



May 27, 2015

Ms. Dana Shuler  
Weber County Engineering Department  
c/o: Mr. Alan Taylor  
Taylor Geotechnical  
2650 North 180 East  
Lehi, Utah 84043

Subject: Second Geologic Review  
6472 and 6498 South Bybee Drive  
Weber County Parcel Numbers: 07-753-0001 and 07-753-0002  
Uintah, Weber County, Utah  
SA Project No: 15-140

Report: "Memorandum - Review Response for Geological Review - 6472 and 6498 South Bybee Drive, Weber County Parcel Numbers: 07-753-0001 and 07-753-0002 Uintah, Utah, SBI Project Number 2-14-522," dated April 24, 2015, prepared by GeoStrata, 14425 South Center Point Way, Bluffdale, Utah 84065, prepared for Matt Rasmussen

Geologic Submittal Status: **INCOMPLETE**

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Dear Ms. Shuler,

At your request, Simon Associates, LLC (SA) reviewed the above referenced April 24, 2015, GeoStrata memorandum. The April 24, 2015, GeoStrata memorandum was submitted in response to SA review letter:

Geologic Review, 6472 and 6498 South Bybee Drive, Weber County Parcel Numbers: 07-753-0001 and 07-753-0002, Uintah, Utah (SBI Project No: 2-14-522), dated November 29, 2014, prepared for Ms. Dana Shuler, Weber County Engineering Department, c/o: Mr. Alan Taylor, Taylor Geotechnical, 2650 North 180 East, Lehi, Utah 84043.

The November 29, 2014, SBI review letter was written in response to GeoStrata report:

Geologic Hazards Assessment, Dauphine-Savory Piedmont Subdivision Lots 1R and 2R and adjacent 2-acre property, Weber County, Utah (GeoStrata Job No. 910-001), dated December 10, 2013: prepared for: Matt Rasmussen, 2927 Melanie Lane, Ogden, UT 84403.

The purpose of SA's review is to evaluate whether or not the GeoStrata documents adequately address geologic conditions at the site, consistent with concerns for public health, safety, and welfare; reasonable professional standards-of-care, and; the Weber County municipal code of ordinances. Weber County did not notify SA of the additional field exploration performed by GeoStrata; therefore, a field review of trench exposures was not performed by SA.

## **SA Recommendations**

The November 29, 2014, SBI review letter contained fourteen items that recommended Weber County request additional data and/or clarification. SA recommends Weber County not consider the December 10, 2013, GeoStrata report and April 24, 2015, GeoStrata memorandum complete from a geologic perspective until GeoStrata adequately addresses the following items.

### **1. Item 1 of November 29, 2014, SBI review letter**

SBI recommended Weber County request GeoStrata submit all plates with correct titles.

GeoStrata submitted 14 Plates in the April 24, 2015, memorandum and noted that Plate A-5 was titled "Site Specific Geologic Map," and Plate A-6 "Site Geologic Setback Map." However, the April 24, 2015, GeoStrata memorandum did not contain Plate A-5 and contained two plates labeled as Plate A-6, "Site Geologic Setback Map."

SA recommends Weber County request GeoStrata clarify the apparent discrepancy.

### **2. Item 2 of November 29, 2014, SBI review letter**

SA recommended Weber County request GeoStrata submit properly annotated trench logs containing: a) a vertical and horizontal scale, b) indication of the trench corresponding to the log, c) the trench wall documented and, d) trench orientation.

The trench logs submitted with the April 24, 2015, GeoStrata memorandum do not contain a vertical scale and trench orientations are not noted. SA recommends Weber County request GeoStrata submit trench logs with a vertical scale and the orientation of the trench.

### **3. Item 4 of November 29, 2014, SBI review letter**

Section 2.1, Purpose and Scope of Work (p. 2), of the GeoStrata December 10, 2013, report indicated GeoStrata reviewed and evaluated aerial photographs covering the

site area. SBI suggested Weber County request GeoStrata provide the source, date, flight-line numbers, and scale of aerial photos used.

