PLANNING COMMISSION

City of Holladay
May 7, 2024
City Council Chambers – 4580 S. 2300 E. Holladay

City of Holladay

This public meeting will be held in-person and also transmitted via live video stream on the City of Holladay webpage. Participation in a *public hearing* portion of this meeting can be accomplished in either of the following ways:

- During the meeting: address the Commission when the item is called by the Commission Chair
- Email: comments must be received by 5:00 pm on **05/06/2024** to the Community and Economic Development Department; cmarsh@holladayut.gov. Emailed comments will be read by the Commission Chair.

MEETING AGENDA

5:30 PM **WORK SESSION –** The Commission may discuss any or all agenda items. No decisions or voting to occur.

6:00 PM **CONVENE REGULAR MEETING** – Public Welcome & Chair Opening Statement

PUBLIC HEARING

1. **"Ault Mixed-Use Planned Unit Development" – Conditional Land Use Permit – 6375 S Highland Drive (PO Zone)**
   Review and consideration of a request by Applicant **Michael Ault** as Owner, for a Mixed Residential and Office Planned Unit Development. Item reviewed as an administrative application as per provisions stated in Holladay Ordinance §13.08.040

   File #24-2-03

ACTION ITEMS

4. **"Silver Hawk 2" Subdivision – Amendment and Extension – ADDRESS (ZONE)**
   Preliminary/Final review and consideration of an application by Application/Property Owner, Robert and Connie Jensen, to subdivide 2 acres of land. This 2-lot, residential subdivision will be added as an amendment to the abutting, "Silver Hawk 2" Subdivision. Item reviewed as an Administrative action for permitted uses in accordance to zone and subdivision standards required by Holladay Ord §13.10

   File #18-1-04-1

5. **Approval of Minutes –** 05/18/2021

ADJOURN

CERTIFICATE OF POSTING

I, Stephanie N. Carlson, the City Recorder of the City of Holladay, certify that the above agenda notice was posted on the City of

Holladay bulletin board, the City website www.holladayut.gov, the Utah Public Notice website www.utah.gov/pmn, and was emailed to the Salt Lake Tribune and Desert News and others who have indicated interest.

DATE POSTED: [DAY, MONTH DATE, 2024 @ TIME AM/PM]

Stephanie N. Carlson MMC, City Recorder
City of Holladay

Reasonable accommodations for individuals with disabilities or those in need of language interpretation service can be provided upon request. For assistance, please call the City Recorder's office at 272-9450 at least three days in advance. TTY/TDD number is (801)270-2425 or call Relay Utah at #7-1-1

Planning Commission
Community Development
Department City of Holladay
801.527.3890

CITY of HOLLADAY

FILE# 24-2-03 6375 S HIGHLAND MIXED-USE PUD CUP

ADDRESS:

6375 S. Highland Dr.

LEGAL DESCRIPTION: *22-22-102-016*

BEG 1204.5 FT S & 53 FT E FR NW COR OF SEC 22, T 2S, R 1E, SL M; S 105.32 FT; S'LY ALG CURVE TO L 64.28 FT; E 78.24 FT; N 38^43' E 50.58 FT; N 31^42' E 153 FT; W 172 FT M OR L TO BEG. 0.5 AC M OR L. 4665-1153, 1154 5510-0412 5818-1188 6811-2170 10430-9291 10426-5242 10844-2613 11237-4032

APPLICANT/REPRESENTATIVE:

Michael Ault

PROPERTY OWNER:

Michael Ault

ZONING:

PO

GENERAL PLAN DISTRICT:

Highland Drive Master Plan - Segment C

CITY COUNCIL DISTRICT:

District #5

PUBLIC NOTICE DETAILS:

Mailed to properties w/in 500 ft 4/26/2024

REQUEST:

Conditional Use Permit

APPLICABLE REGULATIONS:

13.08.040
13.78

EXHIBITS:

Zone map
Staff Report
Applicant Narrative
Applicant supporting doc.

STAFF:

Carrie Marsh, City Planner

DECISION TYPE:

Administrative:

Public hearing required. PC shall make a motion of either, denial, approval or to continue. All motions require findings which support the decision. As directed by ordinance, applications shall be approved if the Land Use Authority finds Substantial Evidence of compliance with applicable requirements. Holladay Ord. 13.06.050.B2 and 13.08

SITE VICINITY MAP

Notes:

CITY OF HOLLADAY
Planning Commission
May 7, 2024
Item #1

Request:	**CONDITIONAL USE – MIXED-USED PLANNED UNIT DEVELOPMENT**
Project	Ault Mixed-Use Redevelopment – Residential Units Above Office Space
Address:	6375 S Highland Dr.
Applicant:	Michael Ault
Notice;	Mailed to all property owners within 500 feet 4/26/2024.
Staff*:*	Carrie Marsh

ACREAGE:	.57 acres (24,829)
ZONE:	PO
CURRENT USE:	Office space in a multi-tenant building
ORDINANCES:	13.08.040: CONDITIONAL USE

REQUIRED PLANNING COMMISION ACTION TYPE

Administrative:
Public hearing required. PC shall make a motion of either, denial, approval or to continue. All motions require findings which support the decision. As directed by ordinance, applications shall be approved if the Land Use Authority finds Substantial Evidence of compliance with applicable approval standards and requirements. Holladay Ord. 13.08.040

BACKGROUND & OVERVIEW

- The .57-acre property was recently approved by the Holladay City Council to be rezoned from RM to PO.
- The PO zone allows for office uses in addition to medical and dental uses and a few others.
- A mixed-use planned unit development is a conditional use in a PO zone, allowing for the Planning Commission to review the use, assess any potential impacts, and apply appropriate conditions to mitigate the impacts.
- The applicant is proposing to convert existing office space on the top floor of the existing building into two dwelling units, owned by the property owner. One will be the owners dwelling unit and the other will function as a rentable unit.

- Office space on the ground and below ground levels is to remain.

TECHNICAL REVIEW COMMITTEE RECOMMENDATION

Planning/Zoning:

- The addition of two living spaces with two bedrooms each has a parking requirement of 3 total spaces.
- Each level contains roughly 2600 sq. ft of finished floor space, totaling 5200 sq. ft., requiring 26 total parking spaces (1 space per 200 sq. ft of floor space, plus two additional spaces)
    - A total of 29 spaces are required.
    - 35 parking spaces exist, meeting parking requirements.

Engineering:

- No comments

Building:

- Access and building code to be addressed when a permit for a commercial tenant improvement is submitted.

Fire:

- Fire access to be addressed in commercial tenant improvement permit.

STAFF ANALYSIS & RECOMMENDED CONDITIONS FOR APPROVAL

Staff recommends approval of the use as proposed upon the following findings and conditions:

General Findings:

1. This use is not in conflict with the City's General Plan.
2. The use complies with the purpose and uses allowed in the PO zone and creates a new mixed-use opportunity in the City.
3. This use is compatible with other uses on the site and is a smaller scaled and lower intensity mixed-use than may be typically seen in mixed-use development.
4. The building doe not exceed the permitted heights on abutting residential properties; thus a residential use on the second floor has no more impact than adjacent residential uses.
5. All access to the site is from Highland Drive, a commercial corridor with a 104 foot wide right of way.
6. There is no expansion of the footprint of the building with this use.
7. There is ample parking and access to the use.

Conditions of Approval:

Upon evaluation of the public comment and review of the narrative and information in this report, staff suggests the following conditions of approval:

1. All businesses within the building to apply for or maintain current business licenses with the City of Holladay.
2. Any new lighting installed on the property to be compliant with lighting standards in the PO zone, according to §13.44.110
3. Building permit for all improvements to be applied for separately.
4. Comply with screening standards required in the PO zone, according to §13.44.130
5. Parking designations, allotments and or locations for each use are to be managed by the property owner via recorded CCR agreements.

SUPPLEMENTAL INFORMATION

- Applicant narrative
- Floor Plan Details showing residential space.
- Section 13.08.040. Conditional Use Permit

13.08.040: CONDITIONAL USE PERMIT:

F. Approval Standards: A conditional use shall be approved if reasonable conditions are proposed by the applicant, or can be imposed by the land use authority, to mitigate the potential detrimental effects of the proposed use in accordance with applicable standards set forth in this section.

1. A conditional use shall:

a. Be consistent with policies set forth in the city's general plan applicable to the site where the conditional use will be located.

b. Be allowed by the zone regulations where the conditional use will be located.

c. Be compatible with the character of the site, adjacent properties and uses, and existing development within the vicinity of the site where the use will be located.

d. Provide vehicular access to the site without materially degrading the existing level of service of the abutting streets.

e. Locate all driveways oriented to direct traffic to streets, major or local, without impacting the safety, purpose, and character of these streets.

f. Locate on-site parking areas and structures, particularly those locations likely to encourage street side parking for the proposed use, in areas of the site that will not adversely impact the reasonable use of adjacent properties.

g. Accommodate peak traffic to the site without impairing the use and enjoyment of adjacent properties.

h. Provide an internal circulation system designed to mitigate adverse impacts on adjacent property from motorized, non-motorized, and pedestrian traffic.

i. Restrict hours of operation of the proposed conditional use in relation to the hours of activity or operation of other nearby uses to mitigate noise, light, odor, or other nuisances that unreasonably impair the use and enjoyment of adjacent properties.

j. Demonstrate existing or proposed utility and public services will be adequate to support the proposed use at normal service levels and is designed in a manner to avoid adverse impacts on adjacent land uses, public services, and utility resources.

k. Install appropriate buffering, such as landscaping, setbacks, and building location, to protect adjacent land uses from light, noise, and visual impacts resulting from the proposed use.

2. A conditional use shall not:

a. Contribute to a detrimental concentration of existing nonconforming or conditional uses substantially similar to the use proposed within one-fourth (1/4) mile of the exterior boundary of the subject property;

b. Result in loss of privacy, objectionable views of large parking or storage areas; or views or sounds of loading and unloading areas; and

c. Encroach on or cause erosion of the bank of a river or stream, or direct runoff into a river or stream without approval by the appropriate storm water authority.

3. The proposed conditional use and associated development shall comply with all other applicable provisions of this title and his code.

G. Conditions of Approval: Such conditions shall:

1. Be expressly set forth in the conditional use permit;

2. Not be used as a means to authorize a use intended to be temporary only;

3. Substantially further a legitimate public purpose;

4. Not require the applicant to carry a disproportionate burden in furthering the public purpose of the condition; and

5. In the case of land dedications and other contributions of property, be reasonably related and roughly proportionate to the use of the property for which the conditional use is authorized.

H. Denial: If the anticipated detrimental effects of a proposed conditional use cannot be substantially mitigated by the proposal or by the imposition of reasonable conditions to achieve compliance with applicable standards, the conditional use permit shall be denied.

I. Appeal: A person adversely affected by a final decision of the planning commission regarding approval or denial of a conditional use permit may appeal the decision to the city council.

CITY OF HOLLADAY
COMMUNITY AND
ECONOMIC DEVELOPMENT DEPARTMENT
4580 South 2300 East
Holladay, Utah 84117
801.527.3890

NOTICE of PUBLIC HEARING
PLANNING COMMISSION

CAMDEN STONE, LLC

2054 E 6425 S

HOLLADAY UT 84121-2208

CITY OF HOLLADAY
40°40'16.59"N 111°49'30.40"W EST.1849 INC.1999

CITY OF HOLLADAY
COMMUNITY AND
ECONOMIC DEVELOPMENT DEPARTMENT
4580 South 2300 East
Holladay, Utah 84117
801.527.3890

NOTICE of PUBLIC HEARING
PLANNING COMMISSION

FELTS, BONNIE A; TR (BAFF TR)

2054 E 6425 S

HOLLADAY UT 84121-2208

CITY OF HOLLADAY
40°40'16.59"N 111°49'30.40"W EST.1849 INC.1999

CITY of HOLLADAY

NOTICE OF A PUBLIC HEARING

CONDITIONAL USE PERMIT – Mixed-use Planned Development

Date: **Tuesday, MAY 7th, 2024**
Time: **As close to 6:00 pm as possible**
Location: **City Hall – City Council Chambers**
Hearing Body: **Planning Commission**

Notice is hereby given that the City of Holladay Planning Commission will review and consider a proposal by Michael Ault for a Conditional Use Permit for a residential mixed-use planned development on his property located at **6375 S. Highland Drive** in the PO Zone. Proposal is in accordance with provisions in Holladay City Code Section 13.08.040.

No zone or ordinance change is proposed in conjunction with the/this application. *

Please submit comments via email by 5:00 pm 05/06/2024 to Carrie Marsh cmarsh@holladayut.gov. Emailed comments received by the designated times will be forwarded to the Commission prior to the meeting.

Additional information regarding this item & instructions how to view this meeting remotely can be found on the City's website and on the posted agenda, prior to the meeting. Interested parties are encouraged to watch the video stream of the meeting on the City of Holladay webpage.

ATTENTION: This notice was mailed on 04/26/2024 by order of the Community and Economic Development Director, Jonathan Teerlink, to all residents within 500 feet from the subject property. If you are not the owner of your residence, please notify the owner regarding this matter. Thank you.

CITY of HOLLADAY

NOTICE OF A PUBLIC HEARING

CONDITIONAL USE PERMIT – Mixed-use Planned

Date: **Tuesday, MAY 7th, 2024**
Time: **As close to 6:00 pm as possible**
Location: **City Hall – City Council Chambers**
Hearing Body: **Planning Commission**

Notice is hereby given that the City of Holladay Planning Commission will review and consider a proposal by Michael Ault for a Conditional Use Permit for a residential mixed-use planned development on his property located at **6375 S. Highland Drive** in the PO Zone. Proposal is in accordance with provisions in Holladay City Code Section 13.08.040.

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City of Holladay
COMMUNITY ECONOMIC DEVELOPMENT DEPARTMENT
4580 S 2300 E, Holladay, Utah 84117
Phone: 801-527-3890

Planning Comm. 5/16 ~~April 16th~~ (April Schedule) May 7th ~~May 21st~~

CONDITIONAL USE:
NEW OR EXPANSION OF BUILDINGS
REQUIRED APPLICATION SUBMITTALS

Residential use in PO = Cond. Use Permit

for applications requiring a concurrent site plan review

Following Documents are Required for a Complete Submittal:

1. The following information shall be submitted to the Community Development Department:

   - ☐ *Completed **General Development Application*** Form
   - ☐ *Applicable fees as per 03.35*
   - ☒ *Proof of Ownership – Signed Ownership Affidavit*
   - ☐ *Narrative detailing the request;* to the Planning Commission and reasons or justifications for the granting of such use. This letter should explain the nature of the business, business hours, traffic impacts (if any), etc. to assist staff and the Planning Commission better understand the request. The letter should address why the Conditional Use will not be in contrast to the public interest and whether or not the proposed use will be in keeping with the character of the existing zoning of the area. Refer to the Home Occupation Ordinance and describe all sections that apply to your request. Review Holladay Ord. 13.08.040 for approval/denial standards.
   - ☒ ***Building floor plans*** *showing all uses,* ***Elevations*** *showing architectural facades and proposed height* sending digital
   - ☒ ***Site plan*** *layout and* ***Landscaping Plan*** *as per applicable sections of Ordinance 13.77*

2. The application should be filed no later than **3 weeks prior** to the desired public hearing date before the Planning Commission. The Planning Commission generally meets on the 1st and 3rd Tuesday of the month

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Application Procedure and Process as per 13.08.040

1. The Community Development Director will notify you of the Planning Commission meeting date
2. The Community Development Department will publish a notice in required media and mail notice to all property owners within 500'meeting and will post notice on your property (do not remove this notice)
3. The agenda on which this item will be considered will be available/posted 24hours prior to the meeting
4. To mitigate the potential detrimental effects, the Planning Commission will consider all elements of 13.08.040F while reviewing your application, please review sections entitled;
   a. *A conditional use shall..*
   b. *A conditional use shall not…*
5. If the anticipated detrimental effects of a proposed conditional use cannot be substantially mitigated by the proposal or by the imposition of reasonable conditions to achieve compliance with applicable standards, the conditional use permit shall be denied.
6. The Planning Commission will make a decision after the required public hearing.
7. If approved a conditional use permit shall not relieve an applicant from obtaining any other authorization, permit, or license required under this title or other title of this code.
8. A conditional use permit shall run with the land, unless otherwise specified and is subject to the provisions relating to amendment, revocation, or expiration of a conditional use permit

APR 15 REC'D 2024

CITY OF HOLLADAY 1849 1999

City of Holladay
COMMUNITY DEVELOPMENT DEPARTMENT
4580 S 2300 E, Holladay, Utah 84117
Phone: 801-527-3890

GENERAL LAND USE DEVELOPMENT APPLICATION

APR 15 RECD 2024

Name of Proposed Project:
6375 HIGHLAND

Address of Project:
6375 So. HIGHLAND DRIVE

TYPE OF REQUEST: (mark all that apply)

	ADMINISTRATIVE PROCEEDURES APPLY (ORD. 13.08)		LEGISLATIVE PROCEEDURES APPLY (ORD. 13.07)
	SITE PLAN (___) PERMITTED of (___) CONDITIONAL		REZONE of PROPERTY
	SUBDIVISION PLAT		GENERAL PLAN AMENDMENT
	CONDOMINIUM PLAT		CODE AMENDMENT
X	CONDITIONAL USE PERMIT		PUBLIC STREET: NAME CHANGE, VACATION /CLOSURE or DESIGNATION
	SPECIAL EXCEPTION		HISTORIC SITE DESIGNATION
	LOT LINE ADJUSTMENT or COMBINATION		DEVELOPMENT AGREEMENT AMENDMENT
	OTHER:		ANNEXATION

Applicant Name: (Please Print)
MICHAEL AULT

Property Owners Name: (Please Print) ***ATTACH SIGNED "OWNER AFFIDAVIT"****

Applicant's Mailing Address: 3340 So. 300 W. #7 **City:** SLC **State:** UT **Zip:** 84115

Applicant Phone: (801-712-5551

Applicant's Email Address: MZAULT1@YAHOO.COM

Main Contact Person (Please Print):
Name: MICHAEL AULT **Phone:** **email:**

Brief summary of proposal / request:
TO ALLOW MIXED USE IN SAMS BUILDING

FILING FEES: (ORD 3.35)

SITE PLAN REVIEW	$600.00	REZONE of PROPERTY	$900.00 + $85.00/acre
SITE PLAN AMENDMENT	$250.00	CODE AMENDMENT	$600.00
SUBDIVISION: *Final = 6% of the cost of improvements)*	$2,000.00 + $100.00/lot	GENERAL PLAN AMENDMENT	$300.00 + $50.00/acre
CONDOMINIUM	$1,000.00 + $100.00/unit	HISTORIC SITE DESIGNATION	$600.00
CONDITIONAL USE PERMIT - *COMMERCIAL*	$1,000.00 + $35.00/acre	PUBLIC STREET:	$300.00 – vacation $500.00 – dedication $250.00 – namechange
★ CONDITIONAL USE PERMIT - *RESIDENTIAL*	$900.00 + $50.00/unit	ANNEXATION	
CONDITIONAL USE PERMIT – *HOME BUSINESS*	$100.00	DEVELOPMENT AGREEMENT AMENDMENT	

OFFICE USE ONLY

FILE NUMBER: _____
PARCEL NUMBER: _____
GENERAL PLAN: _____
ZONE: _____ ACREAGE: _____
PC ACTION: _____ DATE: _____
CC ACTION: _____ DATE: _____
FILE DATE: _____

st(s)/submittals or it will not be accepted.

cisions and/or meetings dates at that time
rd Thursday of each month
r a representative of the applicant.

RECEIPT DATE _____ No. 191027

RECEIVED FROM Ault Investments Inc. $ 900.00

residental planned unit development CUP DOLLARS

FOR RENT
FOR nine hundred and no/100

ACCOUNT		○ CASH	
PAYMENT	900.00	⊘ CHECK	check #1042
BAL. DUE		○ MONEY ORDER	FROM _____ TO _____
		○ CREDIT CARD	BY Connie Keogh

ALTA/NSPS LAND TITLE SURVEY

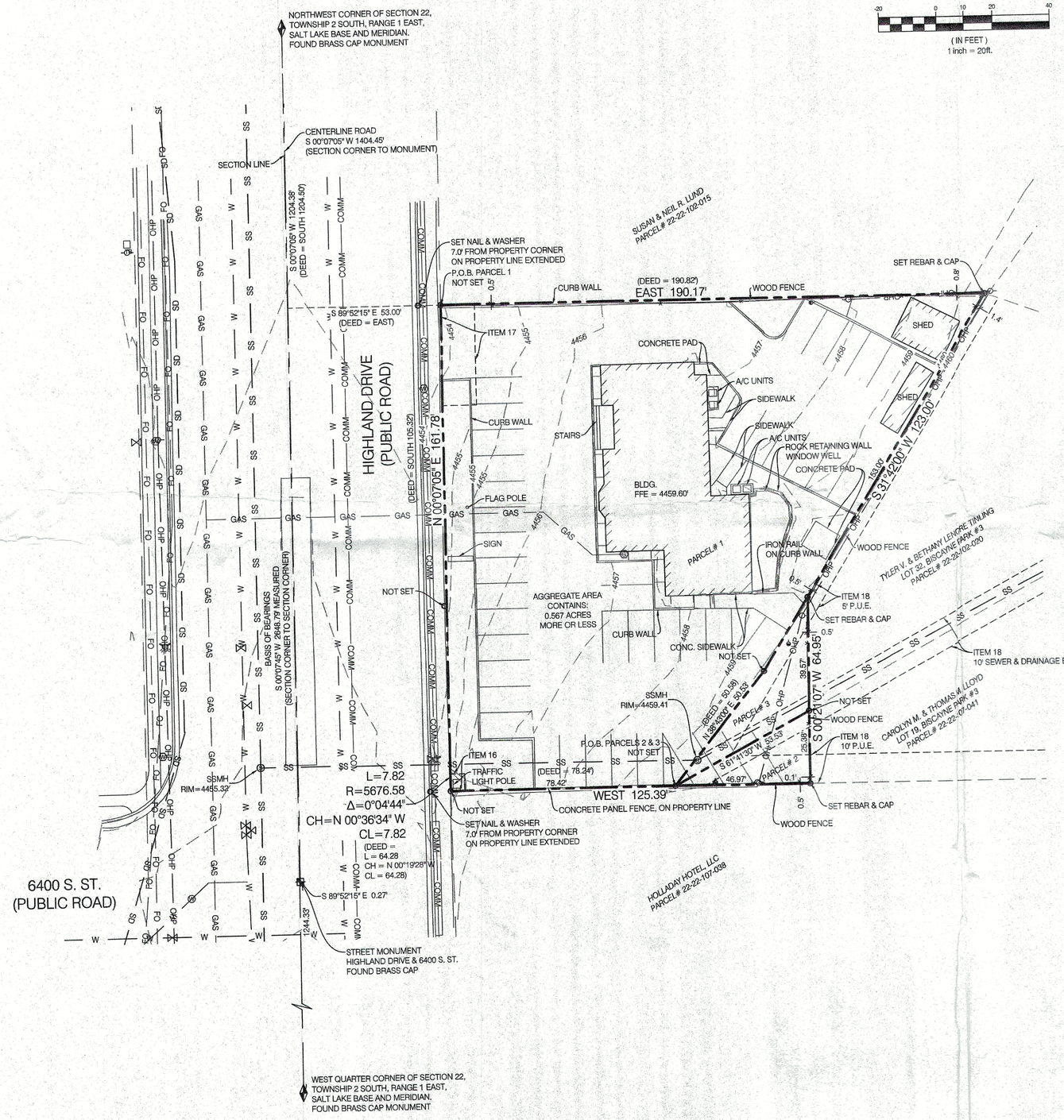
LOCATED IN THE NORTHWEST QUARTER OF SECTION 22,
TOWNSHIP 2 SOUTH, RANGE 1 EAST,
SALT LAKE BASE AND MERIDIAN
MURRAY CITY, SALT LAKE COUNTY, UTAH

NORTH

GRAPHIC SCALE

-20 0 10 20 40

(IN FEET)
1 inch = 20ft.



SURVEYOR'S CERTIFICATE

TO: OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY
KATHRYN J. PRICE FAMILY TRUST
6375 CTAG, LLC
TAG DEVELOPMENT

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 4, 5, 8, 11 AND 13 OF TABLE 'A' THEREOF. THE FIELDWORK WAS COMPLETED ON DECEMBER 27, 2022.

PROFESSIONAL LAND SURVEYOR
1-10-23
7240531
BRIAN A. LINAM
STATE OF UTAH

LEGAL DESCRIPTION PER TITLE REPORT

PARCEL 1:
BEGINNING AT A POINT 1204.5 FEET SOUTH AND 53.0 FEET EAST FROM THE NORTHWEST CORNER OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 1 EAST, SALT LAKE BASE AND MERIDIAN; THENCE SOUTH 105.32 FEET TO A POINT OF TANGENCY WITH A 5676.58 FOOT RADIUS CURVE TO THE LEFT; THENCE SOUTHERLY 64.28 FEET ALONG THE ARC OF SAID CURVE; THENCE EAST 78.24 FEET, MORE OR LESS, TO THE SOUTH-WEST CORNER OF LOT 32, BISCAYNE PARK NO. 3 SUBDIVISION; THENCE NORTH 38°43' EAST 50.58 FEET; THENCE NORTH 31°42' EAST 153.0 FEET; THENCE WEST 190.82 FEET, MORE OR LESS, TO THE POINT OF BEGINNING.

PARCEL 2:
BEGINNING AT THE SOUTHWEST CORNER OF LOT 19, BISCAYNE PARK NO. 3 SUBDIVISION, ACCORDING TO THE OFFICIAL PLAT THEREOF, RECORDED IN THE OFFICE OF THE COUNTY RECORDER, SALT LAKE COUNTY, UTAH AND RUNNING THENCE EAST 46.97 FEET; THENCE NORTH 00°21'07" EAST 25.38 FEET; THENCE SOUTH 61°41'30" WEST 53.53 FEET TO THE POINT OF BEGINNING.

PARCEL 3:
BEGINNING AT THE SOUTHWEST CORNER OF LOT 32, BISCAYNE PARK NO. 3 SUBDIVISION, ACCORDING TO THE OFFICIAL PLAT THEREOF, RECORDED IN THE OFFICE OF THE COUNTY RECORDER, SALT LAKE COUNTY, UTAH AND RUNNING THENCE NORTH 38°43'00" EAST 50.53 FEET; THENCE NORTH 31°42'00" EAST 30.00 FEET; THENCE SOUTH 00°21'07" WEST 39.57 FEET; THENCE SOUTH 61°41'30" WEST 53.53 FEET TO THE POINT OF BEGINNING.

AGGREGATE DESCRIPTION

A TRACT OF LAND LOCATED IN THE NORTHWEST QUARTER OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 1 EAST, SALT LAKE BASE AND MERIDIAN. SAID TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE EASTERLY RIGHT OF WAY LINE OF HIGHLAND DRIVE, SAID POINT BEING SOUTH 00°07'05" WEST 1204.38 FEET ALONG THE CENTERLINE OF HIGHLAND DRIVE AND SOUTH 89°52'15" EAST 53.00 FEET FROM THE NORTHWEST QUARTER OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 1 EAST, SALT LAKE BASE AND MERIDIAN, AND RUNNING THENCE EAST 190.17 TO THE NORTHWEST CORNER OF LOT 32, BISCAYNE PARK #3; THENCE SOUTH 31°42'00" WEST 123.00 FEET ALONG THE WESTERLY LINE OF SAID LOT 32; THENCE SOUTH 00°21'07" WEST 64.95 FEET TO THE SOUTH LINE OF LOT BISCAYNE PARK #3; THENCE WEST 125.39 FEET TO THE EASTERLY RIGHT OF WAY LINE OF HIGHLAND DRIVE; THENCE NORTHWESTERLY 7.82 FEET ALONG THE ARC OF A 5676.58 FOOT RADIUS NON-TANGENT CURVE TO THE RIGHT, CHORD BEARS NORTH 00°36'34" WEST 7.82 FEET; THENCE NORTH 00°07'05" EAST 161.78 FEET TO THE POINT OF BEGINNING.

CONTAINS: 24,689 SQ. FT. OR 0.567 ACRES, MORE OR LESS

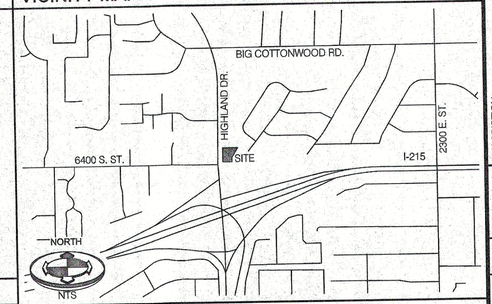
NARRATIVE OF SURVEY

SCOPE
BENCHMARK ENGINEERING & LAND SURVEYING, LLC WAS RETAINED BY TAG DEVELOPMENT TO PERFORM AN ALTA/NSPS SURVEY OF SUBJECT PROPERTY AS SHOWN HEREON.

BASIS OF BEARING
THE BASIS OF BEARINGS FOR THIS SURVEY IS SOUTH 00°07'45" WEST AS SHOWN HEREON.

BENCHMARK
NORTHWEST QUARTER CORNER OF SECTION 22, TOWNSHIP 2 SOUTH, RANGE 1 EAST, SALT LAKE BASE AND MERIDIAN. ELEVATION = 4438.94

VICINITY MAP



REFERENCE DOCUMENTS

R1) COMMITMENT FOR TITLE INSURANCE ISSUED BY OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY, FILE NO. 148128-JHM, EFFECTIVE DATE AUGUST 9, 2021.

R2) BISCAYNE PARK #3, RECORDED AS ENTRY NO. 1776481, IN BOOK 'W' AT PAGE 84 IN THE OFFICE OF THE SALT LAKE COUNTY RECORDER.

TITLE EXCEPTIONS

THIS SURVEY IS BASED UPON THE COMMITMENT FOR TITLE INSURANCE ISSUED BY OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY, FILE NO. 148128-JHM, EFFECTIVE DATE AUGUST 9, 2021.

NOTES PERTAINING TO EXCEPTIONS TO COVERAGE, SCHEDULE B-2 OF REFERENCED COMMITMENT:

ITEMS 1-14 NOT ADDRESSED IN THIS SURVEY.

ITEM 15 THE EFFECTS, IF ANY, OF EASEMENTS AND RIGHTS-OF-WAY FOR EXISTING ROADS, STREETS, ALLEYS, DITCHES, RESERVOIRS, UTILITIES, CANALS, PIPELINES AND POWER, TELEPHONE, SEWER, GAS OR WATER LINES, WHICH MAY BE ASCERTAINED BY AN INSPECTION OR SURVEY OF THE SUBJECT LAND.
(SURVEY FINDINGS: ALL VISIBLE ITEMS FOUND AS SHOWN, OTHER ITEMS MAY NOT BE SHOWN)

ITEM 16 EASEMENT IN FAVOR OF UTAH DEPARTMENT OF TRANSPORTATION FOR THE PURPOSE OF CONSTRUCTING AND MAINTAINING A TRAFFIC SIGNAL POLE AND APPURTENANT PARTS THEREOF INCIDENT TO THE CONSTRUCTION OF A TRAFFIC SAFETY IMPROVEMENT KNOWN AS PROJECT NO. 9999 AND INCIDENTAL PURPOSES, BY INSTRUMENT DATED AUGUST 23, 1988 AND RECORDED OCTOBER 24, 1988, AS ENTRY NO. 4691557, IN BOOK 6075, AT PAGE 17.
(SURVEY FINDINGS: AS SHOWN)

ITEM 17 GRANT OF EASEMENT IN FAVOR OF SUSAN H. LUND, DATED APRIL 19, 1994 AND RECORDED APRIL 22, 1994 AS ENTRY NO. 5801824 IN BOOK 6923 AT PAGE 2581.
(SURVEY FINDINGS: AS SHOWN)

ITEM 18 EASEMENTS, NOTES AND RESTRICTIONS AS SHOWN ON THE RECORDED PLAT FOR BISCAYNE PARK NO. 3 SUBDIVISION, RECORDED MAY 9, 1961 AS ENTRY NO. 1776481 IN BOOK W AT PAGE 84.
(SURVEY FINDINGS: AS SHOWN)

ITEM 19 PROTECTIVE COVENANTS, CONDITIONS AND RESTRICTIONS, BUT DELETING ANY COVENANT, CONDITION OR RESTRICTION INDICATING A PREFERENCE, LIMITATION OR DISCRIMINATION BASED ON RACE, COLOR, RELIGION, SEX, HANDICAP, FAMILIAL STATUS OR NATIONAL ORIGIN TO THE EXTENT SUCH COVENANTS, CONDITIONS OR RESTRICTIONS VIOLATE TITLE 42, USC 3604. RECORDED MAY 9, 1961 AS ENTRY NO. 1776589 IN BOOK 1803 AT PAGE 69.
(SURVEY FINDINGS: BLANKET IN NATURE, NOT PLOTTABLE)

ITEM 20 LACK OF RECORDED MEANS OF INGRESS OR EGRESS TO A PUBLIC ROAD FROM PARCEL 2 AND PARCEL 3. IT IS ASSUMED THERE EXISTS A VALID AND SUBSISTING EASEMENT FOR THAT PURPOSE OVER PARCEL 1, BUT THE COMPANY DOES NOT INSURE AGAINST ANY RIGHTS BASED ON A CONTRARY STATE OF FACTS.
(SURVEY FINDINGS: NOT PLOTTABLE, AFFECTS PARCELS 1-3)

ITEMS 21-26 NOT ADDRESSED IN THIS SURVEY.

GENERAL NOTES

1) SURVEYOR'S OBSERVATIONS REGARDING POSSIBLE ENCROACHMENTS.
   A - NONE
2) ALL UNDERGROUND UTILITIES MAY NOT BE SHOWN AND BLUESTAKE MARKINGS FOUND AT THE SITE MAY NOT DEPICT UNDERGROUND FEATURES ACCURATELY. LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED.
3) NO OBSERVED EVIDENCE OF ANY CEMETERIES AND/OR BURIAL GROUNDS CONTAINED WITHIN PROPERTY.
4) PARCEL 1 HAS DIRECT ACCESS TO HIGHLAND DRIVE.
5) NO GAPS, GORES OR STRIPS ALONG COMMON BOUNDARY LINES WERE FOUND.

LEGEND AND ABBREVIATIONS

- SECTION CORNER & LINE (FOUND)
- SECTION CORNER (NOT FOUND)
- STREET MON. (FOUND)
- PROPERTY CORNER (PLAT NOTED)
- ADJACENT PL or LOT LINES
- EXISTING RIGHT-OF-WAY LINE
- EASEMENT LINE
- CURB & GUTTER
- FENCE, WOOD
- SANITARY SEWER MANHOLE & PIPE
- STORM DRAIN MANHOLE & PIPE
- CULINARY PIPE LINE
- WATER VALVE & WATER METER
- FIRE HYDRANT
- POWER POLE & OVERHEAD POWER
- GAS LINE
- FIBER OPTIC
- COMMUNICATION LINE
- GUY WIRE
- LIGHT POLE
- SIGN
- GAS METER

SSMH SANITARY SEWER MANHOLE
POB POINT OF BEGINNING

No.	DESCRIPTION	DATE

DRAWN BY KO
CHECKED BY BAL
FIELD CREW KO/BT
DATE 1.10.2022
DWG FILE 2111348s

SCALE MEASURES 1-INCH ON FULL SIZE SHEETS
ADJUST ACCORDINGLY FOR REDUCED SIZE SHEETS
0 0.5 1

BENCHMARK ENGINEERING & LAND SURVEYING
9138 SOUTH STATE STREET SUITE # 100
SANDY, UTAH 84070 (801) 542-7192
www.benchmarkcivil.com

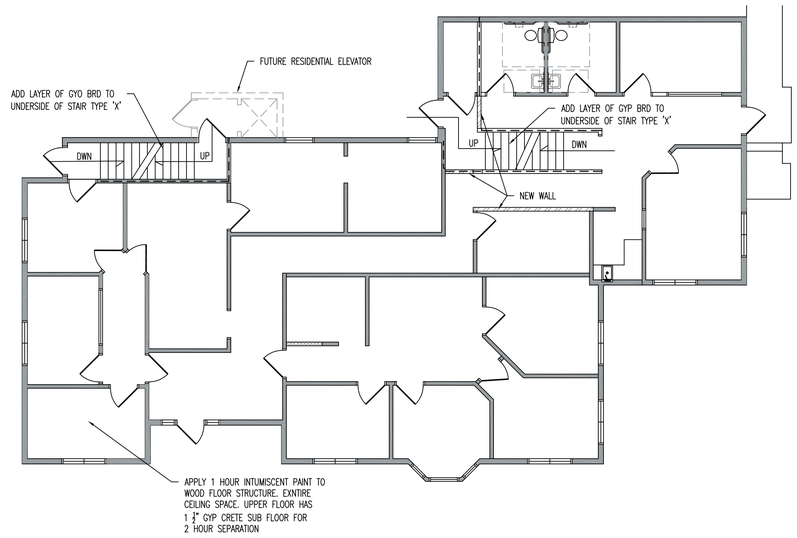
TAG DEVELOPMENT

6375 SOUTH HIGHLAND DRIVE
SALT LAKE CITY, UTAH

PROJECT NO. 2111348

ALTA/NSPS LAND TITLE SURVEY

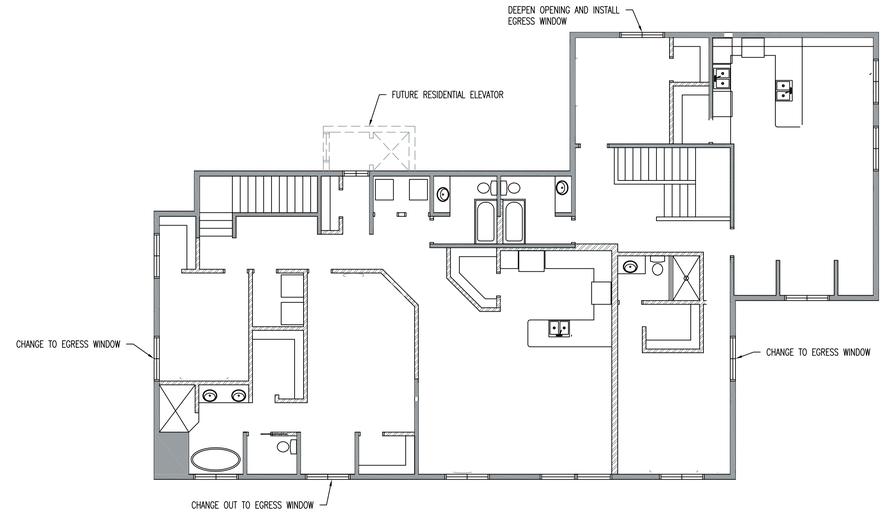
SVA.01
1 OF 1



PROPOSED MAIN FLOOR

SCALE: 1/8" = 1'-0"

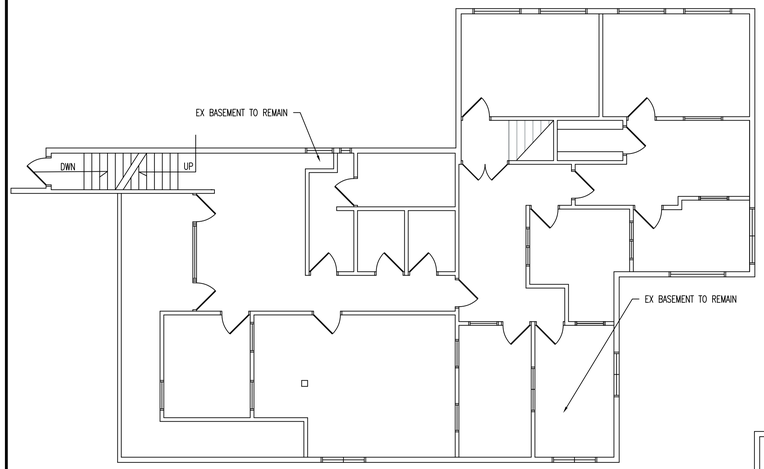
NORTH



PROPOSED 2ND FLOOR PLAN

SCALE: 1/8" = 1'-0"

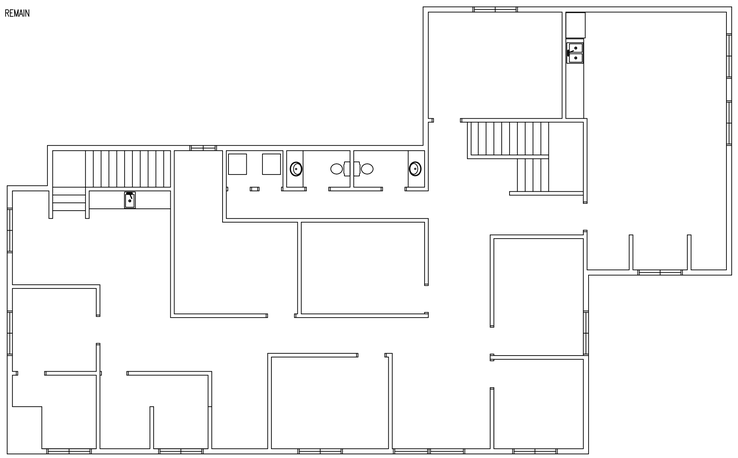
NORTH



AS-IS BASEMENT PLAN

SCALE: 1/8" = 1'-0"

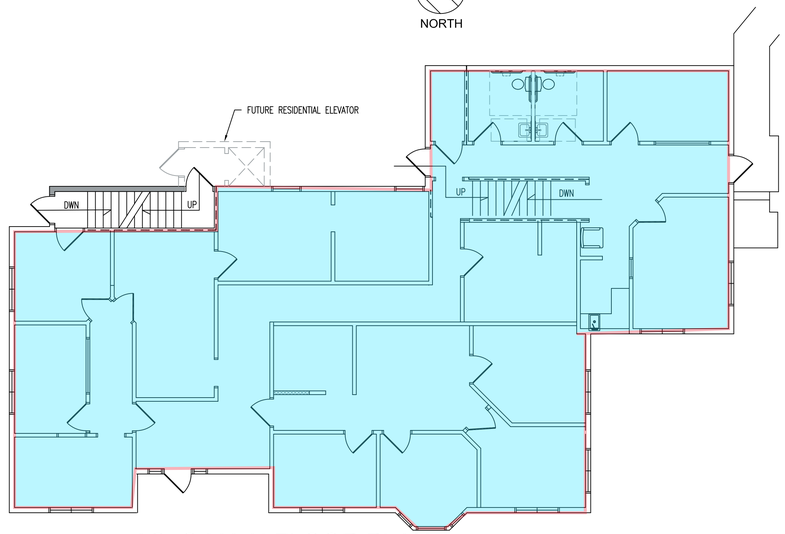
NORTH



AS-IS SECOND FLOOR PLAN

SCALE: 1/8" = 1'-0"

NORTH



AS-IS MAIN FLOOR PLAN

SCALE: 1/8" = 1'-0"

NORTH

VDG
VINCENT DESIGN GROUP, INC.
ARCHITECTS AND PLANNERS
401 EAST 1700 SOUTH, SALT LAKE CITY, UTAH (801) 484-2046
vincentdesign@utah.comcastbiz.net

PROPOSED MIXED USE REMODEL FOR:

AULT INVESTMENTS

6375 SOUTH HIGHLAND DRIVE
HOLLADAY, UTAH

PROPOSED AND AS-IS PLAN

ARCH. PROJECT NO:	XX-XXX
DATE:	X/X/X
DRAWN BY:	BRENT
CHECKED BY:	
DESIGNED BY:	

DATE	REVISION

SHEET TITLE

A-1.00

ARCHITECTURAL –

Planning Commission
Community Development
Department City of Holladay
801.527.3890

CITY of HOLLADAY

FILE# 18-1-04-1 Silver Hawk 2 Prelim/Final Sub. Amend/Exten

ADDRESS:

5560 South Wasatch Blvd

LEGAL DESCRIPTION: *22-14-178-007*

BEG N 1559.98 FT & W 215.78 FT FR CEN SEC 14, T 2S, R 1E, SLM; S 87^09'36" W 100 FT; S 19^ 56'33" W 75.92 FT; S 87^09'36" W 143.9 FT; N 11^52'57" E 727.46 FT; SE'LY ALG CURV TO L641.35 FT TO BEG. 1.90 AC 6598-574, 576 6598-578

APPLICANT/REPRESENTATIVE:

Robert and Connie Jensen

PROPERTY OWNER:

Robert and Connie Jensen

ZONING:

FCOZ

GENERAL PLAN DISTRICT:

Low Density Residential-Protected (CE-P)

CITY COUNCIL DISTRICT:

District #5

PUBLIC NOTICE DETAILS:

Mailed 10/26/2023; Direct mail letter to Lot 15

REQUEST:

Subdivsion

APPLICABLE REGULATIONS:

13.10 Subdivisions
13.72 Foothills and Canyons Overlay Zone

EXHIBITS:

Zone map
Staff Report
Applicant Narrative
Applicant supporting doc.

STAFF:

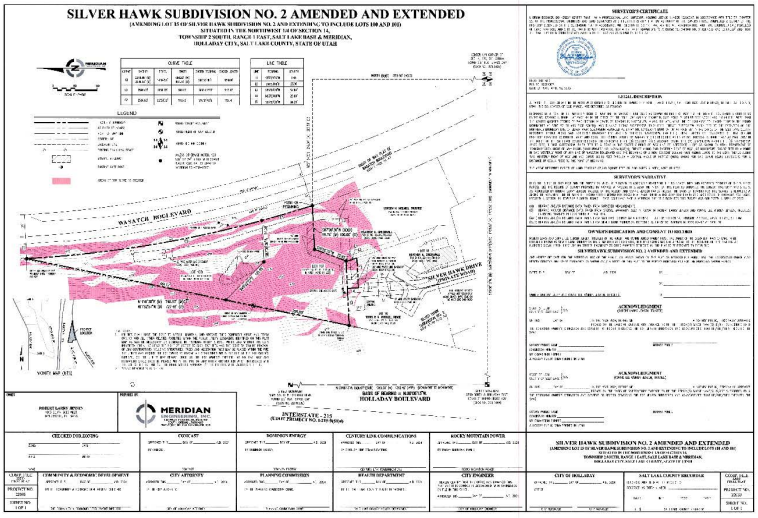
Carrie Marsh, City Planner

DECISION TYPE:

Administrative:

Public hearing required. PC shall make a motion of either, denial, approval or to continue. All motions require findings which support the decision. As directed by ordinance, applications shall be approved if the Land Use Authority finds Substantial Evidence of compliance with applicable requirements. Holladay Ord. 13.06.050.B2 and 13.08

SITE VICINITY MAP



Notes:

CITY OF HOLLADAY
Planning Commission
May 7th, 2024
Item #2

Request:	**RESIDENTIAL SUBDIVISION – PRELIMINARY PLAN / FINAL PLAT REVIEW**
Project:	"Silver Hawk 2 Subdivision Amendment and Extension"
Address:	5560 S. Wasatch Blvd.
Zone:	FCOZ (overlay), R-1-21 (underlying)
Applicant:	Robert and Connie Jensen
File No:	18-1-04-1
Notice:	Mailed notice on October 26, 2023
Staff:	Carrie Marsh

GOVERNING ORDINANCES:	13.06	DEVELOPMENT REVIEW & APPROVAL PROCEDURES - *ADMINISTRATIVE*
	13.08	ADMINISTRATIVE DEVELOPMENT REVIEW STANDARDS
	13.08.010	SITE PLAN – THREE STEP REVIEW STANDARDS – *PRELIMINARY / FINAL*
	13.10	SUBDIVSIONS
	13.10.050B	PRELIMINARY SUBMISSION REQUIRMENTS
	13.10.080	SUBDIVISION APPROVAL STANDARDS

REQUIRED PLANNING COMMISSION ACTION: ***Administrative***
Public hearing held 11/7/2023. PC shall make a motion of either, denial, approval or to continue. All motions require findings which support the decision. As directed by ordinance, applications shall be approved if the Land Use Authority finds Substantial Evidence of compliance with applicable requirements. Holladay Ord. 13.06.050.B2 and 13.08

Creation of a subdivision plat requires review and approval by the Land Use Authority (Planning Commission). Decisions must be made during public meeting. The public hearing for the subdivision was held on November 7th, 2023 and conceptual approval was granted by the Planning Commission as the applicant showed that the proposed lots met the minimum requirements of the underlying R-1-21 zone and FCOZ overlay and provided utility letters.

SUMMARY
Property owner and applicant, Robert and Connie Jensen have been working with the TRC on a plan to add additional area to the existing Silver Hawk 2 Subdivision to then subdivide according to FCOZ lot creation standards. The applicant seeks to add 1.90 acres into the existing Silver Hawk 2 Subdivision.

- .10 acres of land from Lot 15 will be added to the 1.90 acres of land proposed to being added to the existing Silver Hawk 2 subdivision, creating a parcel of 2.00 acres.
- The resulting 2.00 acres of land would then be subdivided into two one-acre parcels, as required by the FCOZ overlay.
- The two new lots are shown as Lot 100 and Lot 101 in the submitted Preliminary Plat.
- The subdivision extension and amendment will facilitate the creation of a new single-family home lot accessed from Wasatch Boulevard, a public street, via a private driveway.
- Both lots are to measure approximately 43,560 square feet, which is the required minimum lot size required by the FCOZ overlay zone.
- The property owner has completed the required geo-technical study, provided, to be reviewed by the City Engineer and verified as complete before final approval.

Proposal is for land use entitlements only, no development or construction permitting is requested. Each lot shall submit for individual development permits as per Holladay Ord § 13.08.100

BACKGROUND
The Silver Hawk 2 subdivision was created in 1996 and did not include the subject parcel at the time of subdivision. Lots 15 and 16 were the end of the subdivision. Salt Lake County also implemented the Foothills and Canyons Overlay Zone (FCOZ) in the 1990s, which was specifically designed to address development within sensitive areas, namely to preserve visual and aesthetic qualities of the foothills, reduce risks associated with natural hazards and provide maximum safety, provide adequate and safe vehicular and pedestrian circulation,

encourage development that fits the natural slope of the land to minimize scarring and erosion, protect fragile soils, steep slopes, and water quality, preserve environmentally sensitive areas and open space by encouraging clustering or other design techniques, minimize disturbances to existing trees and vegetation, preserve wildlife habitat, and protect aquifer recharge areas, and reduce flooding by protecting streams, drainage, absorption areas, and floodplains.

FCOZ limits lot sizes to one-acre minimums. Considering this lot size minimum, the applicant has acquired property from Lot 15 that will enable the creation of two new one-acre lots. Lot 15 will remain at the 1-acre minimum size as well. This change to the subdivision involves an amendment to alter the property boundary of Lot 15 and an extension to add the additional land to the Silver Hawk 2 Subdivision and divide the two-acre area into two separate parcels. The original subdivision identified a water line that continued beyond the road, providing water to the parcels. The applicant has provided utility availability letters with this application.

