

December 2, 2015
Job No. 1675-02N-15

Mr. David Orchard
2248 Oneida Street
Salt Lake City, Utah 84109

Mr. Orchard:

Re: Work Plan
Geological Study
Proposed Single-Lot KEO Homestead Subdivision
Approximately 5600 East Highway 39
(Part of Section 14, Township 6 North, Range 1 East, Salt Lake base and meridian)
Weber County, Utah

Introduction

In response to your request, GSH Geotechnical, Inc (GSH) has prepared this Work Plan for Geological Study for proposed single-lot KEO Homestead Subdivision referenced above. The proposed subdivision is located in the vicinity of Huntsville Town, Weber County, Utah (41.2429, -111.7884). The general location of the subdivision is on the south side of Utah SR-39 with access at approximately 5600 East (MP-15.2), and entirely within Section 14, T6N-R1E SLBM, as shown on Figure 1.

The area of the proposed subdivision consists of approximately 21.3 acres of lands zoned by Weber County as FV-3, "Forest Valley Zone." A smaller area of approximately four acres within northeastern part of the subdivision property has been surveyed for single-family residential use, and is shown on Figure 2 as "Homesite Area." A more detailed drawing of proposed improvements for the Homesite Area titled "KEO Homestead Subdivision" has been prepared by Great Basin Engineering (2015), indicating that the proposed improvements are to include; a residence and a detached garage, with both structures to be supported by independent septic/drain field systems, a well with a 100-foot protection radius is shown to be located between the residence and the garage, and a paved turn-around area for vehicle access on the northeast side of the site.

A previous Geotechnical Study for this subdivision was conducted by our office for this property in 2014 (GSH Geotechnical Inc., 2014). Details from this report indicate:

Construction for the home will likely consist of reinforced concrete footings and basement foundation walls supporting 1 to 3 wood-framed levels above grade with some stone, brick, or stucco veneer. The detached garage is anticipated to be a single level wood framed level above grade and constructed slab on grade. Projected maximum

column and wall loads are on the order of 10 to 20 kips and 1 to 3 kips per lineal foot, respectively. Site development will require a moderate amount of earthwork in the form of site grading. We understand that site grading will be minimized on the project to maintain stability of the slopes at the site. We estimate in general that maximum cuts and fills to achieve design grades will be on the order of 2 to 5 feet. Larger fills and cuts may be required at isolated areas and should be engineered accordingly to maintain stability of the slopes at the site.

As shown on Figure 2 the general area of the proposed KEO Homestead Subdivision and the Homesite Area includes slopes on the order of 20-percent to greater than 50-percent.

Weber County Natural Hazards Overlay Districts

Because the proposed KEO Homestead Subdivision is located on a sloping hill side area with susceptible expansive soil and rock conditions, Weber County (Planning Commission) has requested that geological studies be conducted to evaluate conformance with development plans.

At this time specific guidelines for these studies have not been specified by the County, however Weber County Chapter 27 Natural Hazards Overlay Districts, Section 27-2B (Weber County Code, 2015), pertaining to Landslide/Tectonic Subsidence provides the following requirements:

...any development proposed within a designated landslide hazard area, as delineated on the Sensitive Lands Overlay District maps, shall require the submittal, review and approval by the Planning Commission, of specific site studies, including grading plans, cut/fill, and plans produced by a qualified engineering geologist and a Utah licensed Geotechnical Engineer. The site specific study shall address slope stability (including natural or proposed cut slopes), evaluate slope-failure potential, effects of development and recommendations for mitigative measures. Slope stability analysis shall include potential for movement under static, development-induced and earthquake-induced conditions as well as likely ground water conditions.

Sensitive Lands Overlay District maps addressing Landslide/Tectonic Subsidence zones for Weber County are not available for the site. A preliminary review of site geological mapping prepared by Utah Geological Survey (UGS) geologists (King, et al, 2008) and shown on Figure 2, has indicated that the proposed KEO Homestead Subdivision is upon or within mapped Quaternary landslide deposits (Qms and Qmc) or sensitive Tertiary age Norwood Tuff (Tn) formation rocks (King, et al., 2008).

