SAN JUAN REGIONAL PLANNING COMMISSION
AGENDA
May 21, 2024
Town of Silverton Town Hall

San Juan Regional Planning Commission meetings will be conducted in a hybrid virtual/in-person format. All persons including Board Members, Staff, Applicants and interested Public may meet in person or via zoom. The information necessary to connect to the public meeting is listed below.

7:00 PM Roll Call of Members and Minutes

7:05 PM Public Hearing
24-11 OVR Blk 76 Lot 13-14 - Review of an Avalanche Hazard Development Permit and Use Subject to Review application for A New Single-Family Residential and accessory fence located Structure within the Avalanche Hazard District Blue Zone located at Block 76 Lot 13-14 (TBD Greene Street)

7:30 PM Public Hearing
24-12 PUD Block 7-8 Animas Overlook– A review of the Outline Development Plan for a proposed PUD located at Block 7 and 8 Blagues Addition.

8:00 PM Public Hearing
24-14 PUD Anvil Mountain Subdivision – Consideration of an initial Zoning request to Multiple Family Residential District R-2 Limited (R-2-L) for the Anvil Mountain Subdivision annexation, located north of US Highway 50 and south of Shrine Road

OTHER:

ADJOURN: Next Regular Meeting – 6:30 PM, Tuesday June 18, 2024
Join Zoom Meeting
https://zoom.us/j/92136473203
Meeting ID: 921 3647 3203
One tap mobile
+16699006833,,92136473203# US (San Jose)
+12532158782,,92136473203# US (Tacoma)
Dial by your location
+1 669 900 6833 US (San Jose)
+1 253 215 8782 US (Tacoma)
Meeting ID: 921 3647 3203

San Juan Regional Planning Commission
April 16, 2024

The San Juan Regional Planning Commission met virtually via zoom and in the Town Hall meeting room on April 16, 2024 at 7:12 PM with roll call showing the following attendance:

Bev Rich	X	Ken Safranski	X
Jim Weller	X	Melissa Childs	Absent
Lindsey Halverson	X	Austin Lashley	X
Jim Harper	Absent		

Also present via Zoom were Bev Rich, Jackie BonAnno, Evelyn Volz, Jeremy Allison, Jason Jaynes, Ashley, and Chris Clemmons. Jim Weller, Austin Lashley, Lindsey Halverson, Kirk Huff, Tom BonAnno and William Tookey, County Administrator and Chris Tookey, Secretary were present in the Town Hall meeting Room.
We welcome new Town Representative Lindsey Halverson to the Commission.

MINUTES: March 19, 2024
Bev Rich made a motion to approve the minutes of March 19, 2024, with a second from Austin Lashley. The motion passed unanimously with a show of hands. Ken Safranski abstained since he had been absent at the meeting.

COUNTY IMPROVEMENT PERMIT APPLICATION SKETCH PLAN APPLICATION KIRK HUFF AND TERI ALEXANDER APPLICATION ON WINNEMUCCA MILL SITE MS 563B FOR SINGLE-FAMILY DWELLING AND ASSOCIATED UTILITY IMPROVEMENTS LOCATED IN HOWARDSVILLE ACCESSED FROM CR 2.
William Tookey, Land Use Administrator updated the Sketch Plan application for the development of a two-story residential cabin, a gravel driveway connecting CR2 to the house with a bridge over Cement Creek, a ramp over the historic tramway and associated utility improvements located on Winnemucca Mill Site MS 563B located in Howardsville and a possible Vacation Rental for the house in the future.
The owner Kirk Huff was present in the room to answer questions.

After lengthy discussion with the applicant, and a call for any public comment of which there were none, Ken Safranski made a motion to recommend to the San Juan County Commissioners that they approve the Sketch Plan application for the development of a two-story residence, a gravel driveway connecting CR2 to the house with a bridge over Cement Creek, with a ramp over the historic tramway and associated utility improvements, with the 8 conditions included. Austin Lashley seconded the motion and the motion passed unanimously with a roll call.

After discussion regarding the Vacation Rental, Ken Safranski made a motion to recommend that the Commissioners approve the Vacation Rental for the main house and Jim Weller seconded the motion and it passed unanimously with a roll call.

A letter was sent to the County Commissioners.

COUNTY IMPROVEMENT PERMIT APPLICATION SKETCH PLAN TENNESSEE LODE MS 5985 FOR SINGLE-FAMILY DWELLING AND ASSOCIATED UTILITY IMPROVEMENTS LOCATED IN THE MINNEHAHA CREEK AREA ACCESSED FROM CR51

William Tookey, Land Use Administrator updated the Sketch Plan application for the development of an 844 sq. ft. Cabin, with a 140 sq. ft. covered deck, a gravel driveway, septic system, underground water storage tank and associated utility improvements located on the Tennessee Lode MS 5985 located in Minnehaha Creek area and will be assessed by CR51. Land Use Administrator Tookey noted that the application had to be reviewed using subdivision requirements because the applicant already has a single-family dwelling in the Mountain Zoning District as per County Land Use Regulations. The owner Thomas BonAnno was present in the room to answer questions.

After discussion with the applicant and a call for any public comment and there was none, Ken Safranski made a motion to recommend to the Commissioners that they approve the proposed the Sketch Plan application for the cabin with the covered deck, a gravel driveway, septic system, underground water storage system and associated utility improvements with the nine conditions. Austin Lashley seconded the motion and it passed unanimously with a roll call vote.

The meeting was adjourned at 8:45 PM.

Respectfully Submitted,

Christine M. Tookey, Secretary

Approved_____

Town of Silverton

Community Planning Strategies

STAFF REPORT

To: San Juan County Regional Planning Commission

From: Chris Masar, *Contracted Town Planner, CPS*

Through: Gloria Kaasch-Buerger, *Town Administrator*
Lucy Mulvihill, *Community Development Coordinator*

Date: April 16, 2024

RE: 24-11 OVR Blk 76 Lot 13-14 - Review of an Avalanche Hazard Development Permit and Use Subject to Review application for A New Single-Family Residential and accessory fence located Structure within the Avalanche Hazard District Blue Zone located at Block 76 Lot 13-14 (TBD Greene Street)

PROJECT LOCATION: Block 76 Lot 13-14, North of 5th St., between Greene St. and Reese St., Silverton, San Juan County, Colorado. Parcel #: 48291840760010

APPLICANTS/OWNERS: Shane and Rebecca Goranson

ZONING DISTRICT: Business Pedestrian (B-P) District, §16-3-50, Silverton Municipal Code ("SMC")

ADJACENT PROPERTIES:

- North: Business Pedestrian (B-P) District, Single-Family Residence, Avalanche Overlay District (Blue Zone)
- South: Business Automotive (B-A) District, Vacant Land, Avalanche Overlay District (Blue Zone)
- East: Business Automotive (B-A) and Economic Development (E-D) District, Vacant Land, Avalanche Overlay District (Blue Zone)
- West: Multi-Family Residential (R-2), Single-Family Residence

OVERLAY DISTRICTS: Architectural Review Overlay District (AROD), Avalanche Hazard District

PURPOSE OF REVIEW: SMC, Chapter 16, Article 4, Division 2, Avalanche Hazard District, states that anyone wishing to develop in any area lying within the boundaries of the Avalanche Hazard District must first obtain an approved Avalanche Hazard Development Permit as set forth in Section 16-4-250 before beginning any development or use activity.

APPLICATION: The applicant submitted the required documents and application fee on March 29, 2024.

PUBLIC NOTICE:

- Posted on Town website on Thursday May 9, 2024.
- Posted within the Silverton Standard and Miner newspaper on Thursday May 9, 2024.

PUBLIC COMMENT: As of May 15, 2024, no public comments have been received regarding this application.

PARCEL SIZE AND ACCESS: The project site consists of two lots totaling 5,000 sq. ft. adjacent to Greene Street. Direct vehicular access is proposed from 5th Street.

Town of Silverton

Community Planning Strategies

REQUEST: This application is for both a Use Subject to Review and an Avalanche Development Permit. The Use Subject to Review application is required for single-family dwellings and accessory structures (including fences) within the Avalanche Hazard District, and all developments within the Avalanche Hazard District require an Avalanche Development Permit.

The applicant is proposing a new single-family structure on a 5,000 sq. ft. parcel. New construction within the Avalanche Hazard Overlay District requires Planning Commission Review. The proposed structure will be 2,198 sq. ft. in area with an attached two car garage, covered porch and deck.
A new six foot by three-foot (6' x3') gabion fence constructed of stone and a rusted steel cage will serve as an avalanche runout collection and deflection structure along the portion of the property impacted by the Avalanche Overlay District. The applicant states these materials and this method have been used historically in Silverton; however, staff does not have any proof or examples of this statement. The applicant states the fence will also help alleviate sound and visual impacts from the adjacent road.

Land Use & Dimensional Standards: The proposed single-family residential dwelling is a use permitted by right. The following table indicates the dimensional requirements for buildings in the B-P zone district.

Standard	Required	Proposed	Compliant?
Minimum Lot Area	5,000 sq. ft.	5,000 sq. ft.	Yes
Minimum Lot Width	50'	50'	Yes
Maximum Height of Structure	30' B-P District	30'	Yes
Minimum Floor Area of Dwelling Unit	500 sq. ft.	1,214 sq. ft.	Yes
Minimum Floor Area of ADU	300 sq. ft.	744 sq. ft.	Yes
Maximum Floor Area of ADU	800 sq. ft.	744 sq. ft.	Yes
Front Setback	7'	7'	Yes
Side Setback	7'	10' and 29'	Yes
Rear Setback	5'	7'	Yes

The submitted application materials demonstrate that the proposed improvements meet all dimensional standards of the B-P zone district.

CODE EVALUATION: Sections 16-1-50, 16-4-240 & 16-4-260

Sec. 16-1-50. - Uses subject to review.
The submitted application meets all requirements of § 16-1-50 of the SMC and is therefore deemed a complete Use Subject to Review application.

Sec. 16-4-240. - Restrictions on development in Avalanche Hazard District.
An Avalanche Hazard Development permit was submitted for the single-family residence and accessory fence prior to development or use activity on the subject site; therefore, the application meets the requirements of § 16-4-240.

Sec. 16-4-260. - Information required for issuance of Avalanche Hazard Development Permit.
The applicant submitted a complete Use Subject to Review application and a complete release and indemnification agreement and therefore meets the requirements of § 16-4-260. If the applicant rents or leases the single-family structure in the future, a release and indemnification agreement will be required for each of the renters or leases.

COMPASS MASTER PLAN EVALUATION: The proposed single-family dwelling complies with the Compass Master Plan goals, actions plans, etc. listed below.

- Plan For Responsible Growth and Development That Contribute To Our Community And Sense Of Place: We want to see well-planned growth and quality development that supports our local community. We don't want to lose our small-town character but do want to provide housing & have more full-time residents to support businesses, the school, and expanded services and opportunities. *(Page 39 of the Compass Master Plan)*
- Expand Housing Choices, Opportunities And Affordability For Our Community: We want to ensure that we provide housing choices that are affordable to our people: the elderly, young families, our workforce, the Hispanic community. *(Page 39 of the Compass Master Plan)*

PLANNING COMMISSION ACTION: The Planning Commission shall recommend approval as submitted, recommend approval with conditions, table for additional review with the applicant's consent, or recommend denial the application.

STAFF RECOMMENDATION: Staff finds the applicant has submitted all required materials within the timeframe required and all materials comply with the conditions of §16-4-250 of the SMC. Staff therefore recommends approval of the Use Subject to Review and Avalanche Hazard Development Permit applications for a new single-family residential dwelling with an accessory fence within the Avalanche Hazard District located at block 76 lot 13- 14 (TBD Greene street) as presented.

However, this is a decision for the Planning Commission to make, and the Commission may choose to recommend approval or denial of the Use Subject to Review and Avalanche Hazard Development Permit applications based on the testimony and evidence it hears. Two sample motions are included below for convenience only. They do not limit the evidence the Commission can rely on or the decision the Commission makes.

SAMPLE MOTIONS:

Approval: I move to recommend approval of case 24-11, the Use Subject to Review and Avalanche Hazard Development Permit applications for a new single-family residential structure and accessory fence located at Block 76 Lot 13-14 (TBD Greene Street) as presented, finding the Use Subject to Review and Avalanche Development Permit applications are in conformance with §16-4-250 of the SMC.

Approval with Conditions: I move to recommend approval of case 24-11, the Use Subject to Review and Avalanche Hazard Development Permit applications for a new single-family residential structure and accessory fence located at Block 76 Lot 13-14 (TBD Greene Street) as presented, finding the Use Subject to Review and Avalanche Development Permit applications are in conformance with §16-4-250 of the SMC with the following conditions [insert conditions}.

Continuance: I move to continue case 24-11, the Use Subject to Review and Avalanche Hazard Development Permit applications for a new single-family residential structure and accessory fence located at Block 76 Lot 13-14 (TBD Greene Street) to the {Date Specific}.

Denial: I move to recommend denial of the Use Subject to Review and Avalanche Hazard Development Permit applications for a new single-family residential structure and accessory fence located at Block 76 Lot 13-14 (TBD Greene Street) as presented, finding the applications are NOT in conformance with §16-4-250 of the SMC [insert findings here].

ATTACHMENTS:

1. Application
2. Narrative
3. Site Plan and Elevations
4. Avalanche Study Report
5. Geol Report
6. Public Notice

Town of Silverton

LAND USE APPLICATION
Community Development Department
Town of Silverton
1360 Greene Street, Silverton CO, 81433

Applicant: Shane and Becca Goranson **Company:** Click to enter text.
Mailing Address: 200 Riverview Drive, Durango, Colorado 81301
Phone: 843-696-8392 **Email:** shane.goranson@gmail.com, bdauberteer@gmail.com

Owner: Shane and Becca Goranson
Mailing Address: 200 Riverview Drive
Phone: 843-696-8392 **Email:** shane.goranson@gmail.com, bdauberteer@gmail.com

Property Location/Address: TBD Greene Street, lots 13-14 block 76 Silverton, Colorado
Assessor's parcel no. Click to enter text. **Lot Size:** 50'x100'
Current Zoning: Business-Pedestrian **Proposed Zoning:** Click to enter text.
Current Use: vacant lot **Proposed Zoning:** Click to enter text.

(The person listed as "Applicant" will be contacted to answer questions regarding this application, provide additional information when necessary, post public hearing signs, receive a copy of the staff report prior to Public Hearing, and shall be responsible for forwarding all verbal and written communication to the owner.)

Type of action requested (check one or more of the actions below which pertain to your request):

☐Annexation	☐Site Development Plan approval
☐Change of zoning	☐Subdivision
☐Vacation Rental	☐Temporary Use, Building, Sign
☐Consolidation Plat	☐Development In Hazard Zones
☐Historic/AROD Review	☒Use Subject to Review
☐Lot Line Adjustment	☐Variance/Waiver
☐Planned Unit Development	☐Other: Click to enter text.

Detailed Description of Request: Use subject to review – Avalanche Permit

CERTIFICATION
As owner of the aforementioned property, I hereby consent to the submission of this application and authorize the applicant to act on my behalf with regard to this application.

X _____ Owner Signature

X 4/18/24 Date:

Town of Silverton

I, Steven Gawlik, certify that the information and attachments submitted are true and correct to the best of my knowledge. In filing this application, I am acting with the knowledge and consent of the property owners.

X _____ X 4/18/24

Applicant Signature Date

To be filled out by staff:

DATE RECEIVED: Click to enter text.	**RECEIVED BY:** Click to enter text.
FEES PAID: Click to enter text.	**CASE NO:** Click to enter text.
QUARTER SECTION MAP: Click to enter text.	**RELATED CASES:** Click to enter text.
PRE-APP MEETING DATE: Click to enter text.	**CASE MANAGER:** Click to enter text.

TOWN OF SILVERTON, COLORADO
AVALANCHE HAZARD DEVELOPMENT PERMIT: BLUE ZONE

USE SUBJECT TO REVIEW APPLICATION FORM

Name of Property Owner (s): Shane and Rebecca Goranson
Telephone: 843 696 8392 Cell Phone:
Mailing Address: 200 Riverview Drive Durango, Colorado 81301
Email Address: Shane.goranson@gmail.com

Name of Applicant (if different from owner): Steven Gawlik
Applicant's Mailing Address (if different from owner):
Address of Subject Property: TBD Greene St
Lot #: 13+14 Block: 76 Addition: Zoning District: BP

Description of Proposed Land Use and Buildings: single family residence

Description of the Seasonal Duration and Daily Hours of Operation of Proposed Land Use: Year round
Proposed Schedule for Construction: Spring 2024 - Spring 2025

Attachments:

(1.) Vicinity Map (drawn to a scale of 1"=200" or greater) illustrating the general location of the subject property in Town and in relation to the official avalanche hazard zones.

(2.) Site Plan (drawn to a scale of not less than 1"=20', with scale and north arrow included) illustrating:

- ☐ Location of the property in relation to surrounding Town blocks and lots and adjacent street and alley right of ways
- ☐ Location of appropriate avalanche zone boundaries
- ☐ Boundaries of subject property (identified with bold lines)
- ☐ Location and dimensions of existing buildings and improvements on the property, including setback distances from property lines
- ☐ Location and dimensions of proposed buildings and improvements on the property, including setback distances from property lines
- ☐ Location and dimensions of existing and proposed driveways, utility easements

(2.) Complete list of all property owners within 150 feet of the subject property including mailing addresses.

(3.) Pre-addressed and stamped envelops (legal size) for each property owner on the above list.

(4.) Completed and signed Release and Indemnification Agreement, properly executed by the owner of subject property and signed and stamped by a notary public.

TOWN OF SILVERTON, COLORADO

AVALANCHE HAZARD ZONE DEVELOPMENT PERMIT RELEASE AND INDEMNIFICATION AGREEMENT

In consideration for being permitted to build upon or occupy property situated within the designated Avalanche Hazard Zoning District, I, the undersigned, hereby acknowledge, represent and agree as follows:

A. 1. I acknowledge that my development or occupancy of property lying within the Avalanche Hazard Zoning District, and any or all of the activities occurring in, on, over, or about said property, are or may be dangerous and do or may involve risks of injury, loss or damage. I further acknowledge that such risks may include but are not limited to bodily injury, personal injury, sickness, disease, death, and property loss or damage.

2. By signing this RELEASE AND INDEMNIFICATION AGREEMENT, I hereby expressly assume all such risks of injury, loss, or damage to me or to any third party arising out of or in any way related to my development or occupancy on properties situated within the Avalanche Hazard Zoning District, whether or not caused by the act, omission, negligence, or other fault of the Town, its officers, its employees, its agents, or by any other cause.

3. By signing this RELEASE AND INDEMNIFICATION AGREEMENT, I further hereby exempt, release, and discharge the Town, its officers, its employees, and its agents from any and all claims, demands, and actions for such injury, loss, or damage, arising out of or in any way related to my development or occupancy of property situated within the Avalanche Hazard Zoning District, whether or not caused by the act omission, negligence, or other fault of the Town, its officers, its employees, it agents, or by any other cause.

RDG Signer (s) must initial here

B. I further agree to defend, indemnify and hold harmless the Town, its officers, employees, agents, insurers, and self insurance pool, from and against all liability, claims, and demands, including any third party claim asserted against the Town, its officers, employees, agents, insurers, or self insurance pool, on account of injury, loss, or damage, including without limitation claims arising from bodily injury, personal injury, sickness, disease, death, property loss or damage, or any other loss of any kind whatsoever, which arise out of or are in any way related to my development or occupancy of properties situated within the Avalanche Hazard Zoning District, whether or not caused by the act, omission, negligence or other fault of the Town, its officers, employees, or agents, or by any other cause.

RDG Signer (s) must initial here

C. By signing this RELEASE AND INDEMNIFICATION AGREEMENT, I hereby acknowledge and agree that said AGREEMENT extends to all acts, omissions, negligence, or other fault of the Town, its officers, and/or its employees or agents, and that said AGREEMENT is intended to be as broad and inclusive as is permitted by the laws of the State of Colorado. If any portion hereof is held invalid, it is further agreed that the balance shall, notwithstanding, continue in full legal force and effect.

SG RDG Signer (s) must initial here

D. I understand and acknowledge that the Town, its officers, its employees, and its agents are relying on, and do not waive or intend to waive by any provision of this RELEASE AND INDEMNIFICATION AGREEMENT, the monetary limitations or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, Section 24-10-101 et seq., Colorado Revised Statutes, as from time to time amended, or otherwise available to the Town, its officers, employees, or agents.

SG RDG Signer (s) must initial here

E. This RELEASE AND INDEMNIFICATION AGREEMENT shall be effective as of the date set forth below and shall be binding upon me, my successors, representatives, heirs, executors, assigns, transferees, and any other person(s) who may enter the premises upon or without my invitation.