TECHNICAL REVIEW COMMITTE ANALYSIS

In accordance with Holladay Ord 13.08.010, upon receipt of a complete subdivision application, the Community and Economic Development Director has distributed the application to and has subsequently received recommendation(s) from the Technical Review Committee. Review of submitted elements are compared against the administrative checklist of required submittals 13.10.050A. The following is provided to the Planning Commission as a summary of **joint recommendation of conditional preliminary and final subdivision approv**al from the TRC:

Zoning, City Planner:

- Min 1 acre lots being added to the subdivision
- Building area only on slopes less than 30%; Crossing of slopes for access to be reviewed and approved by the Planning Commission in a separate application for a slope exception upon the submission of a building permit with its associated site plan.
- Utility connection letters have been provided with the exception of gas.
    - Dominion Energy to provide availability letter to individual lots once approved. Gas line accessible from Silver Hawk Dr. utility easement.
    - Phone is not needed but available through Silver Hawk Drive easement
    - Salt Lake City Public Utilities watermain is on the property. Salt Lake City Public Utilities will provide service.
- Lot 100 will be accessed from Silver Hawk Dr., a private road
- Lot 101 will be accessed from an existing access point on Wasatch Blvd.

United Fire Authority (UFA), Area Fire Marshal:

- Maintain 20’ access and turnaround as shown on Silver Hawk Subdivision Plat.

Engineering, City Engineer:

- Geotechnical report received; all recommendations from report to be incorporated into the design and construction of project.
- Stormwater managed per each lot on individual building permits

Building Code, City Building Official

- All building plans to be reviewed as separate permits for each lot

RECOMMENDATION

The TRC recommends that the commission hold the required public hearing and consider comments presented. The CED Director has found that all required preliminary and final elements of a residential subdivision proposal have been reviewed and accepted by the TRC and have been determined to be substantially complete as per the City’s submission requirements. As no development is proposed at this time (only entitlements), preliminary construction submittals have been waived as unnecessary – these details will be submitted upon application for a single-family home building permit. The TRC can therefore recommend the commission approve the **PRELIMINARY SUBDIVISION PLAN.** Additionally, and if the

commission is amenable, in accordance with 13.08.010.D5, a motion to delegate the **FINAL PLAT** approval to staff is recommended.

STAFF FINDINGS:

1. Development details required for a Preliminary and Final site plan have been submitted and reviewed by the TRC
2. Each of the lots comply with the minimum 1.0-acre (43,560 sq ft) lot size for single-family home development in the FCOZ overlay.
3. The development complies with the General Plan
4. The required submittals for preliminary subdivision development have been provided where applicable and have been found to be complete and acceptable.
5. Preliminary level drawings were not subject to conditional approval (Concept Plan was approved, unconditionally)
6. Storm water detention areas and public improvements to be provided with individual building permits for each lot.
7. Existing fire access to be maintained.
8. Vehicular access and utility easements are established

With the Following Conditions

1. All corrections on plat are required before final approval is granted
2. Recommendations from the geotechnical report shall be followed for both lots.
3. FCOZ regulations, standards, and processes including pre-development review shall be followed prior to any development of either lot.

SUGGESTED MOTIONS

"I ____ *Motion to (approve / continue for further discussion) the* ***PRELIMINARY PLAN*** *and* ***FINAL PLAT*** *application by* ***Robert and Connie Jensen*** *for an amendment and extension of the Silver Hawk 2 Subdivision to include two new residential lots based upon the findings… and subject to the following requirements … ".*

"Also, within in one year and in accordance with 13.08.010.D5, to defer administrative review and approval of the ***FINAL PLAT*** *by the Community & Economic Development Director - following a positive, written recommendation from TRC."*

SILVER HAWK SUBDIVISION NO. 2 AMENDED AND EXTENDED

(AMENDING LOT 15 OF SILVER HAWK SUBDIVISION NO. 2 AND EXTENDING TO INCLUDE LOTS 100 AND 101)
SITUATED IN THE NORTHWEST 1/4 OF SECTION 14,
TOWNSHIP 2 SOUTH, RANGE 1 EAST, SALT LAKE BASE & MERIDIAN,
HOLLADAY CITY, SALT LAKE COUNTY, STATE OF UTAH

MERIDIAN ENGINEERING, INC.

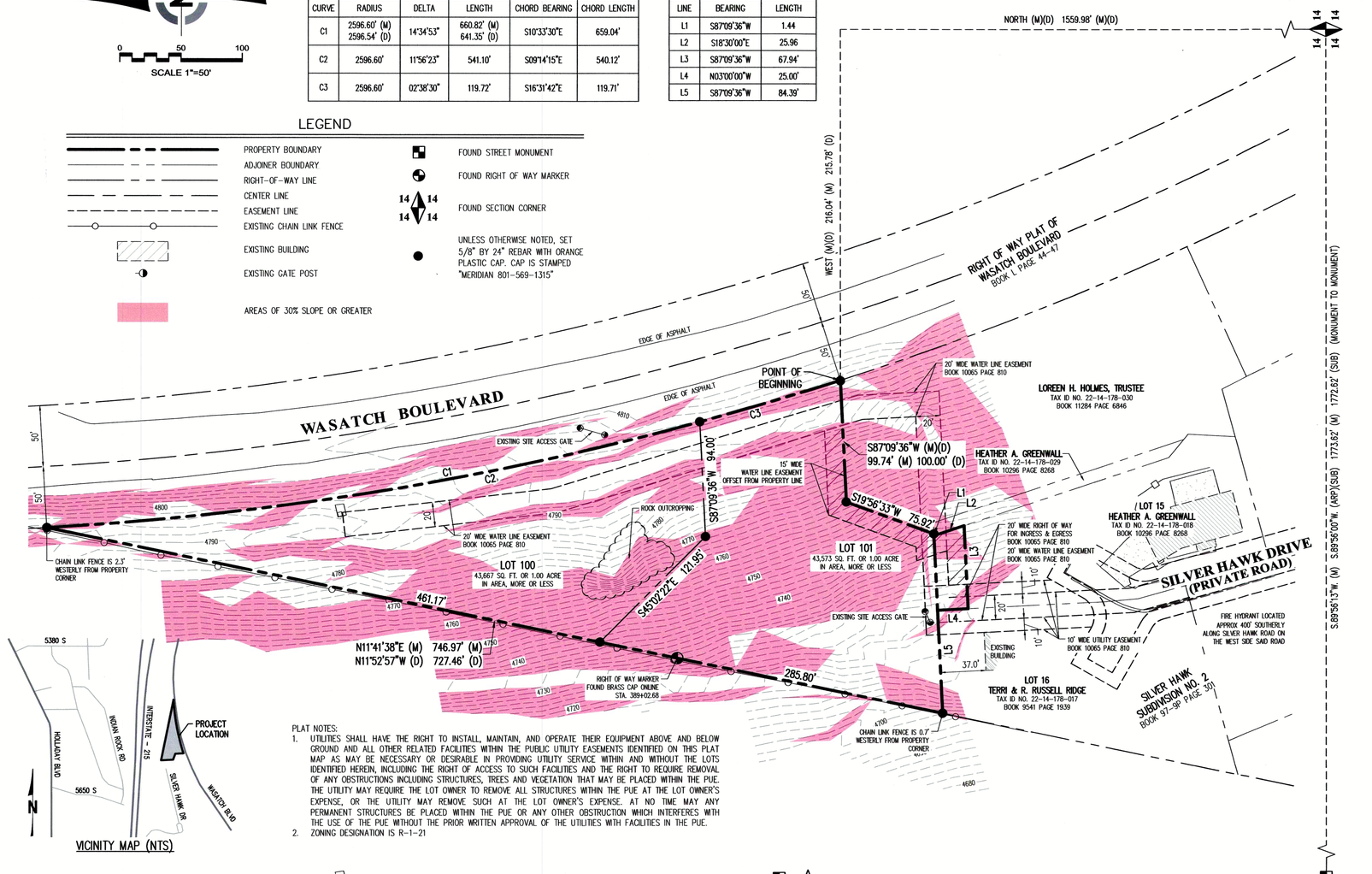
0 50 100
SCALE 1"=50'

CURVE TABLE					
CURVE	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	2596.60' (M) 2596.54' (D)	14°34'53"	660.82' (M) 641.35' (D)	S10°33'30"E	659.04'
C2	2596.60'	11°56'23"	541.10'	S09°14'15"E	540.12'
C3	2596.60'	02°38'30"	119.72'	S16°31'42"E	119.71'

LINE TABLE		
LINE	BEARING	LENGTH
L1	S87°09'36"W	1.44
L2	S18°30'00"E	25.96
L3	S87°09'36"W	67.94'
L4	N03°00'00"W	25.00'
L5	S87°09'36"W	84.39'

LEGEND

- PROPERTY BOUNDARY
- ADJOINER BOUNDARY
- RIGHT-OF-WAY LINE
- CENTER LINE
- EASEMENT LINE
- EXISTING CHAIN LINK FENCE
- EXISTING BUILDING
- EXISTING GATE POST
- AREAS OF 30% SLOPE OR GREATER
- FOUND STREET MONUMENT
- FOUND RIGHT OF WAY MARKER
- FOUND SECTION CORNER (14 14 / 14 14)
- UNLESS OTHERWISE NOTED, SET 5/8" BY 24" REBAR WITH ORANGE PLASTIC CAP. CAP IS STAMPED "MERIDIAN 801-569-1315"



VICINITY MAP (NTS)

PLAT NOTES:
1. UTILITIES SHALL HAVE THE RIGHT TO INSTALL, MAINTAIN, AND OPERATE THEIR EQUIPMENT ABOVE AND BELOW GROUND AND ALL OTHER RELATED FACILITIES WITHIN THE PUBLIC UTILITY EASEMENTS IDENTIFIED ON THIS PLAT MAP AS MAY BE NECESSARY OR DESIRABLE IN PROVIDING UTILITY SERVICE WITHIN AND WITHOUT THE LOTS IDENTIFIED HEREIN, INCLUDING THE RIGHT OF ACCESS TO SUCH FACILITIES AND THE RIGHT TO REQUIRE REMOVAL OF ANY OBSTRUCTIONS INCLUDING STRUCTURES, TREES AND VEGETATION THAT MAY BE PLACED WITHIN THE PUE. THE UTILITY MAY REQUIRE THE LOT OWNER TO REMOVE ALL STRUCTURES WITHIN THE PUE AT THE LOT OWNER'S EXPENSE, OR THE UTILITY MAY REMOVE SUCH AT THE LOT OWNER'S EXPENSE. AT NO TIME MAY ANY PERMANENT STRUCTURES BE PLACED WITHIN THE PUE OR ANY OTHER OBSTRUCTION WHICH INTERFERES WITH THE USE OF THE PUE WITHOUT THE PRIOR WRITTEN APPROVAL OF THE UTILITIES WITH FACILITIES IN THE PUE.
2. ZONING DESIGNATION IS R-1-21

OWNER:

ROBERT LARRY JENSEN
4805 SOUTH 3685 WEST
TAYLORSVILLE, UT 84129

PREPARED BY:

MERIDIAN ENGINEERING, INC.
1628 WEST 11010 SOUTH, SUITE 102
SOUTH JORDAN, UTAH 84095
PHONE (801) 569-1315 FAX (801) 569-1319

SURVEYOR'S CERTIFICATE

I, BRIAN BOEHMER, DO HEREBY CERTIFY THAT I AM A PROFESSIONAL LAND SURVEYOR, HOLDING LICENSE NUMBER 12266367, IN ACCORDANCE WITH TITLE 58, CHAPTER 22, OF THE PROFESSIONAL ENGINEERS AND LAND SURVEYORS ACT; I FURTHER CERTIFY THAT BY AUTHORITY OF THE OWNERS I HAVE COMPLETED A SURVEY OF THE PROPERTY DESCRIBED ON THIS SUBDIVISION PLAT IN ACCORDANCE WITH SECTION 17-23-17, HAVE VERIFIED ALL MEASUREMENTS, AND HAVE SUBDIVIDED SAID PARCEL(S) OF LAND INTO LOTS AND STREETS, TOGETHER WITH EASEMENTS HEREAFTER TO BE KNOWN AS: "SILVERHAWK SUBDIVISION NO. 2 AMENDED AND EXTENDED" AND THAT THE SAME HAS BEEN CORRECTLY MONUMENTED ON THE GROUND AS SHOWN ON THIS PLAT.

PROFESSIONAL LAND SURVEYOR — Electronic Seal — BRIAN BOEHMER — PLS 12266367 — 04/15/2024 — STATE OF UTAH

BRIAN BOEHMER
PLS NO. 12266367
DATE OF PLAT: APRIL 15, 2023

LEGAL DESCRIPTION

A PARCEL OF LAND SITUATE IN THE NORTHWEST QUARTER OF SECTION 14, TOWNSHIP 2 SOUTH, RANGE 1 EAST, SALT LAKE BASE AND MERIDIAN, IN SALT LAKE COUNTY, UTAH. THE BOUNDARIES OF SAID PARCEL ARE DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE WESTERLY RIGHT OF WAY LINE OF WASATCH BOULEVARD AS SHOWN ON RIGHT OF WAY PLAT OF WASATCH BOULEVARD RECORDED AS ENTRY NO. 1224497 IN BOOK L AT PAGE 44 IN THE OFFICE OF THE SALT LAKE COUNTY RECORDER, SAID POINT IS 1559.98 FEET NORTH AND 216.04 FEET WEST FROM THE CENTER QUARTER CORNER OF SAID SECTION 14 (BASIS OF BEARING IS N.00°08'13"W. ALONG THE MONUMENT LINE OF HOLLADAY BOULEVARD BETWEEN THE FOUND MONUMENTS AT 5800 SOUTH AND 5585 SOUTH); AND RUNNING THENCE S.87°09'36"W. 99.74 FEET; THENCE S.19°56'33"W. 75.92 FEET TO THE EXTENSION OF THE NORTHERLY BOUNDARY LINE OF SILVER HAWK SUBDIVISION RECORDED AS ENTRY NO. 6748869 IN BOOK 97-9P AT PAGE 301 IN THE OFFICE OF THE SALT LAKE COUNTY RECORDER; THENCE ALONG SAID NORTHERLY BOUNDARY LINE AND ITS EXTENSION S.87°09'36"W. 1.44 FEET; THENCE ALONG THE BOUNDARIES OF THAT CERTAIN PROPERTY CONVEYED TO ROBERT LARRY AND CONNIE LEE O'BRIEN JENSEN BY WARRANTY DEED RECORDED AS ENTRY NO. 14121352 IN BOOK 11427 AT PAGE 7667 IN THE OFFICE OF THE SALT LAKE COUNTY RECORDER THE FOLLOWING THREE (3) COURSES: (1) S.18°30'00"E. 25.96 FEET, (2) S.87°09'36"W. 67.94 FEET, (3) N.03°00'00"W. 25.00 FEET; THENCE S.87°09'36"W. 84.39 FEET TO A POINT IN THE EASTERLY RIGHT OF WAY LINE OF INTERSTATE – 215 AS SHOWN ON UTAH DEPARTMENT OF TRANSPORTATION RIGHT OF WAY PLANS (UDOT PROJECT NO. I-215-9(50)4); THENCE ALONG SAID EASTERLY RIGHT OF WAY LINE N.11°41'38"E. 746.97 FEET TO A POINT IN SAID WESTERLY RIGHT OF WAY LINE OF WASATCH BOULEVARD AND THE BEGINNING OF A NON-TANGENT 2596.60 FOOT RADIUS CURVE TO THE LEFT; THENCE ALONG SAID WESTERLY RIGHT OF WAY LINE AND CURVE 660.82 FEET THROUGH A CENTRAL ANGLE OF 14°34'53" (NOTE: CHORD FOR SAID CURVE BEARS S.10°33'30"E. FOR A DISTANCE OF 659.04 FEET) TO THE POINT OF BEGINNING.

THE ABOVE DESCRIBED PARCEL OF LAND CONTAINS 87,240 SQUARE FEET OR 2.00 ACRES IN AREA, MORE OR LESS.

SURVEYOR'S NARRATIVE

IT IS THE INTENT OF THIS PLAT AND THE SURVEY ON WHICH IT IS BASED TO CORRECTLY REPRESENT THE BOUNDARY LINES AND PROPERTY CORNERS OF THE SUBJECT PARCEL, SEE THE RECORD OF SURVEY PREPARED BY MICHAEL W. NADEAU. IT IS ALSO THE INTENT OF THIS PLAT TO SUBDIVIDE THE SUBJECT PROPERTY INTO 2-LOTS, AS REQUESTED BY ROBERT LARRY JENSEN, TRUSTEE OF THE ROBERT AND CONNIE JENSEN FAMILY TRUEST. THE BASIS OF BEARING FOR THIS SURVEY IS N.00°08'13"W. ALONG THE MONUMENT LINE BETWEEN THE FOUND STREET MONUMENTS LOCATED AT 5585 SOUTH & HOLLADAY BOULEVARD AND 5800 SOUTH & HOLLADAY BOULEVARD. LOCATED IN SECTION 14, TOWNSHIP 2 SOUTH, RANGE 1 EAST, SALT LAKE BASE & MERIDIAN. THE FIELD DATA FOR THIS SURVEY WAS COLLECTED IN APRIL OF 2023.

(M) BEARING AND/OR DISTANCE DATA TAKEN FROM SURVEYED MEASUREMENTS.
(D) BEARING AND/OR DISTANCE DATA TAKEN FROM SPECIAL WARRANTY DEED IN FAVOR OF ROBERT LARRY JENSEN AND CONNIE LEE O'BRIEN JENSEN, TRUSTEES. ENTRY NO. 11489115 IN BOOK 10065 AT PAGE 810.
(ARP) BEARING AND/OR DISTANCE DATA TAKEN FROM SALT LAKE COUNTY AREA REFERENCE PLAT FOR SECTION 14, TOWNSHIP 2 SOUTH, RANGE 1 EAST, S.L.B.&M.
(SUB) BEARING AND/OR DISTANCE DATA TAKEN FROM SILVER HAWK SUBDIVISION RECORDED AS ENTRY NO. 6748869 IN BOOK 97-9P AT PAGE 301.

OWNER'S DEDICATION AND CONSENT TO RECORD

ROBERT LARRY AND CONNIE LEE O'BRIEN JENSEN, TRUSTEES OF THE ROBERT AND CONNIE JENSEN FAMILY TRUST, THE OWNER OF THE DESCRIBED TRACT OF LAND TO BE HEREAFTER KNOWN AS SILVER HAWK SUBDIVISION NO. 2 AMENDED AND EXTENDED, HEREBY CONSENTS AND GIVE APPROVAL TO THE RECORDING OF THIS PLAT FOR ALL PURPOSES SHOWN HEREIN. THERE ARE NO STREETS, EASEMENTS OR OTHER PROPERTY REFLECTED ON THIS PLAT TO BE DEDICATED TO THE PUBLIC.

SILVERHAWK SUBDIVISION NO. 2 AMENDED AND EXTENDED

AND HEREBY DEDICATE FOR THE PERPETUAL USE OF THE PUBLIC, ALL AREAS SHOWN ON THIS PLAT AS INTENDED FOR PUBLIC USE. THE UNDERSIGNED OWNER ALSO HEREBY CONVEYS ANY OTHER EASEMENTS AS SHOWN AND/OR NOTED ON THIS PLAT TO THE PARTIES INDICATED AND FOR THE PURPOSES SHOWN HEREON.

DATED THIS _____ DAY OF _____ A.D. 2024. BY: _____

BY: _____

OWNER: ROBERY LARRY AND CONNIE LEE O'BRIEN JENSEN, TRUSTEES ITS: _____

STATE OF UTAH } S.S.
COUNTY OF SALT LAKE }

ACKNOWLEDGMENT
(ROBERT LARRY JENSEN, TRUSTEE)

ON THIS _____ DAY OF _____, IN THE YEAR 2024, BEFORE ME _____, A NOTARY PUBLIC, PERSONALLY APPEARED _____ PROVED ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO IN THE FOREGOING OWNER'S DEDICATION AND CONSENT TO RECORD REGARDING THE BOB JENSEN SUBDIVISION AND ACKNOWLEDGED THAT HE/SHE/THEY EXECUTED THE SAME.

NOTARY PUBLIC NAME _____ NOTARY PUBLIC
COMMISSION NUMBER _____
MY COMMISSION EXPIRES _____
A NOTARY PUBLIC COMMISSIONED IN UTAH

STATE OF UTAH } S.S.
COUNTY OF SALT LAKE }

ACKNOWLEDGMENT
(CONNIE LEE O'BRIEN JENSEN, TRUSTEE)

ON THIS _____ DAY OF _____, IN THE YEAR 2024, BEFORE ME _____, A NOTARY PUBLIC, PERSONALLY APPEARED _____ PROVED ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO IN THE FOREGOING OWNER'S DEDICATION AND CONSENT TO RECORD REGARDING THE BOB JENSEN SUBDIVISION AND ACKNOWLEDGED THAT HE/SHE/THEY EXECUTED THE SAME.

NOTARY PUBLIC NAME _____ NOTARY PUBLIC
COMMISSION NUMBER _____
MY COMMISSION EXPIRES _____
A NOTARY PUBLIC COMMISSIONED IN UTAH

CHECKED FOR ZONING
ZONE: _____ DATE: _____
AREA _____ WIDTH: _____
NAME _____

COMCAST
APPROVED THIS _____ DAY OF _____ A.D. 2024
BY COMCAST.
COMCAST

DOMINION ENERGY
APPROVED THIS _____ DAY OF _____ A.D. 2024
BY DOMINION ENERGY.
DOMINION ENERGY

CENTURY LINK COMMUNICATIONS
APPROVED THIS _____ DAY OF _____ A.D. 2024
BY CENTURY LINK COMMUNICATIONS:
CENTURY LINK COMMUNICATIONS

ROCKY MOUNTAIN POWER
APPROVED THIS _____ DAY OF _____ A.D. 2024
BY ROCKY MOUNTAIN POWER.
ROCKY MOUNTAIN POWER

SILVER HAWK SUBDIVISION NO. 2 AMENDED AND EXTENDED
(AMENDING LOT 15 OF SILVER HAWK SUBDIVISION NO. 2 AND EXTENDING TO INCLUDE LOTS 100 AND 101)
SITUATED IN THE NORTHWEST 1/4 OF SECTION 14,
TOWNSHIP 2 SOUTH, RANGE 1 EAST, SALT LAKE BASE & MERIDIAN,
HOLLADAY CITY, SALT LAKE COUNTY, STATE OF UTAH

COMP. FILE 22033 FINAL PLAT	**COMMUNITY & ECONOMIC DEVELOPMENT**	**CITY ATTORNEY**	**PLANNING COMMISSION**	**HEALTH DEPARTMENT**	**CITY ENGINEER**	**CITY OF HOLLADAY**	**SALT LAKE COUNTY RECORDER**	COMP. FILE 22033 FINAL PLAT
PROJECT NO. 22033	APPROVED THIS _____ DAY OF _____ A.D. 2024 BY THE COMMUNITY & ECONOMIC DEVELOPMENT DIRECTOR	APPROVED THIS _____ DAY OF _____ A.D. 2024 BY THE CITY ATTORNEY.	APPROVED THIS _____ DAY OF _____ A.D. 2024 BY THE PLANNING COMMISSION CHAIR.	APPROVED THIS _____ DAY OF _____ A.D. 2024 BY THE SALT LAKE COUNTY HEALTH DEPARTMENT.	I HEREBY CERTIFY THAT THIS OFFICE HAS EXAMINED THIS PLAT AND IT IS CORRECT IN ACCORDANCE WITH INFORMATION ON FILE IN THIS OFFICE. APPROVED THIS _____ DAY OF _____ A.D. 2024.	APPROVED THIS _____ DAY OF _____ A.D. 2024 ATTEST:	RECORDED AND FILED AT THE REQUEST OF _____ RECORDED AS ENTRY NUMBER _____ DATE: _____ TIME: _____ BOOK: _____ PAGE: _____	PROJECT NO. 22033
SHEET NO. 1 OF 1	THE COMMUNITY & ECONOMIC DEVELOPMENT DIRECTOR	CITY OF HOLLADAY ATTORNEY	PLANNING COMMISSION CHAIR	SALT LAKE COUNTY HEALTH DEPARTMENT	CITY OF HOLLADAY ENGINEER	CITY RECORDER / CITY MANAGER	FEE $ / SALT LAKE COUNTY RECORDER	SHEET NO. 1 OF 1

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Geotechnical and Geologic Hazard Study

Salt Lake County Parcel #22141780070000
5560 S. Wasatch Boulevard
Holladay, Utah

IGES Project No. 04590-001

March 12, 2024

Prepared for:
Mr. and Mrs. Bob and Connie Jensen

Geotechnical and Geologic Hazard Study
Salt Lake County Parcel #22141780070000
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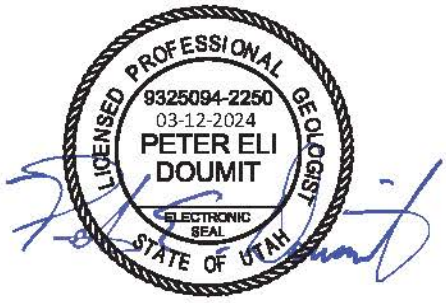
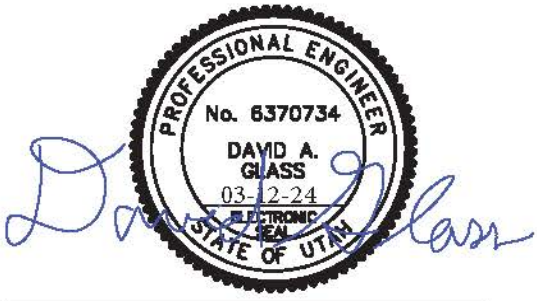
Prepared by:



Peter E. Doumit, P.G., C.P.G.
Senior Geologist



David A. Glass, P.E.
Senior Geotechnical Engineer

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APPENDICES

1.0 EXECUTIVE SUMMARY

This report presents the results of a geotechnical and geologic hazard study performed for Salt Lake County parcel #22141780070000, located at 5560 S. Wasatch Boulevard in Holladay, Utah. Based on the literature reviewed and surficial and subsurface conditions encountered across the subject property, **it is our opinion that the property is suitable for development from a geotechnical and geologic hazard perspective and is not anticipated to be adversely impacted by geologic hazards, provided that the recommendations presented in this report are incorporated into the design and construction of the project**. A brief summary of our most pertinent findings, conclusions, and recommendations are presented in the following paragraphs:

- In general, native materials that underlie the property are largely consistent with the mapping of McKean (2020), consisting predominantly of surficial materials comprised of poorly-graded GRAVEL with silt and sand (GP-GM) colluvium (Qc) and poorly-graded GRAVEL with sand (GP) grading to poorly-graded SAND with gravel (SP) Lake Bonneville gravel and sand deposits (Qlgp) overlying Mutual Formation quartzite bedrock (Zm), with undocumented fill observed in places.

- Two exploration test pits were excavated at representative locations, one at each of the two potential buildable areas on the property, to evaluate the subsurface materials and to assess the geologic conditions in these locations. In the upslope potential buildable area (Proposed Lot 2 building envelope), refusal was encountered on hard bedrock at a depth of 8½ feet below existing grade. In the downslope potential buildable area (Proposed Lot 1 building envelope), bedded Lake Bonneville gravel and sand deposits were observed to extend to the test pit total depth of 10 feet below existing grade.

- The geologic hazard risk associated with rockfall is considered to be low to moderate for the property. The geologic hazard risk associated with landslide, surface-fault-rupture, debris-flows/flooding, liquefaction, and shallow groundwater hazards is considered to be low for the property.

- The slope stability analysis indicates that the risk associated with global and surficial slope instability is low for the project area.

- Earthquake ground shaking is the only identified hazard that may potentially affect all parts of the project area and is considered to pose a high hazard risk. The site is situated within a seismically active area and is located near mapped active components of the

Wasatch Fault Zone. As such, severe to violent ground shaking should be anticipated in the event of an earthquake within the lifetime of the development.

- Shallow spread or continuous wall footings constructed *entirely* on competent, uniform native earth materials (coarse, granular soils, Bonneville sand/gravel), or *entirely* on a minimum of two feet of granular structural fill overlying competent native earth materials, may be proportioned utilizing a maximum net allowable bearing pressure of **2,600 pounds per square foot (psf)** for dead load plus live load conditions. If the foundation subgrade consists of competent bedrock, the net allowable bearing pressure may be increased to **8,000 psf**. The net allowable bearing values presented above is for dead load plus live load conditions. The allowable bearing capacity may be increased by one-third for short-term loading (wind and seismic). The minimum recommended footing width is 20 inches for continuous wall footings and 30 inches for isolated spread footings.

Based on the findings of this study, we recommend the following:

- To reduce the rockfall hazard risk to an acceptable level, it is recommended that any loose boulders present at the surface upslope of the Proposed Lot 1 building envelope be scaled from the slope prior to development. For the Proposed Lot 2 building envelope, it is recommended that a ditch/earthen berm system approximately 5 feet tall (measured from base of ditch to top of berm) be constructed along the eastern side of the property across the length of the building envelope to reduce the risk of a rockfall event adversely impacting the area. The ditch/berm system is anticipated to have a 2-foot-deep ditch east of a 3-foot-tall berm, and should be designed by a qualified civil engineering firm. Alternatively, an energy-absorbing rockfall barrier (e.g., rockfall fence, Tecco-Mesh, etc.) may be used.

- Proper building design according to appropriate building code and design parameters can assist in mitigating the hazard associated with earthquake ground shaking. Review and consideration of the Federal Emergency Management Agency (FEMA, 2006) document for avoiding earthquake damage, which suggests strapping water heaters to wall studs and installing flexible gas and water lines to reduce the risk of fire and water damage in the event of an earthquake, is recommended.

NOTICE: The executive summary is not intended to replace the information presented in the report, of which the executive summary is an essential part. The executive summary should not be used separately from the report and is only provided as an overview, to summarize the primary conclusions and recommendations. The executive summary may omit a number of details, any one of which could be crucial to the proper interpretation and application of the report and implementation of the recommendations.

2.0 INTRODUCTION

2.1 PURPOSE AND SCOPE OF WORK

This report presents the results of a geotechnical and geologic hazard study performed for Salt Lake County parcel #22141780070000, located at 5560 S. Wasatch Boulevard in Holladay, Utah (herein referred to as the subject property; see Figure A-1, *Site Vicinity Map* in Appendix A). The purposes of this investigation were to assess the nature and engineering properties of the subsurface soils; to provide recommendations for the design and construction of foundations, slabs-on-grade, and lateral earth pressures for structures; to provide an evaluation of slope stability, as well as potential rockfall and surface-fault-rupture hazards in accordance with Holladay City Code (2021); and to identify other geotechnical issues such as fill, shallow bedrock, collapsible soils, infiltration, and groundwater. The potential for other geologic hazards to adversely impact the property was also evaluated.

The scope of work completed for this study included a literature review, aerial imagery and remote sensing review, site reconnaissance and field mapping, subsurface investigation, laboratory testing, engineering analyses, and the preparation of this report. The recommendations contained in this report are subject to the limitations presented in the *Limitations* section of this report (Section 8.1). Our services were performed in accordance with our proposal dated December 4, 2023, and your signed authorization.

2.2 PROJECT DESCRIPTION

The subject property is located at 5560 S. Wasatch Boulevard in Holladay, Utah, in the northeastern quarter of the northwestern quarter of Section 14, Township 2 South, Range 1 East (see Figure A-1). The property is bordered by Interstate 215 to the west, Wasatch Boulevard to the east, the Olympic Shadows subdivision to south, and undeveloped land to the north (see Figure A-2, *Aerial Image*).

Our understanding of the project is based largely on conversations with Mr. and Mrs. Jensen (Clients) and a *Conceptual Plat* for the property prepared by Meridian Engineering, dated July 28, 2022. It is our understanding that the subject property is an approximately 1.9-acre, triangular-shaped parcel located between Wasatch Boulevard to the east and I-215 to the west, with much of the parcel containing slopes in excess of 30% grade (see Figure A-3, *Slope Map*). Two proposed building envelopes have been proposed on the property, one along the east-central margin of the property (identified in this report as Proposed Lot 2 building envelope) and the other in the southwestern corner of the property (identified in this report as Proposed Lot 1 building envelope), in areas where the majority of the building envelope has slopes less than 30% grade (see Figure A-3 and

Figure A-4, *Site Plan*). Both building envelopes are anticipated to be approximately 3,600 ft^2 in size. Though not identified on the *Concept Plan,* it is anticipated that other improvements will include driveways, joint utilities, and landscaping.

3.0 METHODS OF STUDY

3.1 LITERATURE REVIEW

A number of pertinent publications were reviewed as part of this investigation. McKean (2020) provides the most recent 1:24,000-scale geologic map that covers the subject property (see Figure A-5, *Regional Geology Map*). The corresponding United States Geological Survey (USGS) topographic map for the Sugar House Quadrangle (2023) provides physiographic and hydrologic data for the project area. Elliott and Harty (2010) provides regional-scale landslide hazard mapping that covers the subject property. Hiscock and McKean (2018; see Figure A-6, *Surface Fault Rupture Special Study Area Map*) provide the most recent surface-fault-rupture hazard mapping and associated special study areas. The Quaternary Fault and Fold Database (USGS and UGS, 2006) was reviewed to identify the location of proximal faults that have had associated Quaternary-aged displacement. The Federal Emergency Management Agency (FEMA) flood map that covers the subject property was also reviewed (FEMA, 2009). The Holladay City Code pertaining to geologic hazards (Chapter 13.75: *Geologic Hazards (Formerly "Natural Hazards Area");* Holladay City, 2021) was reviewed so that the study would be in conformance with City ordinances.

Stereo-paired aerial imagery for the project site (UGS, 2023a), recent and historic Google Earth imagery, and lidar imagery was also reviewed to assist in the identification of potential adverse geologic conditions. The aerial photographs reviewed are documented in the *References* section of this report.

3.2 SITE RECONNAISSANCE AND SLOPE MAPPING

A team of IGES engineering geologists conducted site reconnaissance and site-specific geologic mapping of the subject property and surrounding areas on December 14, 2023. The site reconnaissance was performed to evaluate the geologic conditions at the property, to field-verify features and/or potential geologic hazard areas identified in the literature and aerial imagery review, to map the local geology across the subject property, and to identify any existing geologic hazards associated with the property that need further evaluation with subsurface explorations. Particular attention was given to the potential rockfall hazard within and outside of the subject property due to the presence of steep, boulder-filled slopes to the east (on the east side of Wasatch Boulevard). During our site reconnaissance the locations of the proposed test pits for the subsequent subsurface investigation were located. Figure A-7 is a *Geotechnical and Local Geology Map*, which displays the local geology based upon the results of the field mapping and subsurface explorations described in the following sections.

3.3 SUBSURFACE INVESTIGATION

Subsurface conditions were investigated by IGES through the excavation of two exploration test pits (TP-1 and TP-2) completed at representative locations across the property on December 22, 2023. TP-1 was excavated in Area 1, the proposed east-central margin building envelope to evaluate the depth to bedrock and other subsurface materials in this area. TP-2 was excavated in Area 2, the proposed southwestern building envelope to evaluate specifically the portion of the property located within the surface-fault-rupture hazard special study area, as well as other subsurface materials in this area. The approximate locations of the test pits are illustrated on Figures A-2, A-3, and A-7.

The test pits were excavated with the aid of a Hitachi Z-Axis 160 LC and a JCB 4CX-14 backhoe to depths of between 8½ (refusal on hard bedrock) and 10 feet below existing grade; the test pits were between 19 and 25 feet long. The soil types were visually logged at the time of our field work in general accordance with the *Unified Soil Classification System* (USCS). Soil classifications and descriptions are included on the test pit logs (Figures A-8 and A-9). A key to USCS symbols and terminology is included as Figure A-10, and a key to physical rock properties is included as Figure A-11. Select site and test pit photos are displayed in Figure A-12. A complete photographic record is available upon request. Upon completion of the logging of the test pits, the excavations were backfilled without engineering quality controls. The excavations were re-graded as close to original grade as possible.

3.4 LABORATORY TESTING

Samples retrieved during the subsurface investigation were transported to the IGES laboratory in South Salt Lake, Utah for evaluation of engineering properties. Specific laboratory tests included:

- Grain-Size Distribution (ASTM D6913)
- Direct Shear Test (ASTM D3080)
- Modified Proctor (ASTM D698/D1557
- Point Load Test (ASTM D5731)
- Corrosion Package (ASTM D4327)

Results of the laboratory testing are discussed in this report and presented in Appendix B. Some test results, including moisture content and percent fines, have been incorporated into the test pit logs (Figures A-8 and A-9).

3.5 SLOPE STABILITY MODELING

Two representative geologic cross-sections (Sections A-A' and B-B') were developed to assess the stability of the slopes on the property, utilizing the subsurface and laboratory data gathered from this investigation. The cross-section locations are shown in plan-view on Figures A-3 and A-7 and the respective geologic cross-sections are presented on Figure D-1 in Appendix D. The results of the slope stability modeling are found in Appendix D and are discussed in detail in Section 5.0 of this report.

4.0 GEOLOGIC CONDITIONS

4.1 GENERAL GEOLOGIC SETTING

4.1.1 Regional Geology

The subject property is situated along the western foothills of the central Wasatch Mountains along the eastern margin of the Salt Lake Valley. The Wasatch Mountains contain a broad depositional history of thick Precambrian and Paleozoic sediments that have been subsequently modified by various tectonic episodes that have included thrusting, folding, intrusion, and volcanic activity, as well as scouring by glacial and fluvial processes (Stokes, 1987). The uplift of the Wasatch Mountains occurred relatively recently during the Late Tertiary Period (Miocene Epoch) between 12 and 17 million years ago (Milligan, 2000). Since uplift, the Wasatch Front has seen substantial modification due to such occurrences as movement along the Wasatch Fault and associated spurs, the development of the numerous canyons that empty into the current Salt Lake Valley and Utah Valley and their associated alluvial fans, erosion and deposition from Lake Bonneville, and localized mass-movement events (Hintze, 1988).

The near-surface geology of the Salt Lake Valley is dominated by sediments that were deposited within the last 30,000 years predominantly by the Pleistocene-aged Lake Bonneville, which was as much as 1,000 feet deep (Hintze, 1988). The lacustrine, glacial, and alluvial sediments near the mountain front consist mostly of sand and gravel. Sediments toward the center of the valley are predominantly offshore deposits of clay, silt, and fine sand. Post-Bonneville alluvial and colluvial cover and mass-movement deposits are common along the Wasatch Front and in places extend to the central part of the valley.

4.1.2 Seismotectonic Setting

The Wasatch Front forms the boundary between two seismically-active physiographic provinces, the Basin and Range Province to the west and the Middle Rocky Mountains Province to the east (Milligan, 2000). The Wasatch Mountains, as part of the Middle Rocky Mountains Province, were uplifted as a fault block along the Wasatch Fault (Hintze, 1988). The Wasatch Fault and its associated segments are part of an approximately 230-mile-long zone of active normal faulting referred to collectively as the Wasatch Fault Zone (WFZ), which has well-documented evidence of late Pleistocene and Holocene (though not historic) movement (Lund, 1990; Hintze, 1988). The faults associated with the WFZ are almost all *normal* faults, exhibiting block movement down to the west of the fault and up to the east. The WFZ is contained within a greater area of active seismic activity known as the Intermountain Seismic Belt (ISB), which runs approximately north-south from

northwestern Montana, along the Wasatch Front of Utah, through southern Nevada, and into northern Arizona. In terms of earthquake risk and potential associated damage, the ISB ranks only second in North America to the San Andreas Fault Zone in California (Stokes, 1987).

The WFZ consists of a series of ten segments of the Wasatch Fault that each display different characteristics and past movement and are believed to have movement independent of one another (UGS, 1996). An approximately northwest-trending trace of the Salt Lake City Segment of the WFZ is mapped approximately 200 feet west of the western boundary of the property (see Figure A-6); this represents the closest documented Holocene-aged (active) fault to the subject property.

4.2 SITE GEOLOGY FROM LITERATURE

According to McKean (2020; see Figure A-5), the entire subject property is mapped as being underlain by Lake Bonneville gravel and sand related to the Provo Shoreline (map unit Qlgp) with some outcrops of the Mutual Formation bedrock (map unit Zm) upslope of the subject property.

The Lake Bonneville gravel and sand deposits related to the Provo Shoreline (Qlgp) are described as upper Pleistocene-aged "Moderately to well-sorted, subrounded to rounded, clast-supported, pebble to cobble gravel with a matrix of sand and pebbly sand; locally interbedded with and containing lenses of silt and sandy silt; thin to thick planar and cross-bedded beds; present north and west of Big Cottonwood Canyon below the Provo shoreline; commonly interbedded with or laterally gradational into lacustrine sand and silt (Qlsp); exposed thickness less than 60 feet (20m)" (McKean, 2020).

The Mutual Formation (map unit Zm) bedrock is described as a Neoproterozoic-aged "Grayish-red to red-purple quartzite and argillite; quartzite is fine to medium grained with medium sorting, well bedded with common cross-bedding; locally the unit contains pebble conglomerate; the quartzite forms cliffs and ridges and the argillite forms slopes; located on the north side of Mount Olympus and in Neffs Canyon; lower contact is an unconformity with the argillite unit of Big Cottonwood Canyon...age based on stratigraphic position; unit thickness is an estimated 800 to 1200 feet (250-365 m)..." (McKean, 2020).

A regressive shoreline of Lake Bonneville is also mapped below the Provo Shoreline across the southwestern corner of the property (see Figure A-5).

4.3 HYDROLOGY

The USGS topographic map for the Sugar House Quadrangle (2023; see Figure A-1) shows that the subject lot is located on a slope descending to the west, approximately 1,250 feet north of the mouth of the Tolcats Canyon drainage, which flows from the mountains upslope to the east down to the west and towards Salt Lake Valley.

The FEMA flood map that covers the project area shows that the property is in Zone X, located outside of the 500-year flood floodplain for any nearby drainage (FEMA, 2009).

No drainages or springs are mapped on or near the property. Baseline groundwater depths for the property are currently unknown, since groundwater was not encountered as part of the subsurface investigation in any of the two test pits excavated to depths of up to 10 feet below existing grade. Groundwater depths are anticipated to fluctuate both seasonally and annually, with the annual high groundwater level likely to be attained following peak spring runoff.

4.4 GEOLOGIC HAZARDS FROM LITERATURE

Based upon the available geologic literature, regional-scale geologic hazard maps that cover the project area have been produced for landslide, surface-fault-rupture, debris-flow, and liquefaction hazards. The following is a summary of the data presented in these regional geologic hazard maps and other literature.

4.4.1 Landslides

Neither Elliott and Harty (2010) nor McKean (2020) map any landslide deposits on or adjacent to the subject property.

4.4.2 Surface-Fault-Rupture

Both the UGS surface-fault-rupture hazard map (Hiscock and McKean, 2018; see Figure A-6) and McKean (2020; see Figure A-5) indicate that an active, west-dipping, northwest-southeast trending trace of the Salt Lake City Segment is located approximately 200 feet west of the southwestern margin of the subject property; parts of this fault are shown as *concealed* below I-215, but well-located beyond the limits of I-215. As a result, the southwestern corner of the subject property is located within a designated surface-fault-rupture special study area (Hiscock and McKean, 2018).

4.4.3 Debris-Flows

Christenson and Shaw (2008a) indicate that the property is within a debris-flow source area due to containing slopes greater than 30%. However, McKean (2020; see Figure A-5)

does not map any debris-flow or young alluvial fan deposits on or adjacent to the property.

4.4.4 Liquefaction

Anderson, et al. (1994) and Christensen and Shaw (2008b) both show the project area to be located in an area with very low potential for liquefaction.

4.5 SITE GEOLOGY FROM AERIAL IMAGERY

A series of aerial photographs that cover the project area were taken from the UGS Aerial Imagery Collection (UGS, 2023a) and analyzed for the presence of adverse geologic conditions across the property. This included a review of photos collected from the years 1958 and 1970, taken preceding major developments in the area. A table displaying the details of the aerial photographs reviewed can be found in the *References* section at the end of this report (Section 8.0).

The 1958 imagery shows the subject property to be largely in a natural, unmodified state, with Wasatch Boulevard present along the eastern margin of the property. A west-trending dirt road is present across the central part of the property connecting Wasatch Boulevard and a subdivision downslope to the west. A bedrock knob is present just south of the dirt road, and abundant smaller boulders are present on the surface, with little vegetation present. No distinct evidence of the presence of geologic hazards was observed on or adjacent to the property in the imagery.

The 1970 imagery is similar to the 1958 imagery, and I-215 still is not present west of the property. In this imagery, several north-south trending trails or dirt roads are present across and downslope of the property. No distinct evidence of the presence of geologic hazards was observed on or adjacent to the property in the imagery.

Google Earth imagery of the property from between the years of 1993 and 2023 was also reviewed. The property was observed to be in a similar state to that observed in the historical aerial images, with the bedrock knob and boulders at the surface readily evident. In the 2003 imagery, the subdivision to the south was being constructed and human disturbance to the eastern portion of the property was observed. A dirt road (presumed to be associated with construction of a waterline) was observed along the eastern margin of the property in the 2005 imagery, along with other disturbance along the western margin and southernmost portion of the property. The subject property appears to have remained largely unchanged between 2005 and 2023, though minor disturbance was observed in the northern portion of the property in the 2022 imagery. No evidence of geologic hazards was observed in the imagery.

UGS 2013-2014 0.5-meter bare-earth lidar data that covers the project area was also reviewed. The lidar data shows the eastern and southwestern portions of the property to have been modified by human activity, and the bedrock knob in the southeast-central portion of the property is expressed in the lidar data. No evidence of lineaments indicative of fault scarps or landslide headscarps were observed in the imagery.

4.6 LOCAL GEOLOGY FROM FIELD INVESTIGATION

Field methods in the form of site reconnaissance, slope and rockfall mapping, and subsurface exploration including test pits were employed to assess the local geology of the subject property. The data collected from these field methods was compiled to produce a comprehensive, site-specific local geology map of the property, which is presented as Figure A-7. A discussion of the findings from each of the field methods is provided below.

4.6.1 Site Reconnaissance and Slope Mapping

A team of IGES engineering geologists performed site reconnaissance and geologic mapping of the site on December 14, 2023. At the time of the site reconnaissance, the property was observed to have steep, highly variable terrain, sloping down to the southwest towards I-215. Abundant cobbles and boulders were observed at the surface that were found to be a mix of white to pink to dark yellowish orange quartzite, medium gray to medium dark gray limestone, and argillite/schist. The clasts were observed to be rounded to angular and of highly variable sizes, with some boulders up to 9½ feet in diameter. A white calcium carbonate coating/crust on some clasts indicated the past presence of Lake Bonneville in this area. Patchy sagebrush and shrubs were observed across the site.

In the eastern portion of the property, 6 to 7 feet of undocumented fill was observed, which we understand is associated with the waterline road (Bob Jensen, personal communication) that passes approximately north-south across the property. An additional 10 to 12 feet of undocumented fill thickness was observed between the water line road and Wasatch Boulevard. The fill materials were observed to be a moderate yellowish-brown poorly-graded sand.

Native earth materials observed included Lake Bonneville gravel and sand deposits (map unit Qlgp) and Mutual Formation (map unit Zm) bedrock. The Lake Bonneville gravel and sand deposits were observed to be a grayish brown clayey gravel with sand, with abundant subrounded to rounded to subangular clasts of quartzite, argillite, and limestone typically 1 to 2 feet in diameter, though some ½ to 1 inch in diameter. A

prominent Mutual Formation bedrock outcrop as observed in the aerial imagery was observed in the southeast-central portion of the property. This outcrop is shown on Figure A-7, and was up to 20 feet tall, comprised predominantly of dark yellowish orange to moderate reddish orange orthoquartzite with medium dark gray argillaceous quartzite interbeds. The bedrock was hard to very hard, medium to thickly bedded to massive, and brecciated in places. Though highly fractured, the outcrop was observed to be largely still competent. A bedding attitude measured at the outcrop showed a strike of N63°E and a dip of 45°SE.

A larger outcrop of Mutual Formation bedrock was observed upslope and east of Wasatch Boulevard. This bedrock outcrop was observed to be entirely thickly bedded, very hard orthoquartzite. A bedding attitude measured at this outcrop showed a strike of S78°W and a dip of 19°NW.

The slope east of Wasatch Boulevard was traversed to evaluate the potential rockfall hazard. Though this area was observed to be very steep and contained some large boulders several feet in diameter, nearly all of the boulders observed in this area were partially buried or laying with the long axis flat against the slope and in stable orientations.

No evidence of recent rockfall events, slope instability, or other geologic hazard features were observed during the site reconnaissance.

4.6.2 Subsurface Exploration

Two exploration test pits (TP-1 and TP-2) were excavated to gather representative subsurface data from across the subject property (see Figures A-2, A-3, and A-7). Detailed logs of the test pits are presented in Figures A-8 and A-9, and select test pit photos are shown in Figure A-12. Native subsurface earth materials were found to be mostly consistent with that as mapped by McKean (2020), being primarily Lake Bonneville gravel and sand related to the Provo shoreline (Qlgp) and Mutual Formation (Zm) bedrock, with minor, thin colluvial cover. The soil and moisture conditions for the native units encountered during our subsurface investigation are discussed in the following paragraphs.

Colluvium (Qc)

This unit was observed in both test pits, varying in thickness from between 2 and 3½ feet thick. In TP-2, this unit also included a topsoil cover of approximately 2 to 6 inches thick. In general, the unit consisted of a moderate yellowish brown to moderate reddish brown, medium dense to dense, slightly moist to moist, poorly-graded GRAVEL with silt and sand (GP) gradational to clayey SAND with gravel (SC). Gravel and larger-sized clasts comprised

between approximately 30% and 70% of the unit, with clasts consisting of angular to subrounded quartzite, granodiorite, and schist up to 6 feet in diameter; in TP-1, the mode clast size was 2 to 3 feet in diameter, while in TP-2, the mode clast size was 4 to 6 inches. In TP-2, where clayey, this unit exhibited pinhole voids and the basal contact was identified by a distinct, coarse stone line. It is noted that this unit was too thin to portray on the attached geologic cross sections (Figure D-1).

Lake Bonneville Gravel and Sand-Provo Phase (Qlgp)

This unit was observed in both test pits, found to be greater than 4 feet thick and extending to the maximum depth of exploration in TP-2. In general, the unit consisted of a medium light gray to light gray, dense, dry, medium bedded to massive, poorly-graded GRAVEL with sand (GP). Gravel and larger-sized clasts comprised between approximately 60% and 70% of the unit, with clasts consisting of subrounded to rounded to subangular quartzite, granodiorite, and schist up to 1½ feet in diameter, though the mode clast size was approximately 1 to 2 inches in diameter. The unit was commonly clast-supported, and exhibited abundant calcium carbonate coating on clasts and occasionally as matrix flour.