To address the expectations of the Weber County Planning and Engineering Staff a scoping meeting is to be scheduled between the KEO Subdivision proponents and Weber County Staff. Based upon our experience with Weber County the purpose of the scoping meeting shall be conducted as follows:

Scoping Meeting: The developer or consultant should schedule a scoping meeting with the Weber County to evaluate the engineering geologist's/geotechnical engineer's

investigative approach. At this meeting, the consultant should present a work plan that includes locations of anticipated geologic hazards and locations of proposed exploratory excavations, such as trenches, borings, CPT soundings, etc., which meet the minimum standard of practice. The investigation approach should allow for flexibility due to unexpected site conditions. Field findings may require modifications to the work plan

Provisional Work Plan

For the present circumstances, but pending the consent of the scoping meeting, GSH proposes to conduct an engineering geology evaluation of the KEO Homestead Subdivision. A preliminary layout of our, test pit locations and slope geologic cross-sections to be evaluated for this study is show on Figure 2 Proposed Work Plan. Our proposed work plan effort is to include; 1) a search and review of previous relevant documentation of site engineering and geologic studies and including UGS mapping (King, et al, 2008), and previous reports and studies, 2) a field reconnaissance study including the geologic logging of four walk-in test pits on the Homesite Area, and to include field review by the Weber County Geologist, 3) development of a slope cross section for slopes immediately adjacent to the potential homesite, 4) site specific geological mapping and classification to identify critical geological units and exposure of proposed improvements, 5) slope analysis from DEM-LiDAR geoprocessing identifying critical areas of 30-percent or greater across the site, and 6) preparation of summary report presenting results of our analysis including:

- A vicinity map showing the location of the property relative to site vicinity and topographic features.
- A geologic map showing the site specific surficial geology of the KEO Homestead Subdivision and surrounding area.
- Aerial photography showing the site and nearby surficial geologic features, site reconnaissance and test pit features, and site development features.
- An 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: landsliding and slope stability; alluvial fan processes including debris-flow; surface fault rupture hazards, strong earthquake ground motion, and liquefaction hazards; rockfall and avalanche hazards, and flood hazards.
- Cross-section of slope depicting encountered geological conditions.
- Site development recommendations based upon our findings and professional experience.

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For this effort GSH has selected the following Utah licensed professionals to implement and complete the work plan scope for the geotechnical and geological studies discussed herein:

Gregory Schlenker PhD, P.G., Senior Geologist
Andrew Harris P.E., Senior Geotechnical Engineer
Michael Huber, P.E., Senior Geotechnical Engineer

References

Great Basin Engineering, 2015, Preliminary Site Plan, KEO Homestead Subdivision: Great Basin Engineering Site Plan drawing sheet No. S1 11N722.dwg.

GSH Geotechnical Inc., 2014, Geotechnical Study Proposed Single-Family Residence Approximately 5600 East Highway 39 Weber County, Utah; Unpublished consultants report, 16p. Plates.

King, J.K., Yonkee, W.A., and Coogan, J.C., 2008, Interim geologic map of the Snow Basin and part of the Huntsville quadrangle, Davis, Morgan, and Weber Counties, Utah: Utah Geological Survey Open-File Report 536, scale 1:24,000.

Weber County Code (2015), retrieved from:

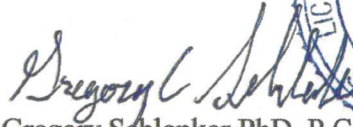
https://www.municode.com/library/ut/weber_county/codes/code_of_ordinances?nodeId=PTIILAUSCO_TIT104ZO_CH27NAHAOVDI#

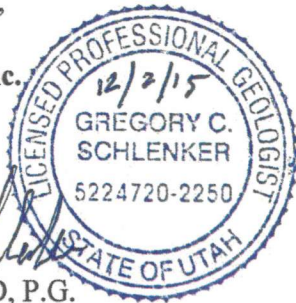
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We appreciate the opportunity to prepare this work plan and look forward to meeting with you and Weber County to finalize this plan and commence the appropriate studies to move your project toward completion. If there are any questions regarding this work plan and scope herein, please do not hesitate to contact our office at (801) 393 2012.


Respectfully submitted,

GSH Geotechnical, Inc.


