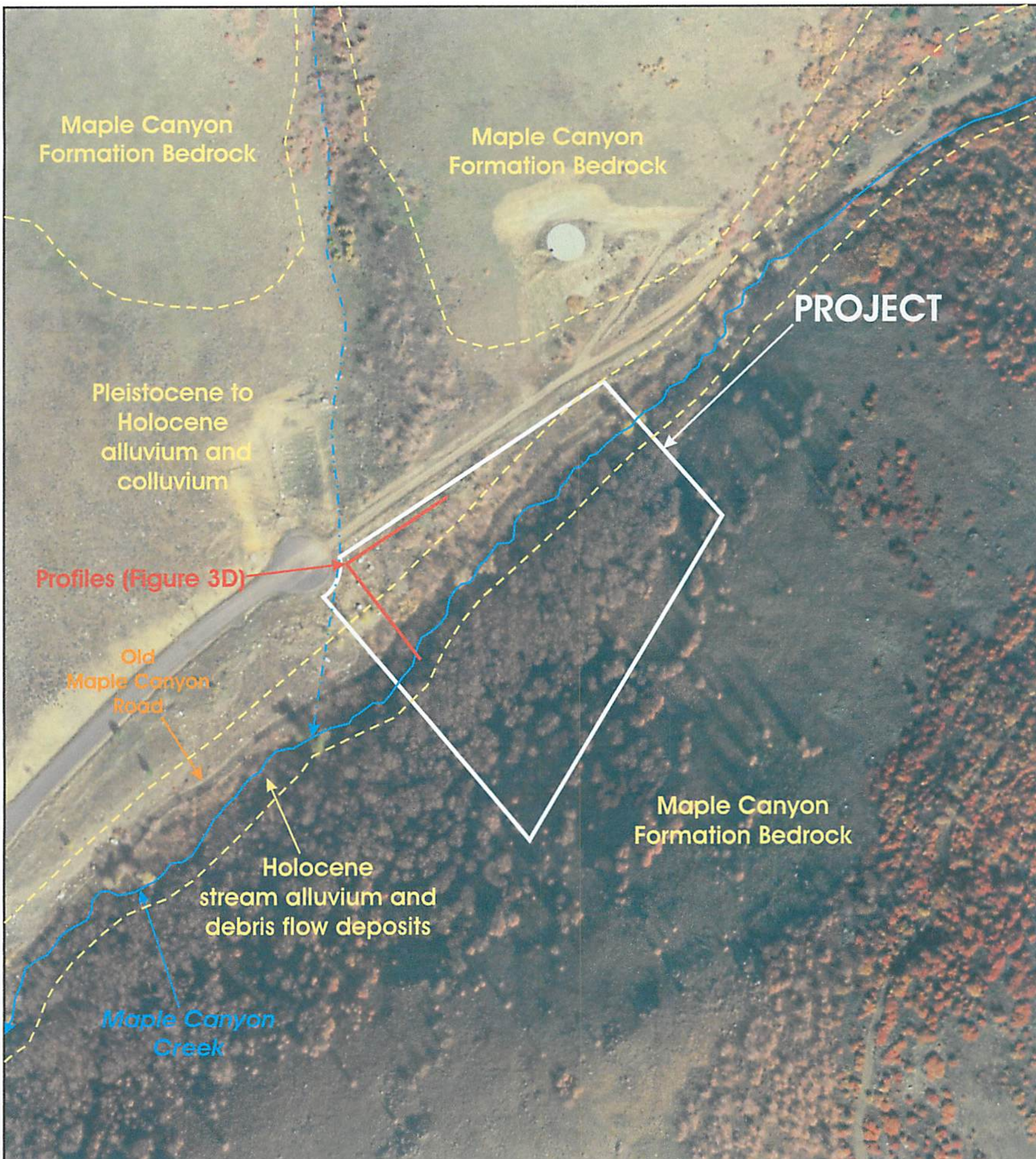
0 100 200 feet

Scale 1:2,400
(1 inch = 200 feet)

1997 AERIAL PHOTO

GEOLOGIC HAZARDS RECONNAISSANCE
Green Hill Country Estates Lot 100R
1330 North Maple Drive
Huntsville, Weber County, Utah

FIGURE 3A



Source: Utah AGRC, 2006 High Resolution Orthophoto, one foot resolution; parcel boundary from Weber County GIS data.

