July 1, 2025
Job No. 3361-007-25

Mr. Eric Ahern
Snowbasin Resort
3925 East Snowbasin Road
Huntsville, Utah 84317

Mr. Ahern:

Re: Report
Geological Site Reconnaissance and Review
Base Area Sprung Structure
Snowbasin Resort, 3925 East Snowbasin Road
Huntsville, Utah (41.2163°, -111.8583°)

1. INTRODUCTION

In response to your request, GSH Geotechnical, Inc (GSH) has prepared this geological siting reconnaissance report for the proposed Base Area Sprung Structure project, at Snowbasin Resort, Huntsville, Weber County, Utah. The proposed location for the structure is shown on Figure 1, Vicinity Map, and Figure 2, Site Plan, provides aerial coverage of the site and detail of the current (2024) layout of the site vicinity.

We understand the proposed new structure is to consist of a sprung structure with a footprint of approximately 8,000 to 10,000 square feet. The structure is anticipated to be one-story of light steel framing construction with exterior vinyl wrapping, to be placed slab-on-grade, and supported upon conventional spread and continuous wall footings. The proposed new structure will be located on the northwest side of the Grizzly Center building as shown on Figure 2. The proposed structure is to be on relatively level ground that is presently landscaped and covered with turf.

Because the proposed structure appears to be located near or in part on sloping areas in the vicinity of mapped landslide hazards, marginal soils, Quaternary faults and FEMA floodplain areas, Weber County is requesting that a geological site reconnaissance be performed to assess whether all or parts of the project are exposed to the hazards that are included in the Weber County Code, Section 108-22 Natural Hazard Areas (2025). These hazards include but are not limited to: Surface-Fault Ruptures, Landslide, Tectonic Subsidence, Rock Fall, Debris Flows, Liquefaction Areas, Flood, or other Hazardous Areas.

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The purpose of this reconnaissance is to evaluate if the proposed structure is outside or within areas identified as Natural Hazards Overlay District, and if within a hazard area, to recommend appropriate additional studies that comply with the purpose and intent of the Weber County Natural Hazards Area guidelines and standards in order to be "cleared" for building permit issuance by the county, as outlined by the Weber County Development Process packet as provided by the Weber County Building Inspection Department (2025).

The objectives and scope of the study were planned in discussions between Mr. Eric Ahern of Snowbasin Resort and Mr. Robert Gifford of GSH Geotechnical, Inc. (GSH).

The **Objectives** of this reconnaissance study are to:

1) Determine potential buildable areas located outside of geological hazards;

2) Define and evaluate subsurface soil and groundwater conditions; and

3) Provide appropriate foundation, earthwork, pavement, and geoseismic recommendations.

In accomplishing the objectives, our **Scope** included the following:

1) Review of previous relevant literature and mapping pertaining to the geological and engineering conditions for the site;

2) Excavation of 2 client provided test pits for soil samples for geotechnical study;

3) An analysis and assessment of potential geologic hazards in the vicinity of the site and the exposure of the site and proposed site improvements to hazards named in the ordinance including but not limited to: surface-fault rupture hazards, landslide hazards, rock fall hazards, debris flow hazards, liquefaction potential areas, flood hazards, or other unnamed hazardous.

4) Engineering analysis and testing on soils samples.

5) Preparation of a summary report(s).

The reporting provided herein is the geological reconnaissance phase of our studies conducted for geologic hazards review, and the proposed structure siting review to be used for Weber County permitting. A concurrent Geotechnical Study for geotechnical engineering soils and groundwater studies for foundations, earthwork, and geoseismic design is being prepared by our office to be presented under separate cover.

1.1 AUTHORIZATION

Authorization was provided by returning a signed copy of the Professional Services Agreement No. 25-0554 dated May 23, 2025.

1.2 PROFESSIONAL STATEMENTS

Supporting data upon which our recommendations are based are presented in subsequent sections of this report. Recommendations presented herein are governed by the physical properties of the soils and rock observed at the site, projected groundwater conditions, and the layout and design data discussed in Section 2, Proposed Construction, of this report. If subsurface conditions other than those described in this report are encountered and/or if design and layout changes are implemented, GSH must be informed so that our recommendations can be reviewed and amended, if necessary.

Our professional services have been performed, our findings developed, and our recommendations prepared in accordance with generally accepted geological and engineering principles and practices in this area at this time.

1.3 PROPOSED CONSTRUCTION

The project is to consist of the construction of a sprung structure with a footprint of approximately 8,000 to 10,000 square feet. The structure is anticipated to be 1-story of light steel framing construction with exterior vinyl wrapping, to be placed slab-on-grade, and supported upon conventional spread and continuous wall footings.