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



Reviewed by:


Andrew M. Harris, P.E.
State of Utah No. 7420456
Senior Geotechnical Engineer

Addressee (email)

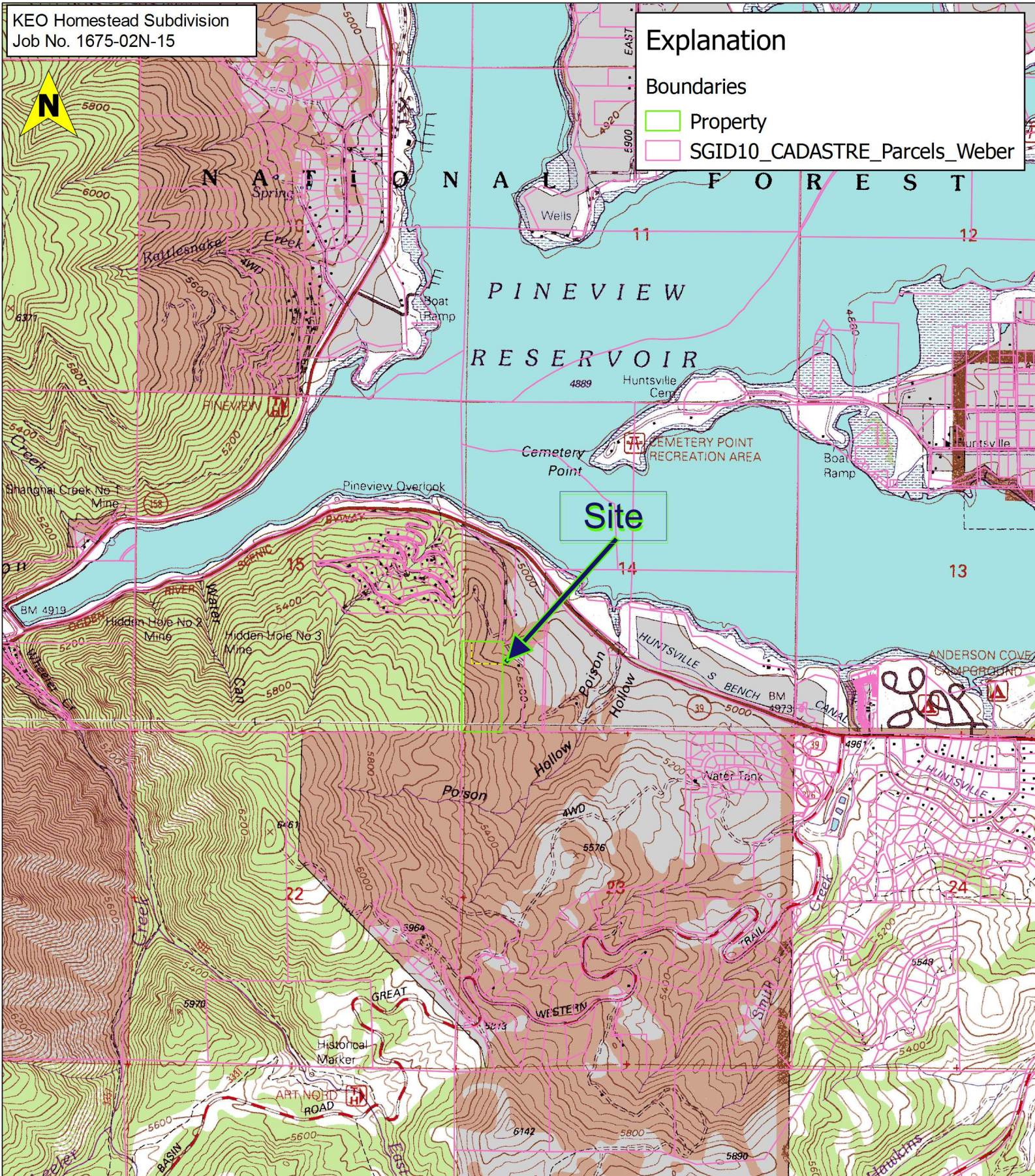
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Explanation

Boundaries

Property

SGID10_CADASTRE_Parcels_Weber



Base:
1998 7.5 Minute USGS Topographic Maps Titled
Snowbasin, Utah, and Huntsville, Utah.