Mutual Formation (Zm)

This unit was only observed in TP-1, with only 3 inches exposed at the bottom of the test pit, extending to the maximum depth of exploration, and inducing refusal in this test pit. In general, this bedrock unit was observed to be a dark yellowish orange to moderate reddish orange, hard to very hard, moderately weathered and slightly fractured orthoquartzite. The unit was highly stained with iron oxide and manganese oxide, and exhibited fine-grained quartz crystals.

4.6.3 Groundwater

Groundwater was not encountered in either of the test pits, excavated to depths of up to 10 feet below existing grade.

4.7 SEISMICITY

Following the criteria outlined in the 2021 International Building Code (IBC, 2021), which references ASCE-7-16, spectral response at the site was evaluated for the risk-targeted *Maximum Considered Earthquake* (MCE_R), which represents the spectral response accelerations in the direction of maximum horizontal response represented by a 5% damped acceleration response spectrum that equates to a 1% probability of building collapse within a 50-year period. The MCE_R spectral accelerations were determined based on the location of the site using the *ASCE-7 Hazard Tool*; this software incorporates seismic hazard maps depicting probabilistic ground motions and spectral response data

developed for the United States by the U. S. Geological Survey. These maps have been incorporated into the *International Building Code* (IBC) (International Code Council, 2021).

To account for site effects, site coefficients that vary with the magnitude of spectral acceleration and *Site Class* are used. Site Class is a parameter that accounts for site amplification effects of soft soils and is based on the average shear wave velocity of the upper 100 feet (30 meters, Vs_{30}); site classifications are identified in Table 4.7a.

Table 4.7a
Site Class Categories

Site Class	Earth Materials	Shear Wave Velocity Range (Vs_{30}) m/s
A	Hard Rock	>1,500
B	Rock	760-1,500
C	Very Dense Soil/Soft Rock	360-760
D	Stiff Soil	180-360
E	Soft Soil	<180
F	Special Soils Requiring Site-Specific Evaluation (e.g., liquefiable)	n/a

The earth materials underlying the site vary with location; at proposed Lot 2, the proposed building envelope is underlain by Neoproterozoic-aged (Precambrian) Mutual Formation orthoquartzite, and would likely classify as Site Class B or possibly A. Underlying the building footprint for proposed Lot 1, upwards of 100 feet of Lake Bonneville sand and gravel is anticipated, thus this location would likely classify as Site Class D or possibly C. However, lacking site-specific shear wave velocity measurements, IBC requires a conservative approach, thus for Lot 2 an *estimated* value of Site Class B has been adopted (for *estimated* Site Class B, site coefficients Fa and Fv cannot be less than 1.0), and for Lot 1 a *default* Site Class D has been adopted. Based on the respective site class coefficients, the short- and long-period *Design Spectral Response Accelerations* are presented in Tables 4.7b (Site Class B, Lot 2) and 4.7c (Site Class D, Lot 1). For geotechnical practice, the geo-mean peak ground acceleration (PGA_M) is presented in Table 4.7d.

Table 4.7b – Use for Lot 2
Spectral Accelerations for MCE_R, Risk-Targeted Values (Structural)

Mapped B/C Boundary S_a (g)		Site Coefficient (Site Class B*)		Design Sa (g)	
Ss	S_1	F_a	F_v	S_{D5}	S_{D1}
1.341	0.497	1.0	1.0	0.894	0.331

*estimated
1) T_L=8

Table 4.7c – Use for Lot 1
Spectral Accelerations for MCE_R, Risk-Targeted Values (Structural)

Mapped B/C Boundary S_a (g)		Site Coefficient (Site Class D*)		Design Sa (g)	
Ss	S_1	F_a	F_v	S_{D5}	S_{D1}
1.341	0.497	1.2	1.803	1.073	0.597

*default
1) T_L=8
2) Exception #2 taken

Table 4.7d
Spectral Accelerations for MCE, Geo-Mean (2PE50) Values (Geotechnical)

Location	Mapped B/C Boundary PGA (g)	Site Coefficient F_{PGA}	PGA_M (g)
Lot 2	0.609	1.0	0.609
Lot 1		1.2	0.730

It should be noted that, for certain structures, particularly those with a longer fundamental natural period, a site-specific seismic hazard analysis may be required; the Structural Engineer should review ASCE-7-16 11.4.8 to assess whether Exception #2 is applicable for their structure (this may be applicable to Lot 1). If the simplified approach and mapped spectral accelerations as allowed by Exception #2 are not applicable to this project, IGES should be contacted regarding the completion of a site-specific seismic hazard analysis, which would necessarily include on-site shear wave velocity measurements.

4.8 GEOLOGIC HAZARD ASSESSMENT

Geologic hazard assessments are necessary to determine the potential risk associated with particular geologic hazards that are capable of adversely affecting a proposed development area. As such, they are essential in evaluating the suitability of an area for development and provide critical data in both the planning and design stages of a proposed development. The geologic hazard assessment discussion below is based upon a qualitative assessment of the risk associated with a particular geologic hazard, based upon the data reviewed and collected as part of this investigation.

A "low" hazard rating is an indication that the hazard is either absent, is present in such a remote possibility so as to pose limited or little risk, or is not anticipated to impact the project in an adverse way. Areas with a low-risk determination for a particular geologic hazard do not require additional site-specific studies or associated mitigation practices with regard to the geologic hazard in question.

A "moderate" hazard rating is an indication that the hazard has the capability of adversely affecting the project at least in part, and that the conditions necessary for the geologic hazard are present in a significant, though not abundant, manner. Areas with a moderate-risk determination for a particular geologic hazard may require additional site-specific studies, depending on location and construction specifics, as well as associated mitigation practices in the areas that have been identified as the most prone to susceptibility to the particular geologic hazard.

A "high" hazard rating is an indication that the hazard is very capable of adversely affecting or currently does adversely affect the project, that the geologic conditions pertaining to the particular hazard are present in abundance, and/or that there is geologic evidence of the hazard having occurred at the area in the historic or geologic past. Areas with a high-risk determination always require additional site-specific hazard investigations and associated mitigation practices where the location and construction specifics are directly impacted by the hazard. For areas with a high-risk geologic hazard, simple avoidance is often considered.

The following is a summary of the geologic hazard assessment for the subject property.

4.8.1 Landslides/Mass-Movement

Landslide deposits have not been identified or mapped within the boundaries of or adjacent to the subject lot (Elliott and Harty, 2010; McKean, 2020). Additionally, no landslide deposits or headscarps were observed in the aerial imagery review, during the site reconnaissance, or in the subsurface investigation. Geologic mapping of the steep

west-facing slopes to the east of the property indicated the presence of shallow Mutual Formation bedrock, and shallow bedrock was encountered in TP-1 on the property.

Slope stability modeling performed as part of this investigation demonstrates that natural slopes in the vicinity of the proposed building locations are stable under static and seismic conditions (see Section 5.0). Given this data, the geologic hazard risk associated with landslide/slope stability hazards is considered to be low.

4.8.2 Rockfall

Steep slopes are present on and upslope of the property, and the slopes are covered with abundant boulders that are largely buried or laying with long axis on the ground in a stable configuration. Additionally, boulders interpreted to have been the product of rockfall from the steep, boulder-covered slopes east of the property were observed on the property during the site reconnaissance, though most of these were partially buried and therefore interpreted to be older rockfall events. It was therefore considered necessary to evaluate the rockfall hazard potential for boulders upslope of the property to adversely impact the two proposed building envelopes.

To provide a quantitative analysis of the rockfall hazard for the subject property, IGES performed rockfall modeling using the Rocscience program RocFall2 8.024 in order to evaluate approximate rockfall runout distances, impact velocity and total kinetic energy, and the projected impact height to proposed structures within the building envelopes.

Rockfall modeling was performed using a single line of section (A''- A'''; shown in plan view on Figures A-2, A-3, and A-7), based upon the specific location of likely rockfall source areas based on slope and anticipated rockfall pathways to the property.

Based upon site observations, the following input parameters were incorporated into the model for the sections:

- The rockfall source areas (located off-site, east of Wasatch Boulevard) were notable steep breaks in slope containing abundant boulders at the surface. Two total rockfall seeder[1] locations each were established at these locations (see Figure A-13, *Rockfall Runout Pathways)* to account for different potential rockfall origination points for Section A''-A'''.

[1] Seeder: A rockfall event starting point. In this case, a bedrock outcrop.

- Slope topography was modeled as "soil with vegetation", and Wasatch Boulevard was modeled as "asphalt." Based on field observations, the slope roughness for the "soil with vegetation" was given an amplitude of 1 foot for every 2-foot spacing. Due to the absence of mature tree vegetation across the line of section, no forest damping effect was applied.

- Rockfall boulders were modeled as *quartzite* with a density of 163 lb/ft^3 having sphere, polygon rectangle (5:6, 2:3, 1:2), and super ellipse (2:3; 1:2) shapes, based upon the observed shape of boulders encountered in the field.

- Initial horizontal and vertical velocities of 0.5 ft/sec, assuming that initial movement of the boulder was produced by a seismic event and not merely gravity-induced.

- 100 total modeled rockfall events for each rockfall source area (50 per seeder location), which included 20 total events for each of the modeled boulder sizes stemming from the bedrock source area, based upon dimensions observed in the field. This included boulders with maximum dimensions of 9 ft., 8 ft., 7 ft., 4 ft. and 3 ft.

Section A''-A''' evaluated the potential for rockfall to impact the Proposed Lot 2 building envelope. A rockfall collector (Collector 1) was modeled along the line of section, representing the eastern side of the Proposed Lot 2 building envelope, and a second rockfall collector (Collector 2) was modeled along the line of section, representing the western side of the Proposed Lot 2 building envelope. Figure A-13 shows the rockfall runout pathway for this line of section, and the graphical results of the modeling for this line of section are attached in Appendix E.

As seen in Figure A-13, none of the 100 modeled rockfall events reached Collector 1. The closest rockfall boulder was observed to terminate at 56½ feet east of the Proposed Lot 2 building envelope, though 8 of the 100 events (8.0%) were found to terminate within 101 feet of the Proposed Lot 2 building envelope.

Because no events reached the Proposed Lot 2 building envelope, a section to evaluate the potential for rockfall to reach the Proposed Lot 1 building envelope further downslope was considered unnecessary as Lot 2 was the more critical of the two lots.

Given this rockfall modeling data, the slope to the east of the property is concluded to constitute a minor rockfall hazard for the Proposed Lot 2 building envelope. Additionally,

loose boulders upslope of the Proposed Lot 1 building envelope on the property also are considered to be a minor rockfall hazard. Given this data, the geologic hazard risk associated with rockfall hazards is considered to be low to moderate for the property.

4.8.3 Debris-Flows and Flooding

Debris-flows typically deposit on existing alluvial fans located at the mouth of active canyons, while flooding typically occurs in drainage channels and lowland areas within a drainage basin. The property is located on steep slopes and young alluvial fan deposits have not been mapped on the property (McKean, 2020; see Figure A-5). Additionally, no evidence of debris-flows was observed on the property in the aerial imagery review, site reconnaissance, or in any of the exploration test pits. Thus, the geologic hazard risk associated with debris-flow hazards is considered to be low for the property.

The FEMA flood map that covers the property shows the property to be located outside of the 500-year flood floodplain for any nearby drainage (FEMA, 2009). The closest drainage to the property is the Tolcats Canyon drainage, located approximately 1,250 feet south of the property. Given this data, the geologic hazard risk associated with flooding hazards is considered to be low for the property.

4.8.4 Surface-Fault Rupture and Earthquake-Related Hazards

Surface-fault-rupture is a vertical or horizontal offset of the ground surface during and/or after a seismic event. No faults are known to be present on or projecting towards the property (McKean, 2020). The closest mapped active fault to the property is a splay of the Salt Lake Segment of the WFZ, located approximately 200 feet west of the southwestern margin of the subject property (McKean, 2020; Hiscock and McKean, 2018). As such, the southwestern corner of the subject property is located within a surface-fault-rupture special study area (Hiscock and McKean, 2018; see Figure A-6).

TP-2 was specifically excavated across the portion of the property located within the surface-fault-rupture special study area. In this test pit, laterally continuous, bedded Lake Bonneville gravel and sand deposits were observed across the length of the test pit. The absence of offset bedding, colluvial wedges, shearing, or other geologic evidence indicative of faulting, constitutes reasonable geologic evidence that active (Holocene-aged) faults are absent within the area investigated. Given this data, the geologic hazard risk associated with surface-fault-rupture hazards are considered to be low for the property.

Based upon the distance of the property from the Salt Lake Segment, severe to violent ground shaking may be possible in the event of an earthquake along the Salt Lake Segment throughout the lifetime of the improvements (UGS, 2023b).

4.8.5 Liquefaction

Liquefaction is a loss of shear strength in soil as a result of dynamic/cyclic loading arising from earthquake ground motions. Earth materials that are potentially susceptible to liquefaction typically consist of loose, saturated sand and some silts, whereas earth materials such as clay, dense sand, or bedrock generally do not liquefy. Shallow bedrock was encountered in TP-1 and bedrock outcrops were encountered on and upslope of the property; furthermore, groundwater was not encountered. Given this data, and consistent with the existing geologic literature for the area, the geologic hazard risk associated with earthquake-induced liquefaction is considered to be low.

4.8.6 Shallow Groundwater

Groundwater was not encountered in any of the two test pits that were excavated across the property to depths of up to 10 feet below existing grade. The groundwater level is anticipated to fluctuate both seasonally and annually, but given this data, the geologic hazard risk associated with shallow groundwater hazards is considered to be low.

5.0 SLOPE STABILITY ASSESSMENT

5.1 STRENGTH OF EARTH MATERIALS

To directly assess the soil strength of the prevailing near-surface Lake Bonneville lacustrine sand and gravel (Qlgp), IGES conducted two direct shear tests (ASTM D3080) on remolded soil samples (the soils were generally too coarse to obtain a driven tube sample). The test specimens were remolded to approximately 94% of the maximum dry density per ASTM D1557. A summary of our laboratory test results is presented in Table 5.1a; detailed laboratory test results are presented in Appendix B.

Table 5.1a
Summary of Direct Shear

Test Location	Depth (ft)	Geologic Unit/USCS Classification	γ_m (pcf)	γ_{sat} (pcf)	Friction Angle (ϕ) (deg.)	Cohesion (psf)	Notes
TP-1	7.5	Qlgp/GW	134.3	142.0	40	815	G:62.9% S:33.2% F:3.9%
TP-2	10	Qlgp/SP	125.5	134.6	37	573	G:24.5% S:70.5% F:5.0%

*Peak strengths reported

To assess the strength of the prevailing moderately weathered bedrock unit (Mutual Formation, map unit Zm), an estimate of the strength was assessed utilizing the software package RocLab (V. 1.033), which is based on the Hoek-Brown failure Criterion (1997); this method is used to assess equivalent strength parameters (friction angle and cohesion) of relatively hard rock to be used in conventional limit-equilibrium slope stability software. Input parameters utilized to estimate reasonable strength parameters for the prevailing bedrock unit were derived from observations made of the bedrock observed within test pits as well as outcrops observed in the field; the input parameters adopted for this exercise are presented in Table 5.1b.

The rock mechanic parameters selected for the RocLab inputs generally consisted of the lower-bound (lower strength/competency) values for the Mutual Formation orthoquartzite bedrock to conservatively estimate the strength of the bedrock (generally the lower-bound of the expected range of values per Hoek-Brown, 1997). For this exercise, the *Uniaxial Compressive Strength* is a critical parameter; this value was estimated based largely on six *point-load tests* (ASTM D5731) completed on representative bedrock samples (results of the point load tests are presented in Appendix B). The RocLab assessment indicates a friction angle (ϕ') of approximately 13.7 degrees and a cohesion of 38 ksf are reasonable values to

model the Mutual Formation in limit-equilibrium slope stability software. Some reduction of these values is often warranted to take into account uncertainties such as highly fractured rock, planes of weakness, or anisotropic behavior; such a reduction is often judgment-based.

Table 5.1b
Hoek-Brown Failure Criterion Parameters-Mutual Formation Bedrock

Parameter	Value
Uniaxial Compressive Strength (ksf)	2,000
Geologic Strength Index (GSI)	35
Intact Rock Parameter (mi)	17
Intact Modulus (Ei) (ksf)	600,000
Disturbance Factor (D)	1.0
Modulus Ratio (MR)	300

5.2 GLOBAL STABILITY

The stability of the existing prominent west-facing slope has been assessed in general accordance with methodologies set forth in Blake et al. (2002) with respect to two representative geologic cross-sections – Sections A-A' and B-B', illustrated on Figure D-1 in Appendix D (the sections are identified in plan-view on Figures A-3 and A-7). The stability of the slope was modeled using SLIDE, a computer application incorporating (among others) Spencer's Method of analysis. Calculations for stability were developed by searching for the minimum factor of safety for a rotational-type failure occurring through the prevailing Lake Bonneville Gravel and Sand (Qlgp) and the upper weathered Mutual Formation bedrock (Zm), with the near-surface surficial soils controlling the stability along the slope. Analysis was performed for both static and seismic (pseudo-static) cases.

Groundwater, e.g., a piezometric groundwater surface, was not encountered during our subsurface investigation. Accordingly, groundwater was not modeled in our limit-equilibrium analysis. Saturated parallel seepage has been modeled in a separate analysis (see Section 5.3).

Soil strength parameters for primary surficial soil unit (Qlgp) was selected based primarily on laboratory test data, and strength parameters for the prevailing bedrock unit (Zm) were selected based on the Hoek-Brown Criterion (see Section 5.1) (noting that the Zm unit is relatively unweathered orthoquartzite with few fractures and appears quite competent and weathering-resistant). The Lake Bonneville Sand and Gravel (Qlgp) is a younger Lake Bonneville unit (associated with the Provo Shoreline); however, underlying the Qlgp is an older, yet analogous unit related to the Bonneville Shoreline (Qlgb). For our model, the

strength of the Qlgb unit can reasonably be assumed to be similar to that of the Qlgp unit considering that both units would logically have a similar soil classification and both units likely have the same parent material. Accordingly, the Qlgp and Qlgb have been assigned the same strength parameters. Similarly, the Afu unit (undocumented fill) would logically have been derived from the adjacent Qlgp unit (the Afu was placed as a part of utility construction along Wasatch Boulevard); thus, the Afu was assigned strength values similar to the Qlgp/Qlgb units, although the strength values were reduced somewhat to capture the uncertainty associated with compaction (this reduction is largely a qualitative estimate).

Based on this assessment, representative soil strength parameters were selected for our model, summarized in Table 5.2a. For our slope stability analysis, saturated unit weights were assumed.

Table 5.2a
Summary of Earth Material Strength Parameters

Geologic Unit	Saturated Unit Weight (pcf)	Effective Friction Angle ϕ (deg.)	Cohesion (psf)
Zm	146	14	19 ksf
Qlgb	142	37	100*
Qlgp	142	37	100*
Afu	140	35	50*

*Apparent cohesion

Pseudo-static (seismic screening) analysis of the selected cross-sections was performed in general conformance with the simplified procedures as outlined in Blake et al. (2002), published by the Southern California Earthquake Center (SCEC). For this project, the design seismic event was taken as the probabilistic ground motion with a 2 percent probability of exceedance in 50 years (2PE50). Based on the USGS *Unified Hazard Tool*[2], utilizing the Dynamic/Conterminous U.S. 2014 updated model (v. 4.2.0), the mapped *Peak Ground Acceleration* (PGA) associated with a 2PE50 event is estimated to be 0.5974g for the Site Class C/B boundary (rock site). The SCEC screening procedure calculates a recommended seismic screening coefficient for a given threshold of displacement (5cm or 15cm) based on the uncorrected PGA (Site Class B), distance to the seismic source, and the deaggregated moment magnitude (the earthquake magnitude that has the greatest contribution to the seismic hazard of interest). The USGS *Unified Hazard Tool* indicates that the moment magnitude with the greatest contribution to the hazard is 6.9 Mw, with the source located

[2] https://earthquake.usgs.gov/hazards/interactive/

approximately 1.1 km from the coordinates used for this exercise. The SCEC procedure resulted in a horizontal seismic screening coefficient (k_{eq}) of 0.295g, consistent with a 5 cm threshold displacement level. Supporting data is presented in Appendix C.

Based upon our analysis, the existing slopes meet the minimum required static and seismic factors of safety of 1.5 and 1.0, respectively. The results of the slope stability analysis are presented in Table 5.2b; detailed results are presented in Appendix D.

Table 5.2b
Summary of Slope Stability Analysis

Section	Factor of Safety	
	Static	Seismic
A-A'	1.98	1.10
B-B'	1.92	1.02

5.3 SURFICIAL STABILITY

Our subsurface investigation indicates that the near-surface soils within the project site are comprised largely of coarse lacustrine sand and gravel. Owing to the relatively few fines present, these earth materials generally appear to be well-drained.

IGES assessed the potential for the upper four feet to become mobilized under saturated parallel seepage conditions. Our assessment assumes four feet of coarse sand and gravel, fully saturated, and a 2.25H:1V slope (the steepest natural slope along Section B-B'). To assess sensitivity to slope gradient, slope angle was also varied, as shown in Table 5.3. Laboratory testing indicates the granular colluvial/Lake Bonneville shoreline soils have a representative friction angle of 37 degrees and an apparent cohesion on the order of 500 to 800 psf. However, the near-surface soils may be less dense, and is subject to lower confining stresses; accordingly, strength values have been reduced (the reduction is judgement-based). Our model assumes an effective friction angle of 35 degrees and an apparent cohesion of 25 psf, and a saturated unit weight of 142 pcf. The results of the sensitivity study are presented in Table 5.3.

It is noted that field mapping did not reveal any geomorphic expression of past shallow/surficial failures on any of the slopes. Also, considering the relatively few fines present and the coarse nature of the prevailing near-surface earth materials, the near-surface earth materials are expected to be well-drained, which may inhibit the development of saturated/parallel seepage conditions. Thus, the prevailing natural slopes, which are

generally 2.25H:1V or flatter, are expected to remain surficially stable in the event of saturated/parallel seepage conditions. Sample calculations are presented in Appendix D.

Table 5.3
Sensitivity Study – Saturated/Parallel Seepage Infinite Slope Stability Assessment

Slope Gradient	Factor of Safety		
	Sat. Depth=2 ft.	Sat. Depth=3 ft.	Sat. Depth = 4 ft.
3H:1V	1.47	1.38	1.33
2.25H:1V	1.12	1.04	1.00
2H:1V	1.00	0.93	0.89

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 GENERAL CONCLUSIONS

Based on the results of the field observations, laboratory testing, engineering analysis, and literature review, **the subsurface conditions are considered suitable for the proposed development provided that the recommendations presented in this report are incorporated into the design and construction of the project.**

Supporting data upon which the following conclusions and recommendations are based have been presented in the previous sections of this report. The recommendations presented herein are governed by the physical properties of the earth materials encountered in the subsurface explorations. If subsurface conditions other than those described herein are encountered in conjunction with construction, and/or if design and layout changes are initiated, IGES must be informed so that our recommendations can be reviewed and revised as deemed necessary.

6.2 GEOLOGIC CONCLUSIONS AND RECOMMENDATIONS

Based upon the data collected and reviewed as part of the geologic hazard assessment, IGES makes the following conclusions regarding the geological hazards present at the project area:

- **The project area does not appear to have major geological hazards that are capable of significantly adversely impacting the proposed building envelopes as currently proposed under the existing conditions.** However, a minor rockfall hazard is present that can be mitigated to an acceptable level.

- In general, native materials that underlie the property are largely consistent with the mapping of McKean (2020), consisting predominantly of surficial materials comprised of poorly-graded GRAVEL with silt and sand (GP-GM) colluvium (Qc) and poorly-graded GRAVEL with sand (GP) grading to poorly-graded SAND with gravel (SP) Lake Bonneville gravel and sand deposits (Qlgp) overlying Mutual Formation quartzite bedrock (Zm), with undocumented fill observed in places.

- Two exploration test pits were excavated at representative locations, one at each of the two potential buildable areas on the property, to evaluate the subsurface materials and to assess the geologic conditions in these locations. In the upslope potential buildable area (Lot 2 building envelope), refusal was encountered on hard bedrock at a depth of 8½ feet below existing grade. In the downslope potential buildable area (Lot 1 building envelope), bedded Lake Bonneville gravel

and sand deposits were observed to extend to the test pit total depth of 10 feet below existing grade.

- The geologic hazard risk associated with rockfall is considered to be low to moderate for the property. The geologic hazard risk associated with landslide, surface-fault-rupture, debris-flows/flooding, liquefaction, and shallow groundwater hazards is considered to be low for the property.

- The slope stability analysis indicates that the risk associated with global and surficial slope instability is low for the project area.

- Earthquake ground shaking is the only identified hazard that may potentially affect all parts of the project area and is considered to pose a high hazard risk. The site is situated within a seismically active area and is located near mapped active components of the Wasatch Fault Zone. As such, severe to violent ground shaking should be anticipated in the event of an earthquake within the lifetime of the development.

Given the conclusions listed above, IGES makes the following recommendations:

- To reduce the rockfall hazard risk to an acceptable level, it is recommended that any loose boulders present at the surface upslope of the Proposed Lot 1 building envelope be scaled from the slope prior to development. For the Proposed Lot 2 building envelope, it is recommended that a ditch/earthen berm system approximately 5 feet tall (measured from base of ditch to top of berm) be constructed along the eastern side of the property across the length of the building envelope to reduce the risk of a rockfall event adversely impacting the area. The ditch/berm system is anticipated to have a 2-foot-deep ditch east of a 3-foot-tall berm, and should be designed by a qualified civil engineering firm. Alternatively, an energy-absorbing rockfall barrier (e.g., rockfall fence, Tecco-Mesh, etc.) may be used.

- Proper building design according to appropriate building code and design parameters can assist in mitigating the hazard associated with earthquake ground shaking. Review and consideration of the Federal Emergency Management Agency (FEMA, 2006) document for avoiding earthquake damage, which suggests strapping water heaters to wall studs and installing flexible gas and water lines to reduce the risk of fire and water damage in the event of an earthquake, is recommended.

6.3 EARTHWORK

6.3.1 General Site Preparation and Grading

Below proposed structures, fills, and man-made improvements, all vegetation, topsoil, debris and undocumented fill should be removed – undocumented fill associated with utility construction along Wasatch Boulevard could potentially impact Lot 2. Any existing utilities should be re-routed or protected in place. The exposed native soils should then be proof-rolled with heavy rubber-tired equipment such as a scraper or loader. Any soft/loose areas identified during proof-rolling should be removed and replaced with structural fill. All excavation bottoms should be observed by an IGES representative during proof-rolling or otherwise prior to placement of engineered fill to evaluate whether soft, loose, or otherwise deleterious earth materials have been removed, and to assess compliance with the recommendations presented in this report.

6.3.2 Excavations

Soft, loose, or otherwise unsuitable soils beneath structural elements, hardscape or pavements may need to be over-excavated and replaced with structural fill. All undocumented fill below structures must be removed. Where over-excavation is required, the excavations should extend ½ foot laterally for every foot of depth of over-excavation. Excavations should extend laterally at least two feet beyond flatwork, pavements, and slabs-on-grade. Structural fill should consist of granular materials and should be placed and compacted in accordance with the recommendations presented in this report.

Prior to placing structural fill, all excavation bottoms should be scarified to at least 6 inches, moisture conditioned as necessary at or slightly above optimum moisture content (OMC), and compacted to at least 90 percent of the maximum dry density (MDD) as determined by ASTM D-1557 (Modified Proctor). Scarification of exposed bedrock is not required.

6.3.3 Excavation Stability

The contractor is responsible for site safety, including all temporary trenches excavated at the site and the design of any required temporary shoring. The contractor is responsible for providing the "competent person" required by Occupational Safety and Health (OSHA) standards to evaluate soil conditions. For planning purposes, Soil Type C may be assumed at the site (coarse, granular soil, cohesionless soils). Close coordination between the competent person and IGES should be maintained to facilitate construction while providing safe excavations.

Based on OSHA guidelines for excavation safety, trenches with vertical walls up to 5 feet in depth may be occupied. Where very moist soil conditions or groundwater is encountered, or when the trench is deeper than 5 feet, we recommend a trench-shield or shoring be used as a protective system to workers in the trench. As an alternative to shoring or shielding, trench walls may be laid back at one and a half horizontal to one vertical (1.5H:1V) (34 degrees) in accordance with OSHA Type C soils. Trench walls may need to be laid back at a steeper grade pending evaluation of soil conditions by the geotechnical engineer; however, where competent bedrock is exposed, a 0.5H:1V cut may be utilized. Soil conditions should be evaluated in the field on a case-by-case basis.

6.3.4 Structural Fill and Compaction

All fill placed for the support of structures, flatwork or pavements should consist of structural fill. Structural fill may consist of granular native soils, which may be defined as soils with less than 30% fines, 10-60% sand, and contain no rock larger than 4 inches in nominal size (6 inches in greatest dimension). Structural fill should also be free of vegetation and debris. All structural fill should be 1-inch minus material when within 1 foot of any base coarse material. Soils not meeting these criteria may be suitable for use as structural fill; however, such soils should be evaluated on a case-by-case basis and should be approved by IGES prior to use.

All structural fill should be placed in maximum 4-inch loose lifts if compacted by small hand-operated compaction equipment, maximum 6-inch loose lifts if compacted by light-duty rollers, and maximum 8-inch loose lifts if compacted by heavy duty compaction equipment that is capable of efficiently compacting the entire thickness of the lift. Additional lift thickness may be allowed by IGES provided the Contractor can demonstrate sufficient compaction can be achieved with a given lift thickness with the equipment in use. We recommend that all structural fill be compacted on a horizontal plane, unless otherwise approved by IGES. Structural fill underlying all shallow footings and pavements should be compacted to at least 95 percent of the MDD as determined by ASTM D-1557. **The moisture content should be at, or slightly above, the OMC for all structural fill.** Compacting dry of optimum is discouraged. Any imported fill materials should be approved prior to importing. Also, prior to placing any fill, the excavations should be observed by IGES to confirm that unsuitable materials have been removed. In addition, proper grading should precede placement of fill, as described in the General Site Preparation and Grading subsection of this report. Frozen soils may not be used as structural fill.

Specifications from governing authorities such as Salt Lake County and/or special service districts having their own precedence for backfill and compaction should be followed where more stringent.

6.3.5 Oversize Material

Based on our observations, there is significant potential for the presence of oversize materials (larger than 6 inches in greatest dimension). Large rocks, particularly boulders up to 9 feet in diameter, may require special handling, such as segregation from structural fill, and disposal. It may be economically feasible to crush boulders on site to create an engineered product such as roadbase or subbase, or create earth materials for re-purposing as structural fill. Boulders may also be re-purposed for rockeries.

6.3.6 Utility Trench Backfill

Utility trenches should be backfilled with structural fill in accordance with Section 6.3.4 of this report. Utility trenches can be backfilled with the onsite soils free of debris, organic and oversized material. Prior to backfilling the trench, pipes should be bedded in and shaded with a uniform granular material that has a Sand Equivalent (SE) of 30 or greater. Alternatively, pipe bedding and shading may consist of clean ¾-inch gravel. Pipe bedding may be water-densified in-place (jetting). Native earth materials can be used as backfill over the pipe bedding zone. All utility trenches backfilled below pavement sections, curb and gutter, and hardscape, should be backfilled with structural fill compacted to at least 95 percent of the MDD as determined by ASTM D-1557. All other trenches should be backfilled and compacted to approximately 90 percent of the MDD (ASTM D-1557). However, in all cases the pipe bedding and shading should meet the design criteria of the pipe manufacturer. Specifications from governing authorities having their own precedence for backfill and compaction should be followed where they are more stringent.

6.4 FOUNDATION RECOMMENDATIONS

Based on our field observations and considering the presence of relatively competent native earth materials, we recommend that the footings for the proposed new homes be founded either *entirely* on competent native granular earth materials or *entirely* on competent bedrock. Bedrock/soil transition zones are not allowed – transition zones will likely result in excessive differential settlement of the structure should foundation soils become wetted.

Where soft, loose, or otherwise deleterious earth materials such as undocumented fill are exposed on the foundation subgrade, IGES recommends a minimum over-excavation of two feet and replacement with structural fill, such that the entire structure is underlain by a relatively uniform fill blanket. Alternatively, the foundations may be extended such

that the foundations bear directly on competent, uniform earth materials (either all bedrock or all surficial soils). **We recommend that IGES assess the bottom of the foundation excavation prior to the placement of steel or concrete, or structural fill, to identify the competent native earth materials as well as any unsuitable soils or transition zones**. Additional over-excavation may be required based on the actual subsurface conditions observed.

Shallow spread or continuous wall footings constructed *entirely* on competent, uniform native earth materials (coarse, granular soils, Bonneville sand/gravel), or *entirely* on a minimum of two feet of granular structural fill overlying competent native earth materials, may be proportioned utilizing a maximum net allowable bearing pressure of **2,600 pounds per square foot (psf)** for dead load plus live load conditions. If the foundation subgrade consists of competent bedrock, the net allowable bearing pressure may be increased to **8,000 psf**. The net allowable bearing values presented above is for dead load plus live load conditions. The allowable bearing capacity may be increased by one-third for short-term loading (wind and seismic). The minimum recommended footing width is 20 inches for continuous wall footings and 30 inches for isolated spread footings.

All conventional foundations exposed to the full effects of frost should be established at a minimum depth of 30 inches below the lowest adjacent final grade. Interior footings, not subjected to the full effects of frost (i.e., *a continuously heated structure*), may be established at higher elevations, however, a minimum depth of embedment of 12 inches is recommended for confinement purposes.

Foundation drains should be installed around below-ground foundations (e.g., basement walls) to minimize the potential for flooding from shallow groundwater or seepage, which may be present at various times during the year, particularly spring run-off.

6.5 SETTLEMENT

Static settlements of properly designed and constructed conventional foundations, founded as described in Section 6.5, are anticipated to be on the order of 1 inch or less. Differential settlement is expected to be half of total settlement over a distance of 30 feet.

6.6 EARTH PRESSURES AND LATERAL RESISTANCE

Lateral forces imposed upon conventional foundations due to lateral earth pressures, wind, or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footing and the supporting soils. In determining the frictional resistance against concrete, a coefficient of friction of 0.48 for undisturbed granular native earth materials, structural fill, or bedrock should be used.

Ultimate lateral earth pressures from natural soils and *granular* backfill acting against retaining walls and buried structures may be computed from the lateral pressure coefficients or equivalent fluid densities presented in Table 6.6. The coefficients and densities presented in Table 6.6 assume no buildup of hydrostatic pressures. The force of the water should be added to the presented values if hydrostatic pressures are anticipated.

Table 6.6
Recommended Lateral Earth Pressure Coefficients

Condition	Level Backfill		2:1 Backfill	
	Lateral Pressure Coefficient	Equivalent Fluid Density (pcf)	Lateral Pressure Coefficient	Equivalent Fluid Density (pcf)
Active (Ka)	0.248	34.7	0.376	52.6
At-rest (Ko)	0.426	5.97	0.646	90.4
Passive (Kp)	6.6	918	-	-

Clayey soils drain poorly and may swell upon wetting, thereby greatly increasing lateral pressures acting on earth retaining structures. Therefore, clayey soils should not be used as retaining wall backfill. Backfill should consist of either native granular soil or sandy imported material with an Expansion Index (EI) less than 25.

Walls and structures allowed to rotate slightly should use the active condition. If the element is constrained against rotation (i.e., a basement wall), the at-rest condition should be used. However, according to the IBC, foundation walls for buried or partially buried structures are allowed to be designed for active pressures if no more than 8 feet of the wall extends below grade and are laterally supported by flexible diaphragms.

The values listed in Table 6.6 should be used with an appropriate factor of safety against overturning and sliding. A value of 1.5 is typically used. Additionally, if passive resistance is calculated in conjunction with frictional resistance, the passive resistance should be reduced by ½.

6.7 RETAINING WALL DESIGN

The subsurface data provided in this report may be used for retaining wall design. Retaining wall design should be completed under a separate design package that contains construction drawings and specifications for each specific wall. The design package should

include elevation (profile) drawings, stationing, section drawings and construction specifications for the particular wall type and planned accessories such as fencing. Drawings should be completed so that accurate construction layout can be provided. If building loads or changes to grading are anticipated, *the wall designer must take those loads into account*. For MSE walls, additional laboratory testing of earth materials intended to be placed in the *reinforced zone* may need to be completed to provide data to estimate reasonable soil strength parameters.

6.8 CONCRETE SLAB-ON-GRADE CONSTRUCTION

To minimize settlement and cracking of slabs, and to aid in drainage beneath the concrete floor slabs, all concrete slabs should be founded on a minimum 4-inch layer of compacted gravel overlying properly prepared subgrade. The gravel should consist of free-draining gravel or road base with a ¾-inch maximum particle size and no more than 5 percent passing the No. 200 mesh sieve. The layer should be compacted to at least 95 percent of the MDD as determined by ASTM D-1557.

All concrete slabs should be designed to minimize cracking as a result of shrinkage. Consideration should be given to reinforcing the slab with a welded wire fabric, re-bar, or fibermesh. Slab reinforcement should be designed by the structural engineer; however, as a minimum, slab reinforcement should consist of 4"×4" W2.9×W2.9 welded wire mesh within the middle third of the slab. We recommend that concrete be tested to assess whether the slump and/or air content is in compliance with the plans and specifications. We recommend that concrete be placed in general accordance with the requirements of the American Concrete Institute (ACI). A Modulus of Subgrade Reaction of **250 psi/inch** may be used for design.

A moisture barrier (vapor retarder) consisting of 10-mil thick Visqueen (or equivalent) plastic sheeting should be placed below slabs-on-grade where moisture-sensitive floor coverings or equipment is planned. Prior to placing this moisture barrier, any objects that could puncture it, such as protruding gravel or rocks, should be removed from the building pad. Alternatively, the subgrade may be covered with 2 inches of clean sand, which will serve to minimize punctures through the Visqueen.

Our experience indicates that use of reinforcement in slabs and foundations can generally reduce the potential for drying and shrinkage cracking. However, some cracking can be expected as the concrete cures. Minor cracking is considered normal; however, it is often aggravated by a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature

and moisture fluctuations can also be expected. The use of low slump concrete can reduce the potential for shrinkage cracking; saw cuts in the concrete at strategic locations can help to control and reduce undesirable shrinkage cracks.

6.9 MOISTURE PROTECTION AND SURFACE DRAINAGE

Moisture should not be allowed to infiltrate into the soils in the vicinity of the foundations. Design strategies to minimize ponding and infiltration near the home should be implemented.

- We recommend that desert or Xeriscape landscaping be considered within 5 feet of foundations.
- Rain gutters should be installed around the entire structure to capture and direct all runoff a minimum of 10 feet away from structures or beyond the limits of the foundation backfill (whichever distance is greater). If architectural features preclude the possibility of incorporating rain gutters, then the perimeter of the home should be designed to accommodate aggressive positive drainage away from the home.
- Irrigation valves should be placed a minimum of 5 feet from foundations and should always be placed beyond the limits of foundation backfill.
- The ground surface within 10 feet of structures should be constructed so as to slope a minimum of five percent away from the structures (if this distance is not practical, then a concrete swale should be constructed to help direct surface runoff from the structure).
- Pavement sections should be constructed to divert surface water away from the pavement into storm drains.

Where basements are planned, IGES recommends a perimeter foundation drain be constructed in accordance with the International Residential Code (IRC).

6.10 CORROSIVE SOILS

To assess the potential corrosive effects of site soils on concrete, a representative soil sample was tested for soluble sulfate content. The test indicated that the sample tested has a soluble sulfate content of less than 10 ppm. Based on this result, the soils are classified as having a 'low' potential for deterioration of concrete due to the presence of soluble sulfate. Accordingly, conventional Type IL Portland cement may be used for all concrete in contact with site soils.

To evaluate the corrosion potential of ferrous metal in contact with onsite native soil, a representative soil sample was tested in our soils laboratory for soil resistivity (AASHTO

T288), soluble chloride content, and pH. The test indicated that the onsite soil tested has a minimum soil resistivity of 17,018 OHM-cm, a soluble chloride content of less than 10 ppm, and a pH of 7.8. Based on this result, the prevailing earth materials are considered *mildly corrosive* to ferrous metal in direct contact with site soils.

7.0 CLOSURE

7.1 LIMITATIONS

The concept of risk is a significant consideration of geotechnical analyses. The analytical means and methods used in performing geotechnical analyses and development of resulting recommendations do not constitute an exact science. Analytical tools used by geotechnical engineers are based on limited data, empirical correlations, engineering judgment and experience. As such the solutions and resulting recommendations presented in this report cannot be considered risk-free and constitute IGES's best professional opinions and recommendations based on the available data and other design information available at the time they were developed. IGES has developed the preceding analyses, recommendations and designs, at a minimum, in accordance with generally accepted professional geotechnical engineering practices and care being exercised in the project area at the time our services were performed. No warrantees, guarantees or other representations are made.

The information presented in this report is based on limited field testing and our understanding of the project. The subsurface data used in the preparation of this report were obtained largely from the explorations made for this project and literature reviewed from readily available published sources. It is very likely that variations in the soil, rock, and groundwater conditions exist between and beyond the points explored. The nature and extent of the variations may not be evident until construction occurs and/or additional explorations are completed. If any conditions are encountered at this site that are different from those described in this report, IGES must be immediately notified so that we may make any necessary revisions to recommendations presented in this report. In addition, if the scope of the proposed construction or grading changes from those described in this report, our firm must also be notified.

This report was prepared for our client's exclusive use on the project identified in the foregoing. Use of the data, recommendations or design information contained herein for any other project or development of the site not as specifically described in this report is at the user's sole risk and without the approval of IGES, Inc. It is the client's responsibility to see that all parties to the project including the designer, contractor, subcontractors, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.

7.2 ADDITIONAL SERVICES

We recommend that IGES be retained to review the final design plans, grading plans and specifications to determine if our engineering recommendations have been properly

incorporated in the project development documents. We also recommend that IGES be retained to evaluate construction performance and other geotechnical aspects of the project as construction initiates and progresses through its completion.

We recommend that IGES assess the bottom of the foundation excavation prior to the placement of steel or concrete, or structural fill, to identify the competent native earth materials as well as any unsuitable soils or transition zones. Additional over-excavation may be required based on the actual subsurface conditions observed.

8.0 REFERENCES CITED

Anderson, L.R., Keaton, J.R., Spitzley, J.E., and Allen, A.C., 1994, Liquefaction Potential Map for Salt Lake County, Utah, Complete Technical Report: Utah Geological Survey Contract Report 94-9, 68 p.

Blake, T.F., Hollingsworth, R.A. and Stewart, J.P., Editors (2002), Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for analyzing and mitigating landslide hazards in California: organized by the Southern California Earthquake Center.

Christenson, G.E., and Shaw, L.M., 2008a, Debris-Flow/Alluvial-Fan Special Study Areas, Wasatch Front and Nearby Areas, Utah: Utah Geological Survey Supplement Map to Utah Geological Survey Circular 106, 1 Plate, Scale 1:200,000.

Christenson, G.E., and Shaw, L.M., 2008b, Liquefaction Special Study Areas, Wasatch Front and Nearby Areas, Utah: Utah Geological Survey Supplement Map to Utah Geological Survey Circular 106, 1 Plate, Scale 1:200,000.

Elliott, A.H., and Harty, K.M., 2010, Landslide Maps of Utah, Salt Lake City 30' X 60' Quadrangle: Utah Geological Survey Map 246DM, Plate 9 of 46, Scale 1:100,000.

Federal Emergency Management Agency (FEMA), 2009, Flood Insurance Rate Map, Salt Lake County, Utah and Incorporated Areas: Map Number 49035C0318G, Effective September 25, 2009.

FEMA, 2006, Homebuilders' Guide to Earthquake Resistant Design and Construction: FEMA 232, dated June 2006, 212 p; https://www.fema.gov/emergency-managers/risk-management/building-science/building-codes/earthquakes.

Hintze, L.F., 1988, Geologic History of Utah: Brigham Young University Geology Studies Special Publication 7, Provo, Utah, 202 p.

Hiscock, A.I., and McKean, A.P., 2018, Surface Fault Rupture Hazard Map of the Sugar House Quadrangle, Salt Lake County, Utah: Utah Geological Survey Contract Deliverable, Detailed Mapping of the Wasatch Fault Zone, Utah and Idaho, Plate 25 of 39, Scale 1:24,000.

Hoek, E., and Brown, E.T., 1997, Practical Estimates of Rock Mass Strength, in *International Journal of Rock Mechanics & Mining Science & Geomechanics Abstracts*, 34(8), 1165-1186.

REFERENCES CITED (CONT.)

Holladay City, 2021, Holladay City Code Chapter 13.75 Geologic Hazards (Formerly "Natural Hazards Area"), Ordinance 2021-26, dated October 14, 2021.

International Building Code [IBC], 2021, International Code Council, Inc.

Lund, W.R., 1990, editor, Engineering geology of the Salt Lake City metropolitan area, Utah: Utah Geological Survey Bulletin 126, 66 p.

McKean, A.P., 2020, Geologic Map of the Sugar House Quadrangle, Salt Lake County, Utah: Utah Geological Survey Map 285DM, 2 Plates, Scale 1:24,000, 27 p.

Milligan, M.R., 2000, How was Utah's topography formed? Utah Geological Survey, Survey Notes, v. 32, no.1, pp. 10-11.

Stokes, W.L., 1987, Geology of Utah: Utah Museum of Natural History and Utah Geological and Mineral Survey Department of Natural Resources, Salt Lake City, UT, Utah Museum of Natural History Occasional Paper 6, 280 p.

U.S. Geological Survey (USGS) and Utah Geological Survey (UGS), 2006, Quaternary fault and fold database for the United States, accessed 12-4-2023, from USGS website: https://www.usgs.gov/natural-hazards/earthquake-hazards/faults

USGS, 2023, Topographic Map of the Sugar House Quadrangle, Salt Lake County, Utah, 7.5-Minute Series: Scale 1:24,000.

Utah Geological Survey, 1996, The Wasatch Fault: UGS Public Information Series 40, 17 p.

Utah Geological Survey, 2023a, Utah Geological Survey Aerial Imagery Collection https://geodata.geology.utah.gov/imagery/

AERIAL PHOTOGRAPHS

Data Set	Date	Flight	Photographs	Scale
AAL	May 29, 1958	21V	27, 28	1:10,000
WF	1970	I-13B	218, 219	1:5,000

*https://geodata.geology.utah.gov/imagery/

Utah Geological Survey, 2023b, Geologic Hazards Mapping and Data Custom Report, site-specific report generated on 12/4/2023 from UGS website: http://geology.utah.gov/apps/hazards/report.

APPENDIX A

Base Map:

-USGS *Sugar House* 7.5-Minute Topographic Quadrangle (2023).

0 2000 4000

FEET

1" = 2000'

N

UTAH

QUADRANGLE LOCATION

IGES

Project No: 04590-001

Geotechnical & Geologic Hazard Study
Salt Lake County Parcel #22141780070000
5560 S. Wasatch Boulevard
Holladay, Utah

Site Vicinity Map

Figure

A-1

Imagery:
- Image from Bing Maps
Accessed on 12/8/2023

Legend

Property Boundary

TP-2 Test Pit

B B' Cross Section

A'' A''' Rockfall Cross Section

0 200 400
FEET
1" = 200'

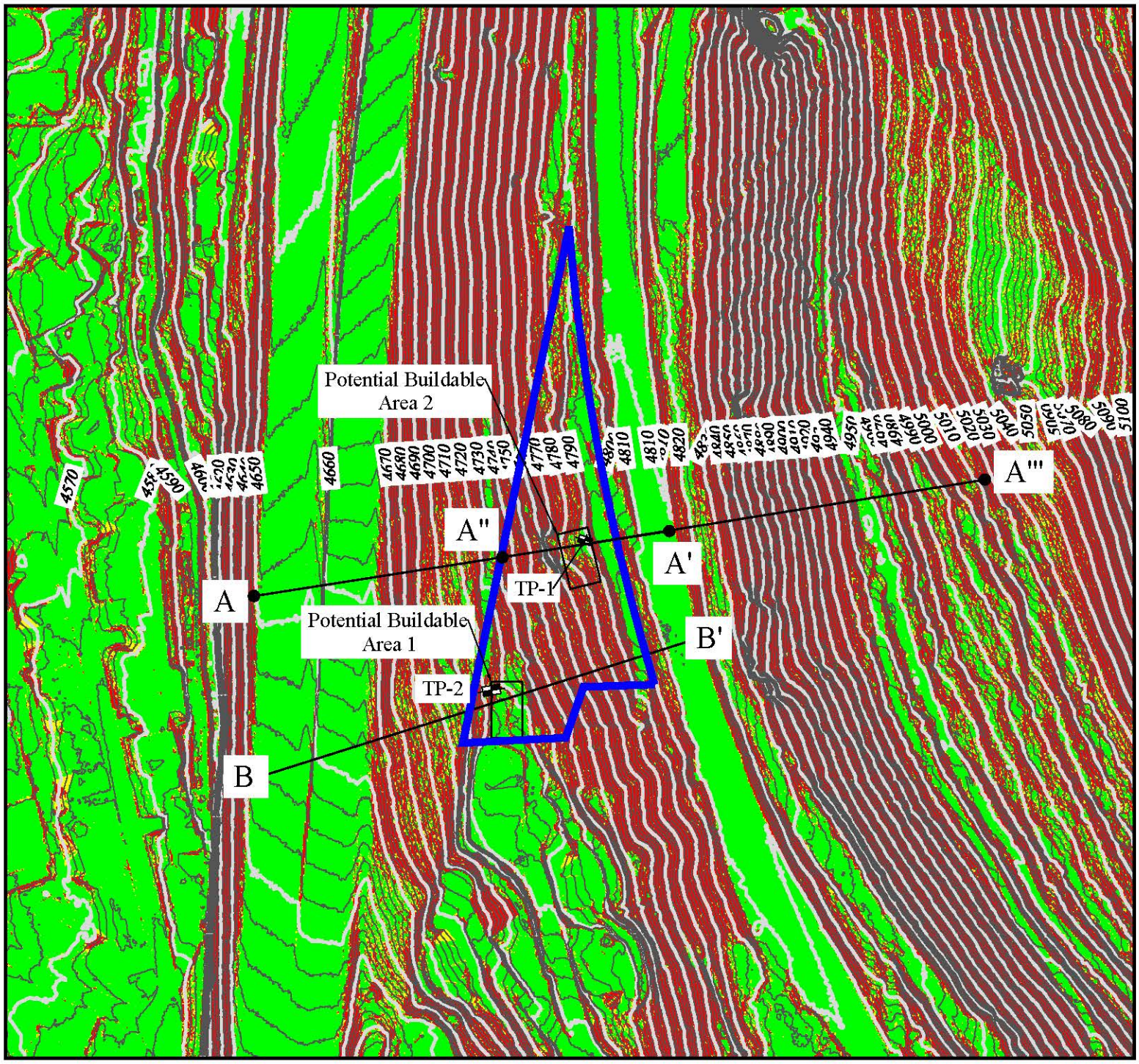
N

IGES
Project No: 04590-001

Geotechnical & Geologic Hazard Study
Salt Lake County Parcel #22141780070000
5560 S. Wasatch Boulevard
Holladay, Utah

Aerial Image

Figure A-2



Topo Data:

-State of Utah Acquired 0.5 Meter Lidar Data-Wasatch Front, 2013-2014. Distributed from www.opentopography.org, accessed on 12-08-2023.