Maximum real column and wall loads are anticipated to be on the order of up to 80 kips and up to 3 kips per lineal foot, respectively. Real loads are defined as the total of all dead plus frequently applied (reduced) live loads.

Site development will require some earthwork in the form of minor cutting and filling. At this time, we anticipate that maximum site grading cuts and fills, excluding utilities, will be on the order of one to three feet.

2. INVESTIGATIONS

2.1 LITERATURE AND RESOURCE REVIEW

To evaluate the potential exposure of sites to geological hazards that impact sites or site improvements, Weber County has compiled a series of Geographic Information Systems (GIS)

data mapping layers of geological hazard related information. These data may be queried on-line using the Weber County Geo-Gizmo web server application at:

https://www3.co.weber.ut.us/gis/maps/gizmo2/index.html

Using the Geo-Gizmo application, under the Engineering Layers category, is listed geological hazard related layers that may be toggled on and off to determine potential hazards exposure to sites in the county. These mapping layers include the following categories; *Quake Epicenters, FEMA Flood Zone Line, FEMA Base Flood Elevation, Wasatch Faults, Landslide Scarps, Geologic Faults, Faults, Quaternary Faults, FEMA Flood Zone, FEMA LOMR, Engineering Problems; Liquefaction Potential, Landslide, FEMA Letters of Map Change, and FEMA Flood Zones.* These layers have been compiled from the respective agencies including the Federal Emergency Management Agency (FEMA), the Utah Geological Survey (UGS), and the U.S. Geological Survey (USGS). These mapping layers consist of regional compilation hazards data but are not compiled at scales that are necessarily applicable for site specific usage and planning. When hazard layer data on the Geo-Gizmo are found to interact with Permit Applicant site improvement locations, Weber County Engineers and Planners will request that the Permit Applicant have a Professional Geologist Site Reconnaissance Review, such as presented herein, conducted for the site.

In addition to the Geo-Gizmo site screening, the Weber County Engineers and Planners rely on published UGS geological mapping (Coogan and King, 2016), that includes much of Weber County for determining if a site is located upon a potentially hazardous geological mapping unit, thus requiring a geological reconnaissance. This interactive "Weber County Geologic Map" may be viewed on-line at:

https://weber.maps.arcgis.com/apps/webappviewer/index.html?id=bd557ebafc0e4ed58471342bb03fdac5

Our preliminary review of the Geo-Gizmo indicated that the proposed structure was near "*deep or unclassified landslide"* hazard units that are mapped nearby according the UGS landslide database (Elliott and Harty, 2010), however the location did not show exposure to any of the other aforementioned hazard layer areas, including: *Quaternary Faults* (USGS and UGS, 2006), and *FEMA Flood Zone* (FEMA, 2015).

The Weber County Geologic Map shows the sprung structure location is underlain in part by mixed glacial and colluvial deposits (**Qmg**), and in part by mixed alluvial and colluvial deposits (**Qac**), which are geologic units that have been determined by Weber County as requiring hazard studies.

2.2 SITE EVALUATION

The site evaluation for the proposed development included the preliminary office procedures, outlined below, followed by a general field reconnaissance.

Our site-specific review consisted of a GIS data integration effort that included:

1. Reviews of previous mapping and literature pertaining to site and regional geology including Mulvey, 1992; USGS and UGS, 2016; Elliott and Harty, 2010; King and others, 2008; and Coogan and King, 2016), and seismic hazards information that was developed from United States Geologic Survey (USGS) databases (Petersen and others, 2014).

2. An analysis of vertical and stereoscopic aerial photography for the site including a 1963 1:15,840 scale black and white stereoscopic sequence; a 1987 1:40,000 scale color-infrared stereoscopic sequence indexed as follows on Table 1:

Table 1
Stereoscopic Aerial Photograph Index

Year	Index	Scale	Color
1963	ELK_2-90	1:15,840	B&W
1963	ELK_2-91	1:15,840	B&W
1987	1117W-552-315-38	1:40,000	Color/IR
1987	1117W-552-315-39	1:40,000	Color/IR

and, the analysis of 2012 5.0-inch digital HRO orthoimagery coverage, and a 2024 0.6-meter digital NAIP orthoimagery coverage of the site, and review of the contemporary Google Earth® orthoimagery coverage of the site as shown on Figure 2.

3. A GIS analysis using the QGIS® GIS platform to geoprocess and analyze 2020 0.5-meter LiDAR digital elevation data made available for the site by the Utah Geospatial Resource Center (UGRC). The GIS LiDAR analysis included using the QGIS® platform Geospatial Data Abstraction Library (GDAL, 2013) Contour; the GRASS® (Geographic Resources Analysis Support System, 2013) r.slope and r.shaded.relief modules.