GeoStrata provided the requested information in their April 24, 2015, memorandum and also provided LiDar hillshade maps. GeoStrata concluded "Based on our review of this Lidar data and our stereo aerial photography review, no visible lineations or other surface fault rupture related geomorphology was observed that would indicate the presence of surface fault ruptures on or adjacent to the subject site."

SA reviewed aerials photographs and also the LiDar hillshade maps provided by GeoStrata and does not agree that there are "... no visible lineations or other surface fault rupture related geomorphology was observed that would indicate the presence of surface fault ruptures on or adjacent to the subject site."

SBI suggests Weber County request GeoStrata evaluate the referenced aerial imagery and submit a lineament<sup>1</sup> map.

4. Item 5 of November 29, 2014, SBI review letter

SBI noted that the Utah Geological Survey geologic map referenced in the April 24, 2015, GeoStrata memorandum (Yonkee and Lowe, 2004), had two apparent errors and attached a corrected version, provided by Mr. Jon King of the UGS. Apparently the corrected version was not distributed, and is attached herein for completeness. No recommendations.

5. Item 8 of November 29, 2014, SBI review letter

Item 8 in the November 29, 2014, SBI review letter recommended Weber County request further clarification of the alluvial fan and debris flow deposits documented in the trenches T-1 and T-2 presented in the December 10, 2013, GeoStrata report.

The April 24, 2015, GeoStrata memorandum indicates GeoStrata revisited the site, determined that additional trenching and closer examination of the existing trenches was required, excavated an additional trench (Trench 3) across the proposed building area of lot 2R, deepened, re-cleaned, and re-investigated trenches T-1 and T-2 and consequently updated their geologic interpretations of the geologic units exposed in trench excavations.

Apparently, it is the opinion of GeoStrata that the geologic units in T-1 and T-3 are not debris flow deposits as originally documented in their December 10, 2013, report, but

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<sup>1</sup> Lineament: A linear topographic, tonal or vegetative surface feature believed to reflect crustal structure, such as fault lines, aligned volcanoes, and straight stream courses (AGI, 2005).

are Pleistocene-age lacustrine sediments, Holocene-age colluvium and alluvium, and a pedogenic horizon. GeoStrata concluded that the oldest continuous geologic units documented in T-1 and T-3 (Pleistocene-age lacustrine deposits) were of proper age to preserve evidence of Holocene-aged movement along the Weber segment of the Wasatch Fault, that no fault-related deformation was observed within any of the deposits observed in T-1 and T-3, and that no active surface rupture faults are located underlying the proposed buildable area of Lots 1R and 2R.

It is standard of practice for trenches to be of adequate length to explore the proposed building site(s) plus any potential setback (Salt Lake County 2002; Christenson and others, 2003; Morgan County, 2010; Draper City, 2010). Trenches should therefore extend beyond the building footprint at least the minimum setback distance for the building type. Using the fault trends shown on Figure A-2 of the April 24, 2015, GeoStrata memorandum, T-1 and T-3 do not fully cover the buildable areas designated on Figure A-2 of the April 24, 2015, GeoStrata memorandum.

SA recommends Weber County request GeoStrata:

- a. Rectify the apparent shortcoming in regards to exploring the proposed building site(s).
  - b. Clarify why the entire length of trenches were not logged/documented.
  - c. Provide data to support their statement that "...no fault-related deformation was observed within any of the deposits observed in T-1 and T-3..."
6. Item 9 of November 29, 2014, SBI review letter

SBI suggested Weber County request GeoStrata delineate the alluvial fan and active channel(s) on the site-specific geologic map.

It appears that one of the plates labeled "Plate 6, Site Geologic Setback Map," may represent the map requested in the November 29, 2014, SBI review letter. The April 24, 2015, GeoStrata memorandum, stated that "... the alluvial fan sediment is largely confined to the channel located south of Trenches T-1 and T-3," and "... that a separate hydrological study has been completed by another firm for the subject site. As part of that study, we understand that a setback has been delineated from either side of the channel. GeoStrata has included this setback on our site specific geologic map (Plate A-5) and on our Site Geologic Setback Map (Plate A-6)."

