Exhibit A

A NEW RESIDENCE
FOR
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, UT

GEOLOGY
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Bill Black PG
(801) 359-7222

GEOTECH
GSH Geotechnical Inc.
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Ogden, UT 84401
Andrew Harris PE
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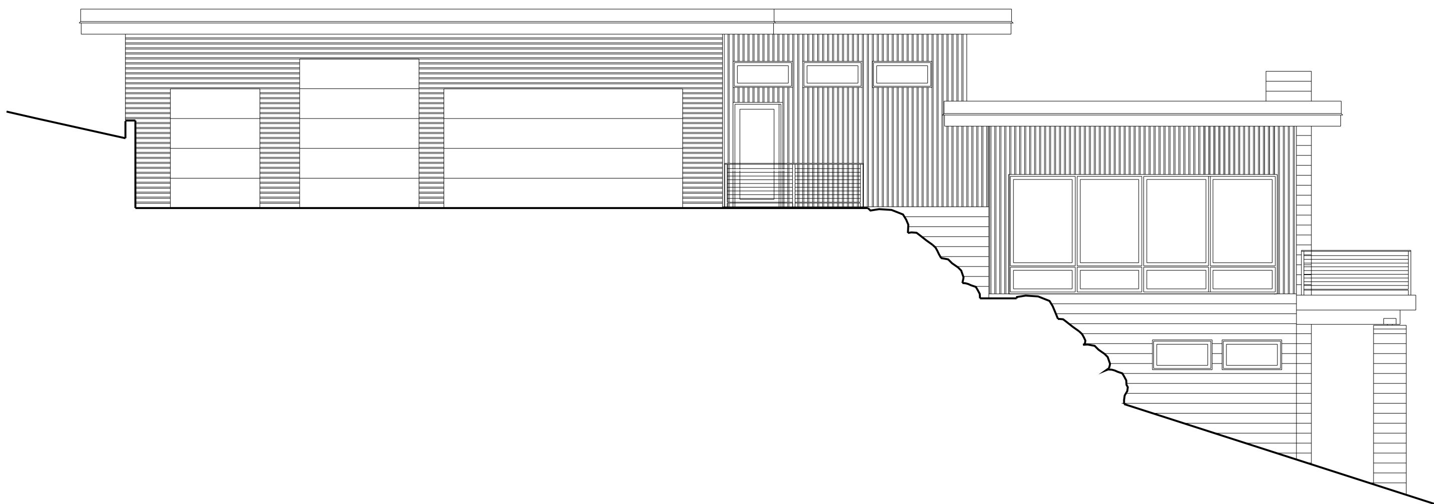
SURVEY/ WASTEWATER
Johanson Engineering
PO Box 18941
Salt Lake City, UT 84118
Nathan Bseiso
(801) 860-8240



Index of Drawings

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STATE OF UTAH
William L Arthur
125771
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LICENSED ARCHITECT

Date: 5/2/16

Revisions:

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, Utah

Project No.: 1507

Sheet: A0 1

Index of Drawings

Scale: NTS

Exhibit A

PROJECT GENERAL NOTES:

1. THE FOLLOWING ITEMS SHALL BE THE RESPONSIBILITY OF THE OWNER TO COORDINATE WITH THE CONTRACTOR.
   - A. KITCHEN CABINETS LAYOUT, DESIGN OF CABINET LAYOUT, DESIGN OF CABINET FACE DESIGN.
   - B. BATHS: ALL BATH VANITIES DESIGN SHALL BE THE RESPONSIBILITY OF THE OWNER TO COORDINATE WITH GENERAL CONTRACTOR PRIOR TO FABRICATION FOR APPROVAL.
   - C. LAUNDRY: DESIGN FOR ALL CABINET FACES AND STYLE OF CABINET.
   - D. STAIRS: THE OWNER SHALL VERIFY WITH GENERAL CONTRACTOR FOR TYPE OF RAILING AND FINISH OF RAILING AROUND STAIRS. GENERAL CONTRACTOR VERIFY.
   - E. ALL COLORS FOR FINISH MATERIALS FOR ENTIRE PROJECT UNLESS NOTED OTHERWISE ON DRAWINGS OR SPECIFICATIONS.
2. COORDINATE WITH ELECTRICAL PLANS FOR LIGHTS, WIRING AND SMOKE DETECTORS. COORDINATE WITH GENERAL ELECTRICAL NOTES.
3. ALL SHOWERS SHALL BE FINISHED TO A HEIGHT OF 72" ABOVE DRAIN OUTLET. ALL MATERIALS OTHER THAN STRUCTURAL SHALL BE MATERIAL TYPE NOT ADVERSLY AFFECTED BY WATER.
4. ALL ELECTRICAL PANELS IN HOUSE AND GARAGE SHALL BE WRAPPED WITH 5/8" TYPES-X DRYWALL, TOP AND BOTTOM, SIDES AND BACK. PROVIDE 30" CLEARANCE MINIMUM WIDTH, AND 6'-0" FLOOR TO HEAD ROOM. COMPLY WITH N.E.C.
5. CONSTRUCTION SHALL CONFORM TO ALL ADOPTED CODES AND PRACTICES OF THE COMMUNITY OR AREA IN WHICH CONSTRUCTION TAKES PLACE. CONTRACTOR TO COORDINATE.
6. ALL STUMPS AND ROOTS SHALL BE REMOVED FROM THE SOIL TO A DEPTH OF 12" BELOW THE SURFACE OF THE GROUND IN THE AREA OF THE BUILDING.
7. JOISTS UNDER AND PARALLEL TO BEARING PARTITIONS SHALL BE DOUBLED WHEN THE LENGTH OF SUCH WALL EXCEEDS 1/3 THE LENGTH OF JOIST 12'-0" AND LONGER. WHEN USING FLOOR TRUSSES USE 4 X 2 BLOCKING AT 24" O.C..
8. FIREBLOCK STUD SPACES AT SOFFITS, FLOOR AND CEILING JOIST LINES AT 10' VERTICALLY AND HORIZONTALLY AND AT OPENING BETWEEN ATTIC SPACES AND CHIMNEY CHASES. FOR FACTORY BUILT CHIMNEYS AND AT ANY OTHER LOCATIONS NOT SPECIFICALLY MENTIONED ABOVE WHICH COULD AFFORD PASSAGE OF FLAMES. CONSULT U.B.C.
9. 2-2x12 HEADERS OVER ALL OUTSIDE OPENINGS OR OPENINGS IN BEARING WALLS UNLESS OTHERWISE NOTED.
11. SHOWER WALLS AND WALLS AROUND BATH TUBS SHALL BE CONSTRUCTED OF DENSE NONABSORBENT WATERPROOF SHEET ROCK FULL HEIGHT OF WALL. USE CEMENTITIOUS BACKER BOARD ON EXTERIOR WALLS WHERE A VAPOR BARRIER IS USED.
12. GUARDRAILS SHALL BE NOT LESS THAN 36" IN HEIGHT. OPEN GUARDRAILS SHALL HAVE INTERMEDIATE RAILS OR ORNAMENTAL PATTERN SUCH THAT NO OBJECT 4" OR LARGER. STAIR RAILINGS SHALL NOT LESS THAN 34"-38" ABOVE NOSING OF TREAD. COORDINATE WITH DRAWINGS FOR HEIGHT.
13. CAULK ALL JOINTS BETWEEN DISSIMILAR MATERIALS WITH CONTINUOUS BEAD OF SILICON BASE CAULK.
14. ALL HINGED SHOWER DOORS SHALL SWING OUTWARD. GLAZING USED IN DOORS AND PANELS OF BATHTUB AND SHOWER ENCLOSURES AND BUILDING WALLS ENCLOSING THESE COMPARTMENTS SHALL BE FULLY TEMPERED, LAMINATED SAFETY GLASS OR APPROVED PLASTIC.
15. ALL STAIR RISERS AND TREADS CALLED OUT ON PLANS OR SECTION. IF NOT CALLED OUT, PROVIDE 3-2x12 STAIR STRINGERS WITH RISERS NOT TO EXCEED 7.5" AND TREADS TO BE MINIMUM OF 10.5"-12" IN WIDTH. PROVIDE 6'-8" HEAD HEIGHT FROM NOSING OF STAIR. PROVIDE 5/8" TYPE-X SHEET ROCK ON ALL ENCLOSED STAIRWAYS- ALL TREADS TO BE 1" MATERIAL- CONTRACTOR TO COORDINATE.
16. ALL LUMBER IN CONTACT WITH CONCRETE OR MASONRY TO BE PRESSURE TREATED OR FOUNDATION REDWOOD. THIS INCLUDES LEDGERS AND STUD WALLS.
17. WOOD TO EARTH SEPARATION: NO WOOD OTHER THAN THAT PERMITTED by UBC SHALL NEARER THAN 6" TO THE EARTH UNLESS SEPARATED BY CONCRETE OF AT LEAST 3" THICKNESS WITH AN IMPERVIOUS MEMBRANE INSTALLED BETWEEN THE EARTH AND THE CONCRETE. THIS INCLUDES DECKS AND SIDING.
18. BALCONIES, LANDINGS, EXTERIOR STAIRWAYS AND SIMILAR SURFACES EXPOSED TO THE WEATHER AND SEALED UNDERNEATH SHALL SLOPE 1/4" PER FOOT TO DRAIN.

ENERGY NOTES:

ENERGY CONSERVATION IS MAJOR CONCERN IN THE CONSTRUCTION OF THIS HOME, AND FOR THAT REASON, COOPERATION IS REQUESTED FROM THE GENERAL CONTRACTOR AND SUBCONTRACTORS IN KEEPING THIS CONCERN UPPERMOST IN THEIR MINDS DURING THE CONSTRUCTION PROCESS.

FOLLOWING IS A LIST OF GENERAL REQUIREMENTS THAT MUST BE ADHERED TO IN THIS REGARD. SUGGESTIONS FROM THE CONTRACTORS WILL BE APPRECIATED AS TO ALTERNATE OR ADDITIONAL METHODS OF ENERGY CONSERVATION THAT MIGHT INCLUDED.

INSTALLING INSULATION

1. CEILINGS

   MAKE SURE THAT INSULATION EXTENDS HORIZONTALLY COMPLETELY ACROSS THE TOP PLATE

   FILL ALL GAPS BETWEEN BATT AND TOP PLATE.

   MAKE SURE THAT VAPOR BARRIER IS ON THE WARM WINTER SIDE OF INSULATION.

2. WALLS

   MAKE SURE THAT BATTS TOUCH SHEATHING OR SIDING AND TOUCH TIGHTLY AGAINST TOP AND BOTTOM PLATES AND THAT STAPLED TO THE PLATES IN ORDER TO GET A TIGHT FIT AND PREVENT GAPS.

   MAKE SURE STAPLES ARE CLOSELY SPACES (ABOUT 6" O.C.)

   MAKE SURE THAT INSULATION IS PLACED BEHIND PIPES, DUCTS AND ELECTRICAL BOXES.

   MAKE SURE THAT SMALL SPACES BETWEEN ROUGH FRAMING AND DOOR AND WINDOW HEADS, JAMBS, AND SILLS ARE STUFFED WITH INSULATION AND COVERED WITH A VAPOR BARRIER.

   MAKE SURE THAT THE VAPOR BARRIER IS ON THE WARM WINTER SIDE OF INSULATION.

3. GENERAL INSULATION NOTES:

   CUT BACK WOOL FROM END OF ONE BLANKET AND LAP BARRIER PAPER OVER ABUTTING BLANKET WITH BUTT ENDS TIGHTLY TOGETHER.

   USE A SERRATED BLADE KNIFE FOR QUICK, CLEAN , ACCURATE CUTTING OF BLANKETS.

   EXTEND VAPOR BARRIER PAPER OVER PLATES AND HEADERS.

   USE SEPARATE PIECES OF INSULATION WHERE PLANE OF WALL OR CEILING CHANGES.

   USE EXTRA STAPLES TO CLOSE GAPS UNDER FLANGES.

   INSULATE ALL AREAS BETWEEN FLOOR JOISTS AND OUTSIDE HEADER.

4. AIR INFILTRATION

   ALL JOIST INTO THE HOUSE MUST BE PROPERLY SEALED TO REDUCE AIR INFILTRATION AS WELL AS TO PREVENT THE ENTRY OF MOISTURE. PAY PARTICULAR ATTENTION TO THE FOLLOWING LIST WHERE COMPLETE CAULKING (GENERAL ELECTRIC SILL-PROOF OR EQUAL APPROVED BY ARCHITECT IS REQUIRED)

   - A. BETWEEN THE BOTTOM EXTERIOR WALL PLATE AND THE FLOOR SHEATHING.
   - B. BETWEEN THE TOP OF THE FOUNDATION WALL AND THE JOISTS OR SILL PLATE.
   - C. JUNCTURES OR WINDOW AND DOOR FRAMES OR MOLDING WITH THE BORDERING STONE OR WOOD SIDING.
   - D. ALL JUNCTURES BETWEEN EXTERIOR COVERING MATERIALS.
   - E. WHERE ROOF PENETRATIONS PASS THROUGH THE ROOF.

     MAKE SURE THAT ALL SHEATHING IS NAILED TIGHTLY TO THE FRAMING AND THAT ALL SHEATHING THAT IS DAMAGED DURING CONSTRUCTION IS REPLACED.

     MAKE SURE THAT ALL FLASHING IS CORRECTLY INSTALLED WHERE A ROOF JOINS A VERTICAL WALL WHERE CHIMNEYS AND PIPES PASS THROUGH THE ROOF AND IN ALL ROOF VALLEYS.

5. WEATHER-STRIPPING

   PROVIDE AN INTERLOCKING WEATHER-STRIPPING ALL AROUND EXTERIOR DOORS INCLUDING THE DOOR FROM THE GARAGE TO THE HOUSE.

6. PROVIDE FLOOR DRAIN BENEATH WATER HEATER AND A PAN UNDER WATER HEATER OR HOT TUB AND EQUIPMENT IF LOCATED ON A WOOD FLOOR. PROVIDE SEISMIC ANCHORS AT WATER HEATERS. CONTRACTOR TO COORDINATE.

APPLICABLE CODES

2012 INTERNATIONAL RESIDENTIAL CODE
2012 INTERNATIONAL PLUMBING CODE
2012 INTERNATIONAL ENERGY CONSERVATION CODE
2012 INTERNATIONAL FUEL GAS CODE
2012 INTERNATIONAL MECHANICAL CODE
2012 INTERNATIONAL FIRE CODE
2012 NATIONAL ELECTRICAL CODE

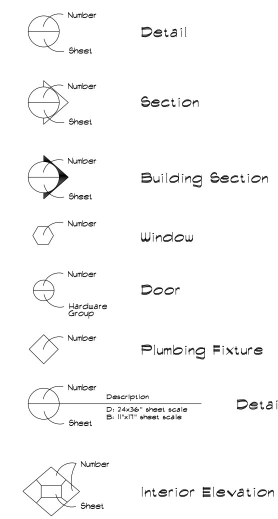
DEFERRED SUBMITALS:

Pre-manufactured Rood and Floor Trussses

GENERAL NOTES:

1. NOTES ON DRAWINGS ARE TYPICAL FOR SIMILAR CONDITIONS UNLESS NOTED OTHERWISE.
2. DRAWINGS ARE NOT TO BE SCALED
3. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY AND ALL PERMITS THAT ARE REQUIRED DURING THE CONSTRUCTION PROCESS AND SHALL BE REQUIRED TO CONTACT THE PROPER AUTHORITIES.
4. THE CONTRACTOR WILL CAREFULLY READ AND STUDY THE PLANS AND SPECIFICATIONS FOR ALL TRADES. COORDINATION BETWEEN TRADES WILL BE NECESSARY AND THE RESPONSIBILITY OF THE CONTRACTOR. ANY QUESTIONS THAT ARISE SHALL BE CLARIFIED BY THE OWNER OR ARCHITECT PRIOR TO CONSTRUCTION.
5. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES ON THE DRAWINGS OR ANY FIELD CONDITIONS THAT DEVIATE FROM THE DRAWINGS. ALSO NOTIFY THE ARCHITECT OF ANY CHANGES MADE IN CONSTRUCTION THAT DIFFER FROM THE CONSTRUCTION DOCUMENTS.
6. ALL SHOP DRAWINGS OF PRODUCTS LISTED SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL PRIOR TO EXECUTION OF WORK. ALLOW APPROPRIATE TIME FOR REVIEW.
7. CONSTRUCTION TO BE IN ACCORDANCE WITH APPROPRIATE CODES AS DETERMINED BY THE SALT LAKE COUNTY BUILDING DEPARTMENT.
8. SEE OTHER NOTES ON THIS SHEET FOR ADDITIONAL INFORMATION.

SYMBOL LEGEND:



BUILDING SUMMARY

Area Totals:

Gross Living Space	
Garage Level:	306 sq. ft.
Main Level:	1,514 sq. ft.
Lower Level:	1,048 sq. ft.
Total:	2,868 sq. ft.
Attached Garage :	1,352 sq. ft.
Total building footprint:	2,866 sq. ft.

Type of building: Type 5 NR

Occupancy: Group R - Division 3

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Date: 5/2/16

Revisions:

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, Utah

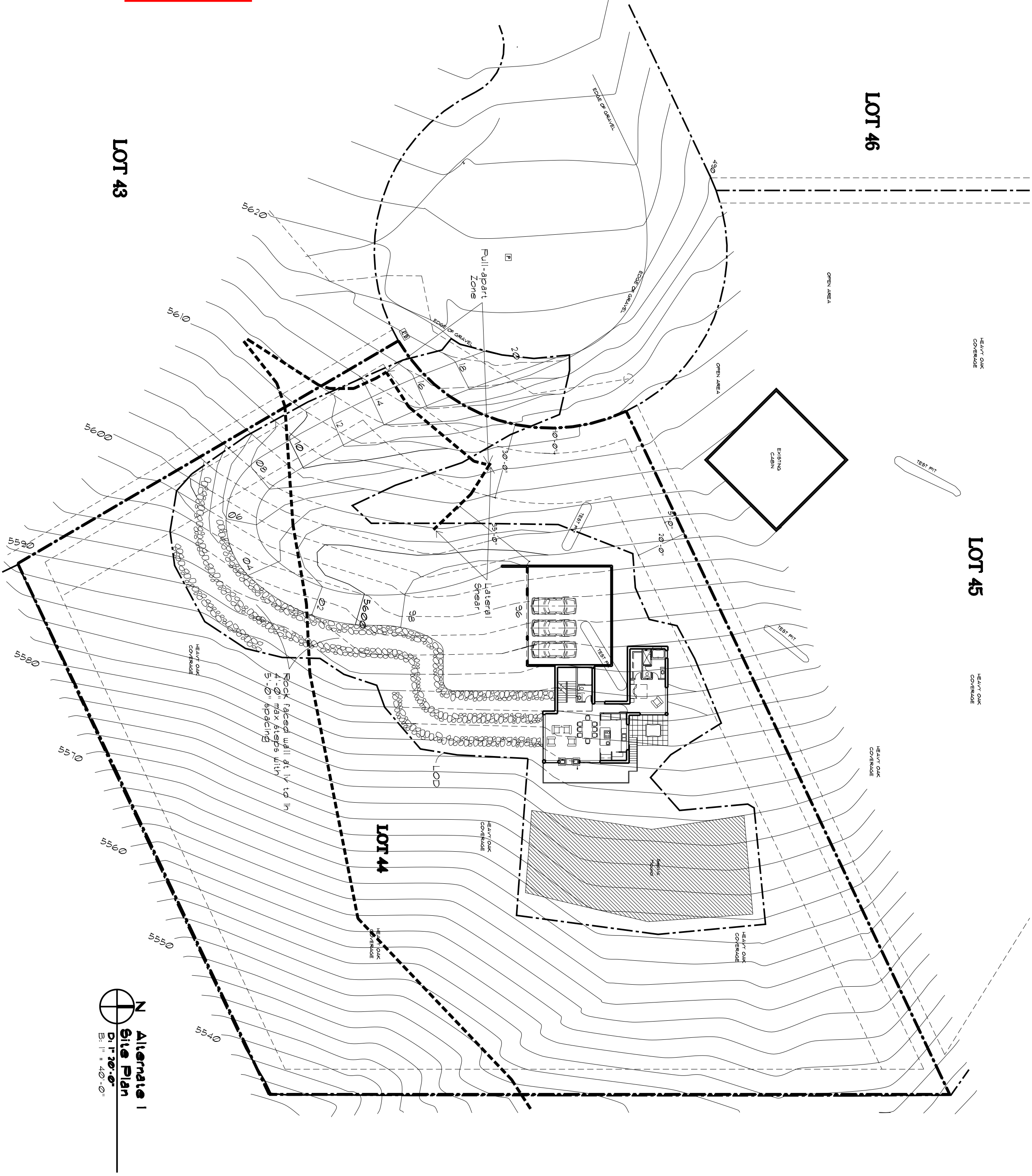
Project No.: 1507

Sheet: A0 2

General Notes, Symbols Legend

Scale: NTS

Exhibit A



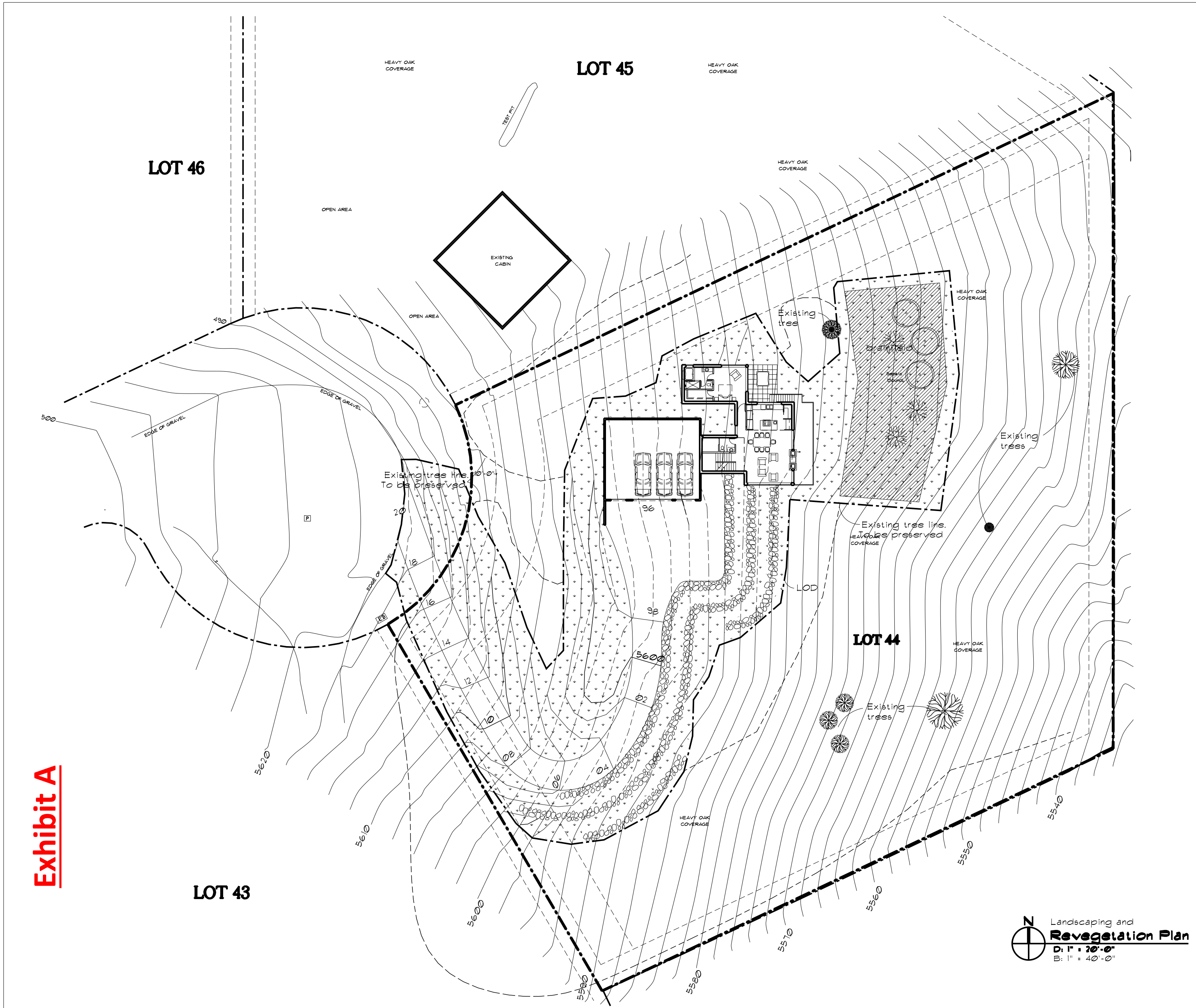
A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, Utah

Project No.: 1507
Sheet: A1 1
Site Plan
Scale: D: 1" = 20'-0" B: 1" = 40'-0"

Date: 5/2/16
Revisions: 5/22/16 8/15/16 8/19/16

State of Utah, William L. Ryan, Licensed Architect

Coalesce Inc. Architecture Planning



Seed Mix:

Species	Amount per pound
Western Wheatgrass (Agropyron smithii aka. Pascopyrum smithii)	.225
Indian ricegrass (Oryzopsis hymenoides aka. Achnatherum hymenoides)	.2
Slender wheatgrass (Agropyron trachycaulum)	.2
Sheep fescue (Festuca ovina)	.05
Sandberg bluegrass (Poa sandbergii)	.05
Mountain brome (Bromus marginatus)	.275

Hydro-seeding notes:

1. Seed disturbed area with mix shown below Install straw bio-degradable erosion blanket. Pin in place and cut around trees.
2. Use a broadcast rate of 1 pound per 600 sq. ft. of disturbed area.
3. Do not hydro-seed until final grading of the site has been completed.
4. Maintain a watering schedule until the new vegetation has been established.

Legend:

- (4) Mountain maple or Popular
- (4) Austrian Pine
- (20) Oak Brush (1 gal.)
- Hydro-seeded area See notes. (20,000 sq. ft. +/-)

NOTES:

1. New trees shown sill be irrigated by drip irrigation.
2. All reseeded area shall have 80% germination coverage with a minimum of 3-6 inches of growth or re-seeding shall be required. Supply temporary irrigation.

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Revisions: 8/24/16

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, Utah

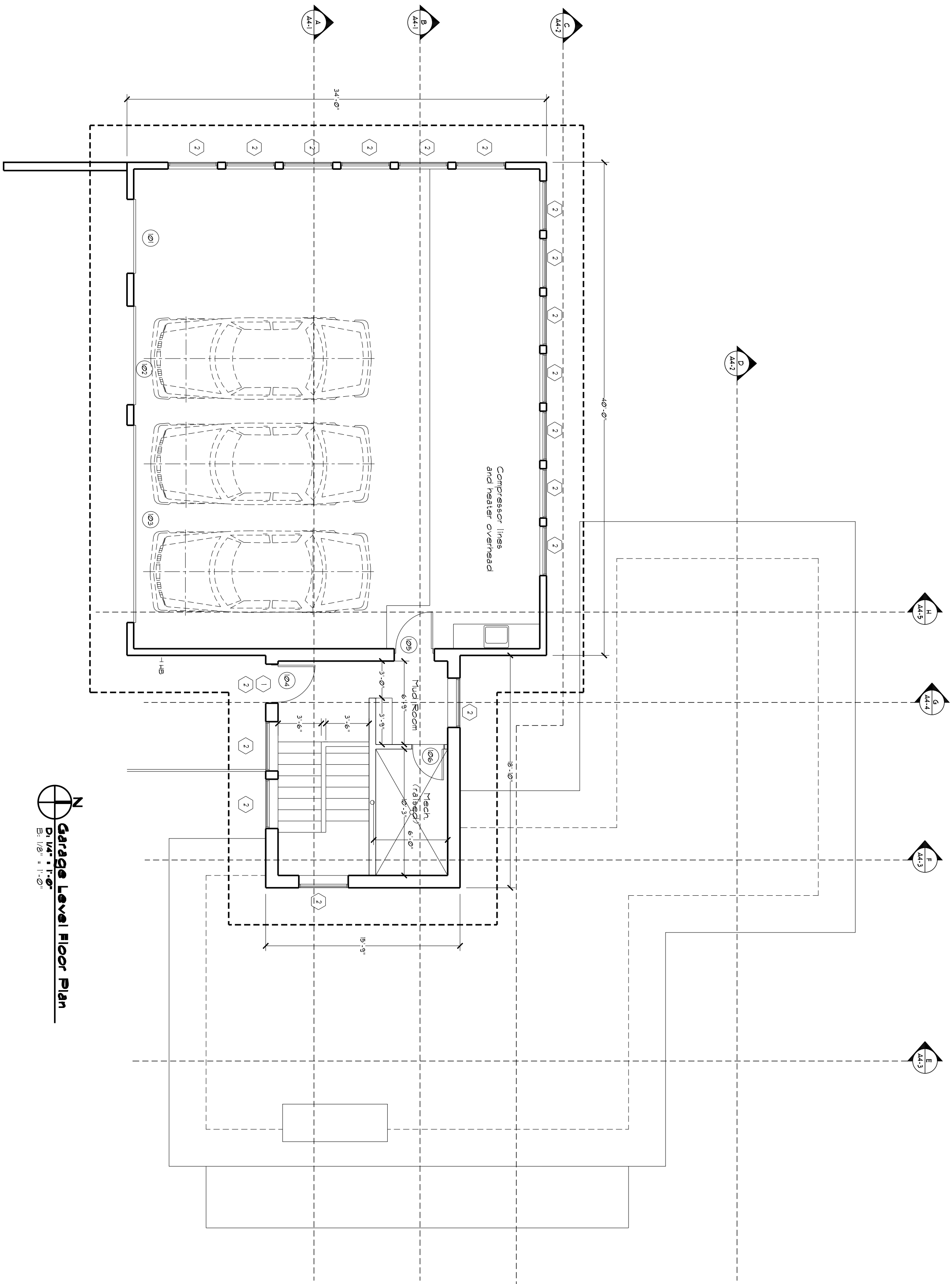
Project No.: 1507

Sheet: L 1

Landscaping and Revegetation

Scale:
D: 1" = 20'-0"
B: 1" = 40'-0"

Exhibit A



Scale: D: 1/4" = 1'-0" B: 1/8" = 1'-0"

Garage Level Plan

A2 1

Sheet:

Project No.: 1507

A New Residence for

Paul and Linda LaStayo

4075 Bluebell Drive

Liberty, Utah

Date: 5/2/16

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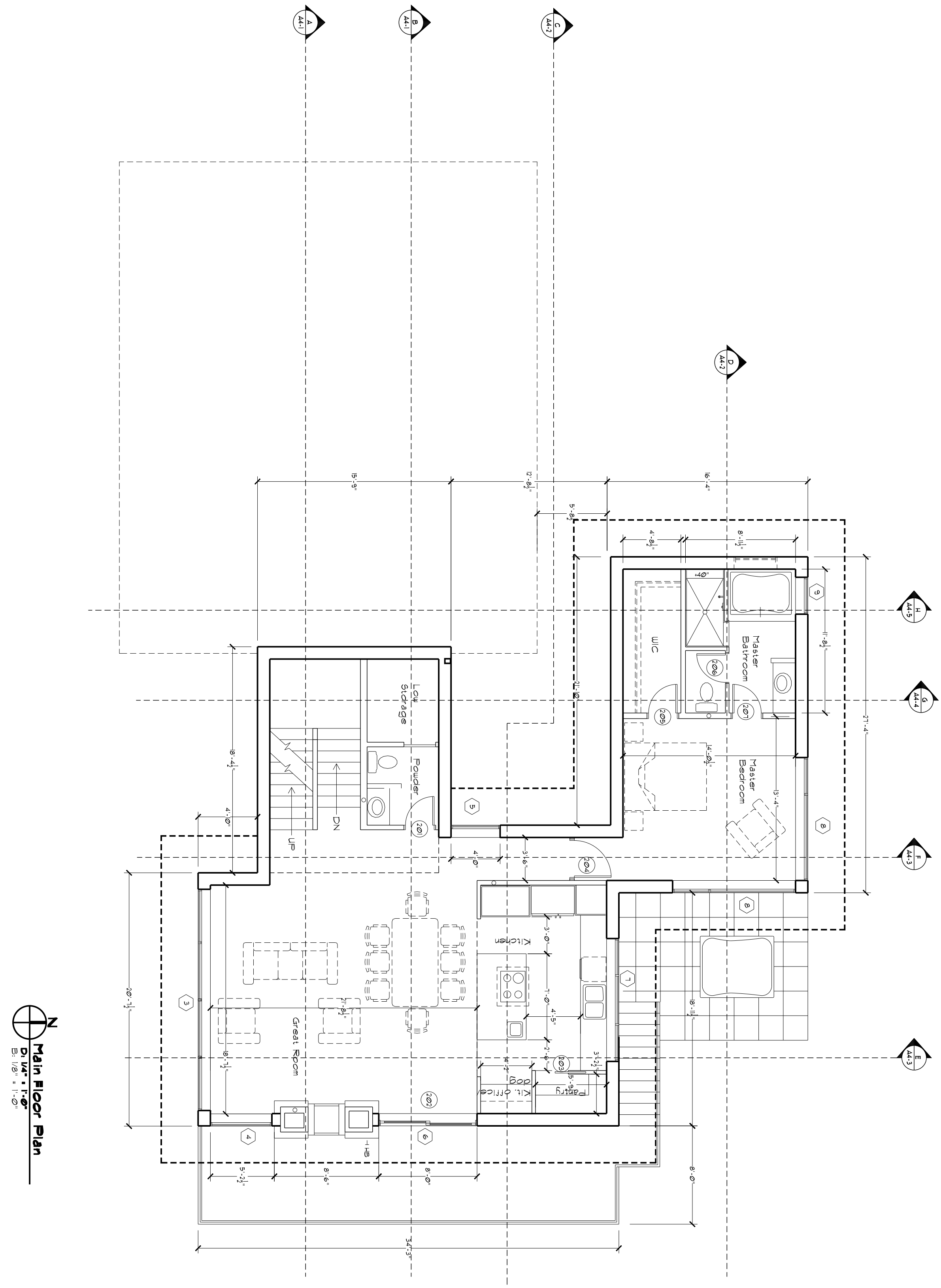
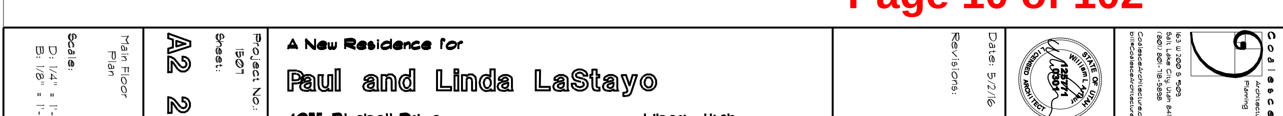
Exhibit A



Main Floor Plan
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"
Master Bathroom
Master Bedroom
WIC
Low Storage
Powder
Kitchen
Great Room
Pantry
Kit. Office
UP
DN



A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, Utah
Project No.: 1507
Sheet: A2 2
Main Floor Plan
Scale: D: 1/4" = 1'-0" B: 1/8" = 1'-0"
Date: 5/2/16
Revisions:
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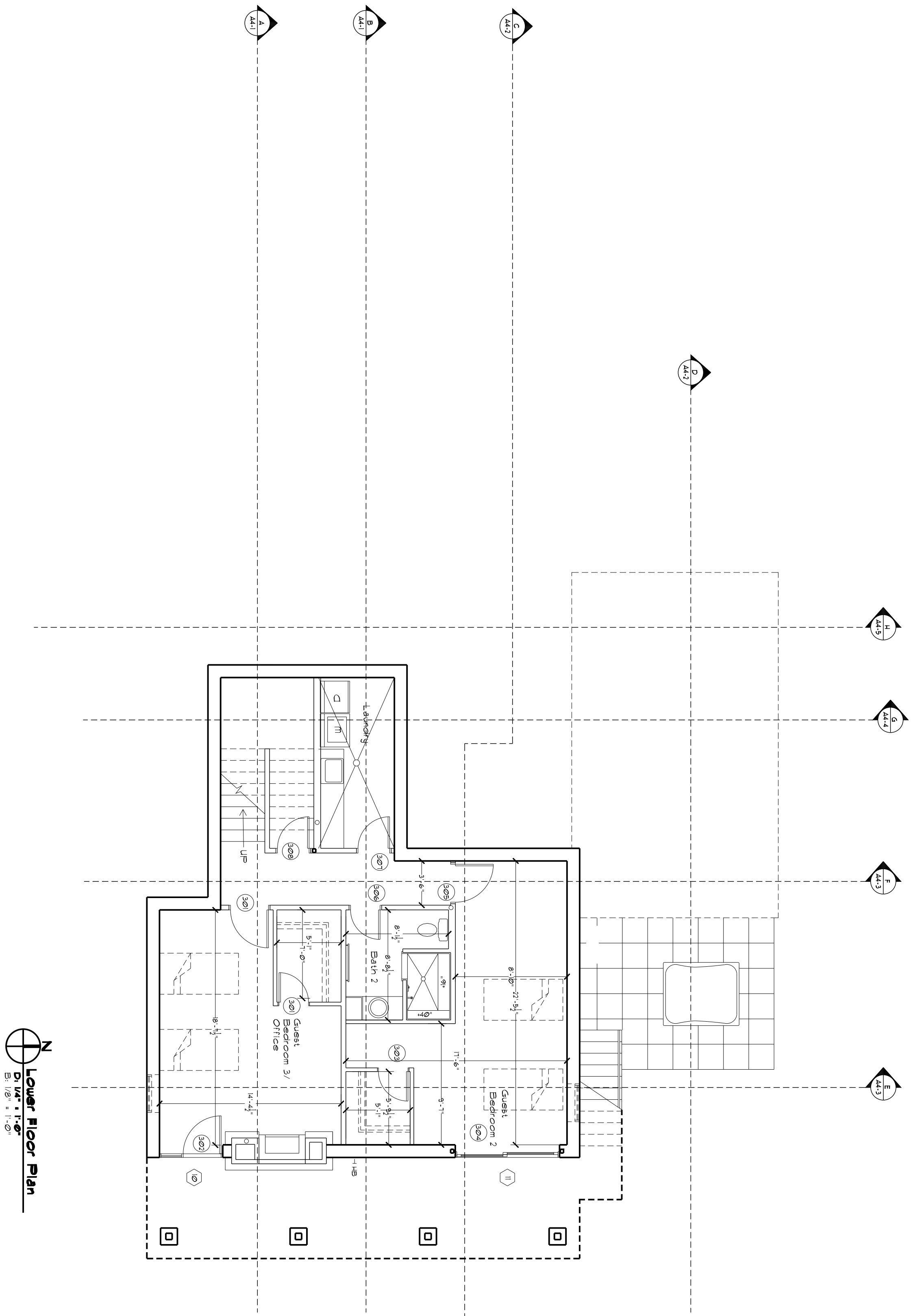
Exhibit A



Scale: D: 1/4" = 1'-0" B: 1/8" = 1'-0"

Lower Floor Plan

A2 3

Sheet:

Project No.: 1507

A New Residence for

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Revisions:

Date: 5/2/16

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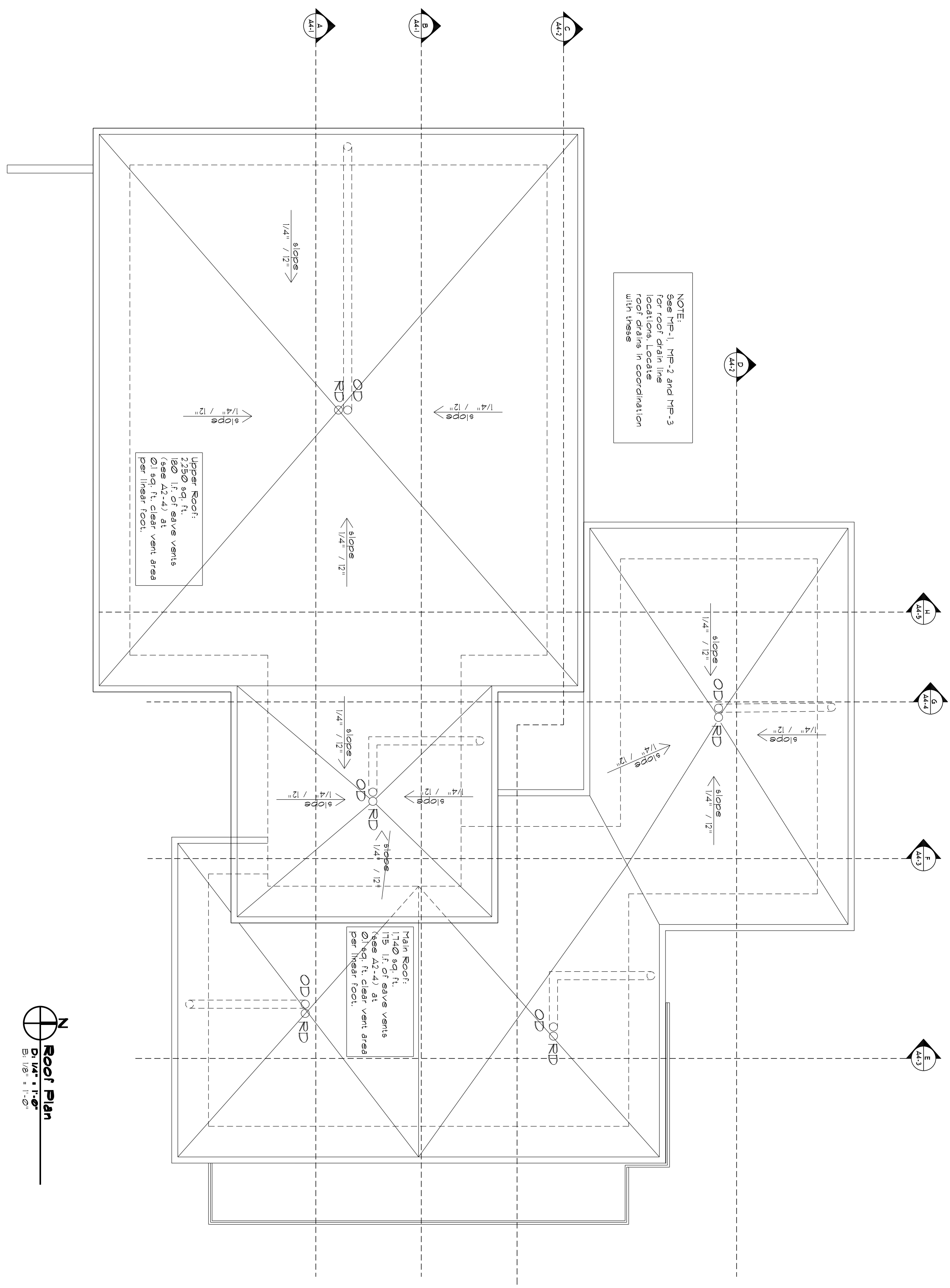
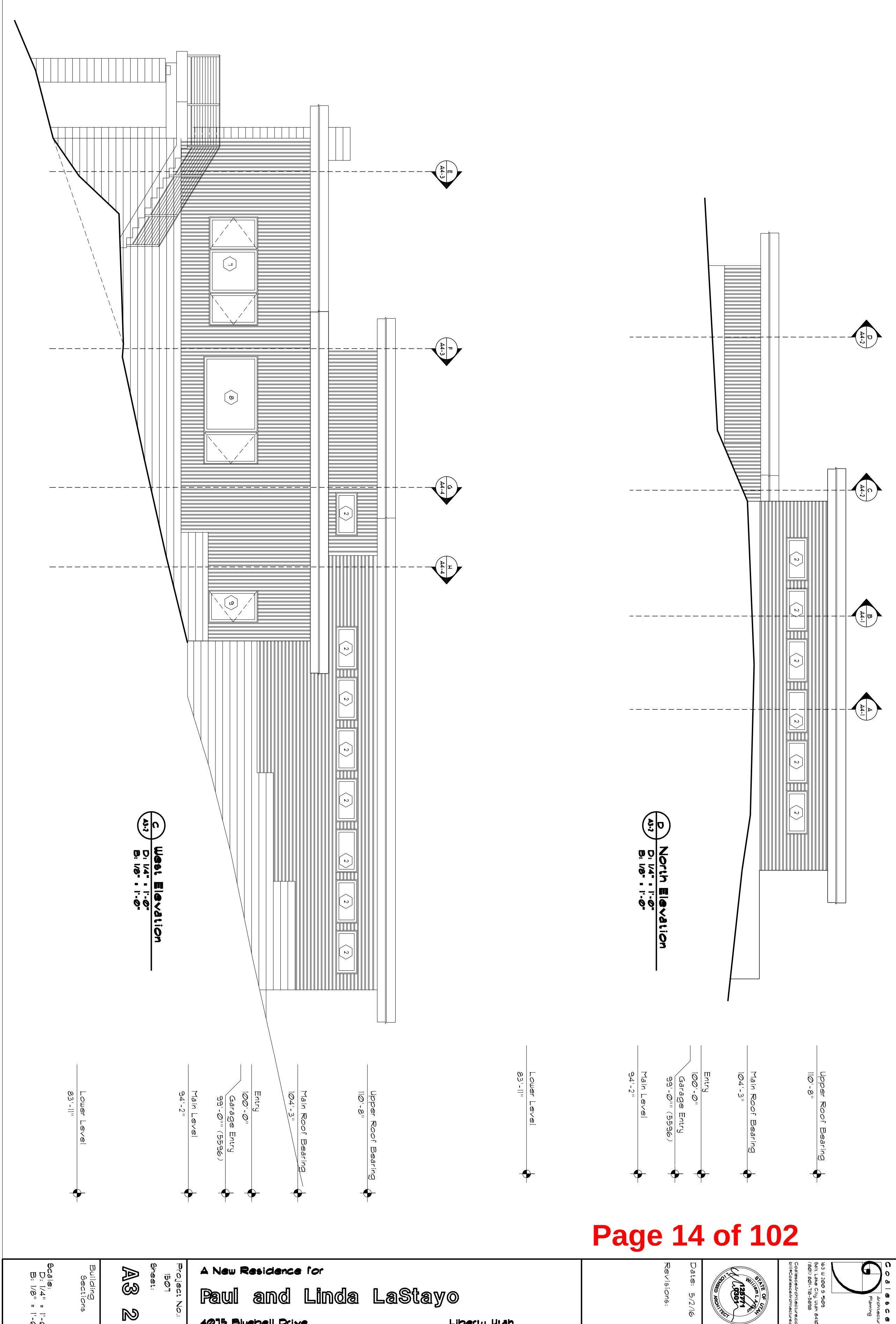


Upper Roof:
2250 sq. ft.
180 l.f. of eave vents
(see A2-4) at
0.1 sq. ft. clear vent area
per linear foot.
NOTE:
See MP-1, MP-2 and MP-3
for roof drain line
locations. Locate
roof drains in coordination
with these
Main Roof:
1,740 sq. ft.
175 l.f. of eave vents
(see A2-4) at
0.1 sq. ft. clear vent area
per linear foot.
slope 1/4" / 12"
OD
RD
Roof Plan
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Exhibit A

South Elevation
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"
East Elevation
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"
Lower Level
83'-11"
Main Level
94'-2"
Garage Entry
99'-0"" (5596)
Entry
100'-0"
Main Roof Bearing
104'-3"
Upper Roof Bearing
110'-8"
A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, Utah
Project No.: 1507
Sheet: A3 1
Building Sections
Scale: D: 1/4" = 1'-0" B: 1/8" = 1'-0"
Date: 5/2/16
Revisions:
Coalesce Inc. Architecture Planning

Exhibit A



West Elevation
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"
North Elevation
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"
Lower Level
83'-11"
Main Level
94'-2"
Garage Entry
99'-0"' (5596)
Entry
100'-0"
Main Roof Bearing
104'-3"
Upper Roof Bearing
110'-8"
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Liberty, Utah
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Sheet: A3 2
Building Sections
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Architecture Planning

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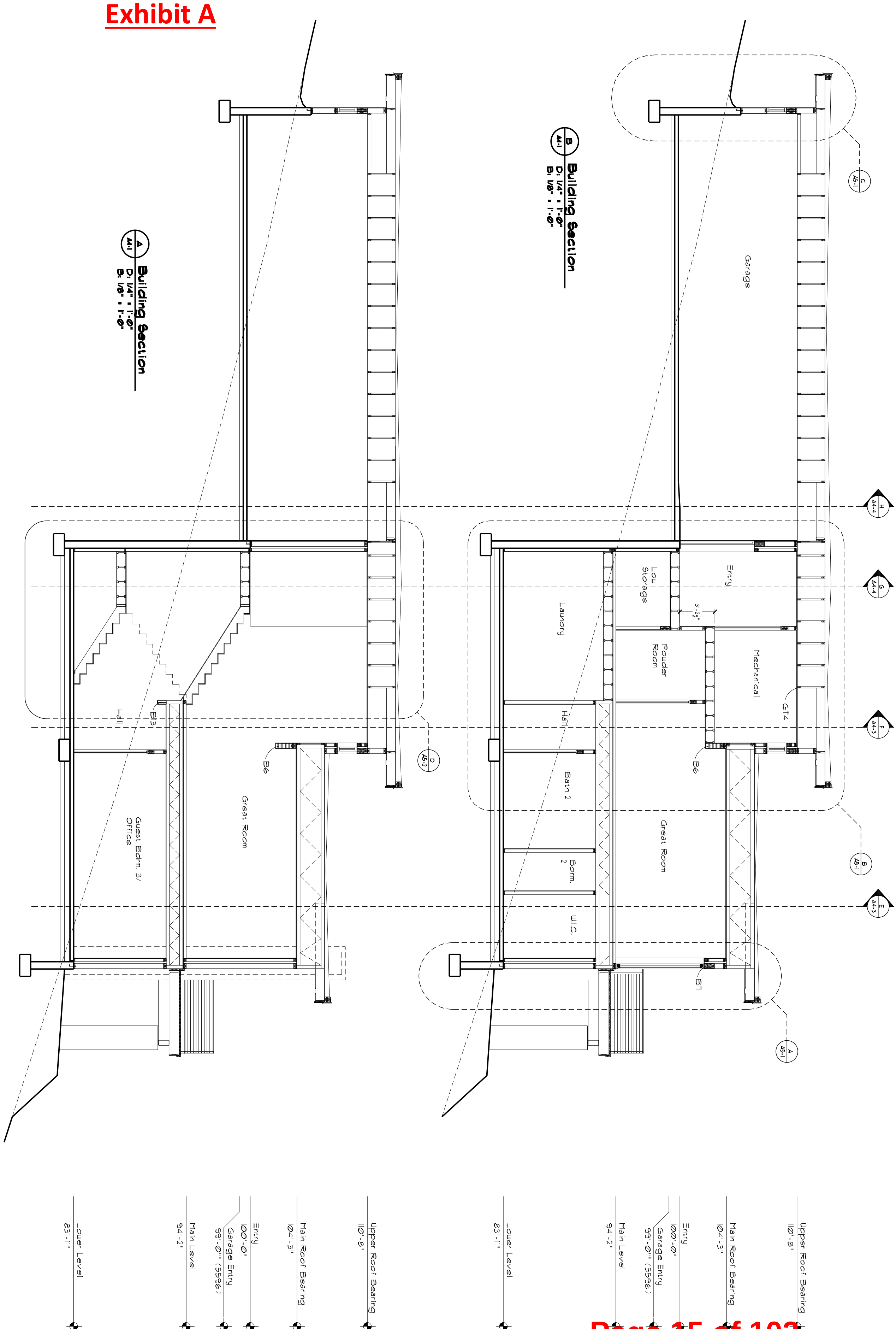

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Building Sections

Sheet:
A4 1

Project No.:
1507

A New Residence for
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Liberty, Utah

Revisions:

Date: 5/2/16

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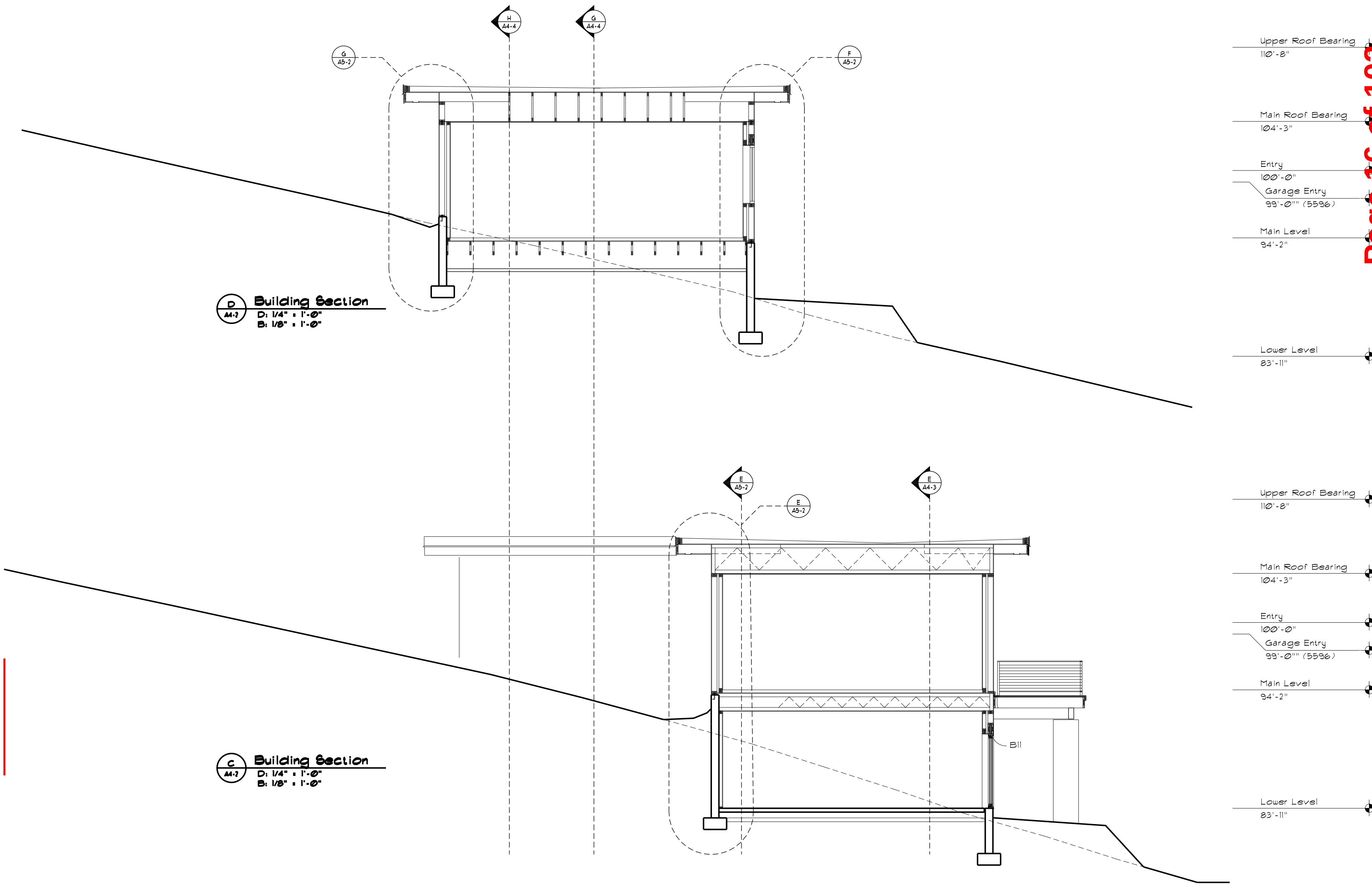

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Project No.:
1507

Sheet:
A4 2

Building Sections

Scale:
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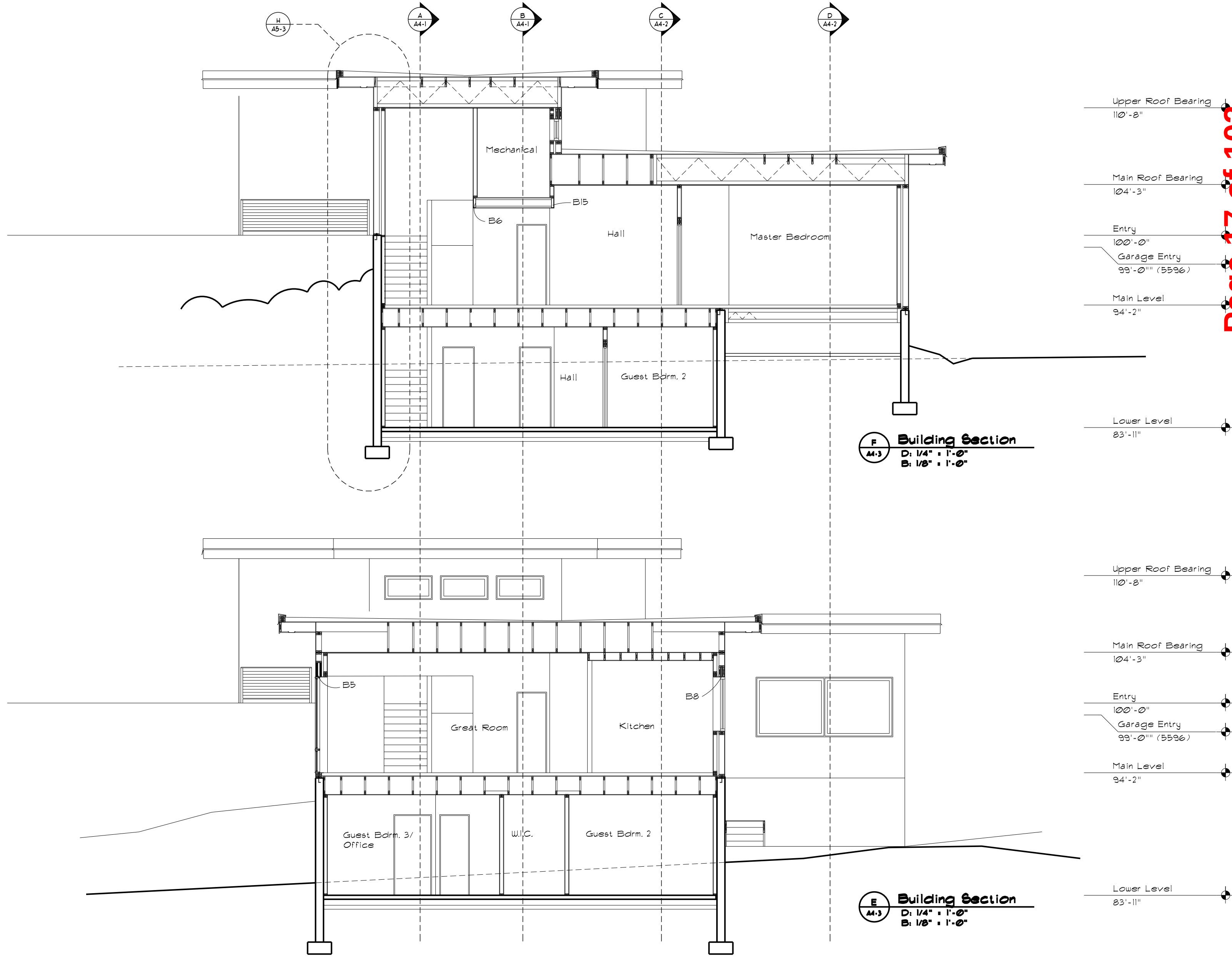

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1507

Sheet:

A4 3

Building Sections

Scale:
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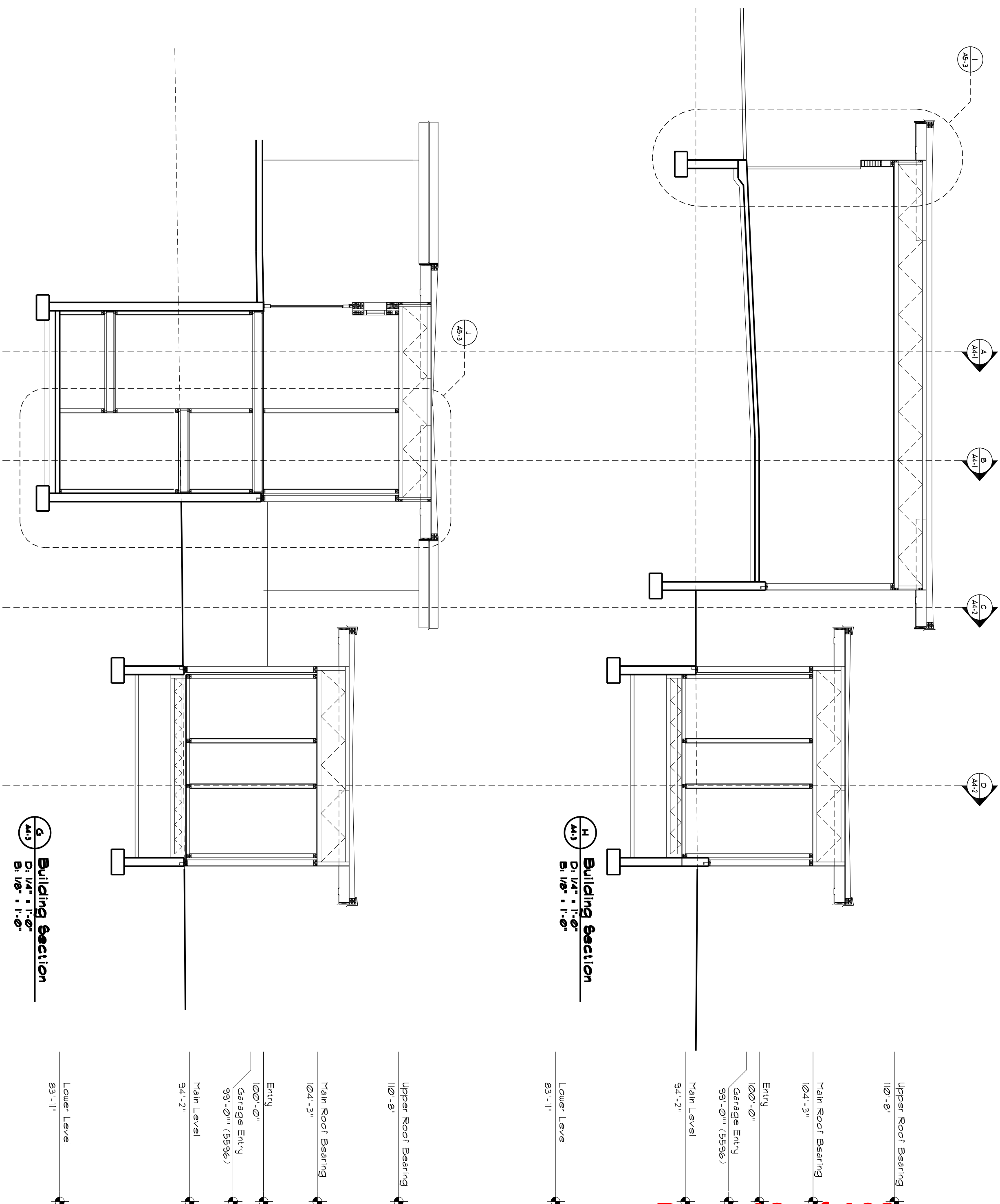

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Sheet: A4 4
Building Sections
Scale:
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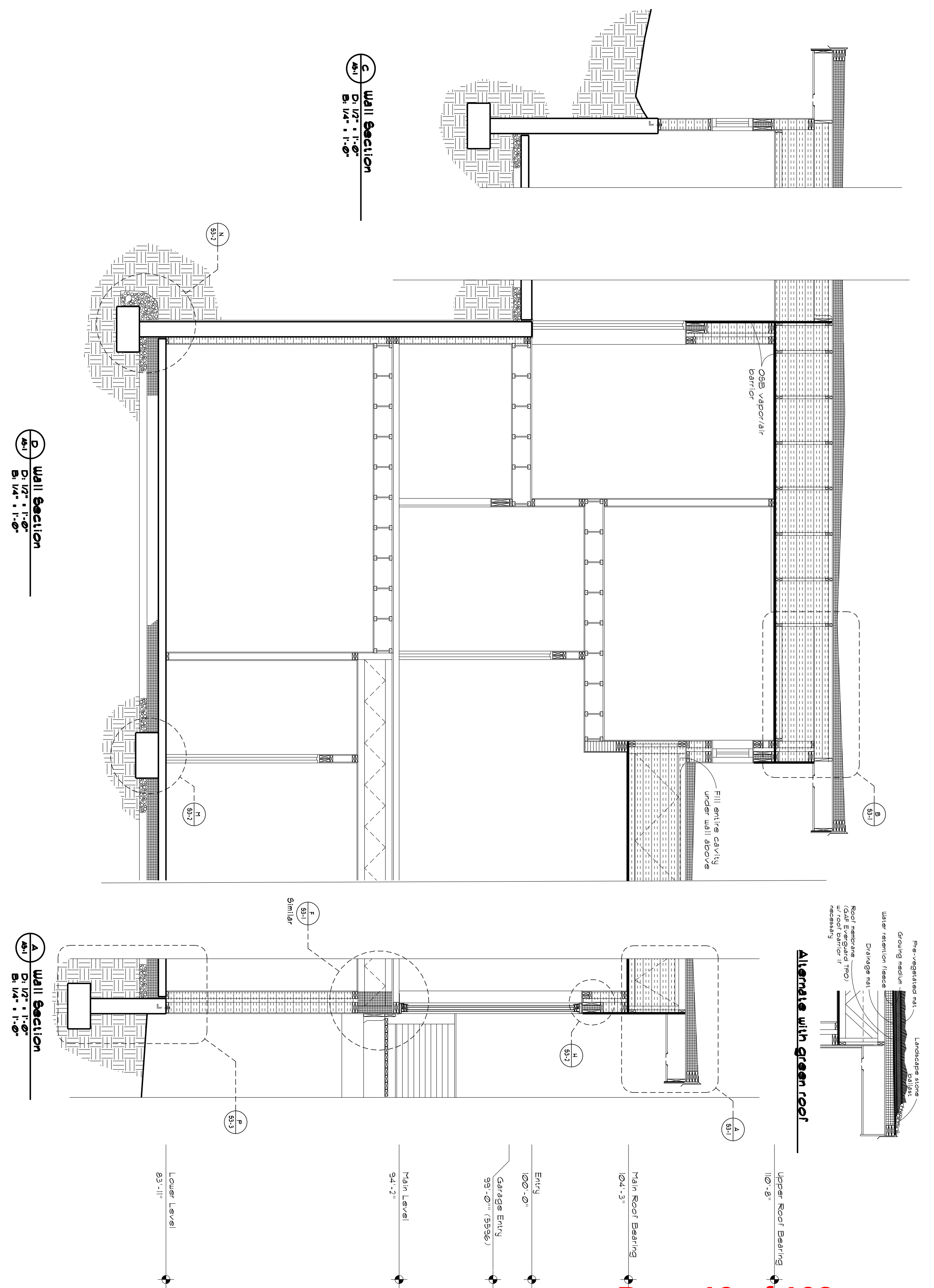

Wall Sections

Scale: D: 1/2" = 1'-0" B: 1/4" = 1'-0"

Sheet: A5 1

Project No.: 1507

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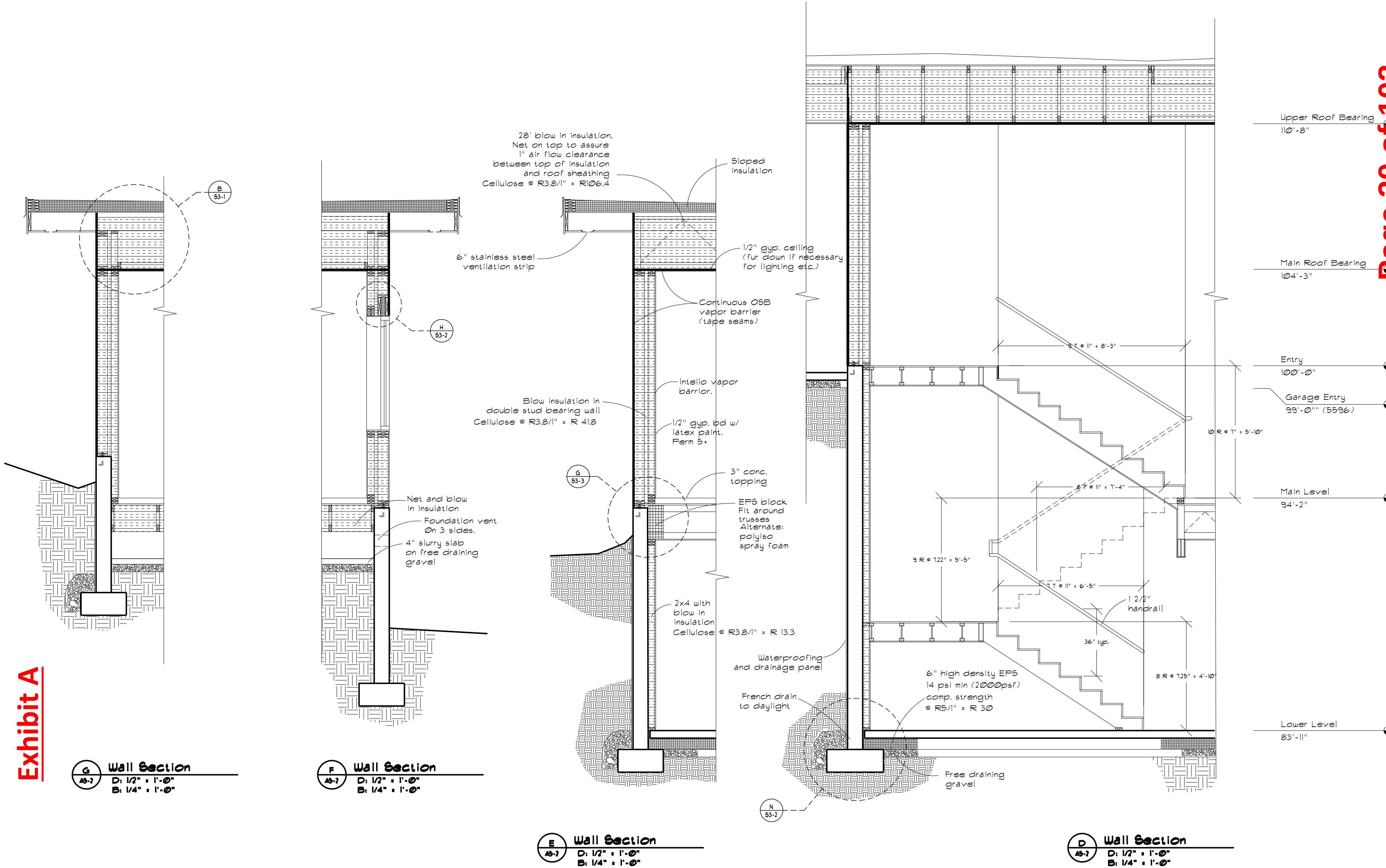

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STATE OF UTAH — William L Arthur — 125771-0301 — LICENSED ARCHITECT

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Paul and Linda LaStayo

4075 Bluebell Drive — Liberty, Utah

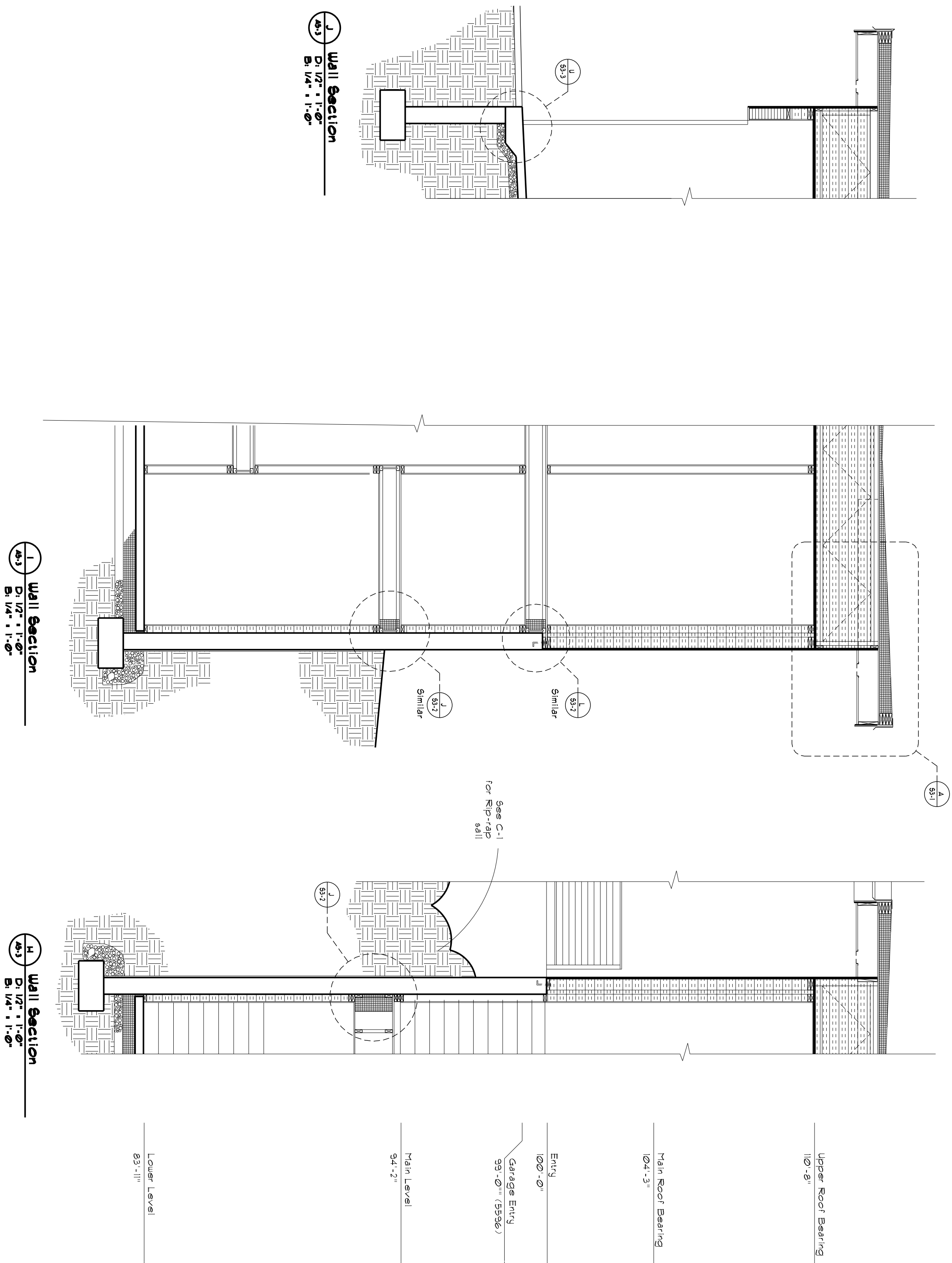
Project No.: 1507

Sheet: A5 2

Wall Sections

Scale: D: 1/2" = 1'-0" B: 1/4" = 1'-0"

Exhibit A



Wall Sections

Scale: D: 1/2" = 1'-0" B: 1/4" = 1'-0"

Sheet: A5 3

Project No.: 1507

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive, Liberty, Utah

Date: 5/2/16

Revisions:

State of Utah — William L. Mull — Licensed Architect

Coalesce Architecture Planning Inc.
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Salt Lake City, Utah 84101
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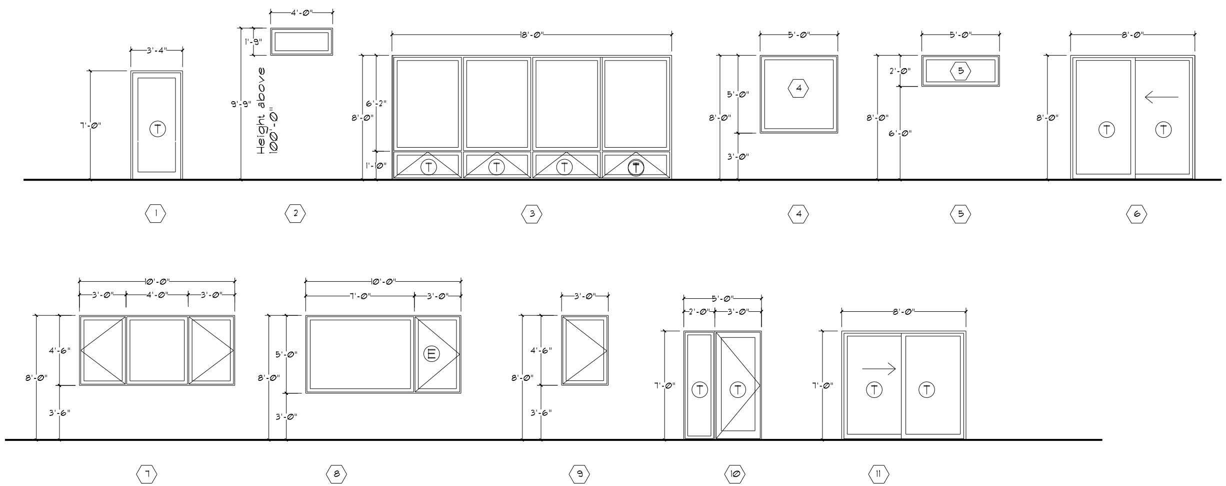
Coalescearchitecture.com

Exhibit A

Window Schedule



NOTES:

Base bid: Marvin Contemporary/ Sqaure Sticking

Door type 3 is Ultimate Multi-slide

Operable units are Tilt and Turn

(T) Tempered glass

(E) Egress window

DOOR SCHEDULE

DOOR NUMBER	DOOR					FRAME		HARDWARE GROUP	REMARKS
	SIZE		MAT.	TYPE	FINISH	MAT.	WALL TYPE		
	WIDTH	HEIGHT							
101	6'-0"	8'-0"	MFR	OV	MFR	MFR	DS	6	
102	10'-0"	10'-0"	MFR	OV	MFR	MFR	DS	6	
103	16'-0"	8'-0"	MFR	OV	MFR	MFR	DS	6	
104	3'-0"	6'-10"	MFR	WDW	MFR	MFR	DS	4	
105	3'-0"	7'-0"	WD	F	PTD	WD	DS	7	20 min. door per IRC 309.2
106	2'-6"	7'-0"	WD	F	PTD	WD	2x4	8	
201	2'-4"	7'-0"	WD	F	PTD	WD	2x4	3	
202	8'-0"	8'-0"	MFR	WDW	MFR	MFR	OS	4	
203	3'-0"	7'-0"	WD	PO	PTD	WD	2x4	8	
204	3'-0"	7'-0"	WD	F	PTD	WD	2x4	2	
205	2'-4"	7'-0"	WD	F	PTD	WD	2X6	8	
206	2'-4"	7'-0"	WD	F	PTD	WD	2X4	3	
207	2'-4"	7'-0"	WD	F	PTD	WD	2X6	3	
301	3'-0"	7'-0"	WD	F	PTD	WD	2x4	2	
302	3'-0"	7'-0"	WD	F	PTD	WD	DS	4	
303	2'-4"	7'-0"	WD	F	PTD	WD	2x4	8	
304	8'-0"	8'-0"	MFR	WDW	MFR	MFR	DS	4	
305	3'-0"	7'-0"	WD	F	PTD	WD	2X4	2	
306	2'-4"	7'-0"	WD	F	PTD	WD	2X4	3	
307	2'-6"	7'-0"	WD	F	PTD	WD	2X6	4	
308	2'-6"	7'-0"	WD	F	PTD	WD	2X6	5	

LEGEND:

WD	Wood
PTD	Painted
F	Flush (hinged)
PO	Pocket Door (Flush)
WDW	See Window Schedule
OV	Sectional overhead door
DS	Exterior wall
MFR	Manufacturer standard

Hardware:

1 Entry Door
2 Passage
3 Privacy
4 By window supplier
5 Storage / Mechanical
6 Garage
7 20 min. entry door
8 Closet

NOTES:

1. Window door dimensions are for the entire unit (see window schedule). Other doors are the door dimensions with the rough opening assumed as 2" additional in each direction. Garage doors have the clear opening dimensioned.

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STATE OF UTAH William L. Archer 125771-0301 LICENSED ARCHITECT

Date: 5/2/16

Revisions:

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, Utah

Project No.: 1507

Sheet: A7 1

Window and Door Schedule

Scale: NTS

Exhibit A

STRUCTURAL NOTES

DESIGN CRITERIA:

1. BUILDING CODES USED FOR DESIGN:
   A. I.B.C./IRC 2012 AS AMENDED BY THE STATE OF UTAH
2. DESIGN LOADS:
   A. DESIGN LIVE LOADS:
      FLOORS AND COVERED DECKS: 40 PSF
      ROOF AND EXPOSED DECKS SNOW LOAD Pf 50 PSF
      GROUND SNOW LOAD Pg 70 PSF
   B. WIND LOADS:
      BASIC WIND SPEED 115
      IMPORTANCE FACTOR 1.0
      WALL HORIZONTAL PRESSURE:
      END ZONES = 25 PSF INT. ZONES = 17 PSF
      ROOF VERTICAL PRESSURE:
      ZONE E = -35 PSF ZONE F = -20 PSF ZONE G = -25 PSF ZONE H = -15
      ANALYSIS PROCEDURE USED: MAIN WIND FORCE RESISTING SYSTEM ASCE 7-10 28.6.2
   C. SEISMIC CRITERIA:
      SEISMIC DESIGN CATAGORY D
      RISK CATEGORY II
      SITE CLASS D
      BEARING WALL SYSTEM WITH LIGHT-FRAMED WOOD SHEAR WALLS
      R = 6.5 UPPER FLOORS 5 LOWER FLOOR
      Ss = .9g
      S1 = .3g
      SdS = .67g
      Cs = .1
      ANALYSIS PROCEDURE USED: EQUIVALENT LATERAL FORCE PROCEDURE

DESIGN STRENGTHS:

A. CONCRETE:

CLASS	STRENGTH AT 28 DAYS (PSI)	TYPE	LOCATION	AIR ENTRAINMENT
A	4000	STD. WT.	INTERIOR SLABS	3%
B	4000	STD. WT.	EXTERIOR SLABS	6%
C	4000	STD. WT.	FOOTINGS	3%
D	4000	STD. WT.	FOUNDATION WALLS AND PIERS	5%

B. REINFORCEMENT FY = 60,000 PSI
C. STRUCTURAL STEEL FY = 36,000 PSI
D. STRUCTURAL TUBES FY = 46,000 PSI
E. STRUCTURAL PIPES FY = 35,000 PSI
F. MASONRY F'm = 1500 PSI

GENERAL

A. NOTES AND DETAILS ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES, TYPICAL DETAILS AND SPECIFICATIONS.

B. CONTRACTOR SHALL COMPARE ALL DIMENSIONS AND CONDITIONS ON DRAWINGS AND AT SITE. ALL OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND/OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND/OR STRUCTURAL ENGINEER BEFORE PROCEEDING WITH ANY WORK INVOLVED. IN CASE OF CONFLICT, FOLLOW THE MOST STRINGENT REQUIREMENT AS DIRECTED BY THE DESIGNER WITHOUT ADDITIONAL COST TO THE OWNER.