SG RDG Signer (s) must initial here

Executed this 5th day of March, 2024 by the person for persons) whose name and signature appear below:

Signature(s)

Shane Goorahn Rebecca D. Gonzales

Printed Name of Signer(s)

700 Riverview Drive Durango CO 81301

Mailing Address of Signer(s)

Location of Subject Property: Lot(s): 13+14 Block(s): 76 Addition or Subdivision:

NOTARY PUBLIC SIGNATURE AND SEAL:

Stephanie Betts

Name of Notary Public

STATE OF NEW MEXICO
NOTARY PUBLIC
STEPHANIE BETTS
Commission Number 1138909
My Commission Expires October 6, 2026

Town of
Silverton

Use Subject for Review Application

NAME OF APPLICANT Steven Gawlik

PROPERTY OWNER Shane and Rebecca Goranson PHONE 843-696-8392

MAILING ADDRESS: 200 Riverview Drive CITY :Durango STATE__Colorado ZIP CODE 81301

EMAIL ADDRESS _shane.goranson@gmail.com LEGAL DESCRIPTION LOT NO. (S) __13+14_____

BLOCK _76_____ ADDITION_____ Zone _BP/Avalanche Blue_____ REASON FOR REQUEST BELOW:

We have friends who live in Silverton and we have visited often. When we had an opportunity to buy a lot in Silverton we jumped on it. We are very much looking forward to being a part of the Silverton community - to that end we would like to build a house on our lots.

PROPOSED STARING DATE OF OPERATION OR USE: Construction to begin summer 2024.

PROPOSED TIME SCHEDUlE FOR CONSTRUCTION: approximately 1 year.

BRIEF DESCRIPTION OF THE PROPOSED USE BELOW:

We propose to build an energy efficient 4 bedroom, 3 bathroom house in Silverton which will pay homage to the period of historical significance in Silverton and its mining heritage.

Town of
Silverton

Use Subject for Review Application

BRIEFLY DESCRIBE THE BENEFITS TO THE COMMUNITY AS A WHOLE, IF THIS IS ALLOWED:

We hope this house will result in an increase in the number of houses which which make up the historic character of Silverton. We also hope that this home will not only be a model of efficiency which could demonstrate to others the myriad ways to make buildings more efficient.

Furthermore, we plan to have Nico Foster construct this home. It is important to us to have local people build this home so that we are making a positive contribution to the community financially.

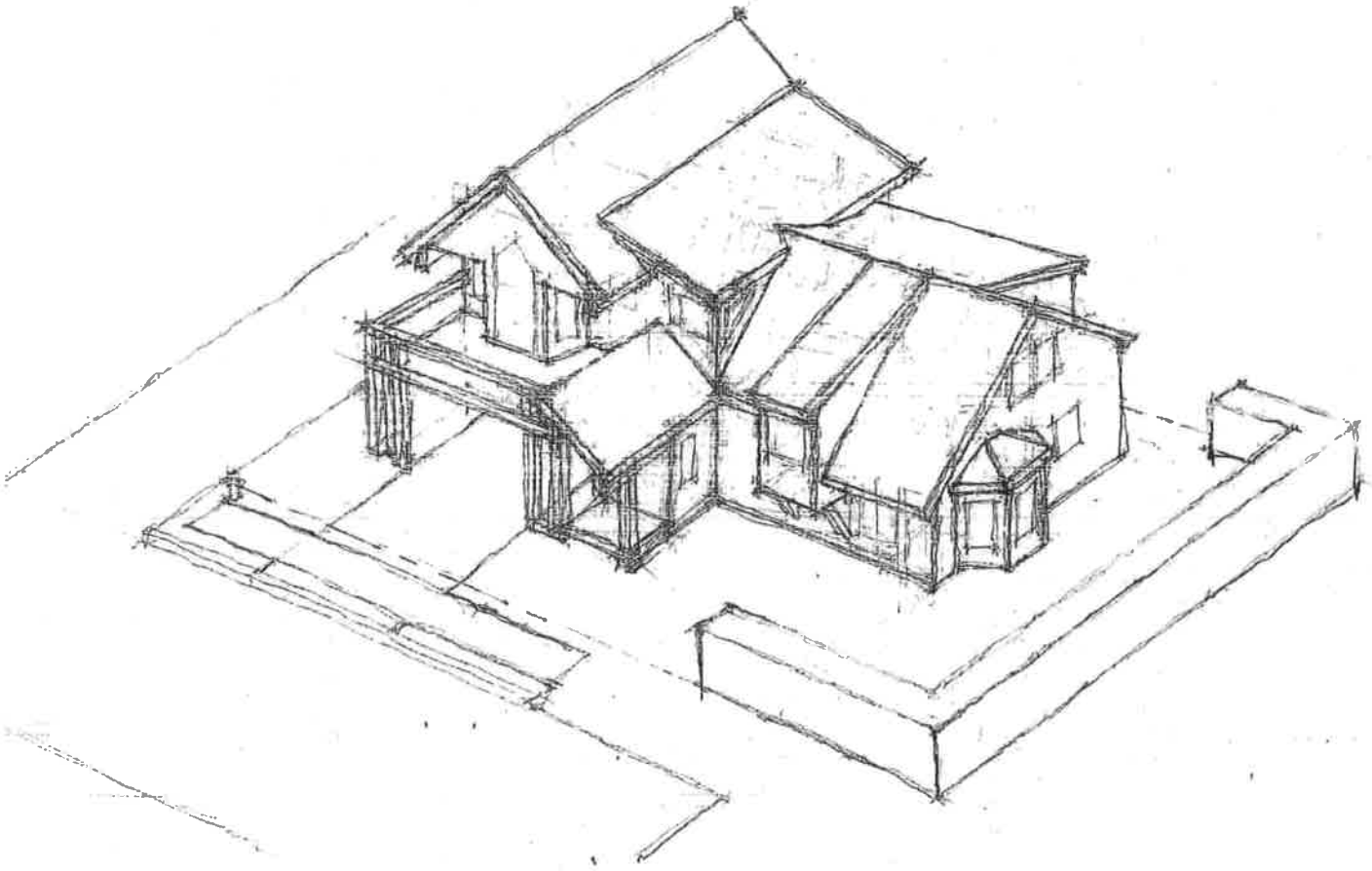
LIST ANY SPECIFIC CONDITIONS WHICH YOU WOULD BE WILLING TO INCORPORATE INTO THIS REQUESTED USE:

We have had an avalanche force study done and we will consult with a structural engineer in order to ensure the home is constructed properly for this zone.

IF THE PROPOSED USE LIES WITHIN A DESIGNATED HAZARD AREA WITHIN THE TOWN OF SILVERTON E.G. FLOOD OR AVALANCHE HAZARD AREAS, DESCRIBE WHAT PRECAUTIONS WILL BE TAKEN BY THE APPLICANT TO MINIMIZE ANY DANGER TO THE PUBLIC HEALTH, SAFETY OR WELFARE BASED UPON SUCH USE:

We have done an avalanche force study and will consult with a structural engineer to ensure the home is designd and constructed with safety a priority.

4/18/24



GORANSON HOUSE

LOTS 13 & 14, BLOCK 76

SILVERTON, COLORADO

4/18/24

GORANSON HOUSE

SILVERTON, CO

AREA SUMMARY

LOT AREA : 50' X 100' = 5,000 SF

GROSS FLOOR AREAS :

HOUSE : 924 LOWER + 1274 SF UPPER = 2198 SF

GARAGE : 576

COVERED PORCH : 54 SF

UPPER DECK : 240 SF

TOTAL HEATED FLOOR AREA : 2198 SF

GORANSON HOUSE

DESIGN NARRATIVE :

PROGRAM :

Shane and Rebecca Goranson propose building a single-family house with attached 2-car garage on Lots 13 & 14, Block 76, in Silverton.

SITE CONDITIONS :

These lots provide a flat low level building site adjacent to both Greene and W. 5th Streets close by the U.S.Highway 550 entry triangle. Considerable road noise and vehicular traffic predominate. Good solar exposure. Foreground views consist of moving road traffic and adjacent private homes. Background views consist of high peaks, ridges, and slopes with distant up and down valley views.

Overlying Avalanche Hazard Blue Zone encroaches on southern portion (40%) of Lots 13 & 14. Avalanche Hazard Assessment & Design Loads by Wilbur Engineering as submitted describes design parameters and recommendations for which this single-family residence and related improvements shall comply.

DESIGN :

Place organic fill soil to elevate finish grades approximately 2' for positive drainage away from foundations per Trautner Geotech soil report as submitted.

Locate building to maximize setback from Greene Street, Highway 550, and Avalanche Hazard Blue Zone. Locate 6' high x 3' wide gabion fence along site perimeter within the Blue Zone as an avalanche runout collecting and deflecting structure. The gabion fence also serves as a sight and sound barrier to perhaps the busiest and noisiest vehicular traffic in Silverton. This natural local stone and rusted steel cage fence incorporates materials and methods in use historically in the Silverton area and thus visually appropriate at this entry point to the Silverton Historic District and Heritage Tourism Corridor.

Only practical access to garage and entry is from W. 5th Street. Locate upper level deck on rear portion of lots to recess garage door and allow entry porch to dominate W. 5th Street façade.

Incorporate steep roof slopes (8:12 and 9:12) at the main gable roofs with lower slope shed roofs at dormers and outer edges similar to existing historic houses that often had additions applied over time. Feature front facing gables at both Greene and W. 5th Street facades.

Naturally weathering non-reflective exterior materials include rusted corrugated steel roofing and base level siding, vertical wood board siding above metal base, and corrugated steel "vintage" zinc finish at upper gable ends and dormers. Entry component is clad entirely in rusted corrugated siding to separate house and garage components while reducing scale of overall form and emphasizing the entry. See Exterior Elevations by Steven Gawlik Associates / Architect as submitted.

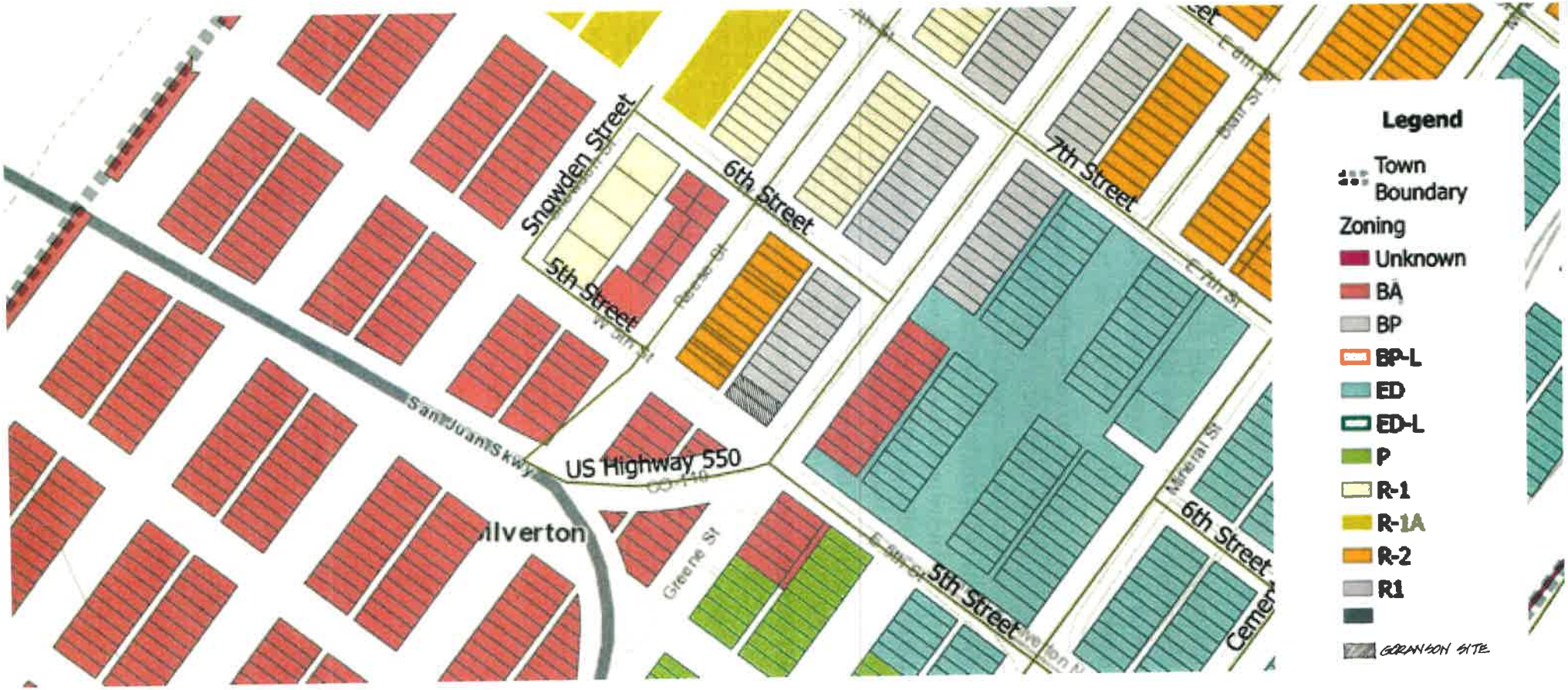
Incorporate simplified timber posts, beams, and struts on front façade to stiffen open structures against snow and lateral loads while relating to historical buildings in surrounding area. This detail also provides a lower pedestrian scale to the front façade while offering a visual gift to the street and neighborhood.

Exterior windows and doors are primarily vertically proportioned (1.5:1 min.) with some larger windows incorporated to capture views and solar gain. Casement and fixed windows are utilized to reduce excessive road noise transmission to interior living spaces, improve views, and avoid exterior mounted screens. While double-hung type windows predominated in Silverton's early boom years, other window types were also used. Current building and energy conservation codes in Silverton promote better ventilation, emergency egress, and energy performance than was provided by window types used over 100 years ago. While double-hung windows are most appropriate in preserving historic buildings, imitating their use in new buildings tends to confuse the historic architectural record and reduce the integrity of the historic district. New buildings can best maintain their own integrity while respectfully relating to historic neighbors.

Steven Gawlik

Architect

4/18/24


Snowden Street
6th Street
7th Street
5th Street
W 5th St
Reese St
E 5th St
Bear St
San Juan Skwy
US Highway 550
Greene St
Mineral St
6th Street
5th Street
Legend
Town Boundary
Zoning
Unknown
BA
BP
BP-L
ED
ED-L
P
R-1
R-1A
R-2
R1
GORANSON SITE

STATE OF COLORADO
STEVEN GAWLIK
B•1633
LICENSED ARCHITECT

Steven Gawlik associates A.I.A
ARCHITECTURE • PLANNING
106 East 12th Street
Durango, Colorado 81301
(970) • 259 • 1142

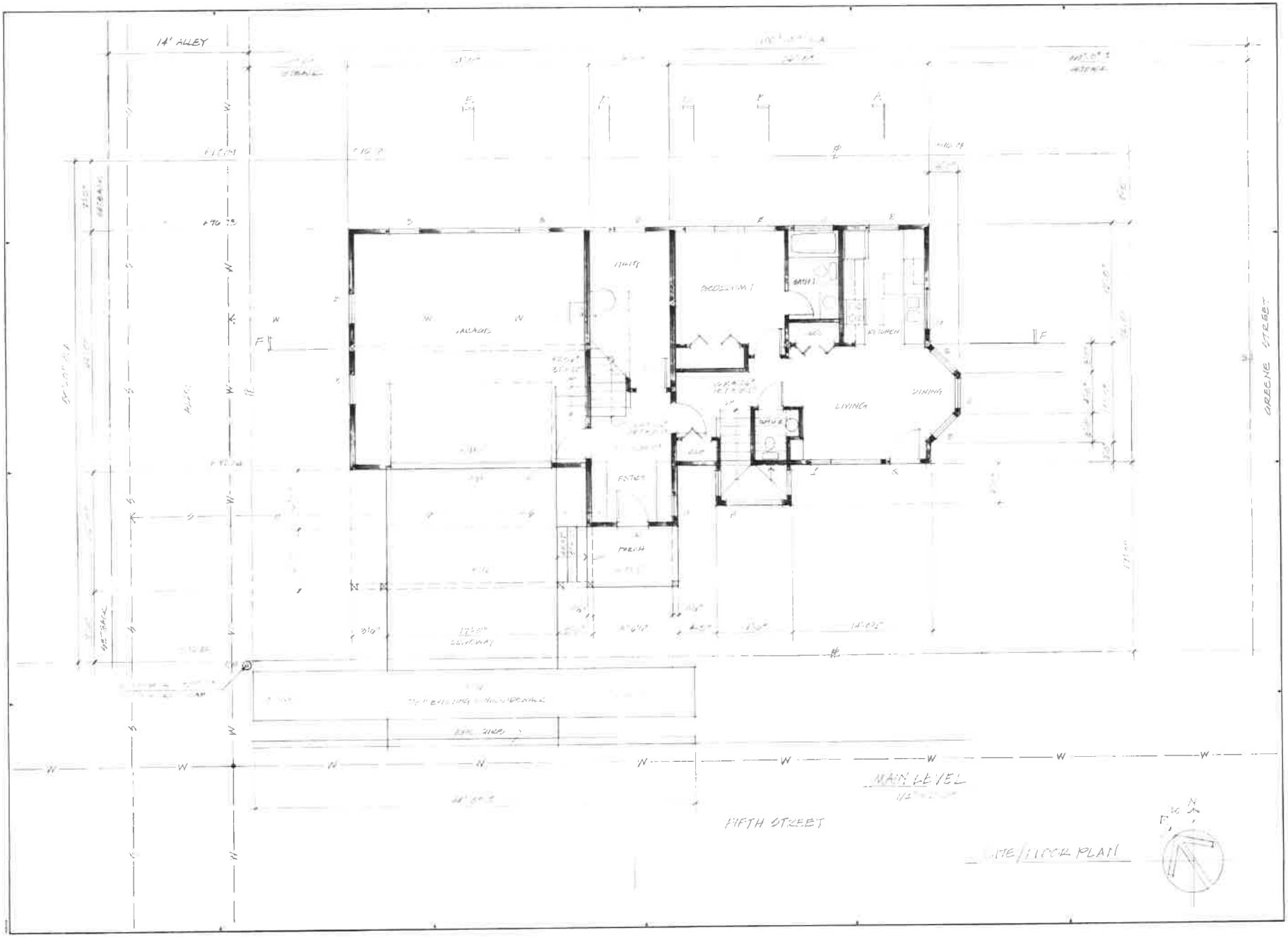
GRAHAM HOUSE
LOTS 13 & 14, BLOCK 71
SILVERTON, COLORADO

DATE
REVISIONS

DRAWN BY:
CHECKED:

SITE VICINITY MAP

A-1



STATE OF COLORADO
STEVEN GAWLIK
B-1633
LICENSED ARCHITECT

Steven Gawlik associates A.I.A
ARCHITECTURE + PLANNING
100 East 13th Street
Durango, Colorado 81301
303 • 259 • 1142