In the December 10, 2013, GeoStrata report, GeoStrata concluded;

- a. “The site was identified as being at an elevated risk of being impacted by alluvial fan flooding/debris flows. Based on our observations, the site has experienced numerous debris flows as well as alluvial fan floods during the Holocene. It is recommended that site grading and catchment basins/earthen barriers be utilized to minimize the risk of the proposed development being impacted by alluvial fan flooding/debris flows. A debris flow analysis was beyond the scope of this project, but should be considered prior to development (Executive Summary, p. 1).”
- b. “Due to the potential for alluvial fan flooding and debris flows at the site, strategic grading to create deflection berms and a break in slope away from each residence with slopes great enough and slope heights sufficient to allow alluvial fan flooding/debris flow events from the north and northeast directions to flow around each residence are likely the most feasible forms of mitigation available to the property owner at this time (Executive Summary, p. 1).”
- c. “...Based on the presence of mapped and observed past alluvial fan deposits on the subject site, the site does have the potential to be impacted by future alluvial fan flooding and debris flows (p. 17).”

SA recommends Weber County request GeoStrata:

- a. Provide Plate A-5, which was not included in the April 24, 2015 GeoStrata memorandum.
- b. Clarify which of the two figures labeled Plate 6 “Site Geologic Setback Map,” is intended for delineating the alluvial fan and active channel(s).
- c. Provide the citation and a copy of “...the separate hydrological study...completed by another firm for the subject site.”
- d. Provide the setback distance recommended in “...the separate hydrological study...completed by another firm for the subject site.”
- e. Clarify whether or not the:
  - i. Site has the potential to be impacted by alluvial fan flooding and debris flows as documented in the December 12, 2013, GeoStrata report, and if not, why.
  - ii. Recommendations in the December 12, 2013, GeoStrata report, remain valid and applicable.

7. Item 12 of November 29, 2014, SBI review letter

SBI recommended Weber County request GeoStrata submit Plate A-2 depicting the surface fault rupture hazard special study area as determined by GeoStrata utilizing a distance of 500 feet from the reported location of faults within the Weber segment of the Wasatch Fault Zone. The map was not provided.

SBI recommends Weber County request GeoStrata submit a map depicting the surface fault rupture hazard special study area, as determined by GeoStrata, utilizing a distance of 500 feet from documented locations of faults within the Weber segment of the Wasatch Fault Zone.

8. Item 14 of November 29, 2014, SBI review letter

SA recommended Weber County request the applicant submit a debris flow analysis for the subject property as recommended in the December 10, 2013, GeoStrata report.

The GeoStrata response in the December 10, 2013, GeoStrata report follows: "GeoStrata has been informed that a hydrological study has been completed for the site, and that recommendations concerning site grading to reduce the potential for the site to be impacted by alluvial fan flooding/debris flow have been given in reports completed by others. All recommendations presented in these reports should be incorporated into the design of the project."

SA recommends Weber County request GeoStrata provide the citation and a copy of "...the separate hydrological study...completed by others..." for the subject site.

9. Section 2.1, Purpose and Scope of Work (p. 2), of December 10, 2013, GeoStrata report states: "Both sites are located within a fault hazard special study area as delineated by the Surface Fault Rupture Special Study Areas, Wasatch Front and Nearby Areas, Utah map prepared by the Utah Geological Survey (Christenson and Shaw, 2008). In addition, both sites are located within a debris flow special study area as delineated by the Debris-Flow/Alluvial Fan Special Study Areas, Wasatch Front and Nearby Areas, Utah prepared by the Utah Geological Survey (Christenson and Shaw, 2008)."

SA recommends Weber County request GeoStrata provide the two referenced maps.

10. SA recommends Weber County request GeoStrata provide the method utilized for locating the exploratory trenches and the degree of accuracy inherent in the method used.