C. ALL DETAILS, SECTIONS, AND NOTES SHOWN ON THE DRAWINGS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR SITUATIONS ELSEWHERE UNLESS NOTED OR SHOWN OTHERWISE.

D. SHORING AND BRACING REQUIREMENTS:
   A. FLOOR AND ROOF STRUCTURES -- THE GENERAL CONTRACTOR IS RESPONSIBLE FOR THE METHOD AND SEQUENCE OF ALL STRUCTURAL ERECTION. HE SHALL PROVIDE TEMPORARY SHORING AND BRACING AS HIS METHOD OF ERECTION REQUIRES TO PROVIDE ADEQUATE VERTICAL AND LATERAL SUPPORT. SHORING AND BRACING SHALL REMAIN IN PLACE AS THE CHOSEN METHOD REQUIRES UNTIL ALL PERMANENT MEMBERS ARE IN PLACE AND ALL FINAL CONNECTIONS ARE COMPLETED, INCLUDING ALL ROOF AND FLOOR ATTACHMENTS. THE BUILDING SHALL NOT BE CONSIDERED STABLE UNTIL ALL CONNECTIONS ARE COMPLETE.
   B. WALLS ABOVE GRADE SHALL BE BRACED UNTIL THE STRUCTURAL SYSTEM IS COMPLETE. WALLS ARE NOT SELF SUPPORTING.

E. IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO COORDINATE WITH ALL TRADES ANY AND ALL ITEMS THAT ARE TO BE INTEGRATED INTO THE STRUCTURAL SYSTEM. OPENINGS OR PENETRATIONS THROUGH, OR ATTACHMENTS TO THE STRUCTURAL SYSTEM THAT ARE NOT INDICATED ON THESE DRAWINGS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND SHALL BE COORDINATED WITH THE ARCHITECT/ENGINEER. THE ORDER OF CONSTRUCTION IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. IT IS THE CONTRACTOR'S OBLIGATION TO PROVIDE ITEMS NECESSARY FOR HIS CHOSEN PROCEDURE.

F. OBSERVATION VISITS TO THE SITE BY THE ENGINEER OR THIER REPRESENTATIVES SHALL NOT BE CONSTRUED AS INSPECTION NOR APPROVAL OF CONSTRUCTION.

G. ALL CONSTRUCTION AND INSPECTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE IBC. THE CONTRACTOR SHALL COORDINATE ALL REQUIRED INSPECTIONS AND SHALL NOT PROCEED WITH THE WORK INVOLVED UNTIL THE INSPECTIONS HAVE BEEN DONE.

H. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION OF THE I.B.C.

J. THE CONTRACTOR MUST SUBMIT A WRITTEN REQUEST FOR, AND OBTAIN THE ARCHITECT'S AND/OR THE STRUCTURAL ENGINEER'S WRITTEN PRIOR APPROVAL FOR ALL CHANGES, MODIFICATIONS, OMMISIONS AND/OR SUBSTITUTIONS.

K. THE CONTRACTOR SHALL COORDINATE AND VERIFY ALL DIMENSIONS AND ELEVATIONS SHOWN ON STRUCTURAL DRAWINGS AND ARCHITECTURAL DRAWINGS WITH SITE CONDITIONS.

L. SEE THE ARCHITECTURAL DRAWINGS FOR DIMENSIONS, DOORS, WINDOWS, NON-BEARING INTERIOR AND EXTERIOR WALLS, ELEVATIONS, SLOPES, STAIRS, CURBS, DRAINS, RECESSES, DEPRESSIONS, RAILINGS, WATERPROOFING, FINISHES, CHAMFERS, KERFS, ETC.

M. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFETY AND PROTECTION IN AND AROUND THE JOB SITE AND/OR ADJACENT PROPERTIES.

N. CONTRACTOR MUST FIELD VERIFY ALL EXISTING CONDITIONS TO MATCH DETAILS SHOWN ON DRAWINGS. IF ANY CONFLICTING CONDITIONS ARISE DURING CONSTRUCTION, CONTRACTOR SHALL NOTIFY DESIGNER BEFORE PROCEEDING WITH FABRICATION OR CONSTRUCTION.

P. THERMAL OR MOISTURE PROTECTION, FURNISHINGS, DOORS, WINDOWS, EQUIPMENT, MECHANICAL, ELECTRICAL, FINISHES, SIDING, PANELING, VENEERS ARE NOT PART OF THE RESPONSIBILITY OF THE STRUCTURAL ENGINEER.

CONCRETE

1. NO PIPES, DUCTS, SLEEVES, ETC. SHALL BE PLACED IN STRUCTURAL CONCRETE UNLESS SPECIFICALLY DETAILED OR APPROVED BY STRUCTURAL ENGINEER. NO ALUMINUM PRODUCTS SHALL BE EMBEDDED IN CONCRETE. PENETRATIONS THRU WALLS WHEN APPROVED SHALL BE BUILT INTO THE WALL PRIOR TO PLACEMENT OF CONCRETE. PENETRATIONS WILL NOT BE ALLOWED IN FOOTINGS OR GRADE BEAMS DESIGNED AND DETAILED AS SEISMIC TIE ELEMENTS. PIPING, ETC. SHOULD BE ROUTED AROUND THESE ELEMENTS AND FOOTINGS STEPPED TO AVOID PIPING. PLUMBING AND ELECTRICAL SLEEVES NOT EXCEEDING 8" IN DIAMETER MAY BE PLACED IN FOUNDATION WALL PROVIDED NO REINFORCING IS CUT AND SLEEVES ARE NOT PLACED CLOSER THAN 36" O.C..
2. REFER TO ARCHITECTURAL DRAWINGS FOR MOLDS, GROOVES, ORNAMENTS, ETC. TO BE CAST IN TO CONCRETE, AND FOR EXTENT AND LOCATION OF DEPRESSIONS, CURBS, RAMPS, ETC..
3. UNLESS OTHERWISE NOTED, MAKE ALL CONCRETE SLABS ON EARTH AT LEAST 4" THICK.
4. AROUND OPENINGS LARGER THAN 12" IN ANY DIRECTION IN CONCRETE WALLS, ADD (2) #4 BARS ALL SIDES IN ADDITION TO REGULAR WALL REINFORCING AND EXTEND 24" EACH WAY BEYOND OPENING. WHERE 24" IS NOT AVAILABLE, EXTEND BARS AS FAR AS POSSIBLE AND TERMINATE WITH A STANDARD HOOK.
5. CONSTRUCTION JOINTS NOT SHOWN ON THE PLANS SHALL BE MADE AND LOCATED SO AS TO NOT IMPAIR THE STRENGTH OF THE STRUCTURE AND AS APPROVED BY THE STRUCTURAL ENGINEER. ALL STEEL REINFORCING SHALL BE CONTINUOUS THROUGH COLD JOINTS UNLESS NOTED OTHERWISE.
9. ALL VERTICAL CONCRETE FACES (INCLUDING FOOTINGS) SHALL BE FORMED. FORM MATERIALS SHALL BE STRAIGHT AND TRUE.

REINFORCING STEEL

1. ALL REINFORCING BARS SHALL CONFORM TO ASTM STANDARD A-615 GRADE 60 AND ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM STANDARD A-185 AND SHALL BE SUPPLIED IN FLAT SHEETS. ADEQUATELY TIE AND SUPPORT ALL REINFORCING STEEL AS SPECIFIED BY ACI 315, TO MAINTAIN EXACT REQUIRED POSITION. ALL FIELD BENT DOWELS SHALL BE BENT ONLY ONCE.
2. REINFORCEMENT SHALL HAVE THE FOLLOWING CONCRETE COVERAGE:
   CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH........3"
   EXPOSED TO EARTH OR WEATHER:
   #6 & LARGER .... 2", #5 & SMALLER ....1-1/2"
   NOT EXPOSED TO WEATHER OR EARTH:
   SLABS, WALLS, JOISTS, #11 & SMALLER...............3/4"
   BEAMS, COLUMNS: MAIN REINFORCING OR TIES.......1-1/2"
   SLAB ON GRADE
   PLACE REINFORCING AT CENTER OF SLAB UNLESS INDICATED OTHERWISE.
3. EXCEPT WHERE NOTED, CONTINUOUS REINFORCEMENT SHALL BE SPLICED AT POINTS OF MINIMUM STRESS BY LAPPING 36 BAR DIAMETERS IN CONCRETE AND 48 BAR DIAMETERS IN MASONRY.
4. ALL VERTICAL REINFORCING SHALL BE DOWELED TO FOOTINGS OR STRUCTURE BELOW WITH DOWELS TO MATCH. SPLICE LENGTHS SHALL COMPLY ACI 318 SECTION 12.15. DOWELS INTO FOOTINGS SHALL TERMINATE WITH A STANDARD HOOK, AND SHALL EXTEND TO WITHIN 4" OF THE BOTTOM OF THE FOOTING, BUT NOT MORE THAN 20" INTO FOOTING.
5. DO NOT WELD REINFORCING EXCEPT AS NOTED ON PLANS. WHERE REINFORCING IS WELDED, USE ASTM A-706 REINFORCING OR FOLLOW AWS D1.4 REQUIREMENTS.

STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST EDITION OF THE FOLLOWING:
   A. STRUCTURAL STEEL FOR BUILDINGS", WITH "COMMENTARY", AISC "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF
   B. AISC "CODE OF STANDARD PRACTICE" EXCLUDING THE FOLLOWING SECTIONS: 1.5.1, 3.3 (FIRST SENTENCE), 4.2, 4.2.1, 4.2.2, 7.5.4, 7.11.5.
   C. AISI "SPECIFICATIONS FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS".
2. STRUCTURAL STEEL SHALL COMPLY WITH THE FOLLOWING:
   SHAPES/PLATES – ASTM A-36 (U.N.O.)
   TUBES – ASTM A-500, GRADE B (FY = 46 KSI)
   PIPE COLUMNS – ASTM A-53, GRADE B TYPE E OR S
   DEFORMED BAR ANCHORS (DBA) – ASTM A-496
   HEADED STUD ANCHORS (HSA) – ASTM A-108
   ANCHOR BOLTS (A.B.) – ASTM A-307,
   WITH ASTM A-563 HEAVY HEX NUT AND HARDENED WASHERS, GRADE A.
3. CONNECTIONS SHALL COMPLY WITH THE STRUCTURAL DRAWINGS UNLESS WRITTEN APPROVAL TO CHANGE IS GIVEN BY THE STRUCTURAL ENGINEER.
4. ALL SHOP FABRICATIONS SHALL BE PERFORMED BY AN APPROVED FABRICATOR ACCORDING TO THE IBC (1704). SEE ALSO SPECIAL INSPECTION SCHEDULE.
5. WELDING
   A. ALL WELDING AND CUTTING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.
   B. USE E-70XX ELECTRODES UNLESS NOTED OTHERWISE. E60-XX MAY BE USED FOR WELDING STEEL DECKS.
   C. ALL INTERSECTING STEEL SHAPES WHICH ARE NOT CONNECTED WITH BOLTS SHALL BE WELDED TOGETHER WITH A FILLET WELD ALL AROUND UNLESS OTED OTHERWISE. WHERE WELD SIZES ARE NOT SHOWN USE THE FOLLOWING: 1) WHERE ALL CONNECTED PARTS ARE THICKER THAN 1/4", WELD SIZE IS 1/16" LESS THAN THE THICKNESS OF THE THINNEST PART. 2) WHERE ANY OF THE CONNECTED PARTS IS LESS THAN 1/4" THICK, WELD SIZE IS SAME AS THICKNESS OF THE THINNEST PART.
   D. WELDING OF HSA'S AND DBA'S SHALL CONFORM TO THE MANUFACTURER'S SPECIFICATIONS.
   E. WHEREVER POSSIBLE, WELDS SHALL BE SHOP WELDS. SPECIAL CONSIDERATIONS, SUCH AS ITEMS WHICH MAY NEED ADJUSTMENT AT THE SITE, REQUIRE THAT SOME WELDS BE FIELD WELDS. WHERE QUESTIONS OR DISCREPANCIES OCCUR THE CONTRACTOR SHALL COORDINATE THE WORK BETWEEN THE SHOP FABRICATOR AND THE STEEL ERECTOR.
6. BOLTING
   A. UNLESS OTHERWISE NOTED, ALL STRUCTURAL STEEL TO STEEL CONNECTIONS SHALL USE HIGH STRENGTH BOLTS CONFORMING TO ASTM A-325.
   B. UNLESS NOTED OTHERWISE ALL BOLTING IS CLASSIFIED AS NON-SLIP CRITICAL BEARING TYPE CONNECTIONS WITH THREADS INCLUDED IN SHEAR PLANE. TIGHTEN BOLTS TO A SNUG TIGHT CONDITION, WITH ALL PLIES OF THE JOINT IN FIRM CONTACT.
   C. AT OVERSIZE AND SLOTTED HOLES, WASHERS SHALL CONFORM TO ASTM F-436 AND COMPLETELY COVER THE HOLE.
   D. WHERE A STEEL BEAM TO BEAM CONNECTION IS NOT SHOWN, PROVIDE AN AISC STANDARD FRAMED CONNECTION SIZED FOR 1/2 OF THE TOTAL LOAD CAPACITY OF THE BEAM FOR THE SPAN AND STEEL SPECIFIED.
7. FABRICATORS AND SUPPLIERS SHALL COORDINATE PAINT/FINISHES WITH REQUIREMENTS FOR DIRECT APPLIED INSULATION, FIREPROOFING, ETC. AS NOTED IN THE PROJECT SPECIFICATIONS.

WOOD FRAMING NOTES

1. FRAMING LUMBER: DOUGLAS FIR LARCH OR HEM FIR (SURFACED DRY NOT TO EXCEED 19% MAXIMUM MOISTURE CONTENT, CONFORMING TO THE NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION IN THE FOLLOWING GRADES (UNLESS NOTED OTHERWISE ON PLANS):
   DIMENSIONED LUMBER - BEAMS, JOISTS: #2 OR BETTER
   (FB = 900 PSI, FV = 180 PSI, E = 1600 KSI)
   BEAMS 5"X5" AND LARGER : #1 OR BETTER
   (FB = 1350 PSI, FV =170 PSI, E = 1600KSI)
   POSTS: #1 OR BETTER
   (FB = 1200 PSI, FV = 170 PSI, E = 1600 KSI)
   STUDS: #2(HEM-FIR OR D.F)
   (FB = 900 PSI, FC = 1350 PSI, E = 1600 KSI)
2. ALL GLUE LAMINATED TIMBER MEMBERS SHALL BE GRADE 24F-1.8E, DF/DF, CONFORMING TO THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION, (FB = 2400 PSI, FV = 240 PSI, E = 1800 KSI).
3. PROVIDE SOLID BLOCKING AT LEAST 1-1/2" THICK AT ENDS AND AT EACH SUPPORT OF JOIST. PROVIDE APPROVED BRIDGING AT A MAXIMUM 8'-0"O.C. BETWEEN SUPPORTS OR AS REQUIRED BY THE JOIST MANUFACTURER.
4. NAILING SHALL CONFORM TO STANDARD NAILING SCHEDULE 2304.9.1 OF THE IBC, UNLESS NOTED OTHERWISE ON PLANS OR SCHEDULES. ALL NAILS SHALL BE COMMON NAILS.
5. BUILT-UP BEAMS OF 2X MEMBERS SHALL BE SPIKED TOGETHER WITH 16D.SPIKES AT 12" O.C. STAGGERED. USE 2-20D COMMON NAILS AT ALLSUPPORTS.
6. ALL WOOD BEAMS AND HEADERS SHALL BEAR ON MINIMUM OF TWO CRIPPLE STUDS AT EACH END UNLESS SHOWN OTHERWISE.
7. ALL WOOD POSTS, BUILT-UP COLUMNS SHALL BE CONTINUOUS TO FOUNDATION OR FLOOR JOISTS. SOLID BLOCK ALL POSTS OR COLUMNS AT FLOOR LINES.
8. BUILT-UP COLUMNS SPIKED TOGETHER WITH 16D SPIKES AT 12" O.C.
9. USE SIMPSON STRONG TIE (SST) HANGERS FOR ALL FLUSH CONNECTIONS. USE STRONGEST HANGER COMPATIBLE WITH MEMBER SIZE AND NAIL PER MANUFACTURER'S SPECIFICATION TO OBTAIN MAXIMUM LOAD CARRYING CAPACITY.
10. ALL METAL HANGERS AND CONNECTORS SHALL BE " SIMPSON " OR EQUAL.
11. PROVIDE METAL STRAPS ACROSS RIDGE BEAM FOR ROOF JOISTS.
12. SILL PLATES SHALL BE FOUNDATION GRADE REDWOOD OR PRESSURE TREATED DOUGLAS FIR LARCH (FC = 625 PSI), WHEN IN CONTACT WITH CONCRETE.
13. SECURE SILL PLATE TO FOUNDATION WITH 5/8"O X 12" A.B. @ 32" O.C. UNLESS NOTED OTHERWISE ON PLANS.
14. DOUBLE TOP AND BOTTOM PLATES TO BE LAPPED 4'-0" AT SPLICE AND CONNECT WITH 16D COMMON NAILS @ 3" O.C., STAGGERED.
15. NOTCHING OR DRILLING THROUGH ANY LUMBER MEMBER WILL NOT BE ALLOWED WITHOUT SPECIFIC APPROVAL OF STRUCTURAL ENGINEER.
16. MAXIMUM HEIGHT OF NON-BEARING STUDS SHALL BE 14 FEET FOR 2X4 AND 20 FEET FOR 2X6.
17. BEARING WALLS/EXTERIOR WALLS/SHEAR WALLS:
   (A) ALL EXTERIOR WALLS SHALL BE 2X6 STUDS AT 16" O.C. U.N.O. ALL INTERIOR WALLS SHALL BE 2x4 OR 2x6 STUDS AT 16" O/C REFER TO PLAN FOR SIZE.
   (B) SHEATH ALL EXTERIOR WALLS AND INTERIOR SHEAR WALLS WITH 7/16" A.P.A. RATED STRUCTURAL II EXTERIOR SHEATHING AS PER THE SHEAR WALL SCHEDULE.
   (C) NAIL SHEATHING AS PER THE SHEAR WALL SCHED. WITH ALL PANEL EDGES BLOCKED. REFER TO PLAN FOR ADDITIONAL REQUIREMENTS.
   (D) ALL WALL SHEATHING SHALL BE CONTINUOUS FROM SILL PLATE TO DOUBLE TOP PLATE. WHERE NECESSARY, MINIMUM DEPTH OF JOINT IN SHEATHING SHALL BE 2'-0" BELOW TOP OR ABOVE BOTTOM PLATE. BLOCK ALL PANEL EDGES.
18. ROOF SHEATHING:
   (A) 5/8" A.P.A. RATED STRUCTURAL II, EXTERIOR, PANEL INDEX #40/20
   (B) NAIL WITH: 8D @ 6" O.C. -SUPPORTED PANEL EDGES, 8D @ 12"O.C. - ALL ELSE
   (C) PLACE LONG DIRECTION OF PANELS PERPENDICULAR TO JOISTS IN A STAGGERED PATTERN.
19. FLOOR SHEATHING:
   (A) 3/4" A.P.A. RATED STURD-I-FLOOR, EXPOSURE I, PANEL INDEX #40/20, TONGUE & GROOVE
   (B) GLUE & NAIL WITH: 10D @ 6" O.C. -SUPPORTED PANEL EDGES,10D @ 10"O.C. - ALL ELSE
   (C) PLACE LONG DIRECTION OF PANELS PERPENDICULAR TO JOISTS IN A STAGGERED PATTERN.
20. TRUSS JOIST FRAMING:
   (A) TRUS JOIST SELECTION BASED ON GLUE-NAILED SYSTEM.
   (B) INSTALL FRAMING, BRIDGING, BLOCKING, PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS FOR MAXIMUM LOAD CARRYING CAPACITIES.
   (C) ANY NOTCHING OR DRILLING THROUGH TRUS JOISTS SHALL ONLY BE MADE PER MANUFACTURER'S GUIDELINES. NOTCHING OR DRILLING TOP OR BOTTOM CHORDS NOT ALLOWED.
   (D) ALL MICRO LAM BEAMS SHALL BE GLUED AND SPIKED TOGETHER BY MANUFACTURER TO ACT AS SOLID BEAM.
21. PROVIDE MIN. 18" CLEARANCE FOR WOOD JOISTS AND 12" CLEARANCE FOR WOOD GIRDERS IN CRAWLSPACES UNLESS PROPER REDWOOD OR PRESSURE TREADED WOOD IS SPECIFIED.
22. ALL LUMBER IN CONTACT WITH CONCRETE OR MASONRY INCLUDING LEDGERS AND FURRING WALLS MUST BE PRESERVATIVELY TREATED OR FOUNDATION GRADE REDWOOD.
23. PROVIDE 1/2 INCH AIRSPACE AT TOP, SIDES AND ENDS OF GIRDERS ENTERING EXTERIOR CONCRETE OR MASONRY WALLS UNLESS WOOD RESISTANT TO DECAY IS USED.
24. NO WOOD SHALL BE NEARER THAN 8 INCHES TO EARTH UNLESS SEPARATED BY CONCRETE AT LEAST 3 INCHES IN THICKNESS WITH AN IMPERVIOUS MEMBRANE INSTALLED BETWEEN THE EARTH AND CONCRETE. THIS INCLUDES DECKS AND SIDING.
25. ALL FASTENERS INSTALLED IN PRESERVATIVE TREAED WOOD, INCLUDING NAILS, SCREWS AND ANCHOR BOLTS, SHALL MEET THE REQUIREMENTS OF IBC 2304.9.5.
26. ALL LUMBER AND LAMINATED BEAMS EXPOSED TO WEATHER AND NOT COVER BY A ROOF, SHALL BE PRESSURE TREATED WITH PRESERVATIVE OR MANUFACTURED WITH PRESERVATIVE TREATED WOOD.
26. ROOF TRUSSES:
   (A) DESIGN TRUSSES FOR FOLLOWING CRITERIA:
   ROOF TRUSSES
   DEAD LOAD = TOP CHORD 30 PSF BOTTOM CHORD 5 PSF
   SNOW LOADS = 50 PSF PLUS DRIFT AS SHOWN ON PLAN.
   WIND UPLIFT PRESSURE = SEE DESIGN CRITERIA THIS SHEET.
   FLOOR TRUSSES
   DEAD LOAD = TOP CHORD 45 PSF BOTTOM CHORD 5 PSF
   LIVE LOAD = 40 PSF
   LIVE LOAD DEFLECTION = L/400 MAXIMUM
   (B) HANDLING, INSTALLING AND TEMPORARY BRACING OF TRUSSES SHALL BE IN ACCORDANCE WITH THE HIB-91 SUMMARY SHEET BY THE TRUSS PLATE INSTITUTE.
   (C) NO STRESS INCREASE ALLOWED FOR TRUSS DESIGN.
   (D) TRUSS MANUFACTURER SHALL PROVIDE HANGERS FOR ALL TRUSS TO TRUSS CONNECTIONS.
   (E) TRUSS MANUFACTURER SHALL SUBMIT TRUSS PACKAGE AS A DEFERRED SUBMITTAL, STAMPED BY A LICENSED ENGINEER, TO ENGINEER AND BUILDING OFFICIAL FOR REVIEW. SUBMITTAL SHALL INCLUDE SCHEMATIC DIAGRAMS SHOWING: SIZES, SLOPES, LOADS, SPANS, AND BEARING CONDITIONS. NO TRUSSES SHALL DE INSTALLED UNTIL APPROVED BY THE BUILDING DEPARTMENT.

FOUNDATION

1. DESIGN SOIL PRESSURE: 1500 PSF (ASSUMED) TO BE FIELD VERIFIED BY A LICENSED GEOTECHNICAL ENGINEEER IF SOFT SOILS ARE ENCOUNTERED.
2. ALL FOOTINGS SHALL BEAR ON UNDISTURBED NATURAL SOILS OR ON ENGINEERED COMPACTED FILL. IF UNSUITABLE SOILS ARE ENCOUNTERED, THEY SHALL BE REPLACED WITH ENGINEERED COMPACTED FILL.
3. TOP OF FOOTING ELEVATIONS SHOWN ON THE FOOTING AND FOUNDATION PLAN ARE BASED ON PRELIMINARY GRADING INFORMATION AND MUST BE VERIFIED PRIOR TO CONSTRUCTION. FOOTING STEPS, WHERE SHOWN, ARE AT APPROXIMATE LOCATIONS.
4. ALL WALLS (EXCEPT CANTILEVERED RETAINING WALLS) SHALL BE ADEQUATELY BRACED AGAINST LATERAL MOVEMENT PRIOR TO BACKFILLING. DESIGN AND ERECTION OF BRACING/SHORING IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. BRACING SHALL REMAIN IN PLACE UNTIL SUPPORTING STRUCTURAL ELEMENTS ARE IN PLACE AND HAVE ATTAINED FULL STRENGTH.
5. UNLESS NOTED OTHERWISE, ALL FOOTINGS AT COLUMNS TO BE CENTERED BELOW COLUMNS.
6. EXTERIOR FOOTINGS SHALL HAVE A MINIMUM 3'-0" FROST PROTECTION. INTERIOR FOOTINGS SHALL BEAR MINIMUM 1-'0" BELOW FINISH GRADE. FOOTINGS SAHLL NOT BE PLACED ON ICE OR FROZEN SOILS.
7. FOUNDATION WALLS OVER 8 FEET HIGH, DO NOT INSTALL FORMS ON ONE SIDE UNTIL REBAR HAS BEEN INSPECTED AND APPROVED.
8. THE CONTRACTOR SHALL COORDINATE TEMPORARY SHORING OF EXCAVATIONS.

MISCELLANEOUS:

A. EXPANSION BOLTS, CHEMICAL ANCHORS, DEFORMED BAR ANCHORS AND HEADED STUDS: ALL EXPANSION BOLTS SHALL BE HILTI KWIK BOLT-3 AS NOTED ON THE DRAWINGS, OR APPROVED WITH EQUIVALANT ICC-ES ALLOWABLE TENSION AND SHEAR VALUES. MINIMUM EMBEDMENT UNLESS OTHERWISE NOTED SHALL BE: 4" FOR 1/2" DIAMETER, 5" FOR 5/8" AND 3/4" DIAMETER.

   HEADED SHEAR STUDS SHALL BE NELSON HEADED ANCHORS WITH FLUXED ENDS OR APPROVED. DEFORMED BAR ANCHORS (DBA) SHALL BE NELSEN, TYPE D2L, OR APPROVED. STUDS AND DBA SHALL BE AUTOMATICALLY END-WELDED WITH THE MANUFACTURER'S STANDARD EQUIPMENT IN ACCORDANCE WITH THEIR RECOMMENDATIONS.

B. EMBEDDED PLATES AND ANCHOR BOLTS:
   PERMANENTLY EXPOSED PLATES AND ANGLES SHALL BE HOT-DIPPED, GALVANIZED AFTER FABRICATION, UNLESS OTHERWISE NOTED. NO LOADS OR WELDS SHALL BE PLACED ON EMBEDDED PLATES OR ANGLES FOR A MINIMUM OF 7 DAYS AFTER CASTING.

   ALL ANCHOR BOLTS FOR MECHANICAL AND ELECTRICAL EQUIPMENT ARE FURNISHED AND LOCATED BY THE RESPECTIVE CONTRACTORS AND SET BY GENERAL CONTRACTOR EXCEPT WHERE THE OTHER CONTRACTORS FURNISH THEIR OWN CONCRETE PADS.

C. EPOXY ADHESIVE:
   EPOXY ADHESIVE SHALL CONFORM TO ASTM C881 AND SHALL BE A TWO-COMPONENT, LIQUID EPOXY WITH NON-SAG CONSISTENCY AND A LONG POT LIFE, AND SHALL BE SUITABLE FOR USE ON DRY OR DAMP SURFACES. MINIMUM SLANT SHEAR STREGTH SHALL BE 5,000 PSI, AND MINIMUM TENSILLE STRENGTH SHALL BE 4,000 PSI. HOLES SIZES AND INSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH APPROVED ICC-ES REQUIREMENTS.

D. CORE DRILLING:
   ALL CORE DRILLING SHALL BE DONE BY THE MECHANICAL AND ELECTRICAL CONTRACTORS FOR THEIR OWN WORK UNDER THE SUPERVISION OF THE GENERAL CONTRACTOR. THERE SHALL NOT BE ANY CORE DRILLING THROUGH BEAMS OR COLUMNS. MAXIMUM CORE HOLE THROUGH SLABS SHALL BE PIPE DIAMETER PLUS 1".

SUBMITTALS:

A. SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO FABRICATION AND CONSTRUCTION REGARDING STRUCTURAL ITEMS INCLUDING:
   PRE-MANUF. WOOD TRUSSES.
B. IF THE SHOP DRAWINGS DIFFER FROM, OR ADD TO THE DESIGN OF THE STRUCTURAL DRAWINGS, THEY SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF JURISDICTION. ANY CHANGES TO THE STRUCTURAL DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT AND ARE SUBJECT TO REVIEW AND ACCEPTANCE OF THE ENGINEER.
C. DESIGN DRAWINGS, SHOP DRAWINGS, AND CALCULATIONS FOR THE DESIGN AND FABRICATION OF ITEMS THAT ARE DESIGNED BY OTHERS, INCLUDING TIMBER TRUSSES METAL ROOF DECKS, STAIRS, WINDOW WALL, AND ALL OTHER GLAZING SYSTEMS SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF JURISDICTION, AND SHALL BE SUBMITTED TO THE ARCHITECT PRIOR TO FABRICATION, CALCULATIONS SHALL BE INCLUDED FOR ALL CONNECTIONS TO THE STRUCTURE, CONSIDERING LOCALIZED EFFECTS ON STRUCTURAL ELEMENTS INDUCED BY CONNECTION LOADS. DESIGN SHALL BE BASED ON THE REQUIREMENTS OF THE CURRENT I.B.C.
D. THE CONTRACTOR SHALL COORDINATE SEISMIC RESTRAINTS OF MECHANICAL, PLUMBING, AND ELECTRICAL EQUIPMENT, MACHINERY, AND ASSOCIATED PIPING WITH THE STRUCTURE. ANY CONNECTIONS TO STRUCTURE NOT CONFORMING TO STEEL METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA), OR SPECIFICALLY DETAILED ON THE MECHANICAL ENGINEER'S DRAWINGS, SHALL BE DESIGNED BY AN ENGINEER REGISTERED IN THE STATE OF JURISDICTION, AND SHALL BE SUBMITTED TO THE ARCHITECT PRIOR TO FABRICATION.
E. FIELD ENGINEERED DETAILS DEVELOPED BY THE CONTRACTOR THAT DIFFER FROM, OR ADD TO THE STRUCTURAL DRAWINGS SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF JURISDICTION AND SHALL BE SUBMITTED TO THE ARCHITECT PRIOR TO CONSTRUCTION.

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Revisions:

A New Residence for
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Liberty, Utah

Project No.: 1507

Sheet: S1 1

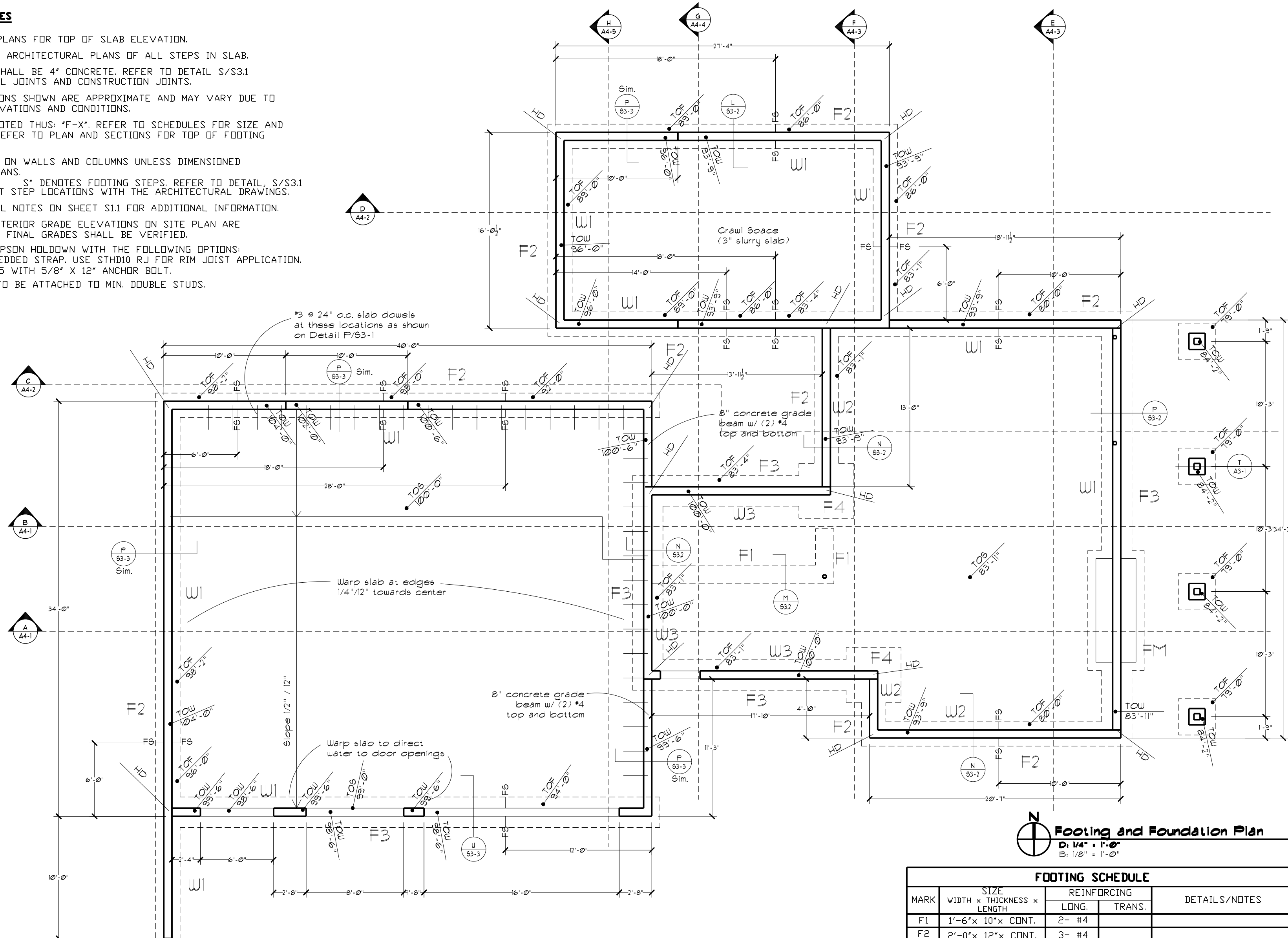
Scale:

Exhibit A

FOUNDATION PLAN NOTES

1. REFER TO ARCH. PLANS FOR TOP OF SLAB ELEVATION.
2. VERIFY WITH THE ARCHITECTURAL PLANS OF ALL STEPS IN SLAB.
3. SLAB ON GRADE SHALL BE 4" CONCRETE. REFER TO DETAIL S/S3.1 FOR SLAB CONTROL JOINTS AND CONSTRUCTION JOINTS.
4. FOOTING ELEVATIONS SHOWN ARE APPROXIMATE AND MAY VARY DUE TO ACTUAL SITE ELEVATIONS AND CONDITIONS.
5. FOOTING TYPES NOTED THUS: "F-X". REFER TO SCHEDULES FOR SIZE AND REINFORCEMENT. REFER TO PLAN AND SECTIONS FOR TOP OF FOOTING ELEVATION.
6. CENTER FOOTINGS ON WALLS AND COLUMNS UNLESS DIMENSIONED OTHERWISE ON PLANS.
7. "S______ S" DENOTES FOOTING STEPS. REFER TO DETAIL, S/S3.1 COORDINATE EXACT STEP LOCATIONS WITH THE ARCHITECTURAL DRAWINGS.
8. REFER TO GENERAL NOTES ON SHEET S1.1 FOR ADDITIONAL INFORMATION.
9. CONTOURS AND EXTERIOR GRADE ELEVATIONS ON SITE PLAN ARE APPROXIMATE. ALL FINAL GRADES SHALL BE VERIFIED.
10. "HD" DENOTES SIMPSON HOLDOWN WITH THE FOLLOWING OPTIONS:
    1. STHD10 EMBEDDED STRAP. USE STHD10 RJ FOR RIM JOIST APPLICATION.
    2. HDU2-SDS2.5 WITH 5/8" X 12" ANCHOR BOLT.

    ALL HOLDDOWNS TO BE ATTACHED TO MIN. DOUBLE STUDS.