GREENACH HOUSE
LOTS 13 & 14 BLOCK 76
SILVERTON, COLORADO

DATE: 1 22 23
REVISIONS 2 3 24
4 10 24

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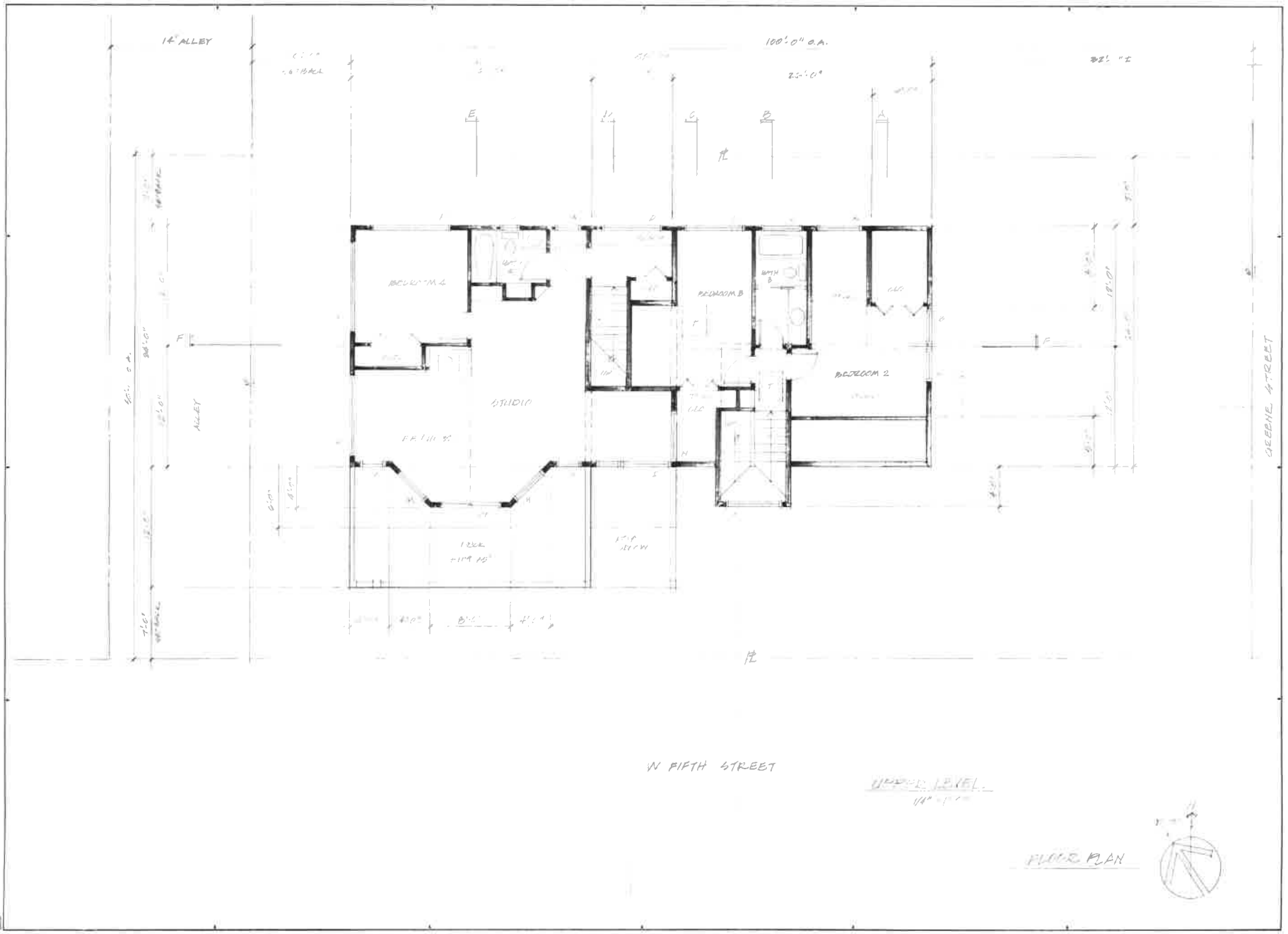
CHECKED

SITE/MAIN FLOOR PLAN

A-1



STATE OF COLORADO
STEVEN GAWLIK
B-1633
LICENSED ARCHITECT

Steven Gawlik associates A.I.A

ARCHITECTURE + PLANNING

100 East 13th Street
Durango, Colorado 81301
303 • 259 • 1148

DONAHUE HOUSE
LOTS 15 & 16, BLOCK 76
SILVERTON, COLORADO

DATE
REVISIONS
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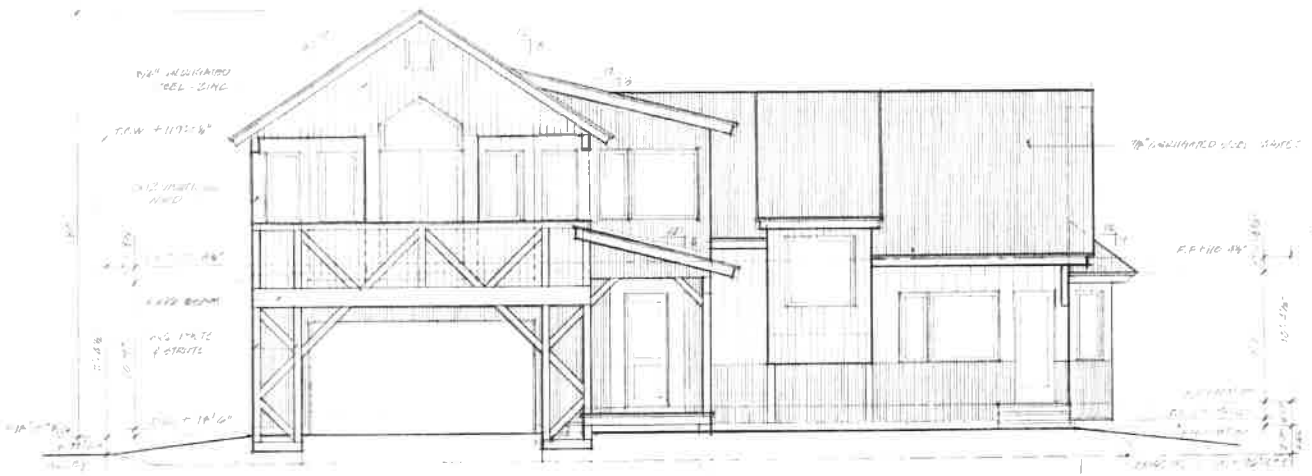
CHECKED

1ST FLOOR PLAN

A-2



WEST

EAST

EXTERIOR ELEVATIONS

STATE OF COLORADO
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DEBAUCHERY HOUSE
LOTS 2 & 14, BLOCK 76
SILVERTON, COLORADO

DATE: 7-26-24
REVISIONS: 8-15-24

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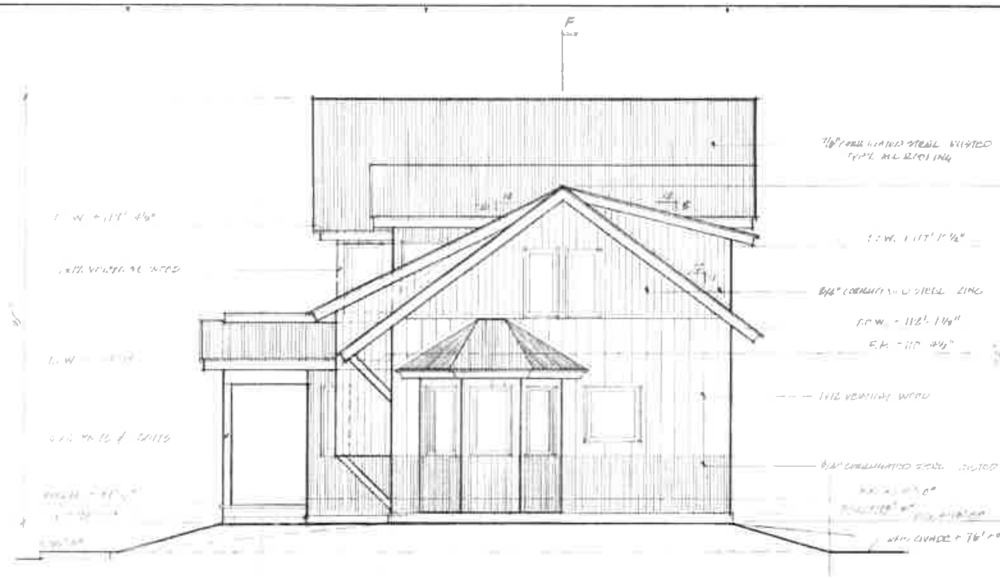
EXTERIOR ELEVATIONS

A 2



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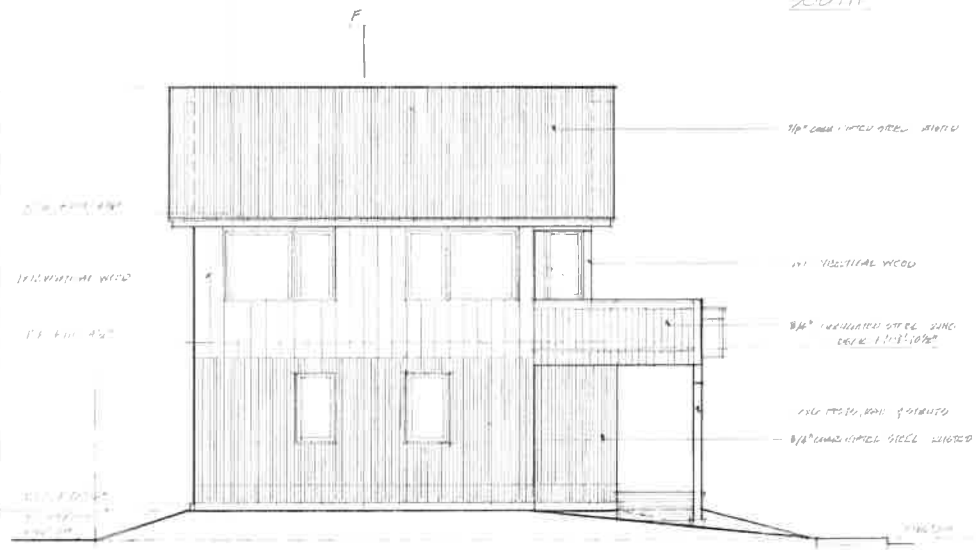

WEST

EXTERIOR ELEVATIONS

STATE OF COLORADO
STEVEN GAWLIK
B•1633
LICENSED ARCHITECT

Steven Gawlik associates A.I.A

ARCHITECTURE • PLANNING

GORANSON HOUSE
LOTS 13 & 14, BLOCK 76
SILVERTON, COLORADO

DATE:
REVISIONS:
DRAWN BY:
CHECKED:

EXTERIOR ELEVATIONS

A-4

AVALANCHE HAZARD ASSESSMENT & DESIGN LOADS

for

GORANSON RESIDENCE & APARTMENT
LOTS 13 & 14, BLOCK 76, GREENE ST.
SILVERTON, COLORADO

Prepared for:

Shane & Rebecca Goranson
200 Riverview Dr
Durango, Co 81301-4352

Prepared by:

Wilbur Engineering, Inc.
Durango, Colorado

November 15, 2023

WILBUR ENGINEERING, INC.

150 East 9 St., Suite 201 • Durango CO 81301
(970) 247-1488 • chris@mearsandwilbur.com

November 15, 2023

Shane & Rebecca Goranson
200 Riverview Dr
Durango, Co 81301-4352
via email

RE: Avalanche Hazard Assessment and Design Loads
Lots 13 & 14, Block 76, Greene St.
Silverton, Colorado

Dear Mr. & Mrs. Goranson:

At your request, we have completed our avalanche hazard assessment. We have also developed design recommendations for reducing and mitigating avalanche risk.

If you have any questions, please contact me at (970) 247-1488.

Sincerely,
Wilbur Engineering, Inc.

Chris Wilbur, P.E.

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1. Introduction

This report describes snow avalanche hazards for a planned residential structure on Lots 13 & 14, Block 76, Greene St., Silverton, Colorado. Our understanding of the project is based on architectural plans dated September 23, 2023 prepared by Steven Gawlik associates A.I.A. (5 sheets). Figure 1 shows the site location. Figure 2 shows the Idaho Gulch avalanche path and the site on a LiDAR map with ground and unclassified reflections. Trees and buildings are indicated in this map. Figure 3 shows a winter photo of the Idaho Gulch avalanche path.

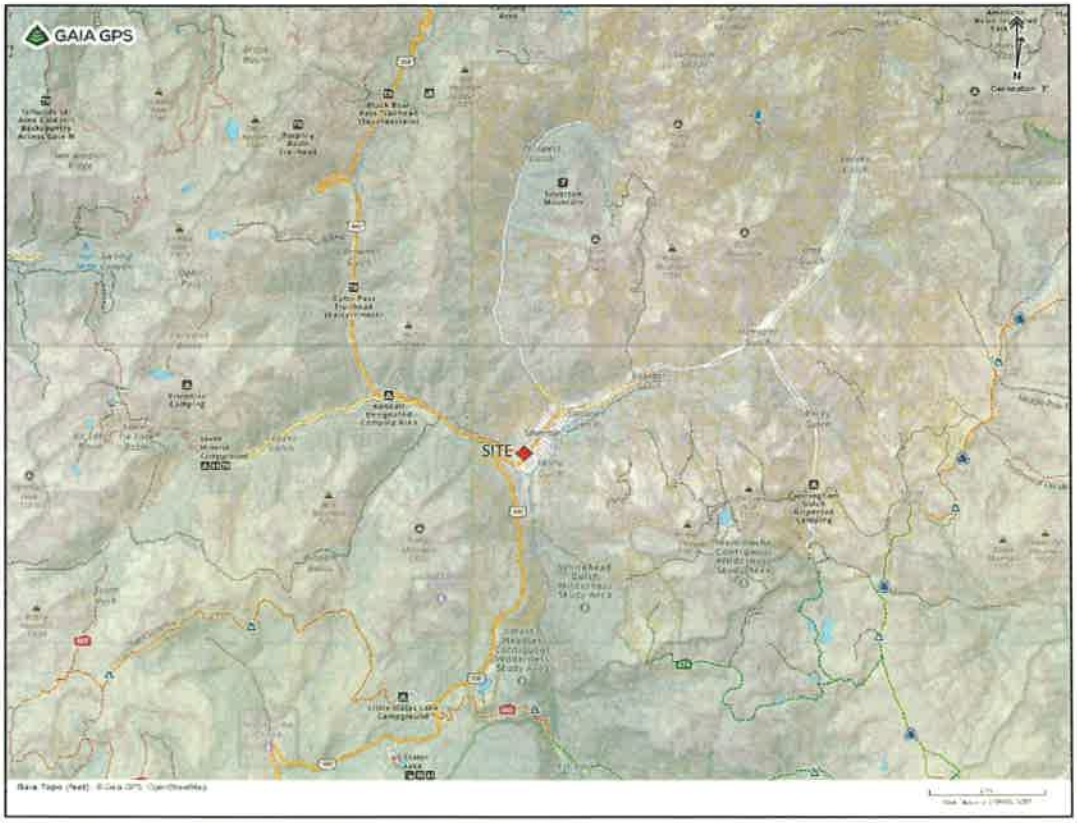


Figure 1 – Site Location Map

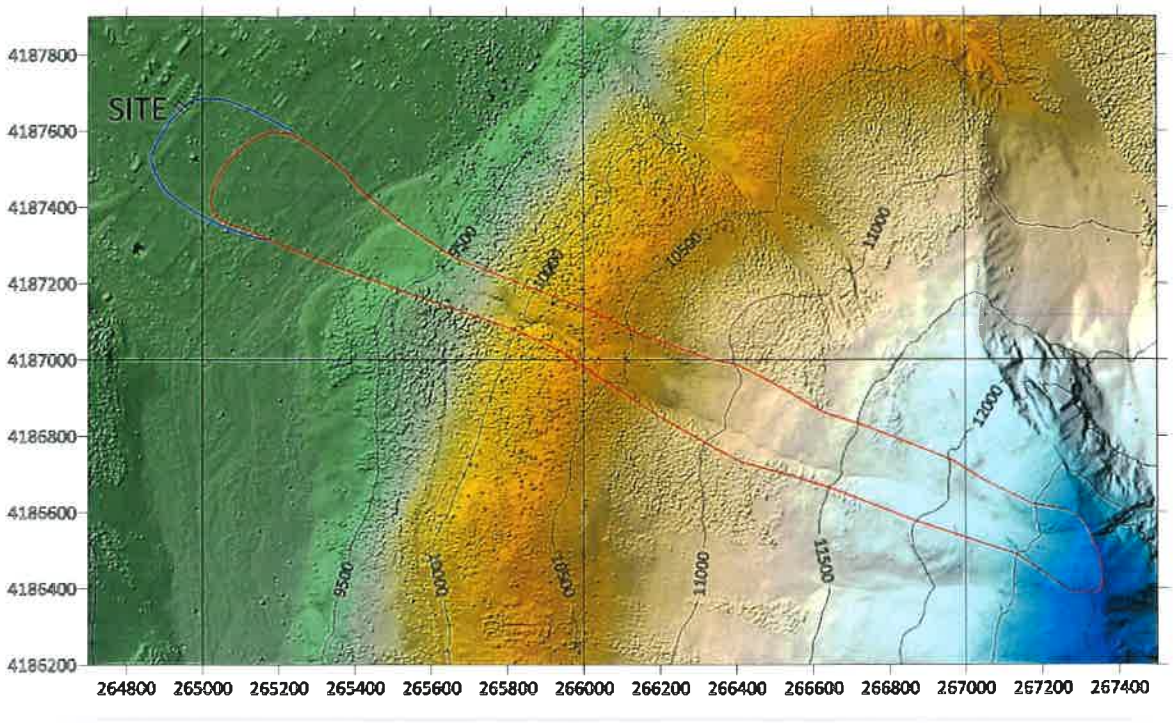


Figure 2 – Idaho Gulch Avalanche Path on 2017 LiDAR Map
Red and Blue Zones from 2000 Mears Hazard Maps (Ref. 1)
UTM zone 13N coordinates in meters

Figure 3 – Winter Photo Idaho Gulch Avalanche Path
(C. Wilbur photo 12-10-2009)

2. *Objectives*

This report has the following **objectives**:

1. Describe avalanche hazards at the site, including previous mapping, reports, terrain, vegetation, snow climate and avalanche history.
2. Present results of avalanche dynamics modeling using the Swiss avalanche-dynamics model RAMMS, version 1.8.0 and RAMMS::Extended to model the powder component in 3-dimensional terrain.
3. Provide design avalanche impact loads on exposed building surfaces for avalanches with estimated annual exceedance probabilities of 0.3% and 1.0%. These are commonly referred to as 300-year and 100-year average return period events, respectively.
4. Provide recommendations to reduce avalanche risk for the planned site development.

3. *Limitations*

This report also has the following **limitations**, which must be understood by all those relying on the results, conclusions, and recommendations:

1. Avalanches larger than the 300-year avalanche[1] are possible, will travel farther, spread wider, and possess greater impact pressures; the probability of such events is small enough that it is generally considered within acceptable limits of risk in this location at this time for the type of land use proposed.
2. This study is site and time specific; it should not be applied to adjacent lands, nor should it be used without updating in the future when additional data and improved methods become available.
3. The avalanche hazard assessment is based on current forest and climatic conditions. Changes in forest cover and/or climatic conditions could increase or decrease the avalanche hazard.

[1] The *100-year* and *300-year* average return period avalanches have approximate annual exceedance probabilities of 1.0-percent, and 0.3-percent, respectively

4. Methods

The avalanche hazard assessment, mapping and recommendations presented in this report are based on:

1. Review of reference documents listed in Section 13 of this report.
2. Terrain analyses using a 3-meter topographic map derived from LiDAR data downloaded from the USGS 3D Elevation Program (3DEP);
3. Site observations of vegetation and ground conditions made by Chris Wilbur on November 14, 2023 during snow-free conditions.
4. Analysis of various sources of aerial imagery, including Google Earth, Bing, USGS, USDA, and San Juan County GIS Department.
5. Review of historic weather data, including SNOTEL, Coop Weather Stations, Colorado Avalanche Information Center (CAIC) and the Center for Snow and Avalanche Studies (CSAS).
6. Avalanche dynamic modeling with the Swiss program, RAMMS, Version 1.8.0 and RAMMS::Extended.
7. Our local and regional knowledge of terrain, climate and avalanche hazards.

5. Avalanche History

Avalanche history is documented in Reference 2 and based primarily on newspaper accounts and interviews.

Figure 4 shows the site location on the town of Silverton's adopted Avalanche Hazard Map (Ref. 1) along with historic runout locations (described in Table 9 in Ref. 2). This Table lists three avalanche occurrences for the Idaho Gulch Slide. Weather and damage descriptions are described below. The Visitor Center building in Block 84 was relocated to its current site in 1974 and has not been impacted to date.

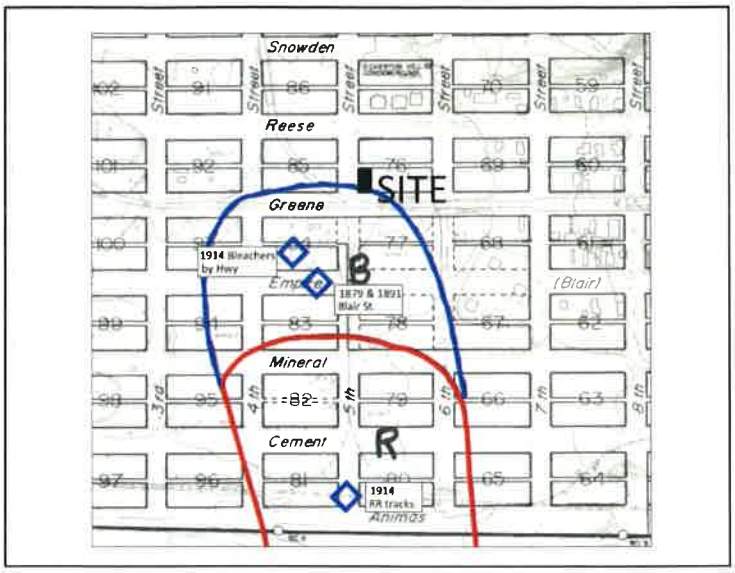


Figure 4 – Historic Runout Estimates
(source: Reference 4, all locations are approximate)

1878-79

Idaho Gulch ran to the level of Blair St. The La Plata Miner newspaper reported 27-inches of new snow on January 11, 1879 which is probably related to the 1879 avalanche.