## Closure


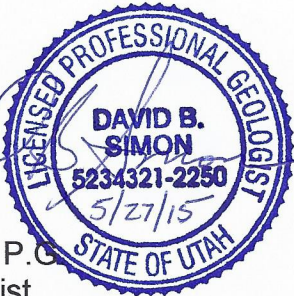
Comments and recommendations in this review are based on data presented in the referenced Consultant's report. SA accordingly provides no warranty that the data in the Consultant's report or any other referenced reports are correct or accurate. SA has not performed an independent site evaluation. Comments and recommendations presented herein are provided to aid Weber County in reducing risks from geologic hazards and to protect public health, safety, and welfare. There is no other warranty, either express or implied.

All services performed by SA for this review were provided for the exclusive use and benefit of Weber County; no other person or entity may or is entitled to use or rely upon any of the information or reports generated by SA as a result of this review.

SA would be pleased to meet with Weber County and/or the Consultant, at a mutually convenient time, to discuss any of the issues presented herein. In the meantime, should you have any questions, please feel free to contact the undersigned. The opportunity to be of service to Weber County is appreciated.

Very truly yours,

**SA**

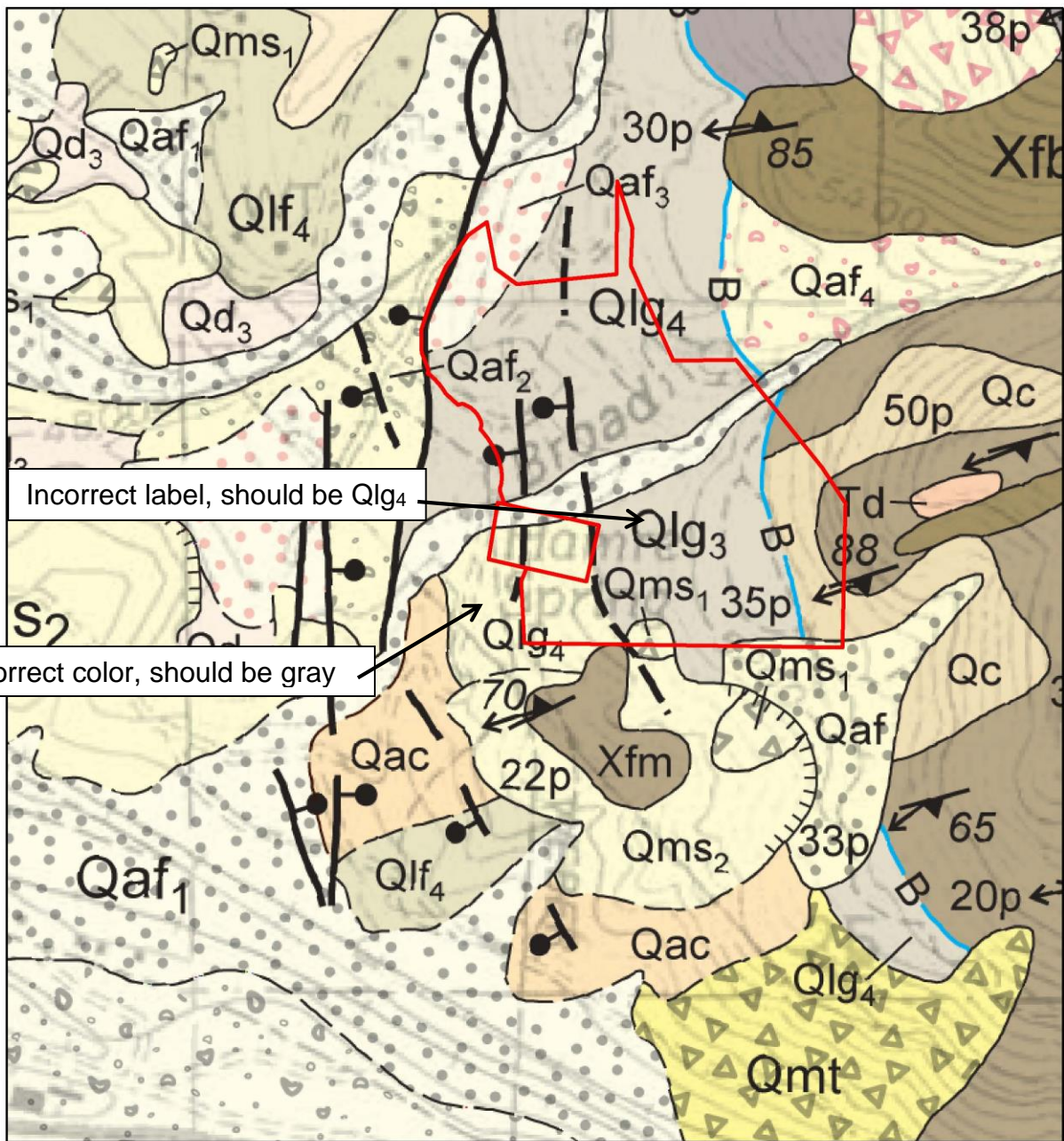
David B. Simon, P.G.  
Principal Geologist