2.3 GEOLOGIC ANALYSIS

For the site-specific geological mapping for this review, we relied on 1:100,000-scale geologic mapping by Coogan and King (2016), which provided the most up to date rendering of geological mapping for the site location, and 1:24,000-scale mapping by King and others (2008) for specific spatial detail. The integrated mapping details from Coogan and King (2016) and King and others (2008) were modified herein based on our site-specific analysis of the stereoscopic aerial photography, LiDAR analysis, and field observations made during our June 10, 2025, reconnaissance. The geological mapping for this review is provided on Figure 3, Geologic/LiDAR Mapping, which includes topographic, slope, and elevation data geoprocessed through the aforementioned LiDAR analysis.

2.4 FIELD RECONNAISSANCE

A field reconnaissance of the general site area, including an on-ground visit to the site was carried out June 10, 2025. During the field reconnaissance GSH engineering staff excavated and logged the two test pits shown on Figure 2, for our engineering analysis. The logs and testing analysis from the test pits are presented in our concurrent geotechnical reporting.

3. SITE CONDITIONS

3.1 SURFACE

As shown on Figure 2, the proposed structure location includes a landscaped area within the developed base facilities area of the resort. Elevation on the proposed structure is approximately 6,396 feet. Slope gradients range from near-level to substantially steeper than the 25-percent on nearby slopes. Surface vegetation consists of maintained turf.

3.2 GEOLOGIC SETTING

The site is located on the eastern flank of Mount Ogden, which western flank comprises the Wasatch Front. The surficial geology of the site vicinity is the result of the uplift and exposure of older pre-Cambrian rocks which forms the crest of Mount Ogden east of the site. This exposure was the result of movement along high-angle faults during late Tertiary and Quaternary age (Bryant, 1988). Bounding the east foothill flank of Mount Ogden are mid Tertiary units of the Wasatch Formation and the Norwood Formation that ramp along the transition of the mountains to the foothills on the east. The Wasatch Front is marked by the Wasatch fault, which is 3.4 miles west of the site, and provides the basis of division between the Middle Rocky Mountain province on the east and the Basin and Range province on the west.

The Basin and Range province is characterized by approximately north-south trending valleys and mountain ranges that have been formed by extensional tectonics and displacement along normal faults and extends from the Wasatch Range on the east to the Sierra Nevada Range on the west (Hunt, 1967). The Middle Rocky Mountain province is an assemblage of sedimentary, igneous, and metamorphic rocks that have been folded, faulted, and uplifted. Mountain building (tectonic) activity commenced about 30 million years ago (Oligocene epoch) and continues to the present. The province is characterized by mountainous terrain with deep canyons and broad intervening basins, with temperate semi-arid to mesic climatic conditions (Hunt, 1967).

The base area is located upon middle to late Tertiary units of the Wasatch Formation and the Norwood Formation, and Quaternary deposits that ramp along the transition of the mountains to the foothills on the east and overlie the older Precambrian and Paleozoic rocks that are exposed by high-angle faulting that form the nearby peaks including Mount Ogden and DeMoisy Peak. Since the deposition of the Norwood Formation, orogenic mountain building processes have been occurring, resulting in the erosion and deposition of Quaternary age soils on the surface vicinity during the past 1.6 million years. More recently, between 30,000 BP to 12,000 BP, glacial ice

accumulated upon the higher elevation peaks along the Wasatch Range, and subjected the terrain to glacial erosion and deposition, leaving eroded cirque valleys and depositional moraine features (Madsen and Currey, 1979). Since the regression of the ancient ice, stream erosion and incision of the mountain slopes has modified the glacial terrain features in the vicinity of the base area. Historical site development and grading modification has resulted in disturbance to the native surface deposits over much of the base area.

3.3 GEOLOGIC MAPPING

Figure 3, Geologic Mapping, shows the location of the site relative to integrated GIS overlays from the geological mapping prepared by King and others (2008), and Coogan and King (2016), and modified herein, included with LiDAR terrain data. A summary of the geological mapping units of the site and site vicinity is provided in relative age order as follows:

Qh - Human disturbance (Historical) - Obscures original deposits by cover or removal; mostly fill along railroad and highway grades, and some large gravel pits that predate 1986 aerial photographs...