Footing and Foundation Plan
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

FOOTING SCHEDULE

MARK	SIZE WIDTH × THICKNESS × LENGTH	REINFORCING LONG.	REINFORCING TRANS.	DETAILS/NOTES
F1	1'-6"× 10"× CONT.	2- #4		
F2	2'-0"× 12"× CONT.	3- #4		
F3	2'-6"× 12"× CONT.	3- #4		
F4	4'-6"× 12"× 4'-6"	6- #4	6- #4	

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Footing and Foundation Plan

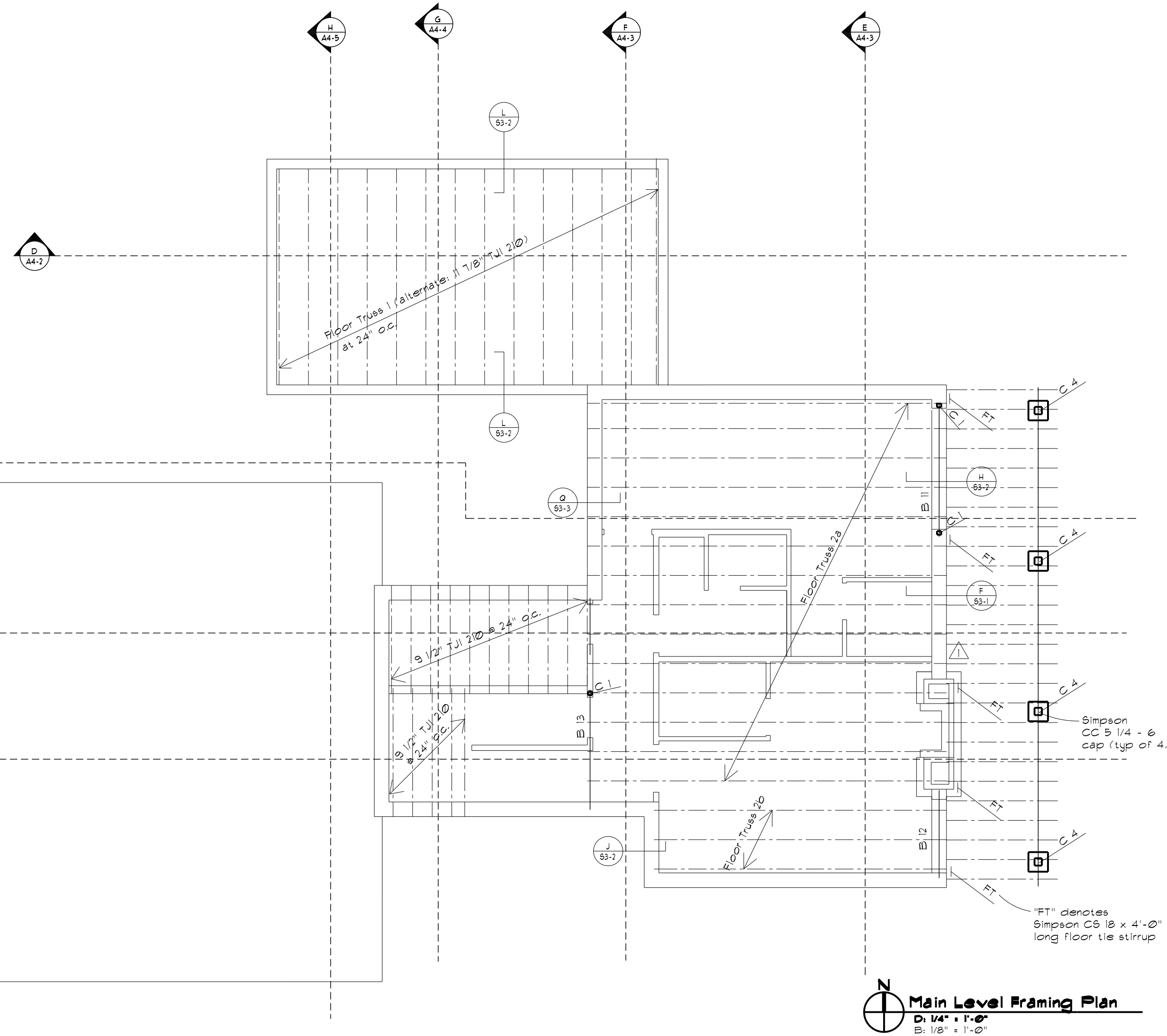
Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

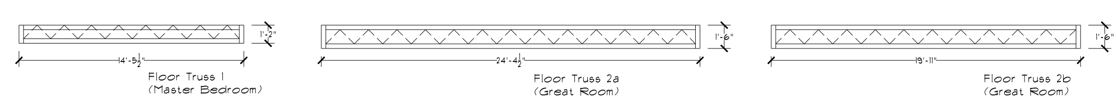
Exhibit A

BEAM SCHEDULE (SEE NOTE 2 BELOW)

MARK	GLU LAM	SAWN	STEEL	LVL (SEE NOTE 1 BELOW)	NOTES
B1	5 1/2" X 18"				5
B2	5 1/2" X 10 1/2"				5
B3	5 1/2" X 9"				5
B4		2-2x10			6
B5				2-1 3/4" X 14"	6
B6	5 1/2" X 16 1/2"				3
B7				2-1 3/4" X 11 7/8"	6
B8				2-1 3/4" X 9 1/4"	6
B9				2-1 3/4" X 9 1/4"	6
B10				2-1 3/4" X 9 1/4"	6
B11				2-1 3/4" X 14"	6
B12				2-1 3/4" X 9 1/4"	6
B13				2-1 3/4" X 9 1/4"	3
B14	5 1/2" X 9"				4
B15	5 1/2" X 18"				3

BEAM SCHEDULE NOTES
1. LVL DENOTES 1.9E MICROLLAM BY TRUS JOIST MACMILLAN OR EQUIVELANT.
2. BEAM SIZES SHOWN MAY BE UPSIZED AS DESIRED. IF A DIFFERENT BEAM TYPE IS DESIRED, IT SHALL FIRST BE APPROVED BY THE ARCHITECT & ENGINEER.
3. BEAM IS FLUSH WITH FLOOR OR ROOF JOISTS.
4. BEAM IS EXPOSED BELOW FLOOR OR ROOF JOISTS.
5. HEADER IN WALL.
6. INSULATED HEADER IN WALL PER DETAIL H/S3.1.
7. USE GRADE 24FV8 GLU-LAM WITH ZERO CAMBER





FRAMING PLAN NOTES

1. ALL BEAMS AND HEADERS TO BEAR ON MINIMUM (1) CRIPPLE UNLESS NOTED OTHERWISE ON PLANS.
2. MINIMUM HEADER SIZE IN BEARING WALLS SHALL BE MIN. 2-2X10 OR (2) 1 3/4"x7 1/4" LVL, UNLESS SHOWN OTHERWISE ON PLANS.
3. SHEAR WALL TYPES & LOCATION ARE DENOTED THUS: [X] ON PLAN. REFER TO SHEAR WALL SCHEDULE ABOVE. INTERIOR SHEAR WALLS ARE DENOTED THUS [X] ON PLAN.
4. ALL EXTERIOR WALLS ARE TO BE TYPE [1] SHEAR WALLS UNLESS NOTED OTHERWISE ON PLANS.
5. REFER TO DETAILS, GENERAL STRUCTURAL NOTES (SHEET S2) AND SHEAR WALL SCHEDULE (ABOVE) FOR TYPICAL SHEAR WALL AND BEARING WALL CONSTRUCTION.
6. REFER TO GENERAL STRUCTURAL NOTES ON SHEET S1.1 FOR ADDITIONAL INFORMATION.
7. REFER TO DETAILS C, D, E, AND H/D2 FOR TYPICAL HEADER OR BEAM IN WALL DETAILS.

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Sheet: S2 2

Main Level Framing Plan

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Exhibit A

SHEAR WALL SCHEDULE

TYPE	SHEATHING MATERIAL	EDGE NAILING	ANCHOR BOLTS	NOTES	SILL PLATE SIZE
1	7/16" APA	#8d @ 6" o/c	5/8" X12" @ 32"	A,B,C,D	2X6 OR 2X8
2	7/16" APA	#8d @ 4" o/c	5/8" X12" @ 32"	A,B,C,D,E	2X6 OR 2X8
3	7/16" APA	#8d @ 3" o/c	5/8" X12" @ 16"	A,B,C,D,E	2X6 OR 2X8

NOTES

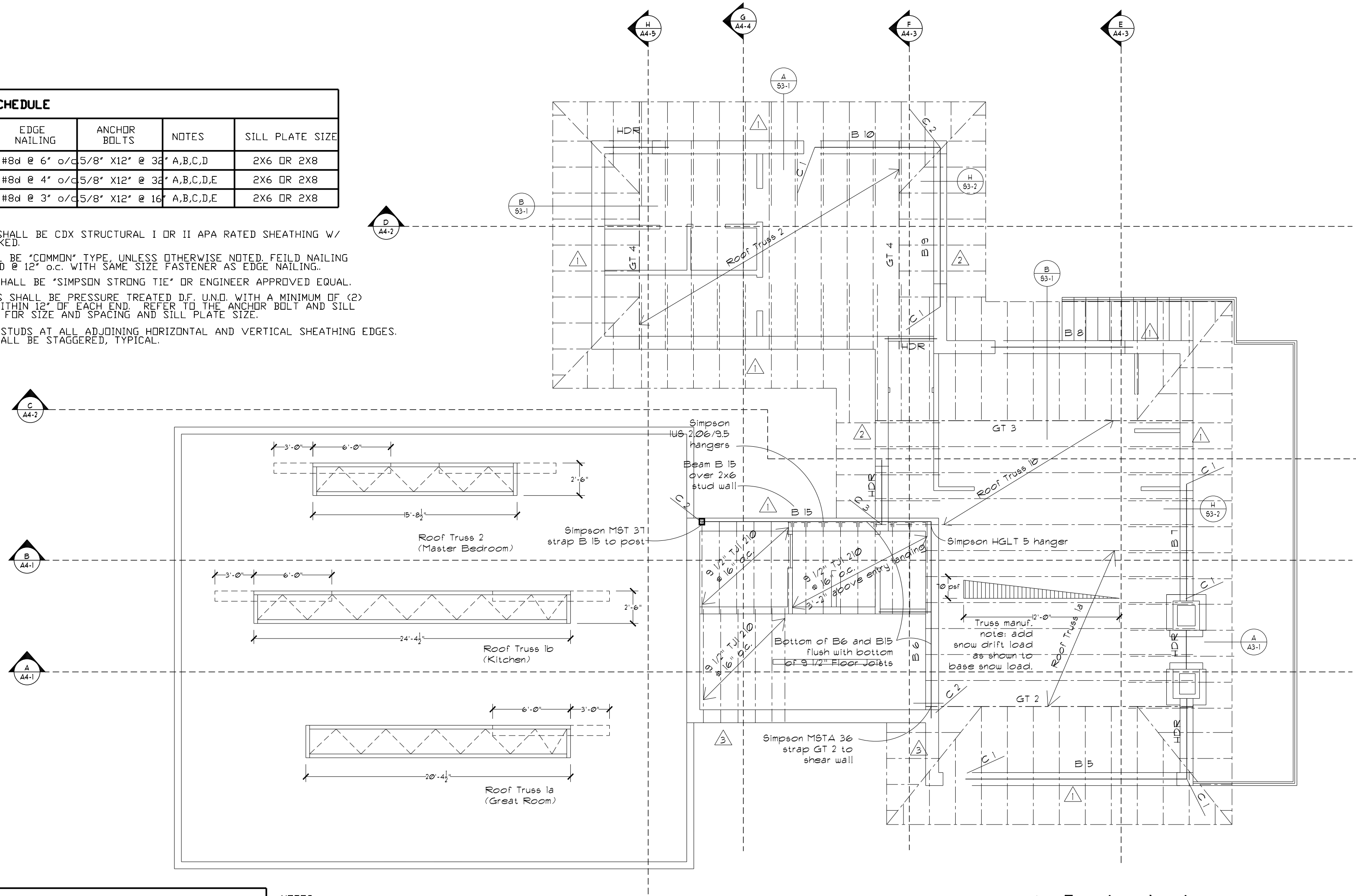
A. ALL SHEATHING SHALL BE CDX STRUCTURAL I OR II APA RATED SHEATHING W/ ALL EDGES BLOCKED.

B. ALL NAILS SHALL BE "COMMON" TYPE, UNLESS OTHERWISE NOTED. FEILD NAILING SHALL BE SPACED @ 12" o.c. WITH SAME SIZE FASTENER AS EDGE NAILING.

C. ALL HARDWARE SHALL BE "SIMPSON STRONG TIE" OR ENGINEER APPROVED EQUAL.

D. ALL SILL PLATES SHALL BE PRESSURE TREATED D.F. U.N.O. WITH A MINIMUM OF (2) ANCHOR BOLTS WITHIN 12" OF EACH END. REFER TO THE ANCHOR BOLT AND SILL PLATE SCHEDULE FOR SIZE AND SPACING AND SILL PLATE SIZE.

E. USE MINIMUM 3x STUDS AT ALL ADJOINING HORIZONTAL AND VERTICAL SHEATHING EDGES. EDGE NAILING SHALL BE STAGGERED, TYPICAL.



N
Entry Level and Main Roof Framing Plan
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

COLUMN SCHEDULE

MARK	SIZE	NOTES
C1	2-2x6, 2-2x4	MATCH STUD WALL SIZE
C2	3-2x6, 3-2x4	MATCH STUD WALL SIZE
C3	4-2x6, 4-2x4	MATCH STUD WALL SIZE
C4	6X6	

NOTES

K.P. DENOTES KING POST.
P.A. DENOTES POST ABOVE.

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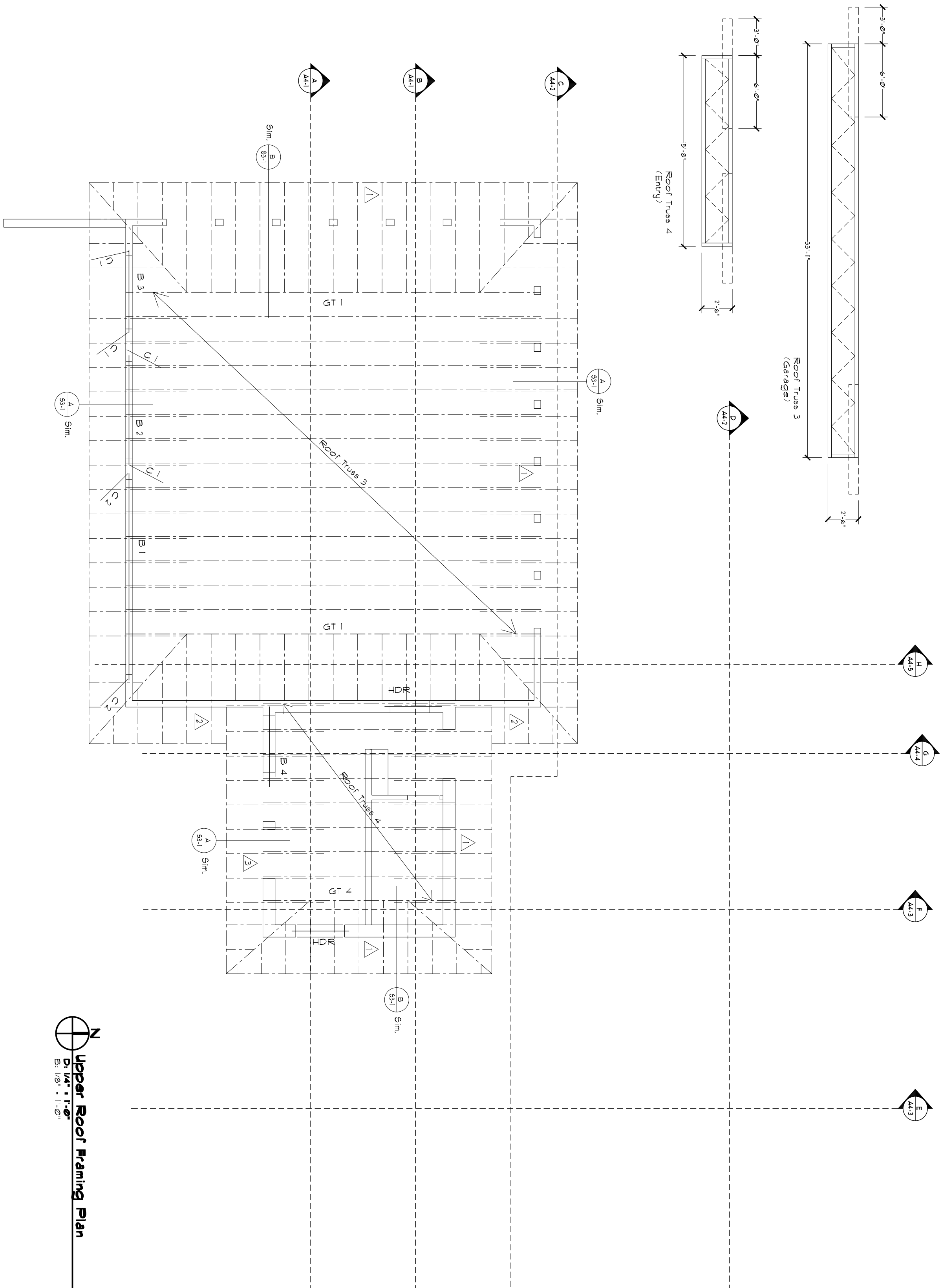
Sheet: **S2 3**

Entry and Main Roof Framing Plan

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Exhibit A



Upper Roof Framing Plan

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Sheet: S2.4

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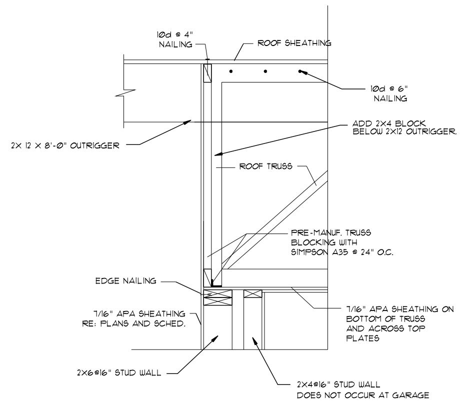
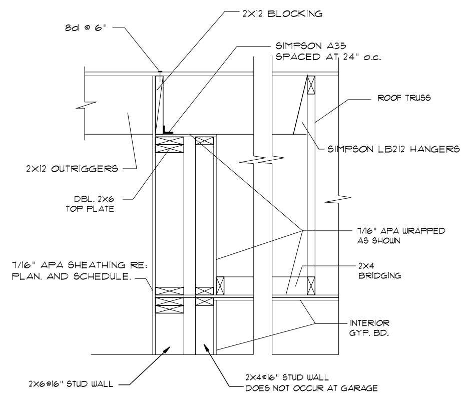
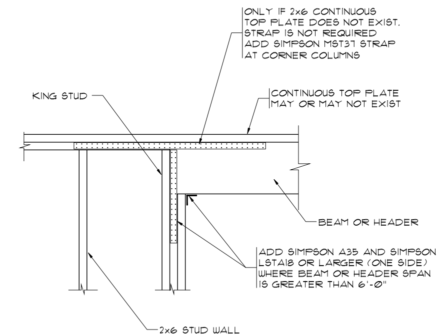
Exhibit A



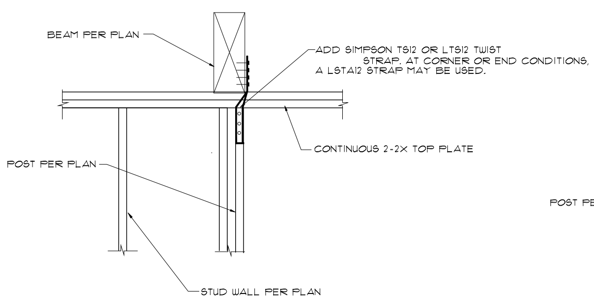
A TYP. ROOF TRUSS BEARING DETAIL
S3.1 NO SCALE



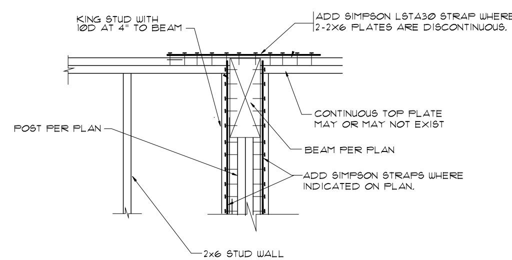
B TYP. GABLE WALL DETAIL
S3.1 NO SCALE



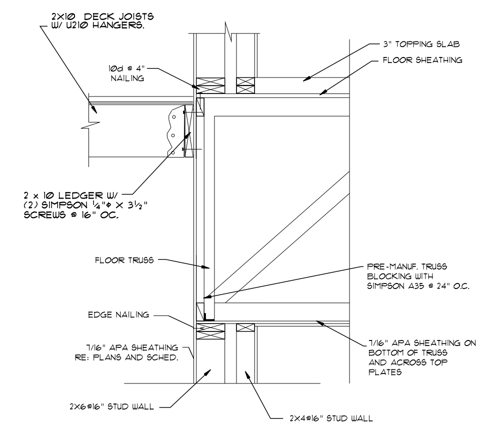
C TYP. BEAM OR HEADER IN WALL DETAIL
S3.1 NO SCALE



D TYP. BEAM TO WALL DETAIL
S3.1 NO SCALE



E TYP. BEAM TO WALL DETAIL
S3.1 NO SCALE



F TYP. FLOOR TRUSS BEARING DETAIL
S3.1 NO SCALE

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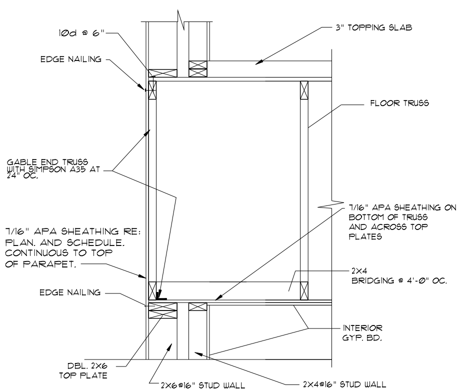
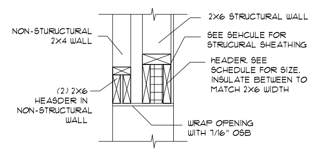
Sheet: S3 1

Structural Details
Scale: NTS

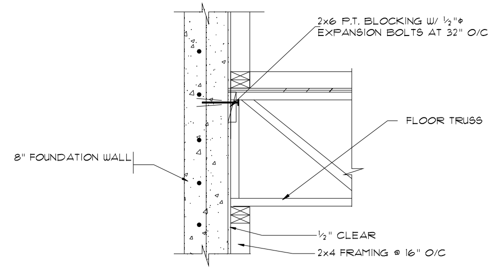
Exhibit A



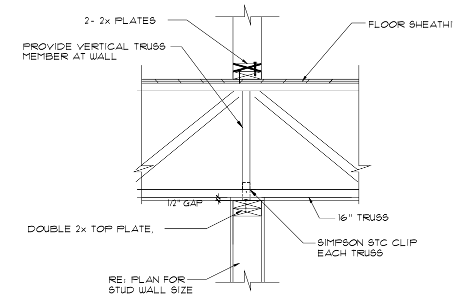
G TYP. GABLE WALL DETAIL
S3.2 NO SCALE



H TYP. INSULATED HEADER
S3.2 NO SCALE

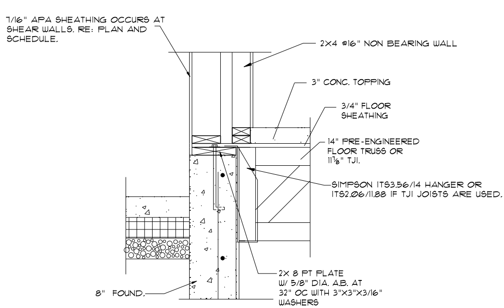


J FLOOR TRUSS BEARING DETAIL
S3.2 NO SCALE

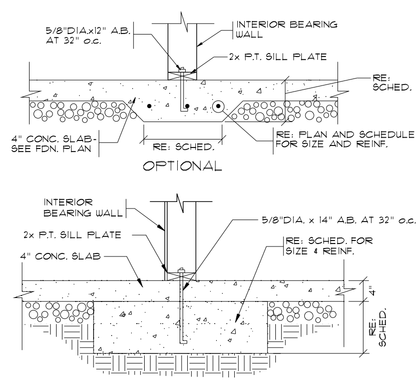


NOTE: TOP OF WALL TO BE BUILT TO ALLOW FOR ½" DEFLECTION OF THE TRUSS.

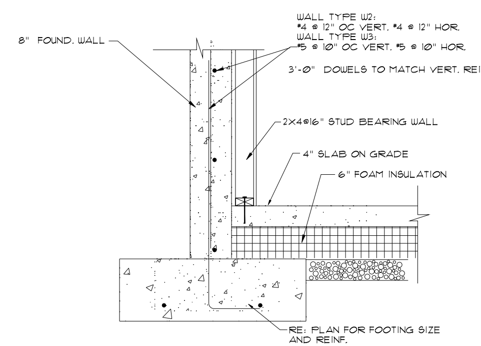
K TYP. INTERIOR NON BEARING WALL DETAIL
S3.2 NO SCALE



L TOP OF FOUNDATION WALL DETAIL
S3.2 NO SCALE



M TYP. INTERIOR FOOTING DETAIL
S3.2 NO SCALE



N TYP. FOUND WALL TYPES W2 AND W3
S3.2 NO SCALE

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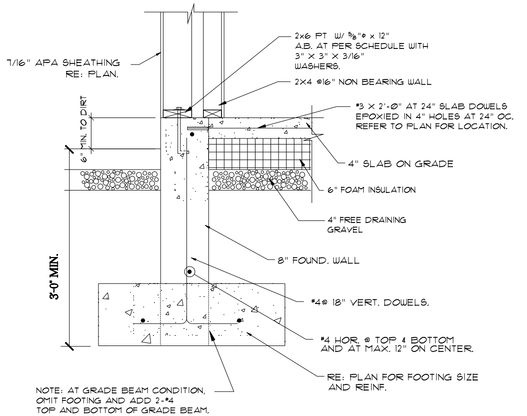
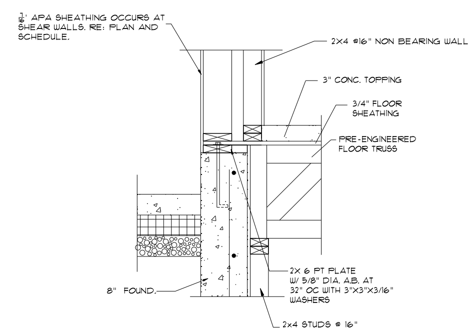
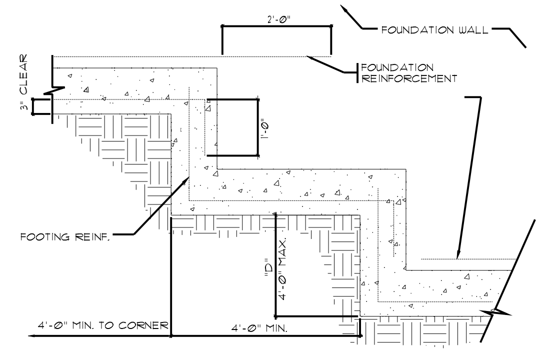
Exhibit A



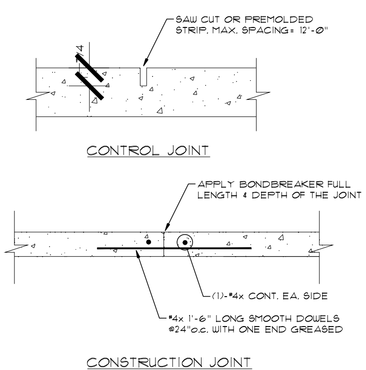
P — TYP. FOUND. WALL W/ DETAIL
S3.3 — NO SCALE



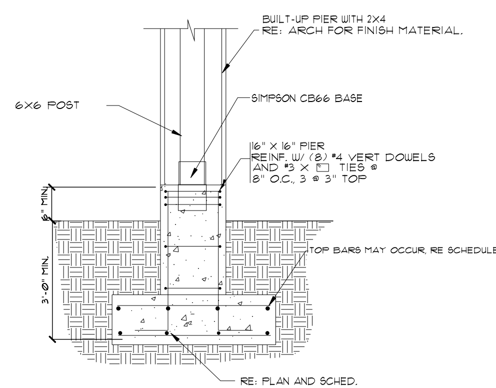
Q — TYP. TOP OF FOUNDATION DETAIL
S3.3 — NO SCALE



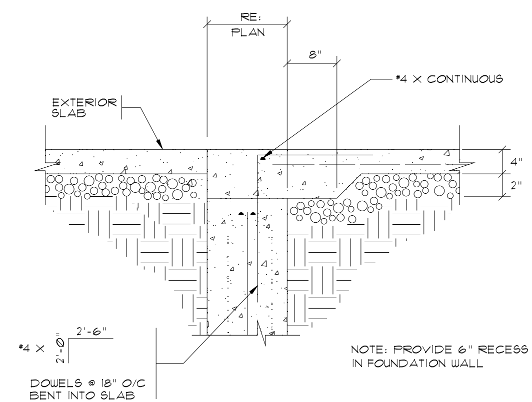
R — TYP. FOOTING STEP DETAIL
S3.3 — NO SCALE



S — TYP. SLAB JOINT DETAILS
S3.3 — NO SCALE



T — DECK PIER DETAIL
S3.3 — NO SCALE



U — DOOR THRESHOLD DETAIL
S3.3 — NO SCALE

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Structural Details

Scale: NTS

Exhibit A

PLUMBING GENERAL NOTES

1. CODES
   COMPLY WITH THE CURRENT PLUMBING CODE AND ALL LOCAL CODES AND REGULATIONS FOR PLUMBING ON THIS PROJECT.
   ALL WORK AND MATERIALS SHALL CONFORM TO ALL APPLICABLE LOCAL AND STATE CODES, LAWS, AND REGULATIONS, AND ALL UTILITY COMPANY REGULATIONS.

2. SOIL AND WASTE PIPING:
   A. VERTICAL DRAIN LINES, INCLUDING ROOF DRAINS, TO BE SERVICE WEIGHT NO-HUB CAST IRON SOIL PIPE WITH STEEL COUPLINGS AND NEOPRENE GASKETS
   B. OTHER SOIL AND WASTE PIPING TO COMPLY WITH APPLICABLE CODES.

4. DOMESTIC WATER PIPING:
   WIRSBO AQUAPEX OR EQUAL

5. WATER CLOSETS SHALL USE 1.6 GAL. OR LESS PER FLUSH SHOWER HEADS SHALL HAVE A FLOW OF 2.5 GPM OR LESS.

6. TRAPS: PROVIDE TRAPS ON ALL FIXTURES EXCEPT FIXTURES WITH INTEGRAL TRAPS. EXPOSED TRAPS 17 GAUGE CHROMIUM PLATED BRASS TUBING.

7. CAULK AROUND ALL PLUMBING FIXTURES AT FLOORS AND WALLS WITH WHITE FLEXIBLE CAULKING COMPOUND.

8. TEST ALL PLUMBING PER PLUMBING CODE, AND ACCORDING TO LOCAL AUTHORITIES.

9. UPON COMPLETION OF ALL TESTS AND REPAIRS, ALL DOMESTIC WATER PIPING SHALL BE DISINFECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTAH STATE BOARD OF HEALTH.

10. INSTALL A PLUMBING VENT FROM THE MAIN DRAIN TO THE OPEN AIR ABOVE THE ROOF. NO PLUMBING VENT SHALL TERMINATE LESS THAN 10" HORIZONTALLY OR 3" ABOVE ANY GRAVITY OR POWER AIR INLET. CONSOLODATE VENTS WHERE POSSIBLE TO MINIMIZE ROOF PENETRATIONS.

11. NOT USED

12. BATHROOM VENTILATION IS SHOWN ON MECHANICAL PLANS

13. SEE CASEWORK ELEVATIONS FOR LOCATION OF FIXTURES IN CASEWORK

14. PROVIDE A RECIRCULATING SYSTEM FOR DOMESTIC HOT WATER

15. FURNISH WRITTEN GUARANTEE TO OWNER FOR PERIOD OF ONE YEAR COVERING ALL DEFECTS IN MATERIAL AND WORKMANSHIP PROVIDING LABOR AND MATERIALS.

PLUMBING FIXTURE SCHEDULE

Fixture No.

No.	FIXTURE	MANUF. & CATALOG NO.	COLOR	ACCESSORY	MANUF. & CATALOG NO.	FINISH	REMARKS
1	Toilet	-	-	Seat	-	White	
2	Lav 1			Faucet			
3	Lav 2			Faucet			
4	Tub			Faucet			
5	Shower faucet			-			
6	Kitchen Sink			Faucet			
7	Disposer			-			
8	Water softener			-			
9	Water purifier			-			
10	Utility sink			Faucet			
11	Bar sink			Faucet			
12	Hot Tub			-			
13	Water Heater						Provide Seismic Straping per IRC

BY OWNER (SEE ALLOWANCE)

BY OWNER (SEE ALLOWANCE)

NOTES:

1. Verify that all showers are finshed to a height of 7'0" above the drain inlet with a non-absorbent material.
2. Tank type toilets shall have a flow rate of 1.6 Gal. per flush or less.
3. All shower heads shall have a flow rate of 2.5 GPM or less.
4. All shower and bath faucets shall have anti-scald devices.

APPLIANCE SCHEDULE

No.

No.	APPLIANCE	MANUF. & CATALOG NO.
1	Refrigerator	-
2	Stovetop	-
3	Exhaust Hood	Recirculating
4	Oven	-
5	Microwave	-
6	Dishwasher	-
7	Drier	-
8	Washer	-

BY OWNER (SEE ALLOEANCE)

NOTES:

Page 31 of 102

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STATE OF UTAH
William L. Arthur
125771
0301
LICENSED ARCHITECT

Date: 5/2/16

Revisions:

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, Utah

Project No.: 1507

Sheet: **MP 0**

Mechanical and Plumbing Notes

Scale: NTS

Exhibit A

Plan Notes:

1 Direct Vent Natural Gas Fireplace
Provide fans and thermostat operation

2 Zehnder 350 HRV w/ pre-heat

3 Provide tee in potable water line for landscape irrigation prior to water softener.
Install 1" stop valve inside Mechanical area.

4 Install 1" double check valve backflow preventer .

5 All hose bibs are to have backflow preventers.

6 Mitsubishi wall unit

7 Mitsubishi 42,000 BTU 18 seer
quad zone 9+9+9+15

8 Natural Gas Meter

9 Supply, at owner's option, a gas line for a Natural Gas heater at the ceiling

10 Install a Nexans2 120 V heating cable with a programable thermostat under the floor finish in the entry and landing.

General Notes:

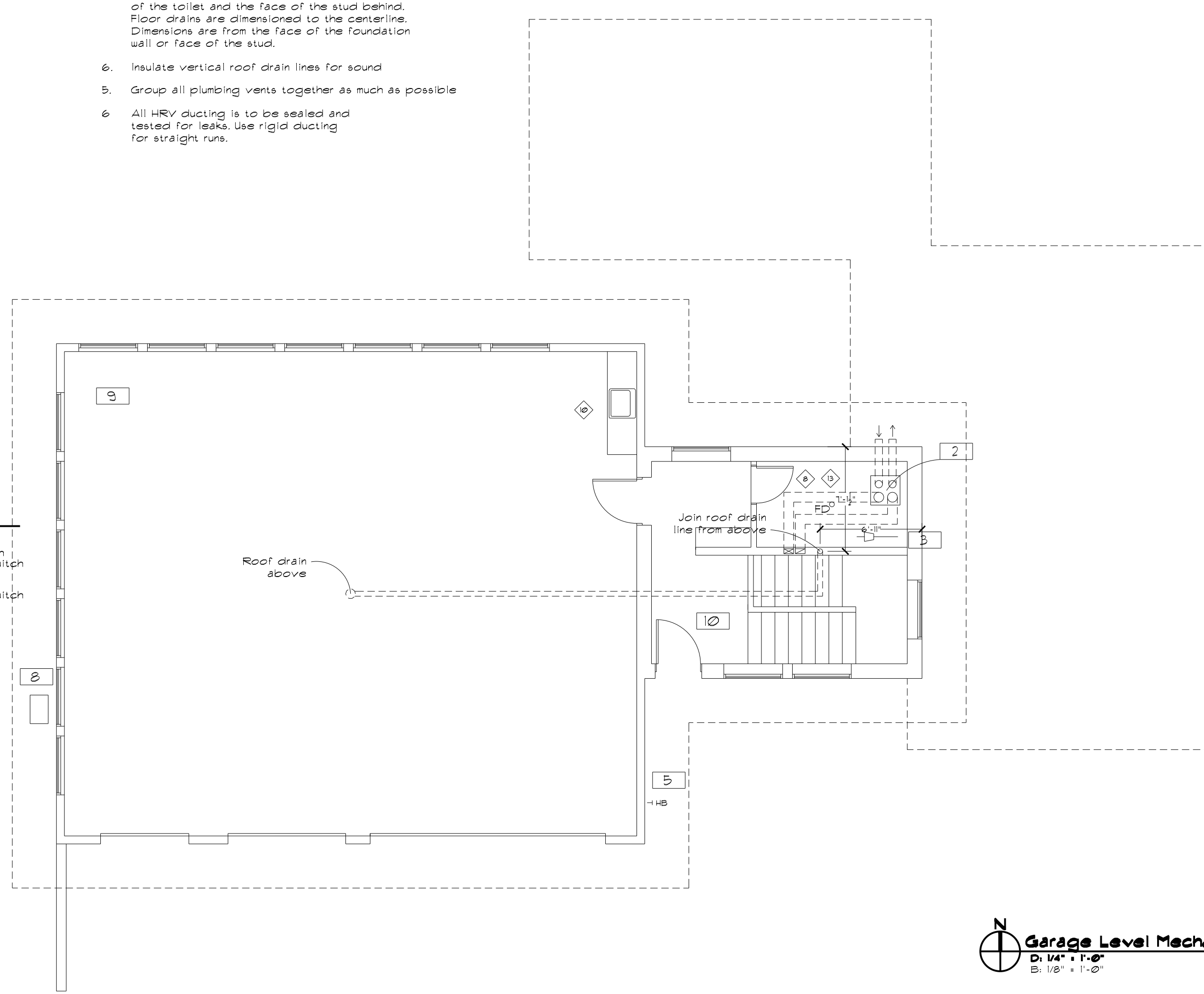
1. See additional notes on MP-0
2. See casework elevations and enlarged plans for location of fixtures in casework.
3. Provide a recirculating system for domestic hot water.
4. Toilet locations are dimensioned to the centerline of the toilet and the face of the stud behind. Floor drains are dimensioned to the centerline. Dimensions are from the face of the foundation wall or face of the stud.
6. Insulate vertical roof drain lines for sound
5. Group all plumbing vents together as much as possible
6 All HRV ducting is to be sealed and tested for leaks. Use rigid ducting for straight runs.

Legend

- Vertical duct: return
- Vertical duct: supply
- Supply register
- Return register
- NOTE Plumbing fixture. See schedule on MP-0
- NOTE Appliance . See schedule on MP-0
- HB Hose Bib
- FD Floor drain
- RD Roof drain line

HRV air flow rates:

1 Exhaust 12 cfm with Ø3364 booster switch
2 Exhaust 24 cfm with Ø3364 booster switch
3 Exhaust 12 cfm with Ø3364 booster switch
4 Supply 36 cfm
5 Supply 12 cfm
6 Exhaust 24 cfm with Ø3364 booster switch
7 Exhaust 12 cfm with Ø3364 booster switch
8 Supply 18 cfm
11 Supply 18 cfm



Garage Level Mechanical and Plumbing Plan
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

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State of Utah William L Arthur 125771-0301 Licensed Architect

Date: 5/2/16

Revisions:

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive Liberty, Utah

Project No.: 1507

Sheet: MP 1

Garage Level Mechanical / Plumbing Plan

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Exhibit A

Plan Notes: #

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Provide fans and thermostat operation

2 Zehnder 350 HRV w/ pre-heat

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- ←⊏⊐ Supply register
- →⊏⊐ Return register
- NOTE Plumbing fixture. See schedule on MP-0
- NOTE Appliance . See schedule on MP-0
- ⊣ HB Hose Bib
- FD Floor drain
- RD Roof drain line

HRV air flow rates:

- 1 Exhaust 12 cfm with Ø3364 booster switch
- 2 Exhaust 24 cfm with Ø3364 booster switch
- 3 Exhaust 12 cfm with Ø3364 booster switch
- 4 Supply 36 cfm
- 5 Supply 12 cfm
- 6 Exhaust 24 cfm with Ø3364 booster switch
- 7 Exhaust 12 cfm with Ø3364 booster switch
- 8 Supply 18 cfm
- 11 Supply 18 cfm

General Notes:

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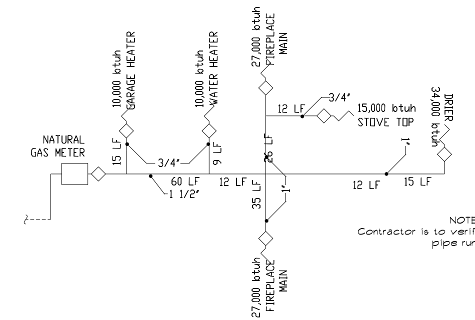
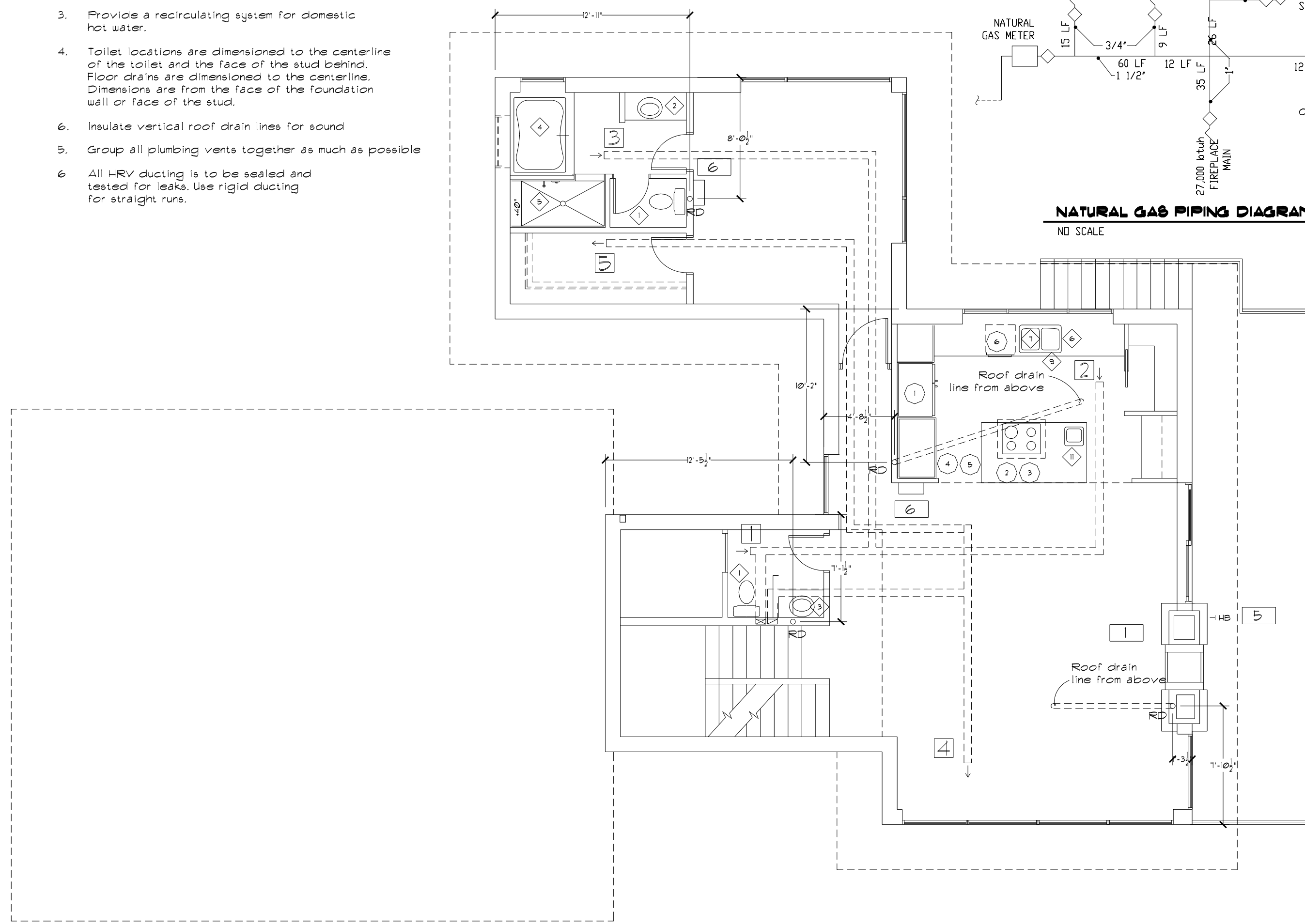


NATURAL GAS PIPING DIAGRAM
NO SCALE



Main Level Mechanical and Plumbing Plan
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

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Date: 5/2/16

Revisions:

A New Residence for
Paul and Linda LaStayo
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Liberty, Utah

Project No.: 1507

Sheet: **MP 2**

Main Level Mechanical / Plumbing Plan

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Exhibit A

Plan Notes:

1. Direct Vent Natural Gas Fireplace. Provide fans and thermostat operation
2. Zehnder 350 HRV w/ pre-heat
3. Provide tee in potable water line for landscape irrigation prior to water softener. Install 1" stop valve inside Mechanical area.
4. Install 1" double check valve backflow preventer .
5. All hose bibs are to have backflow preventers.
6. Mitsubishi wall unit
7. Mitsubishi 42,000 BTU 18 seer quad zone 9=9=9=15
8. Natural Gas Meter
9. Supply, at owner's option, a gas line for a Natural Gas heater at the ceiling
10. Install a Nexans2 120 V heating cable with a programable thermostat under the floor finish in the entry and landing.