1890-91

In December, there was more snow in Silverton than in "the hills" and it was relatively dry until mid-January. A storm ending on February 20, 1891 was the heaviest of the winter with two or three feet of new snow and high winds. On February 28, 1891, the Silverton Standard reported that "everything in the county that could slide has done so." Snow depth at Red Mountain was 12-feet on the level. The railroad was blocked by slides for 53 days in the Animas Canyon with depths up to 48 feet. The February 28 Idaho Gulch slide "swept over the dump of the Idaho Mine, taking with it an iron car, and ran across the park to a level with Blair Street. I took out one telegraph pole and covered up the Y with about 10 feet of snow. This is the furthest is has run since 1879." Snowslides continued into April.

1913-14

On January 31, 1914, a slide covered the main railroad track. The bleachers in the ball park were destroyed and the highway was covered at an unknown date in 1913-14. The Silverton Standard reported heavy snowfalls in December 1913 and January 1914 with the railroad blockaded on February 7, 1914.

6. *Snow Climate*

The site is located in the Colorado Avalanche Information Center's (CAIC) Northern San Juan recreational forecast zone. The region is characterized by a high elevation, high solar radiation, continental snow climate. This snow climate is widely known for its characteristic structure with a generally shallow cold snowpack and development of early season persistent weak layers that can last throughout the winter and spring. The weak layers can become overloaded by snow slabs that form during large storms and wind events, resulting in widespread avalanche activity.

Long-term weather records are available from a COOP weather station in Silverton and SNOTEL stations on Red Mountain Pass and Molas Pass. In addition, the Center for Snow and Avalanche Studies has weather instrumentation at three sites near Red Mountain Pass, including a ridgetop anemometer at the Putney weather station. Selected weather and climate data are presented in Appendix A.

7. *Terrain*

The planned building site is located near elevation 9265 feet about 1800 feet northwest of the Animas River and about 15 feet higher in elevation. Figure 5 shows a slope angle and topographic map of the avalanche terrain derived from LiDAR data.

The Idaho Gulch avalanche path has a relatively small (about 2-acres) NW-facing starting zone[2] between elevations 12,200 and 13,000 feet. The 39-degree starting zone, also known as a potential release area, can be cross-loaded by SW through NW winds common in the region. The avalanche track[3] is channelized, steep and straight with an average slope of about 29-degrees. The path widens between elevations 10,400 and 11,500-ft where the width, steepness and NW aspect are favorable for entrainment of additional snow and debris. The runout zone[4] begins on a steep debris fan at elevation 9500 feet. Wet avalanches will spread laterally on the debris fan. Cold dry avalanches will maintain their flow direction across the valley floor. Avalanches that must be considered for land-use planning and engineering will develop a tall suspension cloud that can reach the site. The total vertical elevation drop of the path is about 3700 feet and the average slope angle from the starting zone to the site (alpha angle) is 22.5-degrees.

[2] The *Starting Zone* of an avalanche is the area where snow releases, accelerates and increases in mass.
[3] The *Track* of an avalanche is the area where maximum velocity and mass are attained.
[4] The *Runout Zone* of an avalanche is the area where deceleration occurs and the avalanche stops.

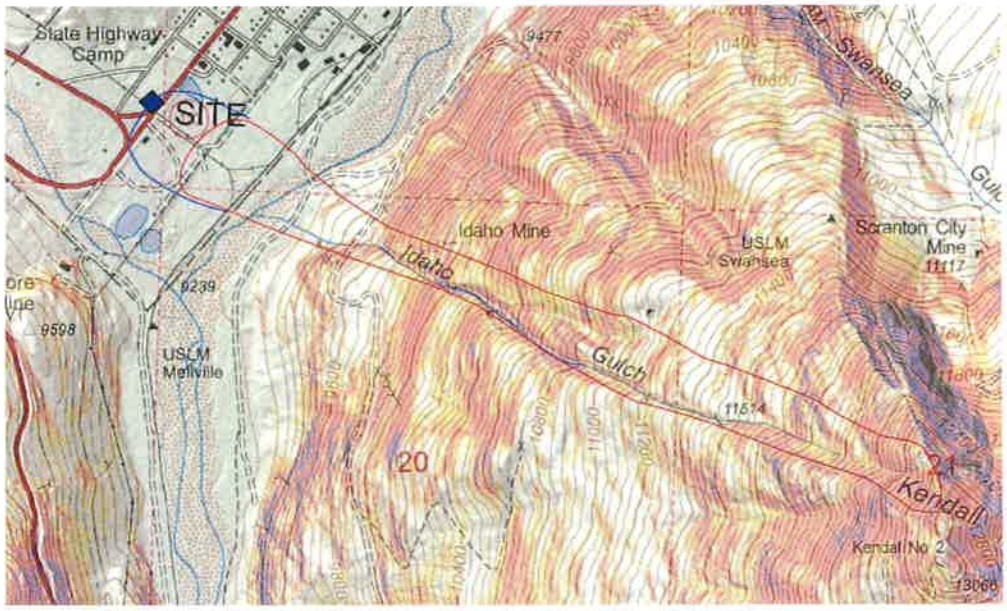


Figure 5 – CalTopo Slope Angle Map

8. Vegetative Indicators

The high elevation spruce-fir forests provide vegetative indicators for historic and undocumented avalanches, including lateral and vertical extents. Figure 6 shows a 2019 Google Earth image of the site and Figure 7 shows a 1998 image. Photos of trees and vegetation are presented in Appendix C.

Figure 6 – Site on 2019 Google Earth Image

Figure 7 – Site on 1998 Google Earth Image

9. Avalanche Flow Regimes

Figure 8 illustrates current scientific understanding of avalanche flow regimes based on measurements at full-scale test sites in Europe. The three theoretical layers of a fully developed mixed motion cold dry avalanche will occur in the design-magnitude avalanche at the site. We conclude that the dense core of the design-magnitude avalanche does not reach the site. The suspension component (powder avalanche) will reach the site and must be considered for the planned construction. The intermediate transition layer (saltation or fluidized layer) runs farther than the dense core, but also does not reach the site. Its boundaries are probably transitional rather than distinct.

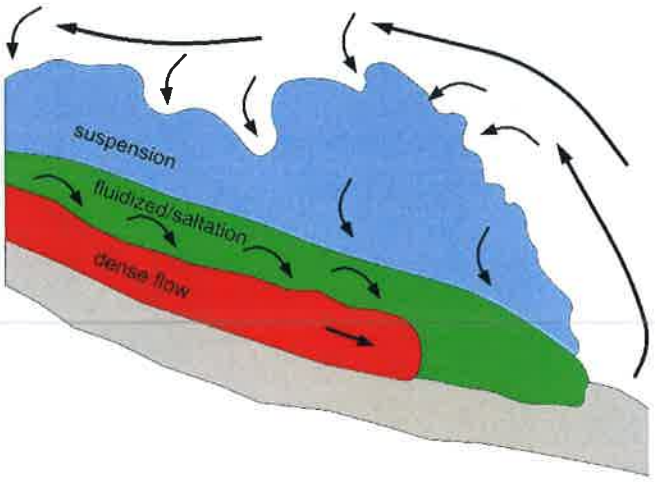


Figure 8 – Avalanche Flow Regimes
(modified from Ref. 3)

The suspension cloud (often called a powder blast, powder snow avalanche, or PSA) reaches speeds higher than the dense core. It flows well beyond the stopping point of the dense core and can be destructive. Its properties are similar to high wind speeds. Typical suspension cloud densities are 3 to 10 times the density of air. While little information is available in the U.S. about powder avalanche properties, measurements and observations in Europe have shown that the run-out distance of the powder part increases with increasing mean slope angle of the track (Ref. 4). Beyond the stopping point of the core, the energy of the suspension cloud is continually reduced flowing across gentle terrain due mainly to air entrainment causing a decrease in velocity and density.

The development of the suspension cloud at the site is enhanced by the site elevation, straightness of the path, NW aspect, steepness, low ground friction and cliff sections. The lack of forest in the path results in low ground friction and energy dissipation. The suspension cloud will reach the building site and the velocity, density and impact pressures will vary with average return period.

10. Avalanche Dynamics Modeling

We used the Swiss avalanche dynamics program RAMMS Release 1.8.2 to evaluate flow directions, thickness and velocities for the dense-flowing core of the design-magnitude avalanche in 3-dimensional terrain. The dense core is highly unlikely to reach the building site, but it affects the direction and magnitude of the suspension cloud that can reach the site. Figure 9 shows representative model results for the maximum flow heights for an approximate 100-year average return period avalanche.

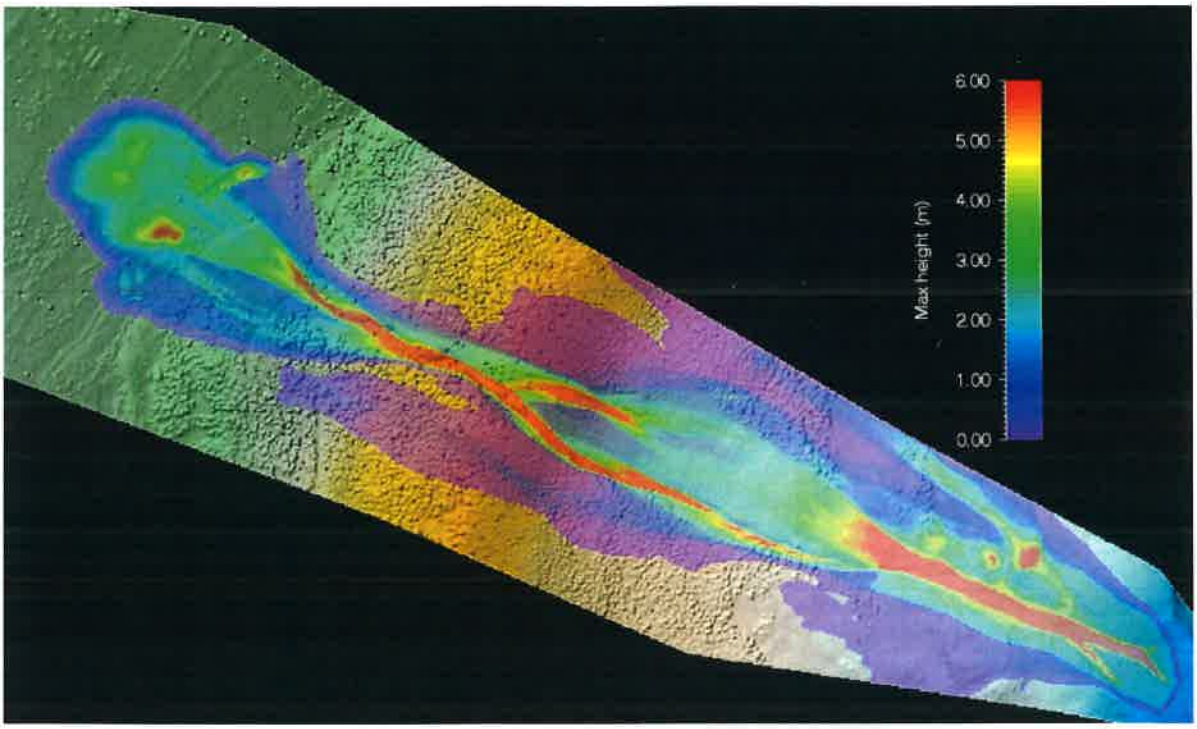


Figure 9 – RAMMS Predicted 100-year Maximum Dense Core Flow Heights

We also used RAMMS:Extended to evaluate the core and suspension cloud in 3-dimensional terrain. This advanced model is under development and has not been widely used or calibrated. It incorporates snow temperatures and entrainment to predict both the core and suspension components of avalanches. Figure 10 shows representative model results for the maximum flow heights for an approximate 100-year average return period avalanche. Figure 11 shows predicted powder avalanche pressures for a 300-year avalanche.

Calibration for both models was based on historic runouts, vegetation trim lines, and our experience with other avalanches in Colorado, including well-documented historic avalanches. We assumed that the 1914 avalanche that destroyed the bleachers and reached the highway was a 100-year avalanche. Model assumptions and parameters are presented in Appendix B.

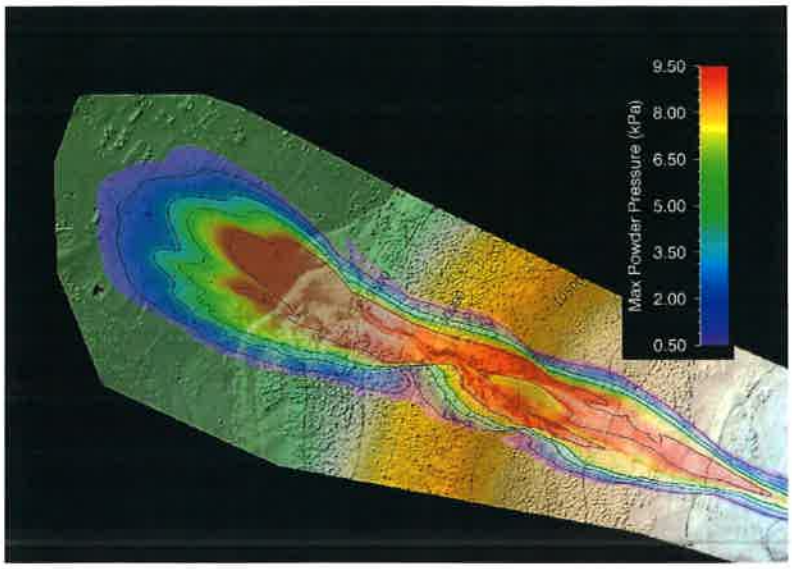


Figure 10 – RAMMS:Extended Predicted 100-yr Maximum Powder Pressures

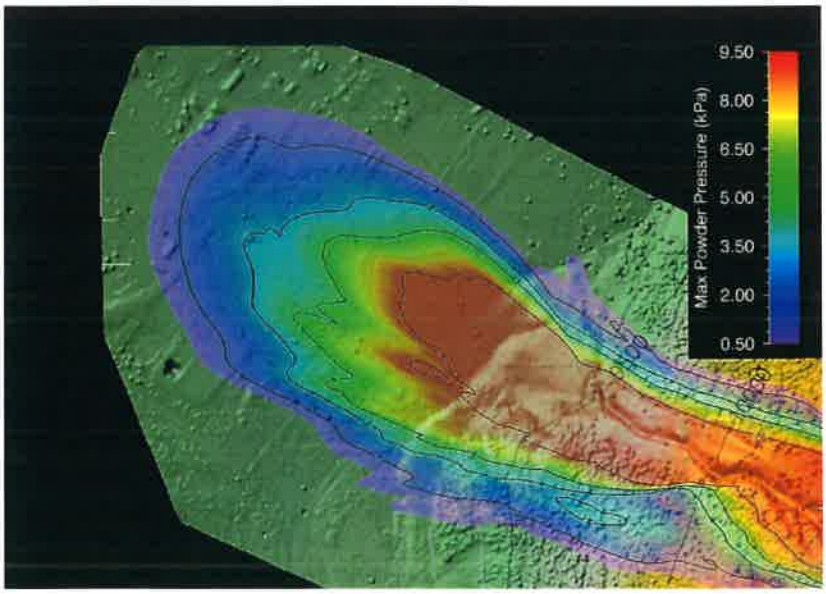


Figure 11 – RAMMS:Extended Predicted 300-yr Maximum Powder Pressures

11. Design Parameters

Table 1 presents design avalanche stagnation pressures for the planned building site for 30-year, 100-year and 300-year estimated average return period avalanches[5]. The 30-year and 100-year stagnation pressures are less than typical wind pressures, but the 300-year pressures may exceed wind design pressures. While the suspension layer is highly turbulent, the predominant flow direction is due NW. Selection of a design return period is described below under *Recommendations*.

Table 1 - Design Avalanche Stagnation Pressures

Average Return Period (yrs)	Annual exceedance probability (%)	Design pressure (kPa)	Design pressure (psf)
30	3.3	0	0
100	1.0	0.5	10
300	0.3	1.3	27

Stagnation pressures can be addressed similar to wind loads. They are directional, but highly turbulent and altered by nearby structures and nearby trees. Pressures on individual walls, roofs, eaves and other exposed objects must be determined by the structural engineer applying shape factors and wind engineering principles. Significant uplift pressures and negative (suction) pressures are possible for the 300-year avalanche.

12. Recommendations

The following recommendations and design guidelines are based on our findings, risk considerations and uncertainties.

1. We recommend the 100-year design parameters as a *minimum* for owner-occupied single-family dwellings.
2. We recommend 300-year design pressure for multi-family and for non-owner occupied (short-term or long-term rental) dwellings.
3. We recommend 300-year design pressure for risk-averse owners for any occupied structures.
4. Structures in avalanche zones should be designed to minimize the surfaces exposed to the flow direction of the avalanche. Where practical, buildings should

[5] The 100 and 300 year avalanches refer to events with annual exceedance probabilities of 1.0% and 0.3%, respectively.

be oriented with their long axes parallel to the avalanche flow direction. Similarly, short buildings will experience lower avalanche forces than tall buildings.
5. Flat roofs will experience lower avalanche forces than gable and hip roofs. Similarly eliminating or reducing eaves will reduce avalanche uplift forces.
6. Windows and doors on walls facing the avalanche should be minimized and designed for impact. Impact pressures of 20 psf (1 kPa) can break conventional windows.
7. Avalanche risk can be reduced by placing high occupancy spaces, especially bedrooms, away from the walls facing the avalanche.
8. Outdoor living spaces, especially hot tubs and heated outdoor spaces, should be placed in protected areas away from the avalanche-facing side of the building.
9. Materials stored outside of buildings, including wood piles, trailers, boats and similar items can become launched during avalanches. Lightweight materials with large surface areas are particularly susceptible to long transport distances. Residents and businesses within avalanche zones should be aware of this potential hazard and take measures to minimize outdoor storage of material that could increase damage to down-gradient resources.
10. It is possible to achieve a high level of avalanche protection for building occupants, but persons outside will not be protected. Therefore, it is prudent for occupants and guests of residential buildings in and near avalanche hazard zones to become educated and keep current on local avalanche conditions, including the local and regional avalanche danger forecasts. However, reliance upon forecasts and avoiding avalanche zones during elevated avalanche danger conditions can reduce, but not eliminate avalanche risk, especially to persons outside of buildings.

13. References

1. *Snow Avalanche Hazard Mapping Analysis, Silverton, Colorado*, prepared by Arthur I. Mears, Inc. for Dave Erickson & the town of Silverton, February 1998, with Maps revised January 2000.
2. *Century of Struggle Against Snow: A History of Avalanche Hazard in San Juan County, Colorado*, prepared by Betsy R. Armstrong, Institute of Arctic and Alpine Research, for San Juan County in 1976, published as Occasional Paper No. 18 by INSTAAR "Overall Hazard Map", prepared by INSTAAR for San Juan County in 1976.
3. Johanneson, et. al., *Design of Avalanche Protection Dams*, European Commission, 2009.
4. Gauer, Peter, *Estimates On the Reach of the Powder Part of Avalanches*, Proceedings, International Snow Science Workshop, Innsbruck, Austria, 2018.
5. *Avalanche Atlas, San Juan County, Colorado*, prepared by Len Miller, Betsy R. Armstrong and Richard L. Armstrong, Institute of Arctic and Alpine Research, for San Juan County in 1976, published as Occasional Paper No. 17 by INSTAAR

6. *Avalanche Hazard Map, San Juan County*, prepared by Rebecca Summer and Margaret Squier, INSTAAR (Institute of Arctic and Alpine Research), Boulder, Colorado, for San Juan County in 1976.