-Contour Interval=2'

Legend

- Property Boundary
- TP-2 — Test Pit
- B / B' — Cross Section
- A" / A''' — Rockfall Cross Section

Slope Grade

- 0-25%
- 25-30%
- >30%

0 200 400

FEET

1" = 200'

N

IGES

Project No: 04590-001

Geotechnical & Geologic Hazard Study
Salt Lake County Parcel #22141780070000
5560 S. Wasatch Boulevard
Holladay, Utah

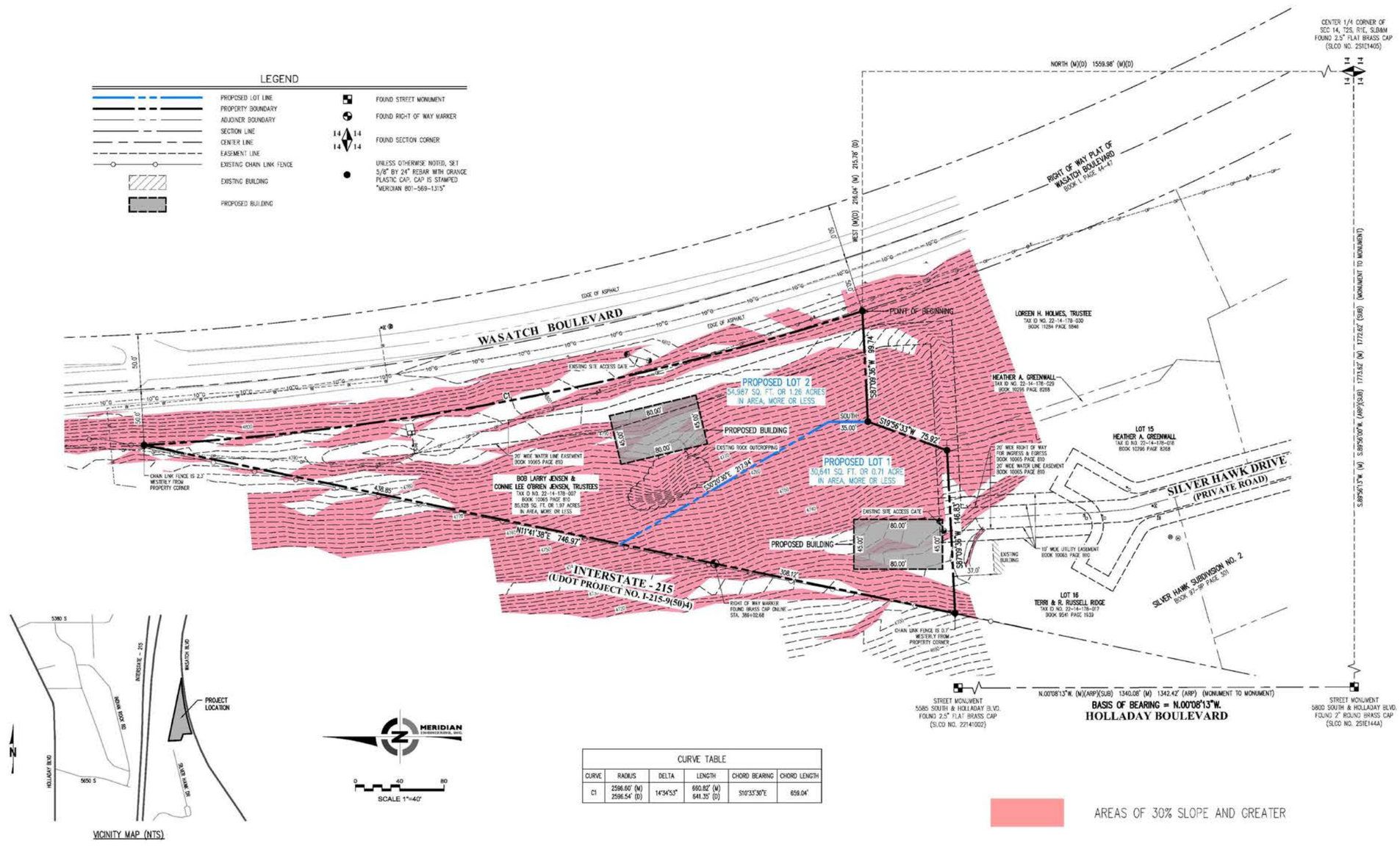
Slope Map

Figure A-3

SILVER HAWK NO. 3 SUBDIVISION

LOCATED IN THE NORTHWEST QUARTER OF SECTION 14,
TOWNSHIP 2 SOUTH, RANGE 2 EAST, SALT LAKE BASE AND MERIDIAN
HOLLADAY, SALT LAKE COUNTY, STATE OF UTAH

CONCEPTUAL - NOT TO BE RECORDED



CURVE TABLE					
CURVE	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	2596.60' (M) 2596.54' (D)	14°34'53"	660.82' (M) 641.35' (D)	S10°33'30"E	659.04'

DRAWN TRW
SURVEYED RA
CHECKED MWN
DATE 28-JULY-2022

NO	REVISIONS	BY	DATE

MERIDIAN ENGINEERING, INC.
1828 WEST 1070 SOUTH, SUITE 102
SALT LAKE CITY, UTAH 84104
PHONE: (801) 569-1315 FAX: (801) 569-1919

BOB JENSEN
5560 S WASATCH BOULEVARD, HOLLADAY, UTAH 84121

CONCEPTUAL PLAT
PROJECT ADDRESS: 5560 S WASATCH BLVD, HOLLADAY, UTAH 84121
SITUATE IN THE NORTHWEST 1/4 OF SECTION 14, T2S, R1E, SLB&M

COMP. FILE
22033_CONCPT

PROJECT NO.
22033

SHEET NO.
1 OF 1

Imagery:
- Meridian Engineering, *Conceptual Plat*, Dated 28-July-2022

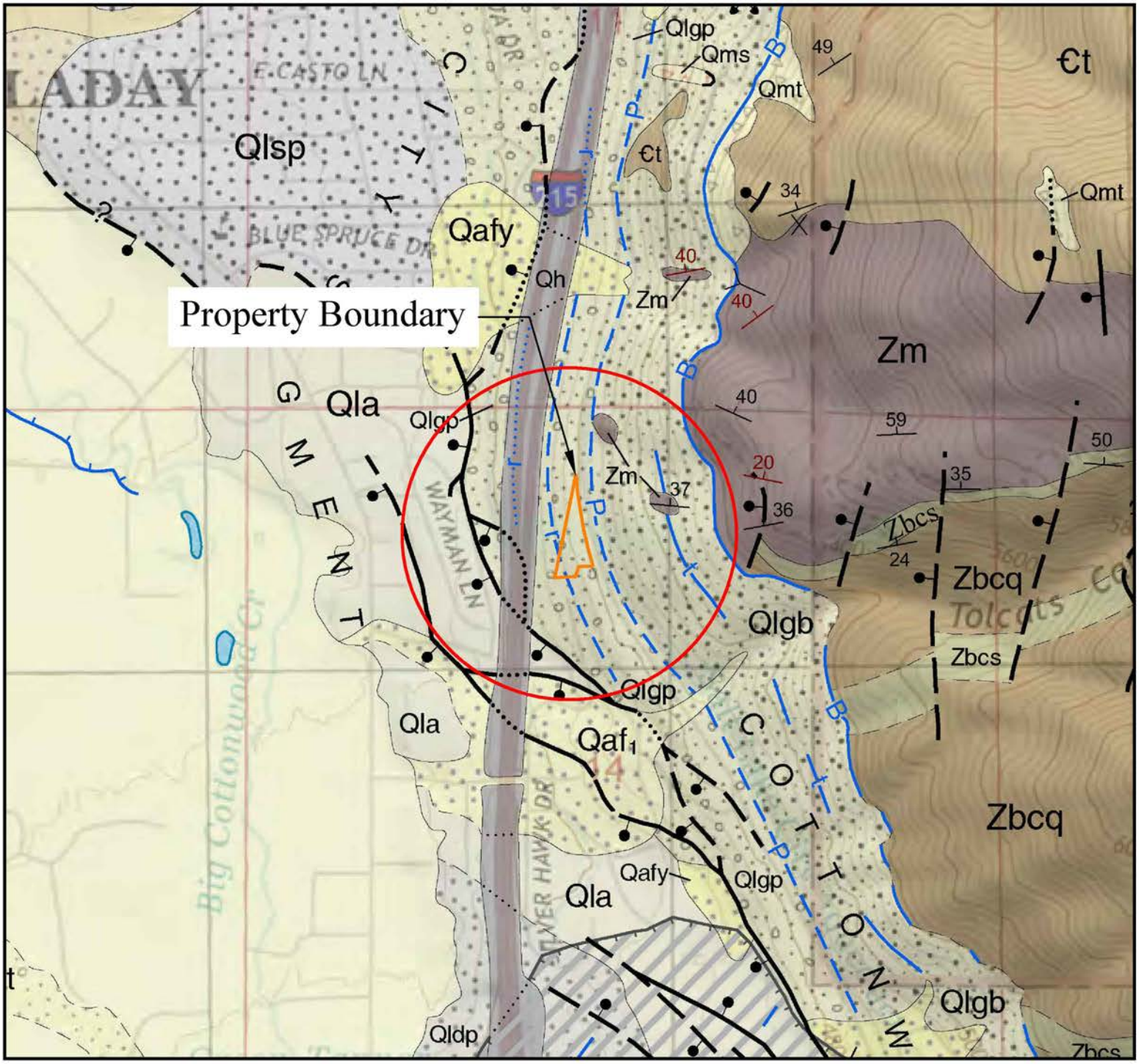
0 100 200
FEET
1" = 100'

IGES
Project No: 04590-001

Geotechnical & Geologic Hazard Study
Salt Lake County Parcel #22141780070000
5560 S. Wasatch Boulevard
Holladay, Utah

Site Plan

Figure
A-4



Base Map:

-UGS *Sugar House* 7.5-Minute Geologic Quadrangle, McKean (2020).

*Map Legend on Figures A-4b - A-4d.

0 1000 2000

FEET

1" = 1000'

N

XIMATE MEAN
NATION, 2018

IGES

Project No: 04590-001

Geotechnical & Geologic Hazard Study
Salt Lake County Parcel #22141780070000
5560 S. Wasatch Boulevard
Holladay, Utah

Regional Geology Map

Figure

A-5a

Map Legend

Qh **Fill and disturbed land** (historical) – Undifferentiated artificial (human) fill and disturbed land related to construction, road embankments, water storage, flood and debris flood control structures, bedrock mines, borrow pits, clay pits, and sand and gravel operations (commonly in Lake Bonneville deposits); the extent of fill and disturbed land are based on 1958 aerial photographs; outlines were updated using 2012 orthophotography; only the larger areas of disturbed land are mapped; unmapped fill is present in most developed areas; land within developed areas contains a complex and still changing mix of cuts and fills; thickness unknown.

Qla **Lacustrine and alluvial deposits, undivided** (Holocene to upper Pleistocene) – Sand, silt, and clay in areas of mixed alluvial and lacustrine deposits that cannot be shown separately at map scale, or because the deposits are gradational into each other, or thin patches of one unit overlie the other; mapped along the Cottonwood and East Bench faults where lacustrine units are likely overlain by thin alluvial-fan deposits, and just north of Heughs Canyon regressive shorelines of Lake Bonneville that are cut into underlying alluvium; exposed thickness 10 to 40 feet (3–12 m).

Qlgp **Lacustrine gravel and sand** (upper Pleistocene) – Moderately to well-sorted, subrounded to rounded, clast-supported, pebble to cobble gravel with a matrix of sand and pebbly sand; locally interbedded with and containing lenses of silt and sandy silt; thin to thick planar and cross-bedded beds; present north and west of Big Cottonwood Canyon below the Provo shoreline; commonly interbedded with or laterally gradational into lacustrine sand and silt (Qlsp); exposed thickness less than 60 feet (20 m).

Qlgb **Lacustrine gravel and sand** (upper Pleistocene) – Moderately to well-sorted, clast-supported, pebble to cobble gravel, with boulders near bedrock sources, with a matrix of sand and pebbly sand; locally interbedded with thin beds and lenses containing silt and clay; clasts commonly subrounded to rounded, but some deposits consist of poorly sorted, angular gravel derived from nearby bedrock outcrops; deposited between the Bonneville and Provo shorelines in planar and cross-bedded beds; typically overlies bedrock near the foot of the Wasatch Range; commonly covered by unmapped colluvium from adjacent steep slopes on erosional benches at the Bonneville shoreline that is thin and does not cover the benches; exposed thickness less than 75 feet (25 m).

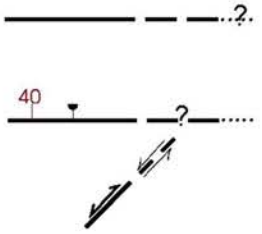
Ct **Tintic Quartzite** (Middle and Lower Cambrian?) – White- to pinkish-gray, dark-yellowish-orange weathering, moderately to well-sorted, fine- to coarse-grained, quartzose, well-cemented sandstone (orthoquartzite); thin to thick bedded with widespread cross-beds; contains lenses of moderately to poorly sorted quartz pebble conglomerate; feldspathic in lower part; cliff former; exposed along the northern part of Mount Olympus and in Neffs Canyon; lower contact with the Mutual Formation is an unconformity; trace fossils in the upper part of the formation in the Ogden Canyon area include *Skolithus* tubes and *Plagiogmus* traces that indicate Middle Cambrian age (Peterson and Clark, 1974); estimated thickness 1000 to 1400 feet (300–400 m) in the map area; 1000 feet (300 m) thick in the Fort Douglas quadrangle (Brigham Quartzite of Granger, 1953) and the Cottonwood canyons area (Granger and others, 1952).

Zm **Mutual Formation** (Neoproterozoic) – Grayish-red to red-purple quartzite and argillite; quartzite is fine to medium grained with medium sorting, well bedded with common cross-bedding; locally the unit contains pebble conglomerate; the quartzite forms cliffs and ridges and the argillite forms slopes; located on the north side of Mount Olympus and in Neffs Canyon; lower contact is an unconformity with the argillite unit of Big Cottonwood Formation (Zbcs); farther to the east in Big Cottonwood Canyon the Mineral Fork Formation is present between these two units (Crittenden, 1965c, 1977), but in the Sugar House quadrangle the Mineral Fork Formation

Map Legend

Zbcq, Zbcs, Zbc

Big Cottonwood Formation (Neoproterozoic) – Interbedded greenish-gray, gray, and reddish- to bluish-purple, thin-bedded shale and siltstone (metamorphosed to argillite) (Zbcs), and grayish-white, greenish-gray, and gray, rusty-weathering orthoquartzite to quartzite (Zbcq); undivided on cross section C-C′ (Zbc); Crittenden (1965a, 1965b, 1977) divided the formation into thirds but did not map them; the lower third is bluish-purple, thin-bedded argillite interbedded with gray orthoquartzite; the middle third is greenish-gray or gray argillite (metashale) interbedded with gray and greenish-gray orthoquartzite; and the upper third is variegated greenish-gray and red argillite and meta-siltstone interbedded with white quartzite; cross-bedding, mud cracks, ripple marks, raindrop prints, and laminated beds, interpreted as tidal rhythmites, suggest shallow-water deposition (Crittenden, 1977; Chan and others, 1994; Ehlers and others, 1997); mapped from Mount Olympus south and east beyond the quadrangle boundary; the base of the unit is not exposed in the quadrangle; Neoproterozoic age based on possible correlation with the <770 Ma Uinta Mountain Group strata (U-Pb age data from detrital zircons) (Mueller and others, 2007; Dehler and others, 2010); the upper approximately 12,000 feet (~3800 m) of the total 16,000 feet (5000 m) is exposed in the Sugar House quadrangle (Crittenden, 1965d, 1977); these thicknesses may be overestimated due to complex folding and faulting.



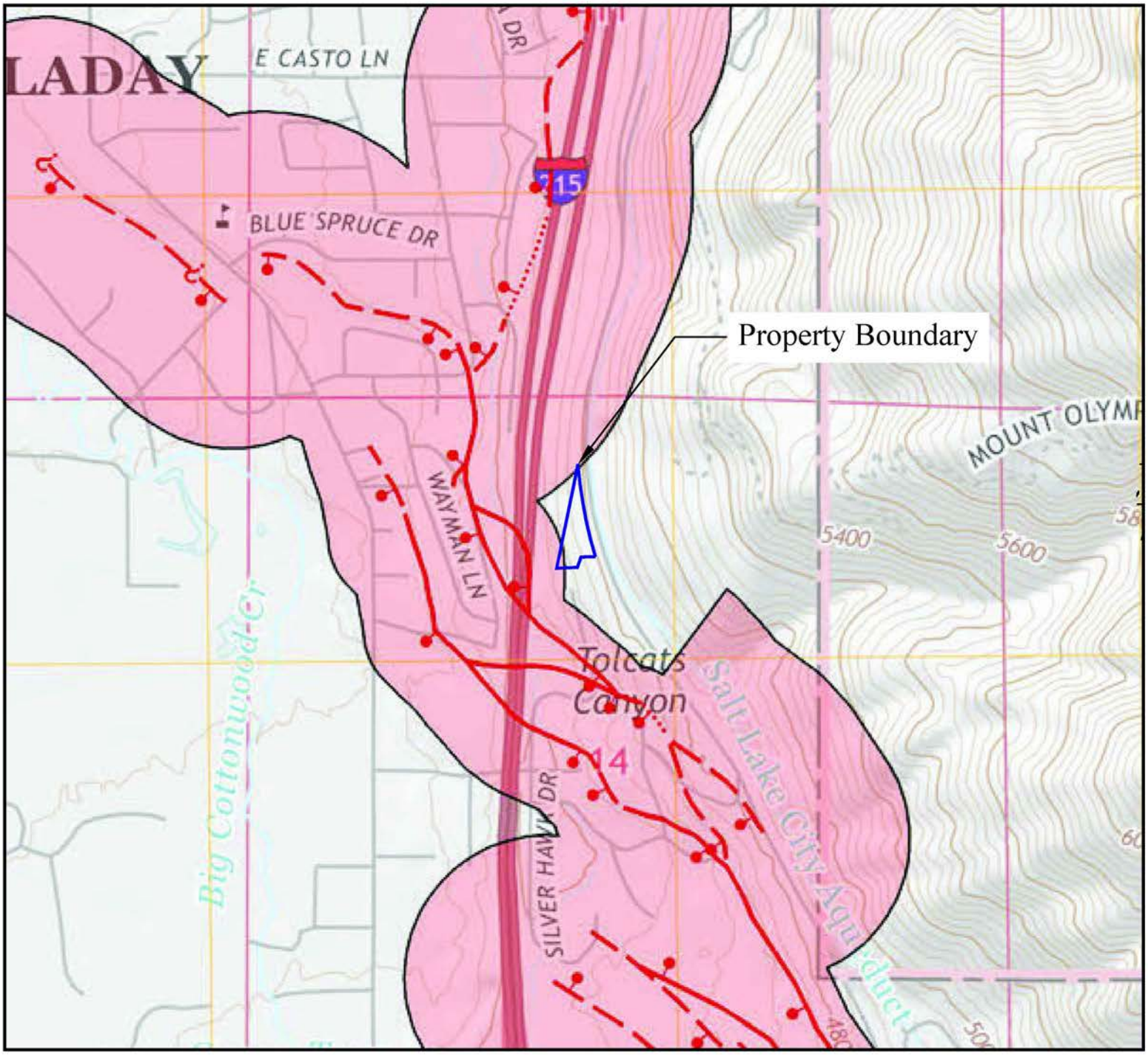
Fault – Sense of offset not known or complex; dashed where approximately located, dotted where concealed, queried where uncertain

Normal fault – Dashed where approximately located, dotted where concealed, queried where existence uncertain; bar and ball on downthrown side; arrows on cross section indicate direction of relative movement; red symbols and dips are from Crittenden (1965d)

Bonneville shoreline (highstand) – Dashed where approximately located

Provo shoreline – Dashed where approximately located, dotted where concealed

Strike and dip of inclined bedding



Base Map:

-UGS Surface Fault Rupture Hazard Map of the Sugar House Quadrangle, Salt Lake County, Utah (Hiscock and McKean, 2018).

Legend

- Property Boundary
- Active Faults
- SFR Special Study Area

0 1000 2000

FEET

1" = 1000'

UTAH

QUADRANGLE LOCATION

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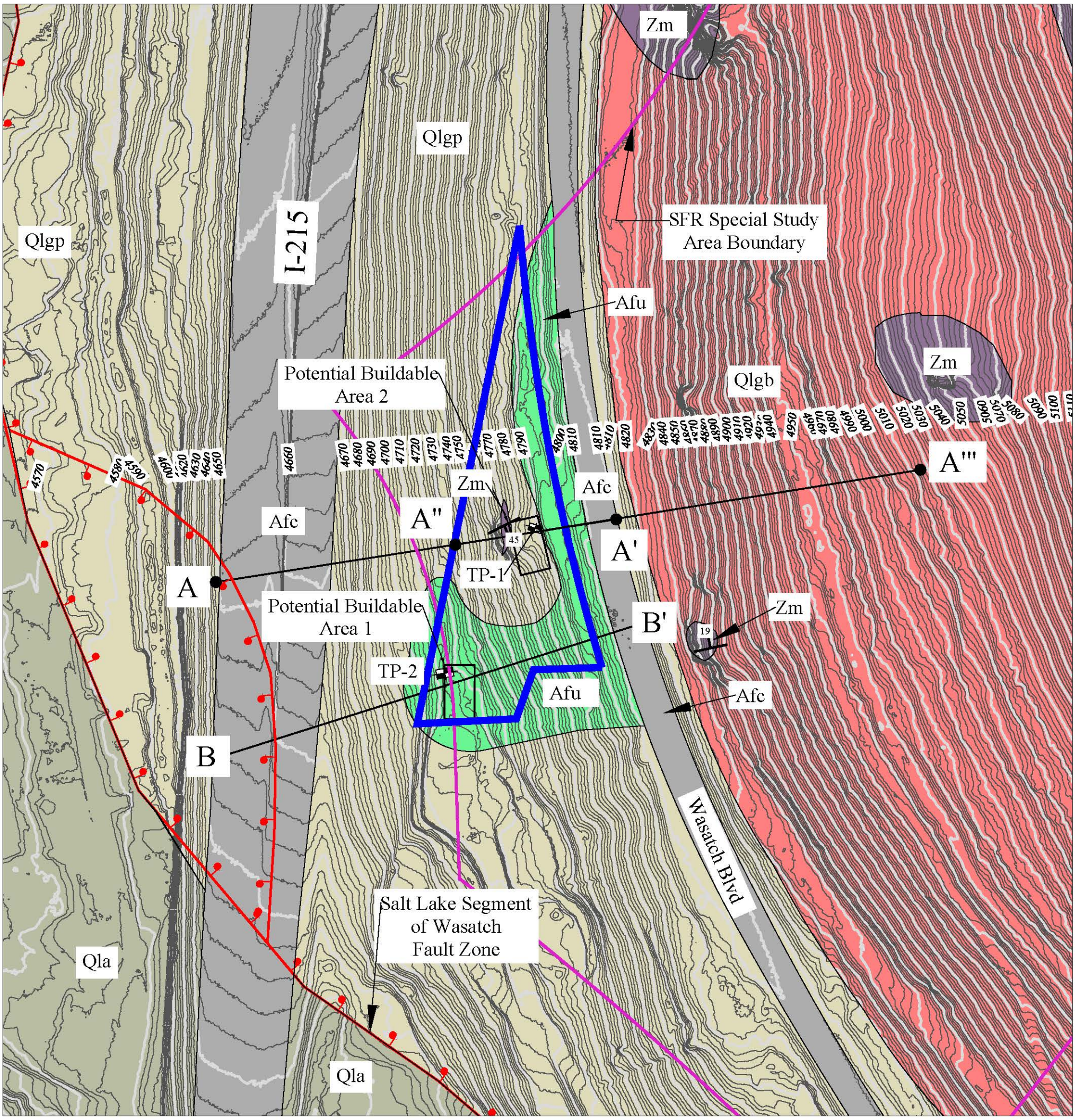
Holladay, Utah

Surface Fault Rupture Special Study Area Map

Figure

A-6



Base Map:

-Geologic Map of the Sugar House Quadrangle, Salt Lake County, Utah (McKean, 2020).

*All Geologic Contacts Approximately Located; modified from McKean, 2020.

Topo Data:

-State of Utah Acquired 0.5 Meter Lidar Data-Wasatch Front, 2013-2014. Distributed by www.opentopography.org, accessed on 12-08-2023.

-Contour Interval=2'

Legend

- Property Boundary
- TP-2 — Test Pit
- B / B' — Cross Section
- Active Fault Trace; bar and ball on downthrown side
- 45 — Bedding Orientation
- Afc — Artificial Fill-Certified
- Afu — Artificial Fill-Undocumented
- Qla — Lacustrine and Alluvial Deposits, Undivided
- Surface-Fault-Rupture Special Study Area Boundary
- A" / A'" — Rockfall Cross Section
- Qlgp — Lake Bonneville Gravel and Sand-Provo Phase
- Qlgb — Lake Bonneville Gravel and Sand-Bonneville Phase
- Zm — Mutual Formation

N

0 150 300
FEET
1" = 150'

IGES
Project No: 04590-001

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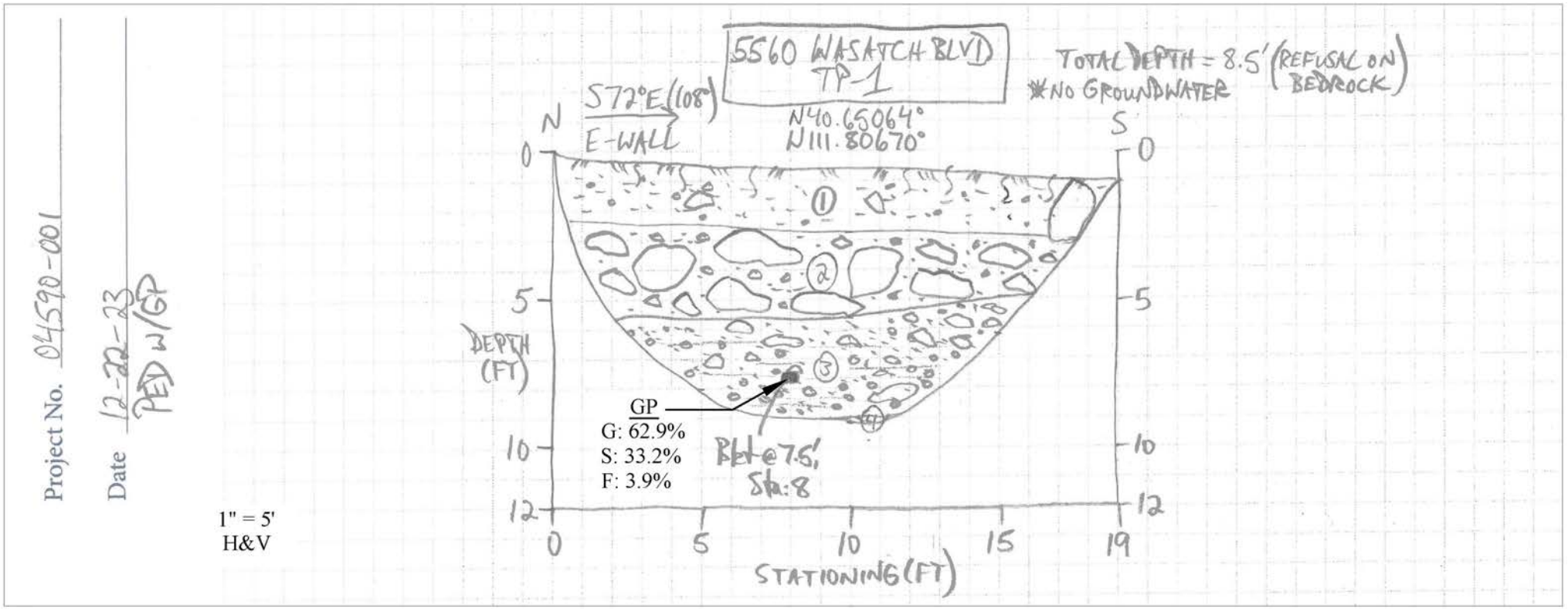
Geotechnical and Local Geology Map

Figure A-7



Lithologic Unit Descriptions

1. **Undocumented Fill (Afu):** ~2' thick; brownish black (5YR 2/1) to light brown (5YR 6/4) sandy lean CLAY with gravel (CL), medium dense to loose, slightly moist, low plasticity, massive; gravel and larger sized clasts comprise ~30% of unit; clasts are angular to subrounded medium gray (N5) to white (N9) quartzite, granodiorite, and purple schist up to 3' diameter, mode ~2-3"; topsoil mixed in; occasional concrete blocks; common plant roots; sharp, irregular basal contact; unit represents fill embankment for water line.
2. **Colluvium (Qc):** ~2-3' thick; moderate yellowish brown (10YR 5/4) poorly-graded GRAVEL with silt and sand (GP), medium dense, moist, low plasticity fines, massive; gravel and larger sized clasts comprise ~70% of unit; clasts are angular to subrounded medium gray (N5) to white (N9) quartzite, granodiorite, and purple schist up to 6' diameter, mode ~2-3'; sandy matrix is fine-grained; clast-supported; occasional plant roots; sharp, irregular basal contact.
3. **Lake Bonneville Gravel and Sand (Qlgp):** ~3-4' thick; medium light gray (N6) to light gray (N7) poorly-graded GRAVEL with sand (GP), dense, dry, low plasticity fines, medium bedded to massive; gravel and larger sized clasts comprise ~60-70% of unit; clasts are subrounded to rounded to subangular medium gray (N5) to white (N9) quartzite, granodiorite, and purple schist up to 1.5' diameter, mode ~1-2"; abundant calcium carbonate coating clasts and occasional flour; sharp, irregular basal contact.
4. **Mutual Formation (Zm):** >3" thick; dark yellowish orange (10YR 6/6) to moderate reddish orange (10R 6/6) orthoquartzite, hard to very hard, moderately weathered and slightly fractured; highly oxidized with iron oxide and manganese oxide; exhibits fine-grained quartz crystals; induced refusal.

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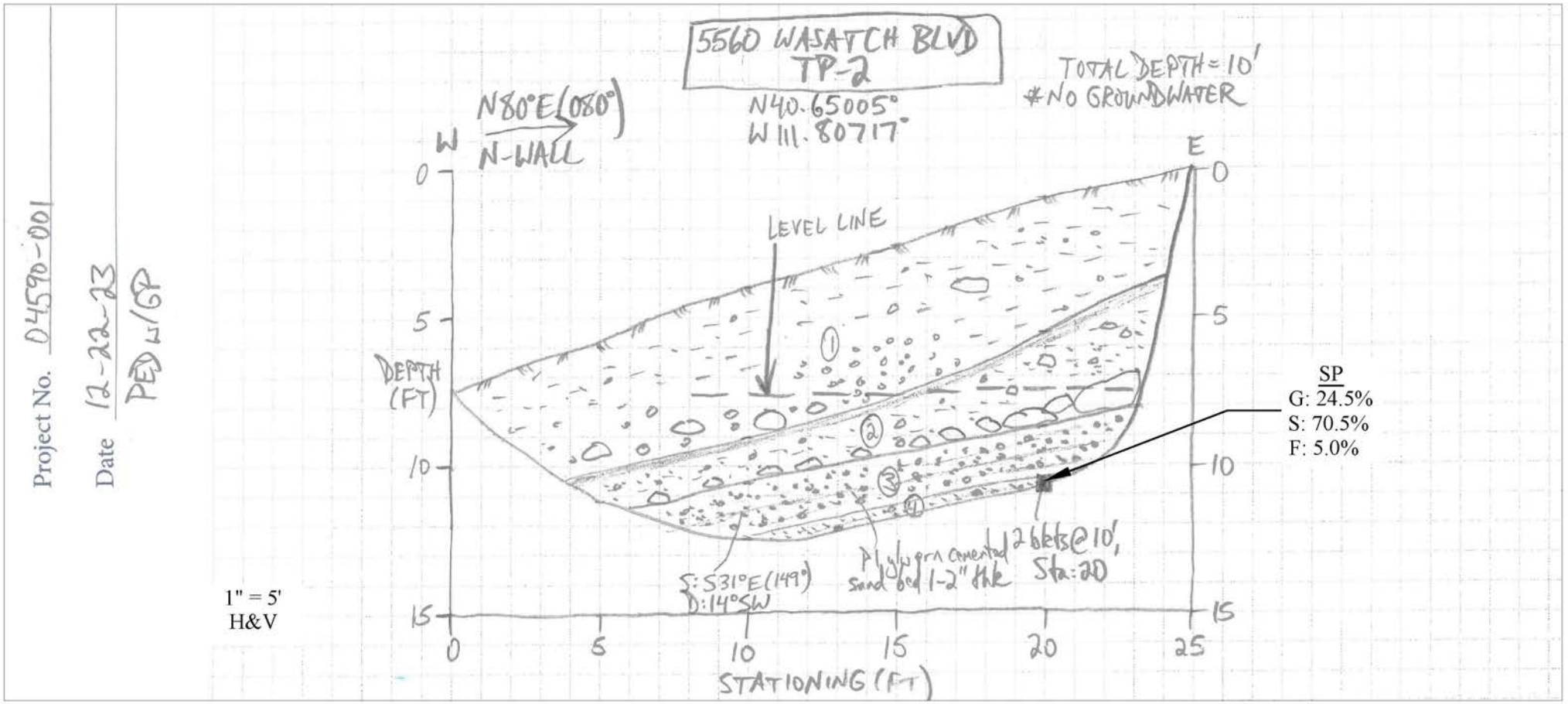
TP-1 Log

Figure

A-8



Lithologic Unit Descriptions

1. **Undocumented Fill (Afu):** Up to 5' thick; dark yellowish brown (10YR 4/2) to moderate yellowish brown (10YR 5/4) sandy lean CLAY with gravel (CL) grading to clayey GRAVEL with sand (GC), medium stiff, slightly moist, low plasticity, massive; represents multiple generations of fill with a clay-rich upper subunit and a gravelly lower subunit; gravel and larger sized clasts comprise ~10-60% of unit; clasts are mix of angular dark yellowish orange (10YR 6/6) and subrounded medium gray (N5) quartzite up to 2' in diameter, mode ~1", some concrete and metal wire observed in unit; common plant and tree roots; sharp, irregular basal contact.
2. **Original Topsoil/Colluvium (Qc):** Up to ~3.5' thick; dark yellowish brown (10YR 4/2) (topsoil) to moderate reddish brown (10R 4/6) (colluvium) clayey SAND with gravel (SC), medium dense to dense, slightly moist, low plasticity fines, massive; gravel and larger sized clasts comprise ~30-40% of unit; clasts are angular dark yellowish orange (10YR 6/6) and subrounded medium gray (N5) quartzite up to 3' in diameter, mode ~4-6"; uppermost ~2-6" is original topsoil; occasional 1-2mm diameter pinholes; common plant and tree roots; sharp, irregular basal contact that includes a coarse basal stone line.
3. **Lake Bonneville Gravel and Sand (Qlgp):** ~2' thick; medium light gray (N6) to light gray (N7) poorly-graded GRAVEL with sand (GP), dense, dry, low plasticity fines, medium bedded to massive; gravel and larger sized clasts comprise ~60-70% of unit; clasts are subrounded to rounded to subangular medium gray (N5) to white (N9) quartzite, granodiorite, and purple schist up to 1.5' diameter, mode ~1-2"; abundant calcium carbonate coating clasts and occasional flour; sand is medium-grained; clast-supported; sharp, planar basal contact.
4. **Lake Bonneville Sand (Qlgp):** >1' thick; medium light gray (N6) to light brown (5YR 6/4) poorly-graded SAND with gravel (SP), medium dense, dry to slightly moist, low plasticity fines, massive; gravel and larger sized clasts comprise ~15% of unit; clasts are subrounded to rounded to subangular medium gray (N5) to white (N9) quartzite, granodiorite, and purple schist up to 6" in diameter, mode ~1/2-1"; sand is medium-grained to coarse-grained.

IGES
Project No: 04590-001

Geotechnical & Geologic Hazard Study
Salt Lake County Parcel #22141780070000
5560 S. Wasatch Boulevard
Holladay, Utah

TP-2 Log

Figure

A-9

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
			SC	CLAYEY SANDS SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

LOG KEY SYMBOLS

- BORING SAMPLE LOCATION
- TEST-PIT SAMPLE LOCATION
- WATER LEVEL (level after completion)
- WATER LEVEL (level where first encountered)

CEMENTATION

DESCRIPTION	DESCRIPTION
WEAKLY	CRUMBLES OR BREAKS WITH HANDLING OR SLIGHT FINGER PRESSURE
MODERATELY	CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE
STRONGLY	WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE

OTHER TESTS KEY

C	CONSOLIDATION	SA	SIEVE ANALYSIS
AL	ATTERBURG LIMITS	DS	DIRECT SHEAR
UC	UNCONFINED COMPRESSION	T	TRIAXIAL
S	SOLUBILITY	R	RESISTIVITY
O	ORGANIC CONTENT	RV	R-VALUE
CBR	CALIFORNIA BEARING RATIO	SU	SOLUBLE SULFATES
COMP	MOISTURE/DENSITY RELATIONSHIP	PM	PERMEABILITY
CI	CALIFORNIA IMPACT	-200	% FINER THAN #200
COL	COLLAPSE POTENTIAL	Gs	SPECIFIC GRAVITY
SS	SHRINK SWELL	SL	SWELL LOAD

MODIFIERS

DESCRIPTION	%
TRACE	<5
SOME	5 - 12
WITH	>12

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
DRY	ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISIBLE FREE WATER, USUALLY SOIL BELOW WATER TABLE

STRATIFICATION

DESCRIPTION	THICKNESS	DESCRIPTION	THICKNESS
SEAM	1/16 - 1/2"	OCCASIONAL	ONE OR LESS PER FOOT OF THICKNESS
LAYER	1/2 - 12"	FREQUENT	MORE THAN ONE PER FOOT OF THICKNESS

GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil conditions between individual sample locations.
3. Logs represent general soil conditions observed at the point of exploration on the date indicated.
4. In general, Unified Soil Classification designations presented on the logs were evaluated by visual methods only. Therefore, actual designations (based on laboratory tests) may vary.

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT (blows/ft)	MODIFIED CA. SAMPLER (blows/ft)	CALIFORNIA SAMPLER (blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
VERY LOOSE	<4	<4	<5	0 - 15	EASILY PENETRATED WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND
LOOSE	4 - 10	5 - 12	5 - 15	15 - 35	DIFFICULT TO PENETRATE WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND
MEDIUM DENSE	10 - 30	12 - 35	15 - 40	35 - 65	EASILY PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
DENSE	30 - 50	35 - 60	40 - 70	65 - 85	DIFFICULT TO PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
VERY DENSE	>50	>60	>70	85 - 100	PENETRATED ONLY A FEW INCHES WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER

CONSISTENCY - FINE-GRAINED SOIL		TORVANE	POCKET PENETROMETER	FIELD TEST
CONSISTENCY	SPT (blows/ft)	UNTRAINED SHEAR STRENGTH (tsf)	UNCONFINED COMPRESSIVE STRENGTH (tsf)	
VERY SOFT	<2	<0.125	<0.25	EASILY PENETRATED SEVERAL INCHES BY THUMB. EXUDES BETWEEN THUMB AND FINGERS WHEN SQUEEZED BY HAND.
SOFT	2 - 4	0.125 - 0.25	0.25 - 0.5	EASILY PENETRATED ONE INCH BY THUMB. MOLDED BY LIGHT FINGER PRESSURE.
MEDIUM STIFF	4 - 8	0.25 - 0.5	0.5 - 1.0	PENETRATED OVER 1/2 INCH BY THUMB WITH MODERATE EFFORT. MOLDED BY STRONG FINGER PRESSURE.
STIFF	8 - 15	0.5 - 1.0	1.0 - 2.0	INDENTED ABOUT 1/2 INCH BY THUMB BUT PENETRATED ONLY WITH GREAT EFFORT.
VERY STIFF	15 - 30	1.0 - 2.0	2.0 - 4.0	READILY INDENTED BY THUMBNAIL.
HARD	>30	>2.0	>4.0	INDENTED WITH DIFFICULTY BY THUMBNAIL.

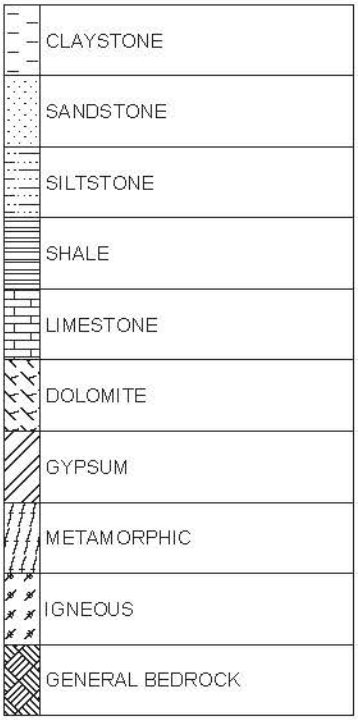
IGES

KEY TO SOIL SYMBOLS AND TERMINOLOGY

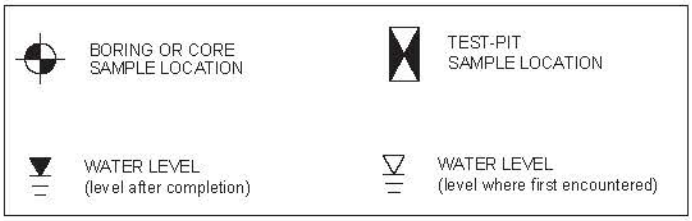
Figure A-10

Project Number - 04590-001

TYPICAL ROCK DESCRIPTION AND GRAPHICAL SYMBOLS



LOG KEY SYMBOLS



OTHER TESTS KEY

C	CONSOLIDATION	SA	SIEVE ANALYSIS
AL	ATTERBURG LIMITS	DS	DIRECT SHEAR
UC	UNCONFINED COMPRESSION	T	TRIAXIAL
S	SOLUBILITY	R	RESISTIVITY
O	ORGANIC CONTENT	RV	R-VALUE
CBR	CALIFORNIA BEARING RATIO	SU	SOLUBLE SULFATES
COMP	MOISTURE/DENSITY RELATIONSHIP	PM	PERMEABILITY
CI	CALIFORNIA IMPACT	-200	% FINER THAN #200
COL	COLLAPSE POTENTIAL	Gs	SPECIFIC GRAVITY
SS	SHRINK SWELL	SL	SWELL LOAD
P	POINT LOAD		

FRACTURING

SPACING	DESCRIPTION
>6 FT	VERY WIDELY
2-6 FT	WIDELY
8-24 IN	MODERATELY
2 1/2 -8 IN	CLOSELY
3/4 - 2 1/2 IN	VERY CLOSELY

RQD

RQD (%)	ROCK QUALITY
90-100	EXCELLENT
75-90	GOOD
50-75	FAIR
25-50	POOR
0-25	VERY POOR

BEDDING OF SEDIMENTARY ROCKS

SPLITTING PROPERTY	THICKNESS	STRATIFICATION
MASSIVE	>4.0 FT	VERY THICK BEDDED
BLOCKY	2.0-4.0 FT	THICK-BEDDED
SLABBY	2 1/2-24 IN	THIN-BEDDED
FLAGGY	1/2-2 1/2 IN	VERY THIN-BEDDED
SHALY OR PLATY	1/8-1/2 IN	LAMINATED
PAPERY	<1/8 IN	THINLY LAMINATED

WEATHERING

WEATHERING	FIELD TEST
FRESH	NO VISIBLE SIGN OF DECOMPOSITION OR DISCOLORATION. RINGS UNDER HAMMER IMPACT.
SLIGHTLY WEATHERED	SLIGHT DISCOLORATION INWARDS FROM OPEN FRACTURES, OTHERWISE SIMILAR TO FRESH.
MODERATELY WEATHERED	DISCOLORATION THROUGHOUT. WEAKER MINERALS SUCH AS FELDSPAR ARE DECOMPOSED. STRENGTH SOMEWHAT LESS THAN FRESH ROCK BUT CORES CANNOT BE BROKEN BY HAND OR SCRAPED WITH A KNIFE.
HIGHLY WEATHERED	MOST MINERALS SOMEWHAT DECOMPOSED. SPECIMENS CAN BE BROKEN BY HAND WITH EFFORT OR SHAVED WITH A KNIFE. TEXTURE PRESERVED.
COMPLETELY WEATHERED	MINERALS DECOMPOSED TO SOIL BUT FABRIC AND STRUCTURE PRESERVED. SPECIMENS EASILY CRUMBLE OR PENETRATED.

COMPETENCY

CLASS	STRENGTH	FIELD TEST	APPROXIMATE RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TSF)
I	EXTREMELY STRONG	MANY BLOWS WITH GEOLOGIC HAMMER REQUIRED TO BREAK INTACT SPECIMEN.	>2000
II	VERY STRONG	HAND-HELD SPECIMEN BREAKS WITH PICK END OF HAMMER UNDER MORE THAN ONE BLOW.	2000-1000
III	STRONG	CANNOT BE SCRAPED OR PEELED WITH KNIFE, HAND-HELD SPECIMEN CAN BE BROKEN WITH SINGLE MODERATE BLOW WITH PICK END OF HAMMER	1000-500
IV	MODERATELY STRONG	CAN JUST BE SCRAPED OR PEELED WITH KNIFE. INDENTATIONS 1-3 mm SHOW IN SPECIMEN WITH MODERATE BLOW WITH PICK END OF HAMMER	500-250
V	WEAK	MATERIAL CRUMBLES UNDER MODERATE BLOW WITH PICK END OF HAMMER AND CAN BE PEELED WITH KNIFE, BUT IS HARD TO HAND-TRIM FOR TRIAXIAL TEST SPECIMEN.	250-10
VI	FRIABLE	MATERIAL CRUMBLES IN HAND.	N/A

KEY TO PHYSICAL ROCK PROPERTIES

Figure A-11

Project Number -04590-001

Mutual Formation Outcrop

Photos taken on December 14, 2023

IGES EST. 1998

Project Number – 04590-001

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Holladay, Utah

SELECT SITE AND TEST PIT PHOTOS

FIGURE A-12a

Photos taken on December 22, 2023

IGES EST. 1998

Project Number – 04590-001

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Holladay, Utah

SELECT SITE AND TEST PIT PHOTOS

FIGURE A-12b

Photos taken on December 22, 2023

Project Number – 04590-001

Geotechnical & Geologic Hazard Study
Salt Lake City Parcel #22141780070000
5560 S. Wasatch Boulevard
Holladay, Utah

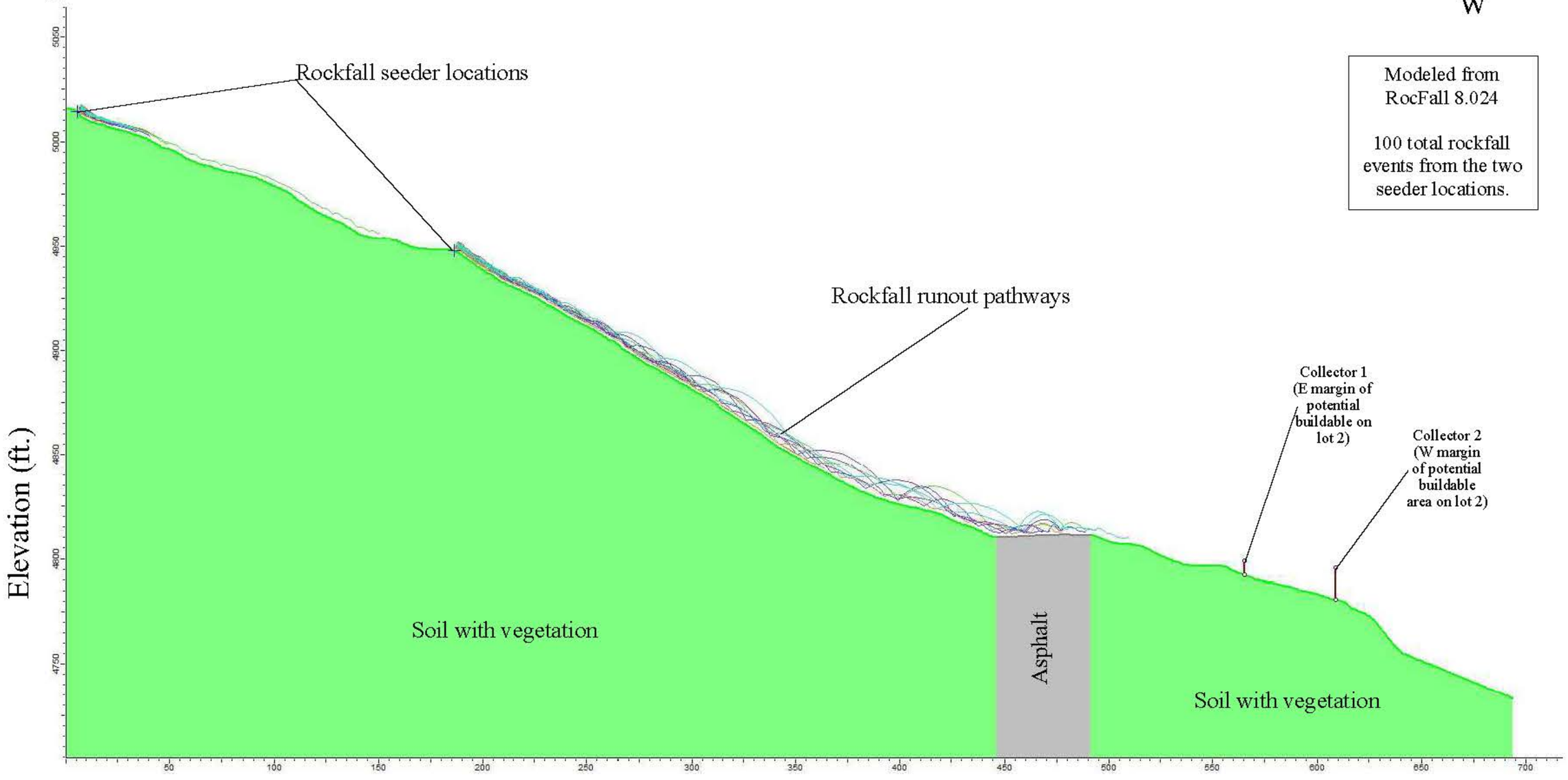
SELECT SITE AND TEST PIT PHOTOS

FIGURE A-12c

Section A"-A'''

A'''
E

A"
W



Modeled from RocFall 8.024

100 total rockfall events from the two seeder locations.