Qay - Alluvial deposits (mostly Holocene) - Variably sorted sand, silt, clay, and gravel; unconsolidated to variably consolidated; lowest deposits…

Qac -Alluvium and colluvium (Holocene and Pleistocene) - Includes stream and fan alluvium, colluvium, and locally mass-movement deposits…

Qafy - Qaf - Alluvial-fan deposits (Holocene and Pleistocene) – Mostly sand, silt, and gravel that is poorly bedded and poorly...variably consolidated; includes debris flows, particularly in drainages and at drainage mouths (fan heads)...with unit **Qafy** being the lowest (youngest) fans and **Qaf** being undivided in age determination...

Qmsh - Qmsy – Qms – Landslide deposits (Holocene and Pleistocene) - Poorly sorted clay- to boulder-sized material; includes slides and slumps, and locally includes flow deposits; generally characterized by hummocky topography, (**Qmsh)** historic movement, (**Qmsy**) post-Lake Bonneville in age, and mostly pre-historic, (**Qms**) where age uncertain (though likely Holocene and/or upper Pleistocene)…

Qmso - Older landslide and slump deposits (Pleistocene) - Poorly sorted clay- to boulder-sized material…**Qmso/Tn -** Older block slide comprised of Norwood Formation rocks…

Qmg - Mass-movement and glacial deposits, undivided (Holocene and Pleistocene) – Unsorted and unstratified clay, silt, sand, and gravel; mapped where glacial deposits lack typical moraine morphology…

Qg - Glacial till and outwash, age not known (Holocene and upper and middle Pleistocene) - is undivided glacial deposits (till and outwash) of various ages; till is non-stratified, poorly sorted clay, silt, sand, and gravel, to boulder size…

Qgy – Younger glacial till and outwash (Holocene and upper Pleistocene) - Mostly Pinedale-age (~15,000 to 30,000 years old, upper Pleistocene) deposits mapped as undivided (**Qgy**)…till is non-stratified, poorly sorted clay, silt, sand, and gravel, to boulder-size materials...

Qgo - Qgmo - Older glacial till and outwash (upper and middle? Pleistocene) – Poorly to moderately sorted clay, silt, sand, gravel to boulder size material...

QTaf/Ts – QTaf/Tw - High-level alluvial-fan deposits (lower Pleistocene and/or Pliocene) – Gravel, sand, silt, and clay above other stream-terrace and alluvial-fan deposits / over Ts Tertiary strata, undivided including **Tn** Norwood Formation and/or **Tw** Wasatch Formation…

Cm – Maxfield Limestone (Middle Cambrian) – From top down includes dolomite, limestone, argillaceous to silty limestone and calcareous siltstone and argillite, and basal limestone with argillaceous interval…

Not show on mapping, but underlying the site at depth:

Tn - Norwood Formation (lower Oligocene and upper Eocene) - Typically light-gray to light brown, altered tuff (claystone), tuffaceous siltstone, sandstone, and conglomerate; locally colored light shades of red and green…locally includes landslides and slumps that are too small to show at map scale…

Tw – Wasatch Formation (Eocene and upper Paleocene) – Typically red to brownish-red sandstone, siltstone, mudstone, and conglomerate with minor gray limestone and marlstone locally; conglomerate clasts mainly rounded Neoproterozic and Paleozoic sedimentary rocks, typically Neoproterozoic and Cambrian quartzite…

The Site is shown on Figure 3 to be located upon **Qh** - Human disturbance -historical age deposits that obscures original deposits by cover or removal. However original geologic mapping by King and others (2008), and Coogan and King (2016) show the sprung structure location to be upon Holocene and Pleistocene age **Qmg** - mass-movement and glacial deposits, and **Qac** - alluvium and colluvium.

4. DISCUSSIONS AND RECOMMENDATIONS

4.1 SUMMARY OF FINDINGS

The engineering geology findings presented in this section pertain to the natural and geological hazards named in the Weber County Code, Section 108-22 Natural Hazard Areas. These hazards

include, but are not limited to: Surface-Fault Ruptures, Landslide, Tectonic Subsidence, Rock Fall, Debris Flows, Liquefaction Areas, Flood, or other Hazardous Areas

4.1.1 Landsliding: From our analyses and reconnaissance no features or surfaces identifiable as active landsliding (Varnes, 1978) were found to directly impact the proposed structure location. The nearest active landslide units are mapped as **Qmsy** deposits, and as shown are located approximately 400 feet to the west of the proposed structure as shown on Figure 3, and as located this **Qmsy** feature should not potentially impact the proposed improvements.

4.1.2 Sloping Surfaces: The site vicinity slopes developed from our LiDAR Analysis range from level to well over 25-percent as shown on Figure 3. Slope percentage values for the average slope gradient for the ground underlying the proposed structure is calculated to be 3.2 percent.

The threshold gradient for slope development restrictions according to the Weber County Section 108-14-3. (Weber County Code, 2025), includes slopes greater than 25-percent.