General Notes:

1. See additional notes on MP-0
2. See casework elevations and enlarged plans for location of fixtures in casework.
3. Provide a recirculating system for domestic hot water.
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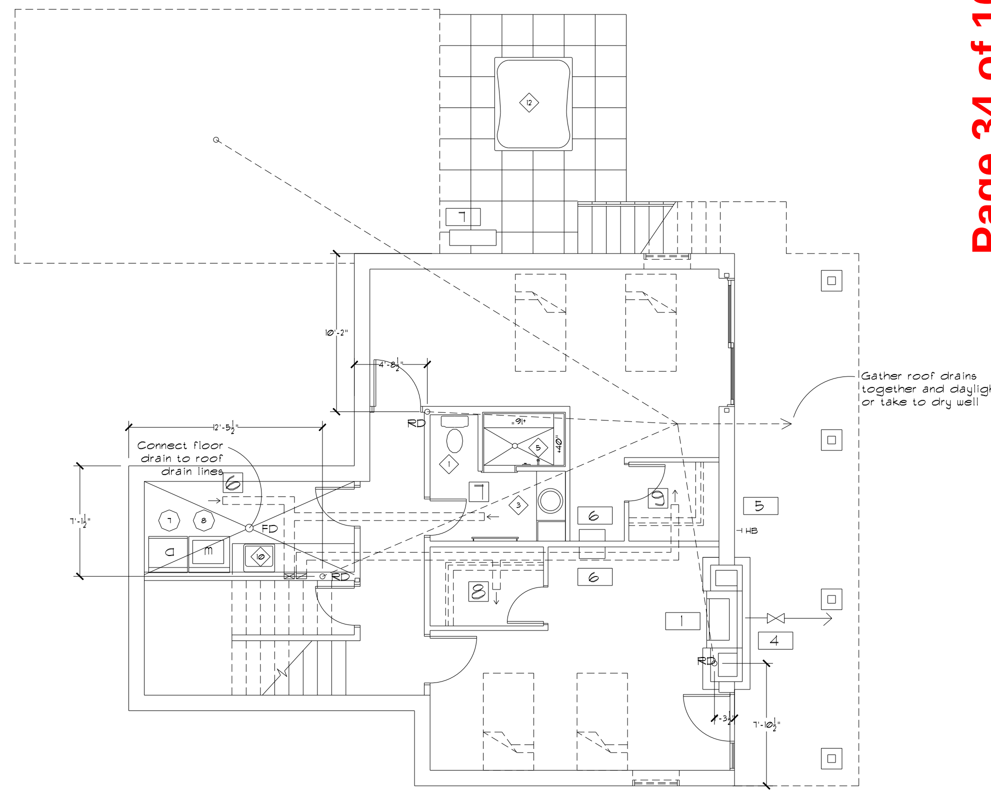
6. Insulate vertical roof drain lines for sound
5. Group all plumbing vents together as much as possible
6 All HRV ducting is to be sealed and tested for leaks. Use rigid ducting for straight runs.

Legend

- Vertical duct: return
- Vertical duct: supply
- Supply register
- Return register
- NOTE: Plumbing fixture. See schedule on MP-0
- NOTE: Appliance . See schedule on MP-0
- HB: Hose Bib
- FD: Floor drain
- RD: Roof drain line

HRV air flow rates:

1	Exhaust 12 cfm with Ø3364 booster switch	6	Exhaust 24 cfm with Ø3364 booster switch
2	Exhaust 24 cfm with Ø3364 booster switch	7	Exhaust 12 cfm with Ø3364 booster switch
3	Exhaust 12 cfm with Ø3364 booster switch	8	Supply 18 cfm
4	Supply 36 cfm	11	Supply 18 cfm
5	Supply 12 cfm		



Lower Level Mechanical and Plumbing Plan
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Page 34 of 102

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STATE OF UTAH William L Archer 125771-0301 LICENSED ARCHITECT

Date: 5/2/16

Revisions:

A New Residence for
Paul and Linda LaStayo
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Liberty, Utah

Project No.: 1507

Sheet:

MP 3

Lower Level Mechanical / Plumbing Plan

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Exhibit A

ELECTRICAL NOTES:

1. ALL WORK DONE BY ELECTRICAL CONTRACTOR SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE AND LOCAL CODE REGULATIONS. THE CONTRACTOR SHALL PERFORM ALL WORK IN CONFORMITY WITH THESE REGULATIONS WHETHER OR NOT SUCH WORK IS SPECIFICALLY SHOWN ON DRAWINGS.

2. THE EXTENT OF WORK SHALL BE AS SHOWN ON DRAWINGS. PERFORMANCE SHALL MEET THE REQUIREMENTS OF THE SPECIFICATIONS. THE WORK CONSISTS OF THE FOLLOWING:

   A. FURNISH AND INSTALL FEEDERS, PANEL BOARDS, RELAY BRANCH CIRCUIT WIRING, CONDUITS, WIRE, AND METER BASE AS SHOWN ON DRAWINGS.

   B. FURNISH AND INSTALL COMPLETE WIRING FOR MOTORS, EXHAUST FAN AS SPECIFIED OR REQUIRED.

   C. FURNISHING AND INSTALLING LINE VOLTAGE CONNECTIONS FOR HEATING AND AIR CONDITIONING EQUIPMENT.

   D. INSTALLING SPECIALTY LIGHTING FIXTURES SPECIFIED AND FURNISHED BY OWNER. ELECTRICAL CONTRACTOR SHALL PROVIDE J-BOX AT CEILING.

   E. FURNISH AND INSTALL OUTLET BOXES, COVER PLATES, WALL SWITCHES, FIXTURES AND RECEPTACLES.

3. ELECTRICAL SERVICE CAPACITY AND SIZE SHALL BE COMPUTED BY METHOD INDICATED IN THE NATIONAL ELECTRICAL CODE.

4. PANELS OR CABINETS ENCLOSING FUSES, CIRCUIT BREAKERS, SWITCHES OR OTHER ELECTRICAL SERVICE EQUIPMENT SHALL BE IN AN UNCONSPICUOUS, ACCESSIBLE, AND PROTECTED LOCATION. SHALL COMPLY WITH N.E.C. 110-16. COORDINATE WITH PROJECT GENERAL NOTES.

5. ELECTRICAL METER BASE SHALL BE LOCATED IN AN AREA THAT IS PROTECTED FROM OUTSIDE WEATHER. CONTRACTOR TO COORDINATE.

6. LIGHTING FIXTURES

   A. ELECTRICAL CONTRACTOR SHALL INSTALL PERMANENT LIGHTING FIXTURES AS INDICATED ON PLANS. SEE FIXTURE SCHEDULE FOR MANUFACTURER OF FIXTURES.

   B. ALL FIXTURES SHALL HAVE A U.L. LABEL LISTING. IF NOT U.L. LISTED, FIXTURE SHALL NOT BE INSTALLED.

   C. HEIGHT OF LIGHT SWITCHES FROM FINISH FLOOR TO TOP OF SWITCH TO BE 48" TYPICAL UNLESS NOTED ON DRAWINGS. SWITCH LOCATIONS SHALL BE APPROVED PRIOR TO COMMENCEMENT OF WIRING. BOXES SHALL BE INSTALLED FOR APPROVAL OF LOCATION.

   D. ALL RECESSED DOWNLIGHTS TO BE THERMAL RATED, AND ALL CAST IN PLACE TO BE INCLUDED IN BASE BID.

   E. ALL SPECIALTY LIGHTING TO BE COORDINATED WITH ARCHITECT FOR POWER REQUIREMENTS BY ELECTRICAL CONTRACTOR.

   F. ALL RECESSED DOWNLIGHTS TO BE INCLUDED IN BASE BID WITH TRIM RINGS AS SPECIFIED ON FIXTURE SCHEDULE OR BY ARCHITECT/INTERIOR DESIGNER.

   G. ALL LIGHTS IN CLOSETS SHALL BE AS SHOWN ON DRAWINGS AND FIXTURE SCHEDULE. FIXTURES SHALL MEET ALL REQUIREMENTS OF 2002 N.E.C. -

7. RECEPTACLE OUTLETS

   A. EXCEPT WHERE OTHERWISE SHOWN ON DRAWINGS, THE MOUNTING FROM THE FLOOR TO CENTER OF OUTLET SHALL BE 12".

   B. ALL OUTLETS WITHIN BATHROOMS, ALONG KITCHEN COUNTERS, WITHIN 6'-0" OF SINKS, IN GARAGES, AND ALL OUTSIDE OUTLETS SHALL BE G.F.I. TYPE OUTLETS TYPICAL. ALL OUTLETS IN GARAGE TO BE 24" ABOVE FLOOR MINIMUM.

   C. UNLESS NOTED OTHERWISE ON DRAWINGS, LOCATE AND INSTALL ONE G.F.I. WEATHER PROTECTED GRADE LEVEL RECEPTACLE, AND RECEPTACLE OUTSIDE AT SOFFIT AT EACH EXTERIOR DOOR.

   D. FLUSH MOUNT ALL RECEPTACLES.

8. VENTS (WHERE SHOWN AS SUPPLIED BY ELECTRICIAN)

   A PROVIDE MECHANICAL VENTILATION FOR ALL BATHROOMS AND FOR THE LAUNDRY AREA AS SHOWN DIRECTLY TO THE EXTERIOR CAPABLE OF FIVE (5) AIR CHANGES PER HOUR.

   B VENT THE DRIER DIRECTLY TO THE EXTERIOR WITH A 14' MAXIMUM RUN AND (2) 90 DEGREE ANGLES MAXIMUM

   C BATH AND LAUNDRY OUTLETS MUST BE A MINIMUM OF THREE FEET FROM OPENINGS INTO THE BUILDING.

   D. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND WIRING ALL FANS, FAN MOTORS, AS REQUIRED. ALL CONNECTIONS SHALL BE IN ACCORDANCE WITH N.E.C.

9. SMOKE DETECTORS

   SMOKE DETECTORS SHALL BE LOCATED IN EACH BEDROOM, AND ADJACENT ROOMS AS SHOWN ON DRAWINGS. ALL SMOKE DETECTORS SHALL BE HARD WIRED TO PRIMARY ELECTRICAL SERVICES WITH BATTERY BACKUP. COMPLY WITH 2010 IRC

10. CONTRACTOR SHALL COORDINATE WITH MECHANICAL CONTRACTOR FOR ALL POWER REQUIREMENTS. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ELECTRICAL SERVICES FOR MECHANICAL ROOM.

11. ALL DRAWINGS INDICATE LOCATIONS AS DIAGRAMMATICALLY. LOCATIONS SHALL BE PER APPROPRIATE CODES. CONTRACTOR TO COORDINATE.

12. ELECTRICAL CONTRACTOR SHALL COORDINATE HIS WORK WITH THE WORK OF OTHER TRADES, AND HAVE HIS WORK SCHEDULE SO AS NOT TO DELAY THE WORK OF OTHER TRADES.

13. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR INSPECTION AND APPROVAL OF WIRING, INSTALLATION OF FIXTURES, AND EQUIPMENT, AND FOR FINAL ACCEPTANCE OF THE COMPLETE ELECTRICAL INSTALLATIONS BY LOCAL ELECTRICAL INSPECTORS. ELECTRICAL CONTRACTOR SHALL PERFORM ALL TESTS AS REQUIRED.

14. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN UP OF ALL ELECTRICAL EQUIPMENT AT COMPLETION OF ELECTRICAL PORTION OF WORK.

15. EXACT LIGHT FIXTURE PLACEMENTS WILL BE COORDINATED WITH INTERIOR ELEVATIONS AND CABINET LAYOUT.

General Notes:

1. A pre-meeting shall be held between the Owner Electrical contractor and Architect before any work begins.

2. Substititions for recessed light fixtures and utility fixtures will be allowed with approval be Architect.

LIGHT FIXTURE SCHEDULE

x: These fixtures will be selected by the owner

MARK	MANUF.	CATALOG #	LAMP	MOUNTING	COLOR	DESCRIPTION / REMARKS
F1a	x	x	LED	recessed	white	Standard recessed downlight
F1b	x	x	LED	recessed	white	Standard recessed downlight, exterior location
F1c	x	x	LED	recessed	white	Recessed shower light, wet location
F1d	x	x	LED	recessed	white	Recessed wall washer/Picture light
F2a	x	x	LED	Wall	white	Wall sconce, up and down
F2b	x	x	LED	Wall	white	Wall sconce, up light
F2c	x	x	LED	Wall	white	Wall vanity light
F2c	x	x	LED	Wall	white	Wall mount exterior light
F3a	x	x	LED	surface	white	48"
F3b	x	x	LED	Surface	white	24"
F4a	x	x	LED	ceiling	white	Surface mounted utility light
F4b	x	x	LED	ceiling	white	Suface mount shower light
F4c	x	x	LED	ceiling	white	Hanging fixture
F5	x	x	-	-	-	landscape transformer

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STATE OF UTAH William L Arthur 125771 0301 LICENSED ARCHITECT

Date: 5/2/16

Revisions:

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive Liberty, Utah

Project No.: 1507

Sheet: E 0

Electrical Notes Light Fixture Schedule

Scale: N.T.S.

Exhibit A

Legend

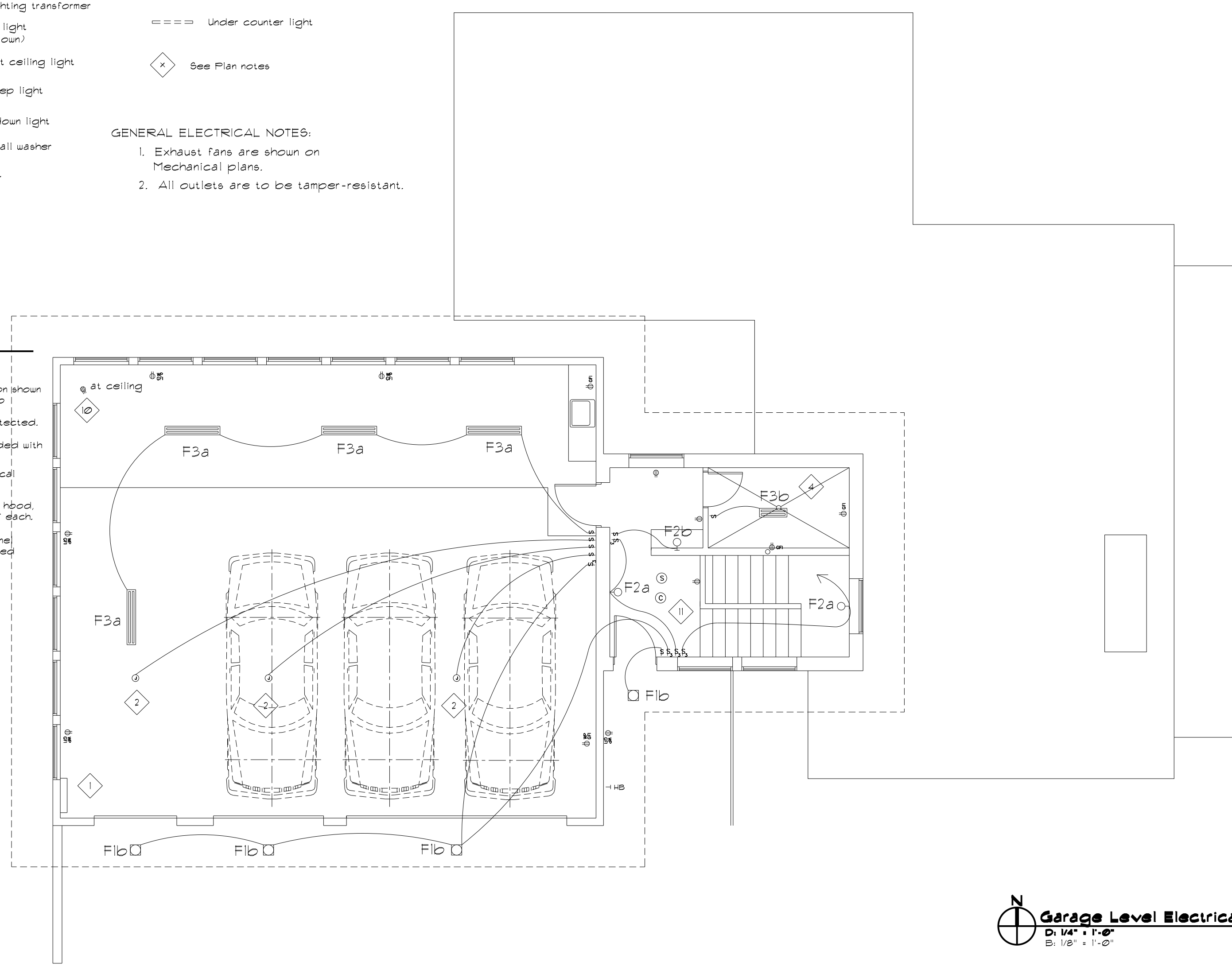
- Duplex outlet
- Half-switched duplex
- GFI duplex
- Weatherproof , GFI duplex Provide an in-use bubble cover where exposed to weather
- 220 outlet
- Telephone outlet
- TV/Data outlet
- Levitron QuickPort
- Floor outlet
- Junction box
- Single pole switch
- 3-way switch
- 4+ -way switch
- D Dimmer
- Smoke detector (Note: all smoke detectors shall be hard wired and have battery backup.)
- Carbon Monoxode Detector
- "Multiset" master keypad
- "Multiset" individual switch with programable switching
- Lx Multiset Load Number (to master key pad)
- Lanscape lighting transformer
- Wall mounted light (Up and/or down)
- Surface mount ceiling light
- Recessed step light
- Recessed down light
- Recessed wall washer
- Picture light
- Surface mount LED
- Surface mount LED
- Cove (up or down) light
- Under counter light
- See Plan notes

GENERAL ELECTRICAL NOTES:

1. Exhaust fans are shown on Mechanical plans.
2. All outlets are to be tamper-resistant.

Plan Notes:

1. Main panel location.
2. Provide a junction box and power to the location shown for the garage door opener and conduit back to the switch location as shown. Outlets for garage door opener to be GFCI protected.
3. All outlets in bedrooms and office shall be provided with arch-fault circuit-interrupter protection.
4. Coordinate the power requirements of the mechanical equipment with the mechanical contractor.
5. Coordinate the power requirements for the stove, hood, disposer and other equipment with the supplier of each.
6. Supply and install a Levitron structured media panel with QuickPort wall plate assemblies where indicated
7. To landscape lighting transformer (F17)
8. Co-ordinate power requirements for fireplace with manufacturer.
9. Co-ordinate power requirements for Hot Tub with manufacturer.
10. Coordinate electric garage heater power with manufacturer.
11. See MP-1for electric heating cable



Garage Level Electrical Plan
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

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Date: 5/2/16

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A New Residence for
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Liberty, Utah

Project No.: 1507

Sheet: E 1

Garage Level Electrical Plan

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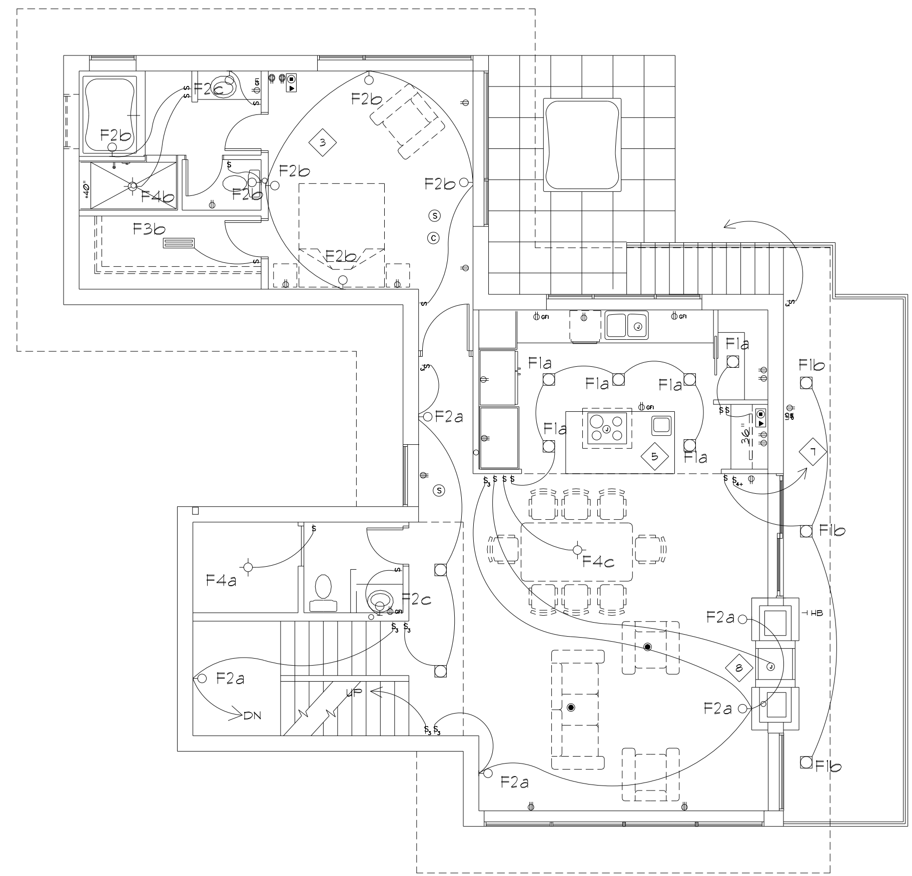

Main Floor Electrical Plan
D: 1/4" = 1'-0"
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A New Residence for
Paul and Linda LaStayo
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Liberty, Utah

Project No.: 1507
Sheet: E 2

Main Floor Electrical Plan

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Exhibit A

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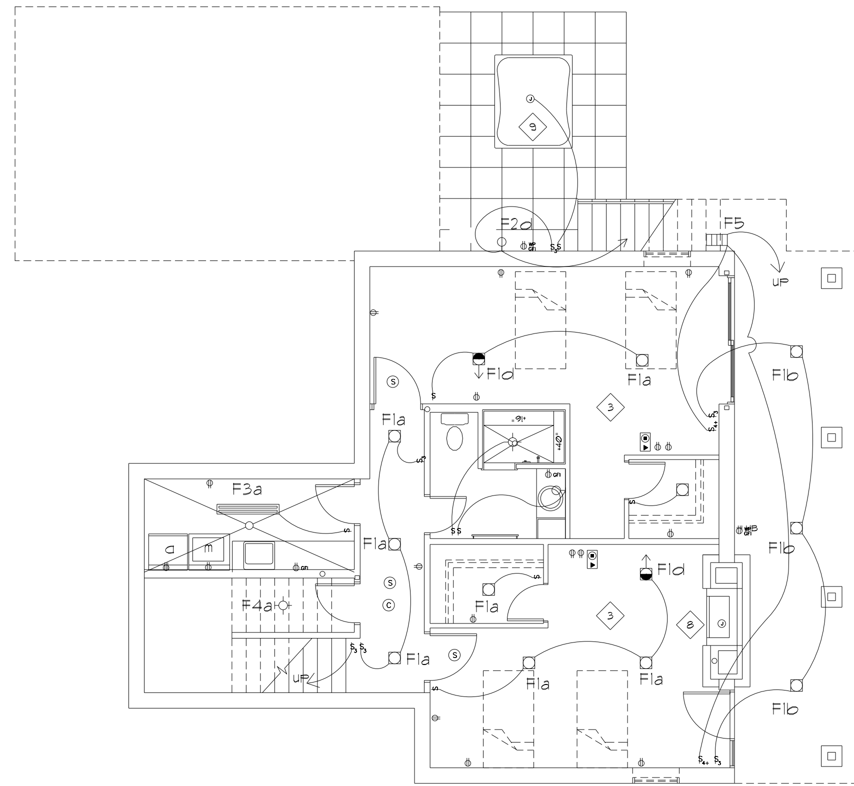
7. To landscape lighting transformer (F17)
8. Co-ordinate power requirements for fireplace with manufacturer.
9. Co-ordinate power requirements for Hot Tub with manufacturer.
10. Coordinate electric garage heater power with manufacturer.
11. See MP-1for electric heating cable



Lower Level Electrical Plan
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

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Date: 5/2/16

Revisions:

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, Utah

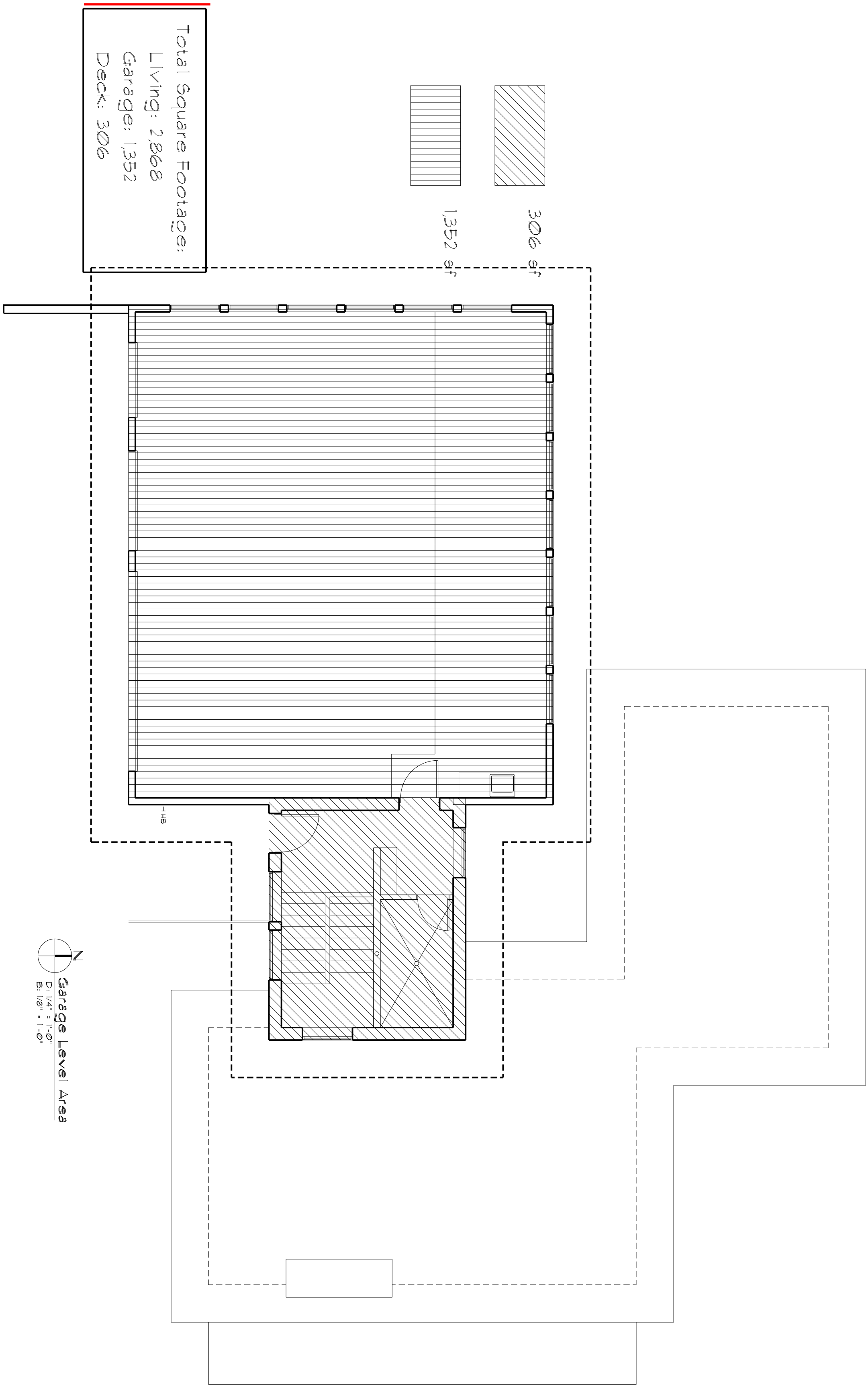
Project No.: 1507

Sheet: E 3

Lower Level Electrical Plan

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Exhibit A



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Revisions:

A New Residence for
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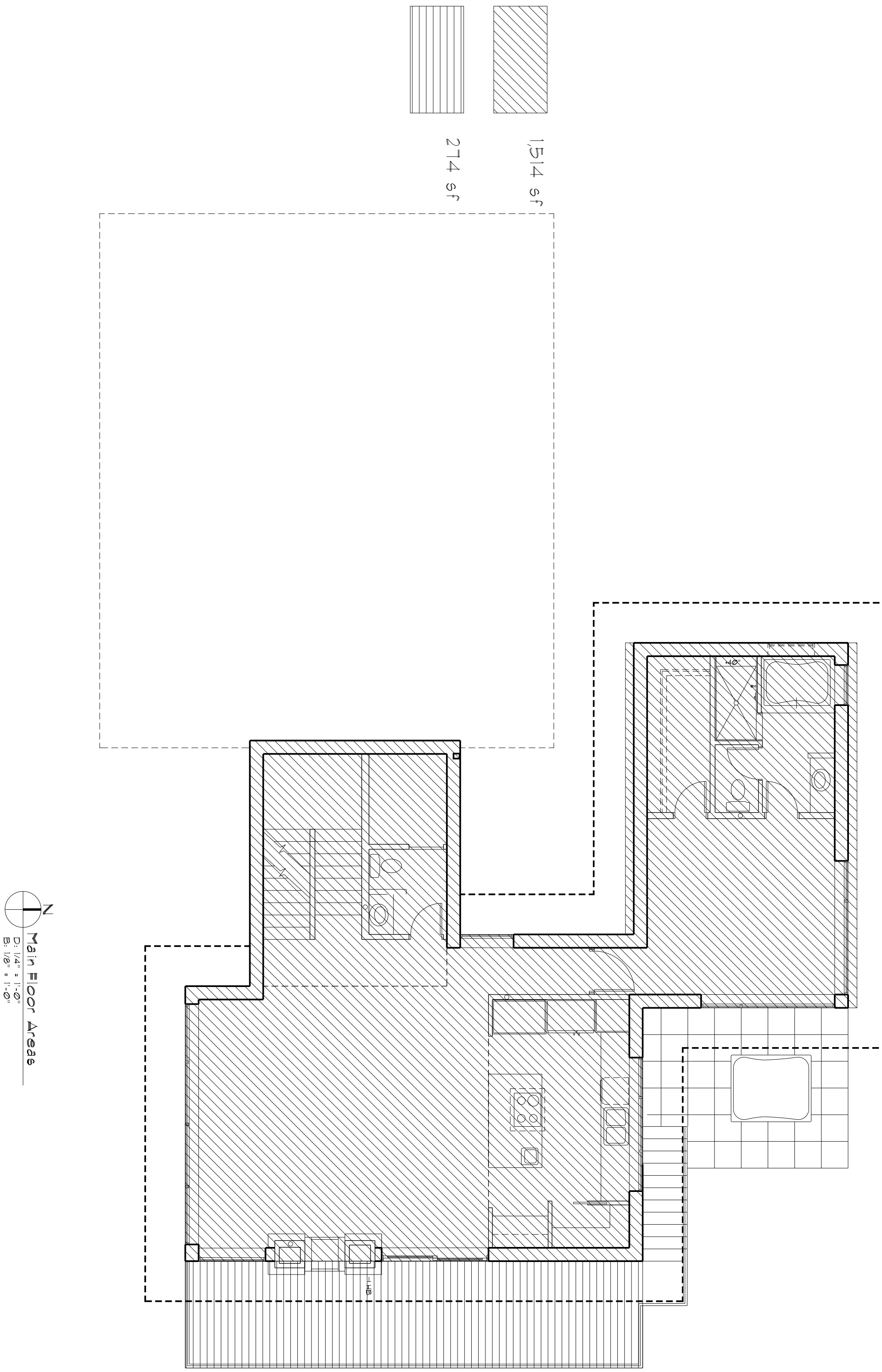
4075 Bluebell Drive — Liberty, Utah

Project No.: 1507
Sheet: AR 1

Garage Level Areas

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Exhibit A



Main Floor Areas

Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

AR 2

Project No.: 1507
Sheet:

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive Liberty, Utah

Date: 5/2/16
Revisions:

STATE OF UTAH
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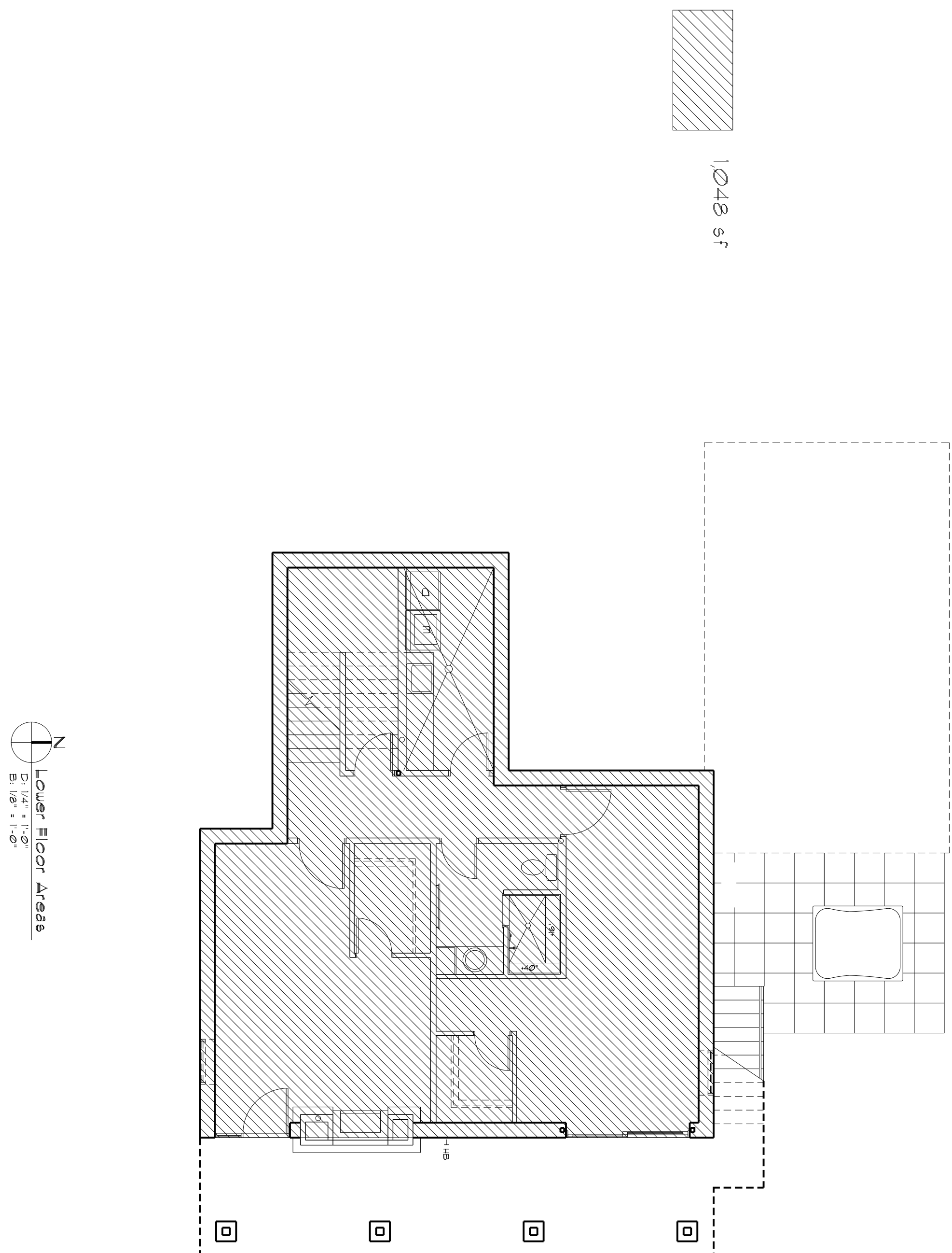
Exhibit A



Scale:
D: 1/4" = 1'-0"
B: 1/8" = 1'-0"

Lower Floor Areas

AR 3

Sheet:

Project No.:
1507

A New Residence for
Paul and Linda LaStayo
4075 Bluebell Drive
Liberty, Utah

Revisions:

Date: 5/2/16

Coalesce Architecture Planning Inc.

GSH

REPORT
GEOTECHNICAL STUDY
LOT 44 BIG SKY ESTATES
4075 BLUEBELL DRIVE
NEAR LIBERTY, WEBER COUNTY, UTAH

Submitted To:

Coalesce Architecture
Attention: Mr. Bill Arthur
163 West 200 South, #509
Salt Lake City, Utah

Submitted By:

GSH Geotechnical, Inc.
1596 West 2650 South
Ogden, Utah 84401

July 8, 2016

Job No. 1041-04N-16

July 8, 2016
Job No. 1041-04N-16

Coalesce Architecture
Attention: Mr. Bill Arthur
163 West 200 South, #509
Salt Lake City, Utah 84101

Re: Report
Geotechnical Study
Lot 44 Big Sky Estates
4075 Bluebell Drive
Near Liberty, Weber County, Utah
(41.2981° N; 111.8497° W)

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical study performed for Lot 44 Big Sky Estates located at 4075 Bluebell Drive near Liberty in Weber County, Utah. The general location of the site with respect to major roadways, as of 2014, is presented on Figure 1, Vicinity Map. A more detailed layout of the site showing the proposed improvements is presented on Figure 2, Site Plan. The locations of the test pits excavated and boring drilled in conjunction with this study are also presented on Figure 2.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of our study were planned in discussions among Mr. Bill Arthur of Coalesce Architecture, Mr. Bill Black of Western Geologic, and Mr. Andrew Harris of GSH Geotechnical, Inc. (GSH).

In general, the objectives of this study were to:

1. Define and evaluate the subsurface soil and groundwater conditions across the site.

2. Provide appropriate foundation, earthwork, and slope stability recommendations as well as geoseismic information to be utilized in the design and construction of the proposed home.

In accomplishing these objectives, our scope has included the following:

1. A field program consisting of the excavating, logging, and sampling of 3 test pits and the drilling, logging and sampling 1 boring.

2. A laboratory testing program.

3. An office program consisting of the correlation of available data, engineering analyses, and the preparation of this summary report.

1.3 AUTHORIZATION

Authorization was provided by returning a signed copy of our Professional Services Agreement No. 16-0344Nrev5 dated April 15, 2016.