Dist.: 1/addressee  
Encl: UGS geologic maps (2)

## References Cited

- AGI, 2005, American Geological Institute, Glossary of Geology Fifth edition, American Geological Institute, Neuendorf, K.K.E., Mehl, Jr., J.P., and, Jackson, J.A., editors: American Geological Institute, Alexandria, Virginia, 770 p.
- Christenson, G.E., Batatian, L.D., and Nelson, C.V., 2003, Guidelines for evaluating surface-fault-rupture hazards in Utah: Utah Geological Survey, Miscellaneous Publication 03-6, 14 p.  
[http://ugspub.nr.utah.gov/publications/misc\\_pubs/MP-03-6Guidelines.pdf](http://ugspub.nr.utah.gov/publications/misc_pubs/MP-03-6Guidelines.pdf)
- Draper City, 2010, Chapter 9-19 Geologic hazard ordinance of Title 9 Land Use and Development Code for Draper City, adopted December 30, 2003, per Ordinance No. 547; amended December 11, 2007 per Ordinance No. 796; amended June 1, 2010, per Ordinance No. 935.  
<http://ut-drapercity.civicplus.com/documentcenter/view/379>
- Morgan County, 2010, Morgan County geologic hazard ordinance, adopted June 1, 2010: Chapter 8-51 of the Morgan County Municipal Code.  
<http://www.morgan-county.net/Portals/0/Documents/851%20Appendix.pdf>
- Salt Lake County, 2002, Minimum standards for surface fault rupture hazard studies, Appendix A, Geologic hazards ordinance, Chapter 19.75 of the Salt Lake County zoning code of ordinances, adopted July 2002: Salt Lake County Planning and Development Services Division, 2001 South State Street, Suite N3700, Salt Lake City, Utah, 84190-4200, 9p.  
<http://slco.org/pwpds/zoning/html/geologicHazards.html>
- Yonkee, W.A. and Lowe, M., 2004, Geologic map of the Ogden 7.5 minute quadrangle, Utah Geological Survey Open-File Report M-200, 42 p., 2 pl., scale 1:24,000  
<http://geology.utah.gov/apps/intgeomap/>





**Legend**

- Site Boundary
- Qac** – Colluvium and Alluvium undivided
- Qaf** – Alluvial fan deposits
- Qlg** – Lacustrine gravel-bearing deposits
- Qlf** – lacustrine fine-grained deposits
- Qms** – Landslide deposits
- Xfm** – Migmatitic gneiss



1:6,000

Base Map: USGS 7.5 Minute Topographic Map obtained from the State of Utah AGRC.