4.1.3 Geoseismic Setting: Utah municipalities have adopted the International Building Code (IBC) 2012. The IBC 2012 code determines the seismic hazard for a site based upon 2008 mapping of bedrock accelerations prepared by the United States Geologic Survey (USGS) and the soil site class (Petersen and others, 2014). The USGS values are presented on maps incorporated into the IBC code and are also available based on latitude and longitude coordinates (grid points).

Based on probabilistic estimates (Petersen and others, 2014) queried for the proposed structure location (41.2163°, -111.8583°), the expected peak horizontal ground acceleration on rock from a large earthquake with a ten-percent probability of exceedance in 50 years is 0.18*g,* and for a two-percent probability of exceedance in 50 years is 0.45*g*.

The ten-percent probability of exceedance in 50 years event has a return period of 475 years, and the 0.18*g* acceleration for this event corresponds "strong" perceived shaking with "light" potential damage based on instrument intensity correlations. The two-percent probability of exceedance in 50 years event has a return period of 2,475 years, and the 0.45*g* acceleration for this event corresponds "severe" perceived shaking with "moderate" potential damage based on instrument intensity correlations (Wald and others, 1999).

Maximum Considered Earthquake (MCE) design spectra for the site is to be included in our concurrent Geotechnical Report.

4.1.4 Active Earthquake Faults: Based upon our review of available literature, no active Holocene age faults are known to pass through or immediately adjacent to the site. The nearest active (Holocene) fault is the Wasatch fault zone, Weber section (UT2351e), located 3.4 miles west of the proposed structure (Black and others, 2004). The Wasatch Fault Zone is considered capable of generating earthquakes as large as magnitude 7.3 (Arabasz and others 1992).

4.1.5 Liquefaction Potential Hazards: In conjunction with the ground shaking potential of large magnitude seismic events as discussed previously, certain soil units may also possess a potential for liquefaction during a large magnitude event. Liquefaction is a phenomenon whereby loose, saturated, granular soil units lose a significant portion of their shear strength due to excess pore water pressure buildup resulting from dynamic loading, such as that caused by an earthquake. Among other effects, liquefaction can result in densification of such deposits causing settlements of overlying layers after an earthquake as excess pore water pressures are dissipated. Horizontally continuous liquefied layers may also have a potential to spread laterally where sufficient slope or free-face conditions exist. The primary factors affecting liquefaction potential of a soil deposit are: (1) magnitude and duration of seismic ground motions; (2) soil type and consistency; and (3) occurrence and depth to groundwater.

Liquefaction potential hazards have not been specifically studied or mapped for the Snowbasin area, as has occurred in other parts of northern Utah (Anderson and others, 1994). Liquefaction commonly occurs in saturated non-cohesive soils, which are not found on the site, consequently the conditions susceptible to liquefaction do not appear to be present at the site.

4.1.6 Tectonic Subsidence is surface tilting subsidence that occurs along the boundaries of normal faults in response to surface-faulting earthquakes (Keaton, 1986). Because the site is not located in near proximity to active earthquake faults, tectonic subsidence hazards are not considered a risk to the site.

4.1.7 Alluvial Fan - Debris Flow Hazards: The nearest alluvial fan-potential debris flow process deposits to the site, are alluvial fan deposits mapped as **Qafy** by Coogan and King (2016) and occur approximately 1,100 feet west of the site as shown on Figure 3. These deposits occur along the Wheeler Creek drainageway, and under present conditions do not appear to be a potential impact to the proposed structure location.

4.1.8 Flooding Hazards: No significant waterways pass in the vicinity of the site and flood insurance rate mapping by Federal Emergency Management Agency for the site vicinity has not been prepared for this area at this time (FEMA, 2015). Local sheet flow, slope wash, and seasonally perched soil water typical of sloping areas should be anticipated for the site, and site improvements.

4.1.9 Rockfall and Avalanche Hazards: The site is not in the vicinity of steep sloping and outcrop areas where such hazards may originate.

5. CONCLUSIONS

This report provides our assessment of potential geologic hazards in the vicinity of the proposed structure and the exposure of the site to the hazards that are included in the Weber County Code, Section 108-22 Natural Hazard Areas. These hazards include but are not limited to: Surface-Fault Ruptures, Landslide, Tectonic Subsidence, Rock Fall, Debris Flows, Liquefaction Areas, Flood, or other Hazardous Areas.