1.4 PROFESSIONAL STATEMENTS

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

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

2. PROPOSED CONSTRUCTION

The proposed project consists of constructing a single-family residence on Lot 44 Big Sky Estates near Liberty in Weber County, Utah. Construction will likely consist of cast-in-place drilled piers combined with reinforced concrete grade beam and basement foundation walls supporting 1 to 2 wood-framed levels above grade. Projected maximum column and wall loads are on the order of 10 to 25 kips and 1 to 3 kips per lineal foot, respectively.

Site development will require a moderate amount of earthwork in the form of site grading. We estimate in general that maximum cuts and fills to achieve design grades will be on the order of 2 to 8 feet. Larger cuts and fills may be required in isolated areas and must be planned to maintain stability of the site slopes.

3. INVESTIGATIONS

3.1 FIELD PROGRAM

In order to define and evaluate the subsurface soil and groundwater conditions at the site, 1 boring was drilled to a depth of about 46.5 feet below existing grade. The boring was drilled using a truck-mounted drill rig equipped with hollow-stem augers. Additionally, 3 test pits were excavated to depths of about 10.5 to 12.0 feet below existing grade. The test pits were excavated using a track-mounted excavator. Test pit and boring locations are presented on Figure 2.

The field portion of our study was under the direct control and continual supervision of an experienced member of our geotechnical staff. During the course of the excavating and drilling operations, a continuous log of the subsurface soil conditions encountered was maintained. In addition, samples of the typical soils encountered were obtained for subsequent laboratory testing and examination. The soils were classified in the field based upon visual and textural examination. These classifications have been supplemented by subsequent inspection and testing in our laboratory. Detailed graphical representation of the subsurface conditions encountered is presented on Figure 3A, Boring Log, and on Figures 4A through 4C, Test Pit Log. Soils were classified in accordance with the nomenclature described on Figure 5, Key to Boring Log (USCS) and on Figure 6, Key to Test Pit Log (USCS).

A 3.0-inch outside diameter, 2.42-inch inside diameter drive sampler (Dames & Moore) and a 2.0-inch outside diameter, 1.38-inch inside diameter drive sampler (SPT) were utilized in the subsurface soil sampling at select locations. The blow counts recorded on the boring logs were those required to drive the sampler 12 inches with a 140-pound hammer dropping 30 inches.

A 2.42-inch inside diameter thin-wall drive sampler was utilized in the subsurface sampling of the test pits at the site.

Following completion of drilling and excavation operations, one and one-quarter-inch diameter slotted PVC pipe was installed in boring B-1 and test pit TP-3 in order to provide a means of monitoring the groundwater fluctuations. The boring was backfilled with auger cuttings. Following completion of excavating and logging, each test pit was backfilled. Although an effort was made to compact the backfill with the trackhoe, backfill was not placed in uniform lifts and compacted to a specific density. Consequently, the backfill soils must be considered as non-engineered and settlement of the backfill with time is likely to occur.

3.2 LABORATORY TESTING

3.2.1 General

In order to provide data necessary for our engineering analyses, a laboratory testing program was performed. The program included moisture, density, Atterberg limits, partial gradations, consolidation, direct shear, and residual direct shear tests. The following paragraphs describe the tests and summarize the test data.

3.2.2 Moisture and Density

To provide index parameters and to correlate other test data, moisture and density tests were performed on selected samples. The results of these tests are presented on the boring log, Figure 3A, and on the test pit logs, Figure 4A through 4C.

3.2.3 Atterberg Limit Tests

To aid in classifying the soils, Atterberg limit tests were performed on samples of the fine-grained cohesive soils. Results of the test are tabulated on the following table:

Boring/ Test Pit No.	Depth (feet)	Liquid Limit (percent)	Plastic Limit (percent)	Plasticity Index (percent)	Soil Classification
B-1	5.0	86	52	34	MH
B-1	7.5	30	14	16	CL
B-1	30.0	41	21	20	CL
TP-1	3.0	75	63	12	MH
TP-3	2.5	68	46	22	MH
TP-3	5.0	59	53	6	MH

3.2.4 Partial Gradation Tests

To aid in classifying the granular soils, partial gradation tests were performed. Results of the tests are tabulated below:

Boring/ Test Pit No.	Depth (feet)	Percent Passing No. 200 Sieve	Soil Classification
B-1	5.0	43.0	MH/SM
B-1	7.5	44.6	CL/SC
B-1	30.0	41.8	ML/SM
B-1	40.0	47.1	ML/SM
TP-1	3.0	47.6	MH/SM
TP-3	2.5	47.6	MH/SM
TP-3	5	43.0	MH/SM

3.2.5 Laboratory Direct Shear Test

To determine the shear strength of the soils encountered at the site, laboratory direct shear tests were performed on samples of the onsite soils. The results of the tests are tabulated below:

Test Pit/Boring No.	Depth (feet)	Soil Type	In-Situ Moisture Content (percent)	Dry Density (pcf)	Internal Friction Angle (degrees)	Apparent Cohesion (psf)
TP-2	2.5	MH/SM	---	---	30	150
B-1	40.0	ML/SM	39	73	34	500

3.2.6 Laboratory Residual Direct Shear Test

To determine the residual shear strength of the soils encountered at the site, laboratory residual direct shear tests were performed on samples of the onsite soils. The results of the test are tabulated below:

Test Pit/Boring No.	Depth (feet)	Soil Type	In-Situ Moisture Content (percent)	Dry Density (pcf)	Internal Friction Angle (degrees)	Apparent Cohesion (psf)
TP-2	2.5	MH/SM	---	---	18	115
B-1	40.0	ML/SM	39	73	29	210

4. SITE CONDITIONS

4.1 GEOLOGIC SETTING

A geologic hazards reconnaissance study[1] dated June 4, 2016 was prepared for the subject property by Western Geologic, LLC, and a copy of that report is included in the attached Appendix.

4.2 SURFACE

The subject property is a vacant, irregularly-shaped lot located at 4075 Bluebell Drive near Liberty in Weber County, Utah. The topography of the site slopes downward to the west at grades of about 5.5H:1V (Horizontal:Vertical) to 2H:1V (Horizontal:Vertical) with an overall

[1] "Report, Geologic Hazards Evaluation, Lot 44 Big Sky Estates No.1, 4075 Bluebell Drive, Liberty, Weber County, Utah," Western Geologic, LLC, June 4, 2016.

change in elevation of about 105 feet across the site. Vegetation at the site consists primarily of native weeds, grasses, brush, and numerous mature trees. The site is bordered on the north and south by residential development, on the east by undeveloped property, and on the west by Bluebell Drive.

4.3 SUBSURFACE SOIL

Subsurface conditions encountered at the test pit and boring locations varied slightly across the site. Topsoil and disturbed soils were observed in the upper 3 to 12 inches at the test pit and boring locations. In test pits TP-1 and TP-2 and boring B-1, natural soils were observed beneath the topsoil/disturbed soils to the full depth penetrated, about 10.5 to 46.5 feet below surrounding grades and consisted of silty clay with varying fine to coarse sand content, fine sandy silt, fine to coarse sand with varying amounts of silt, weathered bedrock (weathered sandstone/claystone/siltstone), and occasional mixture of these soils. In boring B-1 between about 25.0 and 40.0 feet, organic material and deformed bedding was noted in the samples collected, indicating previous movement of the subsurface soils within this zone. In test pit TP-3, mass movement soil deposits were encountered below the topsoil and disturbed soils extending to the full depth explored of about 12.0 feet below surrounding site grades. The mass movement deposits were comprised of a mixture of silty sand, clayey silt, silty clay, and degraded/weathered sandstone/siltstone.

The natural granular soils encountered were very dense, slightly moist to moist, light yellowish-brown to gray in color, and will generally exhibit moderately high strength and low compressibility characteristics under the anticipated vertical loading.

The natural silt/clay soils encountered were medium stiff to hard, slightly moist to moist, brown to gray in color, and will generally exhibit moderate strength and compressibility characteristics under the anticipated vertical loading.

For a more detailed description of the subsurface soils encountered, please refer to Figure 3A, Boring Log, and Figures 4A through 4C, Test Pit Log. The lines designating the interface between soil types on the test pit logs generally represent approximate boundaries. In-situ, the transition between soil types may be gradual.

4.4 GROUNDWATER

Static groundwater was measured in boring B-1 at 29.9 feet below existing site grades. Additionally, water resulting from recent precipitation was observed seeping into the test pits at about 4 feet below existing site grades. Seasonal and longer-term groundwater fluctuations of 1 to 2 feet shall be anticipated. The highest seasonal levels will generally occur during the late spring and summer months. Landscape irrigation on this and surrounding areas may also create additional seasonal groundwater fluctuations. The limitations of landscape irrigation at the site are discussed further in Section 5.9, Site Irrigation, and measures to reduce infiltration of surface water at the site are discussed further in Section 5.8, Subdrains. The contractor must be prepared to dewater excavations as needed.

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

The results of our analyses indicate that the proposed structure may be supported upon conventional spread and/or continuous wall foundations established upon a minimum of 2 feet of granular structural fill extending to suitable natural soils.

The most significant geotechnical aspects of the site are the expansive potential of the near surface silts/clays, the proximity of the proposed structure to mass movement soil deposits, and maintaining stability of the slope at the rear of the property.

The location of the home must be planned to avoid mass movement deposits at the site. If this is not feasible, GSH must be contacted to provide additional recommendations for foundation support.

A subdrain system must be installed upslope of the home and near the head of the mass movement deposit soils below the home to reduce the potential for surface water infiltration, as discussed further within this report.

The on-site soils are not appropriate to be used as structural site grading fill, however, they may be used as general grading fill in landscape areas.

A geotechnical engineer from GSH will need to verify that all mass movement deposit soils, fill material (if encountered) and topsoil/disturbed soils have been completely removed and suitable natural soils encountered prior to the placement of structural site grading fills, floor slabs, foundations, or rigid pavements.

In the following sections, detailed discussions pertaining to earthwork, foundations, lateral pressure and resistance, floor slabs, slope stability, and the geoseismic setting of the site are provided.

5.2 EARTHWORK

5.2.1 Site Preparation

The location of the home must be planned to avoid mass movement deposits at the site. If this is not feasible, GSH must be contacted to provide additional recommendations for foundation support.

Initial site preparation will consist of the removal of surface vegetation, topsoil, and other deleterious materials from beneath an area extending out at least 3 feet from the perimeter of the proposed building, pavements, and exterior flatwork areas.

Additional site preparation will consist of the removal of existing non-engineered fills (if encountered) from an area extending out at least 3 feet from the perimeter of residential structures and 1 foot beyond rigid pavements.

Non-engineered fills may remain in asphalt pavement and sidewalk areas as long as they are properly prepared. Below rigid pavements non-engineered fills must be removed. Additionally, the surface of any existing engineered fills must be prepared prior to placing additional site grading fills.

Proper preparation shall consist of scarifying, moisture conditioning, and re-compacting the upper 12 inches to the requirements for structural fill. Fine-grained soils will require that very close moisture control be maintained for recompacting, which will be very difficult, if not impossible, to recompact during wet and cold periods of the year. As an option to proper preparation and recompaction, the upper 12 inches of non-engineered fill (where encountered) may be removed and replaced with granular subbase. Even with proper preparation, pavements established overlying non-engineered fills may encounter some long-term movements unless the non-engineered fills are completely removed.

Subsequent to stripping and prior to the placement of structural site grading fill, pavements, driveway, and parking slabs on grade, the prepared subgrade must be proofrolled by passing moderate-weight rubber tire-mounted construction equipment over the surface at least twice. If excessively soft or loose soils are encountered, they must be removed to a maximum depth of 2 feet and replaced with structural fill. Beneath footings, all loose and disturbed soils must be totally removed. Fill soils must be handled as described above.

Surface vegetation, debris, and other deleterious materials shall generally be removed from the site. Topsoil, although unsuitable for utilization as structural fill, may be stockpiled for subsequent landscaping purposes.

A representative of GSH must verify that suitable natural soils and/or proper preparation of existing fills have been encountered/met prior to placing site grading fills, footings, slabs, and pavements.

5.2.2 Excavations

For granular (cohesionless) soils, construction excavations above the water table, not exceeding 4 feet, shall be no steeper than one-half horizontal to one vertical (0.5H:1V). For excavations up to 8 feet, in granular soils and above the water table, the slopes shall be no steeper than one horizontal to one vertical (1H:1V). Excavations encountering saturated cohesionless soils will be very difficult and will require very flat sideslopes and/or shoring, bracing and dewatering. Excavations deeper than 8 feet are not anticipated at the site.

Temporary excavations up to 8 feet deep in fine-grained cohesive soils (if encountered), above or below the water table, may be constructed with sideslopes no steeper than one-half horizontal to one vertical (0.5H:1V).

To reduce disturbance of the natural soils during excavation, it is recommended that smooth edge buckets/blades be utilized.

All excavations must be inspected periodically by qualified personnel. If any signs of instability or excessive sloughing are noted, immediate remedial action must be initiated.

5.2.3 Structural Fill

Structural fill will be required as site grading fill, as backfill over foundations and utilities, and possibly as replacement fill beneath some footings. All structural fill must be free of sod, rubbish, construction debris, frozen soil, and other deleterious materials.

Structural site grading fill is defined as fill placed over fairly large open areas to raise the overall site grade. The maximum particle size within structural site grading fill should generally not exceed 4 inches; although, occasional particles up to 6 to 8 inches may be incorporated provided that they do not result in "honeycombing" or preclude the obtainment of the desired degree of compaction. In confined areas, the maximum particle size should generally be restricted to 2.5 inches.

Only granular soils are recommended in confined areas such as utility trenches, below footings, etc. Generally, we recommend that all imported granular structural fill consist of a well-graded mixture of sands and gravels with no more than 20 percent fines (material passing the No. 200 sieve) and less than 30 percent retained on the 3/4 inch sieve. The plasticity index of import fine-grained soil shall not exceed 18 percent.

To stabilize soft subgrade conditions or where structural fill is required to be placed closer than 1.0 foot above the water table at the time of construction, a mixture of coarse gravels and cobbles and/or 1.5- to 2.0-inch gravel (stabilizing fill) should be utilized. It may also help to utilize a stabilization fabric, such as Mirafi 600X or equivalent, placed on the native ground if 1.5- to 2.0-inch gravel is used as stabilizing fill.

On-site soils are not recommended as structural fill but may be used as non-structural grading fill in landscape areas. Non-structural site grading fill is defined as all fill material not designated as structural fill and may consist of any cohesive or granular soils not containing excessive amounts of degradable material.

5.2.4 Fill Placement and Compaction

All structural fill shall be placed in lifts not exceeding 8 inches in loose thickness. Structural fills shall be compacted in accordance with the percent of the maximum dry density as determined by the ASTM[2] D-1557 (AASHTO[3] T-180) compaction criteria in accordance with the table on the following page.

---

[2] American Society for Testing and Materials
[3] American Association of State Highway and Transportation Officials

Location	Total Fill Thickness (feet)	Minimum Percentage of Maximum Dry Density
Beneath an area extending at least 5 feet beyond the perimeter of the structure	0 to 8	95
Site Grading Fills outside area defined above	0 to 5	90
Site Grading Fills outside area defined above	5 to 8	95
Trench Backfill	--	96
Pavement granular base/subbase	--	96

Structural fills greater than 8 feet thick are not anticipated at the site.

Subsequent to stripping and prior to the placement of structural site grading fill, the subgrade shall be prepared as discussed in Section 5.2.1, Site Preparation, of this report. In confined areas, subgrade preparation shall consist of the removal of all loose or disturbed soils.

If utilized for stabilizing fill, coarse gravel and cobble mixtures should be end-dumped, spread to a maximum loose lift thickness of 15 inches, and compacted by dropping a backhoe bucket onto the surface continuously at least twice. As an alternative, the fill may be compacted by passing moderately heavy construction equipment or large self-propelled compaction equipment at least twice. Subsequent fill material placed over the coarse gravels and cobbles shall be adequately compacted so that the "fines" are "worked into" the voids in the underlying coarser gravels and cobbles.

5.2.5 Utility Trenches

All utility trench backfill material below structurally loaded facilities (flatwork, floor slabs, roads, etc.) shall be placed at the same density requirements established for structural fill. If the surface of the backfill becomes disturbed during the course of construction, the backfill shall be proofrolled and/or properly compacted prior to the construction of any exterior flatwork over a backfilled trench. Proofrolling may be performed by passing moderately loaded rubber tire-mounted construction equipment uniformly over the surface at least twice. If excessively loose or soft areas are encountered during proofrolling, they must be removed (to a maximum depth of 2 feet below design finish grade) and replaced with structural fill.

Most utility companies and City-County governments are now requiring that Type A-1-a/A-1-b (AASHTO Designation – basically granular soils with limited fines) soils be used as backfill over utilities. These organizations are also requiring that in public roadways the backfill over major utilities be compacted over the full depth of fill to at least 96 percent of the maximum dry density as determined by the AASHTO T-180 (ASTM D-1557) method of compaction. We recommend that as the major utilities continue onto the site that these compaction specifications are followed.

Natural or imported silt/clay soils are not recommended for use as trench backfill, particularly in structurally loaded areas.

5.3 SLOPE STABILITY

5.3.1 Parameters

The properties of the soils at this site were estimated using the results of our laboratory testing, published correlations, and our experience with similar soils. Accordingly, we estimated the following parameters for use in the stability analyses:

Material	Internal Friction Angle (degrees)	Apparent Cohesion (psf)	Saturated Unit Weight (pcf)
Claystone Bedrock	28	150	120
Altered Siltstone	28	260	120
Siltstone Bedrock	34	500	120
Landslide	18	115	120

For the seismic analysis, a peak horizontal ground acceleration of 0.263 using IBC 2012 guidelines and adjusted for Site Class effects (for Site Class C soils) was obtained for site (grid) locations of 41.2981 degrees latitude (north) and 111.8497 degrees longitude (west). To model sustained accelerations at the site, one-half of this value is typically used. Accordingly, a value of 0.132 was used as the pseudostatic coefficient in the seismic analyses.

5.3.2 Stability Analyses

We evaluated the global stability of the existing slope using the computer program *SLIDE*. This program uses a limit equilibrium (Simplified Bishop) method for calculating factors of safety against sliding on an assumed failure surface and evaluates numerous potential failure surfaces, with the most critical failure surface identified as the one yielding the lowest factor of safety of those evaluated. We analyzed the following configuration based on cross-sections provided in the referenced geologic study (see geological study in appendix for cross-section information and location):

- Slopes between 5.5H:1V (Horizontal:Vertical) to 2H:1V (Horizontal:Vertical) with an overall change in elevation of about 105 feet across the site. To simulate the load imposed on the slope by the proposed home, a load of 1,500 psf was modeled over the proposed building area. In addition, a phreatic surface was included in our analyses to account for potential seasonal perched water and effluent water from the proposed on-site septic system.

Typically, the required minimum factors of safety are 1.5 for static conditions and 1.0 for seismic (pseudostatic) conditions. The results of our analyses indicate that the existing slope configurations analyzed will meet both these requirements provided our recommendations are followed (see Figures 7 and 8).

Slope movements or even failure can occur if the slope soils are undermined or become saturated. Groundwater was not encountered during the course of our field investigation; however saturation of the slope soils can adversely affect the stability of the slope. Measures must be implemented to reduce the potential for saturation of the soils at the site. Surface drainage at the bottom and top of the slope should be directed to prevent ponding at the toe or crest of the slope, and a cut-off drain on the slope above the home is recommended to reduce the potential for infiltration of surface water at the site, as discussed further in Section 5.8, Subdrains. Landscape irrigation on this and surrounding areas may also create additional seasonal groundwater fluctuations. The limitations of landscape irrigation at the site are discussed further in Section 5.9, Site Irrigation. The property owner and the owner's representatives should be made aware of the risks should these or other conditions occur that could saturate or erode/undermine the slope soils.

Changes to the grading at the site and any retaining walls must be properly engineered to maintain stability of the slopes. GSH must review the final grading plans for the project prior to initiation of any construction.

5.4 SPREAD AND CONTINUOUS WALL FOUNDATIONS

5.4.1 Design Data

The proposed structure may be supported upon conventional spread and continuous wall foundations established upon a minimum of 2 feet of structural fill extending to suitable natural soils. For design, the following parameters are provided:

Minimum Recommended Depth of Embedment for Frost Protection	- 30 inches
Minimum Recommended Depth of Embedment for Non-frost Conditions	- 15 inches
Recommended Minimum Width for Continuous Wall Footings	- 16 inches
Minimum Recommended Width for Isolated Spread Footings	- 24 inches

Recommended Net Bearing Pressure for Real Load Conditions	- 1,500 pounds per square foot
Bearing Pressure Increase for Seismic Loading	- 50 percent

The term "net bearing pressure" refers to the pressure imposed by the portion of the structure located above lowest adjacent final grade. Therefore, the weight of the footing and backfill to lowest adjacent final grade need not be considered. Real loads are defined as the total of all dead plus frequently applied live loads. Total load includes all dead and live loads, including seismic and wind.

5.4.2 Installation

Footings shall not be installed upon soft or disturbed soils, mass movement soils, non-engineered fill, construction debris, frozen soil, or within ponded water. If the granular structural fill upon which the footings are to be established becomes disturbed, it shall be recompacted to the requirements for structural fill or be removed and replaced with structural fill.

The width of structural fill, where placed below footings, shall extend laterally at least 6 inches beyond the edges of the footings in all directions for each foot of fill thickness beneath the footings. For example, if the width of the footing is 2 feet and the thickness of the structural fill beneath the footing is 2.0 feet, the width of the structural fill at the base of the footing excavation would be a total of 4.0 feet, centered below the footing.

5.4.3 Settlements

Maximum settlements of foundations designed and installed in accordance with recommendations presented herein and supporting maximum anticipated loads as discussed in Section 2, Proposed Construction, are anticipated to be 1 inch or less.

Approximately 40 percent of the quoted settlement should occur during construction.

5.5 LATERAL RESISTANCE

Lateral loads imposed upon foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the foundations and the supporting soils. In determining frictional resistance, a coefficient of 0.40 should be utilized for foundations placed over granular structural fill. Passive resistance provided by properly placed and compacted granular structural fill above the water table may be considered equivalent to a fluid with a density of 300 pounds per cubic foot. Below the water table, this granular soil should be considered equivalent to a fluid with a density of 150 pounds per cubic foot.

A combination of passive earth resistance and friction may be utilized provided that the friction component of the total is divided by 1.5.

5.6 LATERAL PRESSURES

The lateral pressure parameters, as presented within this section, are for backfills which will consist of drained granular soil placed and compacted in accordance with the recommendations presented herein. The lateral pressures imposed upon subgrade facilities will, therefore, be basically dependent upon the relative rigidity and movement of the backfilled structure. For active walls, such as retaining walls which can move outward (away from the backfill), granular backfill may be considered equivalent to a fluid with a density of 35 pounds per cubic foot in computing lateral pressures. For more rigid walls (moderately yielding), generally not exceeding 8 feet in height, granular backfill may be considered equivalent to a fluid with a density of 45 pounds per cubic foot. The above values assume that the surface of the soils slope behind the wall is no steeper than 4 horizontal to 1 vertical and that the granular fill within 3 feet of the wall will be compacted with hand-operated compacting equipment.

For seismic loading, a uniform pressure shall be added. The uniform pressures based on different wall heights are provided in the following table:

Wall Height (feet)	Seismic Loading Active Case (psf)	Seismic Loading Moderately Yielding (psf)
4	25	55
6	40	85
8	55	115

5.7 FLOOR SLABS

Floor slabs may be established upon a minimum of 2 feet of structural fill extending to suitable natural soils. Under no circumstances shall floor slabs be established over mass movement deposit soils, non-engineered fills, loose or disturbed soils, sod, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. In order to provide a capillary break and facilitate curing of the concrete, it is recommended that floor slabs be directly underlain by 4 inches of "free-draining" fill, such as "pea" gravel or three-quarters- to one-inch minus clean gap-graded gravel.

Settlement of lightly loaded floor slabs (average uniform pressure of 100 to 150 pounds per square foot or less) is anticipated to be less than 1/4 inch.

The tops of all floor slabs in habitable areas must be established at least 4 feet above the highest anticipated normal water level or 1.5 feet above the maximum groundwater level controlled by land drains.

5.8 SUBDRAINS

5.8.1 General

We recommend that the perimeter foundation subdrains and a cutoff drain near the head of the mass movement deposit soils be installed as indicated below.

5.8.2 Foundation Subdrains

Foundation subdrains should consist of a 4-inch diameter perforated or slotted plastic or PVC pipe enclosed in clean gravel. The invert of a subdrain should be at least 2 feet below the top of the lowest adjacent floor slab. The gravel portion of the drain should extend 2 inches laterally and below the perforated pipe and at least 1 foot above the top of the lowest adjacent floor slab. The gravel zone must be installed immediately adjacent to the perimeter footings and the foundation walls. To reduce the possibility of plugging, the gravel must be wrapped with a geotextile, such as Mirafi 140N or equivalent. Above the subdrain, a minimum 4-inch-wide zone of "free-draining" sand/gravel should be placed adjacent to the foundation walls and extend to within 2 feet of final grade. The upper 2 feet of soils should consist of a compacted clayey cap to reduce surface water infiltration into the drain. As an alternative to the zone of permeable sand/gravel, a prefabricated "drainage board," such as Miradrain or equivalent, may be placed adjacent to the exterior below-grade walls. Prior to the installation of the footing subdrain, the below-grade walls should be dampproofed. The slope of the subdrain should be at least 0.3 percent. The gravel placed around the drain pipe should be clean 0.75-inch to 1.0-inch minus gap-graded gravel and/or "pea" gravel. The foundation subdrains can be discharged into the area subdrains, storm drains, or other suitable down-gradient location.

We recommend final site grading slope away from the structures at a minimum 2 percent for hard surfaces (pavement) and 5 percent for soil surfaces within the first 10 feet from the structures.

5.8.3 Cutoff Drain

To reduce potential infiltration of surface water and groundwater into the subsurface soils at the site, a cutoff drain should be installed upslope of the home and near the head of the mass movement deposit soils below the home. The drain should consist of a perforated 4-inch minimum diameter pipe wrapped in fabric and placed near the bottom of a minimum 24 inch wide trench excavated to a depth of at least 15 feet below existing grade or to competent bedrock and lined in filter fabric. The pipe should daylight at one or both ends of the drain and discharge to an appropriate drainage device or area. Clean gravel up to 2 inches in maximum size, with less than 10 percent passing the No. 4 sieve and less than 5 percent passing the No. 200 sieve, should be placed around the drain pipe. A fabric, such as Mirafi 140N or equivalent, should be placed between the clean gravel and the adjacent soils. A zone of clean gravel wrapped in fabric at least 24 inches wide should also extend above the drain, to within 2 feet of the ground surface, with fabric placed over the top of the gravel. The upper 2 feet of soils should consist of a compacted clayey cap to reduce surface water infiltration into the drain.

5.9 SITE IRRIGATION

Proper site drainage is important to maintaining slope stability at the site. Saturation of soils at the site may result in slope movement or failure. Therefore, we recommend that no irrigation lines should be placed on the slope. Landscaping at the site should be planned to utilize drought resistant plants that require minimal watering. Plants or lawn may be placed on the slope, with plants watered using direct drip systems targeted only for each plant, and any lawn areas watered using sprinklers placed in a manner such that watering is a minimum of 30 feet back from the crest of the slope. Overwatering should be strictly avoided. The surface of the site should be graded to prevent the accumulation or ponding of surface water at the site. The property owner and the owner's representatives should be made aware of the risks should these or other conditions occur that could saturate or erode/undermine the slope soils.

To reduce the potential for saturation of the site soils, overwatering at the site should be strictly avoided. Watering at the site should be limited to a maximum equivalent rainfall of 0.5 inches per week. Irrigation at the site should be strictly avoided during periods of natural precipitation.

5.10 GEOSEISMIC SETTING

5.10.1 General

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

The structure must be designed in accordance with the procedure presented in Section 1613, Earthquake Loads, of the IBC 2012 edition.

5.10.2 Faulting

Based upon our review of available literature, no active faults are known to pass through the site. The nearest active fault is the Wasatch Fault Zone Weber Section, approximately 4.3 miles west of the site.

5.10.3 Soil Class

For dynamic structural analysis, the Site Class C – Soft Bedrock Soil Profile as defined in Chapter 20 of ASCE 7 (per Section 1613.3.2, Site Class Definitions, of IBC 2012) can be utilized.

GSH

5.10.4 Ground Motions

The IBC 2012 code is based on 2008 USGS mapping, which provides values of short and long period accelerations for the Site Class B boundary for the Maximum Considered Earthquake (MCE). This Site Class B boundary represents average bedrock values for the Western United States and must be corrected for local soil conditions. The following table summarizes the peak ground and short and long period accelerations for the MCE event and incorporates the appropriate soil amplification factor for a Site Class C soil profile. Based on the site latitude and longitude (41.2981 degrees north and -111.8497 degrees west, respectively), the values for this site are tabulated below:

Spectral Acceleration Value, T	Site Class B Boundary [mapped values] (% g)	Site Coefficient	Site Class C [adjusted for site class effects] (% g)	Design Values (% g)
Peak Ground Acceleration	39.1	F_a = 1.009	39.5	26.3
0.2 Seconds (Short Period Acceleration)	S_S = 97.8	F_a = 1.009	S_{MS} = 98.7	S_{DS} = 65.8
1.0 Second (Long Period Acceleration)	S_1 = 33.7	F_v = 1.463	S_{M1} = 49.3	S_{D1} = 32.9

5.10.5 Liquefaction

The site is located in an area that has been identified by the Utah Geologic Survey as having "very low" liquefaction potential. Liquefaction is defined as the condition when saturated, loose, finer-grained sand-type soils lose their support capabilities because of excessive pore water pressure which develops during a seismic event. Clay soils, even if saturated, will generally not liquefy.

Liquefaction of the site soils is not anticipated during the design seismic event due to the unsaturated nature of the site soils.

5.11 SITE OBSERVATIONS

As stated previously, prior to placement of foundations, floor slabs, pavements, and site grading fills, a geotechnical engineer from GSH must verify that all mass movement deposit soils, non-engineered fill materials, topsoil, and disturbed soils have been removed and/or properly prepared and suitable subgrade conditions encountered. Additionally, GSH must observe fill placement and verify in-place moisture content and density of fill materials placed at the site.

GSH

5.12 CLOSURE

If you have any questions or would like to discuss these items further, please feel free to contact us at (801) 393-2012.

Respectfully submitted,

GSH Geotechnical, Inc.	Reviewed by:
Andrew M. Harris, P.E.	Michael S. Huber, P.E.
State of Utah No. 740456	State of Utah No. 343650
Senior Geotechnical Engineer	Senior Geotechnical Engineer

AMH/MSH:mmh

Encl.	Figure	1,	Vicinity Map
	Figure	2,	Site Plan
	Figures	3A	Boring Log
	Figures	4A	through 4C, Test Pit Logs
	Figure	5,	Key to Boring Log (USCS)
	Figure	6,	Key to Test Pit Log (USCS)
	Figures	7	and 8, Stability Results
	Appendix,		Geologic Hazards Reconnaissance Study

Addressee (email)

Exhibit B

COALESCE ARCHITECTURE
JOB NO. 1041-04N-16

DELORME

DeLorme Street Atlas USA® 2014

mi
0 ½ 1 1½ 2 2½
Data Zoom 12-0

FIGURE 1
VICINITY MAP

GSH

REFERENCE:
DELORME STREET ATLAS

Exhibit B

COALESCE ARCHITECTURE
JOB NO. 1041-04N-16

FIGURE 2
SITE PLAN

KEY:
Measured Groundwater depth (feet)

REFERENCE:
ADAPTED FROM AERIAL PHOTOGRAPH
DOWNLOADED FROM GOOGLE EARTH
IMAGERY DATE: JUNE 16, 2015

GSH

Exhibit B

BORING LOG

Page: 1 of 2

BORING: B-1

CLIENT: Coalesce Architecture	PROJECT NUMBER: 1041-04N-16
PROJECT: Lot 44 Big Sky Estates	DATE STARTED: 5/2/16 DATE FINISHED: 5/2/16
LOCATION: 4075 Bluebell Drive, near Liberty, Weber County, Utah	GSH FIELD REP.: AA
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger	HAMMER: Automatic WEIGHT: 140 lbs DROP: 30"
GROUNDWATER DEPTH: Not Encountered (5/2/16)	ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface									
	MH/ SM	FINE SANDY SILT/SILTY FINE SAND with trace fine to coarse sand; major roots (topsoil); brown	0								slightly moist medium stiff
		reddish-brown		30	X						very stiff
			5	17	X	48		52	86	34	stiff
	CL	SILTY CLAY/CLAYEY SAND with trace fine to coarse sand; light brown		45	X	49		45	30	16	very stiff
			10	54	X						hard
				85	X						
			15	72	X						
	ML/ SM	SILT/SILTSTONE with fine to coarse sand; gray		50+	X						moist very dense
			20	50+	X						
				50+	X						
		trace organics	25		X						

See Subsurface Conditions section in the report for additional information.

Exhibit B

GSH	BORING LOG Page: 2 of 2	BORING: B-1

CLIENT: Coalesce Architecture — PROJECT NUMBER: 1041-04N-16

PROJECT: Lot 44 Big Sky Estates — DATE STARTED: 5/2/16 — DATE FINISHED: 5/2/16

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
			25	99							
		trace organics; deformed bedding		50+							
		deformed bedding	30	82		27		42	41	20	
				50+							slightly moist
	SM	SILTY FINE TO COARSE SAND/SANDSTONE light yellowish-brown	35	50+							slightly moist very dense
		trace organics; deformed bedding		50+							
	ML/ SM	SILT/SILTSTONE with trace fine to coarse sand; gray	40	50+		36		47			slightly moist very dense
				50+							
			45	50+							
		End of Exploration at 46.5' No groundwater encountered at time of drilling Installed 1.25" diameter slotted PVC pipe to 45.0'									
			50								

See Subsurface Conditions section in the report for additional information.

FIGURE 3A
(continued)

Exhibit B

GSH

TEST PIT LOG

Page: 1 of 1

TEST PIT: TP-1

CLIENT: Coalesce Architecture — PROJECT NUMBER: 1041-04N-16

PROJECT: Lot 44 Big Sky Estates — DATE STARTED: 4/29/16 — DATE FINISHED: 4/29/16

LOCATION: 4075 Bluebell Drive, near Liberty, Weber County, Utah — GSH FIELD REP.: HRW

EXCAVATING METHOD/EQUIPMENT: JCB 214S - Backhoe

GROUNDWATER DEPTH: Not Encountered (4/29/16) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface								
	MH/SM	FINE SANDY SILT/SILTY FINE SAND major roots (topsoil) to 8"; brown	0							moist medium stiff
				▮	48		48	75	12	
			5							stiff
	CL	SILTY CLAY brown		◣						
										very stiff
			10	▮						
		End of Exploration at 10.5' No significant sidewall caving No groundwater encountered at time of excavation								
			15							
			20							
			25							

See Subsurface Conditions section in the report for additional information.

FIGURE 4A

Exhibit B

TEST PIT LOG

Page: 1 of 1

TEST PIT: TP-2

CLIENT: Coalesce Architecture	PROJECT NUMBER: 1041-04N-16
PROJECT: Lot 44 Big Sky Estates	DATE STARTED: 4/29/16 DATE FINISHED: 4/29/16
LOCATION: 4075 Bluebell Drive, near Liberty, Weber County, Utah	GSH FIELD REP.: HRW
EXCAVATING METHOD/EQUIPMENT: JCB 214S - Backhoe	
GROUNDWATER DEPTH: Not Encountered (4/29/16)	ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface								
	ML	SILT with some fine sand; major roots (topsoil) to 8"; brown	0							moist medium stiff
			5							
			10							
		End of Exploration at 11.0' No significant sidewall caving No groundwater encountered at time of excavation								
			15							
			20							
			25							

See Subsurface Conditions section in the report for additional information.

FIGURE 4B

Exhibit B

GSH

TEST PIT LOG

Page: 1 of 1

TEST PIT: TP-3

CLIENT: Coalesce Architecture — PROJECT NUMBER: 1041-04N-16

PROJECT: Lot 44 Big Sky Estates — DATE STARTED: 4/29/16 — DATE FINISHED: 4/29/16

LOCATION: 4075 Bluebell Drive, near Liberty, Weber County, Utah — GSH FIELD REP.: HRW

EXCAVATING METHOD/EQUIPMENT: JCB 214S - Backhoe

GROUNDWATER DEPTH: Not Encountered (4/29/16) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0							
	MH/SM	FINE SANDY SILT/SILTY FINE SAND major roots (topsoil) to 8"; brown								moist medium stiff
				◣	60		48	68	22	
		pieces of weathered claystone								stiff
			5	◣	43		43	59	6	
	CL	SILTY CLAY brown								moist stiff
			10	◣						
		End of Exploration at 12.0' No significant sidewall caving No groundwater encountered at time of excavation Installed 1.25" diameter slotted PVC pipe to 12.0'								
			15							
			20							
			25							

See Subsurface Conditions section in the report for additional information.

FIGURE 4C

Exhibit B

CLIENT: Coalesce Architecture PROJECT: Lot 44 Big Sky Estates PROJECT NUMBER: 1041-04N-16	**KEY TO BORING LOG**

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫

COLUMN DESCRIPTIONS

① **Water Level:** Depth to measured groundwater table. See symbol below.

② **USCS:** (Unified Soil Classification System) Description of soils encountered; typical symbols are explained below.

③ **Description:** Description of material encountered; may include color, moisture, grain size, density/consistency,

④ **Depth (ft.):** Depth in feet below the ground surface.

⑤ **Blow Count:** Number of blows to advance sampler 12" beyond first 6", using a 140-lb hammer with 30" drop.

⑥ **Sample Symbol:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

⑦ **Moisture (%):** Water content of soil sample measured in laboratory; expressed as percentage of dryweight of

⑧ **Dry Density (pcf):** The density of a soil measured in laboratory; expressed in pounds per cubic foot.

⑨ **% Passing 200:** Fines content of soils sample passing a No. 200 sieve; expressed as a percentage.

⑩ **Liquid Limit (%):** Water content at which a soil changes from plastic to liquid behavior.

⑪ **Plasticity Index (%):** Range of water content at which a soil exhibits plastic properties.

⑫ **Remarks:** Comments and observations regarding drilling or sampling made by driller or field personnel. May include other field and laboratory test results using the following abbreviations:

CEMENTATION:	MODIFIERS:	MOISTURE CONTENT (FIELD TEST):
Weakly: Crumbles or breaks with handling or slight finger pressure.	**Trace** <5%	**Dry:** Absence of moisture, dusty, dry to the touch.
Moderately: Crumbles or breaks with considerable finger pressure.	**Some** 5-12%	**Moist:** Damp but no visible water.
Strongly: Will not crumble or break with finger pressure.	**With** > 12%	**Saturated:** Visible water, usually soil below water table.

Descriptions and stratum lines are interpretive; field descriptions may have been modified to reflect lab test results. Descriptions on the logs apply only at the specific boring locations and at the time the borings were advanced; they are not warranted to be representative of subsurface conditions at other locations or times.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS SYMBOLS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS More than 50% of material is larger than No. 200 sieve size.	**GRAVELS** More than 50% of coarse fraction retained on No. 4 sieve.	**CLEAN GRAVELS** (little or no fines)	GW	Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
			GP	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
		GRAVELS WITH FINES (appreciable amount of fines)	GM	Silty Gravels, Gravel-Sand-Silt Mixtures
			GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	SANDS More than 50% of coarse fraction passing through No. 4 sieve.	**CLEAN SANDS** (little or no fines)	SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
			SP	Poorly-Graded Sands, Gravelly Sands, Little or No Fines
		SANDS WITH FINES (appreciable amount of fines)	SM	Silty Sands, Sand-Silt Mixtures
			SC	Clayey Sands, Sand-Clay Mixtures
FINE-GRAINED SOILS More than 50% of material is smaller than No. 200 sieve size.	**SILTS AND CLAYS** Liquid Limit less than 50%		ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
			OL	Organic Silts and Organic Silty Clays o f Low Plasticity
	SILTS AND CLAYS Liquid Limit greater than 50%		MH	Inorganic Silts, Micacious or Diatomacious Fine Sand or Silty Soils
			CH	Inorganic Clays of High Plasticity, Fat Clays
			OH	Organic Silts and Organic Clays of Medium to High Plasticity
HIGHLY ORGANIC SOILS			PT	Peat, Humus, Swamp Soils with High Organic Contents

Note: Dual Symbols are used to indicate borderline soil classifications.

STRATIFICATION:

DESCRIPTION	THICKNESS
Seam	up to 1/8"
Layer	1/8" to 12"

Occasional: One or less per 6" of thickness

Numerous; More than one per 6" of thickness

TYPICAL SAMPLER GRAPHIC SYMBOLS

- Bulk/Bag Sample
- Standard Penetration Split Spoon Sampler
- Rock Core
- No Recovery
- 3.25" OD, 2.42" ID D&M Sampler
- 3.0" OD, 2.42" ID D&M Sampler
- California Sampler
- Thin Wall

WATER SYMBOL

Water Level

FIGURE 2

GSH

Exhibit B

CLIENT: Coalesce Architecture PROJECT: Lot 44 Big Sky Estates PROJECT NUMBER: 1041-04N-16	**KEY TO TEST PIT LOG**

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪

COLUMN DESCRIPTIONS

① **Water Level:** Depth to measured groundwater table. See symbol below.