All Locations are Approximate



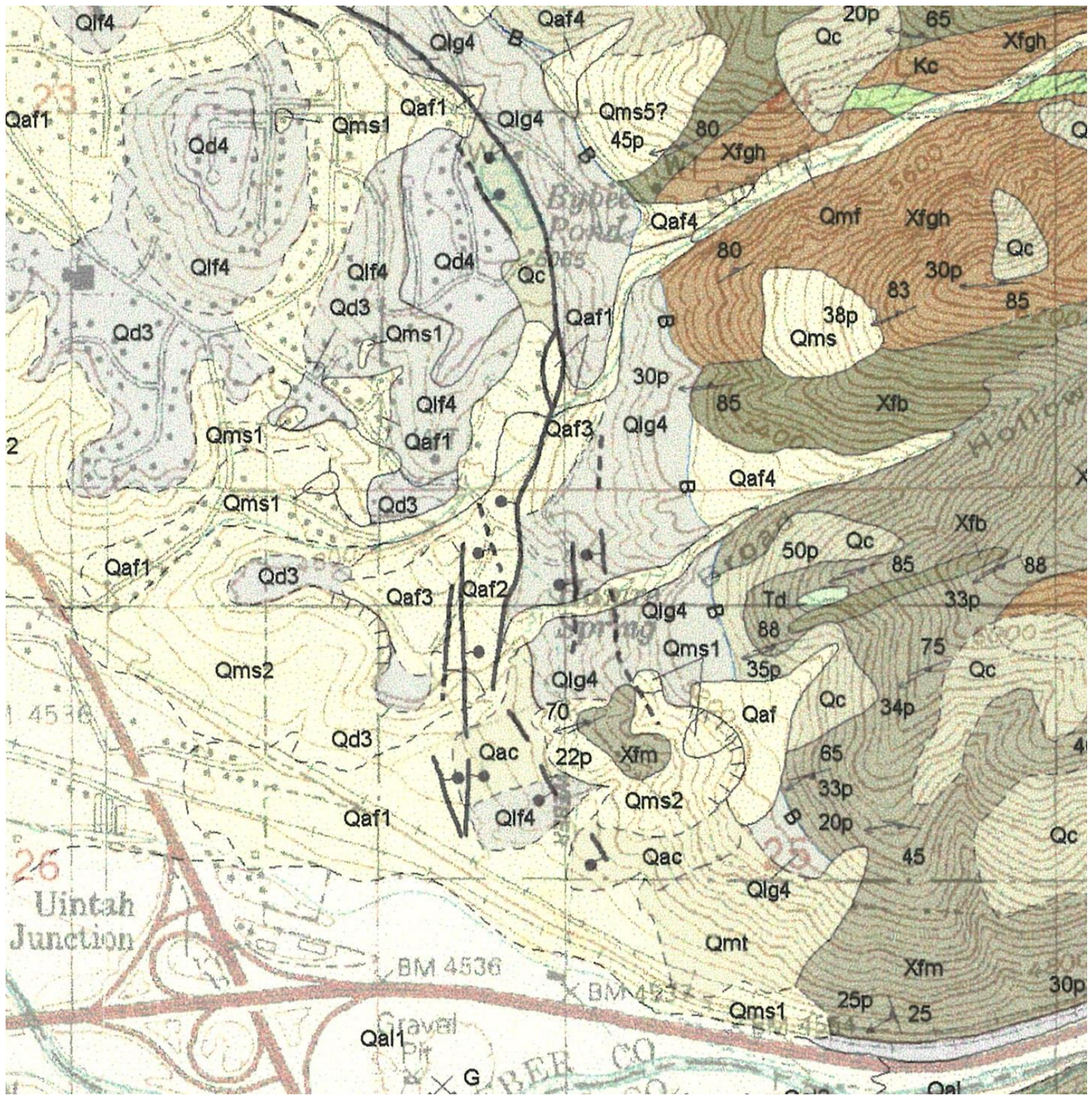
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Matt Rasmussen  
Dauphine-Savory Piedmont Subdivision  
South Weber, Utah  
Project Number: 910-001

**Geologic Map**

**Plate  
A-3**





Corrected Version

Yonkee, W.A. and Lowe, M., 2004, Geologic map of the **Ogden 7.5 minute quadrangle**, Utah Geological Survey Open-File Report M-200, 42 p., 2 pl., scale 1:24,000.

<http://geology.utah.gov/apps/intgeomap/>