Appendix A
Weather and Climate

Regional Map with Weather Stations

SILVERTON, COLORADO (057656)

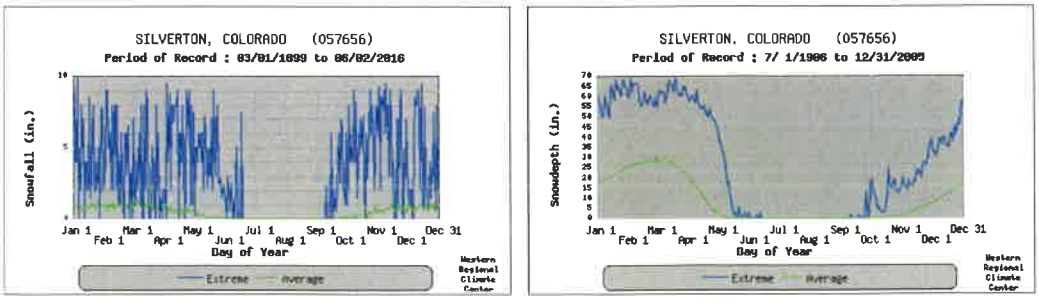
Period of Record Monthly Climate Summary

Period of Record : 7/ 1/1906 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	34.0	36.6	40.6	47.3	57.6	67.9	73.1	70.5	64.7	55.1	43.2	35.1	52.2
Average Min. Temperature (F)	-1.9	1.0	8.1	18.5	26.4	31.9	37.9	37.2	30.3	22.0	9.5	0.2	18.4
Average Total Precipitation (in.)	1.68	1.75	2.30	1.72	1.46	1.39	2.72	3.10	2.81	2.34	1.49	1.73	24.50
Average Total SnowFall (in.)	25.8	25.3	28.4	17.3	4.3	0.3	0.0	0.0	0.9	8.5	20.0	24.0	154.8
Average Snow Depth (in.)	21	27	26	11	0	0	0	0	0	1	4	12	9

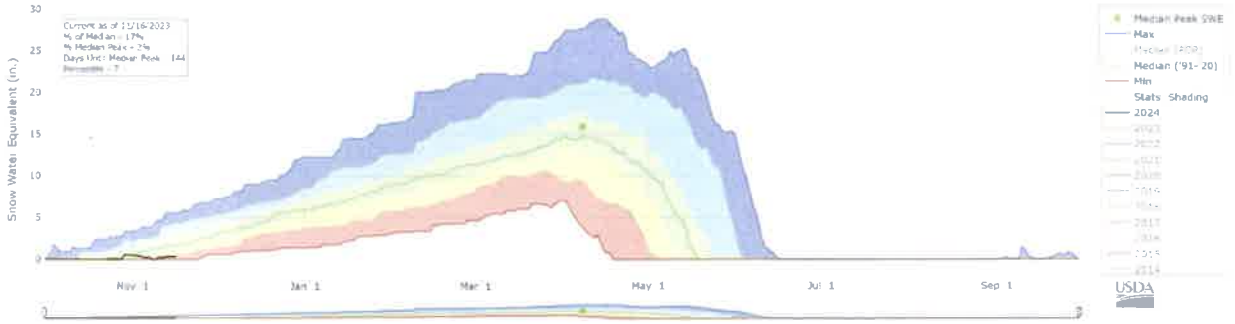
Percent of possible observations for period of record.
Max. Temp.: 94.1% Min. Temp.: 93.9% Precipitation: 95% Snowfall: 95.2% Snow Depth: 85.8%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

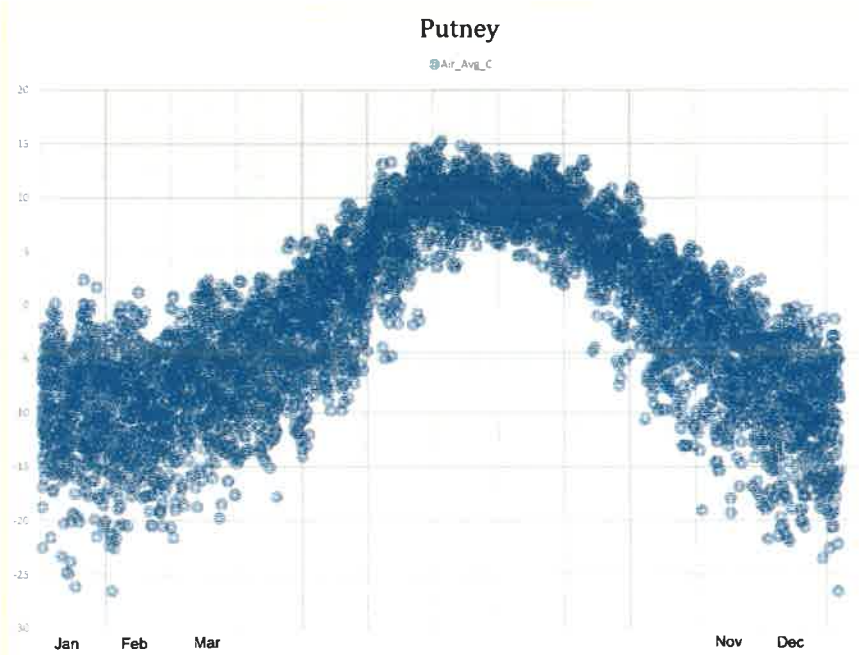


Silverton Coop Snow Height and 24-hour Snowfall Data

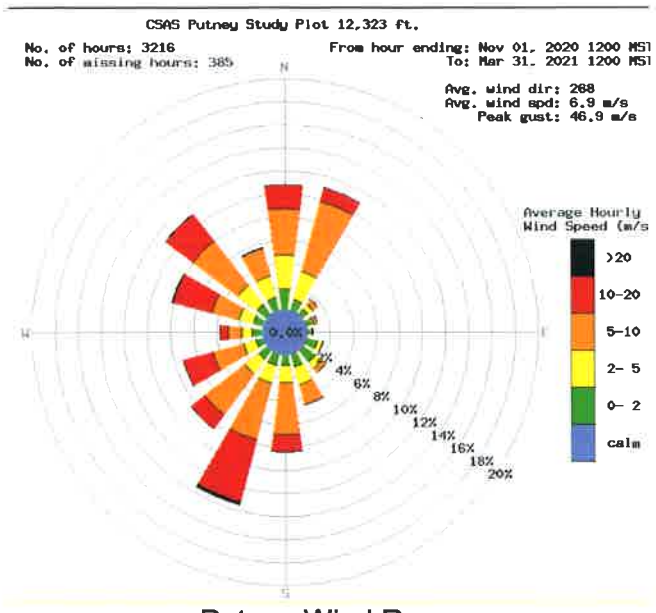
Mineral SNOTEL



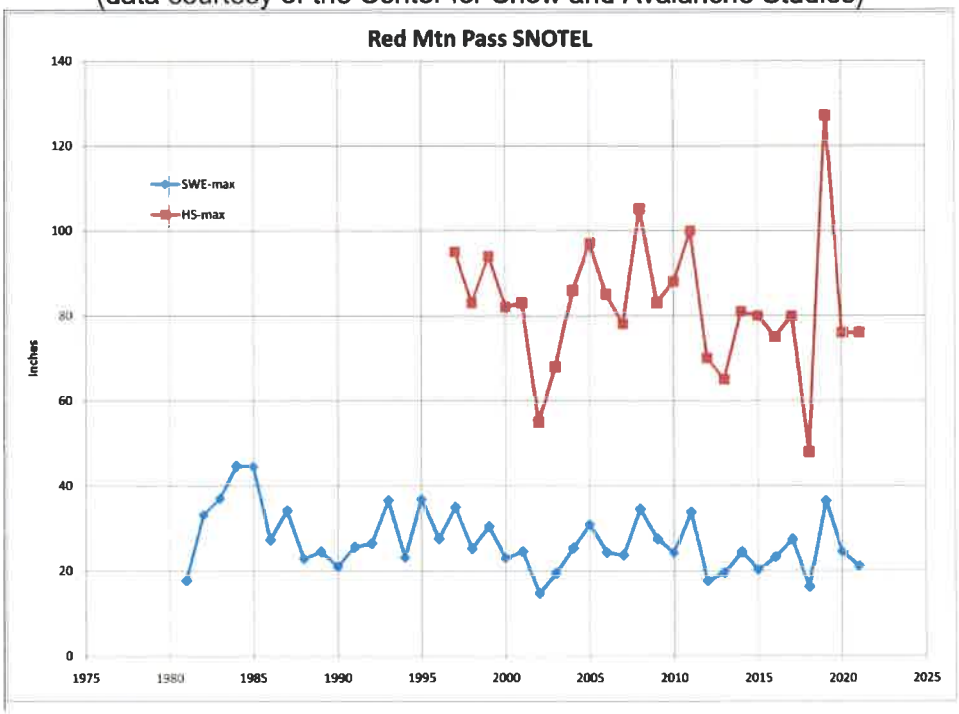
Putney

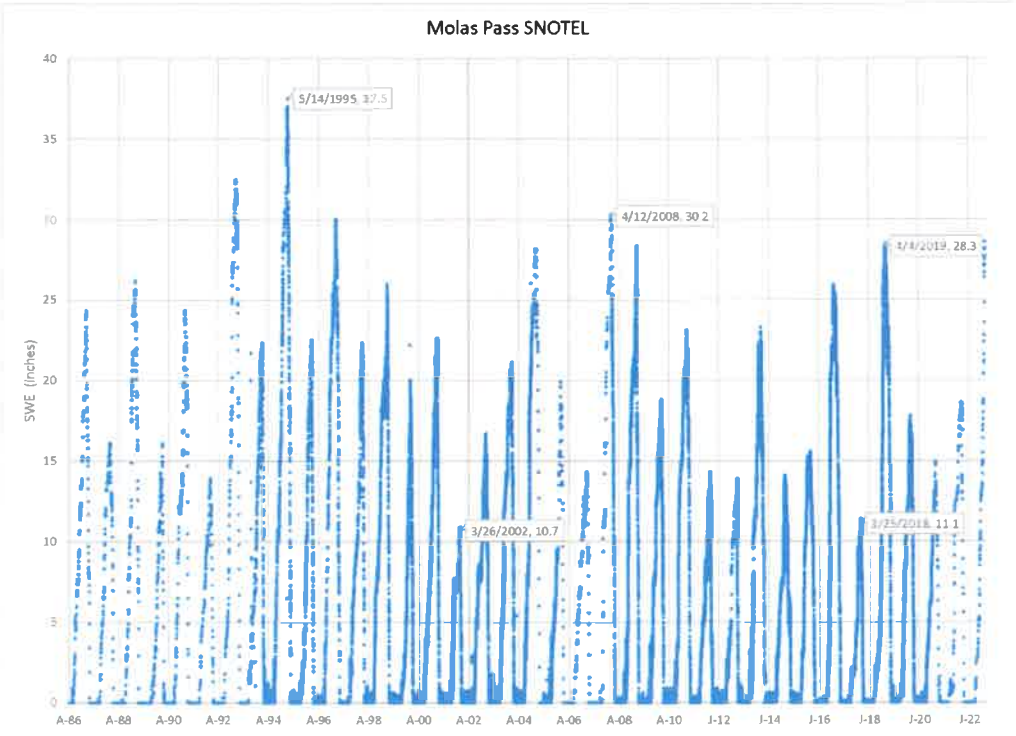


Putney Air Temperatures
(data courtesy of the Center for Snow and Avalanche Studies)



Putney Wind Rose
(data courtesy of the Center for Snow and Avalanche Studies)





Molas SNOTEL Snow Water Equivalent
(El. 3200 meters)

Appendix B

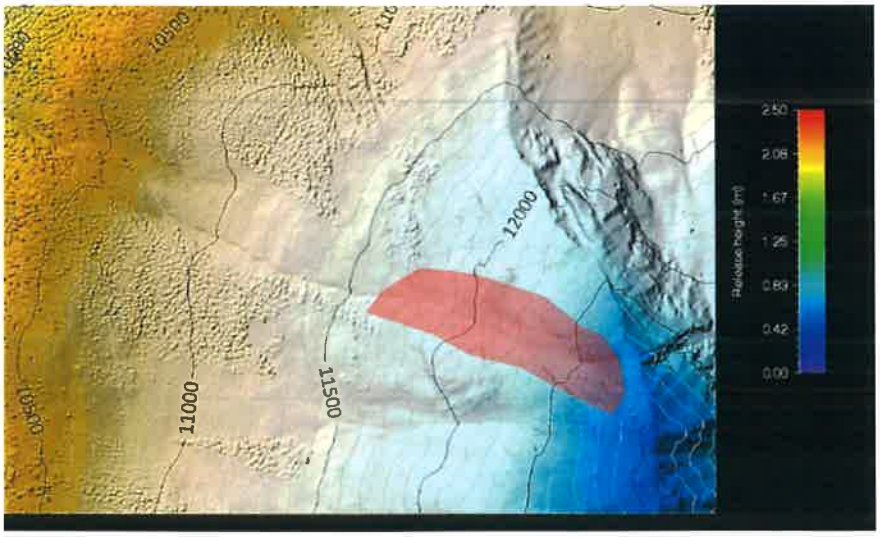
RAMMS Parameters & Results

*** Important Note: ***

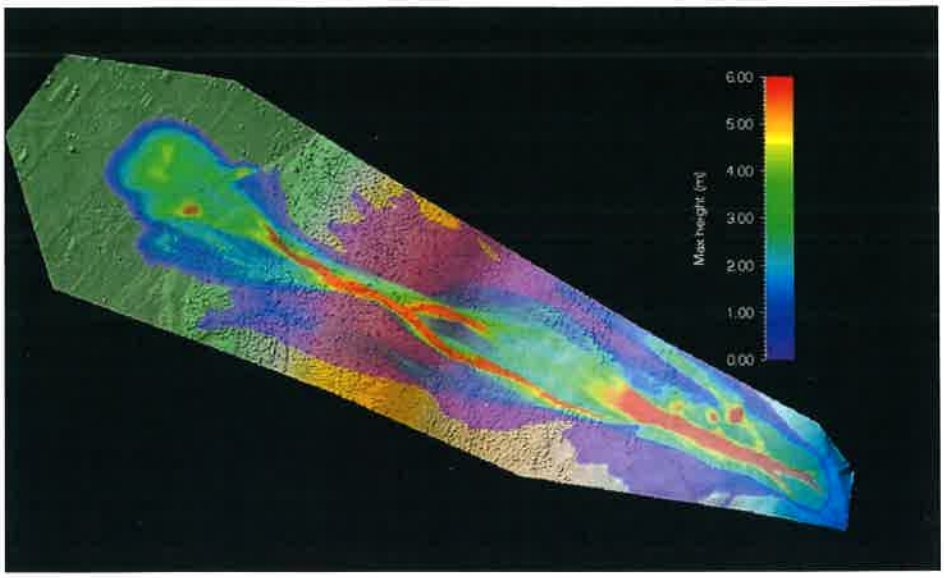
Interpretation of avalanche dynamics model results requires an understanding of the model assumptions, simplifications and limitations of the underlying equations of motion. The models do not accurately show wet avalanche runouts, flow heights or impact pressures, nor the variations in avalanche properties with depth, including density and velocity.

RAMMS 1.8.0 Assumptions

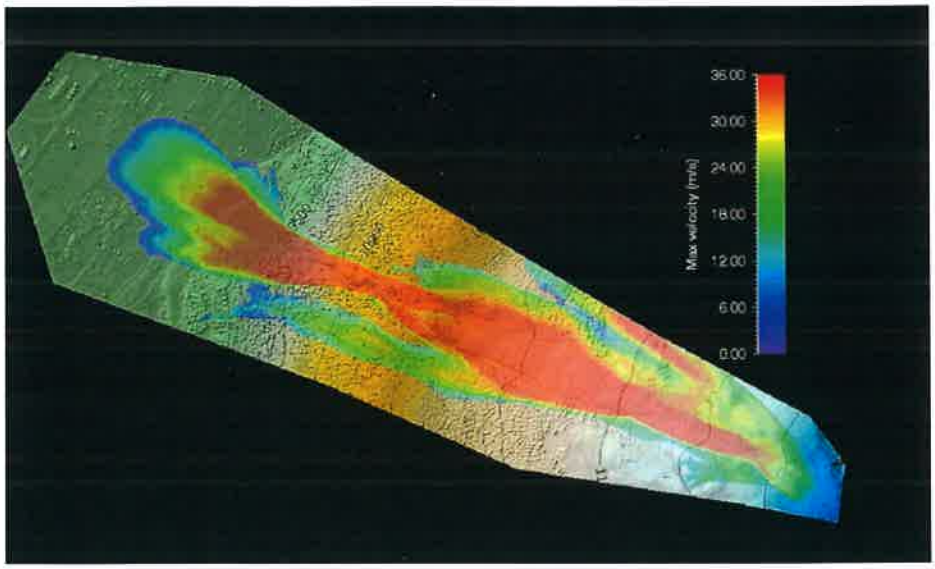
		Release				cohesion
run	res.	name	ht. (m)	vol. (m3)	Friction	(Pa)
run1	3.0	R1	1.5	165000	L300	0
run2	3.0	R1	2.0	221,000	L300	0
run3	3.0	R1	2.5	276,000	L300	0



Release area



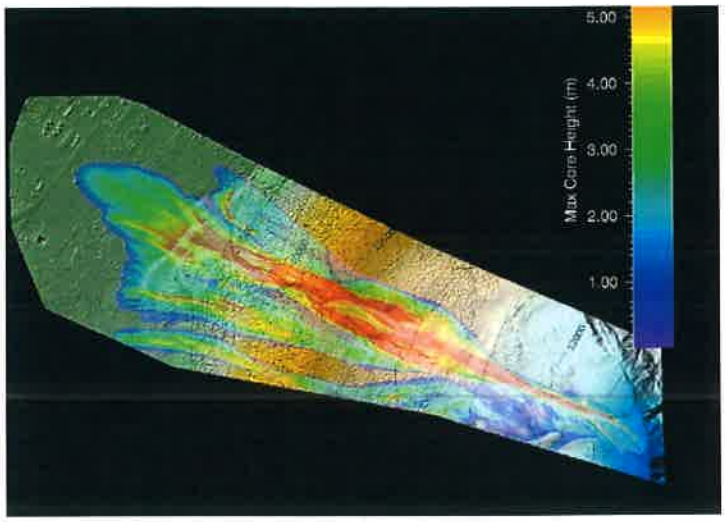
Run 3 – Maximum core heights



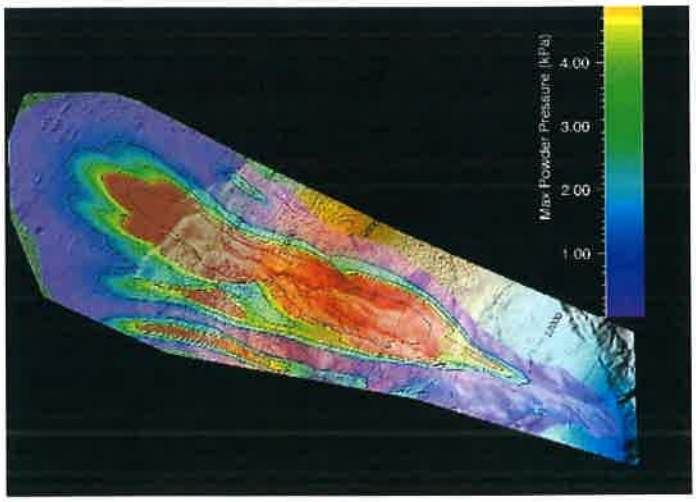
Run 3 – Maximum Core Velocities

RAMMS:Extended Assumptions

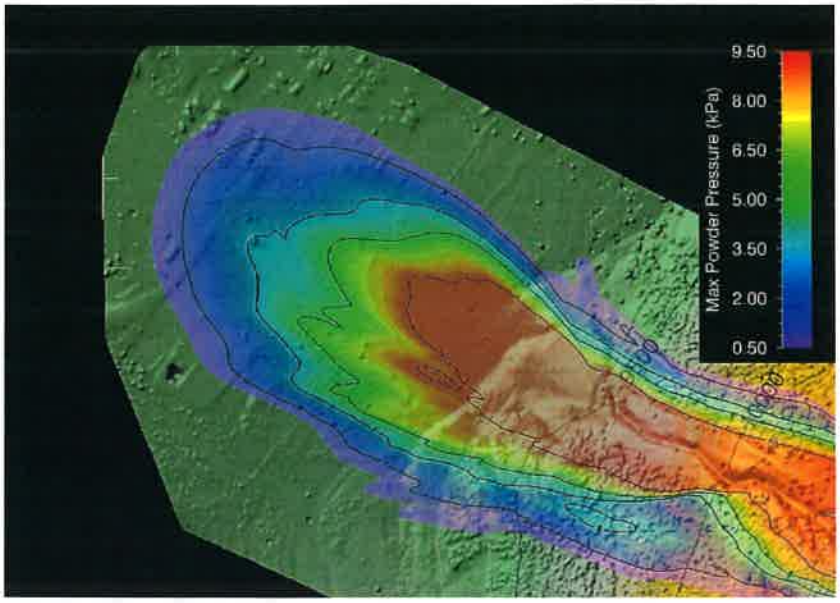
			Release				Friction			erosion											RKE	
	comments	res	name	ht. (m)	rho (kg/m3)	vol. (m3)	mu	xi	C (Pa)	D	To	W %	ref alt	delta D	delta T	delt a W	Erod 0-5	Epsil 0-1	spash 0-1	gen. 0-10	decay 1/s	activ. kJ/m3
run1	Big rel. est. 300-yr	3	R1	1.8	200	88,100	0.38	1900	100	0.3	-5.0	0	3200	0.03	0.3	0	4.0	0.4	0.2	5	0.7	2
run2	smaller rel area, colder	3	R2	1.8	200	70,900	0.38	1900	100	0.3	-6.0	0	3200	0.03	0.3	0	4.0	0.4	0.2	5	0.7	2
run3	slope-based rel, colder	3	R3	2.0	200	46,100	0.38	1900	100	0.5	-6.0	0	2800	0.03	0.3	0	4.0	0.4	0.2	7	0.7	2
run4	smaller rel area, colder	3	R4	2.5	200	42,000	0.38	1900	75	0.7	-7.0	0	2800	0.03	0.3	0	4.0	0.4	0.2	7	0.7	2