② **USCS:** (Unified Soil Classification System) Description of soils encountered; typical symbols are explained below.

③ **Description:** Description of material encountered; may include color, moisture, grain size, density/consistency,

④ **Depth (ft.):** Depth in feet below the ground surface.

⑤ **Sample Symbol:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

⑥ **Moisture (%):** Water content of soil sample measured in laboratory; expressed as percentage of dryweight of

⑦ **Dry Density (pcf):** The density of a soil measured in laboratory; expressed in pounds per cubic foot.

⑧ **% Passing 200:** Fines content of soils sample passing a No. 200 sieve; expressed as a percentage.

⑨ **Liquid Limit (%):** Water content at which a soil changes from plastic to liquid behavior.

⑩ **Plasticity Index (%):** Range of water content at which a soil exhibits plastic properties.

⑪ **Remarks:** Comments and observations regarding drilling or sampling made by driller or field personnel. May include other field and laboratory test results using the following abbreviations:

CEMENTATION:	MODIFIERS:	MOISTURE CONTENT (FIELD TEST):
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Strongly: Will not crumble or break with finger pressure.	**With** > 12%	**Saturated:** Visible water, usually soil below water table.

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			GP	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
		GRAVELS WITH FINES (appreciable amount of fines)	GM	Silty Gravels, Gravel-Sand-Silt Mixtures
			GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	SANDS More than 50% of coarse fraction passing through No. 4 sieve.	**CLEAN SANDS** (little or no fines)	SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
			SP	Poorly-Graded Sands, Gravelly Sands, Little or No Fines
		SANDS WITH FINES (appreciable amount of fines)	SM	Silty Sands, Sand-Silt Mixtures
			SC	Clayey Sands, Sand-Clay Mixtures
FINE-GRAINED SOILS More than 50% of material is smaller than No. 200 sieve size.	**SILTS AND CLAYS** Liquid Limit less than 50%		ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
			OL	Organic Silts and Organic Silty Clays o f Low Plasticity
	SILTS AND CLAYS Liquid Limit greater than 50%		MH	Inorganic Silts, Micacious or Diatomacious Fine Sand or Silty Soils
			CH	Inorganic Clays of High Plasticity, Fat Clays
			OH	Organic Silts and Organic Clays of Medium to High Plasticity
HIGHLY ORGANIC SOILS			PT	Peat, Humus, Swamp Soils with High Organic Contents

Note: Dual Symbols are used to indicate borderline soil classifications.

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DESCRIPTION	THICKNESS
Seam	up to 1/8"
Layer	1/8" to 12"

Occasional: One or less per 6" of thickness
Numerous; More than one per 6" of thickness

TYPICAL SAMPLER GRAPHIC SYMBOLS

- Bulk/Bag Sample
- Standard Penetration Split Spoon Sampler
- Rock Core
- No Recovery
- 3.25" OD, 2.42" ID D&M Sampler
- 3.0" OD, 2.42" ID D&M Sampler
- California Sampler
- Thin Wall

WATER SYMBOL

Water Level

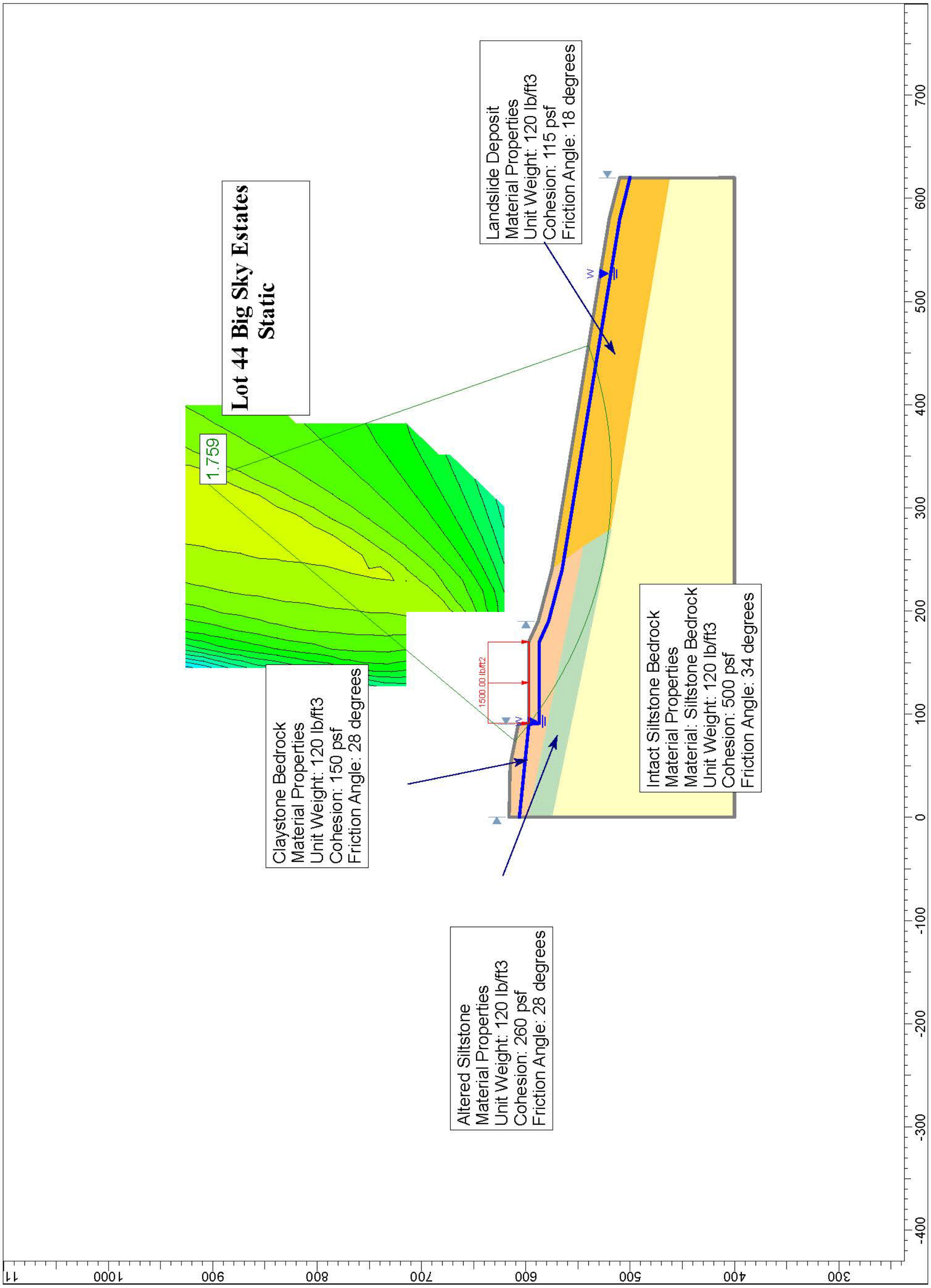
FIGURE 2

GSH

Exhibit B

STABILITY RESULTS

LOT 44 BIG SKY ESTATES

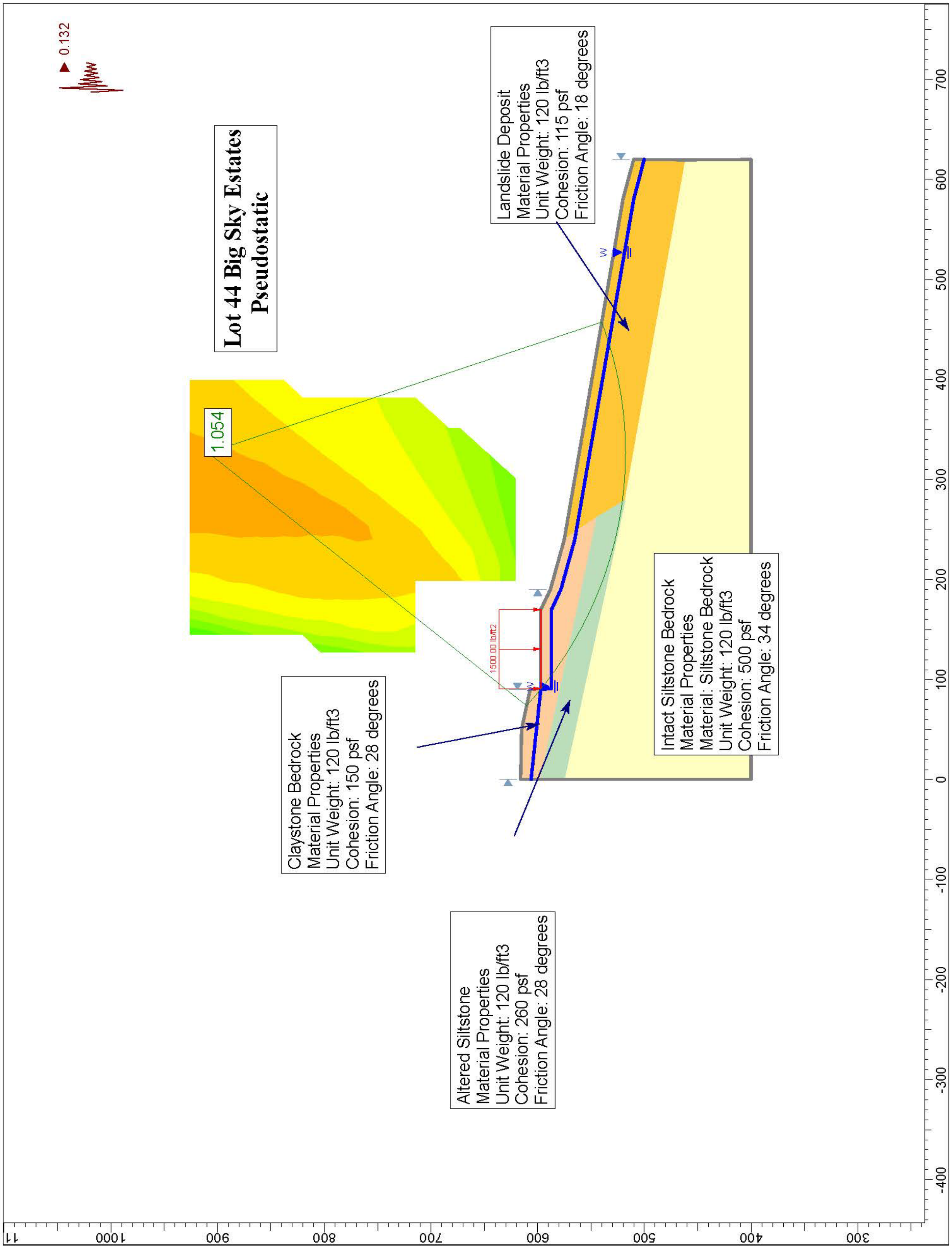


PROJECT NO.: 1041-04N-16 | GSH | **FIGURE NO.:** 7

Exhibit B

STABILITY RESULTS

LOT 44 BIG SKY ESTATES



PROJECT NO.: 1041-04N-16	GSH	FIGURE NO.: 8

REPORT

GEOLOGIC HAZARDS EVALUATION

LOT 44 BIG SKY ESTATES NO. 1

4075 BLUEBELL DRIVE

LIBERTY, WEBER COUNTY, UTAH

Prepared for

Carson Young
Solitude Builders
PO Box 529
Eden, Utah 84310

June 4, 2016

Prepared by

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June 4, 2016

Carson Young
Solitude Builders
PO Box 529
Eden, Utah 84310

SUBJECT: Geologic Hazards Evaluation
Lot 44 Big Sky Estates No. 1
4075 Bluebell Drive
Liberty, Weber County, Utah

Dear Mr. Young:

This report presents results of an engineering geology and geologic hazards review and evaluation conducted by Western GeoLogic, LLC (Western GeoLogic) for Lot 44 in the Big Sky Estates No. 1 Subdivision at 4075 Bluebell Drive in Liberty, Weber County, Utah (Figure 1 – Project Location). The site is at the margin of northwestern Ogden Valley at the eastern base of the Wasatch Range in the SW1/4 Section 33, Township 7 North, Range 1 East (Salt Lake Base Line and Meridian; Figure 1). Elevation of the site ranges from about 5,545 feet to 5,610 feet above sea level. It is our understanding that the current intended site use is for development of one residential home in the central part of the site.

PURPOSE AND SCOPE

The purpose and scope of this investigation is to identify and interpret geologic conditions at the site to identify potential risk from geologic hazards to the Project. This investigation is intended to: (1) provide geologic information and assessment of geologic conditions at the site; (2) identify potential geologic hazards that may be present and qualitatively assess their risk to the intended site use; and (3) provide recommendations for additional site- and hazard-specific studies or mitigation measures, as may be needed based on our findings. Such recommendations could require further multi-disciplinary evaluations, and/or may need design criteria that are beyond our professional scope.

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

- A site reconnaissance conducted by an experienced certified engineering geologist to assess the site setting and look for adverse geologic conditions;
- Excavation and logging of three test pits on April 29, 2016 to evaluate subsurface conditions at the property;

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

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

The engineering geology section of this report has been prepared in accordance with current generally accepted professional engineering geologic principles and practice in Utah, and meets specifications provided in Chapter 27 of the Weber County Land Use Code.

HYDROLOGY

The U.S. Geological Survey (USGS) topographic map of the Huntsville Quadrangle shows the site is at the western margin of Ogden Valley between Pole Canyon and Coal Hollow Creeks, and is on southeast- to east-facing slopes slightly below a hilltop overlooking Ogden Valley to the east and Nordic Valley to the west and northwest (Figure 1). Pole Canyon Creek flows to the north about 1,950 feet west of the property, and Coal Canyon Creek flows to the northeast about 650 feet to the southeast. Nordic Valley Ski Area is about one mile to the northwest. No active drainages are shown crossing the site on Figure 1. However, one small drainage that may be seasonally active reportedly flows to the east across the property into Coal Canyon from slightly below the cul-de-sac bordering the site on the west (AGEC, 2014). No springs or seeps were observed at the site or are shown in the site area on Figure 1.

The site is the western margin of Ogden Valley about 1.1 miles northwest of the north arm of Pineview Reservoir. The valley bottom to the east is dominated by unconsolidated lacustrine and alluvial basin-fill deposits, whereas slopes in the site area are mainly in weathered Tertiary-age tuffaceous bedrock and landslide colluvium from a complex series of overlapping failures since Late Pleistocene time. The Utah Division of Water Rights Well Driller Database shows one water well about 2,000 feet southwest of the property that has a reported depth to static groundwater of 50 feet, but no site-specific groundwater information was available and no groundwater was encountered in the boring conducted by GSH at the property to its explored depth of 46.5 feet. Given all the above, we anticipate the depth to the shallow aquifer at the Project is somewhere between 50 and 100 feet. However, groundwater depths at the site likely vary seasonally from snowmelt runoff and annually from climatic fluctuations. Such variations would be typical for an alpine environment. Perched conditions above less-permeable, clay-rich bedrock layers may also be present in the subsurface that could cause locally shallower groundwater levels.

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

GEOLOGY

Surficial Geology

The site is located on the northwestern margin of Ogden Valley, a sediment-filled intermontane valley within the Wasatch Range, a major north-south trending mountain range marking the eastern boundary of the Basin and Range physiographic province (Stokes; 1977, 1986). Surficial geology of the site is shown on unpublished, 1:24,000-scale, Utah Geological Survey (UGS) mapping from 2014 (Figure 2). The 2014 mapping is part of an ongoing surficial geologic mapping project for Ogden Valley that will be, in part, incorporated into an optimized update of Coogan and King (2001). The unpublished mapping was provided for this report since it represents the most-recent geologic information available for the area, although it will be replaced by the official optimized map.

Figure 2 shows the site in bedrock of the Norwood Formation, with possible landslide and slump deposits near the southeast site corner (units Tn and Qmc?, Figure 2). Descriptions of geologic units within 0.5 miles of the site from the adjoining Snow Basin Quadrangle (King and others, 2008) are as follows:

***Qaf* – *Alluvial-fan deposits, undivided (Holocene and Pleistocene)*.** *Mostly sand, silt, and gravel that is poorly bedded and poorly sorted; includes debris flows, particularly in drainages and at drainage mouths (fan heads); generally less than 60 feet (18 m) thick. Mapped where fan age uncertain or for composite fans where portions of fans with different ages cannot be shown separately at map scale.*

Qaf1, Qafy* – *Younger alluvial-fan deposits (Holocene and uppermost Pleistocene) - *Mostly sand, silt, and gravel that is poorly bedded and poorly sorted; includes debris flows, particularly in drainages and at drainage mouths (fan heads); generally less than 40 feet (12 m) thick. Near late Pleistocene Lake Bonneville, deposits with suffixes 1 and y are younger than Lake Bonneville (mostly Holocene), are active, and impinge on present-day drainages like the Weber River and Cottonwood Creek; Qafy fans may be partly older than Qaf1 fans, and may be as old as uppermost Pleistocene Provo shoreline.*

***Qmdf* – *Debris- and mud-flow deposits (Holocene and uppermost Pleistocene)*.** *Poorly sorted, clay- to boulder-sized material, typically with distinct natural lateral levees, channels, and lack of vegetation; older deposits can be vegetated; 0 to 40 feet (0-12 m) thick.*

Qms, Qms1, Qmsy, Qmso – Landslide and slump deposits (Holocene and Pleistocene). *Poorly sorted clay- to boulder-sized material; locally includes flow deposits; generally characterized by hummocky topography, main and internal scarps, and chaotic bedding in displaced blocks; composition depends on local sources; morphology becomes more subdued with time and amount of water in deposits; Qms may be in contact with Qms when two different slide/slumps abut; locally, unit involved in slide/slump is shown in parentheses where a nearly intact block is visible; Qms and Qmso queried (?) where bedrock block may be in place; thickness highly variable, boreholes in Rogers (1986) show thicknesses of about 20 to 30 feet (6-9 m) on small slides/flows. Qms without suffix is mapped where age uncertain (though likely Holocene and/or upper Pleistocene), where portions of slide/slump complexes have different ages but cannot be shown separately at map scale, or where boundaries between slides/slumps of different ages are not distinct. Estimated time of emplacement indicated by relative age number and letter suffixes with: 1 - likely emplaced in the last 80 to 150 years, mostly historical; y - post- Lake Bonneville in age and mostly pre-historic; and o – likely emplaced before Lake Bonneville transgression. Suffixes y (as well as 1) and o indicate probable Holocene and Pleistocene ages, respectively. Qmso typically mapped where rumpled morphology typical of mass movements has been diminished and/or younger surficial deposits cover or cut Qmso. These older deposits are as unstable as other landslides and slumps, and are easily reactivated with the addition of water, be it irrigation or septic tank drain fields.*

Qmc – Landslide and slump, and colluvial deposits, undivided (Holocene and Pleistocene). *Mapped where landslides and slumps are difficult to distinguish from colluvium (slopewash and soil creep) and where mapping separate, small, intermingled areas of slides and slumps, and colluvial deposits is not possible at map scale; locally includes talus and debris flows; typically mapped where landslides and slumps are thin ("shallow"); also mapped where the blocky or rumpled morphology that is characteristic of landslides and slumps has been diminished ("smoothed") by slopewash and soil creep; composition depends on local sources; 0 to 40 feet (0-12 m) thick. These deposits are as unstable as other landslides and slumps units (Qms).*

Qac – Alluvium and colluvium (Holocene and Pleistocene). *Includes stream and fan alluvium, colluvium, and, locally, mass-movement deposits; 0 to 20 feet (0-6 m) thick.*

Qls – Lake Bonneville sand (upper Pleistocene). *Mostly sand with some silt and gravel deposited nearshore in Morgan Valley; typically less than 20 feet (6 m) thick, but thicker in "bench" east of Cottonwood Creek in southeast corner of Snow Basin quadrangle.*

Qafp, Qafb, Qafo – Older alluvial-fan deposits (upper and middle(?) Pleistocene). *Incised fans of mostly sand, silt, and gravel that is poorly bedded and poorly sorted; includes debris flows, particularly in drainages and at drainage mouths (fan heads); generally less than 60 feet (18 m) thick. Fans labeled Qafp and Qafb are graded to the Provo (and slightly lower) and Bonneville shorelines of late Pleistocene Lake Bonneville, respectively. Near Lake Bonneville, unit Qafo is older than (above and* *typically incised/eroded at) the Bonneville shoreline; upstream unit Qafo is topographically higher than fans graded to the Bonneville shoreline (Qafb). Elsewhere relative-age letters only apply to local drainages. Like Qa and Qat suffixes, ages are partly based on heights above present drainages (table 1), in this case heights at drainage-eroded edge of fan, with Qafp about 35 to 45 feet (10 to 12 m) above, Qafb 50 to 75 feet (15-23 m) above, and Qafo about 70 to 110 feet (20-35 m) above present drainages. Dates presented in Sullivan and Nelson (1992) imply Qafo to southeast in Morgan quadrangle considerably predates Lake Bonneville and is middle Pleistocene in age (300-600 ka). This means these older fans could be related to Pokes Point lake cycle (at about 200 ka, after McCoy, 1987) (Kansan continental glaciation?, 300-400 ka) and/or pre Pokes Point (Nebraskan continental glaciation?, >500 ka); however, the Bonneville shoreline is obscure on this fan.*

***Tn – Norwood Formation (lower Oligocene and upper Eocene)** - Typically light-gray to light brown, altered tuff (claystone), tuffaceous siltstone, sandstone, and conglomerate; locally colored light shades of red and green; variable calcareous cement and zeolitization, that is less common to south of Snow Basin quadrangle; zeolite marker beds mapped as an aid to recognizing geologic structure; locally includes landslides and slumps that are too small to show at map scale.*

Upper Norwood Formation, as exposed on east margin of Snow Basin quadrangle and to east in Durst Mountain quadrangle, contains interbedded claystone (tuffaceous beds), fine- to coarse-grained sandstone, gray granule to small pebble conglomerate, with chert and carbonate clasts, as well as conglomerate interbeds with quartzite pebble clasts like those in unit Tcg; interbedded with more extensive quartzite-clast conglomerate, some mapped as Tcg, to east in Durst Mountain quadrangle (see Coogan and King, 2006); north of Wasatch Formation (Tw) knob on Snow Basin-Durst Mountain quadrangle boundary, the Norwood contains intermittent quartzite gravel (quartzite-richest exposures mapped as Tcg?); also, gravel-rich beds containing mostly chert and carbonate clasts are common north of the knob, and with quartzite-bearing beds, are involved in multiple landslides that obscure bedding and structure; these variations and disruptions make it difficult to map a consistent Tcg-Tn contact (see also unit Tcg description above and in Coogan and King, 2006); based on outcrop pattern, dip, and topography, Norwood is at least 7000 feet (2135 m) thick in Snow Basin quadrangle; it thins to the south, so is about 5000 feet (1525 m) thick north of Morgan, and only about 1500 feet (460 m) thick east of East Canyon Creek in the type area in Porterville quadrangle (Eardley, 1944) (not 2500+ feet [800+ m] inferred by Bryant and others, 1989, p. K6).

Zeolite beds mapped in the Norwood indicate a generally east-dipping homocline with minor faulting. A broad, north-south-oriented, doubly plunging syncline is superimposed on the homocline but the east limb of the syncline and companion anticline are obscured by landslide complexes. The common fold limb may dip steeply to the west. Also the zeolite beds become obscure to the east, due to the increased abundance of clastic sediment, making the zeolite beds thinner and less pure, and therefore less distinct. Norwood generally considered younger than the Fowkes Formation, but not well dated due to alteration. Corrected Norwood K-Ar ages are

38.4 Ma (sanidine) from Norwood type area (Evernden and others, 1964) and 39.3 Ma (biotite) from farther south in East Canyon (Mann, 1974), while Fowkes $_{40}Ar/_{39}Ar$ ages are 40.41 Ma and 38.78 Ma on biotite and hornblende, respectively, from Utah to east near Wyoming (Coogan and King, unpublished). To north in southern Cache Valley, basal part of unit similar to Fowkes and Norwood ("resting" on Wasatch and less than 600 feet [180 m] or about 1200 feet [260 m] thick) dated at 44.2 + 1.7 Ma and 48.6 + 1.3 Ma K-Ar on hornblende and biotite, respectively (Smith, 1997; King and Solomon, 2008); though the biotite date is suspect, its age is similar to older dates on the Fowkes Formation in Wyoming, which are: 47.94 + 0.17 Ma ($_{40}Ar/_{39}Ar$, sanidine) at the northeast end of the Crawford Mountains (Smith and others, 2008, p. 67), south of the Fowkes type area (see Oriel and Tracey, 1970); 49.1 Ma (biotite; recalculated; dated in 1977, but decay constant not reported, so may not need to be recalculated), reported as 47.9 + 1.9 Ma by Nelson (1979) and likely from near the base of the Fowkes near Evanston, Wyoming (Nelson, 1973); and 48.9 Ma K-Ar (hornblende; recalculated) from the Fowkes type area near Leefe, Wyoming (47.7 + 1.5 Ma, Oriel and Tracey, 1970). The Norwood is different in the southern Peterson and Morgan quadrangles, near the type area (see Eardley, 1944), where it contains extensive unaltered tuff (hence the name Norwood Tuff), has cut-and-fill structures (fluvial), and includes volcanic-clast conglomerate; in the Morgan quadrangle, it also contains local limestone and silica-cemented rocks. Unit referred to here as Norwood Formation, rather than Norwood Tuff, because the type area includes only part of the formation (see thickness in following paragraph), the Norwood contains many lithologies, and this emphasizes that it is not tuffaceous away from the type area.

Citations in the above unit descriptions are provided in King and others (2008).

Figure 2 shows several strike and dip measurements in Norwood Formation in the site area. Those shown in black where measured by the UGS, whereas those in purple are from U.S. Geological Survey (USGS) data (Jon King, verbal communication, February 29, 2016). The nearest measurement is about 700 feet northwest of the property and shows a strike/dip of N46°W 40° NE. Several additional measurements are to the east and southeast that show generally northwest-trending strikes and dips generally between about 27 to 46 degrees to the northeast. Norwood Formation bedrock in the area has average dips of about 30 to 45 degrees, although this unit has local depositional variations that may produce lower and higher dips within a relatively short distance (Jon King, verbal communication, February 29, 2016).

Seismotectonic Setting

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

Rocky Mountains provinces is the prominent, west-facing escarpment along the Wasatch fault zone at the base of the Wasatch Range. Late Cenozoic normal faulting, a characteristic of the Basin and Range, began between about 17 and 10 million years ago in the Nevada (Stewart, 1980) and Utah (Anderson, 1989) portions of the province. The faulting is a result of a roughly east-west directed, regional extensional stress regime that has continued to the present (Zoback and Zoback, 1989; Zoback, 1989). The back valleys are morphologically similar to valleys in the Basin and Range, but exhibit less structural relief (Sullivan and others 1988).

Ogden Valley occupies a structural trough created by up to 2,000 feet of vertical displacement on normal faults bounding the east and west sides of the valley. The Ogden Valley southwestern margin fault and North Fork fault (Black and others, 2003) are shown on Figure 2 trending northwestward about 900 feet to the southwest and 3,750 feet to the northeast, respectively. The most recent movement on these faults is pre-Holocene (Sullivan and others, 1986). The faults are concealed where mantled by Late Pleistocene and Holocene surficial deposits (Figure 2, dashed and dotted bold lines). Norwood Formation mapped in the site area (Figure 2, unit Tn) likely represents an in-place faulted block preserved between the faults (Jon King, verbal communication, February 29, 2016).

The site is also situated near the central portion of the Intermountain Seismic Belt (ISB). The ISB is a north-south-trending zone of historical seismicity along the eastern margin of the Basin and Range province which extends for approximately 900 miles from northern Arizona to northwestern Montana (Sbar and others, 1972; Smith and Sbar, 1974). At least 16 earthquakes of magnitude 6.0 or greater have occurred within the ISB since 1850, with the largest of these events the M_S 7.5 1959 Hebgen Lake, Montana earthquake. However, none of these events have occurred along the Wasatch fault zone or other known late Quaternary faults in the region (Arabasz and others, 1992; Smith and Arabasz, 1991). The closest of these events to the site was the 1934 Hansel Valley (M_S 6.6) event north of the Great Salt Lake and south of the town of Snowville.

Lake Bonneville History

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

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

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

SITE CHARACTERIZATION

Empirical Observations

On April 29, 2016, Mr. Bill D. Black of Western GeoLogic conducted a reconnaissance of the property. Weather at the time of the site reconnaissance was partly cloudy with temperatures in the 50's (°F). The site is at the western margin of Ogden Valley on heavily vegetated east- to southeast-facing slopes slightly overlooking Ogden Valley to the east. Coal Canyon Creek is to the southeast of the site. Native vegetation appeared to consist of oak brush and mature trees. No active streams are mapped crossing the site or were observed, and no bedrock outcrops were evident at the site or in adjacent slopes. However, a small seasonal drainage reportedly once flowed to the east in a drainage easement crossing the lot from slightly below Bluebell Drive. The drainage channel was reportedly about 1.5 feet deep and 6 feet wide below the cul-de-sac in 2014 (AGEC, 2014).

Air Photo Observations

High-resolution orthophotography from 2012 and 1-meter bare earth DEM LIDAR from 2011 available from the Utah AGRC (Figures 3A and 3B) were reviewed to obtain information about the geomorphology of the site area. Only the westernmost (upper) part of the small seasonal drainage reported by AGEC (2014) is evident on the 2012 photo (Figure 3A). Figures 3A and 3B also show the southeast part of the site straddles a landslide that appears to have originated to the southwest. Morphology of the landslide appears subdued or obscured, suggesting it may be an older feature (possibly latest Pleistocene to early Holocene in age). The landslide trends northeastward across the southeast corner of the lot and then turns downslope toward the east (Figures 3A and 3B).

Figure 3B shows a lineament that begins near the head of the landslide and trends into the property. We infer this lineament is a tension crack from a younger failure that is occurring on the margin of the older landslide (Figure 3B, Tension Crack). Below Bluebell Drive, the LIDAR imagery suggest that the crack may be widening as the younger landslide creeps downslope (Figure 3B, Pull-Apart Zone). The tension crack then makes an abrupt 90-degree turn to the southeast slightly southwest of the small seasonal drainage, travels downslope for a short distance, and then dies out. We infer this latter feature is a lateral shear on the northeastern margin of the younger failure (Figure 3B, Lateral Shear). The boring conducted by GSH at the site is about 24 feet to the southeast and topographically below the tension crack (Figure 3B), and reportedly encountered a disturbed/weak zone containing roots between 25 and 40 feet in depth. This confirms that the tension crack is not just a surficial feature and continues at depth. The roots are likely from large trees that have preferentially followed the tension crack because it is a zone of weakness and groundwater percolation. No evidence of other geologic hazards were observed on the air photos in the site area.

Subsurface Investigation

Three test pits were excavated at the property in April 2016 to evaluate subsurface conditions. Test pit locations are shown on Figures 3A-3C, and were measured using a hand-held GPS unit and trend and distance methods from known points. The test pits were logged at a scale of 1 inch equals 5 feet (1:60). No complications were encountered that substantially impacted the subsurface investigation. The test pit exposures were digitally photographed at five-foot intervals to document subsurface conditions. The photos are not provided herein, but are available on request.

Test pits 1 and 2 (Figures 4A and 4B) both exposed a similar sequence of weathered Norwood Formation consisting of an upper clay-rich conglomerate overlying interbedded claystone and siltstone. Bedding in test pit 1 showed a strike/dip of N30°W 22° NE, whereas test pit 2 bedding showed a strike/dip of N36°W 20°NE. Both of these bedding strikes and dips appear similar to reported regional measurements, suggesting the sequence is intact bedrock. However, test pit 3 (Figure 4C) exposed a backtilted sequence of Norwood Formation that we infer is a rafted landslide block. Bedding in this test pit showed a strike/dip of N85°E 35°NW. East-west strikes are typical for deformed landslide blocks in the area on Figure 2. No other evidence of geologic hazards was exposed in the test pits, except for water seepage along the contact between the conglomerate and underlying claystone (units 1 and 2, Figure 4A) in test pit 1 that appeared to be from recent rainfall. This suggests that surface water percolating through the subsurface is perching on the less-permeable clay layers.

Cross Section

Figure 5 shows a cross section across the slope south of the proposed home location at a scale of 1 inch equals 25 feet with no vertical exaggeration. The profile location is shown on Figure 3C (A-A', in blue). Units and contacts are inferred based on the subsurface data discussed above and our review of the log for the GSH boring in the western part of the site (which is not reproduced herein). We use an overall dip of 15 degrees for contacts within the Norwood Formation, which is corrected from an average of 21 degrees to account for the difference between the profile trend and dip direction. As discussed above, the boring conducted by GSH at the site exposed a deformed zone containing roots at a depth of 25 to 40 feet below the ground surface that likely corresponds to the tension crack and pull-apart zone upslope from the boring. Given the above depths and distance between the boring and tension crack (24 feet), dip of the shear would be about 45 to 60 degrees. The area between the tension crack and existing landslide on the cross section appears to represent a smaller failure working its way downslope. The lateral shear along the margin of this failure (Figures 3B and 3C) is not displayed on the cross section because of difficulty representing it in two dimensions, although it would likely be subvertical and near where the pull-apart zone coalesces (85-90 feet on Figure 5).

GEOLOGIC HAZARDS

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

Table 1. *Geologic hazards summary for Lot 44 Big Sky Estates No. 1.*

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

Earthquake Ground Shaking

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

The extent of property damage and loss of life due to ground shaking depends on factors such as: (1) proximity of the earthquake and strength of seismic waves at the surface (horizontal motions are the most damaging); (2) amplitude, duration, and frequency of ground motions; (3) nature of foundation materials; and (4) building design (Costa and Baker, 1981). Based on 2012 IBC provisions, a site class of D (stiff soil), and a risk category of II, USGS calculated uniform-hazard and deterministic ground motion values with a 2% chance of exceedance in 50 years are as follows:

Table 2. *Seismic hazards summary for Lot 44 Big Sky Estates No. 1. (Site Location: 41.298053° N, -111.849567° W)*

S_S	*0.978 g*
S_1	*0.336 g*
S_{MS} (F_a x S_S)	*1.084 g*
S_{M1} (F_v x S_1)	*0.581 g*
S_{DS} (2/3 x S_{MS})	*0.723 g*
S_{D1} (2/3 x S_{M1})	*0.387 g*
Site Coefficient, F_a	*= 1.109*
Site Coefficient, F_v	*= 1.727*

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

Surface Fault Rupture

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

The nearest active fault to the site is the Weber segment of the WFZ about 4.2 miles to the west, and no evidence of active surface faulting is mapped or was evident at the site. Based on this, the hazard from surface faulting is rated as low.

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

No soils likely susceptible to liquefaction were observed in the test pit exposures at the site or were evident in the boring conducted by GSH. Based on this, the hazard from liquefaction and lateral spreading is rated as low.

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

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

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

No active drainages cross the site or were evident, and based on this the hazard from stream flooding should be low. However, there was a small seasonal drainage that reportedly had an easement crossing the site (AGEC, 2014). Site hydrology and runoff should therefore be addressed in the civil engineering design and grading plan for the Project.

Shallow Groundwater

No springs or seeps are shown on the topographic map for the site or were reported or observed, and no groundwater was encountered in the boring conducted by GSH. Given this, the depth to static groundwater is at least more than 46.5 feet. Based on the above, we rate the risk from shallow groundwater as low. However, proper site drainage should maintained so that groundwater does not pose a future risk of slope instability. It is also possible that groundwater levels may fluctuate seasonally and following snowmelt or rainstorms, and may be perched locally over less permeable bedrock layers.

Landslides and Slope Failures

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

The southeast part of the site is on what appears to be an older (latest Pleistocene to early Holocene) landslide that originated to the southwest of the property. A rafted block in this landslide was observed in test pit 3, but test pits 1 and 2 both exposed undeformed bedrock layers. A younger failure marked by a tension crack, pull-apart zone, and lateral shear appears to be forming on the north margin of the old landslide in the western part of the property (Figures 3B and 3C). The boring conducted by GSH downslope of the tension crack exposed a disturbed/weak zone between 25 and 40 feet in depth that likely corresponds to the basal shear of this younger landslide in the subsurface. The lateral shear for this failure appears to trend to near the southwest corner of the proposed home (Figure 3C).

Given all the above, we rate the hazard from landsliding as high. We recommend stability of the slopes be evaluated in a geotechnical engineering evaluation prior to building based on site specific data and subsurface information included in this report. Recommendations for reducing the risk from landsliding should be provided if factors of safety are determined to be unsuitable. The stability evaluation should take into account possible perched groundwater and fluctuating seasonal levels.

Additional exploration to determine if shearing may be present beneath the home footprint was considered outside the scope of our evaluation. Reducing risk to the structure and occupants is a significant concern given the site conditions described above. We therefore recommend that the proposed home location be moved at least 30 feet away from the presumed lateral shear location and that the excavation for the home be inspected by a licensed engineering geologist to confirm that no deformation is present. Relocating the home northward, as indicated on Figure 3C (and recommended above), would reduce the risk from landsliding and does not appear to pose a significant development constraint, although the proposed location for the septic system may also need to be moved to the northeast. Care should also be taken that site grading does not destabilize slopes in this area without prior geotechnical analysis and grading plans, and that proper drainage is maintained.

Debris Flows

Debris flow hazards are typically associated with unconsolidated alluvial fan deposits at the mouths of large range-front drainages, such as those along the Wasatch Front. Debris flows have historically significant damage in the Wasatch Front area. The site is not in any mapped alluvial-fan deposits, and no evidence of debris-flow channels, levees, or other debris-flow features was observed. Based on the above, we rate the hazard from debris flows at the site as low.

Rock Fall

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

Swelling and Collapsible Soils

Surficial soils that contain certain clays can swell or collapse when wet. Given the subsurface soil conditions observed at the site, it is possible that clayey interbeds may be present in the subsurface that could pose a moderate risk from problem soils. A geotechnical engineering evaluation should therefore be performed to address soil conditions and provide specific recommendations for site grading, subgrade preparation, and footing and foundation design.

CONCLUSIONS AND RECOMMENDATIONS

Geologic hazards posing a high relative risk to the site are earthquake ground shaking and landslides. Problem soils also pose a moderate-risk hazard. The following recommendations are provided with regard to the geologic characterizations in this report:

- ***Home Location and Excavation Inspection*** – To reduce the risk from landsliding, we recommend that the proposed home location be moved at least 30 feet away from the presumed lateral shear location as shown on Figure 3C, and that the excavation for the home be inspected by a licensed engineering geologist to confirm that no deformation is present, as well as to recognize any differing conditions that could affect the performance of the planned structure. The proposed location for the septic system may also need to be moved slightly to the northeast to accommodate this new location. If the home footing is located over the excavation for test pit 1, or any prior percolation test pits, care should also be taken that the backfilled material is removed and/or replaced by structural fill, as noted below.

- ***Geotechnical Investigation*** - A design-level geotechnical engineering study should be conducted prior to construction to: (1) address soil conditions at the site for use in foundation design, site grading, and drainage; (2) provide recommendations regarding building design to reduce risk from seismic acceleration; and (3) evaluate stability of slopes at the site, including providing recommendations for reducing the risk of landsliding if the factors of safety are deemed unsuitable, based on the geologic characterizations provided in this report and site-specific geotechnical data. The stability evaluation should account for possible perched groundwater and seasonal fluctuations. It is our understanding that GSH is in the process of preparing a geotechnical report for the site. Our report should be provided to them to assist with their evaluation.

- ***Excavation Backfill Considerations*** - The test pits may be in areas where structures could subsequently be placed. However, backfill may not have been replaced in the test pits in compacted layers. The fill could settle with time and upon saturation. Should structures be located over an excavated area, no footings or structure should be founded over the excavations unless the backfill has been removed and replaced with structural fill, if the fill is to support a structure.