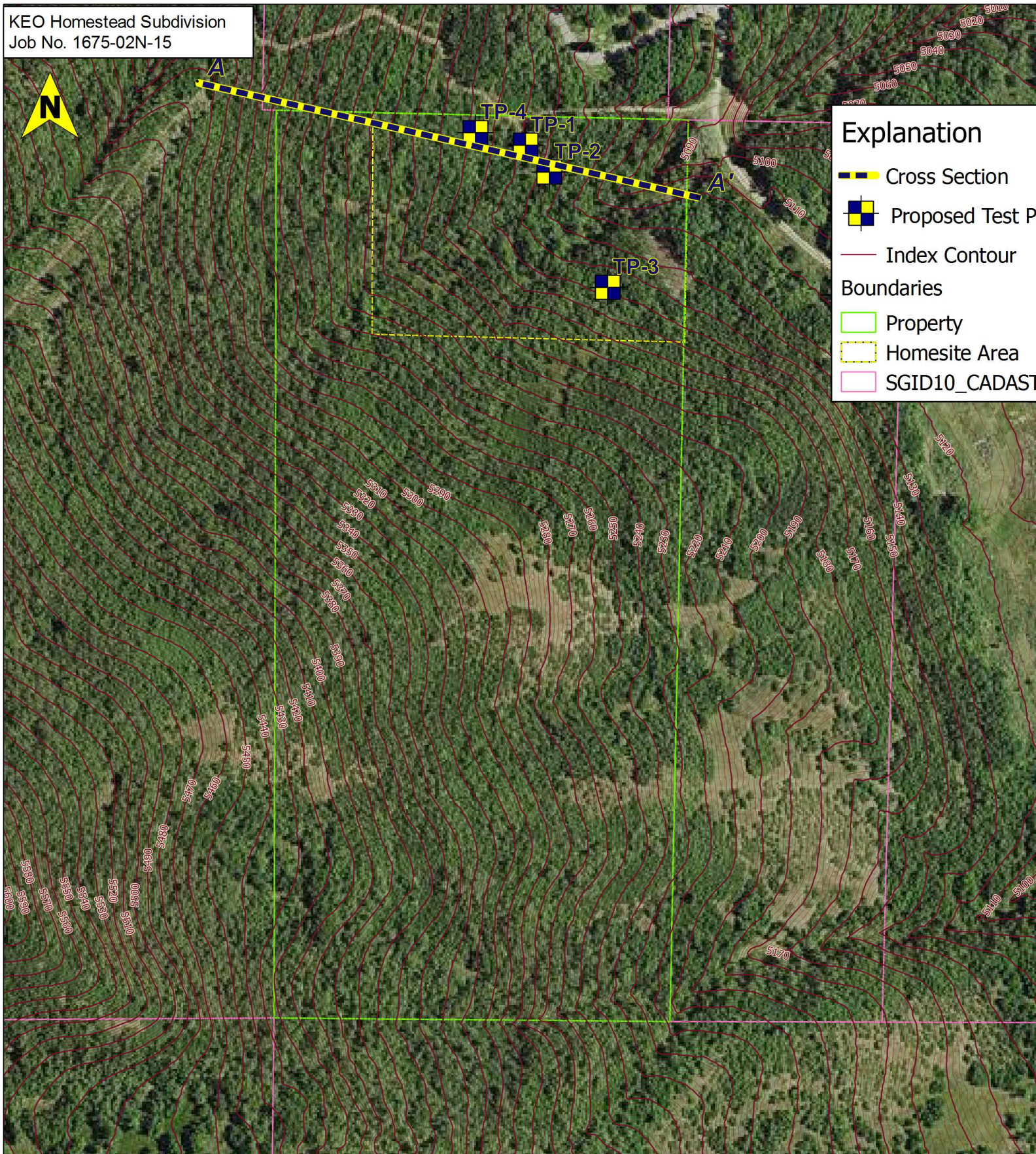
0 1000 2000 3000 4000 ft



1:24,000

FIGURE 1
VICINITY MAP



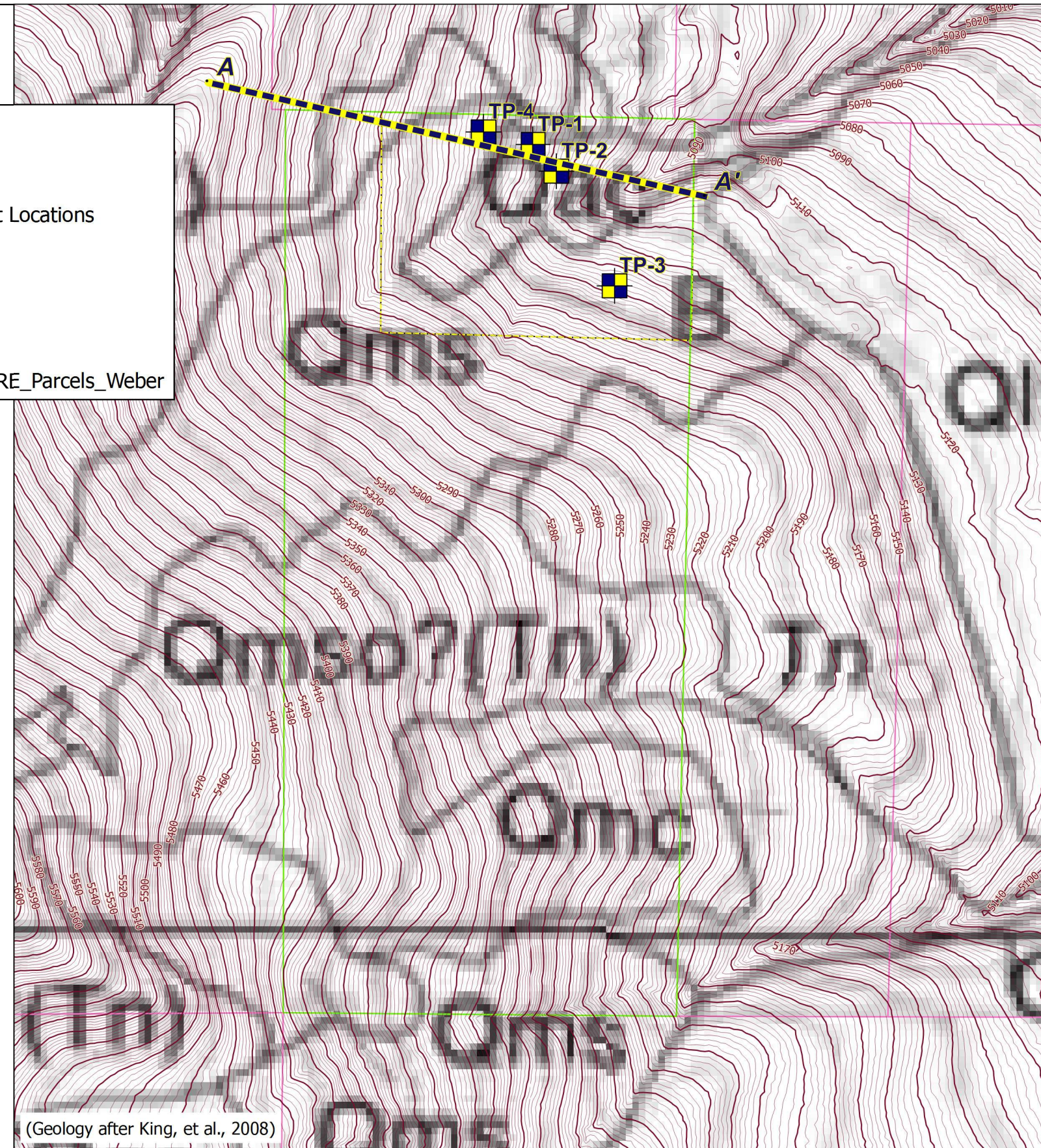


Explanation

- Cross Section
- Proposed Test Pit Locations
- Index Contour

Boundaries

- Property
- Homesite Area
- SGID10_CADASTRE_Parcels_Weber



Base: 2014 1.0m Color NAIP Orthoimagery,
from Utah AGRC; <http://gis.utah.gov/>
Elevation: 2006 2.0m Geoprocessed LiDAR from Utah AGRC;
<http://gis.utah.gov/>
Geology: King, J.K., Yankee, W.A., and Coogan, J.C., 2008, Interim
geologic map of the Snow Basin and part of the Huntsville
quadrangle, Davis, Morgan, and Weber Counties, Utah: Utah
Geological Survey Open-File Report 536, scale 1:24,000



**FIGURE 2
PROPOSED
WORK PLAN**