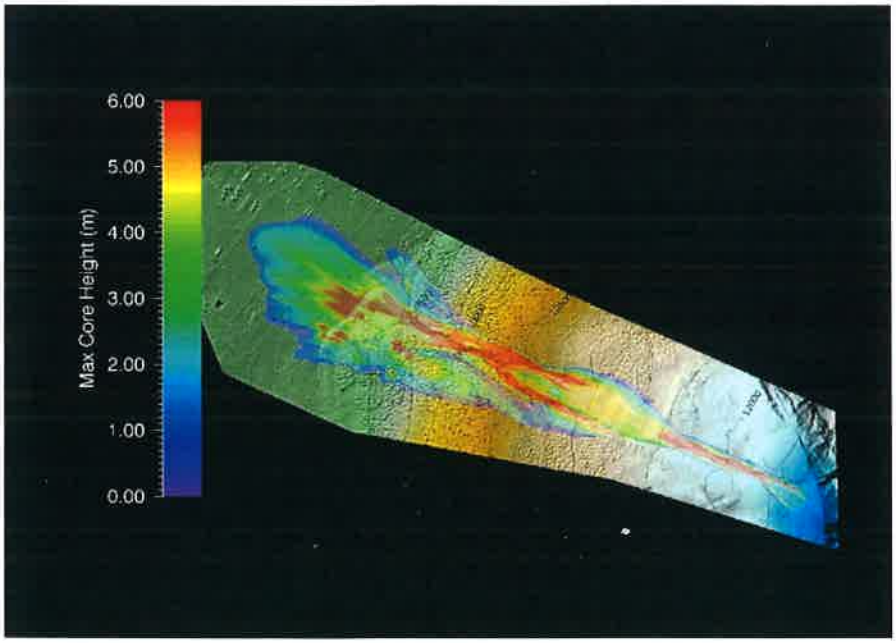
Run 1 – Maximum Core Flow Height



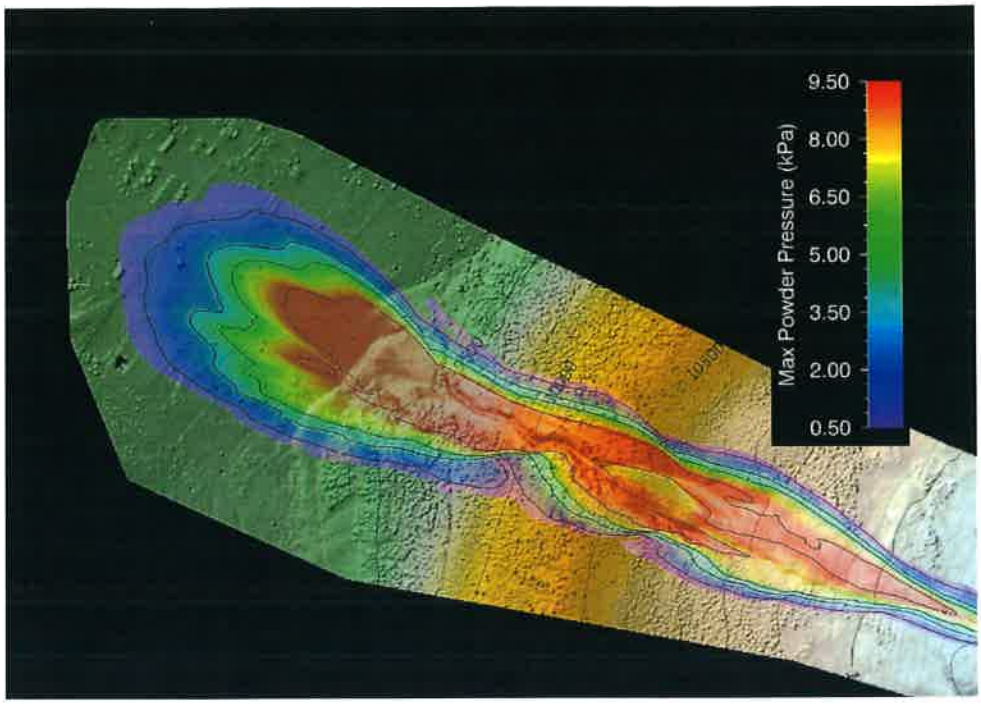
Run 1 – Maximum Powder Pressures



Run 3 – Maximum Powder Pressures



Run 4 – Maximum Core Flow Height



Run 4 – Maximum Powder Pressures

Appendix C – Site Photos

All photos by C. Wilbur, November 14, 2023

1 – looking NE

2 – looking NE

3 – Tri-State dead end single pole tower

4 – looking east from building site

TRAUTNER GEOTECH LLC
GEOTECHNICAL ENGINEERING, MATERIAL TESTING
AND ENGINEERING GEOLOGY

GEOTECHNICAL ENGINEERING STUDY
PROPOSED RESIDENCE
LOTS 13 AND 14, BLOCK 76, SULTAN SUBDIVSION
5th AND GREENE STREET
SILVERTON, COLORADO

December 16, 2022

PREPARED FOR:

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PROJECT NO. 57537GE

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1.0 REPORT INTRODUCTION

This report presents our geotechnical engineering recommendations for the proposed residence to be located at the corner of 5th and Green Streets in Silverton, Colorado. This report was requested by Mr. Steven Gawlik and was prepared in accordance with our proposal dated August 3, 2022, Proposal No. 22274P.

As outlined within our proposal for services for this project the client is responsible for appropriate distribution of this report to other design professionals and/or governmental agencies unless specific arrangements have been made with us for distribution.

Geotechnical engineering is a discipline which provides insight into natural conditions and site characteristics such as; subsurface soil and water conditions, soil strength, swell (expansion) potential, consolidation (settlement) potential, and often slope stability considerations. The information provided by the geotechnical engineer is utilized by many people including the project owner, architect or designer, structural engineer, civil engineer, the project builder and others. The information is used to help develop a design and subsequently implement construction strategies that are appropriate for the subsurface soil and water conditions, and slope stability considerations. We are available to discuss any aspect of this report with those who are unfamiliar with the recommendations, concepts, and techniques provided below.

This geotechnical engineering report is the beginning of a process involving the geotechnical engineering consultant on any project. It is imperative that the geotechnical engineer be consulted throughout the design and construction process to verify the implementation of the geotechnical engineering recommendations provided in this report. Often the design has not been started or has only been initiated at the time of the preparation of the geotechnical engineering study. Changes in the proposed design must be communicated to the geotechnical engineer so that we have the opportunity to tailor our recommendations as needed based on the proposed site development and structure design.

The following outline provides a synopsis of the various portions of this report;

- Sections 1.0 provides an introduction and an establishment of our scope of service.
- Sections 2.0 and 3.0 of this report present our geotechnical engineering field and laboratory studies
- Sections 4.0 through 7.0 presents our geotechnical engineering design parameters and recommendations which are based on our engineering analysis of the data obtained.
- Section 8.0 provides a brief discussion of construction sequencing and strategies which may influence the geotechnical engineering characteristics of the site. Ancillary information such as some background information regarding soil corrosion and radon considerations is also presented as general reference.
- Section 9.0 provides our general construction monitoring and testing recommendations.
- Sections 10.0 and 11.0 provides our conclusions and limitations.

The data used to generate our recommendations are presented throughout this report and in the attached figures.

All recommendations provided within this report must be followed in order to achieve the intended performance of the foundation system and other components that are supported by the site soil.

1.1 Proposed Construction

Architectural details and grading plans were not available at the time of this report. We understand the proposed residence will likely be a one or two story structure with an attached garage supported by a steel reinforced concrete foundation system. The lower level and garage floors will be either structurally supported or concrete slab-on-grade. Grading for the structure is assumed to be relatively minor with cuts of approximately 3 to 4 feet below the adjacent ground surface. We assume relatively light foundation loadings, typical of the proposed type of construction.

When final building location, grading and loading information have been developed, we should be notified to re-evaluate the recommendations presented in this report.

2.0 FIELD STUDY

2.1 Site Description and Geomorphology

The approximate 0.11-acre project site is currently vacant. The ground surface across the site is relatively flat. Vegetation consists primarily of grasses and weeds. The site is bordered by 5th Street to the southwest, Greene Street to the southeast, vacant residential lots to the northeast and the Reece Street Alley to the northwest.

2.2 Subsurface Soil and Water Conditions

We advanced two test borings in the vicinity of the proposed structure. A schematic showing the approximate boring locations is provided below as Figure 1. The logs of the soils encountered in our test borings are presented in Appendix A.

Figure 1: Locations of Exploratory Borings. Adapted from San Juan County GIS.

The schematic presented above was prepared using notes and field measurements obtained during our field exploration and is intended to show the approximate test boring locations for reference purposes only.

The subsurface conditions encountered in our test borings consisted of about 1 to 1½ feet of man-placed fill consisting of clayey gravel with sand and cobbles (GC) overlying natural clayey gravel with sand, cobbles and scattered boulders (GC) down to the maximum depth explored of 18 feet. Practical auger drilling refusal was encountered on dense cobbles at 18 feet in boring TB-1 and at 4 feet in TB-2 and at 3 feet after offsetting slightly from the original TB-2 location.

We did not encounter free subsurface water in our test borings at the time of the advancement of our test borings at the project site. We suspect that the subsurface water elevation and soil moisture conditions will be influenced by snow melt and/or precipitation and local irrigation.

The logs of the subsurface soil conditions encountered in our test borings are presented in Appendix A. The logs present our interpretation of the subsurface conditions encountered in the test borings at the time of our field work. Subsurface soil and water conditions are often variable across relatively short distances. It is likely that variable subsurface soil and water conditions will be encountered during construction. Laboratory soil classifications of samples obtained may differ from field classifications.

3.0 LABORATORY STUDY

The laboratory study included tests to estimate the strength, swell and consolidation potential of the soils tested. We performed the following tests on select samples obtained from the test borings.

The laboratory test results are provided in Appendix B.

- Moisture Content and Dry Density
- Sieve Analysis (Gradation)
- Atterberg Limits, Liquid Limit, Plastic Limit and Plasticity Index
- Swell Consolidation Tests

A synopsis of some of our laboratory data for some of the samples tested is tabulated below.

Sample Designation	Percent Passing #200 Sieve	Atterberg Limits LL/PI	Moisture Content (percent)	Dry Density (PCF)	Measured Swell Pressure (PSF)	Swell or Consolidation Potential
TB-1 @ 3.5'	-	-	5.4	121.2	0*	-0.2 (% under 500 psf load)
TB-1 @ 1-3.5'	25	18/6	2.2	-	-	-
TB-2 @ 2'	-	-	8.1	122.1	490*	0.1 (% under 100 psf load)

*NOTES:
1. We determine the swell pressure as measured in our laboratory using the constant volume method. The graphically estimated load-back swell pressure may be different from that measured in the laboratory.
2. Negative Swell-Consolidation Potential indicates compression under conditions of loading and wetting.
3. * = Swell-Consolidation test performed on remolded sample due to rock content. Test results should be considered an estimate only of the swell or consolidation potential at the density and moisture content indicated.

4.0 FOUNDATION RECOMMENDATIONS

There are two general types of foundation system concepts, "deep" and "shallow", with the designation being based on the depth of support of the system. We have provided a discussion of viable foundation system concepts for this project below. The choice of the appropriate foundation system for the project is best made by the project structural engineer or project architect. We should be contacted once the design choice has been made to provide consultation regarding implementation of our design parameters.

Deep foundation system design concepts may be viable for this project; however, we anticipate that only a shallow foundation system design is being considered at this time. We are available to develop deep foundation design parameters if desired.

4.1 Shallow Foundation System Concepts

Subsurface data indicate that clayey gravel with sand, gravel and scattered boulders will likely be the predominant soil type encountered beneath shallow foundations. Based on the laboratory analysis, the soils encountered in our borings were found to have a low swell potential. Deep foundation system design concepts which include isolation of shallow components including floor systems from shallow soils are less likely to experience post-construction movement due to volume changes in the site soil.

There are numerous types of shallow foundation systems and variants of each type. Shallow foundation system concepts discussed below include:

- Spread Footings (continuous and isolated) and stem walls

The integrity and long-term performance of each type of system is influenced by the quality of workmanship which is implemented during construction. It is imperative that all excavation and fill placement operations be conducted by qualified personnel using appropriate equipment and techniques to provide suitable support conditions for the foundation system.

4.1.1 Spread Footings

A spread footing foundation system consists of a footing which dissipates, or spreads, the loads imposed from the stem wall (or beam) from the structure above. The soil samples tested from the anticipated support elevations in our test borings had a measured swell pressure of about 490 pounds per square foot and a swell potential magnitude of about 0.1 percent under a 100 pound per square foot surcharge load. The owner must understand that regardless of the expansive soil mitigation design concepts presented below, if the swell pressure generated by the expansive soil on this site exceeds the minimum dead load which is imposed by the spread footing or other structural components, and the expansive site soils become wetted, uplift of the foundation system and other structural components is highly likely. Drilled piers, or other deep foundation system design will provide the least likelihood of post construction movement associated with soil volume changes.

The actual magnitude of the potential uplift of the foundation system depends on the volume (or depth) of the support soils which become moistened after construction. It is difficult to predict the amount of soil which will become moistened after construction, some theories suggest that with time the entire soil mantle may become moistened. Based on our experience in the area we feel that it is possible for at least 4 to 5 feet of soil below the footings to be influenced by subsurface moisture. Based on the assumed depth of moistened soil, laboratory test data, and the soil characteristics we estimate that the magnitude of the potential uplift associated with swelling of the expansive support soil materials may be in the range of about ¼ inch or less. If the entire soil mantle becomes moistened the total potential uplift may be considerably higher. The project structural engineer or architect should determine if the potential uplift is tolerable for the proposed structure on this project site.

Uplift associated with swelling soils occurs only where the foundation support soils have been exposed to water; therefore, the uplift may impose shear stresses in the foundation system. The magnitude of the imposed shear stress is related to the swell pressure of the support soil, but is difficult to estimate. Properly designed and constructed continuous spread footings with stem walls (or beams) have the ability to distribute the forces associated with swelling of the support soil. The rigidity of the system helps reduce differential movement and associated damage to the overlying structure. Swelling of the soil supporting isolated pad footings will result in direct uplift of the columns and structural components supported by the columns. Damage to the structure due to this type of movement can be severe. We recommend that isolated pad footings be avoided and that the foundation system be designed as rigid as is reasonably possible.

High foundation dead load, careful preparation of the support soils, placement of granular compacted structural fill, careful placement and compaction of stem wall backfill and positive surface drainage adjacent to the foundation system all help reduce the influence of swelling soils

on the performance of the spread footing foundation system.

We recommend that the footings be designed with a high dead load and supported by a layer of moisture conditioned and compacted natural soil which is overlain by a layer of compacted structural fill material. This concept is outlined below:

- The foundation excavation should be excavated to at least 12 inches below the proposed footing support elevation and below any existing fill soils.
- The natural soils exposed in the bottom of the excavation should be scarified to a depth of about 6 to 8 inches
- The scarified soil should be thoroughly moisture conditioned to about 2 percent above the laboratory determined optimum moisture content and then compacted.
- After completion of the compaction of the moisture conditioned natural soil a 12 inch thick layer of granular aggregate base course structural fill material should be placed, moisture conditioned and compacted.
- The moisture conditioned natural soil material and the granular soils should be compacted as discussed under the Compaction Recommendations portion of this report below.
- In the absence of structural engineering design and for general geotechnical engineering purposes, we recommend the stem walls be designed to act as beams and reinforced with continuous steel reinforcement, 4 reinforcement bars, 2 top and 2 bottom. Taller walls may require additional reinforcement bar.
- The structural engineer should be contacted to provide the appropriate reinforcement bar diameter and locations.

We recommend that particular attention and detail be given to the following aspects of the project construction for this lot;

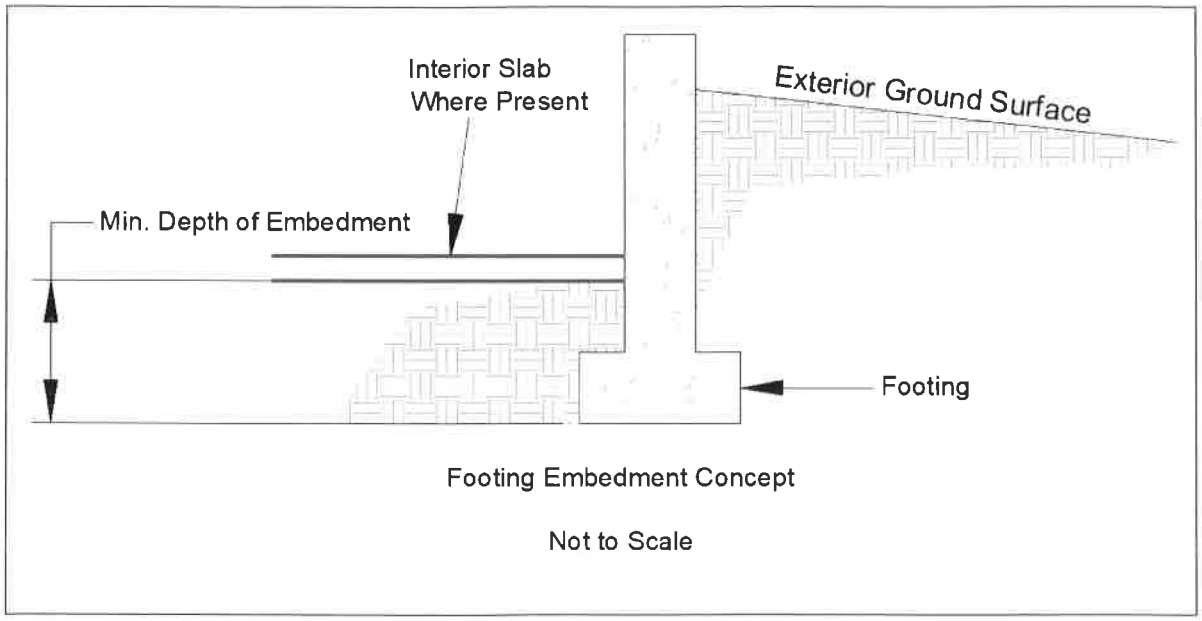
- A subsurface drain system should be installed adjacent to the residential structure foundation system. Concepts for a subsurface drain system are presented in Section 6.0 of this report.
- The landscaping drainage concept provided in Section 8.5 below is imperative for this site to limit the moisture available to the foundation bearing soils.
- The exterior foundation backfill must be well compacted and moisture conditioned to above optimum moisture content. Recommendations for exterior foundation backfill are provided later in this report.

We recommend below-grade construction, such as retaining walls, crawlspace and basement areas, be protected from wetting and hydrostatic pressure buildup by an underdrain and wall drain system. Topographic conditions on the site may influence the ability to install a subsurface drain system which promotes water flow away from the foundation system. The subsurface drain system concept is discussed under the Subsurface Drain System section of this report below.

The footing embedment is a relatively critical, yet often overlooked, aspect of foundation construction. The embedment helps develop the soil bearing capacity, increases resistance of the footing to lateral movement and decreases the potential for rapid moisture changes in the footing support soils, particularly in crawl space areas. Interior footing embedment reduces the exposure of the crawl space support soils to dry crawl space air. Reduction in drying of the support soil

helps reduce downward movement of interior footings due to soil shrinkage.

All footings should have a minimum depth of embedment of at least one 1 foot. The embedment concept is shown below.



Spread footings located away from sloped areas may be designed using the bearing capacity information tabulated below.

Minimum Depth of Embedment (Feet)	Continuous Footing Design Capacity (psf)	Isolated Footing Design Capacity (psf)
1	1,500	2,000
2	2,000	2,500
3	2,500	3,000

The bearing capacity values tabulated above may be increased by 20 percent for transient conditions associated with wind and seismic loads. Snow loads are not transient loads.

The bearing capacity values above were based on footing placed directly on the natural soils and on a continuous spread footing width of 2 feet and an isolated footing width of 3 feet. Larger footings and/or footings placed on a blanket of compacted structural fill will have a higher design soil bearing capacity. Development of the final footing design width is usually an iterative process based on evaluation of design pressures, footing widths and the thickness of compacted structural fill beneath the footings. We should be contacted as the design process continues to re-evaluate the design capacities above based on the actual proposed footing geometry.

The settlement of the spread footing foundation system will be influenced by the footing size and the imposed loads. We estimated the total post construction settlement of the footings based on our laboratory consolidation data, the type and size of the footing. Our analysis below assumed

that the highest bearing capacity value tabulated above was used in the design of the footings. The amount of post construction settlement may be reduced by placing the footings on a blanket of compacted structural fill material.