IGES

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5560 S. Wasatch Boulevard
Holladay, Utah

Rockfall Runout Pathways

Figure

A-13

APPENDIX B

Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

(In general accordance with ASTM D6913)

Project: Bob Jensen
No: 04590-001 (I)
Location: 5560 S. Wasatch BLVD, Holladay
Date: 1/9/2024
By: CJ

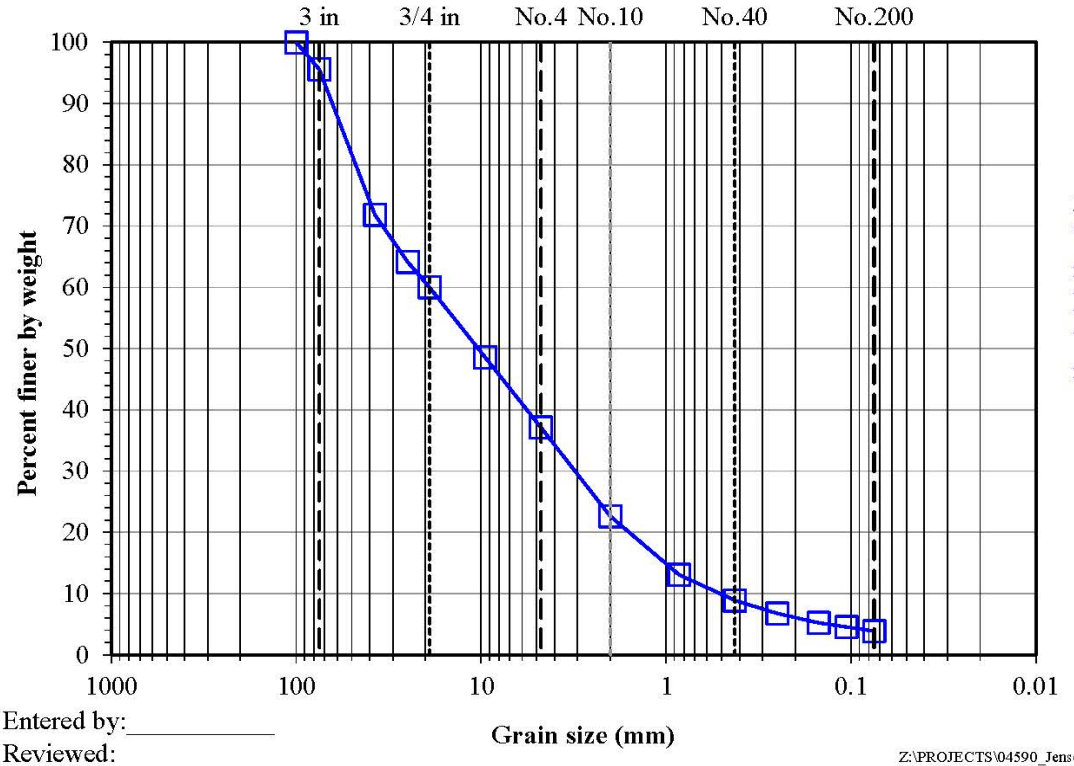
Boring No.: TP-1
Station: 8
Depth: 7.5'
Description: Brown gravel with sand

	Moist	Dry
Split:	Yes	
First Split sieve:	3/4"	
Total sample wt. (g):	31996.3	31556.9
+3/4" Coarse fraction (g):	12689.6	12614.1
-3/4" Split fraction (g):	1576.8	1547.1
-3/8" Split fraction (g):	216.24	216.24
First Split fraction:	0.600	

Water content data	C.F.1(+3/4")	S.F.1(-3/4")	C.F.2(+3/8")	S.F.2(-3/8")
Moist soil + tare (g):	2013.13	1986.54	422.04	340.06
Dry soil + tare (g):	2002.43	1956.82	422.04	340.06
Tare (g):	215.01	409.70	127.70	123.82
Water content (%):	0.60	1.92	0.00	0.00

Second Split Data	
Second split:	Yes
Second split sieve:	3/8"
Second Split fraction:	0.486

Sieve	Accum. Wt. Ret. (g)	Grain Size (mm)	Percent Finer	
6"	-	150	-	
4"	-	100	100.0	
3"	1387.7	75	95.6	
1.5"	8878.8	37.5	71.9	
1"	11306.9	25	64.2	
3/4"	12614.1	19	60.0	<=1st Split
3/8"	294.34	9.5	48.6	<=2nd Split
No.4	51.05	4.75	37.1	
No.10	115.55	2	22.6	
No.20	158.12	0.85	13.1	
No.40	176.70	0.425	8.9	
No.60	186.24	0.25	6.7	
No.100	193.03	0.15	5.2	
No.140	195.99	0.106	4.6	
No.200	198.94	0.075	3.9	



Gravel (%): 62.9
Sand (%): 33.2
Fines (%): 3.9

Comments:
These results are in nonconformance with Method D6913 because the minimum dry mass was not met.

Entered by:_____
Reviewed:_____

Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

(ASTM D6913)

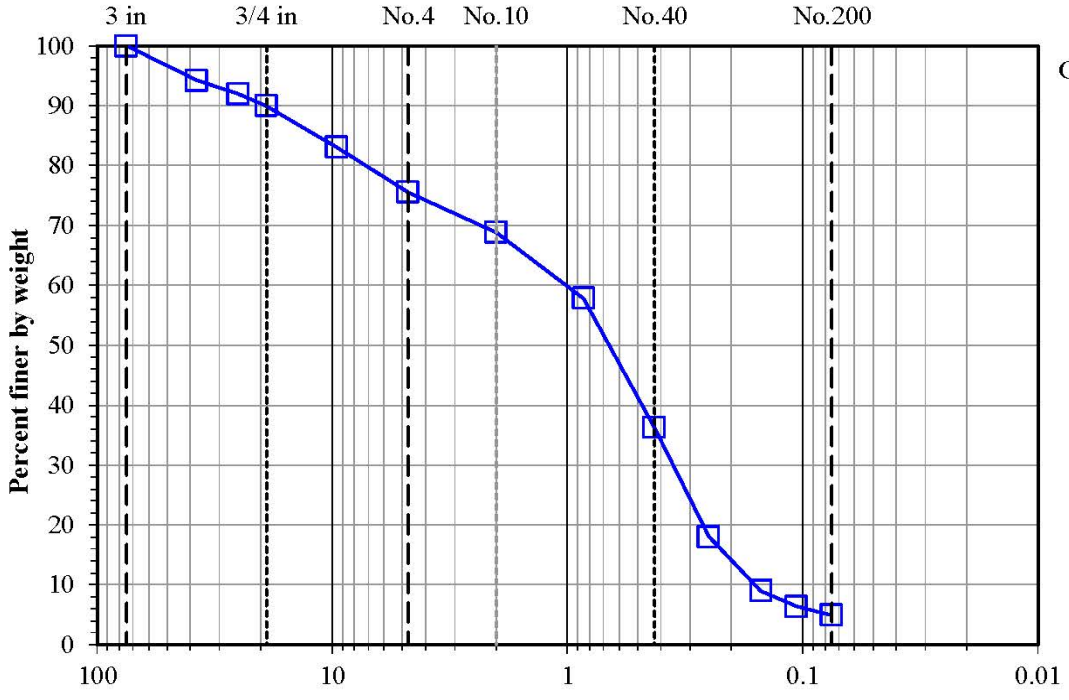
Project: Bob Jensen
No: 04590-001 (I)
Location: 5560 S. Wasatch BLVD, Holladay
Date: 1/5/2024
By: SE

Boring No.: TP-2
Station: 20
Depth: 10.0'
Description: Light brown sand with silt and gravel

	Moist	Dry
Split:	Yes	
Split sieve:	3/8"	
Total sample wt. (g):	58877.1	58271.0
+3/8" Coarse fraction (g):	9924.1	9887.8
-3/8" Split fraction (g):	207.06	204.65
Split fraction:	0.830	

Water content data	C.F.(+3/8")	S.F.(-3/8")
Moist soil + tare (g):	1407.64	361.38
Dry soil + tare (g):	1403.09	358.97
Tare (g):	165.35	154.32
Water content (%):	0.4	1.2

Sieve	Accum. Wt. Ret. (g)	Grain Size (mm)	Percent Finer	
6"	-	150	-	
4"	-	100	-	
3"	-	75	100.0	
1.5"	3365.9	37.5	94.2	
1"	4690.6	25	92.0	
3/4"	5844.3	19	90.0	
3/8"	9887.8	9.5	83.0	←Split
No.4	18.46	4.75	75.5	
No.10	35.01	2	68.8	
No.20	62.11	0.85	57.8	
No.40	115.26	0.425	36.3	
No.60	160.20	0.25	18.0	
No.100	182.44	0.15	9.0	
No.140	188.96	0.106	6.4	
No.200	192.32	0.075	5.0	



Gravel (%): 24.5
Sand (%): 70.5
Fines (%): 5.0

Entered by:_____
Reviewed:_____

Laboratory Compaction Characteristics of Soil

(ASTM D698 / D1557)

Project: Bob Jensen
No: 04590-001 (I)
Location: 5560 S. Wasatch BLVD, Holladay
Date: 1/8/2024
By: KC

Method: ASTM D1557 C
Mold Id. INC 4
Mold volume (ft^3): 0.0750

Boring No.: TP-1
Station: 8
Depth: 7.5'
Sample Description: Brown gravel with sand
Engineering Classification: Not requested
As-received water content (%): Not requested
Preparation method: Moist
Rammer: Mechanical-sector face
Rock Correction: Yes * See results below
Percent fraction retained, Pc (%) 30.0
Percent fraction passing, Pf (%) 70.0

Optimum water content (%): 5.8
Maximum dry unit weight (pcf): 134.7

Point Number	+2%	+4%	*+6%	+8%				
Wt. Sample + Mold (g)	9937.7	10220.2	10450.8	10383.1				
Wt. of Mold (g)	5556.0	5556	5556	5556				
Wet Unit Wt., γ_m (pcf)	128.8	137.1	143.8	141.9				
Wet Soil + Tare (g)	353.09	365.94	463.41	778.32				
Dry Soil + Tare (g)	344.50	354.92	440.82	719.65				
Tare (g)	123.23	124.09	126.99	120.14				
Water Content, w (%)	**3.9**	**4.8**	**7.2**	**9.8**				
Dry Unit Wt., γ_d (pcf)	**124.0**	**130.8**	**134.2**	**129.2**				

*Correction of Unit Weight and Water Content for Soils Containing Oversize Particles

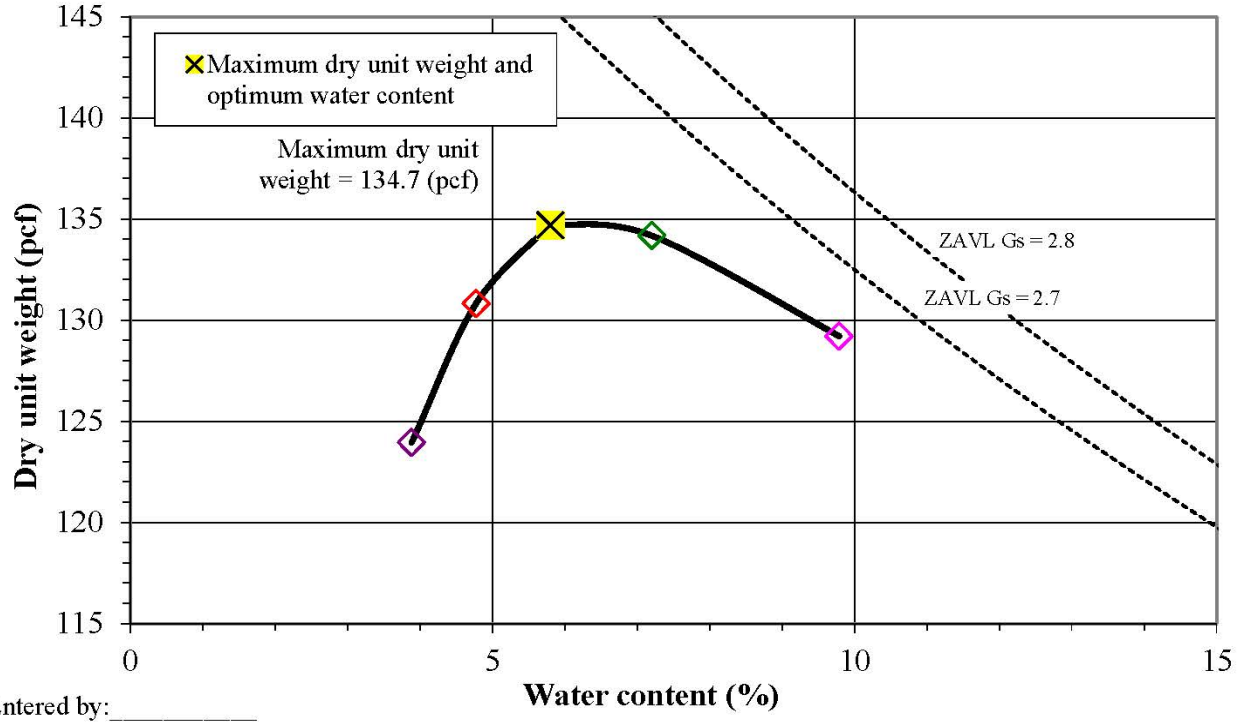
(ASTM D4718)

Corrected water content (%): 4.2
Corrected dry unit weight (pcf): 142.7

Oversized fraction, +3/4-in. (%): 30.0
Water content, +3/4-in. (%): 0.6
Sieve for oversized fraction: 3/4-in.
Bulk specific gravity, Gs: 2.65 Assumed

Comments:

According to ASTM D4718 the maximum allowable 3/4" oversized fraction is 30%. The actual 3/4" oversized fraction is 40.0%. *Due to insufficient sample, previously compacted material was used to create point +6%. Water present at base of mold during compaction of +8% point.



Entered by:_____

Reviewed:_____

Laboratory Compaction Characteristics of Soil

(ASTM D698 / D1557)

Project: Bob Jensen
No: 04590-001 (I)
Location: 5560 S. Wasatch BLVD, Holladay
Date: 1/10/2024
By: JJ

Method: ASTM D1557 B
Mold Id. INC 3
Mold volume (ft^3): 0.0333

Boring No.: TP-2
Station: 20
Depth: 10.0'
Sample Description: Light brown sand with silt and gravel
Engineering Classification: Not requested
As-received water content (%): Not requested
Preparation method: Moist
Rammer: Mechanical-circular face
Rock Correction: Yes * See results below
Percent fraction retained, Pc (%) 17.0
Percent fraction passing, Pf (%) 83.0

Optimum water content (%): 9.3
Maximum dry unit weight (pcf): 121.8

Point Number	As is	+2%	+4%	+6%	+8%			
Wt. Sample + Mold (g)	6053.9	6096.0	6166.0	6222.1	6244.8			
Wt. of Mold (g)	4205.5	4205.5	4205.5	4205.5	4205.5			
Wet Unit Wt., γ_m (pcf)	122.5	125.3	129.9	133.6	135.1			
Wet Soil + Tare (g)	464.86	603.06	567.51	554.53	679.12			
Dry Soil + Tare (g)	452.47	576.50	535.10	515.96	626.66			
Tare (g)	127.02	122.44	127.31	124.60	179.66			
Water Content, w (%)	**3.8**	**5.8**	**7.9**	**9.9**	**11.7**			
Dry Unit Wt., γ_d (pcf)	**118.0**	**118.3**	**120.3**	**121.6**	**120.9**			

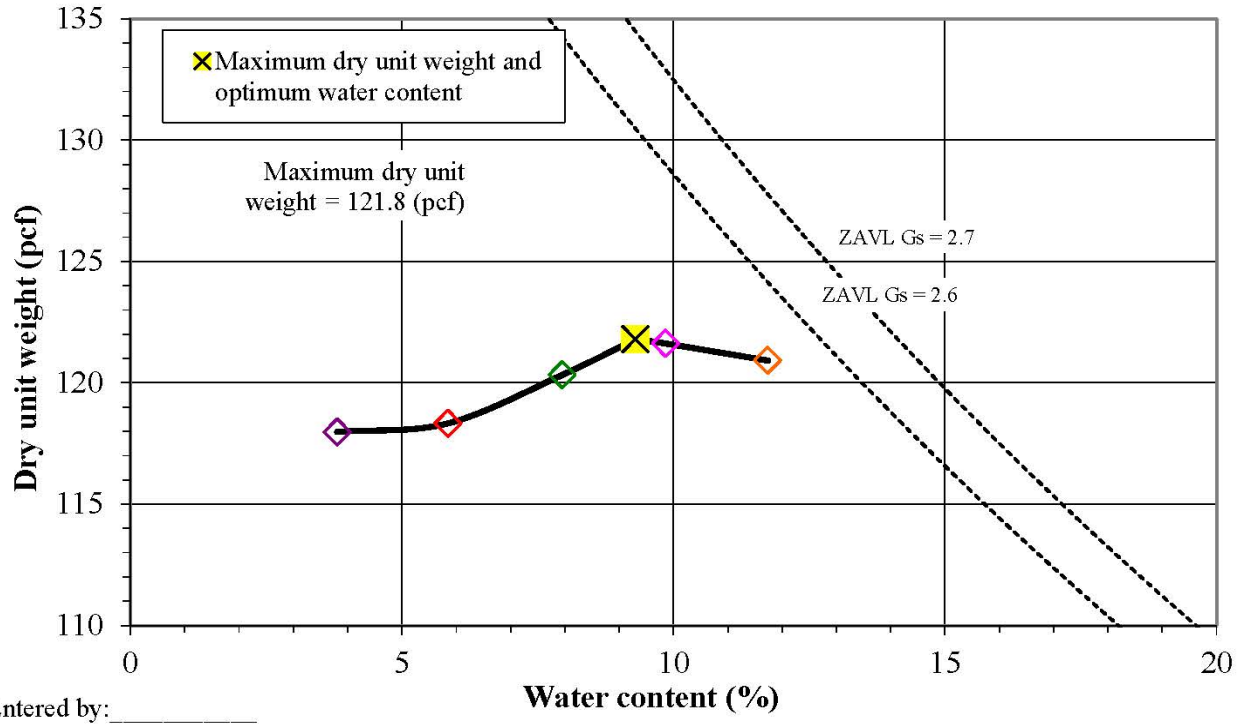
*Correction of Unit Weight and Water Content for Soils Containing Oversize Particles

(ASTM D4718)

Corrected water content (%): 7.8
Corrected dry unit weight (pcf): 127.5

Oversized fraction, +3/8-in. (%): 17.0
Water content, +3/8-in. (%): 0.4
Sieve for oversized fraction: 3/8-in.
Bulk specific gravity, Gs: 2.65 Assumed

Comments:
Water present at base of mold during compaction of +8% point.



Entered by:_____
Reviewed:_____

Direct Shear Test for Soils Under Drained Conditions

(ASTM D3080)

Project: Bob Jensen
No: 04590-001 (I)
Location: 5560 S. Wasatch BLVD, Holladay
Date: 1/10/2024
By: PW

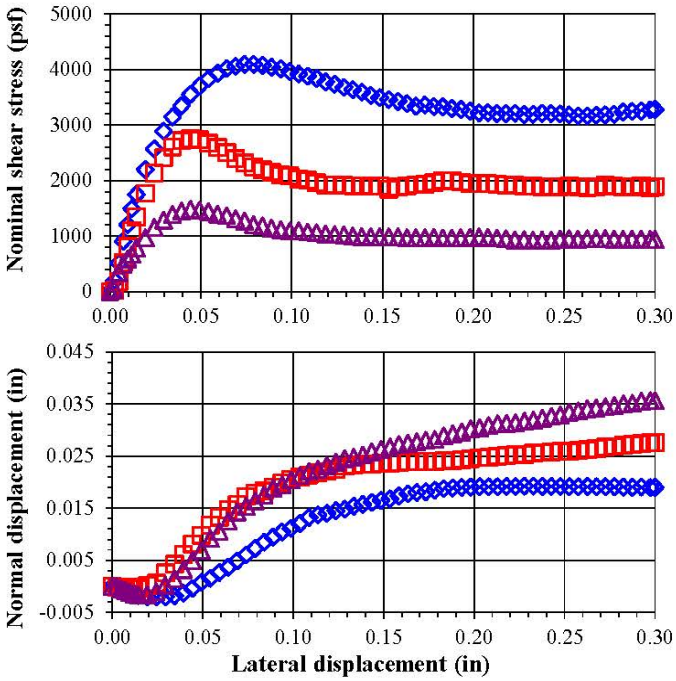
Boring No.: TP-1
Station: 8
Depth: 7.5'
Sample Description: Brown gravel with sand
Sample type: Laboratory compacted
Dry unit weight 126.6 pcf
at 5.8 (%) w
Compaction specifications: 94% of ASTM D1557C

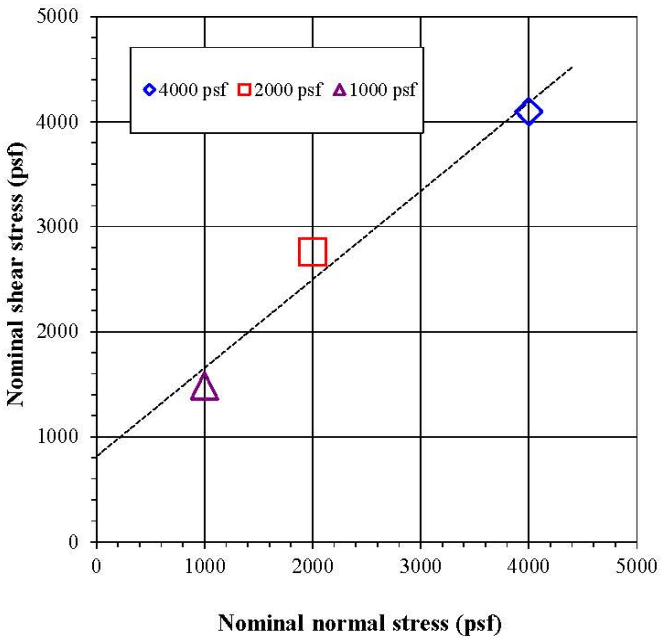
Test type: Inundated
Lateral displacement (in.): 0.3
Shear rate (in./min): 0.0017
Specific gravity, Gs: 2.70 Assumed

	Sample 1		Sample 2		Sample 3	
Nominal normal stress (psf)	4000		2000		1000	
Peak shear stress (psf)	4096		2756		1484	
Lateral displacement at peak (in)	0.074		0.044		0.044	
Load Duration (min)	1190		1205		1220	
	Initial	Pre-shear	Initial	Pre-shear	Initial	Pre-shear
Sample height (in)	1.003	0.973	0.997	0.982	0.998	0.979
Sample diameter (in)	2.413	2.413	2.412	2.412	2.414	2.414
Wt. rings + wet soil (g)	204.85	212.32	206.82	215.31	205.68	213.92
Wt. rings (g)	43.27	43.27	46.36	46.36	44.79	44.79
Wet soil + tare (g)	234.72		234.72		234.72	
Dry soil + tare (g)	229.46		229.46		229.46	
Tare (g)	139.71		139.71		139.71	
Water content (%)	5.9	10.8	5.9	11.5	5.9	11.3
Dry unit weight (pcf)	126.8	130.6	126.8	128.7	126.8	129.1
Void ratio, e, for assumed Gs	0.33	0.29	0.33	0.31	0.33	0.30
Saturation (%)*	48.0	100.0	48.0	100.0	48.0	100.0

		Average of 3 samples	Initial	Pre-shear
ϕ' (deg)	40	Water content (%)	5.9	11.2
c' (psf)	815	Dry unit weight (pcf)	126.8	129.5

*Pre-shear saturation set to 100% for phase calculations





Comments:
Test specimens remolded to 94% of maximum dry unit weight at optimum water content using material passing the No. 4 sieve. Test specimen #2 swelled upon inundation and at 100 psf load step.

Entered by:_____
Reviewed:_____

Direct Shear Test for Soils Under Drained Conditions

(ASTM D3080)

Project: Bob Jensen **Boring No.:** TP-1

No: 04590-001 (I) **Station:** 8

Location: 5560 S. Wasatch BLVD, Holladay **Depth:** 7.5'

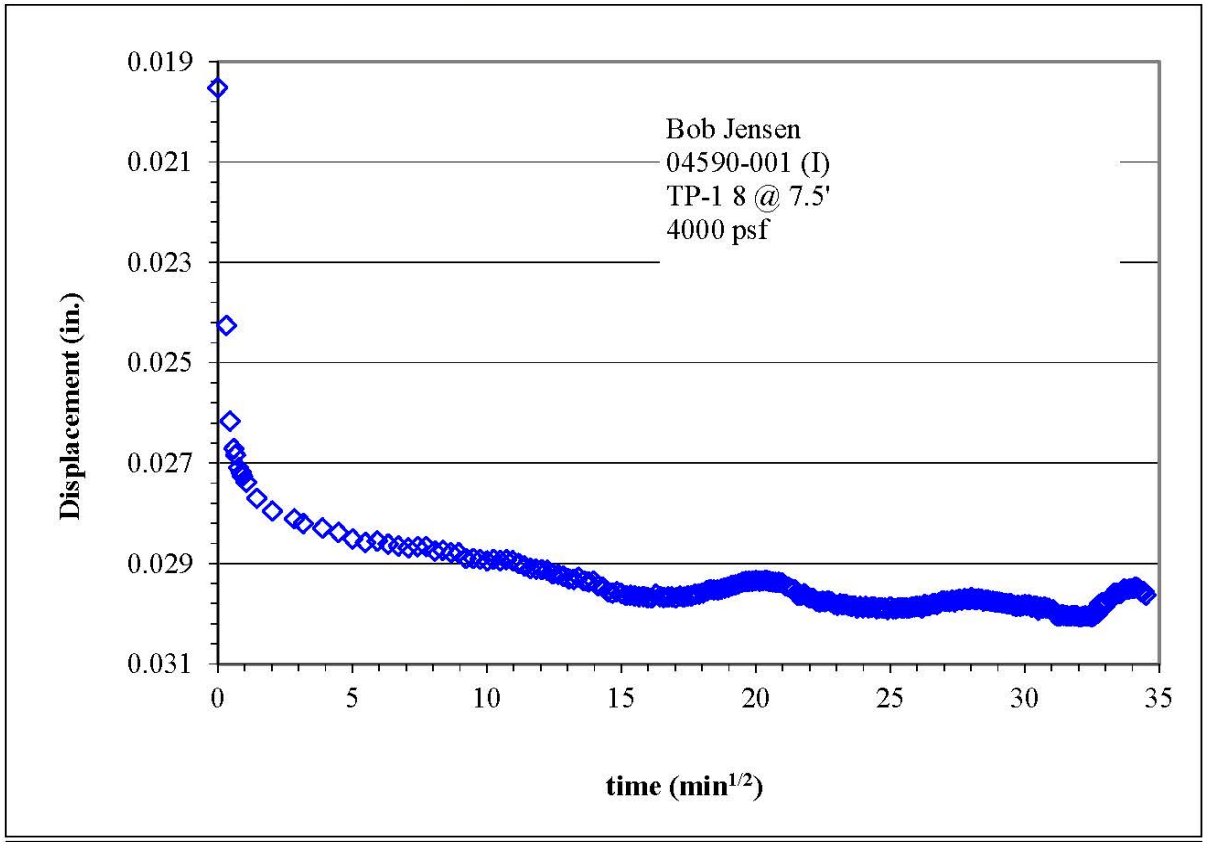
Nominal normal stress = 4000 psf			Nominal normal stress = 2000 psf			Nominal normal stress = 1000 psf		
Lateral Displacement (in.)	Nominal Shear Stress (psf)	Normal Displacement (in.)	Lateral Displacement (in.)	Nominal Shear Stress (psf)	Normal Displacement (in.)	Lateral Displacement (in.)	Nominal Shear Stress (psf)	Normal Displacement (in.)
0.000	0	0.000	0.000	0	0.000	0.000	0	0.000
0.002	199	0.000	0.002	22	0.000	0.002	47	0.000
0.005	512	0.000	0.005	182	0.000	0.005	344	-0.001
0.007	906	-0.001	0.007	522	0.000	0.007	494	-0.001
0.010	1207	-0.001	0.010	812	0.000	0.010	592	-0.001
0.012	1496	-0.002	0.012	1099	0.000	0.012	672	-0.001
0.014	1746	-0.002	0.014	1342	0.000	0.014	784	-0.002
0.019	2197	-0.002	0.019	1771	0.000	0.019	973	-0.002
0.024	2574	-0.002	0.024	2134	0.001	0.024	1152	-0.001
0.029	2889	-0.002	0.029	2412	0.003	0.029	1288	0.000
0.034	3147	-0.002	0.034	2607	0.004	0.034	1389	0.001
0.039	3353	-0.001	0.039	2726	0.006	0.039	1448	0.003
0.044	3552	0.000	0.044	2756	0.008	0.044	1484	0.005
0.049	3701	0.001	0.049	2732	0.010	0.049	1464	0.007
0.054	3833	0.002	0.054	2676	0.012	0.054	1442	0.009
0.059	3936	0.003	0.059	2598	0.013	0.059	1397	0.011
0.064	4021	0.004	0.064	2504	0.015	0.064	1367	0.013
0.069	4060	0.005	0.069	2393	0.016	0.069	1308	0.014
0.074	4096	0.006	0.074	2322	0.017	0.074	1268	0.015
0.079	4093	0.007	0.079	2243	0.018	0.079	1209	0.016
0.084	4075	0.009	0.084	2194	0.018	0.084	1182	0.018
0.089	4043	0.009	0.089	2158	0.019	0.089	1145	0.019
0.094	4013	0.010	0.094	2103	0.020	0.094	1112	0.019
0.099	3964	0.011	0.099	2081	0.021	0.099	1093	0.020
0.104	3922	0.012	0.104	2031	0.021	0.104	1093	0.021
0.109	3882	0.013	0.109	2009	0.021	0.109	1075	0.022
0.114	3842	0.014	0.114	1963	0.022	0.114	1063	0.023
0.119	3777	0.014	0.119	1923	0.022	0.119	1041	0.023
0.124	3739	0.014	0.124	1921	0.022	0.124	1029	0.024
0.129	3682	0.015	0.129	1918	0.023	0.129	1022	0.024
0.134	3638	0.015	0.134	1911	0.023	0.134	1001	0.025
0.139	3593	0.016	0.139	1908	0.023	0.139	995	0.025
0.144	3537	0.016	0.144	1901	0.023	0.144	990	0.026
0.148	3496	0.016	0.148	1903	0.024	0.148	988	0.026
0.153	3461	0.017	0.153	1848	0.024	0.153	988	0.027
0.158	3424	0.017	0.158	1887	0.024	0.158	988	0.027
0.163	3388	0.018	0.163	1906	0.024	0.163	969	0.027
0.168	3338	0.018	0.168	1925	0.024	0.168	969	0.028
0.173	3362	0.018	0.173	1939	0.024	0.173	970	0.028
0.178	3332	0.018	0.178	1968	0.024	0.178	977	0.028
0.183	3325	0.019	0.183	2003	0.024	0.183	963	0.029
0.188	3300	0.019	0.188	1994	0.024	0.188	966	0.029
0.193	3282	0.019	0.193	1972	0.024	0.193	972	0.030
0.198	3253	0.019	0.198	1945	0.025	0.198	978	0.030
0.203	3218	0.019	0.203	1947	0.025	0.203	983	0.030
0.208	3224	0.019	0.208	1945	0.025	0.208	978	0.031
0.213	3209	0.019	0.213	1933	0.025	0.213	967	0.031
0.218	3206	0.019	0.218	1921	0.025	0.218	952	0.031
0.223	3211	0.019	0.223	1916	0.025	0.223	930	0.031
0.228	3189	0.019	0.228	1897	0.025	0.228	935	0.032
0.233	3195	0.019	0.233	1898	0.026	0.233	923	0.032
0.238	3211	0.019	0.238	1888	0.026	0.238	929	0.032
0.243	3206	0.019	0.243	1890	0.026	0.243	926	0.033
0.248	3202	0.019	0.248	1892	0.026	0.248	946	0.033
0.253	3186	0.019	0.253	1907	0.026	0.253	951	0.033
0.258	3168	0.019	0.258	1890	0.026	0.258	944	0.034
0.263	3165	0.019	0.263	1875	0.026	0.263	953	0.034
0.268	3178	0.019	0.268	1879	0.026	0.268	954	0.034
0.273	3181	0.019	0.273	1917	0.027	0.273	954	0.034
0.278	3197	0.019	0.278	1896	0.027	0.278	946	0.035
0.282	3234	0.019	0.283	1888	0.027	0.282	943	0.035
0.287	3249	0.019	0.287	1893	0.027	0.287	946	0.035
0.292	3255	0.019	0.292	1912	0.027	0.292	946	0.036
0.297	3278	0.019	0.297	1877	0.028	0.297	944	0.036
0.300	3280	0.019	0.300	1894	0.028	0.300	943	0.036

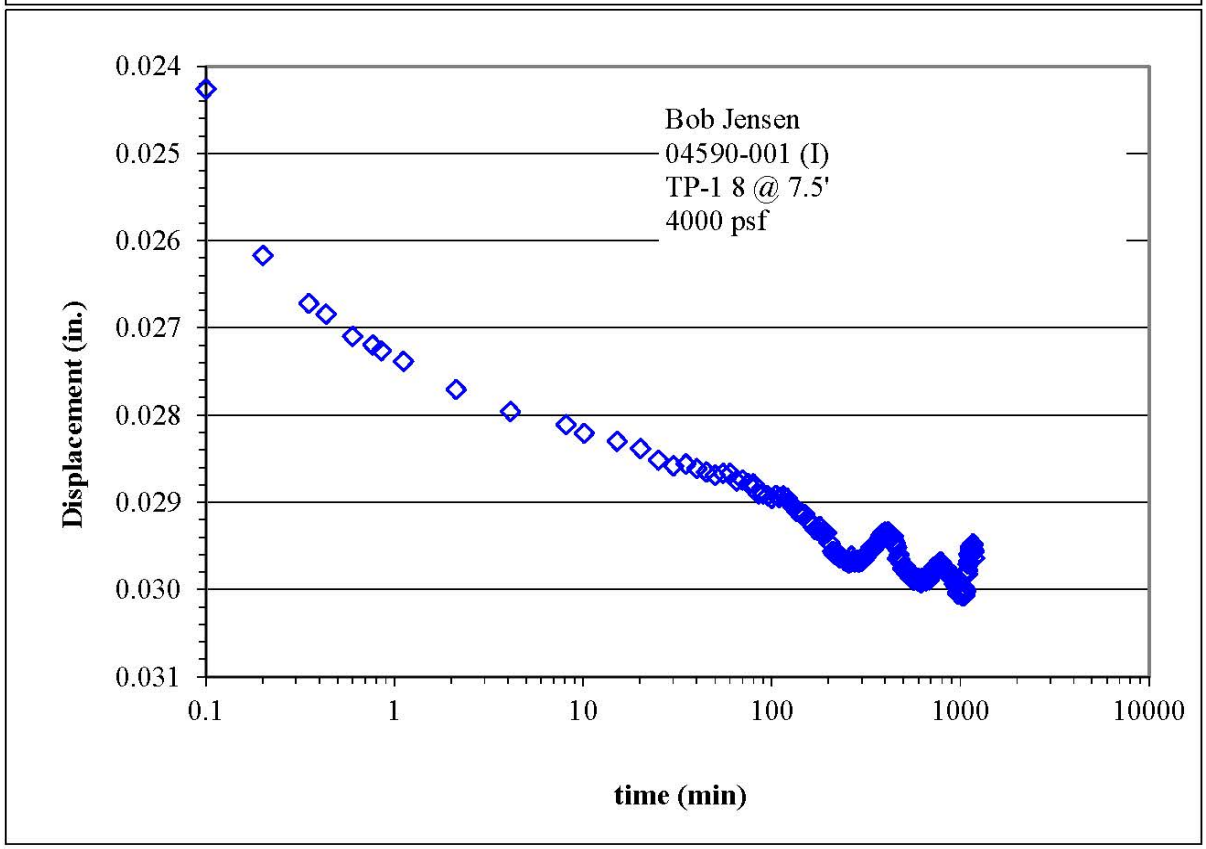
Direct Shear Test for Soils Under Drained Conditions

(ASTM D3080)

Project: Bob Jensen
No: 04590-001 (I)
Location: 5560 S. Wasatch BLVD, Holladay

Boring No.: TP-1
Station: 8
Depth: 7.5'





Direct Shear Test for Soils Under Drained Conditions

(ASTM D3080)

Project: Bob Jensen
No: 04590-001 (I)
Location: 5560 S. Wasatch BLVD, Holladay
Date: 1/12/2004
By: PW

Boring No.: TP-2
Station: 20
Depth: 10.0'
Sample Description: Light brown sand with silt and gravel
Sample type: Laboratory compacted
Dry unit weight 114.5 pcf
at 9.3 (%) w
Compaction specifications: 94% of ASTM D1557B

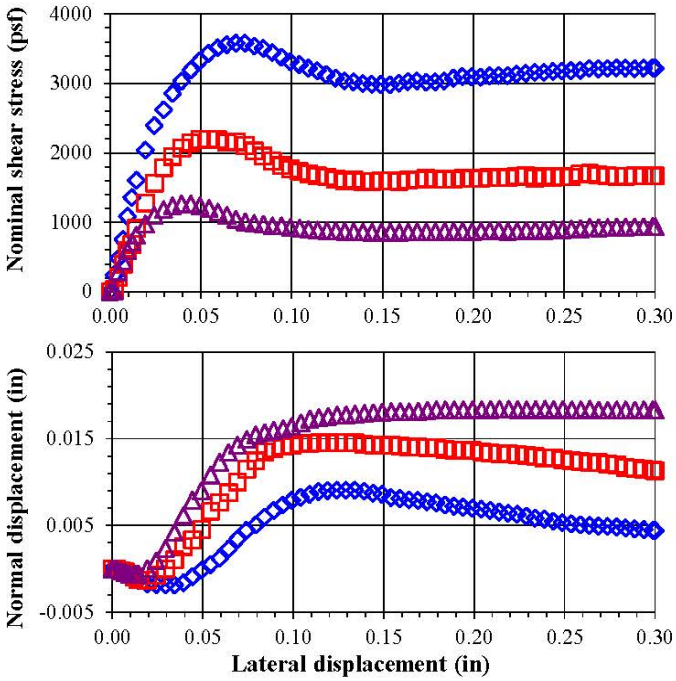
Test type: Inundated
Lateral displacement (in.): 0.3
Shear rate (in./min): 0.0154
Specific gravity, Gs: 2.70 Assumed

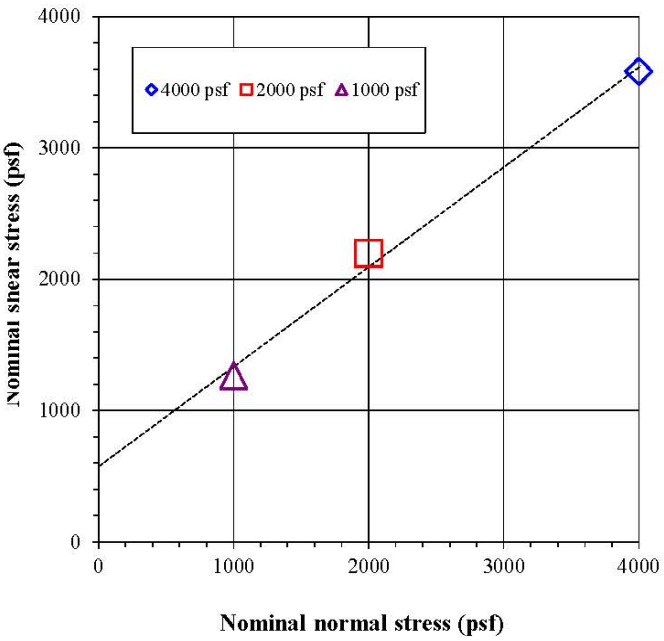
	Sample 1		Sample 2		Sample 3	
Nominal normal stress (psf)	4000		2000		1000	
Peak shear stress (psf)	3582		2195		1267	
Lateral displacement at peak (in)	0.074		0.054		0.044	
Load Duration (min)	1215		1230		1246	
	Initial	Pre-shear	Initial	Pre-shear	Initial	Pre-shear
Sample height (in)	1.003	0.964	0.997	0.975	0.998	0.986
Sample diameter (in)	2.413	2.413	2.412	2.412	2.414	2.414
Wt. rings + wet soil (g)	194.37	202.40	196.42	205.60	195.24	205.25
Wt. rings (g)	43.27	43.27	46.36	46.36	44.79	44.79
Wet soil + tare (g)	226.27		226.27		226.27	
Dry soil + tare (g)	217.78		217.78		217.78	
Tare (g)	128.68		128.68		128.68	
Water content (%)	9.5	15.3	9.5	16.2	9.5	16.8
Dry unit weight (pcf)	114.6	119.1	114.6	117.1	114.6	115.9
Void ratio, e, for assumed Gs	0.47	0.41	0.47	0.44	0.47	0.45
Saturation (%)*	54.6	100.0	54.6	100.0	54.6	100.0

ϕ' (deg)	37
c' (psf)	573

*Pre-shear saturation set to 100% for phase calculations

Average of 3 samples	Initial	Pre-shear
Water content (%)	9.5	16.1
Dry unit weight (pcf)	114.6	117.4





Comments:
Test specimens remolded to 94% of maximum dry unit weight at optimum water content using material passing the No. 4 sieve.

Entered by:_____
Reviewed:_____

Direct Shear Test for Soils Under Drained Conditions

(ASTM D3080)

Project: Bob Jensen **Boring No.:** TP-2

No: 04590-001 (I) **Station:** 20

Location: 5560 S. Wasatch BLVD, Holladay **Depth:** 10.0'

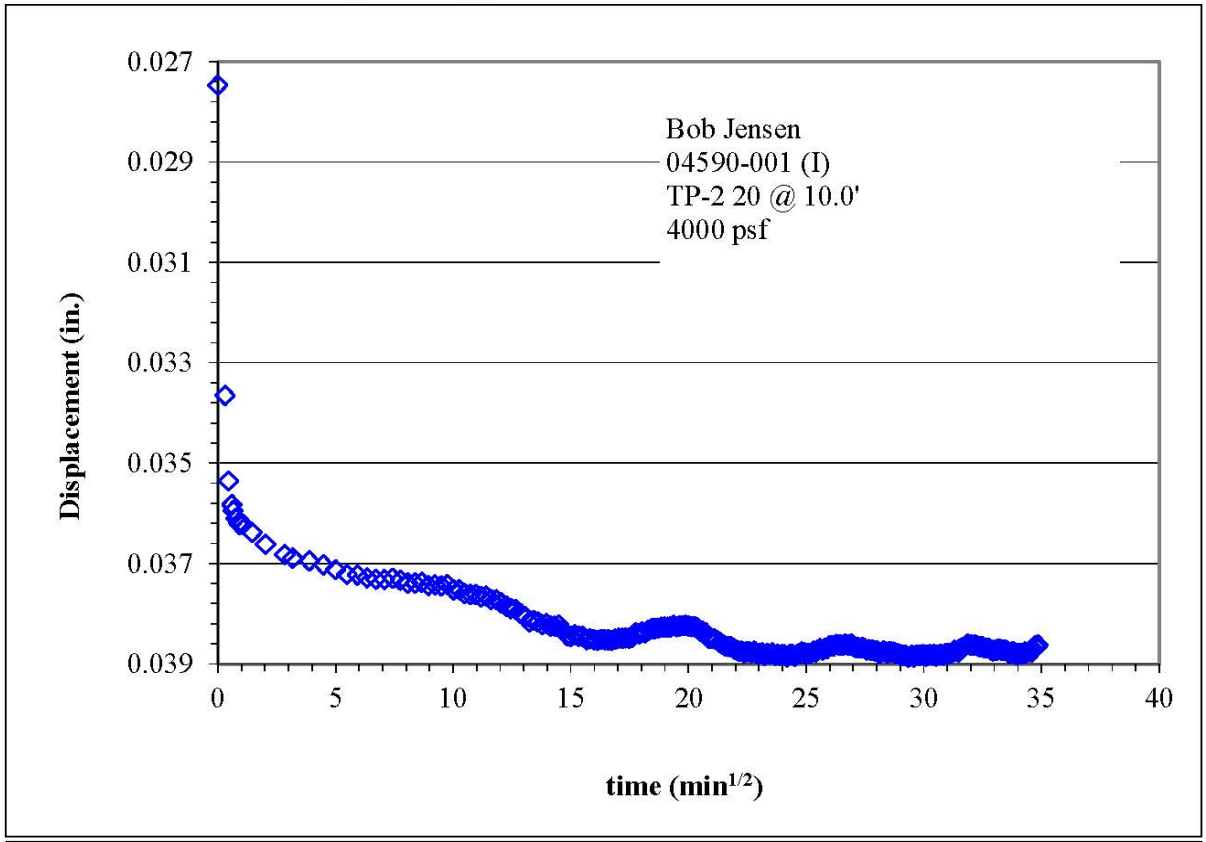
Nominal normal stress = 4000 psf			Nominal normal stress = 2000 psf			Nominal normal stress = 1000 psf		
Lateral Displacement (in.)	Nominal Shear Stress (psf)	Normal Displacement (in.)	Lateral Displacement (in.)	Nominal Shear Stress (psf)	Normal Displacement (in.)	Lateral Displacement (in.)	Nominal Shear Stress (psf)	Normal Displacement (in.)
0.000	0	0.000	0.000	0	0.000	0.000	0	0.000
0.002	242	0.000	0.002	28	0.000	0.002	13	0.000
0.005	481	0.000	0.005	205	0.000	0.005	289	0.000
0.007	746	0.000	0.007	398	0.000	0.007	441	0.000
0.010	1086	-0.001	0.010	588	-0.001	0.010	588	-0.001
0.012	1357	-0.001	0.012	681	-0.001	0.012	710	-0.001
0.014	1604	-0.001	0.014	909	-0.001	0.014	811	-0.001
0.019	2040	-0.002	0.019	1280	-0.001	0.019	974	0.000
0.024	2395	-0.002	0.024	1566	-0.001	0.024	1100	0.001
0.029	2622	-0.002	0.029	1788	0.000	0.029	1181	0.002
0.034	2856	-0.002	0.034	1948	0.001	0.034	1235	0.004
0.039	3031	-0.002	0.039	2066	0.003	0.039	1263	0.006
0.044	3193	-0.001	0.044	2146	0.003	0.044	1267	0.008
0.049	3325	0.000	0.049	2191	0.005	0.049	1239	0.009
0.054	3440	0.000	0.054	2195	0.007	0.054	1201	0.011
0.059	3514	0.001	0.059	2191	0.008	0.059	1146	0.012
0.064	3557	0.002	0.064	2150	0.009	0.064	1097	0.013
0.069	3580	0.003	0.069	2161	0.010	0.069	1045	0.014
0.074	3582	0.004	0.074	2102	0.012	0.074	1007	0.015
0.079	3538	0.005	0.079	2025	0.012	0.079	982	0.015
0.084	3507	0.006	0.084	1953	0.013	0.084	968	0.016
0.089	3446	0.007	0.089	1882	0.014	0.089	946	0.016
0.094	3378	0.007	0.094	1817	0.014	0.094	948	0.016
0.099	3312	0.008	0.099	1769	0.014	0.099	923	0.016
0.104	3269	0.008	0.104	1732	0.014	0.104	910	0.017
0.109	3219	0.009	0.109	1697	0.014	0.109	896	0.017
0.114	3185	0.009	0.114	1665	0.015	0.114	884	0.017
0.119	3127	0.009	0.119	1652	0.015	0.119	876	0.018
0.124	3076	0.009	0.124	1618	0.015	0.124	872	0.018
0.129	3036	0.009	0.129	1591	0.015	0.129	869	0.018
0.134	3023	0.009	0.134	1615	0.015	0.134	864	0.018
0.139	3000	0.009	0.139	1587	0.014	0.139	858	0.018
0.144	2988	0.009	0.144	1584	0.014	0.144	853	0.018
0.149	2986	0.009	0.149	1598	0.014	0.149	856	0.018
0.154	2978	0.008	0.154	1599	0.014	0.154	859	0.018
0.159	3002	0.008	0.159	1587	0.014	0.159	851	0.018
0.164	3026	0.008	0.164	1605	0.014	0.164	861	0.018
0.169	3036	0.008	0.169	1617	0.014	0.169	863	0.018
0.174	3020	0.008	0.174	1632	0.014	0.174	863	0.018
0.179	3024	0.008	0.179	1614	0.014	0.179	864	0.018
0.184	3034	0.007	0.184	1622	0.014	0.184	870	0.018
0.189	3076	0.007	0.189	1621	0.014	0.189	868	0.018
0.194	3103	0.007	0.194	1629	0.014	0.194	873	0.018
0.199	3096	0.007	0.199	1635	0.014	0.199	866	0.018
0.204	3093	0.007	0.204	1630	0.013	0.204	871	0.018
0.209	3108	0.007	0.209	1649	0.013	0.209	874	0.018
0.214	3113	0.007	0.214	1645	0.013	0.214	882	0.018
0.219	3116	0.006	0.219	1645	0.013	0.219	869	0.018
0.224	3134	0.006	0.224	1661	0.013	0.224	873	0.018
0.229	3149	0.006	0.229	1669	0.013	0.229	880	0.018
0.234	3162	0.006	0.234	1633	0.013	0.234	882	0.018
0.239	3162	0.006	0.239	1663	0.013	0.239	880	0.018
0.244	3174	0.005	0.244	1649	0.013	0.244	893	0.018
0.249	3181	0.005	0.249	1658	0.013	0.249	892	0.018
0.254	3182	0.005	0.254	1652	0.012	0.254	900	0.018
0.259	3189	0.005	0.259	1697	0.012	0.259	905	0.018
0.264	3214	0.005	0.264	1705	0.012	0.264	923	0.018
0.269	3210	0.005	0.269	1678	0.012	0.269	918	0.018
0.274	3214	0.005	0.274	1667	0.012	0.274	922	0.018
0.279	3224	0.005	0.279	1662	0.012	0.279	931	0.018
0.284	3222	0.005	0.284	1662	0.012	0.284	930	0.018
0.289	3209	0.005	0.289	1667	0.012	0.289	932	0.018
0.294	3221	0.005	0.294	1671	0.011	0.294	933	0.018
0.299	3223	0.004	0.299	1671	0.011	0.299	938	0.018
0.300	3222	0.004	0.300	1667	0.011	0.300	939	0.018