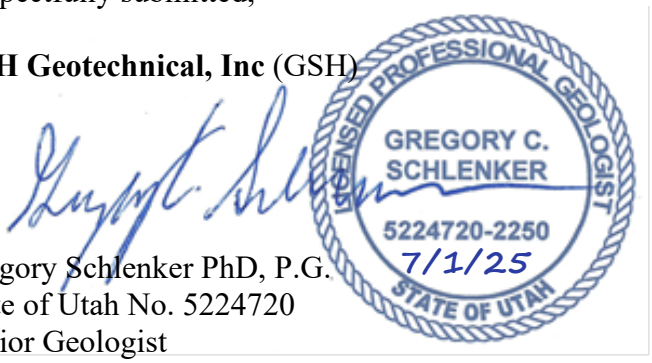
Based upon the findings of this review we believe that the proposed structure is not adversely exposed to the geological hazards specified in the Section 108-22 Natural Hazard Areas of the Weber County Code (2025).

6. CLOSURE

If you have any questions or would like to discuss these items further, please feel free to contact us at (801) 685-9190.

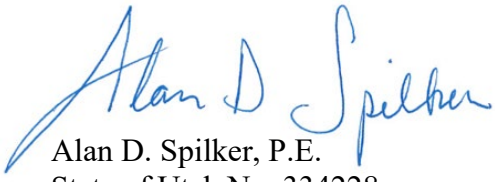
Respectfully submitted,

GSH Geotechnical, Inc (GSH)



Gregory Schlenker PhD, P.G.
State of Utah No. 5224720
Senior Geologist

Reviewed by:



Alan D. Spilker, P.E.
State of Utah No. 334228
President/Senior Geotechnical Engineer

Encl. Figure 1, Vicinity Map
Figure 2, Aerial Coverage
Figure 3, Geologic/LiDAR Mapping

7. REFERENCES

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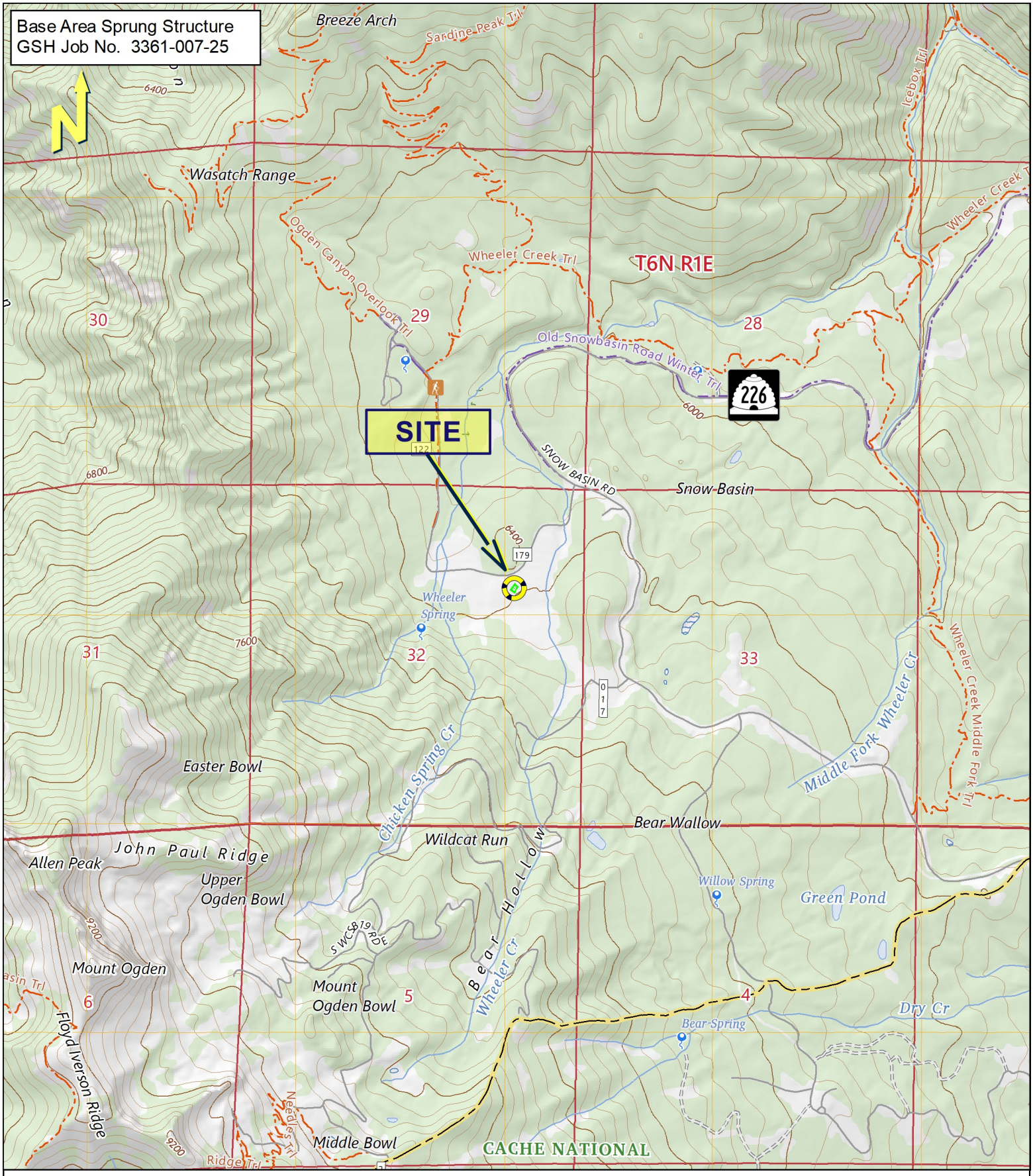