The estimated settlement for continuous footing with a nominal width of about 1½ to 2½ feet are tabulated below.

Thickness of Compacted Structural Fill (feet)	Estimated Settlement (inches)
0	⅜-½
B/2	¼-⅜
B	<¼

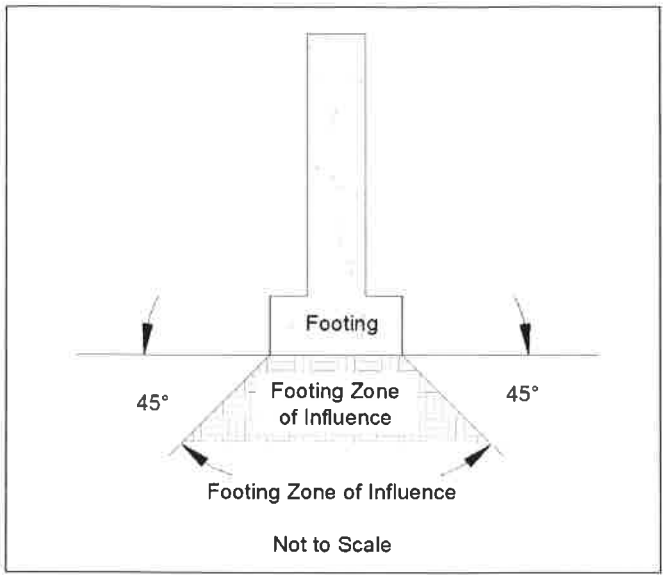
B is the footing width

The estimated settlement for isolated pad footings with a nominal square dimension of about 2 to 3 feet are tabulated below.

Thickness of Compacted Structural Fill (feet)	Estimated Settlement (inches)
0	⅜-½
B/4	¼-⅜
B/2	⅛-¼
3B/4	<⅛

B is the footing width

The compacted structural fill should be placed and compacted as discussed in the Construction Considerations, "Fill Placement Recommendations" section of this report, below. The zone of influence of the footing (at elevations close to the bottom of the footing) is often approximated as being between two lines subtended at 45 degree angles from each bottom corner of the footing. The compacted structural fill should extend beyond the zone of influence of the footing as shown in the sketch below.



A general and simple rule to apply to the geometry of the compacted structural fill blanket is that it should extend beyond each edge of the footing a distance which is equal to the fill thickness.

We estimate that the footings designed and constructed above will have a total post construction settlement of about 1 inch or less.

All footings should be support at an elevation deeper than the maximum depth of frost penetration for the area. This recommendation includes exterior isolated footings and column supports. Please contact the local building department for specific frost depth requirements.

The post construction differential settlement may be reduced by designing footings that will apply relatively uniform loads on the support soils. Concentrated loads should be supported by footings that have been designed to impose similar loads as those imposed by adjacent footings.

Under no circumstances should any footing be supported by more than 3 feet of compacted structural fill material unless we are contacted to review the specific conditions supporting these footing locations.

The design concepts and parameters presented above are based on the soil conditions encountered in our test borings. We should be contacted during the initial phases of the foundation excavation at the site to assess the soil support conditions and to verify our recommendations.

4.1.2 General Shallow Foundation Considerations

Some movement and settlement of any shallow foundation system will occur after construction. Movement associated with swelling soils also occurs occasionally. Utility line connections through and foundation or structural component should be appropriately sleeved to reduce the potential for damage to the utility line. Flexible utility line connections will further reduce the potential for damage associated with movement of the structure.

5.0 RETAINING STRUCTURES

We understand that laterally loaded walls will be constructed as part of this site development. Lateral loads will be imposed on the retaining structures by the adjacent soils and, in some cases, additional surcharge loads will be imposed on the retained soils from vehicles or adjacent structures. The loads imposed by the soil are commonly referred to as lateral earth pressures. The magnitude of the lateral earth pressure forces is partially dependent on the soil strength characteristics, the geometry of the ground surface adjacent to the retaining structure, the subsurface water conditions and on surcharge loads.

The retaining structures may be designed using the values tabulated below.

Lateral Earth Pressure Values

Type of Lateral Earth Pressure	Level Native Soil Backfill (pounds per cubic foot/foot)*	Level Granular Soil Backfill (pounds per cubic foot/foot)
Active	40	35
At-rest	60	55
Passive	360	460
Allowable Coefficient of Friction	0.38	0.45

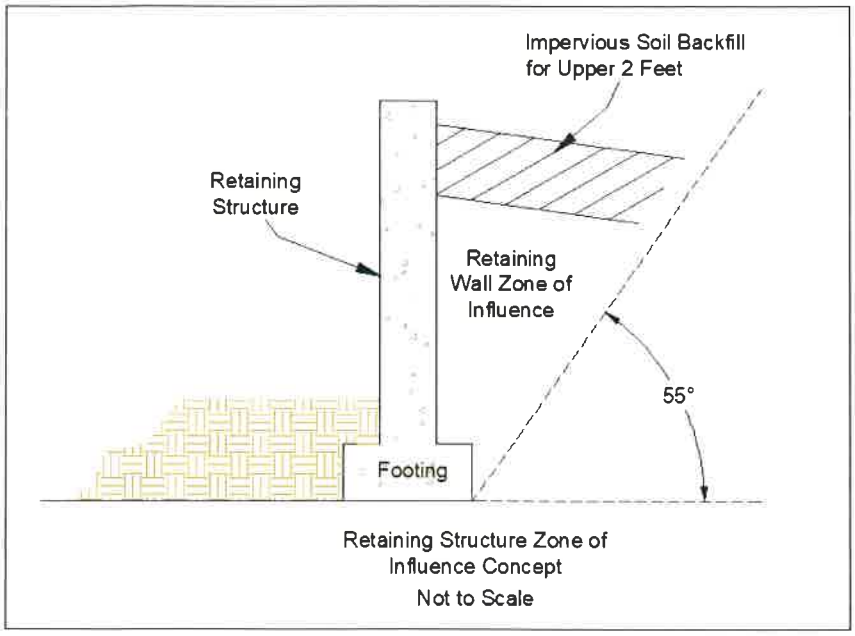
The site soils have a measured swell pressure of 490 pounds per square foot which may be exerted on the retaining wall should the backfill soils become moistened. A 490 pound per square foot swell pressure may exert approximately 3,920 pounds of force per lineal foot for a wall that retains 8feet of soil. The forces from the swelling soil may be treated as a uniformly distributed load for structural design purposes. If the site clayey soils are used as backfill they must be moisture conditioned to above optimum moisture content during the backfill placement. The retaining wall should be designed to resist forces associated with swelling of the soils used as backfill adjacent to the retaining walls.

The granular soil that is used for the retaining wall backfill may be permeable and may allow water migration to the foundation support soils. There are several options available to help reduce water migration to the foundation soils, two of which are discussed here. An impervious geotextile layer and shallow drain system may be incorporated into the backfill, as discussed in Section 9.5, Landscaping Considerations, below. A second option is to place a geotextile filter material on top of the granular soils and above that place about 1½ to 2 feet of moisture conditioned and compacted site clay soils. It should be noted that if the site clay soils are used volume changes may occur which will influence the performance of overlying concrete flatwork or structural components.

The values tabulated above are for well drained backfill soils. The values provided above do not include any forces due to adjacent surcharge loads or sloped soils. If the backfill soils become saturated the imposed lateral earth pressures will be significantly higher than those tabulated above.

The granular imported soil backfill values tabulated above are appropriate for material with an angle of internal friction of 35 degrees, or greater. The granular backfill must be placed within the retaining structure zone of influence as shown below in order for the lateral earth pressure values

tabulated above for the granular material to be appropriate.



If an open graded, permeable, granular backfill is chosen it should not extend to the ground surface. Some granular soils allow ready water migration which may result in increased water access to the foundation soils. The upper few feet of the backfill should be constructed using an impervious soil such as silty-clay and clay soils from the project site, if these soils are available. The 55 degree angle shown in the figure above is approximately correct for most clay soils. The angle is defined by $45 + (\varphi/2)$ where "φ" if the angle of internal friction of the soil.

Backfill should not be placed and compacted behind the retaining structure unless approved by the project structural engineer. Backfill placed prior to construction of all appropriate structural members such as floors, or prior to appropriate curing of the retaining wall concrete, may result in severe damage and/or failure of the retaining structure.

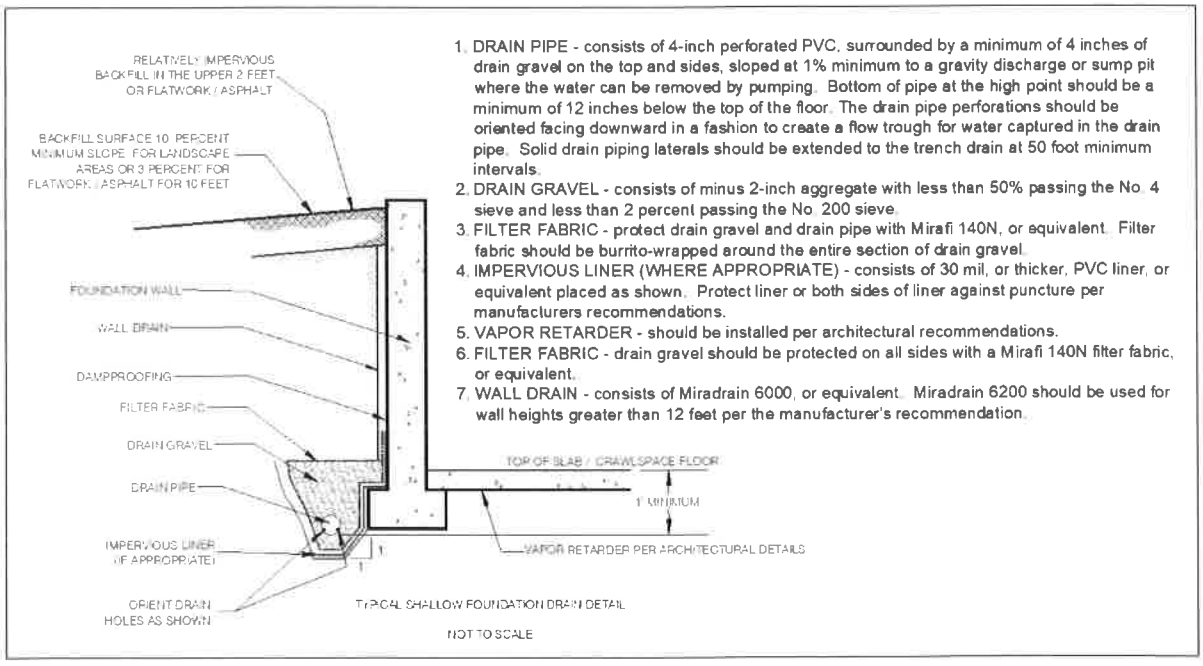
6.0 SUBSURFACE DRAIN SYSTEM

We recommend below-grade construction, such as retaining walls, crawlspace and basement areas, be protected from wetting and hydrostatic pressure buildup by an underdrain and wall drain system. Exterior retaining structures may be constructed with weep holes to allow subsurface water migration through the retaining structures. Topographic conditions on the site may influence the ability to install a subsurface drain system which promotes water flow away from the foundation system. The subsurface drain system concept is discussed under the Subsurface Drain System section of this report below.

A drain system constructed with a free draining aggregate material and a 4 inch minimum diameter perforated drain pipe should be constructed adjacent to retaining structures and/or adjacent to foundation walls. The drain pipe perforations should be oriented facing downward. The system should be protected from fine soil migration by a fabric-wrapped aggregate which

surrounds a rigid perforated pipe. We do not recommend use of flexible corrugated perforated pipe since it is not possible to establish a uniform gradient of the flexible pipe throughout the drain system alignment. Corrugated drain tile is perforated throughout the entire circumference of the pipe and therefore water can escape from the perforations at undesirable locations after being collected. The nature of the perforations of the corrugated material further decreases its effectiveness as a subsurface drain conduit.

The drain should be placed at each level of excavation and at least 12 inches below lowest adjacent finish floor or crawlspace grade. The drain system pipe should be graded to surface outlets or a sump vault. The drain system should be sloped at a minimum gradient of about 2 percent, but site geometry and topography may influence the actual installed pipe gradient. Water must not be allowed to pool along any portion of the subsurface drain system. An improperly constructed subsurface drain system may promote water infiltration to undesirable locations. The drain system pipe should be surrounded by about 2 to 4 cubic feet per lineal foot of free draining aggregate. If a sump vault and pump are incorporated into the subsurface drain system, care should be taken so that the water pumped from the vault does not recirculate through pervious soils and obtain access to the basement or crawl space areas. An impervious membrane should be included in the drain construction for grade beam and pier systems or other foundation systems such as interrupted footings where a free pathway for water beneath the structure exists. A generalized subsurface drain system concept is shown below.



There are often aspects of each site and structure which require some tailoring of the subsurface drain system to meet the needs of individual projects. Drain systems that are placed adjacent to void forms must include provisions to protect and support the impervious liner adjacent to the void form. We are available to provide consultation for the subsurface drain system for this project, if desired.

Water often will migrate along utility trench excavations. If the utility trench extends from areas above the site, this trench may be a source for subsurface water within the proposed basement or crawl space. We suggest that the utility trench backfill be thoroughly compacted to help reduce the amount of water migration. The subsurface drain system should be designed to collect subsurface water from the utility trench and direct it to surface discharge points.

7.0 CONCRETE FLATWORK

We anticipate that both interior and exterior concrete flatwork will be considered in the project design. Concrete flatwork is typically lightly loaded and has a limited capability to resist shear forces associated with uplift from swelling soils and/or frost heave. It is prudent for the design and construction of concrete flatwork on this project to be able to accommodate some movement associated with swelling soil conditions.

The soil samples tested have a measured swell pressure of about 490 pounds per square foot and a magnitude swell potential of about 0.1 percent under a 100 pound per square foot surcharge load.

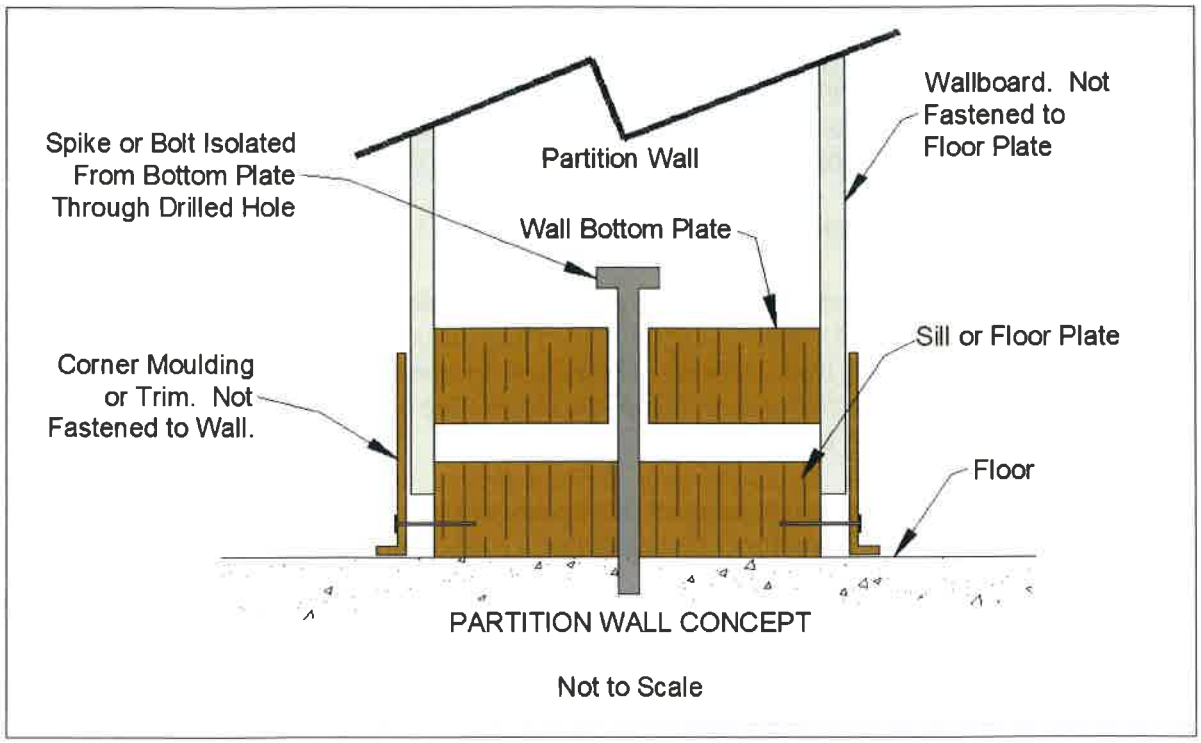
Man-placed fill was encountered in our test borings. We do not recommend concrete flatwork be placed on any uncontrolled fill soils due to the unknown means and methods of placement. A representative of Trautner Geotech should observe the bearing conditions at the time of construction to determine if fill soils exist.

7.1 Interior Concrete Slab-on-Grade Floors

A primary goal in the design and construction of concrete slab-on-grade floors is to reduce the amount of post construction uplift associated with swelling soils, or downward movement due to consolidation of soft soils. A parallel goal is to reduce the potential for damage to the structure associated with any movement of the slab-on-grade which may occur. There are limited options available to help mitigate the influence of volume changes in the support soil for concrete slab-on-grade floors, these include:

- Preconstruction scarification, moisture conditioning and re-compaction of the natural soils in areas proposed for support of concrete flatwork, and/or,
- Placement and compaction of granular compacted structural fill material

Although the soil on this site does not exhibit a high swell potential when wetted, performance of the structure may be improved by isolating the floors from the interior partition walls. Interior walls may be structurally supported from framing above the floor, or interior walls and support columns may be supported on interior portions of the foundation system. Partition walls should be designed and constructed with voids above, and/or below, to allow independent movement of the floor slab. This concept is shown below.



The sketch above provides a concept. If the plans include isolation of the partition walls from the floor slab, the project architect or structural engineer should be contacted to provide specific details and design of the desired system.

If the owner chooses to construct the residence with concrete slab-on-grade floors, the floors should be supported by a layer of granular structural fill overlying the processed natural soils. Interior concrete flatwork, or concrete slab-on-grade floors, should be underlain by scarification, moisture conditioning and compaction of about 6 inches of the natural soils followed by placement of at least 12 inches of compacted granular structural fill material that is placed and compacted as discussed in the Construction Considerations, "Fill Placement Recommendations" section of this report, below.

The above recommendations will not prevent slab heave if the expansive soils underlying slabs-on-grade become wet. However, the recommendations will reduce the effects if slab heave occurs. All plumbing lines should be pressure tested before backfilling to help reduce the potential for wetting. The only means to completely mitigate the influence of volume changes on the performance of interior floors is to structurally support the floors over a void space. Floors that are suspended by the foundation system will not be influenced by volume changes in the site soils. The suggestions and recommendations presented in this section are intended to help reduce the influence of swelling soils on the performance of the concrete slab-on-grade floors.

7.1.1 Capillary and Vapor Moisture Rise

Capillary and vapor moisture rise through the slab support soil may provide a source for moisture in the concrete slab-on-grade floor. This moisture may promote development of mold or mildew

in poorly ventilated areas and may influence the performance of floor coverings and mastic placed directly on the floor slabs. The type of floor covering, adhesives used, and other considerations that are not related to the geotechnical engineering practice will influence the design. The architect, builder and particularly the floor covering/adhesive manufacturer should be contacted regarding the appropriate level of protection required for their products.

Comments for Reduction of Capillary Rise

One option to reduce the potential for capillary rise through the floor slab is to place a layer of clean aggregate material, such as washed concrete aggregate for the upper 4 to 6 inches of fill material supporting the concrete slabs.

Comments for Reduction of Vapor Rise

To reduce vapor rise through the floor slab, a moisture barrier such as a 6 mil (or thicker) plastic, or similar impervious geotextile material is often be placed below the floor slab. The material used should be protected from punctures that will occur during the construction process.

There are proprietary barriers that are puncture resistant that may not need the underlying layer of protective material. Some of these barriers are robust material that may be placed below the compacted structural fill layer. We do not recommend placement of the concrete directly on a moisture barrier unless the concrete contractor has had previous experience with curing of concrete placed in this manner. As mentioned above, the architect, builder and particularly the floor covering/adhesive manufacturer should be contacted regarding the appropriate level of moisture and vapor protection required for their products.

7.1.2 Slab Reinforcement Considerations

The project structural engineer should be contacted to provide steel reinforcement design considerations for the proposed floor slabs. Any steel reinforcement placed in the slab should be placed at the appropriate elevations to allow for proper interaction of the reinforcement with tensile stresses in the slab. Reinforcement steel that is allowed to cure at the bottom of the slab will not provide adequate reinforcement.