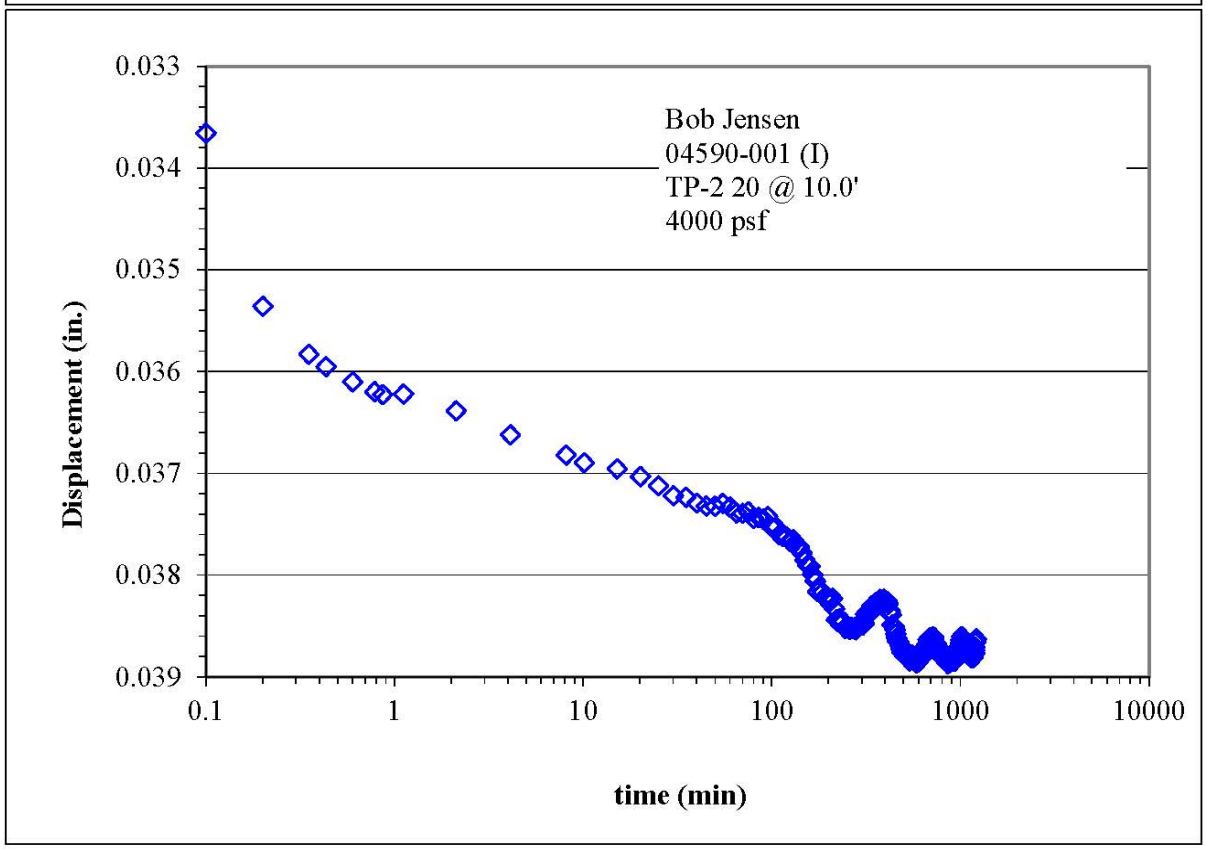
Direct Shear Test for Soils Under Drained Conditions

(ASTM D3080)

Project: Bob Jensen
No: 04590-001 (I)
Location: 5560 S. Wasatch BLVD, Holladay

Boring No.: TP-2
Station: 20
Depth: 10.0'





Determination of the Point Load Strength Index of Rock

(ASTM D5731)

Project: **Bob Jensen**
No: **04590-001 (I)**
Location: 5560 S. Wasatch BLVD, Holladay
Date: 1/11/2024
By: PW
Test Device: Humboldt H-1342
Test Frame: GEOTAC Sigma-1 10K

Boring No.	Hand	Hand	Hand	Hand	Hand	Hand
Sample:	1	2	3	4	5	6
Depth:	0.0'	0.0'	0.0'	0.0'	0.0'	0.0'
Sample type	Block	Block	Block	Block	Block	Block
Core test type						
Distance between platen points, D (in.)	0.923	1.212	1.200	1.012	1.470	1.162
D (mm)	23.444	30.785	30.480	25.705	37.338	29.515
Smallest specimen width, W (in.)	2.171	3.016	1.767	1.956	2.194	2.854
W (mm)	55.1	76.6	44.9	49.7	55.7	72.5
Equivalent core area, D_e^2 (mm^2)	1646.0	3002.7	1741.8	1626.0	2649.3	2724.2
Failure load, P (lbf)	959	754	1942	670	1577	1188
P (N)	4267	3352	8639	2979	7014	5285
Point load strength index, I_s (MPa)	2.59	1.12	4.96	1.83	2.65	1.94
Size correction factor, F	0.910	1.042	0.922	0.908	1.013	1.020
PLSI 50mm equivalent, $I_{s(50)}$ (MPa)	2.36	1.16	4.57	1.66	2.68	1.98
Site specific correlation, C	20.7	24.2	20.9	20.7	23.4	23.6
Uniaxial compressive strength, δ_{uc} (MPa)	48.86	28.10	95.75	34.35	62.73	46.62
Uniaxial compressive strength, δ_{uc} (psi)	**7086**	**4076**	**13887**	**4983**	**9098**	**6761**

Entered by:_____

Reviewed:_____

Minimum Laboratory Soil Resistivity, pH of Soil for Use in Corrosion Testing, and Ions in Water by Chemically Suppressed Ion Chromatography *(AASHTO T 288, T 289, ASTM D4327, and C1580)*

Project: Bob Jensen
No: 04590-001 (I)
Location: 5560 S. Wasatch BLVD, Holladay
Date: 1/10/2024
By: SE/JJ

Sample info.	Boring No.	TP-2							
	Station	20							
	Depth	10.0'							
Water content data	Wet soil + tare (g)	44.01							
	Dry soil + tare (g)	42.12							
	Tare (g)	23.33							
	Water content (%)	10.1							
Chem. data	pH	7.8							
	Soluble chloride* (ppm)	<10							
	Soluble sulfate** (ppm)	<10							
Resistivity data	Pin method	2							
	Soil box	Miller Small							
		Approximate Soil condition (%)	Resistance Reading (Ω)	Soil Box Multiplier (cm)	Resistivity (Ω-cm)	Approximate Soil condition (%)	Resistance Reading (Ω)	Soil Box Multiplier (cm)	Resistivity (Ω-cm)
		As is	50500	0.67	33835				
		+3	39700	0.67	26599				
		+6	34700	0.67	23249				
		+9	29600	0.67	19832				
		+12	27300	0.67	18291				
		+15	25400	0.67	17018				
		+18	25600	0.67	17152				
	Minimum resistivity (Ω-cm)	**17018**							

* Performed by Chemtech-Ford using EPA 300.0

** Performed by Chemtech-Ford using ASTM C1580

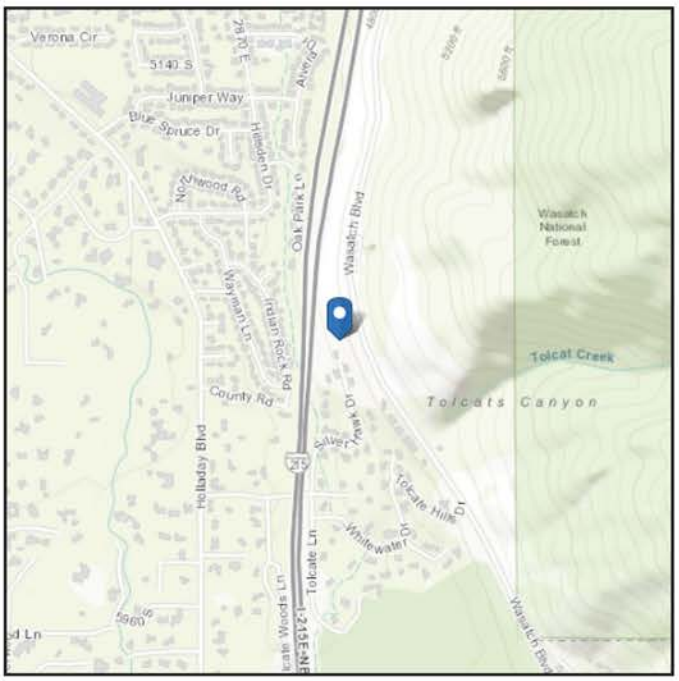
Entered by:_____
Reviewed:_____

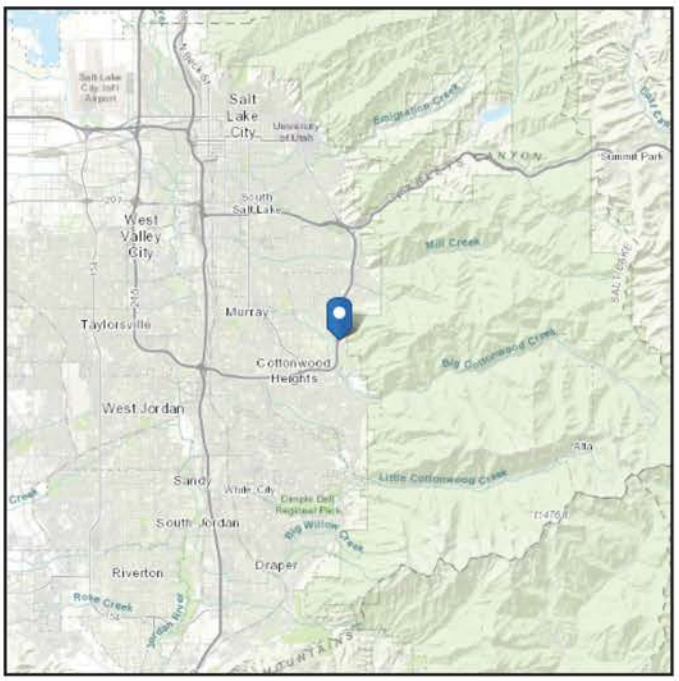
APPENDIX C

ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	40.65005
Risk Category:	II	**Longitude:**	-111.807
Soil Class:	B - Estimated (see Section 11.4.3)	**Elevation:**	4722.843271235967 ft (NAVD 88)





ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

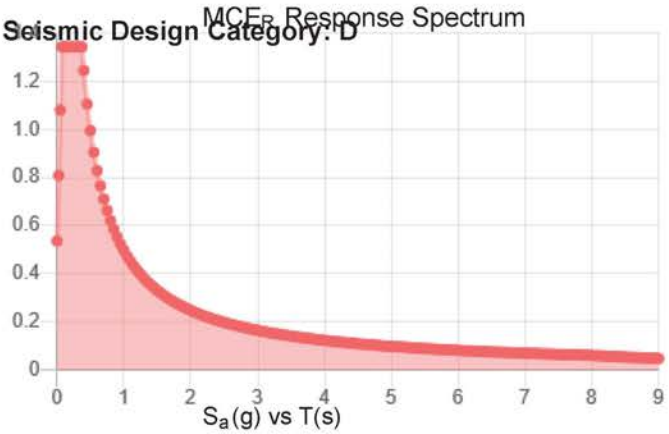
Seismic

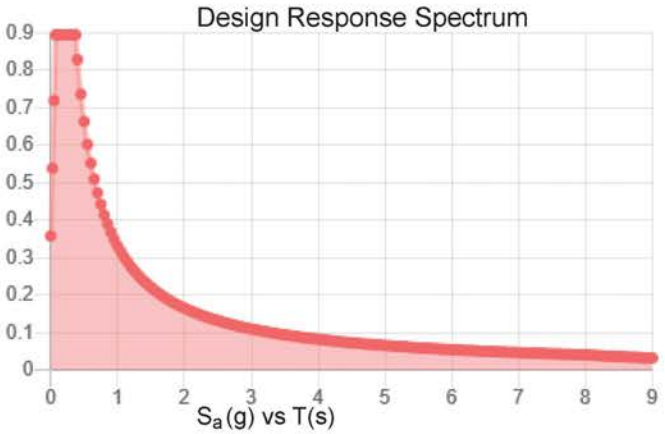
Site Soil Class: B - Estimated (see Section 11.4.3)

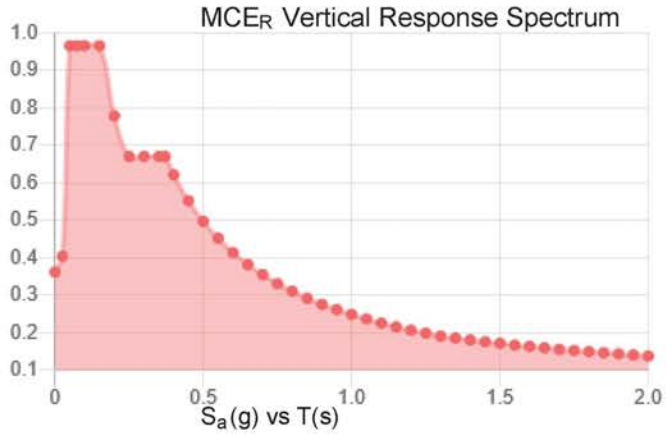
Results:

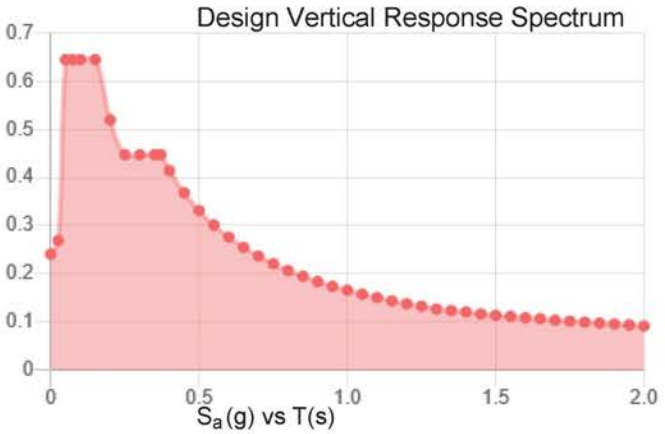
S_S :	1.341	S_{D1} :	0.331
S_1 :	0.497	T_L :	8
F_a :	1	PGA :	0.609
F_v :	1	PGA_M :	0.609
S_{MS} :	1.341	F_{PGA} :	1
S_{M1} :	0.497	I_e :	1
S_{DS} :	0.894	C_v :	0.9

Seismic Design Category: D









Data Accessed: Thu Mar 07 2024

Date Source:
USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

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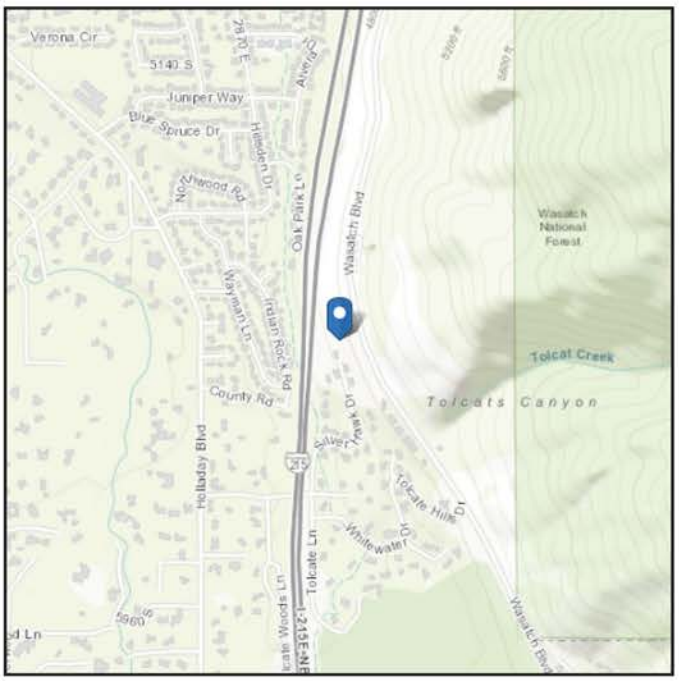
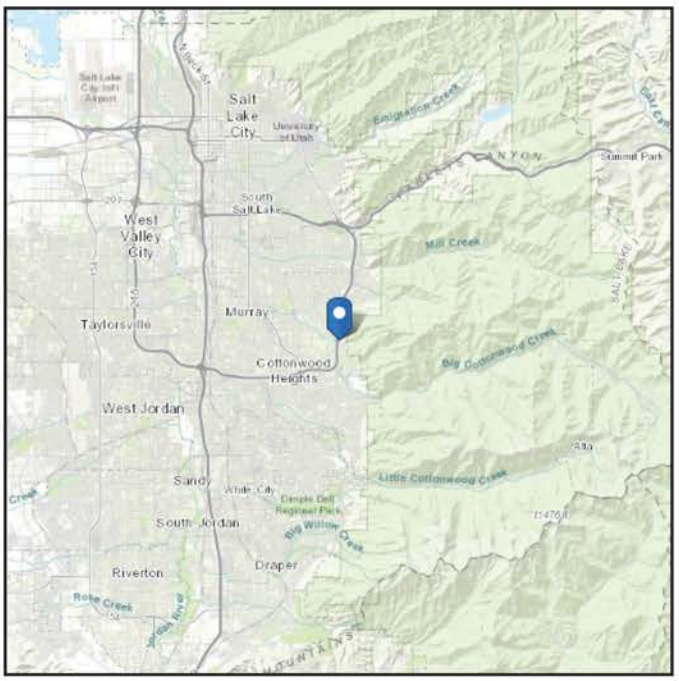
ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	40.65005
Risk Category:	II	**Longitude:**	-111.807
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	4722.843271235967 ft (NAVD 88)





ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	1.341	S_{D1} :	N/A
S_1 :	0.497	T_L :	8
F_a :	1.2	PGA :	0.609
F_v :	N/A	PGA_M :	0.73
S_{MS} :	1.609	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.073	C_v :	1.368

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Thu Mar 07 2024

Date Source: USGS Seismic Design Maps

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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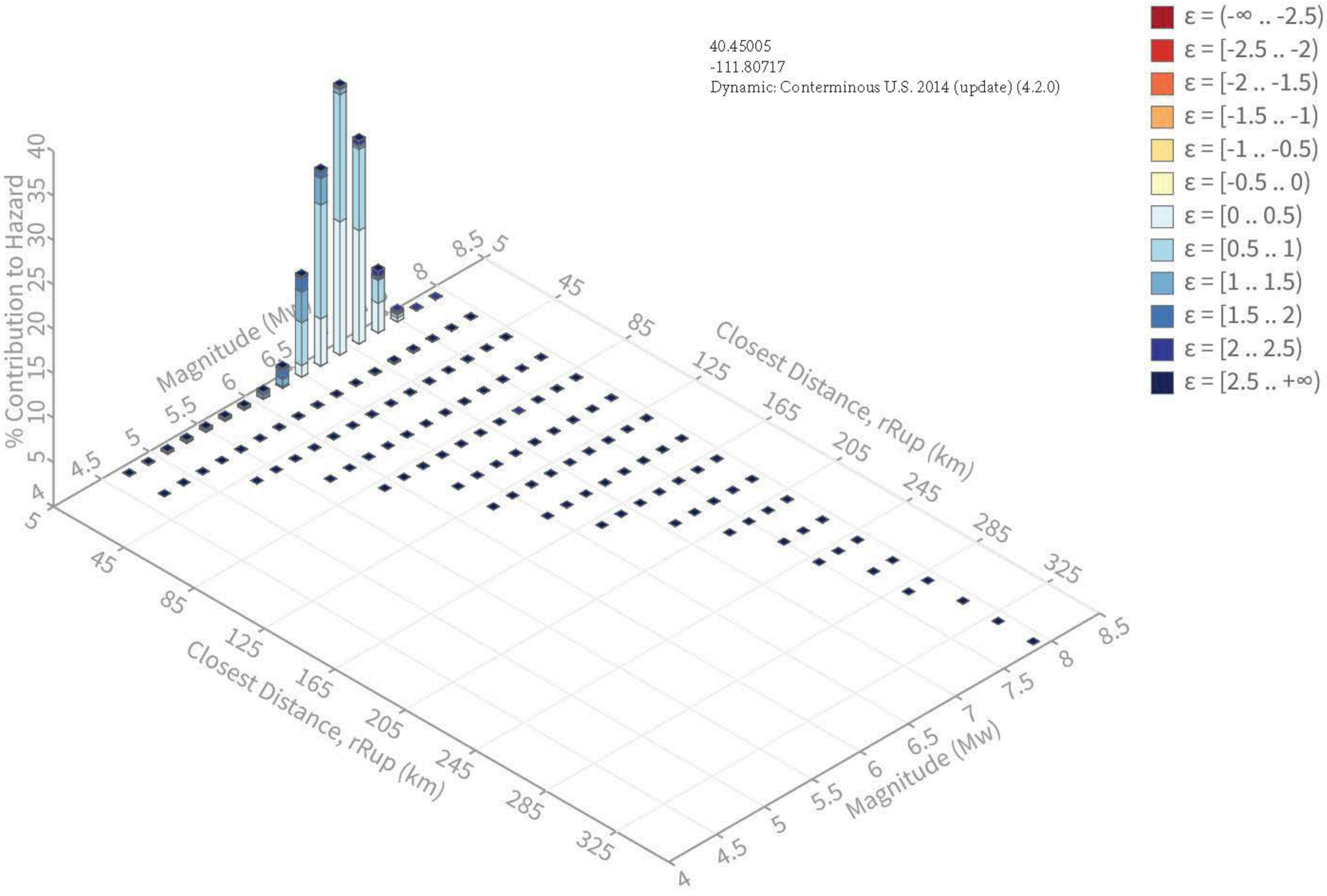


Download Deaggregation Report

Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.59741364 g

Recovered targets

Return period: 2559.1699 yrs
Exceedance rate: 0.0003907517 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.37 %

Mean (over all sources)

m: 6.84
r: 2.58 km
ε_0: 0.71 σ

Mode (largest m-r bin)

m: 6.89
r: 1.03 km
ε_0: 0.55 σ
Contribution: 30.18 %

Mode (largest m-r-ε_0 bin)

m: 6.89
r: 0.47 km
ε_0: 0.35 σ
Contribution: 14.97 %

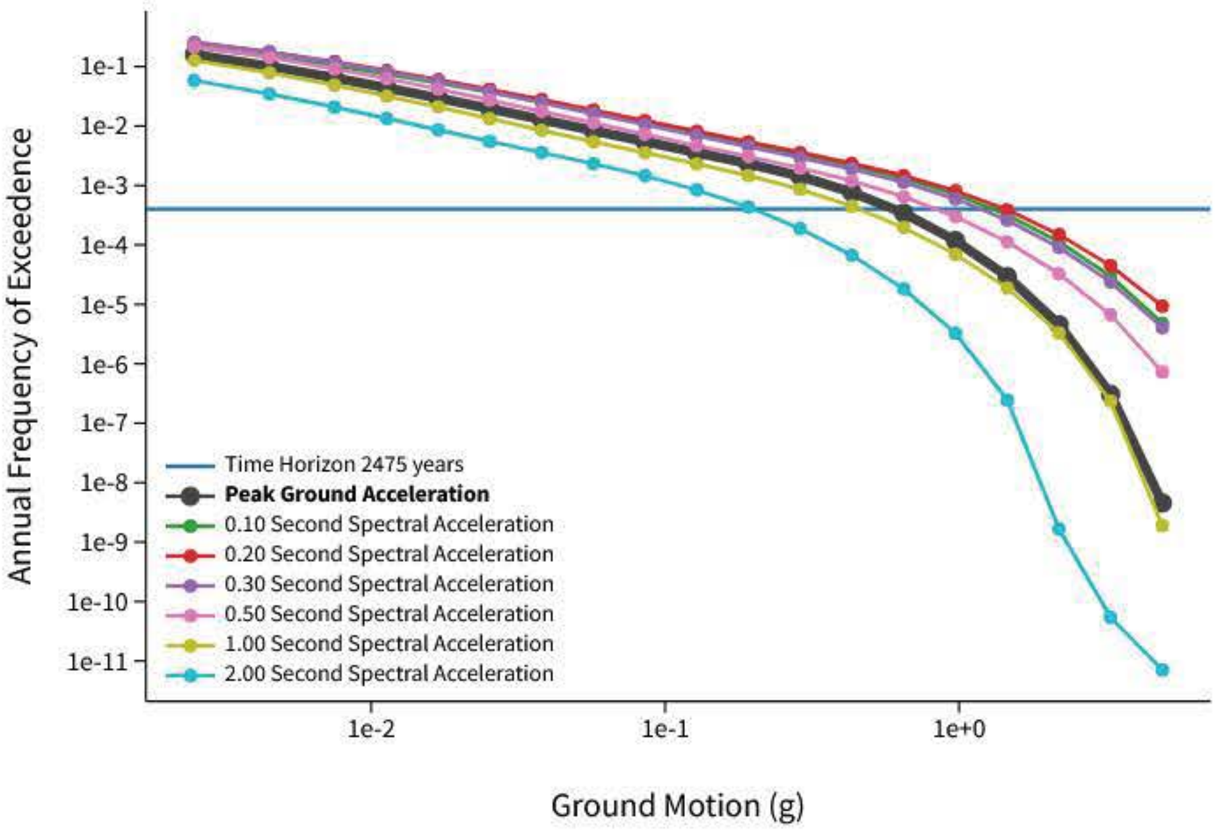
Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

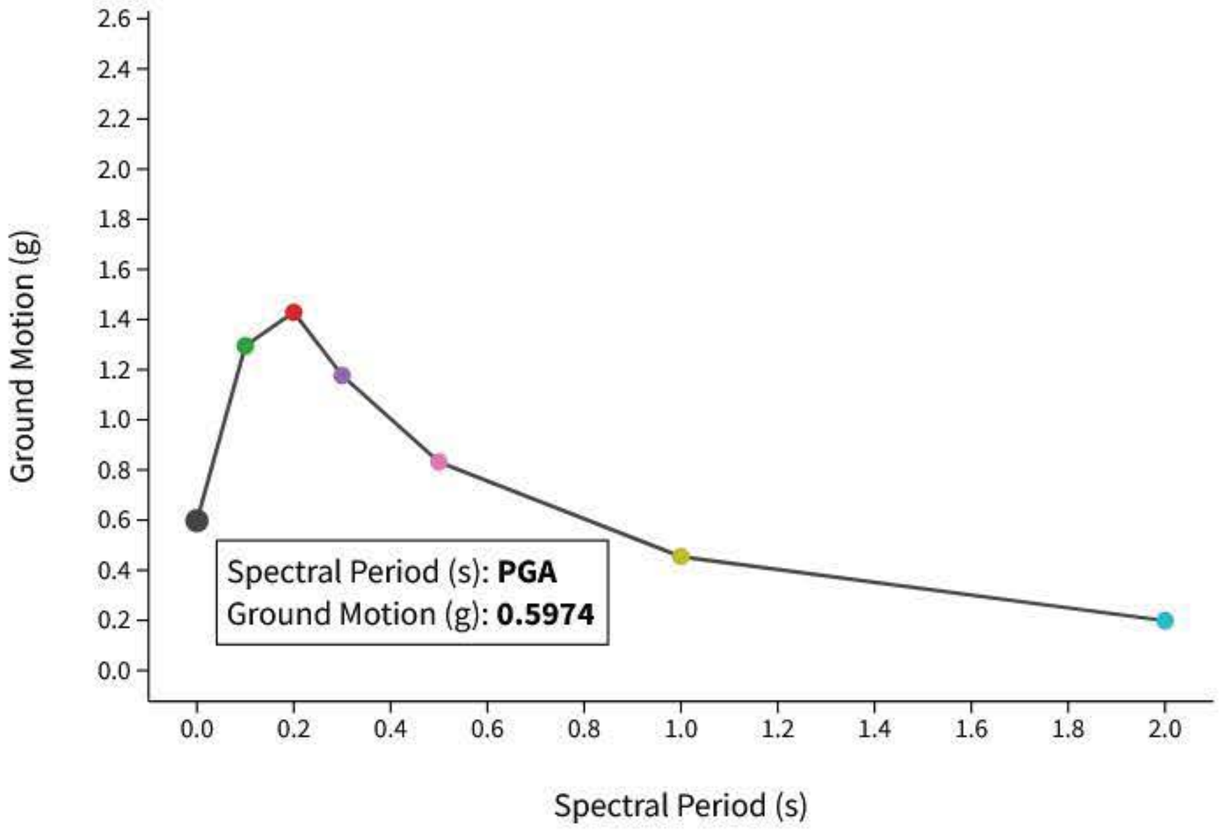
Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

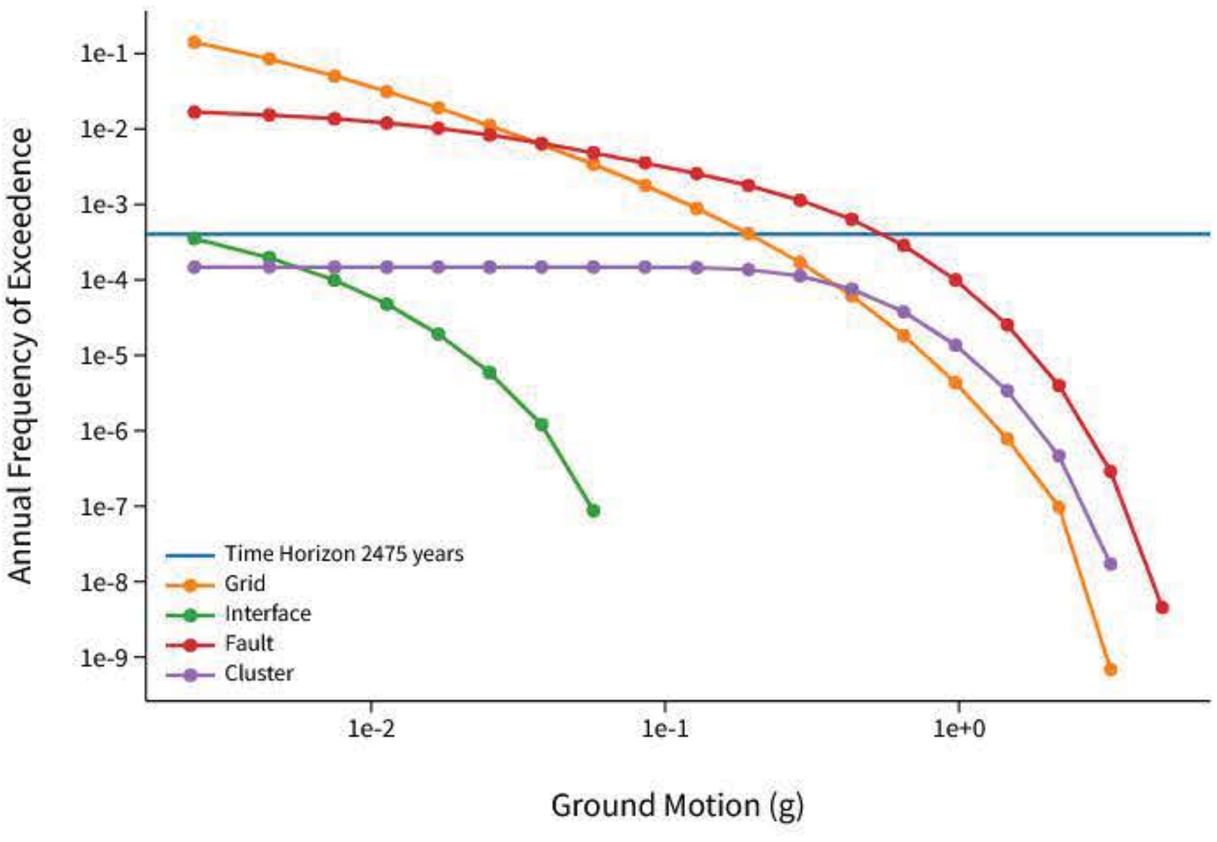
Hazard Curves



Uniform Hazard Response Spectrum

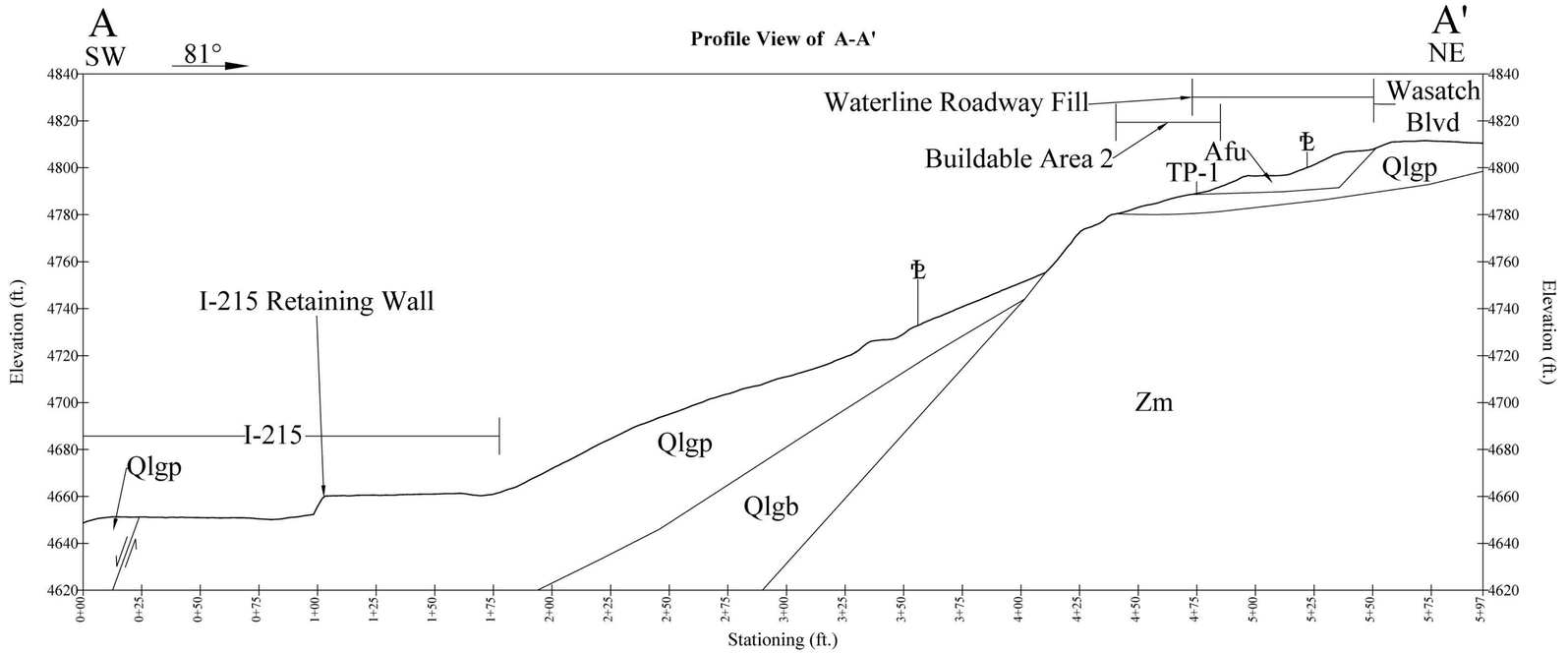


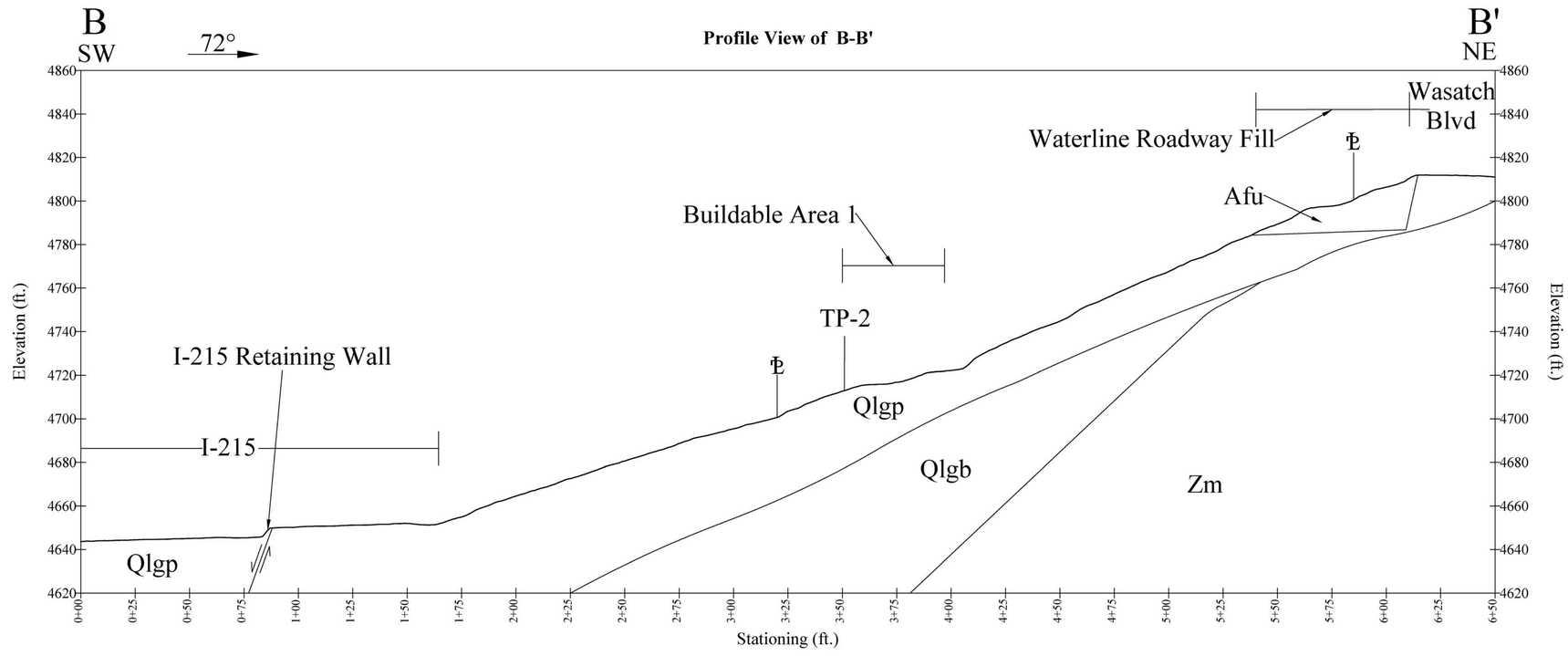
Component Curves for Peak Ground Acceleration



40.65005
-111.80717
Dynamic: Conterminous U.S. 2014 (update) (4.2.0)

APPENDIX D





Topo Data:

--State of Utah Acquired 0.5 Meter Lidar Data-Wasatch Front, 2013-2014. Distributed by www.opentopography.org, accessed on 12-08-2023.

*No Vertical Exaggeration

Legend

- Afu — Artificial Fill-Undocumented
- Qlgp — Lake Bonneville Gravel and Sand-Provo Phase
- Mapped Normal Fault (McKean, 2020)
- Qlgb — Lake Bonneville Gravel and Sand-Bonneville Phase
- Zm — Mutual Formation
- ℄ — Property Line

0 30 60
FEET
1" = 30'

IGES
Project No: 04590-001

Geotechnical & Geologic Hazard Study
Salt Lake County Parcel #22141780070000
5560 S. Wasatch Boulevard
Holladay, Utah

Cross Sections A-A' and B-B'

Figure D-1

Analysis of Rock Strength using RocLab-Mutual Formation (Zm)

Hoek-Brown Classification

intact uniaxial comp. strength (sigci) = 2000 ksf
GSI = 35 mi = 17 Disturbance factor (D) = 1
intact modulus (Ei) = 600000 ksf
modulus ratio (MR) = 300

Hoek-Brown Criterion

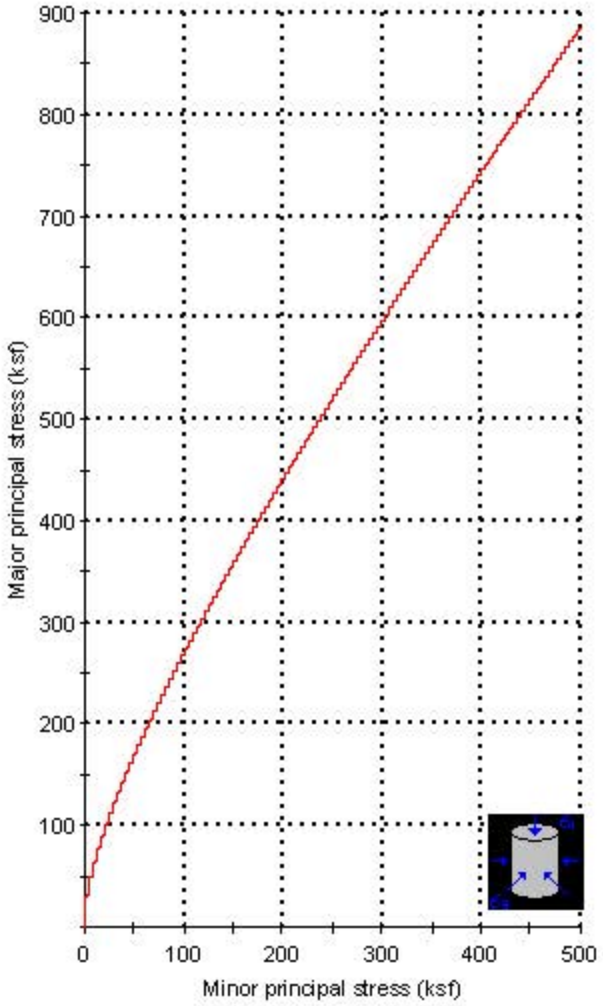
mb = 0.164 s = 1.97e-5 a = 0.516

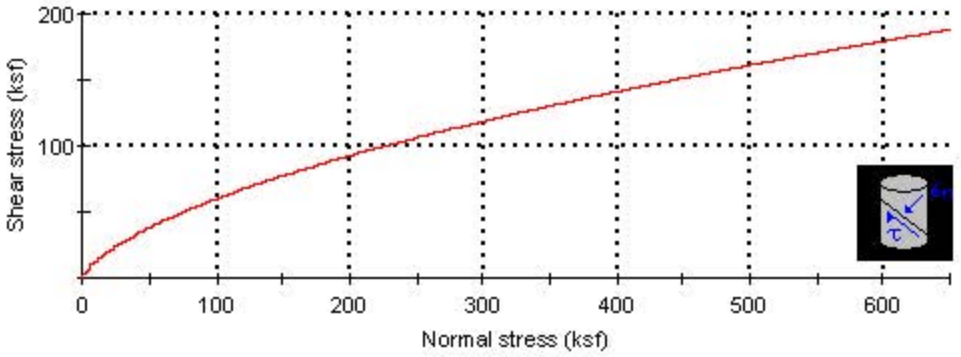
Mohr-Coulomb Fit

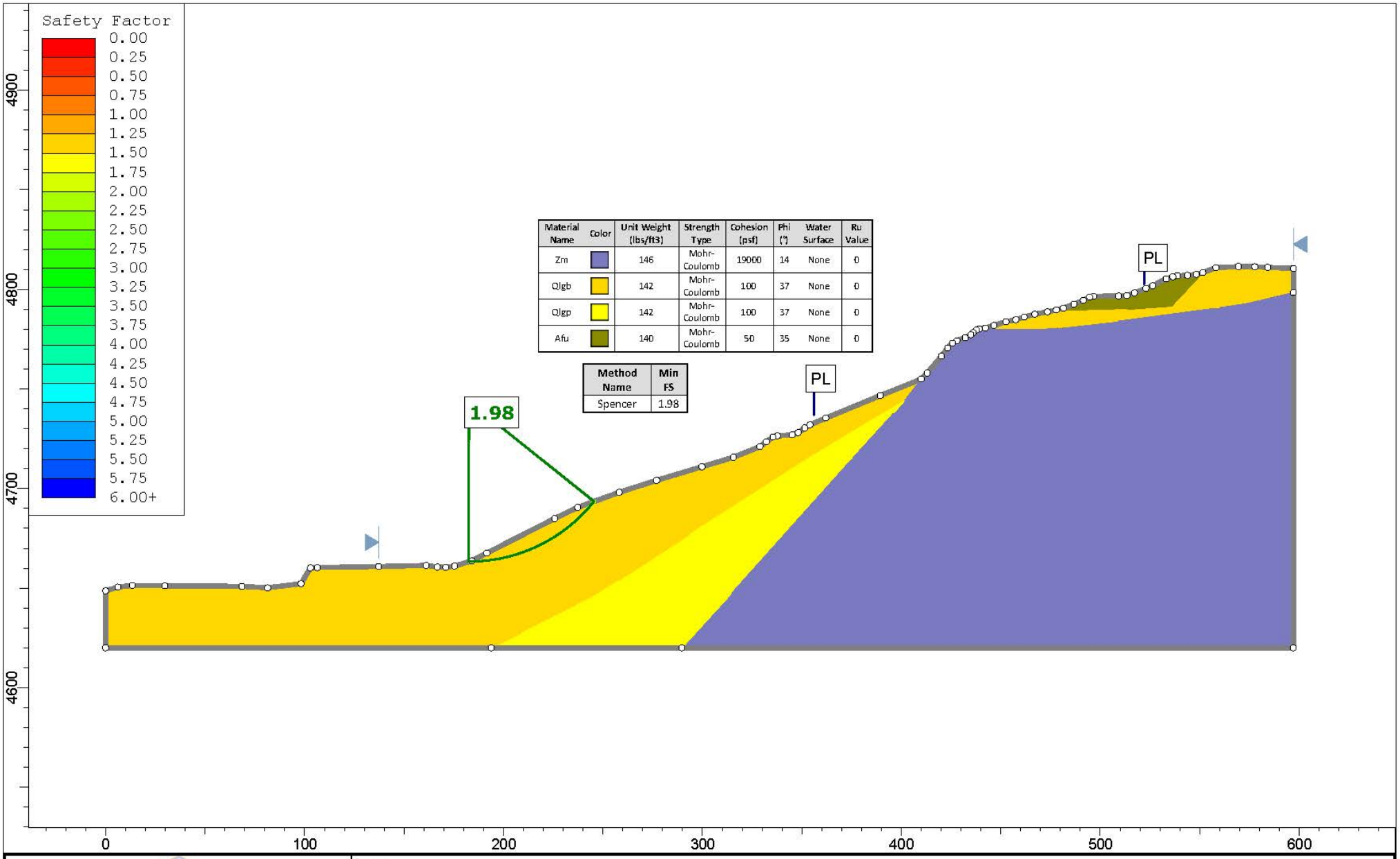
cohesion = 38.361 ksf friction angle = 13.76 deg

Rock Mass Parameters

tensile strength = -0.241 ksf
uniaxial compressive strength = 7.474 ksf
global strength = 97.772 ksf
deformation modulus = 19701.48 ksf







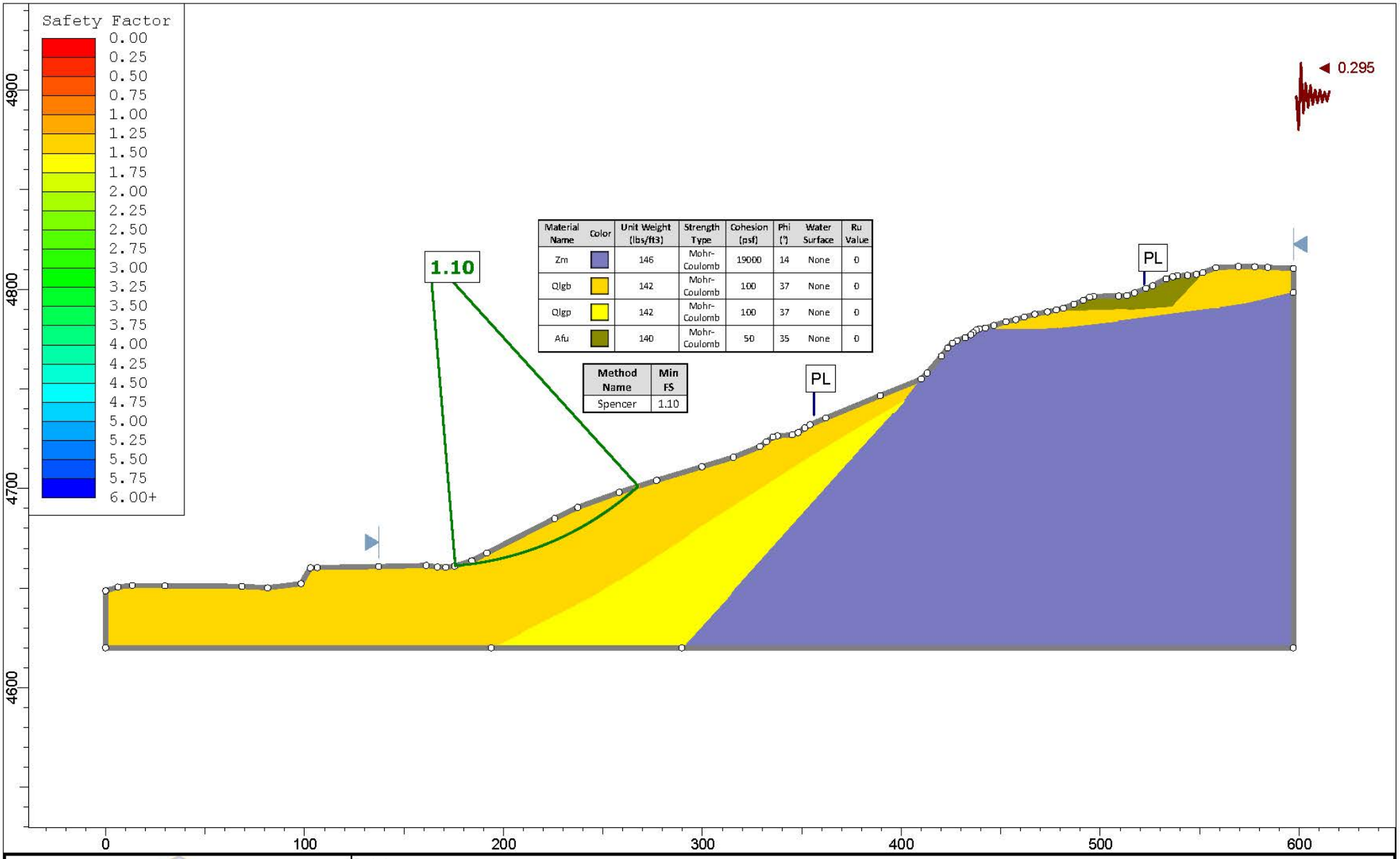
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	Ru Value
Zm		146	Mohr-Coulomb	19000	14	None	0
Qlgb		142	Mohr-Coulomb	100	37	None	0
Qlgp		142	Mohr-Coulomb	100	37	None	0
Afu		140	Mohr-Coulomb	50	35	None	0