Base:
USGS 7.5 Minute topographic maps titled "Snowbasin, Utah" and "Ogden, Utah" from https://topobuilder.nationalmap.gov 2025

0 2000 4000 ft

1:24,000

FIGURE 1
VICINITY MAP

GSH

Base:
2024 ~0.5ft Color Google Earth®
Orthoimagery,
from; https://earth.google.com/web/

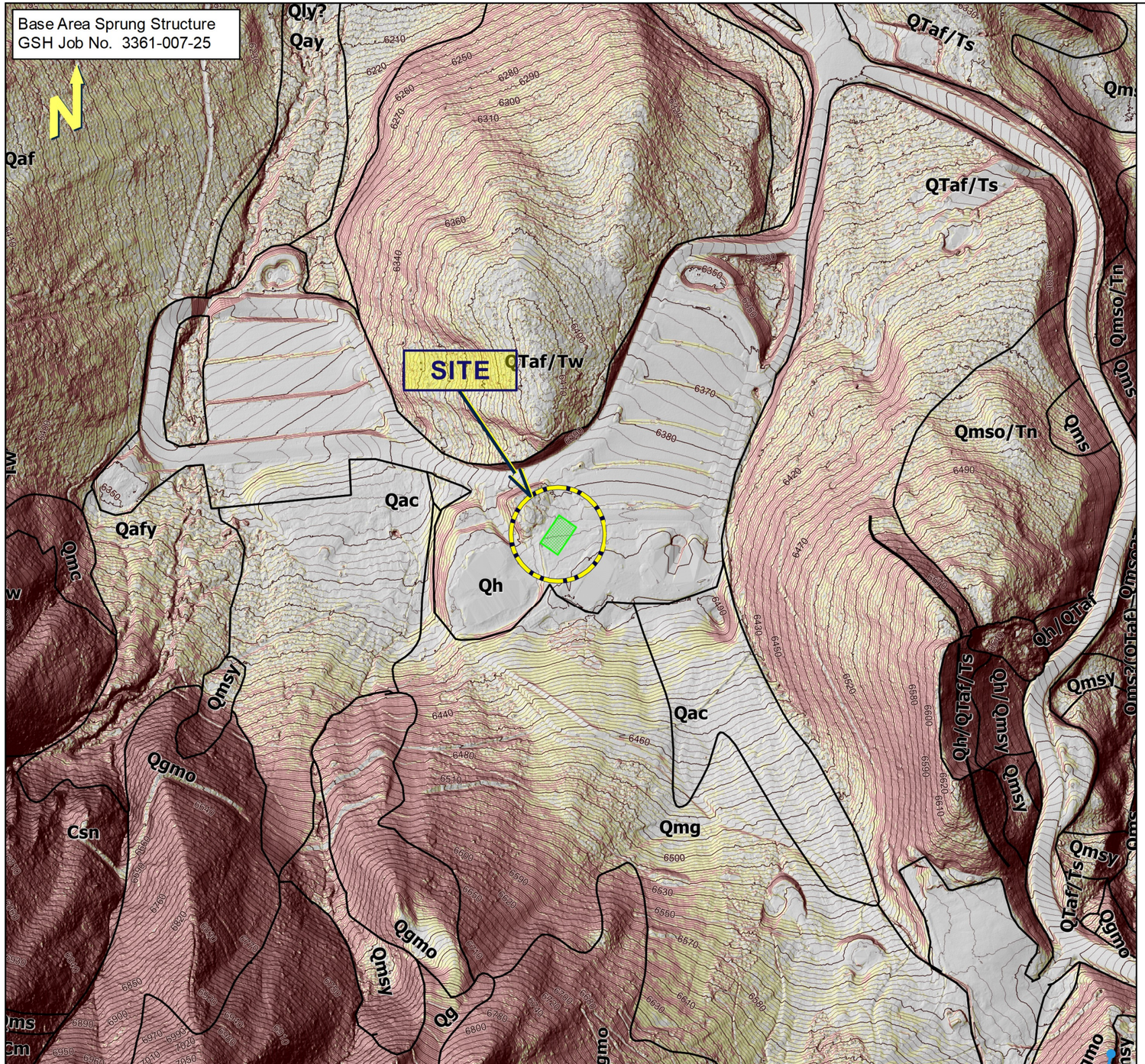
0 200 400 ft

1:2,400

FIGURE 2
SITE PLAN

GSH

Base Area Sprung Structure
GSH Job No. 3361-007-25



Base:
2020 Geoprocessed 0.5m Bare Earth LiDAR
from Utah UGRC; http://gis.utah.gov/

0 400 800 ft

1:4,800

Geologic Classification

(modified from King and others, 2008; and Coogan and King, 2016)

Qh - Human disturbance (Historical) - Obscures original deposits by cover or removal; mostly fill along railroad and highway grades, and some large gravel pits that predate 1986 aerial photographs...

Qay - Alluvial deposits (mostly Holocene) - Variably sorted sand, silt, clay, and gravel; unconsolidated to variably consolidated; lowest deposits…

Qac - Alluvium and colluvium (Holocene and Pleistocene) - Includes stream and fan alluvium, colluvium, and locally mass-movement deposits…

Qafy - Qaf - Alluvial-fan deposits (Holocene and Pleistocene) – Mostly sand, silt, and gravel that is poorly bedded and poorly...variably consolidated; includes debris flows, particularly in drainages and at drainage mouths (fan heads)...with unit Qafy being the lowest (youngest) fans and Qaf being undivided in age determination...

Qmsh - Qmsy – Qms – Landslide deposits (Holocene and Pleistocene) - Poorly sorted clay- to boulder-sized material; includes slides and slumps, and locally includes flow deposits; generally characterized by hummocky topography, (Qmsh) historic movement, (Qmsy) post- Lake Bonneville in age, and mostly pre-historic, (Qms) where age uncertain (though likely Holocene and/or upper Pleistocene)…

Qmso - Older landslide and slump deposits (Pleistocene) - Poorly sorted clay- to boulder-sized material…**Qmso/Tn -** Older block slide comprised of Norwood Formation rocks…