WESTERN GEOLOGIC

N W E S

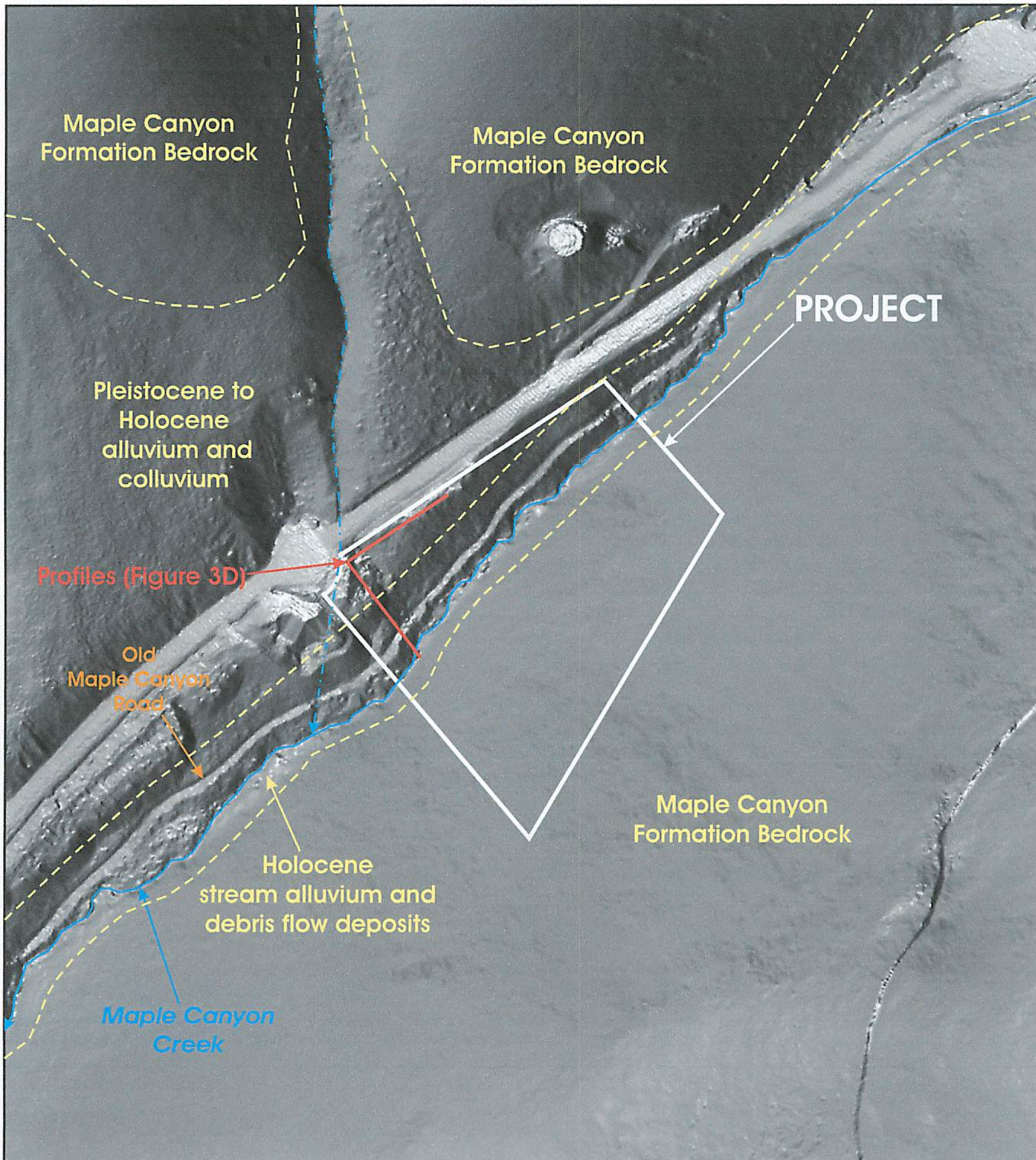
0 100 200 feet

Scale 1:2,400
(1 inch = 200 feet)

2006 AIR PHOTO

GEOLOGIC HAZARDS RECONNAISSANCE
Green Hill Country Estates Lot 100R
1330 North Maple Drive
Huntsville, Weber County, Utah

FIGURE 3B



Source: Utah AGRC, 2011 LIDAR Bare Earth DEM, one meter resolution.