Method Name	Min FS
Spencer	1.98

IGES

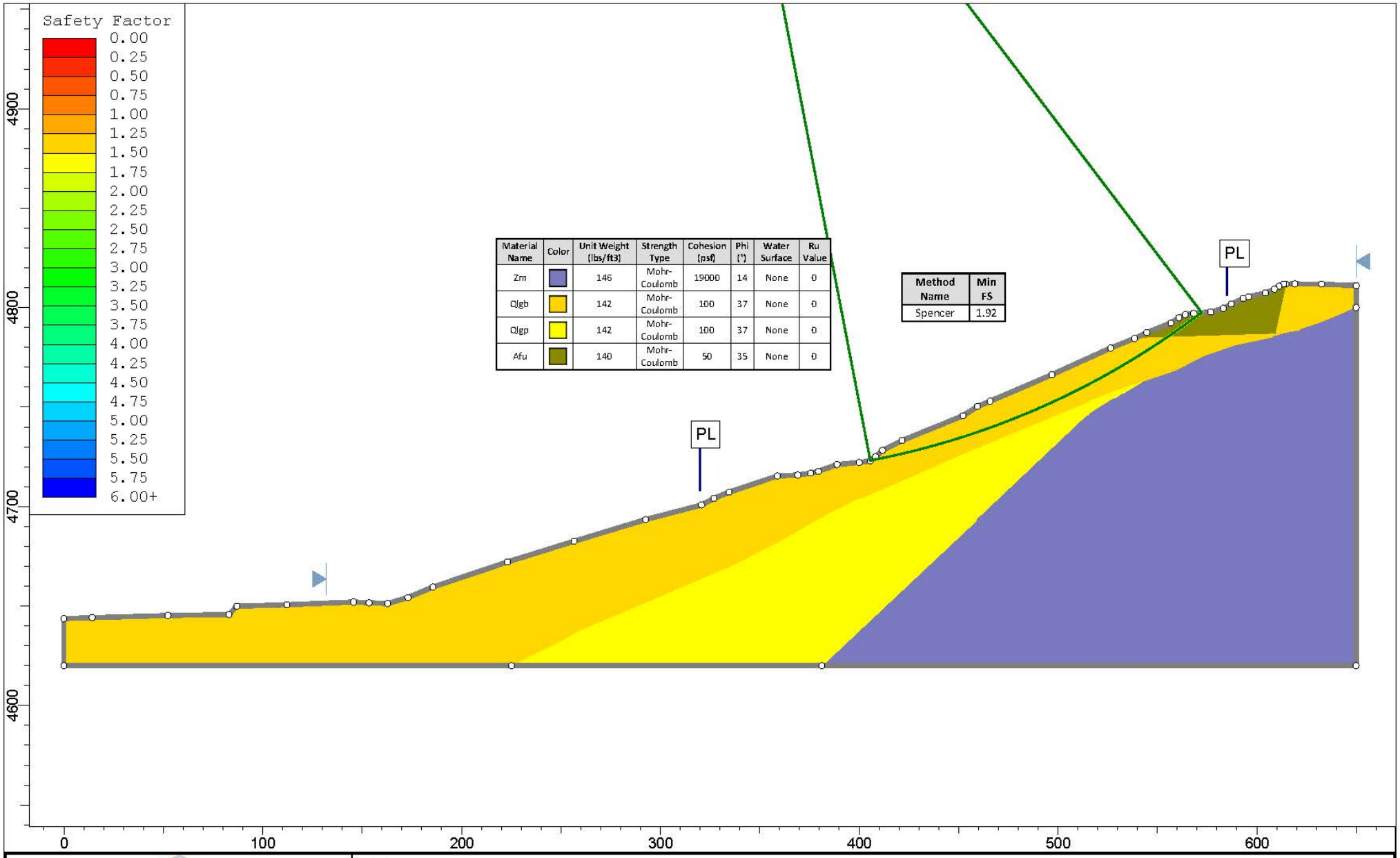
SLIDEINTERPRET 9.031

Project	Jensen/5560 Wasatch Blvd.		
Analysis Description	Section A-A' Static		
Drawn By	DAG	Scale 1:800	Company IGES Inc.
Date	03-11-24		File Name Jensen 1.slmd



Project	Jensen/5560 Wasatch Blvd.		
Analysis Description	Section A-A' Seismic		
Drawn By	DAG	Scale 1:800	Company IGES Inc.
Date	03-11-24		File Name Jensen 1.slmd

SLIDEINTERPRET 9.031



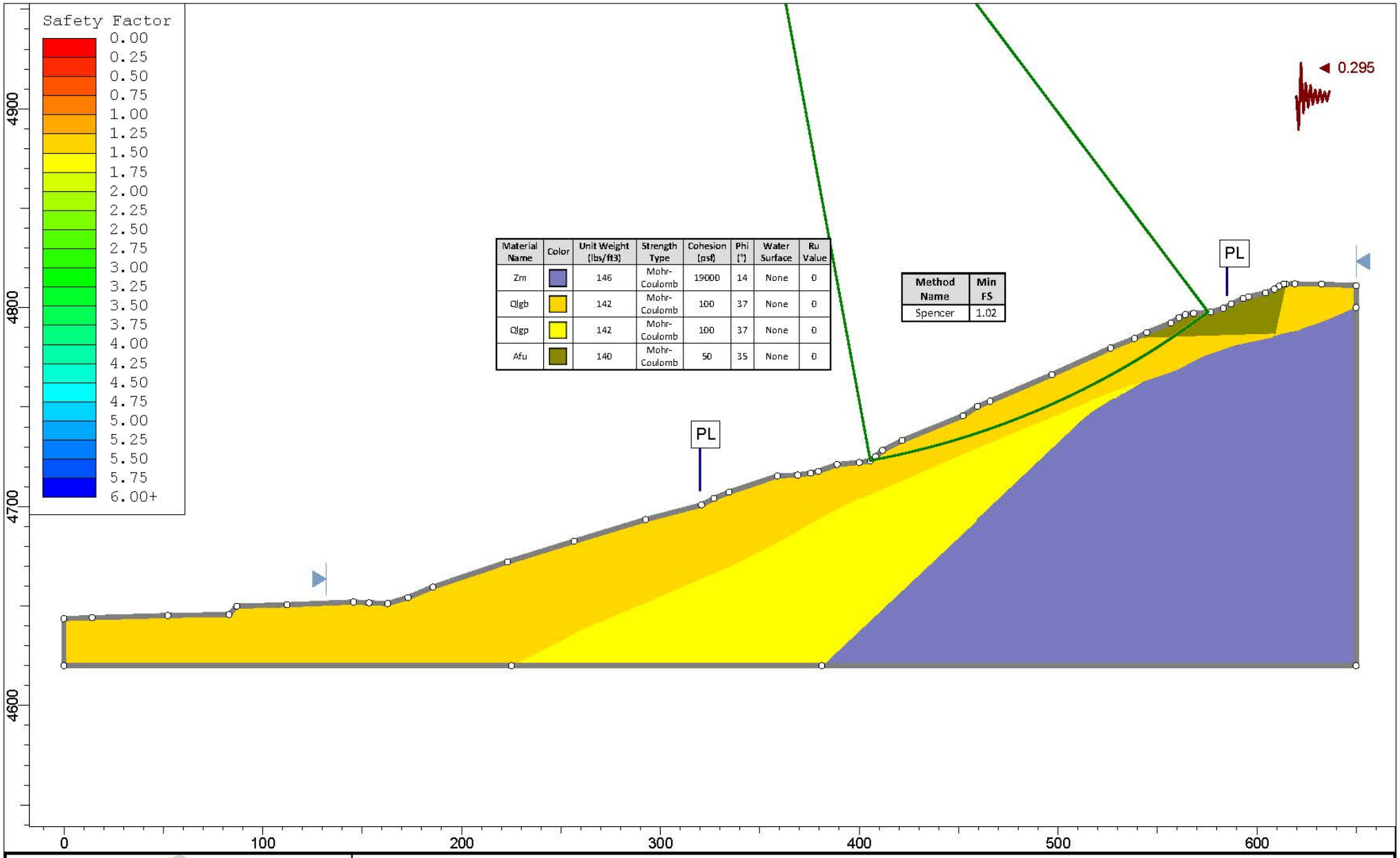
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	Ru Value
Zm		146	Mohr-Coulomb	19000	14	None	0
Qlgb		142	Mohr-Coulomb	100	37	None	0
Qlgp		142	Mohr-Coulomb	100	37	None	0
Afu		140	Mohr-Coulomb	50	35	None	0

Method Name	Min FS
Spencer	1.92

IGES

SLIDEINTERPRET 9.031

Project	Jensen/5560 Wasatch Blvd.		
Analysis Description	Section B-B' Static		
Drawn By	DAG	Scale	1:800
Company	IGES Inc.		
Date	03-11-24	File Name	Jensen 1.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	Ru Value
Zm		146	Mohr-Coulomb	19000	14	None	0
Qlgb		142	Mohr-Coulomb	100	37	None	0
Qlgp		142	Mohr-Coulomb	100	37	None	0
Afu		140	Mohr-Coulomb	50	35	None	0

Method Name	Min FS
Spencer	1.02

Project	Jensen/5560 Wasatch Blvd.		
Analysis Description	Section B-B' Seismic		
Drawn By	DAG	Scale	1:800
Company	IGES Inc.		
Date	03-11-24	File Name	Jensen 1.slmd

SLIDEINTERPRET 9.031

Jensen 1
Jensen/5560 Wasatch Blvd.
IGES Inc.
Date Created: 03-11-24
Software Version: 9.031

Table of Contents

Slide2 Analysis Information

Jensen 1

Project Summary

File Name:	Jensen 1.slmd
Slide2 Modeler Version:	9.031
Project Title:	Jensen/5560 Wasatch Blvd.
Analysis:	Section A-A' Seismic
Author:	DAG
Company:	IGES Inc.
Date Created:	03-11-24
Comments	
	04590-001

Currently Open Scenarios

Group Name	Scenario Name	Global Minimum	Compute Time
A-A'	A-A' Static	Spencer: 1.981370	00h:00m:02.171s
	A-A' Seismic	Spencer: 1.100560	00h:00m:01.826s
B-B	B-B' Static	Spencer: 1.919430	00h:00m:02.367s
	B-B' Seismic	Spencer: 1.023980	00h:00m:02.701s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

All Open Scenarios

Slices Type:	Vertical
Analysis Methods Used	
	Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

All Open Scenarios

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Advanced Groundwater Method:	None

Random Numbers

All Open Scenarios

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

All Open Scenarios

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	20
Circles per division:	10
Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

A-A' - A-A' Static

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

A-A' - A-A' Seismic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.295

B-B - B-B' Static

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

B-B - B-B' Seismic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No
Seismic Load Coefficient (Horizontal):	0.295

Materials

Zm	
Color	
Strength Type	Mohr-Coulomb
Unit Weight	146 lbs/ft3
Cohesion	19000 psf
Phi	14 °
Water Surface	Assigned per scenario
Ru Value	0

Qlgb	
Color	
Strength Type	Mohr-Coulomb
Unit Weight	142 lbs/ft3
Cohesion	100 psf
Phi	37 °
Water Surface	Assigned per scenario
Ru Value	0

Qlgp	
Color	
Strength Type	Mohr-Coulomb
Unit Weight	142 lbs/ft3
Cohesion	100 psf
Phi	37 °
Water Surface	Assigned per scenario
Ru Value	0

Afu	
Color	
Strength Type	Mohr-Coulomb
Unit Weight	140 lbs/ft3
Cohesion	50 psf
Phi	35 °
Water Surface	Assigned per scenario
Ru Value	0

Materials In Use

Material	A-A' Static	A-A' Seismic	B-B' Static	B-B' Seismic
Zm	✓	✓	✓	✓
Qlgb	✓	✓	✓	✓
Qlgp	✓	✓	✓	✓
Afu	✓	✓	✓	✓

Global Minimums

A-A' - A-A' Static

Method: spencer

FS	1.981370
Center:	182.679, 4743.739
Radius:	80.457
Left Slip Surface Endpoint:	182.516, 4663.282
Right Slip Surface Endpoint:	245.539, 4693.521
Resisting Moment:	3.81793e+06 lb-ft
Driving Moment:	1.92692e+06 lb-ft
Resisting Horizontal Force:	42389.1 lb
Driving Horizontal Force:	21393.9 lb
Total Slice Area:	405.233 ft2
Surface Horizontal Width:	63.0233 ft
Surface Average Height:	6.42989 ft

A-A' - A-A' Seismic

Method: spencer

FS	1.100560
Center:	162.785, 4816.786
Radius:	156.146
Left Slip Surface Endpoint:	175.770, 4661.180
Right Slip Surface Endpoint:	267.745, 4701.178
Resisting Moment:	1.03724e+07 lb-ft
Driving Moment:	9.42462e+06 lb-ft
Resisting Horizontal Force:	60712.5 lb
Driving Horizontal Force:	55164.9 lb
Total Slice Area:	643.73 ft2
Surface Horizontal Width:	91.9747 ft
Surface Average Height:	6.99899 ft

B-B - B-B' Static

Method: spencer

FS	1.919430
Center:	329.859, 5116.416
Radius:	400.596
Left Slip Surface Endpoint:	405.623, 4723.050
Right Slip Surface Endpoint:	572.268, 4797.488
Resisting Moment:	7.33855e+07 lb-ft
Driving Moment:	3.8233e+07 lb-ft
Resisting Horizontal Force:	167352 lb
Driving Horizontal Force:	87188.7 lb
Total Slice Area:	1686.87 ft2
Surface Horizontal Width:	166.644 ft
Surface Average Height:	10.1226 ft

B-B - B-B' Seismic

Method: spencer

FS	1.023980
Center:	331.866, 5121.554
Radius:	405.275
Left Slip Surface Endpoint:	405.619, 4723.047
Right Slip Surface Endpoint:	575.543, 4797.719
Resisting Moment:	7.15698e+07 lb-ft
Driving Moment:	6.98938e+07 lb-ft
Resisting Horizontal Force:	162323 lb
Driving Horizontal Force:	158522 lb
Total Slice Area:	1840.69 ft2
Surface Horizontal Width:	169.924 ft
Surface Average Height:	10.8324 ft

Global Minimum Support Data

All Open Scenarios

No Supports Present

Valid and Invalid Surfaces

A-A' - A-A' Static

Method: spencer

Number of Valid Surfaces:	11943
Number of Invalid Surfaces:	0

A-A' - A-A' Seismic

Method: spencer

Number of Valid Surfaces:	12946
Number of Invalid Surfaces:	0

B-B - B-B' Static

Method: spencer

Number of Valid Surfaces:	11809
Number of Invalid Surfaces:	0

B-B - B-B' Seismic

Method: spencer

Number of Valid Surfaces:	7894
Number of Invalid Surfaces:	0

Slice Data

A-A' - A-A' Static

Global Minimum Query (spencer) - Safety Factor: 1.98137

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.26047	34.4932	0.332908	Qlgb	100	37	71.9657	142.591	56.5196	0	56.5196	56.9378	56.9378
2	1.26047	114.901	1.23064	Qlgb	100	37	99.5453	197.236	129.037	0	129.037	131.175	131.175
3	1.26047	222.276	2.12867	Qlgb	100	37	135.682	268.837	224.054	0	224.054	229.098	229.098
4	1.26047	327.336	3.02723	Qlgb	100	37	170.023	336.878	314.347	0	314.347	323.339	323.339
5	1.26047	428.847	3.92653	Qlgb	100	37	202.217	400.666	398.997	0	398.997	412.876	412.876
6	1.26047	526.797	4.82681	Qlgb	100	37	232.339	460.35	478.201	0	478.201	497.82	497.82
7	1.26047	621.175	5.72828	Qlgb	100	37	260.462	516.071	552.144	0	552.144	578.272	578.272
8	1.26047	711.801	6.63117	Qlgb	100	37	286.596	567.853	620.862	0	620.862	654.18	654.18
9	1.26047	798.406	7.53573	Qlgb	100	37	310.726	615.664	684.31	0	684.31	725.415	725.415
10	1.26047	881.363	8.44218	Qlgb	100	37	333.039	659.873	742.977	0	742.977	792.406	792.406
11	1.26047	960.667	9.35076	Qlgb	100	37	353.593	700.599	797.023	0	797.023	855.248	855.248
12	1.26047	1036.29	10.2617	Qlgb	100	37	372.44	737.942	846.579	0	846.579	914.005	914.005
13	1.26047	1108.2	11.1753	Qlgb	100	37	389.625	771.992	891.761	0	891.761	968.735	968.735
14	1.26047	1176.37	12.0918	Qlgb	100	37	405.194	802.839	932.698	0	932.698	1019.5	1019.5
15	1.26047	1240.76	13.0114	Qlgb	100	37	419.186	830.562	969.489	0	969.489	1066.35	1066.35
16	1.26047	1301.33	13.9345	Qlgb	100	37	431.64	855.238	1002.24	0	1002.24	1109.33	1109.33
17	1.26047	1358.03	14.8612	Qlgb	100	37	442.592	876.939	1031.03	0	1031.03	1148.48	1148.48
18	1.26047	1410.81	15.792	Qlgb	100	37	452.077	895.731	1055.97	0	1055.97	1183.82	1183.82
19	1.26047	1459.63	16.727	Qlgb	100	37	460.125	911.677	1077.13	0	1077.13	1215.41	1215.41
20	1.26047	1504.42	17.6667	Qlgb	100	37	466.765	924.835	1094.59	0	1094.59	1243.26	1243.26
21	1.26047	1545.13	18.6113	Qlgb	100	37	472.027	935.261	1108.43	0	1108.43	1267.39	1267.39
22	1.26047	1581.68	19.5612	Qlgb	100	37	475.936	943.005	1118.71	0	1118.71	1287.82	1287.82
23	1.26047	1614.01	20.5167	Qlgb	100	37	478.516	948.117	1125.49	0	1125.49	1304.56	1304.56
24	1.26047	1642.03	21.4782	Qlgb	100	37	479.789	950.64	1128.84	0	1128.84	1317.62	1317.62
25	1.26047	1665.67	22.4461	Qlgb	100	37	479.777	950.616	1128.8	0	1128.8	1327.01	1327.01
26	1.26047	1684.83	23.4208	Qlgb	100	37	478.5	948.085	1125.45	0	1125.45	1332.72	1332.72
27	1.26047	1699.41	24.4028	Qlgb	100	37	475.975	943.083	1118.81	0	1118.81	1334.75	1334.75
28	1.26047	1709.31	25.3924	Qlgb	100	37	472.221	935.644	1108.93	0	1108.93	1333.08	1333.08
29	1.26047	1714.41	26.3903	Qlgb	100	37	467.251	925.798	1095.87	0	1095.87	1327.72	1327.72
30	1.26047	1714.6	27.3968	Qlgb	100	37	461.083	913.576	1079.65	0	1079.65	1318.62	1318.62
31	1.26047	1709.73	28.4126	Qlgb	100	37	453.728	899.003	1060.31	0	1060.31	1305.77	1305.77
32	1.26047	1699.67	29.4382	Qlgb	100	37	445.199	882.104	1037.89	0	1037.89	1289.13	1289.13
33	1.26047	1684.25	30.4743	Qlgb	100	37	435.508	862.902	1012.4	0	1012.4	1268.67	1268.67
34	1.26047	1663.31	31.5215	Qlgb	100	37	424.664	841.417	983.897	0	983.897	1244.35	1244.35
35	1.26047	1635.19	32.5807	Qlgb	100	37	412.352	817.021	951.517	0	951.517	1215.03	1215.03
36	1.26047	1597.4	33.6525	Qlgb	100	37	398.086	788.755	914.009	0	914.009	1179.02	1179.02
37	1.26047	1553.28	34.7378	Qlgb	100	37	382.688	758.247	873.523	0	873.523	1138.88	1138.88
38	1.26047	1502.78	35.8376	Qlgb	100	37	366.209	725.596	830.196	0	830.196	1094.68	1094.68
39	1.26047	1445.65	36.9528	Qlgb	100	37	348.655	690.814	784.038	0	784.038	1046.32	1046.32
40	1.26047	1381.58	38.0847	Qlgb	100	37	330.032	653.915	735.067	0	735.067	993.702	993.702
41	1.26047	1310.27	39.2343	Qlgb	100	37	310.345	614.908	683.308	0	683.308	936.728	936.728
42	1.26047	1231.33	40.4031	Qlgb	100	37	289.599	573.803	628.757	0	628.757	875.252	875.252
43	1.26047	1144.39	41.5926	Qlgb	100	37	267.8	530.61	571.438	0	571.438	809.14	809.14
44	1.26047	1043.65	42.8045	Qlgb	100	37	243.93	483.316	508.678	0	508.678	734.595	734.595
45	1.26047	913.721	44.0406	Qlgb	100	37	215.256	426.501	433.282	0	433.282	641.446	641.446
46	1.26047	772.292	45.303	Qlgb	100	37	185.373	367.293	354.71	0	354.71	542.054	542.054
47	1.26047	620.688	46.5943	Qlgb	100	37	154.671	306.46	273.981	0	273.981	437.508	437.508
48	1.26047	458.171	47.9171	Qlgb	100	37	123.161	244.027	191.13	0	191.13	327.516	327.516
49	1.26047	283.887	49.2747	Qlgb	100	37	90.8595	180.026	106.198	0	106.198	211.738	211.738
50	1.26047	96.8444	50.6707	Qlgb	100	37	57.9301	114.781	19.6151	0	19.6151	90.3182	90.3182

A-A' - A-A' Seismic

Global Minimum Query (spencer) - Safety Factor: 1.10056

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	1.83949	53.3795	5.10898	Qlgb	100	37	163.423	179.857	105.973	0	105.973	120.584	120.584
2	1.83949	157.269	5.78704	Qlgb	100	37	206.222	226.96	168.482	0	168.482	189.382	189.382
3	1.83949	255.411	6.46591	Qlgb	100	37	244.77	269.384	224.78	0	224.78	252.52	252.52
4	1.83949	347.782	7.14569	Qlgb	100	37	279.285	307.37	275.19	0	275.19	310.203	310.203
5	1.83949	445.72	7.82649	Qlgb	100	37	314.61	346.247	326.781	0	326.781	370.025	370.025
6	1.83949	609.575	8.5084	Qlgb	100	37	374.77	412.457	414.644	0	414.644	470.71	470.71
7	1.83949	780.15	9.19153	Qlgb	100	37	435.069	478.82	502.711	0	502.711	573.11	573.11
8	1.83949	944.839	9.87598	Qlgb	100	37	490.617	539.953	583.838	0	583.838	669.252	669.252
9	1.83949	1103.53	10.5619	Qlgb	100	37	541.603	596.067	658.301	0	658.301	759.286	759.286
10	1.83949	1255.33	11.2493	Qlgb	100	37	587.923	647.045	725.956	0	725.956	842.894	842.894
11	1.83949	1400.86	11.9383	Qlgb	100	37	630.035	693.391	787.454	0	787.454	920.664	920.664
12	1.83949	1540.36	12.6291	Qlgb	100	37	668.218	735.414	843.222	0	843.222	992.943	992.943
13	1.83949	1673.76	13.3218	Qlgb	100	37	702.647	773.305	893.507	0	893.507	1059.89	1059.89
14	1.83949	1801.01	14.0165	Qlgb	100	37	733.484	807.243	938.541	0	938.541	1121.64	1121.64
15	1.83949	1922.07	14.7133	Qlgb	100	37	760.882	837.396	978.559	0	978.559	1178.36	1178.36
16	1.83949	2036.87	15.4123	Qlgb	100	37	784.989	863.927	1013.77	0	1013.77	1230.17	1230.17
17	1.83949	2145.35	16.1137	Qlgb	100	37	805.939	886.984	1044.36	0	1044.36	1277.19	1277.19
18	1.83949	2247.45	16.8175	Qlgb	100	37	823.866	906.714	1070.55	0	1070.55	1319.56	1319.56
19	1.83949	2343.09	17.524	Qlgb	100	37	838.891	923.25	1092.49	0	1092.49	1357.38	1357.38
20	1.83949	2432.2	18.2332	Qlgb	100	37	851.131	936.721	1110.37	0	1110.37	1390.75	1390.75
21	1.83949	2514.71	18.9454	Qlgb	100	37	860.699	947.251	1124.34	0	1124.34	1419.78	1419.78
22	1.83949	2590.53	19.6606	Qlgb	100	37	867.698	954.954	1134.56	0	1134.56	1444.57	1444.57
23	1.83949	2659.56	20.379	Qlgb	100	37	872.23	959.941	1141.18	0	1141.18	1465.2	1465.2
24	1.83949	2721.73	21.1008	Qlgb	100	37	874.388	962.317	1144.33	0	1144.33	1481.75	1481.75
25	1.83949	2776.92	21.8261	Qlgb	100	37	874.265	962.181	1144.15	0	1144.15	1494.3	1494.3
26	1.83949	2825.03	22.5551	Qlgb	100	37	871.944	959.627	1140.77	0	1140.77	1502.92	1502.92
27	1.83949	2865.96	23.288	Qlgb	100	37	867.51	954.747	1134.29	0	1134.29	1507.68	1507.68
28	1.83949	2895.38	24.0249	Qlgb	100	37	859.94	946.416	1123.23	0	1123.23	1506.55	1506.55
29	1.83949	2910.13	24.7661	Qlgb	100	37	848.598	933.933	1106.67	0	1106.67	1498.16	1498.16
30	1.83949	2917.2	25.5117	Qlgb	100	37	835.444	919.456	1087.46	0	1087.46	1486.15	1486.15
31	1.83949	2916.57	26.262	Qlgb	100	37	820.573	903.09	1065.74	0	1065.74	1470.61	1470.61
32	1.83949	2908.09	27.0171	Qlgb	100	37	804.05	884.905	1041.6	0	1041.6	1451.59	1451.59
33	1.83949	2891.6	27.7774	Qlgb	100	37	785.934	864.967	1015.15	0	1015.15	1429.13	1429.13
34	1.83949	2856.05	28.5431	Qlgb	100	37	763.745	840.547	982.74	0	982.74	1398.16	1398.16
35	1.83949	2768.88	29.3143	Qlgb	100	37	730.272	803.708	933.852	0	933.852	1343.9	1343.9
36	1.83949	2668.68	30.0914	Qlgb	100	37	694.834	764.706	882.097	0	882.097	1284.74	1284.74
37	1.83949	2559.74	30.8747	Qlgb	100	37	658.514	724.734	829.049	0	829.049	1222.77	1222.77
38	1.83949	2441.85	31.6644	Qlgb	100	37	621.35	683.833	774.771	0	774.771	1157.99	1157.99
39	1.83949	2314.77	32.4609	Qlgb	100	37	583.378	642.043	719.318	0	719.318	1090.41	1090.41
40	1.83949	2178.27	33.2645	Qlgb	100	37	544.635	599.403	662.729	0	662.729	1020	1020
41	1.83949	2032.08	34.0756	Qlgb	100	37	505.152	555.95	605.068	0	605.068	946.768	946.768
42	1.83949	1875.93	34.8946	Qlgb	100	37	464.964	511.721	546.372	0	546.372	870.67	870.67
43	1.83949	1709.51	35.7217	Qlgb	100	37	424.103	466.751	486.695	0	486.695	791.688	791.688
44	1.83949	1532.51	36.5576	Qlgb	100	37	382.601	421.075	426.081	0	426.081	709.787	709.787
45	1.83949	1344.31	37.4026	Qlgb	100	37	340.436	374.67	364.499	0	364.499	624.806	624.806
46	1.83949	1132.5	38.2572	Qlgb	100	37	295.426	325.134	298.763	0	298.763	531.719	531.719
47	1.83949	902.379	39.122	Qlgb	100	37	248.768	273.784	230.62	0	230.62	432.947	432.947
48	1.83949	660.128	39.9976	Qlgb	100	37	201.732	222.018	161.923	0	161.923	331.182	331.182
49	1.83949	405.278	40.8846	Qlgb	100	37	154.342	169.863	92.7115	0	92.7115	226.334	226.334
50	1.83949	137.322	41.7836	Qlgb	100	37	93.4096	102.803	3.7195	0	3.7195	87.1891	87.1891

B-B - B-B' Static

Global Minimum Query (spencer) - Safety Factor: 1.91943

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	3.31885	458.732	11.144	Qlgb	100	37	110.442	211.985	148.609	0	148.609	170.365	170.365
2	3.31885	1488.32	11.6282	Qlgb	100	37	230.841	443.083	455.286	0	455.286	502.789	502.789
3	3.31885	2168.47	12.1132	Qlgb	100	37	308.808	592.735	653.883	0	653.883	720.16	720.16
4	3.31885	2616.03	12.5992	Qlgb	100	37	358.745	688.586	781.079	0	781.079	861.263	861.263
5	3.31885	3046.26	13.086	Qlgb	100	37	405.99	779.27	901.422	0	901.422	995.795	995.795
6	3.31885	3359.7	13.5739	Qlgb	100	37	439.225	843.061	986.076	0	986.076	1092.12	1092.12
7	3.31885	3610.86	14.0627	Qlgb	100	37	464.916	892.374	1051.52	0	1051.52	1167.97	1167.97
8	3.31885	3847.83	14.5526	Qlgb	100	37	488.636	937.903	1111.94	0	1111.94	1238.78	1238.78
9	3.31885	4070.5	15.0436	Qlgb	100	37	510.409	979.695	1167.4	0	1167.4	1304.58	1304.58
10	3.31885	4278.79	15.5357	Qlgb	100	37	530.261	1017.8	1217.96	0	1217.96	1365.37	1365.37
11	3.31885	4472.58	16.029	Qlgb	100	37	548.215	1052.26	1263.69	0	1263.69	1421.19	1421.19
12	3.31885	4651.78	16.5235	Qlgb	100	37	564.295	1083.12	1304.65	0	1304.65	1472.05	1472.05
13	3.31885	4816.28	17.0193	Qlgb	100	37	578.521	1110.43	1340.89	0	1340.89	1517.98	1517.98
14	3.31885	4965.95	17.5164	Qlgb	100	37	590.92	1134.23	1372.47	0	1372.47	1558.97	1558.97
15	3.31885	5264.15	18.0148	Qlgb	100	37	619.074	1188.27	1444.18	0	1444.18	1645.51	1645.51
16	3.31885	5757.16	18.5147	Qlgb	100	37	667.594	1281.4	1567.77	0	1567.77	1791.34	1791.34
17	3.31885	6126.22	19.016	Qlgb	100	37	702.271	1347.96	1656.1	0	1656.1	1898.13	1898.13
18	3.31885	6233.78	19.5189	Qlgb	100	37	708.908	1360.7	1673	0	1673	1924.3	1924.3
19	3.31885	6326.18	20.0233	Qlgb	100	37	713.821	1370.13	1685.52	0	1685.52	1945.66	1945.66
20	3.31885	6419.8	20.5294	Qlgb	100	37	718.75	1379.59	1698.07	0	1698.07	1967.22	1967.22
21	3.31885	6497.97	21.0371	Qlgb	100	37	721.964	1385.76	1706.27	0	1706.27	1983.94	1983.94
22	3.31885	6560.19	21.5466	Qlgb	100	37	723.46	1388.63	1710.06	0	1710.06	1995.72	1995.72
23	3.31885	6606.31	22.0578	Qlgb	100	37	723.241	1388.21	1709.51	0	1709.51	2002.57	2002.57
24	3.31885	6636.16	22.5709	Qlgb	100	37	721.329	1384.54	1704.64	0	1704.64	2004.47	2004.47
25	3.31885	6649.54	23.086	Qlgb	100	37	717.744	1377.66	1695.51	0	1695.51	2001.44	2001.44
26	3.31885	6646.27	23.603	Qlgb	100	37	712.493	1367.58	1682.14	0	1682.14	1993.46	1993.46
27	3.31885	6626.17	24.1221	Qlgb	100	37	705.6	1354.35	1664.58	0	1664.58	1980.54	1980.54
28	3.31885	6593.27	24.6432	Qlgb	100	37	697.494	1338.79	1643.93	0	1643.93	1963.9	1963.9
29	3.31885	6570.15	25.1666	Qlgb	100	37	690.392	1325.16	1625.84	0	1625.84	1950.22	1950.22
30	3.31885	6534.32	25.6922	Qlgb	100	37	682.109	1309.26	1604.74	0	1604.74	1932.9	1932.9
31	3.31885	6480.79	26.2202	Qlgb	100	37	672.179	1290.2	1579.45	0	1579.45	1910.5	1910.5
32	3.31885	6409.3	26.7505	Qlgb	100	37	660.628	1268.03	1550.03	0	1550.03	1883.02	1883.02
33	3.31885	6319.62	27.2833	Qlgb	100	37	647.458	1242.75	1516.49	0	1516.49	1850.43	1850.43
34	3.31885	6211.47	27.8188	Qlgb	100	37	632.693	1214.41	1478.87	0	1478.87	1812.71	1812.71
35	3.31885	6084.59	28.3568	Qlgb	100	37	616.334	1183.01	1437.2	0	1437.2	1769.85	1769.85
36	3.31885	5938.7	28.8976	Qlgb	100	37	598.396	1148.58	1391.51	0	1391.51	1721.81	1721.81
37	3.31885	5759.3	29.4413	Qlgb	100	37	577.593	1108.65	1338.52	0	1338.52	1664.52	1664.52
38	3.31885	5501.67	29.9878	Qlgb	100	37	549.92	1055.53	1268.03	0	1268.03	1585.37	1585.37
39	3.31885	5217.72	30.5374	Qlgb	100	37	520.231	998.547	1192.41	0	1192.41	1499.31	1499.31
40	3.31885	4913.48	31.0901	Qlgb	100	37	489.121	938.833	1113.17	0	1113.17	1408.11	1408.11
41	3.31885	4638.43	31.6461	Qlgb	100	37	461.029	884.912	1041.61	0	1041.61	1325.75	1325.75
42	3.31885	4400.42	32.2054	Qlgb	100	37	436.586	837.997	979.356	0	979.356	1254.35	1254.35
43	3.31885	4069.51	32.7681	Qlgb	100	37	404.347	776.115	897.234	0	897.234	1157.5	1157.5
44	3.31885	3668.67	33.3345	Qlgb	100	37	366.5	703.472	800.834	0	800.834	1041.9	1041.9
45	3.31885	3245.61	33.9045	Qlgb	100	37	327.302	628.234	700.99	0	700.99	920.966	920.966
46	3.45914	2967.45	34.4906	Afu	50	35	251.177	482.116	617.126	0	617.126	789.694	789.694
47	3.45914	2840.26	35.0931	Afu	50	35	239.517	459.737	585.167	0	585.167	753.459	753.459
48	3.45914	2492.08	35.7001	Afu	50	35	211.384	405.737	508.046	0	508.046	659.941	659.941
49	3.45914	1644.55	36.3117	Afu	50	35	146.438	281.078	330.013	0	330.013	437.629	437.629
50	3.45914	570.372	36.9281	Afu	50	35	66.7216	128.067	111.492	0	111.492	161.639	161.639

B-B - B-B' Seismic

Global Minimum Query (spencer) - Safety Factor: 1.02398

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	3.38338	483.492	10.7288	Qlgb	100	37	235.259	240.9	186.981	0	186.981	231.556	231.556
2	3.38338	1563.94	11.216	Qlgb	100	37	465.621	476.787	500.012	0	500.012	592.343	592.343
3	3.38338	2264.94	11.7041	Qlgb	100	37	609.221	623.83	695.146	0	695.146	821.355	821.355
4	3.38338	2742.18	12.193	Qlgb	100	37	702.058	718.893	821.297	0	821.297	972.998	972.998
5	3.38338	3197.66	12.6829	Qlgb	100	37	787.904	806.798	937.954	0	937.954	1115.27	1115.27
6	3.38338	3524.65	13.1736	Qlgb	100	37	845.176	865.443	1015.78	0	1015.78	1213.6	1213.6
7	3.38338	3797.65	13.6654	Qlgb	100	37	889.985	911.327	1076.67	0	1076.67	1293.05	1293.05
8	3.38338	4055.86	14.1582	Qlgb	100	37	930.597	952.913	1131.85	0	1131.85	1366.61	1366.61
9	3.38338	4299.19	14.652	Qlgb	100	37	967.137	990.329	1181.51	0	1181.51	1434.36	1434.36
10	3.38338	4527.52	15.147	Qlgb	100	37	999.723	1023.7	1225.78	0	1225.78	1496.41	1496.41
11	3.38338	4740.77	15.6431	Qlgb	100	37	1028.47	1053.13	1264.85	0	1264.85	1552.84	1552.84
12	3.38338	4938.82	16.1405	Qlgb	100	37	1053.49	1078.75	1298.85	0	1298.85	1603.73	1603.73
13	3.38338	5121.56	16.6391	Qlgb	100	37	1074.88	1100.66	1327.92	0	1327.92	1649.15	1649.15
14	3.38338	5296.79	17.139	Qlgb	100	37	1094.22	1120.46	1354.19	0	1354.19	1691.64	1691.64
15	3.38338	5713.53	17.6402	Qlgb	100	37	1156.92	1184.66	1439.39	0	1439.39	1807.28	1807.28
16	3.38338	6237.13	18.1428	Qlgb	100	37	1237.1	1266.77	1548.36	0	1548.36	1953.73	1953.73
17	3.38338	6526.39	18.6469	Qlgb	100	37	1273.52	1304.06	1597.83	0	1597.83	2027.58	2027.58
18	3.38338	6640.74	19.1525	Qlgb	100	37	1278.18	1308.83	1604.17	0	1604.17	2048.09	2048.09
19	3.38338	6757.18	19.6597	Qlgb	100	37	1282.91	1313.67	1610.59	0	1610.59	2068.92	2068.92
20	3.38338	6866.47	20.1684	Qlgb	100	37	1286.11	1316.95	1614.95	0	1614.95	2087.34	2087.34
21	3.38338	6959.35	20.6788	Qlgb	100	37	1286.28	1317.13	1615.19	0	1615.19	2100.7	2100.7
22	3.38338	7035.65	21.191	Qlgb	100	37	1283.51	1314.29	1611.41	0	1611.41	2109.02	2109.02
23	3.38338	7095.21	21.7049	Qlgb	100	37	1277.86	1308.5	1603.73	0	1603.73	2112.38	2112.38
24	3.38338	7137.85	22.2207	Qlgb	100	37	1269.4	1299.84	1592.24	0	1592.24	2110.81	2110.81
25	3.38338	7163.39	22.7383	Qlgb	100	37	1258.21	1288.38	1577.04	0	1577.04	2104.35	2104.35
26	3.38338	7171.62	23.258	Qlgb	100	37	1244.36	1274.2	1558.22	0	1558.22	2093.05	2093.05
27	3.38338	7162.35	23.7796	Qlgb	100	37	1227.92	1257.37	1535.88	0	1535.88	2076.94	2076.94
28	3.38338	7154.46	24.3034	Qlgb	100	37	1211.91	1240.97	1514.11	0	1514.11	2061.4	2061.4
29	3.38338	7147.04	24.8294	Qlgb	100	37	1196.16	1224.84	1492.71	0	1492.71	2046.16	2046.16
30	3.38338	7121.46	25.3575	Qlgb	100	37	1177.86	1206.11	1467.86	0	1467.86	2026.08	2026.08
31	3.38338	7077.49	25.888	Qlgb	100	37	1157.08	1184.83	1439.62	0	1439.62	2001.17	2001.17
32	3.38338	7014.88	26.4209	Qlgb	100	37	1133.89	1161.08	1408.1	0	1408.1	1971.48	1971.48
33	3.38338	6933.38	26.9563	Qlgb	100	37	1108.32	1134.9	1373.36	0	1373.36	1937.02	1937.02
34	3.38338	6832.71	27.4943	Qlgb	100	37	1080.46	1106.37	1335.49	0	1335.49	1897.81	1897.81
35	3.38338	6712.59	28.0348	Qlgb	100	37	1050.34	1075.53	1294.56	0	1294.56	1853.86	1853.86
36	3.38338	6569.24	28.5781	Qlgb	100	37	1017.53	1041.93	1249.99	0	1249.99	1804.26	1804.26
37	3.38338	6347.71	29.1242	Qlgb	100	37	974.581	997.951	1191.62	0	1191.62	1734.61	1734.61
38	3.38338	6085.18	29.6733	Qlgb	100	37	926.948	949.176	1126.89	0	1126.89	1655.04	1655.04
39	3.38338	5801.96	30.2253	Qlgb	100	37	877.559	898.603	1059.78	0	1059.78	1571.05	1571.05
40	3.38338	5526.97	30.7805	Qlgb	100	37	830.343	850.255	995.623	0	995.623	1490.22	1490.22
41	3.38338	5309.79	31.3389	Qlgb	100	37	791.73	810.716	943.153	0	943.153	1425.27	1425.27
42	3.38338	5024.16	31.9006	Qlgb	100	37	745.099	762.966	879.785	0	879.785	1343.58	1343.58
43	3.38338	4642.88	32.4658	Qlgb	100	37	687.316	703.798	801.267	0	801.267	1238.56	1238.56
44	3.38338	4238.43	33.0346	Qlgb	100	37	627.969	643.028	720.624	0	720.624	1128.97	1128.97
45	3.38338	3833.86	33.607	Qlgb	100	37	570.018	583.687	641.873	0	641.873	1020.69	1020.69
46	3.53436	3877.84	34.1962	Afu	50	35	470.397	481.677	616.499	0	616.499	936.135	936.135
47	3.53436	3611.58	34.8025	Afu	50	35	435.674	446.121	565.72	0	565.72	868.55	868.55
48	3.53436	2817.27	35.4134	Afu	50	35	345.643	353.932	434.06	0	434.06	679.817	679.817
49	3.53436	1751.84	36.0288	Afu	50	35	229.534	235.038	264.262	0	264.262	431.205	431.205
50	3.53436	588.81	36.6492	Afu	50	35	90.5318	92.7028	60.986	0	60.986	128.341	128.341

Interslice Data

A-A' - A-A' Static

Global Minimum Query (spencer) - Safety Factor: 1.98137

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	182.516	4663.28	0	0	0
2	183.776	4663.29	90.2183	37.8794	22.7758
3	185.037	4663.32	212.09	89.0489	22.7758
4	186.297	4663.36	372.469	156.386	22.7757
5	187.558	4663.43	565.638	237.491	22.7758
6	188.818	4663.52	785.786	329.923	22.7758
7	190.079	4663.62	1027.49	431.406	22.7758
8	191.339	4663.75	1285.7	539.818	22.7757
9	192.6	4663.9	1555.65	653.163	22.7758
10	193.86	4664.06	1832.87	769.557	22.7758
11	195.121	4664.25	2113.3	887.299	22.7758
12	196.381	4664.46	2393.19	1004.81	22.7757
13	197.641	4664.69	2669.04	1120.64	22.7759
14	198.902	4664.93	2937.67	1233.42	22.7758
15	200.162	4665.2	3196.11	1341.93	22.7758
16	201.423	4665.5	3441.64	1445.02	22.7758
17	202.683	4665.81	3671.8	1541.66	22.7758
18	203.944	4666.14	3884.34	1630.9	22.7759
19	205.204	4666.5	4077.24	1711.89	22.7758
20	206.465	4666.88	4248.69	1783.87	22.7758
21	207.725	4667.28	4397.09	1846.18	22.7758
22	208.986	4667.7	4521.06	1898.23	22.7758
23	210.246	4668.15	4619.41	1939.52	22.7757
24	211.507	4668.62	4691.17	1969.65	22.7757
25	212.767	4669.12	4735.55	1988.29	22.7758
26	214.028	4669.64	4751.99	1995.19	22.7758
27	215.288	4670.19	4740.11	1990.2	22.7758
28	216.548	4670.76	4699.76	1973.26	22.7758
29	217.809	4671.36	4630.98	1944.38	22.7758
30	219.069	4671.98	4534.03	1903.68	22.7758
31	220.33	4672.64	4409.4	1851.35	22.7758
32	221.59	4673.32	4257.8	1787.7	22.7758
33	222.851	4674.03	4080.18	1713.12	22.7758
34	224.111	4674.77	3877.74	1628.12	22.7757
35	225.372	4675.54	3651.94	1533.32	22.7758
36	226.632	4676.35	3404.8	1429.55	22.7757
37	227.893	4677.19	3139.18	1318.03	22.7758
38	229.153	4678.06	2857.66	1199.83	22.7758
39	230.414	4678.97	2563.1	1076.15	22.7757
40	231.674	4679.92	2258.76	948.372	22.7758
41	232.935	4680.91	1948.31	818.023	22.7757
42	234.195	4681.94	1635.84	686.831	22.7758
43	235.455	4683.01	1325.99	556.735	22.7758
44	236.716	4684.13	1023.92	429.909	22.7759
45	237.976	4685.3	737.302	309.566	22.7757
46	239.237	4686.52	480.245	201.637	22.7757
47	240.497	4687.79	261.846	109.94	22.7758
48	241.758	4689.12	91.5181	38.4251	22.7758
49	243.018	4690.52	-20.159	-8.46405	22.7758
50	244.279	4691.98	-61.219	-25.7036	22.7757
51	245.539	4693.52	0	0	0

A-A' - A-A' Seismic

Global Minimum Query (spencer) - Safety Factor: 1.10056

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	175.77	4661.18	0	0	0
2	177.609	4661.34	268.81	185.457	34.6025
3	179.449	4661.53	572.08	394.689	34.6025
4	181.288	4661.74	902.177	622.429	34.6025
5	183.128	4661.97	1252.21	863.92	34.6024
6	184.967	4662.22	1619.45	1117.29	34.6025
7	186.807	4662.5	2018.05	1392.29	34.6025
8	188.646	4662.8	2442.23	1684.94	34.6025
9	190.486	4663.12	2883.13	1989.12	34.6024
10	192.325	4663.46	3332.62	2299.23	34.6024
11	194.165	4663.83	3783.1	2610.03	34.6025
12	196.004	4664.21	4227.81	2916.84	34.6025
13	197.844	4664.63	4660.65	3215.47	34.6025
14	199.683	4665.06	5076.1	3502.1	34.6025
15	201.523	4665.52	5469.22	3773.31	34.6025
16	203.362	4666	5835.54	4026.05	34.6025
17	205.202	4666.51	6171.14	4257.59	34.6026
18	207.041	4667.04	6472.55	4465.53	34.6025
19	208.881	4667.6	6736.74	4647.81	34.6026
20	210.72	4668.18	6961.14	4802.62	34.6025
21	212.56	4668.79	7143.57	4928.48	34.6025
22	214.399	4669.42	7282.26	5024.17	34.6025
23	216.239	4670.07	7375.81	5088.71	34.6025
24	218.078	4670.76	7423.21	5121.41	34.6025
25	219.918	4671.47	7423.78	5121.8	34.6025
26	221.757	4672.2	7377.2	5089.67	34.6025
27	223.597	4672.97	7283.5	5025.03	34.6026
28	225.436	4673.76	7143.02	4928.1	34.6025
29	227.276	4674.58	6956.96	4799.73	34.6025
30	229.115	4675.43	6727.41	4641.36	34.6025
31	230.955	4676.31	6456	4454.12	34.6025
32	232.794	4677.21	6144.65	4239.31	34.6025
33	234.634	4678.15	5795.57	3998.47	34.6025
34	236.473	4679.12	5411.25	3733.32	34.6025
35	238.313	4680.12	4996.74	3447.34	34.6025
36	240.152	4681.15	4564.82	3149.35	34.6025
37	241.992	4682.22	4121.26	2843.33	34.6025
38	243.831	4683.32	3671.19	2532.82	34.6025
39	245.671	4684.45	3220.03	2221.56	34.6025
40	247.51	4685.62	2773.49	1913.48	34.6025
41	249.35	4686.83	2337.61	1612.76	34.6025
42	251.189	4688.08	1918.73	1323.76	34.6024
43	253.029	4689.36	1523.53	1051.11	34.6025
44	254.868	4690.68	1159.08	799.674	34.6026
45	256.708	4692.05	832.811	574.572	34.6025
46	258.547	4693.45	552.643	381.279	34.6025
47	260.387	4694.9	331.106	228.436	34.6025
48	262.226	4696.4	179.57	123.889	34.6026
49	264.066	4697.94	107.698	74.3027	34.6025
50	265.905	4699.53	125.699	86.7219	34.6025
51	267.745	4701.18	0	0	0

B-B - B-B' Static

Global Minimum Query (spencer) - Safety Factor: 1.91943

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	405.623	4723.05	0	0	0
2	408.942	4723.7	269.307	107.128	21.6922
3	412.261	4724.39	724.331	288.134	21.6923
4	415.58	4725.1	1283.25	510.466	21.6922
5	418.899	4725.84	1894.22	753.506	21.6923
6	422.218	4726.61	2545.94	1012.76	21.6924
7	425.537	4727.41	3213.21	1278.19	21.6923
8	428.855	4728.24	3881.71	1544.11	21.6922
9	432.174	4729.11	4545.08	1808	21.6923
10	435.493	4730	5197.4	2067.49	21.6923
11	438.812	4730.92	5833.17	2320.39	21.6923
12	442.131	4731.87	6447.33	2564.7	21.6923
13	445.45	4732.86	7035.24	2798.57	21.6923
14	448.769	4733.88	7592.67	3020.31	21.6923
15	452.087	4734.92	8115.82	3228.41	21.6923
16	455.406	4736	8611.29	3425.51	21.6923
17	458.725	4737.11	9084.03	3613.56	21.6923
18	462.044	4738.26	9520.01	3786.99	21.6923
19	465.363	4739.43	9904	3939.74	21.6923
20	468.682	4740.64	10234	4070.99	21.6922
21	472.001	4741.89	10508.5	4180.21	21.6923
22	475.319	4743.16	10726.1	4266.78	21.6924
23	478.638	4744.47	10885.7	4330.27	21.6924
24	481.957	4745.82	10986.6	4370.4	21.6923
25	485.276	4747.2	11028.5	4387.06	21.6923
26	488.595	4748.61	11011.5	4380.31	21.6924
27	491.914	4750.06	10936.3	4350.39	21.6923
28	495.233	4751.55	10803.8	4297.69	21.6924
29	498.551	4753.07	10615.3	4222.7	21.6924
30	501.87	4754.63	10370.9	4125.46	21.6923
31	505.189	4756.23	10071.9	4006.54	21.6924
32	508.508	4757.86	9720.68	3866.82	21.6923
33	511.827	4759.53	9319.75	3707.33	21.6923
34	515.146	4761.25	8872.26	3529.32	21.6923
35	518.464	4763	8381.81	3334.23	21.6923
36	521.783	4764.79	7852.5	3123.67	21.6923
37	525.102	4766.62	7288.94	2899.49	21.6923
38	528.421	4768.49	6698.13	2664.47	21.6923
39	531.74	4770.41	6094.32	2424.28	21.6923
40	535.059	4772.37	5485.94	2182.27	21.6923
41	538.378	4774.37	4881.16	1941.69	21.6923
42	541.696	4776.41	4280.35	1702.69	21.6923
43	545.015	4778.5	3681.75	1464.57	21.6923
44	548.334	4780.64	3106.72	1235.83	21.6923
45	551.653	4782.82	2574.66	1024.18	21.6923
46	554.972	4785.05	2097.1	834.213	21.6923
47	558.431	4787.43	1499.14	596.346	21.6923
48	561.89	4789.86	905.245	360.1	21.6923
49	565.349	4792.35	373.478	148.567	21.6923
50	568.808	4794.89	41.0037	16.311	21.6923
51	572.268	4797.49	0	0	0