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

LIMITATIONS

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

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

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

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

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

Exhibit C

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

Sincerely,
Western GeoLogic, LLC

LICENSED PROFESSIONAL GEOLOGIST
6-4-2016
BILL DUANE BLACK
NO. 5224898-2250
STATE OF UTAH

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

Reviewed by:

LICENSED PROFESSIONAL GEOLOGIST
CRAIG V NELSON
5251804
STATE OF UTAH

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

ATTACHMENTS

Figure 1. Location Map (8.5”x11”)
Figure 2. Geologic Map (8.5”x11”)
Figure 3A. 2012 Air Photo (8.5”x11”)
Figure 3B. 2011 LIDAR Image (8.5”x11”)
Figure 3C. Site Plan (8.5”x11”)
Figure 4A-C. Test Pit Logs (three 8.5”x11” sheets)
Figure 5. Cross Section (11”x17”)

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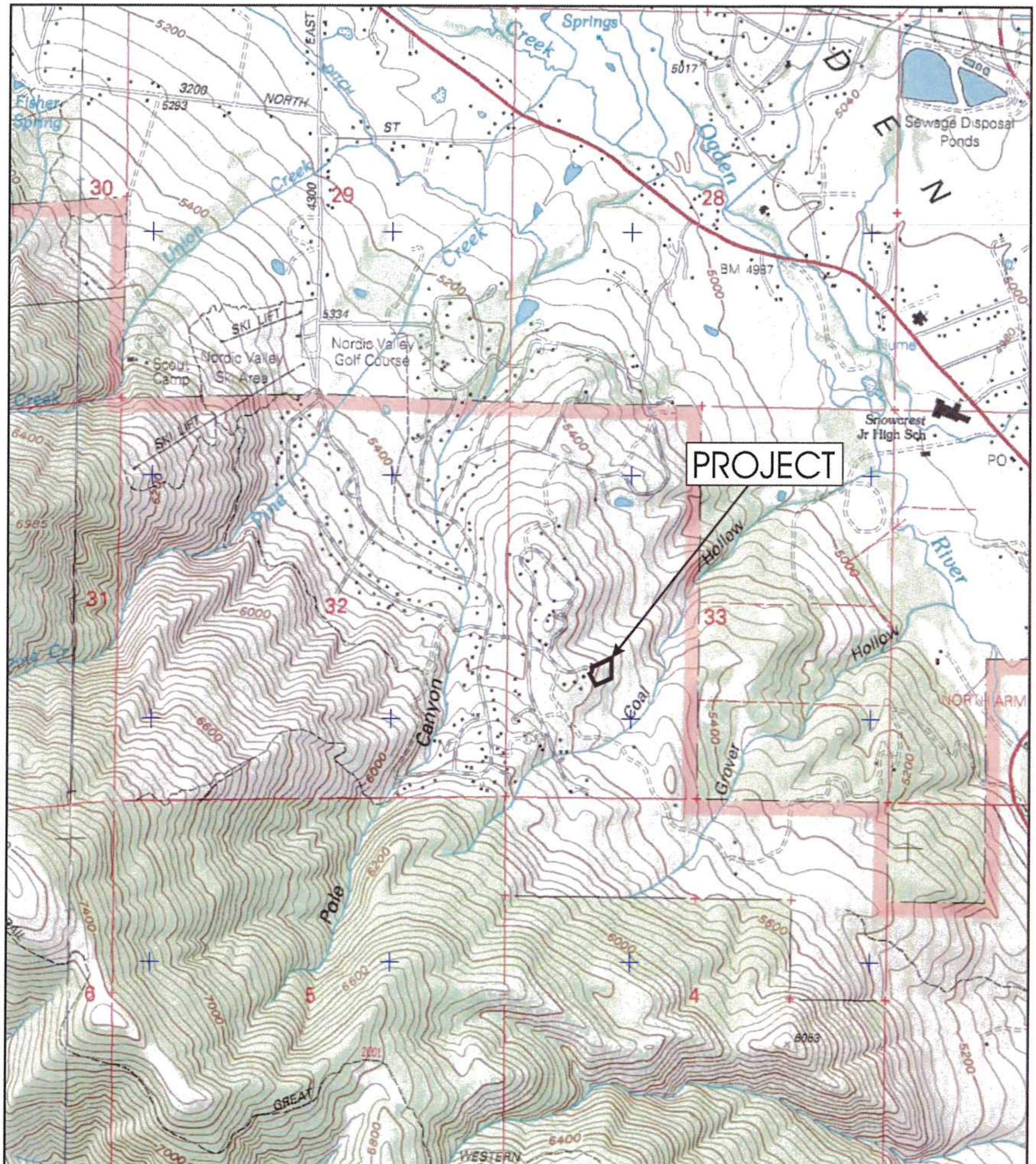


Source: U.S. Geological Survey 7.5 Minute Series Topographic Maps, Utah - Huntsville, 1998;
Project location SW1/4, Section 33, T7N, R1E (SLBM); about 5,525 to 5,615 feet elevation (ASL).

LOCATION MAP

WESTERN GEOLOGIC

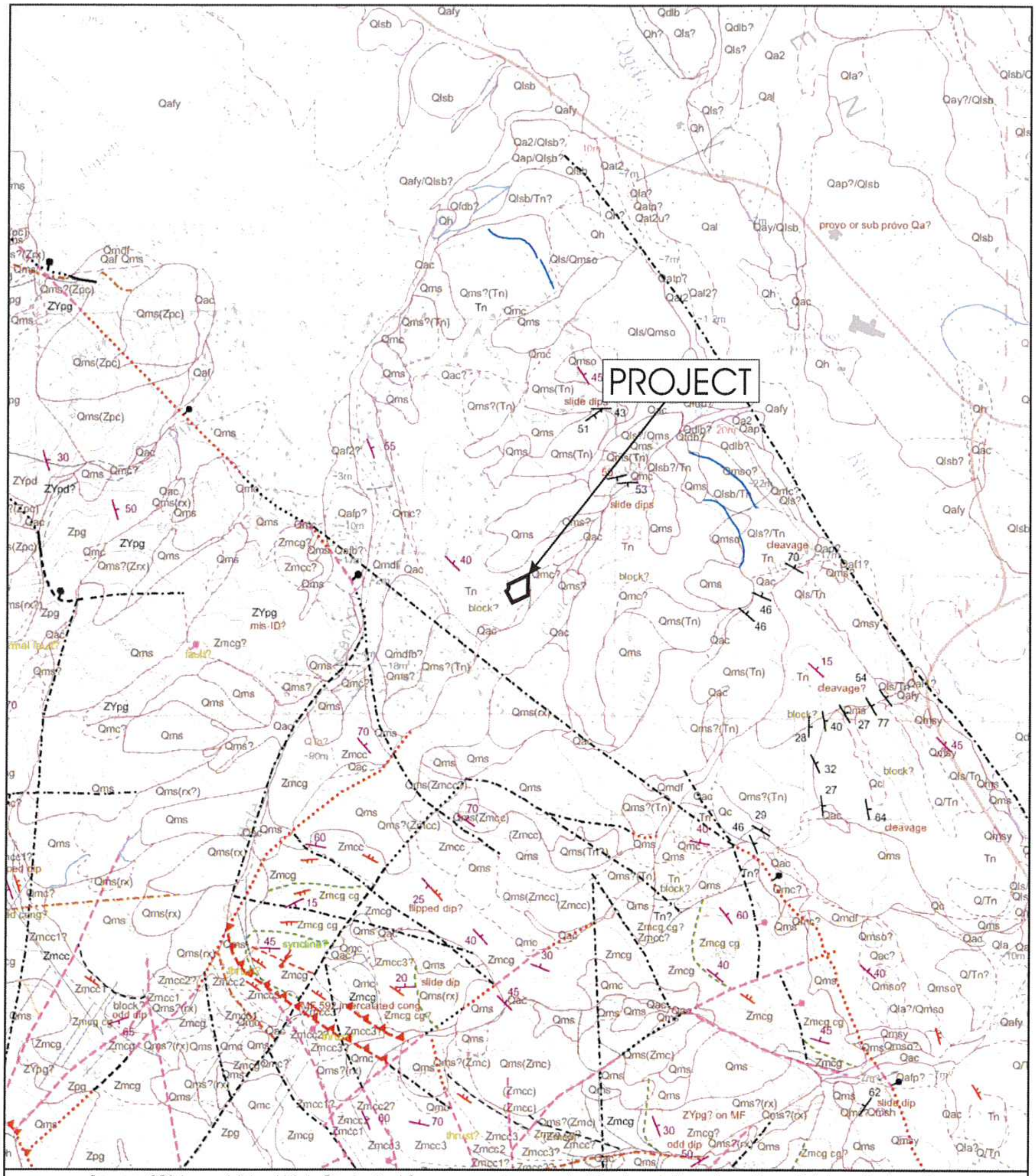
N W E S

0 1000 2000 feet

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

GEOLOGIC HAZARDS EVALUATION
Lot 44 Big Sky Estates No. 1
4075 Bluebell Drive
Liberty, Weber County, Utah

FIGURE 1



Source: 2014 unpublished Utah Geological Survey mapping; see text for description of nearby surficial geologic units.

WESTERN GEOLOGIC

N W E S

0 1000 2000 feet

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

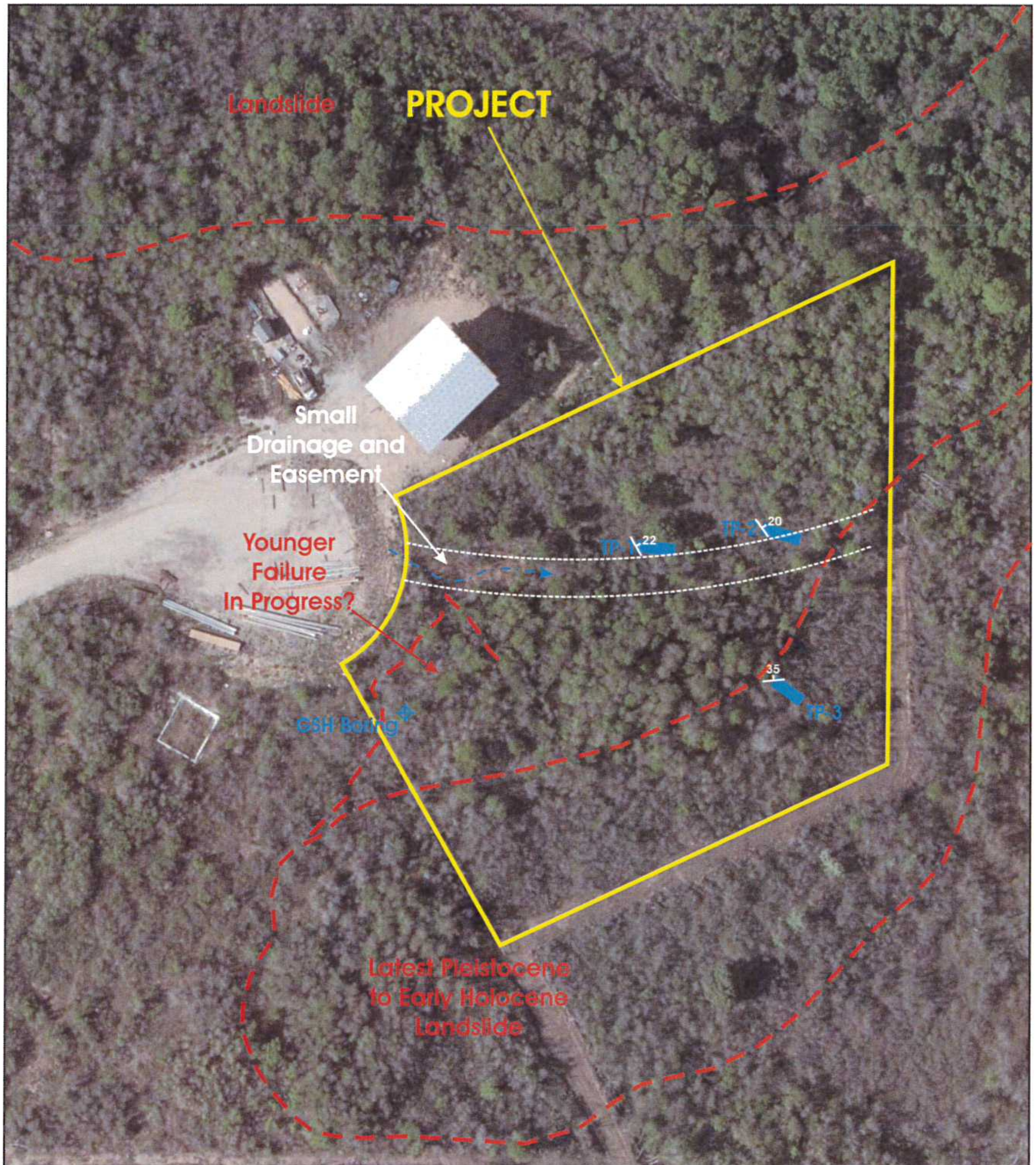
GEOLOGIC MAP

GEOLOGIC HAZARDS EVALUATION

Lot 44 Big Sky Estates No. 1
4075 Bluebell Drive
Liberty, Weber County, Utah

FIGURE 2

Exhibit C



Source: Utah AGRC, 2012 High-Resolution Orthophoto, 6-inch resolution.

WESTERN GEOLOGIC

N W E S

0 40 80 feet

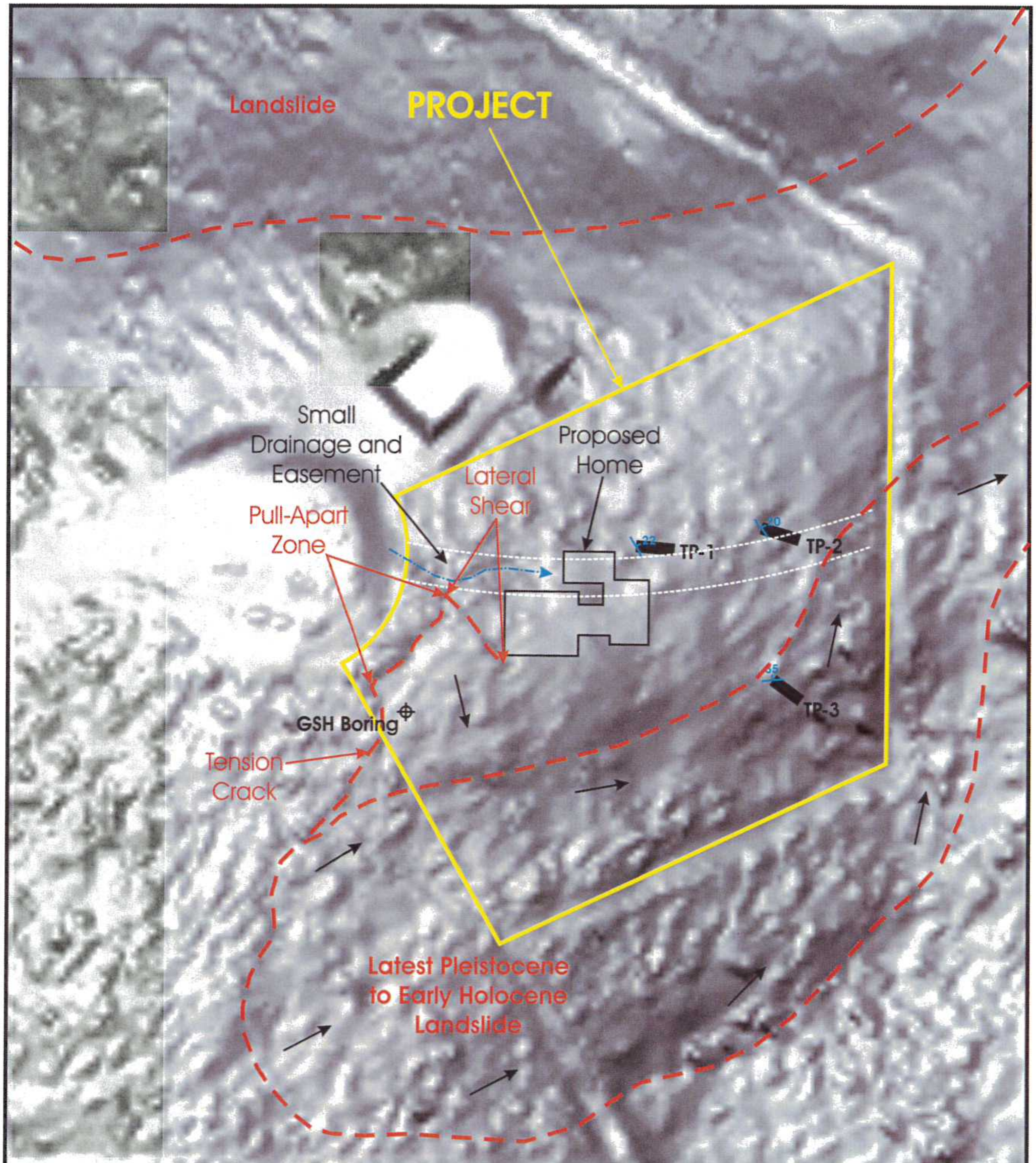
Scale 1:960
(1 inch = 80 feet)

2012 AERIAL PHOTO

GEOLOGIC HAZARDS EVALUATION
Lot 44 Big Sky Estates No. 1
4075 Bluebell Drive
Liberty, Weber County, Utah

FIGURE 3A

Exhibit C



Source: Utah AGRC, 2011 LIDAR Bare Earth DEM.

WESTERN GEOLOGIC

N W E S

0 40 80 feet

Scale 1:960
(1 inch = 80 feet)

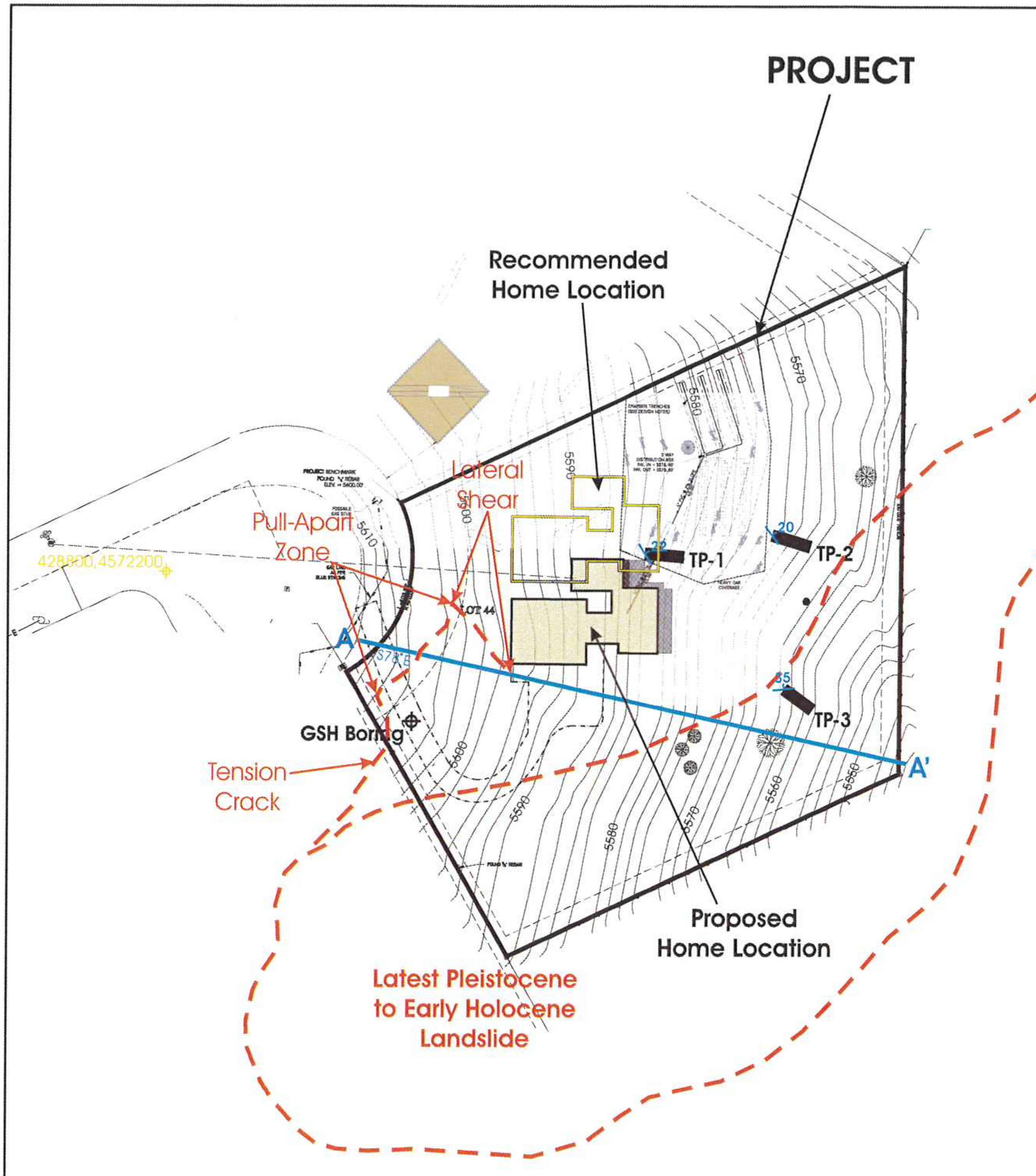
2011 LIDAR IMAGE

GEOLOGIC HAZARDS EVALUATION

Lot 44 Big Sky Estates No. 1
4075 Bluebell Drive
Liberty, Weber County, Utah

FIGURE 3B

Exhibit C



Source: Utah AGRC, 2012 High-Resolution Orthophoto, 6-inch resolution.

WESTERN GEOLOGIC

Scale 1:960 (1 inch = 80 feet)

SITE PLAN

GEOLOGIC HAZARDS EVALUATION

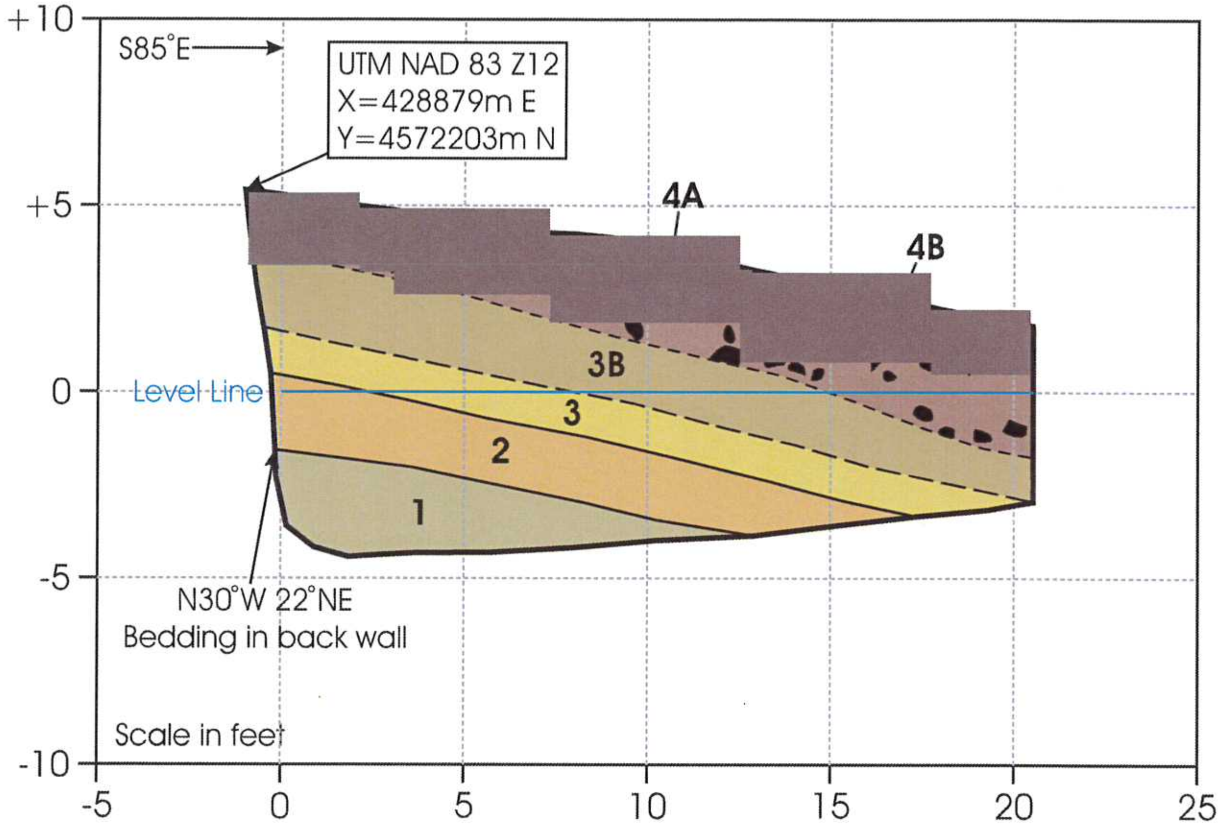
Lot 44 Big Sky Estates No. 1

4075 Bluebell Drive

Liberty, Weber County, Utah

FIGURE 3C

Exhibit C



UNIT DESCRIPTIONS

Unit 1. *Tertiary Norwood Formation* - Weathered tuffaceous claystone comprised of olive- to reddish-brown, moderate to high density, poorly bedded, lean to fat clay (CL/CH).

Unit 2. *Tertiary Norwood Formation* - Weathered tuffaceous siltstone comprised of pale-brown to pink, moderate density, poorly bedded, carbonate-enriched, silt (ML).

Unit 3. *Tertiary Norwood Formation* - Weathered tuffaceous claystone comprised of olive- to reddish-brown, moderate density, poorly bedded, sandy lean to fat clay (CL/CH).

3B. Bt soil horizon formed in unit 3.

Unit 4. *Tertiary Norwood Formation* - Weathered tuffaceous conglomerate comprised of brown to dark brown, moderate density, poorly bedded to massive, root-penetrated, lean clay (CL) grading upward to clayey sand with cobbles (SC); clasts subangular to subround with stage II carbonate.

4B. Bt soil horizon formed in unit 4.

4A. Modern A-horizon soil formed in unit 4.

SCALE: 1 inch = 5 feet
(no vertical exaggeration)
North Wall Logged, West to East

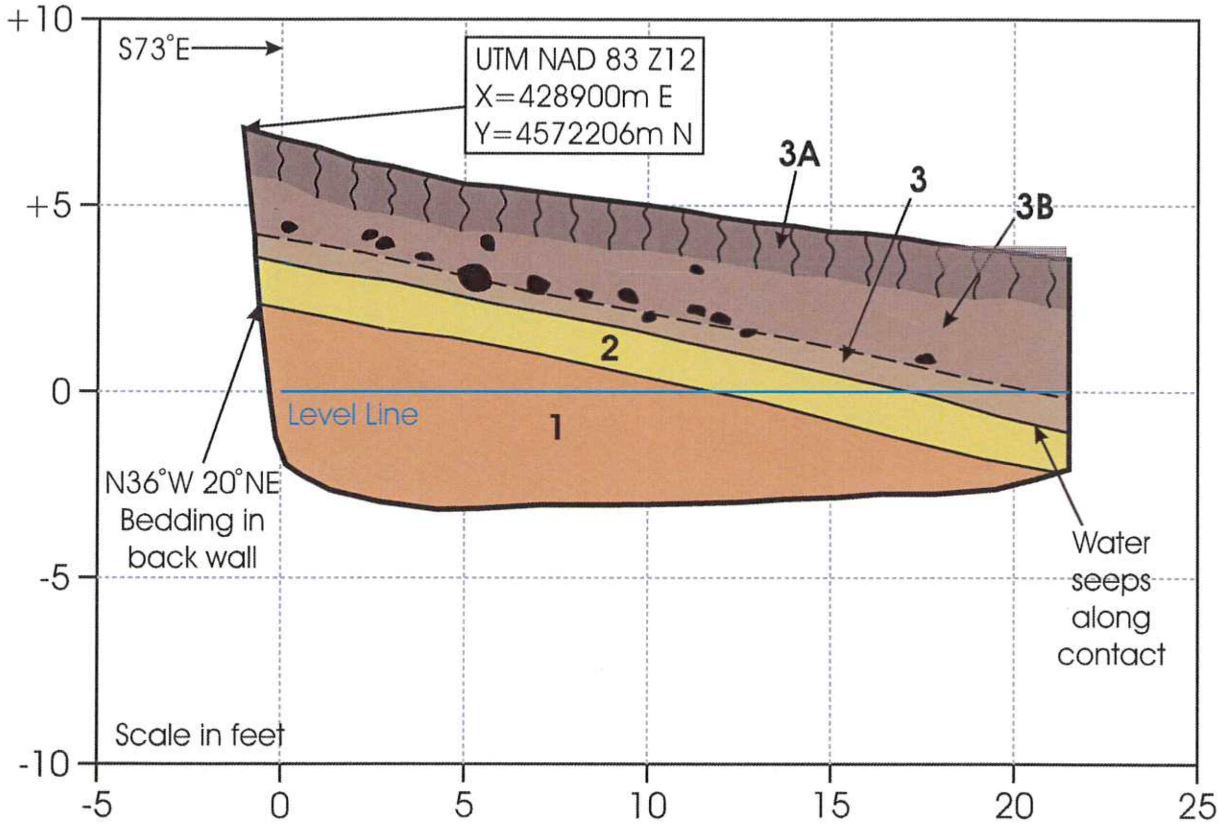
Logged by Bill D. Black, P.G.
on April 29, 2016
Reviewed by
Craig V. Nelson, P.G.

TEST PIT 1 LOG

GEOLOGIC HAZARDS EVALUATION
Lot 44 Big Sky Estates No. 1
4075 Bluebell Drive
Liberty, Weber County, Utah

FIGURE 4A

Exhibit C



UNIT DESCRIPTIONS

Unit 1. *Tertiary Norwood Formation* - Weathered tuffaceous siltstone to claystone comprised of reddish-brown, moderate to high density, poorly bedded, carbonate-enriched silt to lean clay (ML/CL).

Unit 2. *Tertiary Norwood Formation* - Weathered tuffaceous claystone comprised of olive- to brownish-olive, moderate to high density, poorly bedded, lean to fat clay (CL/CH).

Unit 3. *Tertiary Norwood Formation* - Weathered tuffaceous conglomerate comprised of brown to dark brown, moderate density, poorly bedded to massive, root-penetrated, sandy clay (CL) with cobbles and trace gravel; clasts subangular to subround with stage II carbonate.

3B. Bt soil horizon formed in unit 3.

3A. Modern A-horizon soil formed in unit 3.

WESTERN GEOLOGIC

SCALE: 1 inch = 5 feet
(no vertical exaggeration)
North Wall Logged, West to East

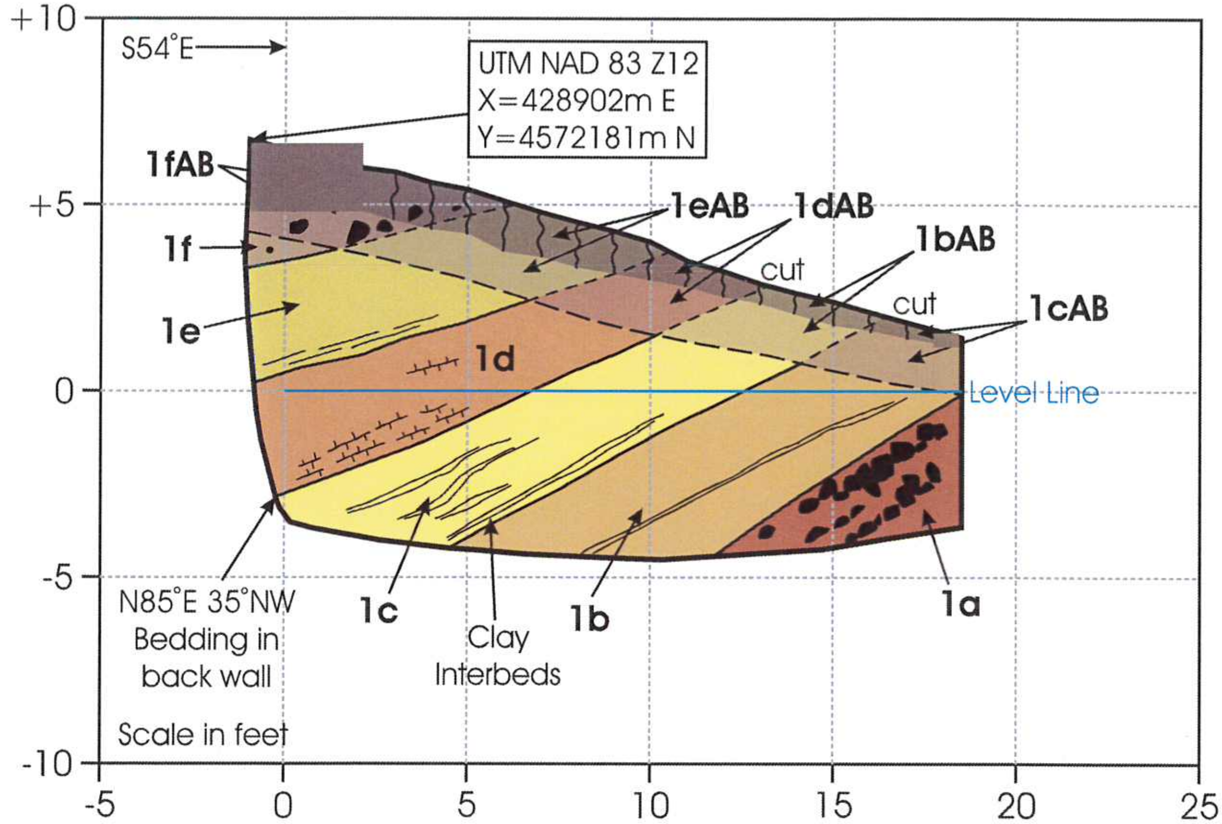
Logged by Bill D. Black, P.G.
on April 29, 2016
Reviewed by
Craig V. Nelson, P.G.

TEST PIT 2 LOG

GEOLOGIC HAZARDS EVALUATION
Lot 44 Big Sky Estates No. 1
4075 Bluebell Drive
Liberty, Weber County, Utah

FIGURE 4B

Exhibit C



UNIT DESCRIPTIONS

Unit 1. *Late Pleistocene to Holocene Landslide Colluvium* - Rafted and backtilted block of Tertiary Norwood Formation.

1a. Moderate density, massive to poorly bedded, fractured claystone comprised of pale-gray clasts in a matrix of dark-reddish-brown lean to fat clay (CL/CH).

1b. Orange-olive, moderate density, poorly bedded, tuffaceous sandstone (SC).

1bAB. Bt and modern A-horizon soils formed in unit 1b.

1c. Pale-olive-brown, moderate density, poorly bedded, interbedded tuffaceous sandstone and claystone (SC/CH).

1cAB. Bt and modern A-horizon soils formed in unit 1c.

1d. Orange- to dark-reddish-brown, moderate to high density, well to poorly bedded, claystone (CL/CH).

1dAB. Bt and modern A-horizon soils formed in unit 1d.

1e. Orange to olive, moderate to high density, well bedded, claystone (CL/CH).

1eAB. Bt and modern A-horizon soils formed in unit 1e.

1f. Reddish-brown, massive to poorly bedded, tuffaceous conglomerate comprised of sandy lean to fat clay (CL/CH) with cobbles and gravel.

1fAB. Bt and modern A-horizon soils formed in unit 1f.

WESTERN GEOLOGIC

SCALE: 1 inch = 5 feet
(no vertical exaggeration)
North Wall Logged, West to East

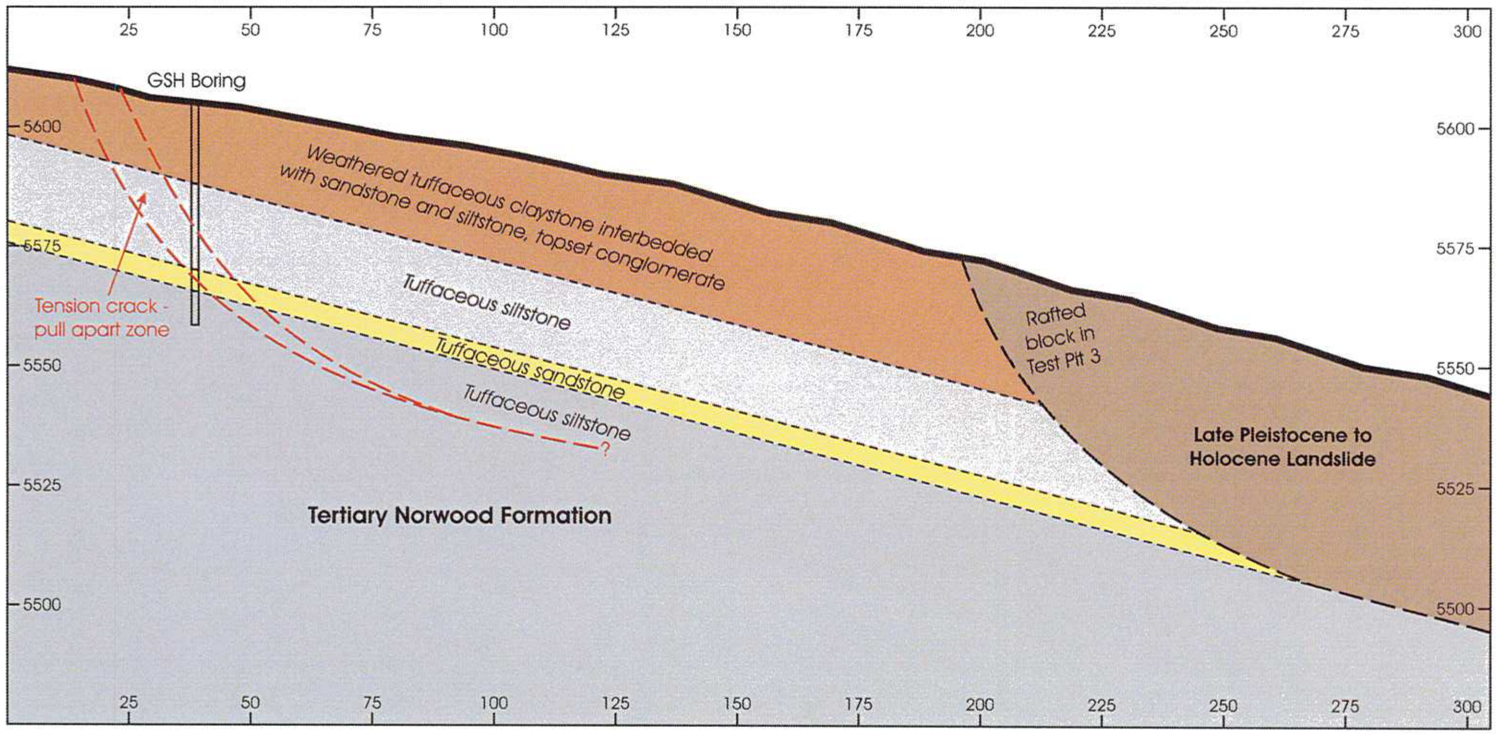
Logged by Bill D. Black, P.G.
on April 29, 2016
Reviewed by
Craig V. Nelson, P.G.

TEST PIT 3 LOG

GEOLOGIC HAZARDS EVALUATION
Lot 44 Big Sky Estates No. 1
4075 Bluebell Drive
Liberty, Weber County, Utah

FIGURE 4C

Exhibit C



SCALE: 1 inch = 25 feet
No vertical exaggeration
Contacts based on subsurface data and are inferred in unexplored areas and at depth

CROSS SECTION

GEOLOGIC HAZARDS EVALUATION
Lot 44 Big Sky Estates No. 1
4075 Bluebell Drive
Liberty, Weber County, Utah

FIGURE 5

WESTERN GEOLOGIC, LLC
2150 SOUTH 1300 EAST, SUITE 500
SALT LAKE CITY, UTAH 84106 USA

Phone: 801.359.7222 Fax: 801.990.4601 Email: cnelson@westerngeologic.com

July 26, 2016

Carson Young
Solitude Builders
PO Box 529
Eden, Utah 84310

SUBJECT: Supplemental Plan Review Clarification
Lot 44 Big Sky Estates No. 1
4075 Bluebell Drive
Liberty, Weber County, Utah

Dear Mr. Young:

Western GeoLogic previously reviewed a revised site plan prepared for the subject site dated July 13, 2016. Based on our review, we prepared a supplemental plan review letter dated July 16, 2016 that noted that the new home location appeared to be only half (15 feet) the setback distance recommended (30 feet) in our June 4, 2016 geologic hazard evaluation report for the project. We indicated that a risk therefore remained for shearing to manifest in the home excavation and render it unusable. This risk is higher at a 15-foot setback rather than 30 feet. However, given that a variance may be needed to locate the home further north, the lower setback is acceptable to us if all other parties are willing to accept the risk for the excavation to be unusable should evidence for shearing be found. A future excavation inspection must be conducted by us that confirm there is no shearing in the area of the home. However, as we discussed, evaluation of any impacts on slope stability that may be caused by the lower setback is outside of our professional scope. The potential for such impacts should be assessed by the project geotechnical engineer that performed the slope stability analysis (GSH Geotechnical).

It is also our understanding that the septic system location has been changed from the area of the shear to east of the home as it originally was. We cannot confirm since a newer site plan was not provided, but it is our belief that this change will likely improve overall slope stability from that of the previous revised site plan; however, the project geotechnical engineer should be informed of this change.

Exhibit C

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

Sincerely,
Western GeoLogic, LLC

LICENSED PROFESSIONAL GEOLOGIST
07/26/2016
BILL DUANE BLACK
NO. 5224898-2250
STATE OF UTAH

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

Reviewed by:

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CRAIG V NELSON
5251804
STATE OF UTAH

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