WESTERN GEOLOGIC

N W E S

0 100 200 feet

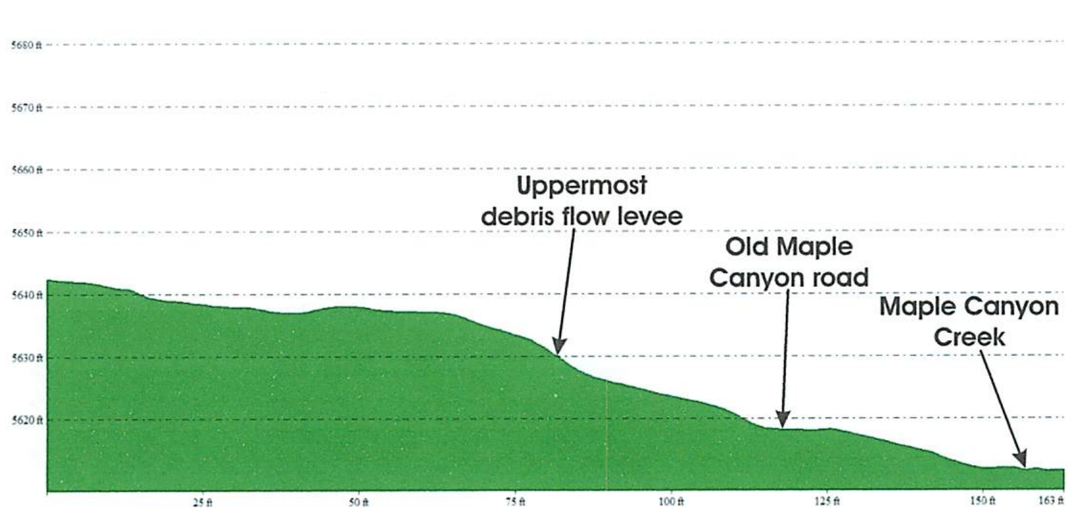
Scale 1:2,400
(1 inch = 200 feet)

2011 LIDAR IMAGE

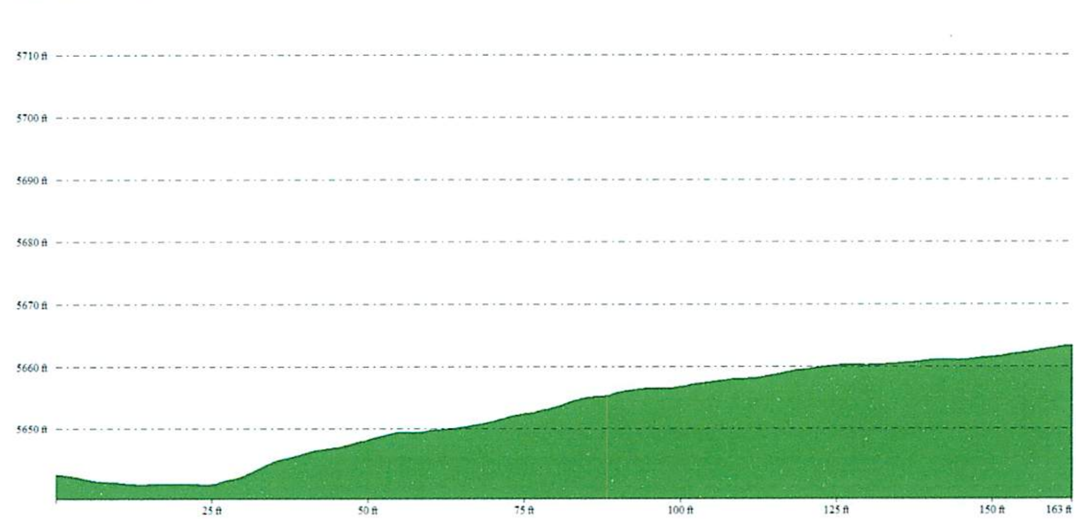
GEOLOGIC HAZARDS RECONNAISSANCE
Green Hill Country Estates Lot 100R
1330 North Maple Drive
Huntsville, Weber County, Utah

FIGURE 3C

NORTH-SOUTH TOPOGRAPHIC PROFILE



WEST-EAST TOPOGRAPHIC PROFILE



Profiles based on 2011 LIDAR data.

WESTERN GEOLOGIC

Scale 1:360
(1 inch = 30 feet)
No vertical exaggeration

TOPOGRAPHIC PROFILES

GEOLOGIC HAZARDS RECONNAISSANCE
Green Hill Country Estates Lot 100R
1330 North Maple Drive
Huntsville, Weber County, Utah

FIGURE 3D

APPENDIX

Photographic Record of Site Reconnaissance

Photographic Record of Site Reconnaissance
Lot 100R Green Hill Country Estates Phase 6
1330 North Maple Street, Huntsville, Weber County, Utah

Photo 1. Retaining wall on Maple Drive

Photo 2. Maple Canyon Creek

Photographic Record of Site Reconnaissance
Lot 100R Green Hill Country Estates Phase 6
1330 North Maple Street, Huntsville, Weber County, Utah

Photo 3. Unnamed drainage north of Project.

Photo 4. Typical surficial soils

Photographic Record of Site Reconnaissance
Lot 100R Green Hill Country Estates Phase 6
1330 North Maple Street, Huntsville, Weber County, Utah

Photo 5. Sequences of boulder levees overlooking creek

Photo 6. North facing slopes overlooking Maple Canyon Creek