B-B - B-B' Seismic

Global Minimum Query (spencer) - Safety Factor: 1.02398

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	405.619	4723.05	0	0	0
2	409.003	4723.69	534.789	317.111	30.6664
3	412.386	4724.36	1315.94	780.307	30.6665
4	415.77	4725.06	2225.18	1319.45	30.6664
5	419.153	4725.79	3195.05	1894.55	30.6664
6	422.536	4726.55	4207.76	2495.05	30.6664
7	425.92	4727.34	5227.85	3099.93	30.6664
8	429.303	4728.17	6237.99	3698.91	30.6665
9	432.687	4729.02	7229.25	4286.69	30.6664
10	436.07	4729.9	8193.44	4858.42	30.6664
11	439.453	4730.82	9123.17	5409.72	30.6665
12	442.837	4731.77	10011.8	5936.63	30.6664
13	446.22	4732.75	10853.3	6435.63	30.6665
14	449.603	4733.76	11642.5	6903.58	30.6664
15	452.987	4734.8	12375.3	7338.09	30.6664
16	456.37	4735.88	13061.9	7745.25	30.6665
17	459.754	4736.99	13697.9	8122.36	30.6664
18	463.137	4738.13	14264.2	8458.18	30.6665
19	466.52	4739.3	14751.9	8747.35	30.6664
20	469.904	4740.51	15159.5	8989.03	30.6664
21	473.287	4741.75	15485.5	9182.36	30.6665
22	476.67	4743.03	15729	9326.76	30.6665
23	480.054	4744.34	15889.6	9421.96	30.6664
24	483.437	4745.69	15967.3	9468.04	30.6664
25	486.821	4747.07	15962.8	9465.41	30.6665
26	490.204	4748.49	15877.5	9414.81	30.6665
27	493.587	4749.94	15713.1	9317.3	30.6664
28	496.971	4751.44	15471.9	9174.27	30.6664
29	500.354	4752.96	15155	8986.38	30.6664
30	503.737	4754.53	14763.6	8754.3	30.6665
31	507.121	4756.13	14300.8	8479.9	30.6665
32	510.504	4757.77	13770.5	8165.4	30.6664
33	513.888	4759.46	13176.7	7813.31	30.6664
34	517.271	4761.18	12524.3	7426.48	30.6665
35	520.654	4762.94	11818.7	7008.08	30.6665
36	524.038	4764.74	11065.7	6561.6	30.6666
37	527.421	4766.58	10272.5	6091.22	30.6664
38	530.804	4768.47	9456.48	5607.36	30.6664
39	534.188	4770.39	8630.37	5117.51	30.6665
40	537.571	4772.37	7803.8	4627.38	30.6665
41	540.955	4774.38	6980.84	4139.39	30.6664
42	544.338	4776.44	6154.45	3649.37	30.6664
43	547.721	4778.55	5344.59	3169.16	30.6665
44	551.105	4780.7	4579.42	2715.44	30.6665
45	554.488	4782.9	3871.82	2295.85	30.6664
46	557.871	4785.15	3229.34	1914.89	30.6665
47	561.406	4787.55	2270.09	1346.09	30.6666
48	564.94	4790.01	1357.26	804.808	30.6665
49	568.475	4792.52	659.031	390.782	30.6664
50	572.009	4795.09	275.528	163.379	30.6665
51	575.543	4797.72	0	0	0

Discharge Sections

Entity Information

A-A'

Shared Entities

Type	Coordinates (x,y)
External Boundary	0, 4620 193.845, 4620 289.733, 4620 597.103, 4620 597.103, 4798.48 597.103, 4810.55 584.135, 4811.09 577.656, 4811.38 569.498, 4811.46 558.098, 4810.98 551.596, 4808.4 548.349, 4807.56 543.842, 4807.06 538.773, 4806.89 536.509, 4806.37 533.176, 4805.3 526.303, 4801.86 522.952, 4800.44 517.257, 4798.28 513.399, 4796.94 509.284, 4796.69 496.582, 4796.59 494.681, 4796.17 491.493, 4794.48 486.798, 4792.57 481.491, 4790.64 477.864, 4789.7 473.422, 4788.77 467.058, 4787.59 461.816, 4786.18 457.577, 4784.78 452.617, 4783.82 446.563, 4781.9 442.272, 4780.62 439.154, 4780.14 437.763, 4779.61 436.076, 4778.3 435.018, 4777.26 432.087, 4775.73 427.941, 4774.21 425.757, 4773.09 423.281, 4770.56 420.162, 4766.53 413.043, 4757.99

	410.022, 4754.98 389.455, 4746.68 362.053, 4735.43 354.054, 4732 351.462, 4730.45 348.152, 4728.15 345.203, 4727.02 337.736, 4726.46 335.432, 4725.92 332.151, 4723.49 328.923, 4721.05 315.62, 4715.71 299.751, 4710.97 276.987, 4704.15 258.234, 4698.12 237.192, 4690.5 225.706, 4684.94 191.669, 4667.65 184.071, 4663.77 175.397, 4661.06 170.946, 4660.49 166.799, 4660.61 161.11, 4661.4 137.238, 4660.87 106.402, 4660.38 102.962, 4660.18 98.2391, 4652.26 81.3789, 4650.19 68.4956, 4650.92 29.7579, 4651.17 13.3823, 4651.38 6.18276, 4650.58 0, 4648.65
Material Boundary	193.845, 4620 209.154, 4627.47 236.124, 4641.08 245.564, 4645.9 257.36, 4653.39 293.763, 4677.05 353.844, 4715.49 379.385, 4730.94 401.487, 4743.94 410.022, 4754.98
Material Boundary	289.733, 4620 313.824, 4646.47 375.116, 4714.81 396.665, 4738.45 401.487, 4743.94
Material Boundary	473.422, 4788.77 514.816, 4789.98 535.822, 4791.53 551.596, 4808.4

Material Boundary	442.272, 4780.62 463.01, 4780.16 479.248, 4780.78 508.495, 4784 559.594, 4790.79 574.351, 4793.02 597.103, 4798.48

B-B

Shared Entities

Type	Coordinates (x,y)

External Boundary	0, 4620 225.072, 4620 381.283, 4620 649.975, 4620 649.975, 4799.99 649.975, 4811.06 632.601, 4811.8 619.118, 4811.95 614.615, 4811.89 613.602, 4811.88 611.186, 4810.8 608.893, 4809.29 604.318, 4807.42 595.816, 4805.44 593.119, 4804.58 587.079, 4801.79 583.164, 4799.6 576.758, 4797.81 568.198, 4797.2 563.973, 4796.51 560.758, 4794.94 556.757, 4792.28 544.664, 4787.45 538.518, 4784.52 526.434, 4779.66 496.94, 4766.31 465.875, 4752.97 459.473, 4750.33 452.304, 4745.7 421.521, 4733.18 411.727, 4728.24 408.198, 4725.05 405.606, 4723.04 400.087, 4722.17 388.957, 4721.12 379.48, 4717.76 375.641, 4716.76 369.119, 4715.86 358.884, 4715.43 334.525, 4707.25 326.907, 4704.04 320.727, 4700.82 292.62, 4693.48 256.656, 4682.59 223.155, 4672.18 185.543, 4659.49 173.04, 4654.31 162.84, 4651.26 153.471, 4651.63 145.78, 4652 112.187, 4650.63 87.0038, 4649.88 82.9648, 4645.75 52.3519, 4645.25 14.2207, 4644.13 0, 4643.66

Material Boundary	225.072, 4620 256.835, 4636.2 294.671, 4652.24 336.755, 4670.24 357.549, 4680.81 384.119, 4695.82 400.399, 4704.02 423.323, 4713.97 455.648, 4728.15 515.998, 4753.06 537.798, 4761.16 543.079, 4763.12 559.193, 4768.64 572.802, 4775.66 588.712, 4781.21 607.529, 4785.19 621.883, 4788.85 633.401, 4792.82 643.455, 4796.95 649.975, 4799.99
Material Boundary	381.283, 4620 458.996, 4693 515.298, 4746.2 519.824, 4749.7 529.029, 4754.76 543.079, 4763.12
Material Boundary	538.518, 4784.52 609.09, 4786.82 614.615, 4811.89

Jensen/5560 Wasatch Blvd.
04590-001
3/11/2024

c'	25	psf	Effective Cohesion
ϕ'	35	deg	Effective Friction Angle
Y_{sat}	142	pcf	Saturated Unit Weight of Soil
Y_w	62.4	pcf	Unit weight of water
h	4	ft	Depth to shear surface
β	24.0	deg	Slope Gradient (2.25H:1V)

FS 1.00

Input Variable
Calculated Value

This model assumes c>0 and the face of the slope is saturated to depth h

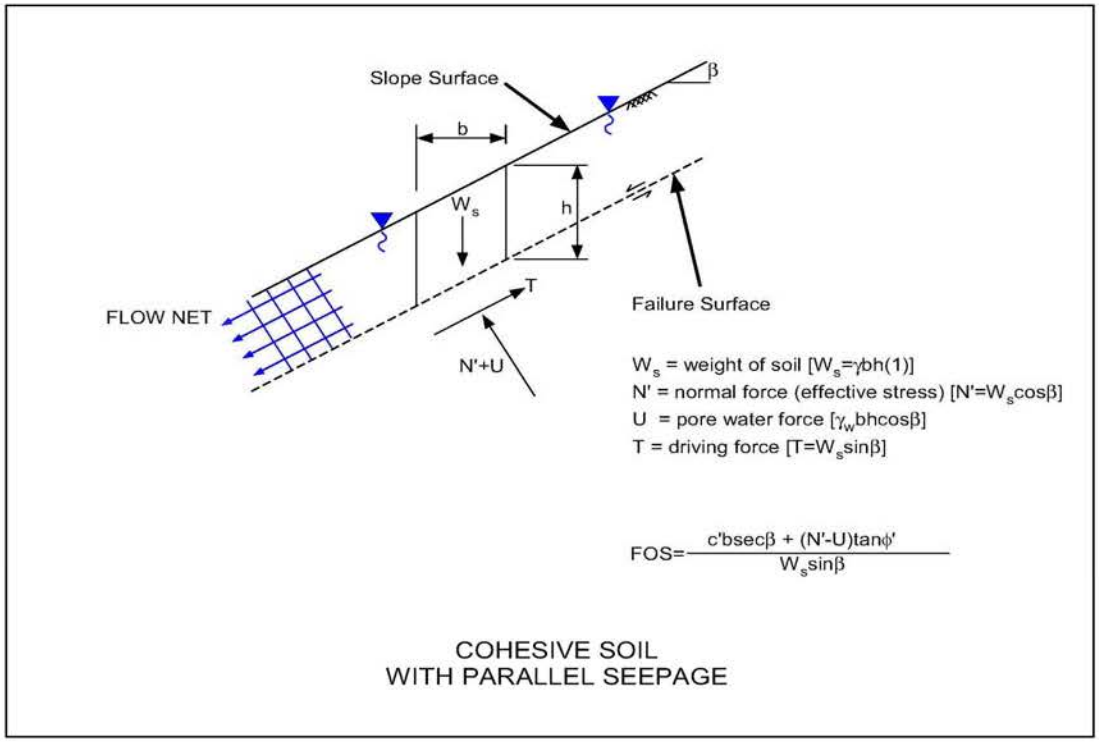
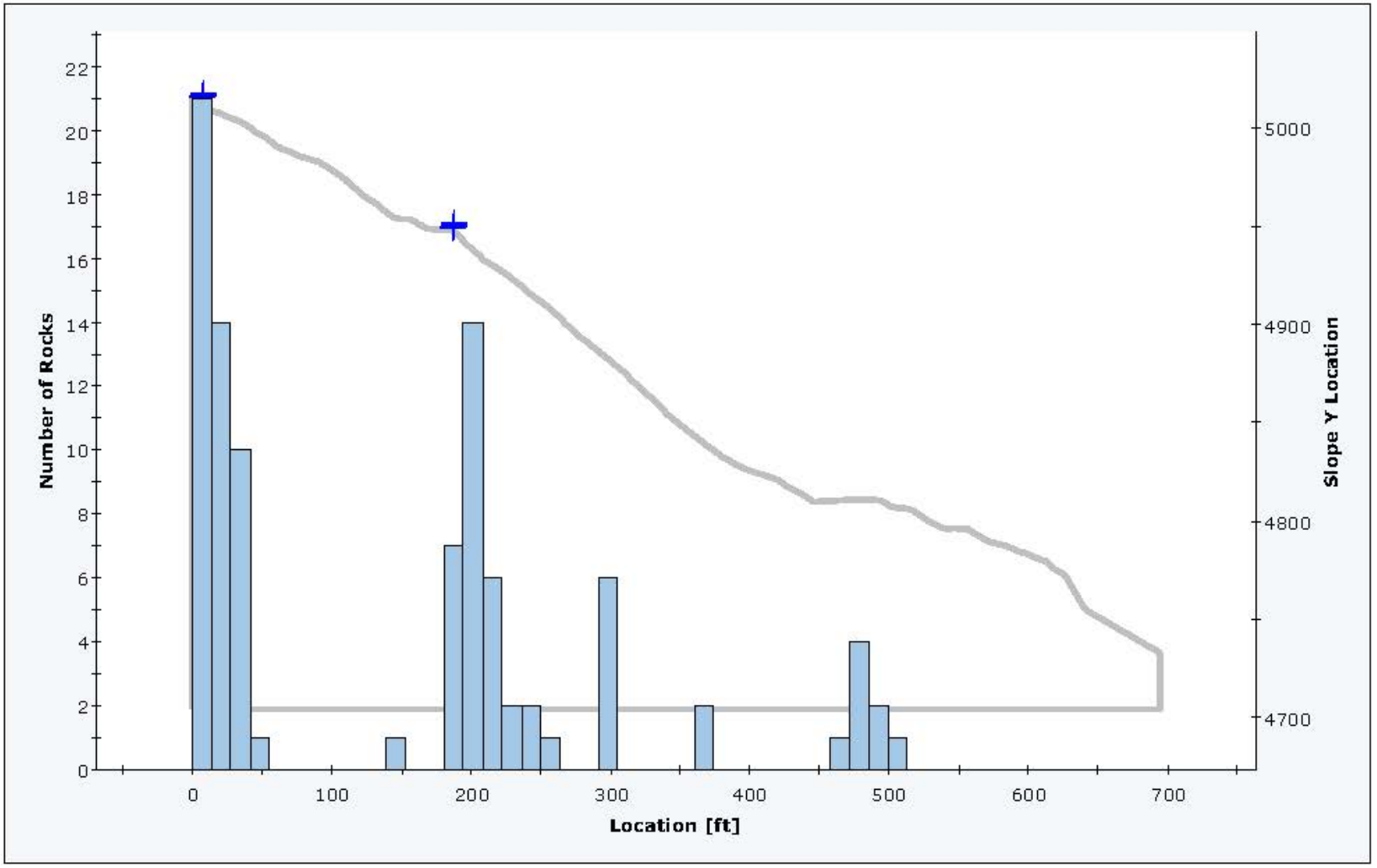


Figure D-2

APPENDIX E

Distribution of Rock Path End Locations



Total number of rock paths: 95

rocscience	*Project* Jensen-5560 Wasatch Blvd, Holladay, Utah		
	Analysis Description		
	Drawn By GP/PED	*Company* IGES	
ROCFALL 8.024	*Date* 3/4/2024, 3:39:46 PM	*File Name* A-A'.fal8	

Planning Commission
Community Development
Department City of Holladay
801.527.3890

CITY of HOLLADAY

DATE: 3/19/2024 COMMISSION MEETING MINUTES

ADDRESS:

n/a

LEGAL DESCRIPTION: *n/a*

APPLICANT/REPRESENTATIVE:

City of Holladay Planning Commission

PROPERTY OWNER:

n/a

ZONING:

n/a

GENERAL PLAN DISTRICT:

n/a

CITY COUNCIL DISTRICT:

N/A

PUBLIC NOTICE DETAILS:

n/a

REQUEST:

Adoption of Meeting Minutes

APPLICABLE REGULATIONS:

UCA§52-4-203, 206
2.01.080
13.06.030

EXHIBITS:

STAFF:

Carrie Marsh, City Planner

DECISION TYPE:

Administrative/Procedural:

Commission shall approve, approve with changes or continue to a later date the agenda item

SITE VICINITY MAP

Effective 5/8/2018
52-4-203 Written minutes of open meetings -- Public records -- Recording of meetings.
(1) Except as provided under Subsection (7), written minutes and a recording shall be kept of all open meetings.
(2)
(a) Written minutes of an open meeting shall include:
(i) the date, time, and place of the meeting;
(ii) the names of members present and absent;
(iii) the substance of all matters proposed, discussed, or decided by the public body which may include a summary of comments made by members of the public body;
(iv) a record, by individual member, of each vote taken by the public body;
(v) the name of each person who:
(A) is not a member of the public body; and
(B) after being recognized by the presiding member of the public body, provided testimony or comments to the public body;
(vi) the substance, in brief, of the testimony or comments provided by the public under Subsection (2)(a)(v); and
(vii) any other information that is a record of the proceedings of the meeting that any member requests be entered in the minutes or recording.
(b) A public body may satisfy the requirement under Subsection (2)(a)(iii) or (vi) that minutes include the substance of matters proposed, discussed, or decided or the substance of testimony or comments by maintaining a publicly available online version of the minutes that provides a link to the meeting recording at the place in the recording where the matter is proposed, discussed, or decided or the testimony or comments provided.

Notes:

DRAFT

MINUTES OF THE CITY OF HOLLADAY
PLANNING COMMISSION MEETING

Tuesday, March 19, 2024
5:30 p.m.
City Council Chambers
4580 South 2300 East
Holladay, Utah

ATTENDANCE:

Planning Commission Members:	**City Staff:**
Dennis Roach, Chair	Carrie Marsh, City Planner
Paul Cunningham	Jonathan Teerlink, Community Development Director
Ginger Vilchinsky	Brad Christopherson, City Attorney
Jill Fonte	
Brian Berndt	

WORK SESSION

Chair Dennis Roach called the Work Session to order at approximately 5:30 p.m.

The agenda items were reviewed and discussed. Community Development Director, Jonathan Teerlink, shared information about the proposed Text Amendment to Chapter 13.62 and explained that City Staff has provided background information about heights across all zones. Based on some elements in the General Plan, specifically Chapter 4, it is possible for the Planning Commission to discuss the merits of the request and the specifics of the General Plan. From there, the Planning Commission can make a recommendation to the City Council. However, City Staff recommends that the Commission keep the public hearing open and continue it to the next meeting.

Mr. Teerlink explained that some residents expressed concerns with how Text Amendments are noticed in the City. He clarified that this is done according to State law, but some wanted specific neighborhoods to be noticed. Mr. Teerlink reiterated the request to open the public hearing, keep the hearing open, and continue the item to the next Planning Commission Meeting.

Chair Roach wanted to know if City Staff has a recommendation on the application. Mr. Teerlink confirmed this. Since it is a specific height amendment, there is recommendation for approval. Commissioner Paul Cunningham noted that there has not been a change since Holladay became a City. He wanted to know if someone previously asked for a change that was declined. Mr. Teerlink reported that the height has not been addressed by the Council and an applicant has not previously approached the City. Commissioner Cunningham referenced the graph in the Meeting Materials Packet that shows the different heights in Holladay. He asked if there was an advantage to looking at all zone heights at the same time so there would be a solid rationale for

the amendment. Mr. Teerlink stated that the Planning Commission can make that recommendation.

Discussions were had about the typical height of a commercial story. Mr. Teerlink reported that it is normally 13.5 feet. He mentioned the previous amendment to the height in the Holladay Village Zone. Some applicants were requesting additional height, because in the Holladay Village Zone, there is a requirement to have the first level be retail. The retail height takes up a lot of the space. The idea was to grant the extra height if there is retail as the main floor component.

City Planner, Carrie Marsh, shared information about the Action Items on the Regular Meeting agenda. The first related to the Walker Meadows Circle Subdivision. The item is an extension of the Final Plat approval. The request is to extend it by one year. The second Action Item is for Base 45 Subdivision, and it is also a request for an extension of the Final Plat approval by one year.

Following the Public Hearing Items and Action Items, there will be a discussion on the pending Historic Preservation Ordinance. Mr. Teerlink explained that the Historic Preservation section is missing some language that enables a property owner to put it on a City list. Property owners can go to the State and receive State Historic Designation for their properties, but the process to get a home on the Holladay list needs to be updated. The reason there may be a desire to put a property on the Holladay list is because for historic properties, there are a number of additional uses that are afforded to the property owner to sustain the property economically or create more interest in the property. City Staff has provided some information about historic preservation in the City. At the next Planning Commission Meeting, there will be a draft amendment presented for review.

Chair Roach noted that a list of existing properties was included in the Meeting Materials Packet. He asked if this change will allow a larger scope of properties to be added to the Holladay list. This was confirmed. Mr. Teerlink explained that the idea is to allow only the property owner to add a property to the list. Previously, any outside entity could add a historic property to the Holladay list. Chair Roach asked if this will result in additional restrictions to future property owners who assume ownership after it has been placed on the list. Mr. Teerlink confirmed this.

Discussions were had about developers who may want to tear down a historic site. Mr. Teerlink explained that there was some direction received about a potential Period of Stay so the Historic Preservation Commission can document the property appropriately. However, he clarified that this would not prevent a property owner from taking down a historic home if that was desired.

Chair Roach noted that a request was made to amend the order of the Regular Meeting agenda. It was suggested that the agenda start with the Action Items. This was supported by the Commission.

CONVENE REGULAR MEETING – Public Welcome and Opening Statement by Commission Chair.

Chair Roach called the Regular Meeting to order at approximately 6:02 p.m. The order of the Regular Meeting agenda will be changed slightly to allow the Action Items to be considered first. Commissioner Cunningham read the Commission Statement for the benefit of those present.

PUBLIC HEARING

1. Conditional Use Permit - Accessory Building Footprint Size - 3931 South 2175 East (R-1-10). Review and Consideration of a Request by Applicant, Colyn MacDonald, for a Conditional Permit Allowing Construction of a Detached Accessory Building with a Footprint Size Larger than Normally Permitted. Item Reviewed as an Administrative Application as Per Provisions stated in Holladay Ordinance §13.14.030 & 13.08.040 13.14.030 & 13.08.040. *File #24-2-02.*

Ms. Marsh presented the Staff Report and explained that the application is for a Conditional Use Permit. The applicant is Colyn MacDonald, and the property is located at 3931 South 2175 East in the R-1-10 Zone. The applicant is requesting an accessory building that exceeds the permitted footprint size of 900 square feet. The total footprint size is proposed to be 1,577 square feet, which is an additional 677 square feet over the permitted accessory building footprint size. The accessory building is compliant with setbacks and lot coverage standards. The narrative submitted explains that there is a desire to use the accessory structure as a mother-in-law apartment, sports court, and garage. The current accessory dwelling unit ("ADU") code does not allow ADUs on properties that are half an acre or smaller. However, proposed amendments are currently under review and will be heard by the City Council on Thursday. If the applicant were to use their accessory structure for an ADU, requirements need to be met in order to rent it as an ADU. She clarified that the accessory structure can be built for private use with family member occupancy.

The Planning Commission needs to consider the impact on neighboring properties, discuss the specific uses proposed by the applicant, and potentially create Conditions of Approval. Ms. Marsh asked the applicant to address the Commission. Mr. MacDonald explained that his intention is to primarily use this as a structure for his children. The family moved to Holladay approximately seven months ago from Arizona. The idea is to use the structure for recreational sports. He reported that he wants to match the accessory building to the newly remodeled home, so the siding and stone will match. As far as the height, 17 feet is proposed. There are trees surrounding that are 30 to 40 feet, so the building height will not be intrusive. He pointed out that the accessory building will not be visible from the front of the home. This is intended for private use only.

Mr. MacDonald stated that the proposal is to have gravel along the north side of the property to back in some trailers that he owns. However, it will not be a formal driveway. He simply wants there to be 10 feet of gravel on the north side so the trailers will not sink into the mud. Commissioner Jill Fonte did not believe this was proposed to be a dwelling unit. Mr. MacDonald explained that initially, he mentioned a mother-in-law apartment, but right now, he does not intend to use it as an apartment. It was contemplated in case the family needs to take in his mother or mother-in-law. In that case, a section of the building can be converted. It would never be rented out as an ADU or have a separate meter. Chair Roach asked if the applicant would have an issue with the Planning Commission restricting the use to what was submitted. Mr. MacDonald stated that he would not have an objection to that, as he intends to use the building as described.

Chair Roach opened the public hearing.

Brent Hardcastle gave his address as 3920 South and stated that his property is directly west, across the street from the applicant property. He does not have an issue with what is proposed.

Jerry Williams gave his address as 3954 Alberly Way and expressed his support for the application. The MacDonald family is an asset to the neighborhood. Rarely has a family come in and had such a positive impact on the area. Everyone is pleased to have them live in the neighborhood.

Gary Jones gave his address as 3939 South 2175 East. He lives directly south of the MacDonald home. He has lived in the area for more than 40 years and it has been a benefit to have the MacDonald family in the neighborhood. What they are doing on the property is an improvement.

Jeff Lund gave his address as 3916 South Feramorz Drive and explained that he lives to the east of this property. He has a few questions about the application. On the application itself, he saw a reference to 2,000 square feet, but during the presentation, 1,577 square feet was mentioned. Ms. Marsh clarified that the applicant originally applied for a 2,000 square foot footprint, but after reviewing the application, it was found that a 2,000 square foot structure would not be compliant. The code states that structures can only cover 28% of this size of property. Calculating what the current structure covers, that resulted in the remaining 1,577 square foot allowed on the property.

Mr. Lund asked if a public hearing would be needed if the proposal was to attach the accessory building to the home. Ms. Marsh explained that the hearing is because it is a detached structure. Mr. Lund pointed out that the other structures in this neighborhood are about 500 or 600 square feet with one or two car detached buildings. What is proposed is very different than what currently exists. He is not opposed to the application, especially since it will not be used as an ADU, but he feels it is important to acknowledge that what is being considered is very different for the area.

Roger Ding gave his address as 3956 South Feramorz Drive. He had a question about the irrigation ditch on the east side of the applicant property. He wanted to make sure that the construction will not interfere with that irrigation ditch and that there will still be access to service the irrigation ditch as necessary to prevent flooding in the neighborhood. Ms. Marsh explained that for properties with irrigation laterals, the applicants are required to have a waterway protection agreement that is signed by the irrigation management company. She added that all of the irrigation canals and ditches have utility easements for maintenance.

Ashley Smith stated that she owns the property at 3926 South Feramorz Drive. She asked if the structure will be built running east-west or north-south. It was noted that those decisions are made when there are plans submitted for the Building Permit. This application only relates to a Conditional Use Permit for the footprint size. Details for the building are largely non-regulated, but the Commission can institute conditions to mitigate potential impacts from the footprint size.

There were no additional comments. The public hearing was closed.

Mr. MacDonald responded to comments made during the public hearing. He shared information about the irrigation ditch. As for the building, it will most likely be 40x30 or 40x35 and will be in

the northeast corner of the lot. That is where there are large trees located, so the building will not be obtrusive. Chair Roach recommended that if there is a lot of root zone that flows into the building area, there be mitigation to the roots so the large trees will remain around the structure.

Commissioner Brian Berndt referenced the aerial image. He asked if there are other buildings in the back that will be removed. This was confirmed. Mr. MacDonald explained that there are a few old sheds back there that will be removed. Commissioner Berndt asked what will happen if the City Council approves the proposed amendments. The 5 feet on the south side that is shown on the Site Plan might be a problem. Ms. Marsh explained that it can be moved further if there is a desire to increase the side setback, but as proposed, this is compliant with the setbacks. The Commission could draft a Condition of Approval to state that if there is living space on that side of the building, some additional screening must be added. Commissioner Berndt asked for additional details about the Site Plan that was submitted. It was clarified that the only thing the Planning Commission is approving at the current meeting is the size of the accessory building.

Commissioner Berndt moved to APPROVE the application for a detached accessory garage sized at 1,577 square feet, located at 3931 South 2175 East, based on the following findings:

1. ***The desired structure's footprint does not exceed the total allowed structure coverage on the parcel and is within the setbacks required for an accessory building.***

2. ***Staff has not received objections or concerns (written or verbally expressed) to date respecting the CUP request.***

The approval is contingent upon the following conditions:

1. ***The project is subject to height, setback, and lot coverage regulations for their property size.***

2. ***The Owner/Applicant shall obtain a Building Permit for the proposed detached garage addition.***

3. ***The Owner/Applicant shall not establish or use the structure as a commercial amenity.***

4. ***The Owner/Applicant is to be compliant with impervious lot coverage standards when adding a driveway to access the detached structure.***

5. ***The Owner/Applicant is to replace all trees removed by the placement of the accessory building and any other hard/impervious surfaces added.***

Commissioner Fonte seconded the motion. Vote on Motion: Commissioner Berndt-Aye; Commissioner Fonte-Aye; Commissioner Cunningham-Aye; Commissioner Vilchinsky-Aye; Chair Roach-Aye. The motion passed with the unanimous consent of the Commission.

2. <u>Zone Map Amendment - Rezone from RM to PO - 6375 South Highland Drive (R-M). Review and Recommendation to City Council on a Proposal by Applicant Aaron Hauga to Amendment to the Holladay Zone Map at this Location from the Current, Residential Multi-Family Zone (R-M) to the Professional Office Zone (PO) for Approximately 0.57 Acres of Property. Item Reviewed as a Legislative Action, According to Procedures Set Forth in Holladay Ordinance §13.07. *File #24-4-04.*</u>

Ms. Marsh presented the Staff Report and explained the application is for a Zone Map Amendment. The request is to rezone property at 6375 South Highland Drive from the RM Zone to the PO Zone. The property size is approximately 0.57 acres and is comprised of one larger parcel and two smaller triangular pieces. The RM Zone is a rollover from Salt Lake County, which had mixed-uses. It previously allowed both office use and residential use. In 2018, the City created the PO Zone, which expanded the uses slightly to include medical and dental uses but removed residential uses as a permitted use. Priority was given to property owners who were zoned as RM and used their buildings for office space to rezone to the PO Zone. That is the request made by the applicant, since the current use is an office. There is a desire to rezone to PO and redevelop the upstairs level of the property into a residential space. That residential space would come back to the Planning Commission as a Conditional Use Permit in the future. The Highland Drive Master Plan, Segment C, is interpreted as the applicable General Plan District that guides this particular application.

The Planning Commission has a few different options to consider. Given the General Plan recommendation for commercial, the C-2 Zone is the best fit. However, the PO Zone is also appropriate. Chair Roach asked if there is anything in the PO Zone or C-2 Zone that would make a difference to what the applicant is requesting. Ms. Marsh explained that the property owner might be interested in leasing space to someone in the future and that use might not fit within the PO Zone. In that instance, a rezone could be requested for the C-2 Zone to allow for expanded uses. Currently, the property owner has not expressed a desire to expand the uses beyond office.

Commissioner Fonte believed if the Commission approves the zone change to PO, the hands of the applicant will be tied for now. Ms. Marsh explained that they can come back and ask for a rezone to the C-2 Zone in future, they can withdraw their application and submit a new one for C-2, or the Commission can forward a recommendation to the City Council for the PO Zone. The Planning Commission recommendation can be a positive recommendation, negative recommendation, or neutral recommendation. Commissioner Fonte wondered whether the City Council would look more favorably on the application if it were for the C-2 Zone rather than the PO Zone proposed. Ms. Marsh confirmed this since the C-2 Zone would fit with the General Plan.

The applicant, Aaron Hauga, introduced himself to the Commission. He explained that he is the applicant for the rezone, but since the application was submitted, he has sold the building. The new owner will be taking over, so he thought it was best that the new owner share comments.

Mike Ault gave his mailing address as 3340 South 300 West Suite #7 and introduced himself as the new owner of the building. Christopher Ault stated that he is Legal Counsel for the new owner and clarified that the actual owner of the property is 6375 Highland LLC. He is representing 6375 Highland LLC, and its member, Mike Ault. Chair Roach asked about the rationale for the rezone

to PO. Mr. Ault explained that his parents wanted to move into a commercial space and live in the top floor. He has a Site Plan and plans for the remodeled top floor, which would be split into two apartments. One apartment would belong to his parents and the other would be available to rent. The reason the PO Zone was selected instead of the C-2 Zone is because the community would prefer it to be PO. For the purposes of the LLC, the zones are identical, as there is no desire to change the office use. The only thing that is proposed to change is the top floor use.

Chair Roach opened the public hearing.

Tom Lloyd gave his address as 6284 Wrenhaven Road. He is supportive of what has been proposed but is opposed to the idea of a future rezone to the C-2 Zone. His daughter lives behind the applicant property and C-2 allows a lot of additional uses that the PO Zone does not. He suggested that the Master Plan have an exemption for certain parcels to address issues in the area. Mr. Lloyd reiterated his opposition to the C-2 Zone and hoped it would be removed from the Master Plan. He expressed concerns about the traffic implications of a rezone to C-2.

There were no further comments. The public hearing was closed.

Commissioner Fonte asked whether it is possible to designate some properties along that corridor as PO and some as C-2. City Attorney, Brad Christopherson, noted that the General Plan calls for certain areas to be C-2. However, he pointed out that the General Plan can be amended. Circumstances can change and what was previously contemplated may still not be the best choice.

Commissioner Fonte referenced a previous discussion about property on Murray Holladay Road. There was a lot of pushback at that time from nearby residents. She wondered whether the adjacent properties and homeowners are considered when the different Master Plans are created. Mr. Christopherson confirmed that these factors are considered on some level. He informed the Commission that when the City amends the General Plan, homeowners can share comments. Mr. Teerlink noted that the City will look at the General Plan again next year. Residents can share comments about what is proposed in the General Plan at that time if there is a desire to be involved.

Commissioner Fonte noted that what is in front of the Planning Commission is a proposal to rezone the applicant property from the RM Zone to the PO Zone. Commissioner Ginger Vilchinsky appreciated that there was a comment in the Meeting Materials Packet about the public meeting that was held. One of the reasons the PO Zone is being considered has to do with neighbor concerns. She appreciated that the owners considered what the residents were concerned about. She understands that the request is not within the General Plan, but thought it made sense to make a recommendation to approve the PO Zone request and potentially amend the General Plan.

Commissioner Cunningham was in favor of what was proposed, because it satisfied the applicant and the nearby residents. However, he does not want it to appear that a decision has been made about the General Plan, because that is not a decision for the Planning Commission to make. Commissioner Cunningham stated that he is reluctant to forward something that goes against the General Plan, because there is purpose behind the General Plan. That being said, he is supportive

of this particular application. Commissioner Fonte explained that Commissioners can vote on what is before the Planning Commission, which is a Zone Map Amendment, not the General Plan.

Commissioner Berndt agreed with the comments made by other Commissioners. This is a unique proposal, as there will not be a noticeable change as a result of the rezone. He supports the request. Chair Roach asked about the area across the street from the applicant property. Ms. Marsh believed that particular segment is referenced within the Highland Drive Master Plan. She explained that overall, Highland Drive is commercial on both sides, which the General Plan took into account.

Discussions were had about zoning in the area across the street from the applicant property. Mr. Christopherson spoke about the Commercial Neighborhood (C-N) Zone in Murray. The C-N Zone has to be low impact and is supposed to be a transition from a busy street to the residential behind. There are certain height restrictions and lot coverage restrictions. It is intended to ease the transition and act as a buffer. Chair Roach asked whether the C-2 Zone in Holladay is similar to the C-N Zone in Murray. Mr. Christopherson felt the C-2 Zone is fairly close, because of the height restrictions. The height restrictions might be slightly higher in Murray that Holladay.

Chair Roach liked what the applicant was trying to do, because it considered the nearby residents. However, he also wants to look at this from the perspective of the General Plan. If it is approved as the PO Zone, he suspects that in the future, it will be back before the Planning Commission for a Zone Map Amendment to change it to the C-2 Zone. He wonders whether the rezone to PO will simply delay the inevitable. Discussions were had about appropriate language for a motion.

Commissioner Fonte moved to forward a recommendation to the City Council to APPROVE an application by Aaron Hauga to amend the Holladay Zoning Map for 0.57 acres of land, located at 6375 South Highland Drive from RM to PO, based upon the following findings:

1. ***The proposed amendment is harmonious with the overall character of existing development in the vicinity.***

2. ***The proposed amendment may not adversely affect abutting properties.***

3. ***Facilities and services intended to serve the subject property are adequate, including roadways, parks and recreation facilities, police and fire protection, schools, storm water drainage systems, environmental hazard mitigation measures, water supply, and wastewater and refuse collection.***

Commissioner Vilchinsky seconded the motion. Vote on Motion: Commissioner Berndt-Aye; Commissioner Fonte-Aye; Commissioner Cunningham-Aye; Commissioner Vilchinsky-Aye; Chair Roach-Abstain. The motion passed.

3. <u>Text Amendment - Chapter 13.62 Allowed Building Height in the C-2 Zone Review and Recommendation to City Council on a Proposal by Applicant, Bret Laughlin to Amend Title 13, of the Holladay City Code, Land Use and Development Regulations Related to Maximum Building Height in the C-2 Zone. Item Reviewed as a Legislative Action, According to Procedures Set Forth in Holladay Ordinance §13.07. *File #24-4-03.*</u>

Mr. Teerlink presented the Staff Report and explained that the application is for a Text Amendment to Chapter 13.62. This item relates to allowed building heights in the C-2 Zone. The Staff Report includes background information about the commercial zones in the City and the allowed heights. Since the incorporation of Holladay in 1999, the C-1 and C-2 Zones have largely stayed the same as far as standards are concerned. He reiterated that there is height information in the Staff Report as well as information about what the General Plan has to say about height. Elements of Chapter 4 can be used by the Planning Commission when considering this particular application.

Mr. Teerlink explained that the Text Amendment would impact all C-2 Zones throughout the City. The City is required to mail notices to all property owners impacted by the change, so all C-2 property owners received a notice. However, a request was received from some neighborhoods that abut C-2 Zones to extend the public comment period to allow an opportunity to comment. As a result, City Staff believes it is appropriate to open the public hearing and continue the item to the next Planning Commission Meeting to ensure that all interested residents have time to speak. Mr. Teerlink added that City Staff recommends approval for the proposed Text Amendment.

Commissioner Berndt referenced the proposal that building heights in C-2 Zones be set to a maximum of 40 feet, which is 5 feet taller than what is currently allowed. He wondered whether what is seen in neighboring communities is higher than that. Mr. Teerlink explained that even if the height is increased to 40 feet in the C-2 Zone, it will still be 5 feet below what is seen in Murray and Millcreek. Commissioner Berndt did not believe there will be a significant difference moving from 35 feet to 40 feet. He wanted to know if what is proposed retains competitiveness with other cities. Mr. Teerlink shared previous scenarios that have occurred in the City. Chair Roach appreciated the comments shared but noted that the Commission is only looking at an amendment. Mr. Teerlink noted that the Planning Commission can make a recommendation on the application itself. In addition, it is possible to share direction with the Council on possible future actions.

The applicant, Bret Laughlin, introduced himself to the Commission and noted that Chris Layton was also present. Mr. Laughlin believed 40 feet was proposed because that was something that was proposed to be a permanent change. Mr. Teerlink believed the City Council wanted to look at a General Plan amendment before looking at heights across the entire City. In the meantime, a Text Amendment to address the needs of this particular application makes the most sense.

Mr. Laughlin explained that he is a resident of Holladay, and he wants to break even with this development. To break even, he will either need to do something more affordable at 35 feet or something more aesthetically pleasing at 40 feet. If there are low 9- or 10-foot ceilings, it is only possible to charge so much per square foot. If there are 11- or 12-foot ceilings, the prices increase. In order to create something that stands out visually in the neighborhood, additional height is needed. While he would prefer to have a 45-foot height allowance, the 40 feet will still work.

Chair Roach explained that when the Text Amendment is considered for the zone, it does not just contemplate the applicant property. Part of the consideration is how the amendment will impact other properties. He understands that Mr. Laughlin wants to create something that is high quality and will improve the area, but the amendments will reach beyond his property. Commissioner Cunningham understood the plan that Mr. Laughlin had, but this will impact other areas in the City as well. The applicant property is fairly simple to deal with due to the location, as there is not a lot of residential backing onto it. However, some other properties zoned C-2 are more complicated. He is reluctant to allow this additional height in the C-2 Zone with those differences to consider. Commissioner Cunningham asked City Staff whether it is possible to allow the additional 5 feet for this specific project without changing the whole C-2 Zone. Mr. Teerlink denied this.

Commissioner Vilchinsky discussed the area next to the applicant property. There are different height requirements in that area. She wondered whether it is possible to incorporate this project into that. Mr. Teerlink explained that it is technically possible. His assumption was that if that process was pursued, the heights allowed would likely be similar to the abutting properties, because on the far east side of Memory Lane are detached single-family homes that cannot be higher than 40 feet. In that instance, the end result might be the same as the Text Amendment for 40 feet.

Mr. Layton explained that there are regulations and setbacks in neighboring zones. As a result, there are other ways to protect neighbors from uses. As far as the height, the reason the 40 feet was settled on was not only specific to this project. It also relates to other C-2 Zone projects that have three stories and want to have commercial on the lower floor with mixed-use projects on the other floors. That mixture is viable and needed. The issue is that the quality of the spaces becomes diminished when the height is reduced to 35 feet. The additional 5 feet can make a difference. It is time for the City to look at this generally, because it impacts the design of many projects.

Commissioner Cunningham mentioned the possibility of concealing items on the roof with the additional 5 feet. He wondered whether that could be a tradeoff for the extra 5 feet. Mr. Layton noted that there are still items on the roof that are typically allowed above the height limit. Mr. Teerlink stated that the items on the roof can be a maximum of 8 feet above the limit.

Commissioner Fonte noted that Economic Development and Housing Manager, Ann Frances Garcia, was present at a previous Planning Commission Meeting. What is being discussed is the development of a high-quality structure. Ms. Garcia made a case for more moderate-income housing in Holladay. She wondered whether it would be possible to rethink this application, so it considers that need in the community. Mr. Laughlin explained that the additional height makes it possible to put three or four studio apartments over the restaurant. That means it will be both commercial and residential. This will not necessarily result in moderate-income housing.

Ms. Marsh noted that moderate-income housing is often created when new units are added. She explained that new units are typically more expensive, but what happens is that people looking to move into a newer and potentially nicer unit make available some of the older units.

Chair Roach opened the public hearing. There were no comments. The hearing remained open.

Mr. Teerlink discussed moderate-income housing and explained that the intention was to find out where there are opportunities to create different types of housing. It has not been conceptualized that the C-1 and C-2 Zones would be the areas for that. He is glad that the discussions have considered moderate-income housing and offered to bring specific information back to the Commission. It is also possible for Ms. Garcia to address the Commission at the next meeting.

Commissioner Cunningham wanted to see someone provide information about the need for the additional 5 feet, so it is possible to create a finding. Some documents that illustrate how the addition would benefit development is something he felt was worthwhile. Commissioner Cunningham also thought it was important to look at equivalent zones in the surrounding cities.

Commissioner Cunningham moved to CONTINUE to the next regularly scheduled Planning Commission Meeting, an application by Brent Laughlin, represented by Chris Layton, to amend Title 13, Chapter 13.62.110, of the City of Holladay Land Use Code to increase the maximum allowable height from 35 feet to 40 feet. Specific items to discuss further are requested:

1. ***Resolution of the noticing request.***

2. ***Additional explanation and examples of the argument for the height increase.***

3. ***Comparison to the surrounding localities for similar zones.***

Commissioner Berndt seconded the motion. Vote on Motion: Commissioner Berndt-Aye; Commissioner Fonte-Aye; Commissioner Cunningham-Aye; Commissioner Vilchinsky-Aye; Chair Roach-Aye. The motion passed with the unanimous consent of the Commission.

ACTION ITEMS

4. Walker Meadows Circle Subdivision - Extension of Final Plat Approval - 5203 South Highland Drive. (R-1-10) Request to Extend the Time Period for Final Plat Approval by Applicant/Property Owner, Darren Mansell. Previous Approval for the Preliminary Subdivision was Granted on November 15, 2022, with the Condition of Recording the Final Plat within One Year. Plats that Are Not Recorded within One Year Require Approval of Extension by the Planning Commission According to Holladay Ordinance §13.10.090. *File #22-1-15.*

Ms. Marsh presented the Staff Report and explained that the application is a request to extend the Final Plat approval for Walker Meadows Circle Subdivision at 5203 South Highland Drive. This is a two-lot subdivision. The subdivision is currently waiting for corrections and comments from City Staff before it is recorded. It is possible for the applicant to meet the extension within the allotted timeframe. The applicant was not present at the meeting to address the Commission.

Commissioner Vilchinsky moved to APPROVE the extension of the recording date for the Final Plat for "Walker Meadows Circle," a residential Planned Unit Development subdivision in the

R-1-10 Zone, located at 5203 South Highland Drive, to one year from the prior approval date of November 15, 2022 based on the following findings:

1. No significant changes have been made to the plat.

2. Reasonable circumstances for the extension have been presented.

Commissioner Fonte seconded the motion. Vote on Motion: Commissioner Berndt-Aye; Commissioner Fonte-Aye; Commissioner Cunningham-Aye; Commissioner Vilchinsky-Aye; Chair Roach-Aye. The motion passed with the unanimous consent of the Commission.

5. Base 45 Subdivision - Extension of Final Plat Approval - 2180 East 4500 South (R-M). Request to Extend the Time Period for Final Plat Approval by Applicant/Property Owner, Luke Martineau. Previous Approval for the Preliminary Subdivision was Granted on February 22, 2023, with the Condition of Recording the Final Plat within One Year. Plats that Are Not Recorded within One Year Require Approval of Extension by the Planning Commission According to Holladay Ordinance §13.10.09. *File #17-1-05-01.*

Ms. Marsh presented the Staff Report and explained that the application is a request to extend the Final Plat approval for Base 45 Subdivision at 2180 East 4500 South. It is located in the R-M Zone, and this is an approved subdivision for 32 townhomes on 2.29 acres of land. All of the standards have been met and approved. She noted that nothing has been changed in terms of what is being requested. The applicant was not present at the meeting to address the Commission.

Chair Roach moved to APPROVE the extension of the recording date for the Final Plat for "Base 45," a residential Planned Unit Development subdivision in the R-M Zone, located at 2180 East 4500 South, to one year from the prior approval date of February 22, 2023, based on the following findings:

1. No significant changes have been made to the plat.

2. Reasonable circumstances for the extension have been presented.

Commissioner Berndt seconded the motion. Vote on Motion: Commissioner Berndt-Aye; Commissioner Fonte-Aye; Commissioner Cunningham-Aye; Commissioner Vilchinsky-Aye; Chair Roach-Aye. The motion passed with the unanimous consent of the Commission.

6. Approval of Minutes- January 9, 2024

Chair Roach noted that he did not read the Commission Statement at the January 9, 2024, meeting.

Chair Roach moved to APPROVE the Meeting Minutes from January 9, 2024, as amended. There was no second. The motion passed with the unanimous consent of the Commission.

DISCUSSION ITEM

7. Discussion - Pending Historic Preservation Ordinance Update Presentation by Staff on Pending Updates to Title 13, of the Holladay City Code, Land Use and Development Regulations as they Relate to Council Direction on Historical Preservation Including; Historical Designation Process, Allowable Land Uses, Modification Standards, and Review Processes for Historic Sites. DISCUSSION ITEM ONLY for Future Review as a Legislative Action to Make a Recommendation to City Council, According to Procedures Set Forth in Holladay Ordinance §13.07.

Mr. Teerlink offered to answer questions about how historic preservation is handled in Holladay. He noted that this is something that City Staff has been concerned about for some time, but the timing to address the matter needed to be appropriate. Former City Council Member, Dan Gibbons, championed the effort to make sure it is addressed. Council Member Emily Gray has taken his place as the liaison for the Historical Commission. She is trying to continue this work and informed City Staff that May is Historic Preservation Month. As a result, there is a desire to have this item in front of the City Council in May so it can be approved during that month. Mr. Teerlink clarified that there will not be an extravagant update or rewrite, but procedural changes.

Chair Roach asked what would qualify a structure as historic. He wanted to know if there is a certain date needed for consideration. Mr. Teerlink explained that it is open to whatever the State will approve and accept, whether that has to do with an architectural style, individual, or use. He shared an example on Spring Lane of a Victorian home. It is a historic property, not for the architecture, but for the dairy that was located there. This process starts at the State. Once there is approval, it is possible to bring the property to the City Council to add to the Holladay list.

Commissioner Berndt does not feel he has the background to express an opinion on a historic property. Mr. Teerlink noted that if a historic home comes to the Planning Commission for a Conditional Use for a remodel or addition, it is probably a good idea for the Design Review Board ("DRB") to be the recommending body before it comes to the Planning Commission for approval. Chair Roach asked if it would make sense to involve the Historical Commission in those kinds of applications. Mr. Teerlink believed the City Council wanted the Historical Commission to assist property owners with the process, but not necessarily to be a recommending body to the Planning Commission. Commissioner Berndt suggested that the Commission share relevant information.

ADJOURN

Chair Roach moved to ADJOURN. The motion was not seconded. The motion passed with the unanimous consent of the Commission.

The Planning Commission Meeting adjourned at approximately 7:40 PM.

I hereby certify that the foregoing represents a true, accurate, and complete record of the City of Holladay Planning Commission Meeting held Tuesday, March 19, 2024.

Teri Forbes

Teri Forbes
T Forbes Group
Minutes Secretary

Minutes Approved: _____