Qmg - Mass-movement and glacial deposits, undivided (Holocene and Pleistocene) – Unsorted and unstratified clay, silt, sand, and gravel; mapped where glacial deposits lack typical moraine morphology…

Qg - Glacial till and outwash, age not known (Holocene and upper and middle Pleistocene) -is undivided glacial deposits (till and outwash) of various ages; till is non-stratified, poorly sorted clay, silt, sand, and gravel, to boulder size…

Qgy – Younger glacial till and outwash (Holocene and upper Pleistocene) - Mostly Pinedale-age (~15,000 to 30,000 years old, upper Pleistocene) deposits mapped as undivided (Qgy)…till is non-stratified, poorly sorted clay, silt, sand, and gravel, to boulder-size materials...

Qgo - Qgmo - Older glacial till and outwash (upper and middle? Pleistocene) – Poorly to moderately sorted clay, silt, sand, gravel to boulder size material...

QTaf/Ts – QTaf/Tw - High-level alluvial-fan deposits (lower Pleistocene and/or Pliocene) – Gravel, sand, silt, and clay above other stream-terrace and alluvial-fan deposits / over Ts Tertiary strata, undivided including Tn Norwood Formation and/or Tw Wasatch Formation…

Cm – Maxfield Limestone (Middle Cambrian) – From top down includes dolomite, limestone, argillaceous to silty limestone and calcareous siltstone and argillite, and basal limestone with argillaceous interval…

Not show on mapping, but underlying the site at depth:

Tn - Norwood Formation (lower Oligocene and upper Eocene) - Typically light-gray to light brown, altered tuff (claystone), tuffaceous siltstone, sandstone, and conglomerate; locally colored light shades of red and green…locally includes landslides and slumps that are too small to show at map scale…

Tw – Wasatch Formation (Eocene and upper Paleocene) – Typically red to brownish-red sandstone, siltstone, mudstone, and conglomerate with minor gray limestone and marlstone locally; conglomerate clasts mainly rounded Neoproterozic and Paleozoic sedimentary rocks, typically Neoproterozoic and Cambrian quartzite…

Landslide Scarps

Slope Gradients

15 to 25 Percent Slopes

Greater than 25 Percent Slopes

Index Contour 10ft

FIGURE 3
GEOLOGIC/LiDAR MAPPING

GSH