7.2 Exterior Concrete Flatwork Considerations

Exterior concrete flatwork includes concrete driveway slabs, aprons, patios, and walkways. The desired performance of exterior flatwork typically varies depending on the proposed use of the site and each owner's individual expectations. As with interior flatwork, exterior flatwork is particularly prone to movement and potential damage due to movement of the support soils. This movement and associated damage may be reduced by following the recommendations discussed under interior flatwork, above. Unlike interior flatwork, exterior flatwork may be exposed to frost heave, particularly on sites where the bearing soils have a high silt content. It may be prudent to remove silt soils from exterior flatwork support areas where movement of exterior flatwork will adversely affect the project, such as near the interface between the driveway and the interior garage floor slab. If silt soils are encountered, they should be removed to the maximum depth of frost penetration for the area where movement of exterior flatwork is undesirable.

If some movement of exterior flatwork is acceptable, we suggest that the support areas be prepared by scarification, moisture conditioning and re-compaction of about 6 inches of the natural soils followed by placement of at least 12 inches of compacted granular fill material. The scarified material and granular fill materials should be placed as discussed under the Construction Considerations, "Fill Placement Recommendations" section of this report, below.

It is important that exterior flatwork be separated from exterior column supports, masonry veneer, finishes and siding. No support columns, for the structure or exterior decks, should be placed on exterior concrete unless movement of the columns will not adversely affect the supported structural components. Movement of exterior flatwork may cause damage if it is in contact with portions of the structure exterior.

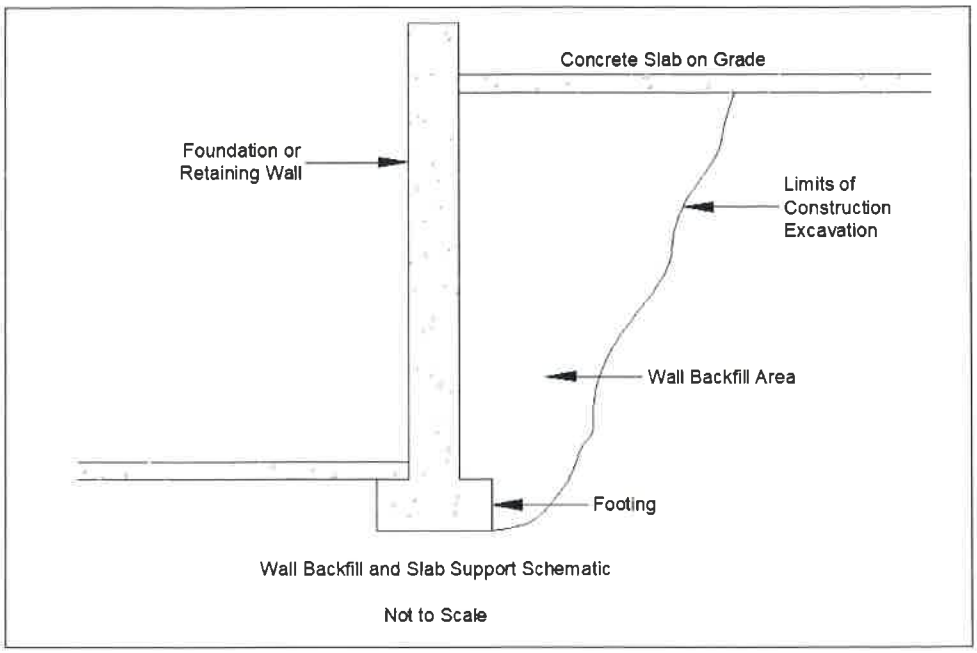
It should be noted that silt and silty sand soils located near the ground surface are particularly prone to frost heave. Soils with high silt content have the ability to retain significant moisture. The ability for the soils to accumulate moisture combined with a relatively shallow source of subsurface water and the fact that the winter temperatures in the area often very cold all contribute to a high potential for frost heave of exterior structural components. We recommend that silty soils be removed from the support areas of exterior components that are sensitive to movement associated with frost heave. These soils should be replaced with a material that is not susceptible to frost heave. Aggregate road base and similar materials retain less water than fine-grained soils and are therefore less prone to frost heave. We are available to discuss this concept with you as the plans progress.

Landscaping and landscaping irrigation often provide additional moisture to the soil supporting exterior flatwork. Excessive moisture will promote heave of the flatwork either due to expansive soil, or due to frost action. If movement of exterior slabs is undesirable, we recommend against placement of landscaping that requires irrigation. The ground surfaces near exterior flatwork must be sloped away from flatwork to reduce surface water migration to the support soil.

Exterior flatwork should not be placed on soils prepared for support of landscaping vegetation. Cultivated soils will not provide suitable support for concrete flatwork.

7.3 General Concrete Flatwork Comments

It is relatively common that both interior and exterior concrete flatwork is supported by areas of fill adjacent to either shallow foundation walls or basement retaining walls. A typical sketch of this condition is shown below.



Settlement of the backfill shown above will create a void and lack of soil support for the portions of the slab over the backfill. Settlement of the fill supporting the concrete flatwork is likely to cause damage to the slab-on-grade. Settlement and associated damage to the concrete flatwork may occur when the backfill is relatively deep, even if the backfill is compacted.

If this condition is likely to exist on this site it may be prudent to design the slab to be structurally supported on the retaining or foundation wall and designed to span to areas away from the backfill area as designed by the project structural engineer. We are available to discuss this with you upon request.

8.0 CONSTRUCTION CONSIDERATIONS

This section of the report provides comments, considerations and recommendations for aspects of the site construction which may influence, or be influenced by the geotechnical engineering considerations discussed above. The information presented below is not intended to discuss all aspects of the site construction conditions and considerations that may be encountered as the project progresses. If any questions arise as a result of our recommendations presented above, or if unexpected subsurface conditions are encountered during construction we should be contacted immediately.

8.1 Fill Placement Recommendations

There are several references throughout this report regarding both natural soil and compacted structural fill recommendations. The recommendations presented below are appropriate for the fill placement considerations discussed throughout the report above.

All areas to receive fill, structural components, or other site improvements should be properly

prepared and grubbed at the initiation of the project construction. The grubbing operations should include scarification and removal of organic material and soil. No fill material or concrete should be placed in areas where existing vegetation or fill material exist.

We encountered man-placed fill in our test borings. We suspect that man-placed fill and subterranean structures may be encountered as the project construction progresses. All existing fill material should be removed from areas planned for support of structural components. Excavated areas and subterranean voids should be backfilled with properly compacted fill material as discussed below.

8.1.1 Natural Soil Fill

Any natural soil used for any fill purpose should be free of all deleterious material, such as organic material and construction debris. Natural soil fill includes excavated and replaced material or in-place scarified material. Our recommendations for placement of natural soil fill are provided below.

- The natural soils should be moisture conditioned, either by addition of water to dry soils, or by processing to allow drying of wet soils. The proposed fill materials should be moisture conditioned to between about optimum and about 2 percent above optimum soil moisture content. This moisture content can be estimated in the field by squeezing a sample of the soil in the palm of the hand. If the material easily makes a cast of soil which remains in-tact, and a minor amount of surface moisture develops on the cast, the material is close to the desired moisture content. Material testing during construction is the best means to assess the soil moisture content.
- Moisture conditioning of clay or silt soils may require many hours of processing. If possible, water should be added and thoroughly mixed into fine grained soil such as clay or silt the day prior to use of the material. This technique will allow for development of a more uniform moisture content and will allow for better compaction of the moisture conditioned materials.
- The moisture conditioned soil should be placed in lifts that do not exceed the capabilities of the compaction equipment used and compacted to at least 90 percent of maximum dry density as defined by ASTM D1557, modified Proctor test.
- We typically recommend a maximum fill lift thickness of 6 inches for hand operated equipment and 8 to 10 inches for larger equipment.
- Care should be exercised in placement of utility trench backfill so that the compaction operations do not damage underlying utilities.
- The maximum recommended lift thickness is about 6 to 8 inches. The maximum recommended rock size for natural soil fill is about 3 inches. This may require on-site screening or crushing if larger rocks are present. We must be contacted if it is desired to utilize rock greater than 3 inches for fill materials.

8.1.2 Granular Compacted Structural Fill

Granular compacted structural fill is referenced in numerous locations throughout the text of this report. Granular compacted structural fill should be constructed using an imported commercially produced rock product such as aggregate road base. Many products other than road base, such as

clean aggregate or select crusher fines may be suitable, depending on the intended use. If a specification is needed by the design professional for development of project specifications, a material conforming to the Colorado Department of Transportation (CDOT) "Class 6" aggregate road base material can be specified. This specification can include an option for testing and approval in the event the contractor's desired material does not conform to the Class 6 aggregate specifications. We have provided the CDOT Specifications for Class 6 material below.

Grading of CDOT Class 6 Aggregate Base-Course Material	
Sieve Size	Percent Passing Each Sieve
1 inch	100
¾ inch	95-100
#4	30-65
#8	25-55
#200	3-12

Liquid Limit less than 30

All compacted structural fill should be moisture conditioned and compacted to at least 90 percent of maximum dry density as defined by ASTM D1557, modified Proctor test. Areas where the structural fill will support traffic loads under concrete slabs or asphalt concrete should be compacted to at least 95 percent of maximum dry density as defined by ASTM D1557, modified Proctor test.

Although clean-screened or washed aggregate may be suitable for use as structural fill on sites with sand or non-expansive silt soils, or on sites where shallow subsurface water is present, clean aggregate materials must not be used on any site where expansive soils exist due to the potential for water to accumulate in the voids of the clean aggregate materials.

Clean aggregate fill, if appropriate for the site soil conditions, must not be placed in lifts exceeding 8 inches and each lift should be thoroughly vibrated, preferably with a plate-type vibratory compactor prior to placing overlying lifts of material or structural components. We should be contacted prior to the use of clean aggregate fill materials to evaluate their suitability for use on this project.

8.1.3 Deep Fill Considerations

Deep fills, in excess of approximately 3 feet, should be avoided where possible. Fill soils will settle over time, even when placed properly per the recommendations contained in this report. Natural soil fill or engineered structural fills placed to our minimum recommended requirements will tend to settle an estimated 1 to 3 percent; therefore, a 3 foot thick fill may settle up to approximately 1 inch over time. A 10 foot thick fill may settle up to approximately 3½ inches even when properly placed. Fill settlement will result in distress and damage to the structures they are intended to support. There are methods to reduce the effects of deep fill settlement such as surcharge loading and surveyed monitoring programs; however, there is a significant time period of monitoring required for this to be successful. A more reliable method is to support structural components with deep foundation systems bearing below the fill envelope. We can provide additional guidance regarding deep fills up on request.

8.2 Excavation Considerations

Unless a specific classification is performed, the site soils should be considered as an Occupational Safety and Health Administration (OSHA) Type C soil and should be sloped and/or benched according to the current OSHA regulations. Excavations should be sloped and benched to prevent wall collapse. Any soil can release suddenly and cave unexpectedly from excavation walls, particularly if the soils is very moist, or if fractures within the soil are present. Daily observations of the excavations should be conducted by OSHA competent site personnel to assess safety considerations.

We did not encounter free subsurface water in our test borings. If water is encountered during construction, it may be necessary to dewater excavations to provide for suitable working conditions.

Scattered boulders were encountered in our test borings and large boulders are known to be present throughout the vicinity. Due to the size of the boulders encountered in the vicinity, if encountered, they may be difficult to remove using conventional excavation techniques and equipment. Removal of large boulders can also create a void of loose soil beneath structural components, which may require additional removal of loose soil and replacement with structural fill. In some instances, it may be preferable to leave boulders in place. Reduction in the thickness of the recommended structural fill beneath footings and slabs may also be prudent to limit disturbance to the bearing soils. If large boulders are encountered in the building footprint, a representative of the geotechnical engineer can provide field observations and provide additional recommendations for subgrade preparation.

If possible, excavations should be constructed to allow for water flow from the excavation the event of precipitation during construction. If this is not possible it may be necessary to remove water from snowmelt or precipitation from the foundation excavations to help reduce the influence of this water on the soil support conditions and the site construction characteristics.

8.2.1 Excavation Cut Slopes

We anticipate that some permanent excavation cut slopes may be included in the site development. Temporary cut slopes should not exceed 5 feet in height and should not be steeper than about 1:1 (horizontal to vertical) for most soils. Permanent cut slopes greater than 5 feet or steeper than 2½:1 must be analyzed on a site-specific basis.

8.3 Utility Considerations

Subsurface utility trenches will be constructed as part of the site development. Utility line backfill often becomes a conduit for post construction water migration. If utility line trenches approach the proposed project site from above, water migrating along the utility line and/or backfill may have direct access to the portions of the proposed structure where the utility line penetrations are made through the foundation system. The foundation soils in the vicinity of the utility line penetration may be influenced by the additional subsurface water. There are a few options to help mitigate water migration along utility line backfill. Backfill bulkheads constructed with high clay content soils and/or placement of subsurface drains to promote utility line water discharge away

from the foundation support soil.

Some movement of all structural components is normal and expected. The amount of movement may be greater on sites with problematic soil conditions. Utility line penetrations through any walls or floor slabs should be sleeved so that movement of the walls or slabs does not induce movement or stress in the utility line. Utility connections should be flexible to allow for some movement of the floor slab.

8.4 Exterior Grading and Drainage Comments

The following recommendations should be following during construction and maintained for the life of the structure with regards to exterior grading and surface drainage.

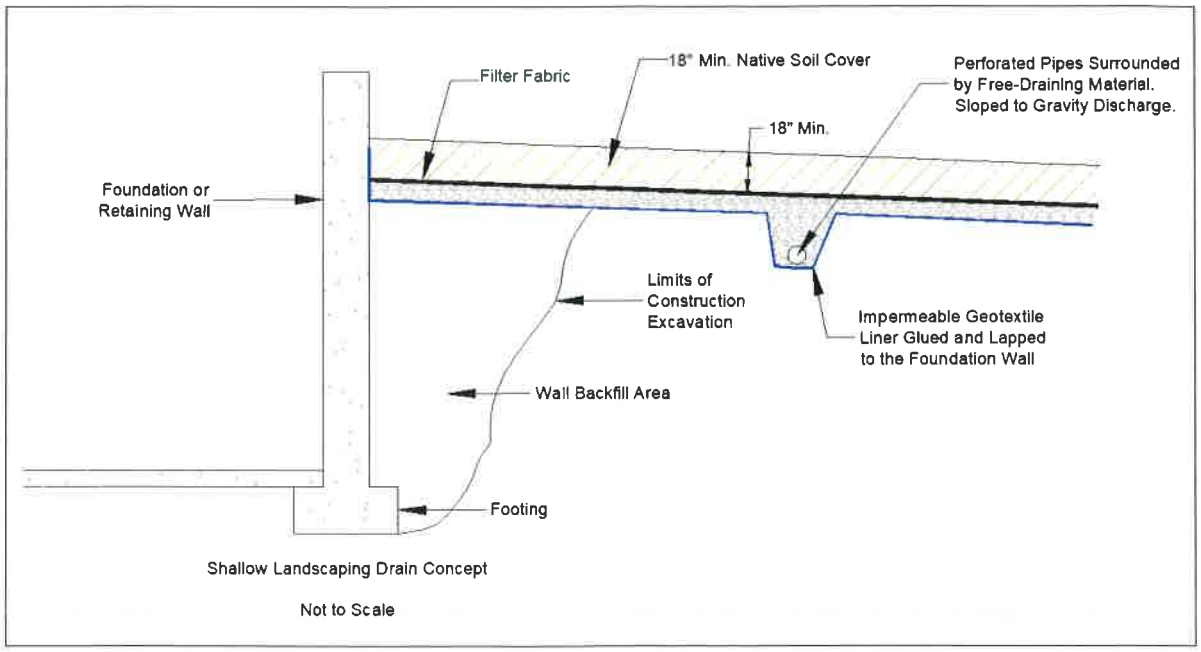
- The ground surface adjacent to the structure should be sloped to promote water flow away from the foundation system and flatwork.
- Snow storage areas should not be located in areas which will allow for snowmelt water access to support soils for the foundation system or flatwork.
- The project civil engineer, architect or builder should develop a drainage scheme for the site. We typically recommend the ground surface surrounding the exterior of the building be sloped to drain away from the foundation in all directions. We recommend a minimum slope of 12 inches in the first 10 feet in unpaved areas and a minimum slope of 3 inches in the first 10 feet in paved areas.
- Water flow from the roof of the structure should be captured and directed away from the structure. If the roof water is collected in an eave gutter system, or similar, the discharge points of the system must be located away from areas where the water will have access to the foundation backfill or any structure support soils. If downspouts are used, provisions should be made to either collect or direct the water away from the structure.
- Care should be taken to not direct water onto adjacent property or to areas that would negatively influence existing structures or improvements.

8.5 Landscaping Considerations

We recommend against construction of landscaping which requires excessive irrigation. Generally landscaping which uses abundant water requires that the landscaping contractor install topsoil which will retain moisture. The topsoil is often placed in flattened areas near the structure to further trap water and reduce water migration from away from the landscaped areas. Unfortunately, almost all aspects of landscape construction and development of lush vegetation are contrary to the establishment of a relatively dry area adjacent to the foundation walls. Excess water from landscaped areas near the structure can migrate to the foundation system or flatwork support soils, which can result in volume changes in these soils.

A relatively common concept used to collect and subsequently reduce the amount of excess irrigation water is to glue or attach an impermeable geotextile fabric or heavy mill plastic to the foundation wall and extend it below the topsoil which is used to establish the landscape vegetation. A thin layer of sand can be placed on top of the geotextile material to both protect the geotextile from punctures and to serve as a medium to promote water migration to the collection trench and perforated pipe. The landscape architect or contractor should be contacted for additional

information regarding specific construction considerations for this concept which is shown in the sketch below.



A free draining aggregate or sand may be placed in the collection trench around the perforated pipe. The perforated pipe should be graded to allow for positive flow of excess irrigation water away from the structure or other area where additional subsurface water is undesired. Preferably the geotextile material should extend at least 10 or more feet from the foundation system.

Care should be taken to not place exterior flatwork such as sidewalks or driveways on soils that have been tilled and prepared for landscaping. Tilled soils will settle which can cause damage to the overlying flatwork. Tilled soils placed on sloped areas often "creep" down-slope. Any structure or structural component placed on this material will move down-slope with the tilled soil and may become damaged.

The landscape drain system concept provided above is optional for this site and provided only if there is a desire to reduce the potential for subsurface water migration to below grade finished areas or crawl space areas. Often this concept is implemented only on the northern sides of structures and/or where snow may accumulate and melt water may migrate toward subsurface areas under the structure.

8.6 Soil Sulfate and Corrosion Issues

The requested scope of our services did not include assessment of the chemical constituents of corrosion potential of the site soils. Most soils in southwest Colorado are not typically corrosive to concrete. There has not been a history of damage to concrete due to sulfate corrosion in the area.

We are available to perform soluble sulfate content tests to assess the corrosion potential of the soils on concrete if desired.

8.7 Radon Issues

The requested scope of service of this report did not include assessment of the site soils for radon production. Many soils and formational materials in western Colorado produce Radon gas. The structure should be appropriately ventilated to reduce the accumulation of Radon gas in the structure. Several Federal Government agencies including the Environmental Protection Agency (EPA) have information and guidelines available for Radon considerations and home construction. If a radon survey of the site soils is desired, please contact us.

8.8 Mold and Other Biological Contaminants

Our services do not include determining the presence, prevention or possibility of mold or other biological contaminants developing in the future. If the client is concerned about mold or other biological contaminants, a professional in this special field of practice should be consulted.

9.0 CONSTRUCTION MONITORING AND TESTING

Engineering observation of subgrade bearing conditions, compaction testing of fill material and testing of foundation concrete are equally important tasks that should be performed by the geotechnical engineering consultant during construction. We should be contacted during the construction phase of the project and/or if any questions or comments arise as a result of the information presented below. It is common for unforeseen, or otherwise variable subsurface soil and water conditions to be encountered during construction. As discussed in our proposal for our services, it is imperative that we be contacted during the foundation excavation stage of the project to verify that the conditions encountered in our field exploration were representative of those encountered during construction. Our general recommendations for construction monitoring and testing are provided below.

- Consultation with design professionals during the design phases: This is important to ensure that the intentions of our recommendations are properly incorporated in the design, and that any changes in the design concept properly consider geotechnical aspects.
- Grading Plan Review: A grading plan was not available for our review at the time of this report. A grading plan with finished floor elevations for the proposed construction should be prepared by a civil engineer licensed in the State of Colorado. Trautner Geotech should be provided with grading plans once they are complete to determine if our recommendations based on the assumed bearing elevations are appropriate.
- Observation and monitoring during construction: A representative of the Geotechnical engineer from our firm should observe the foundation excavation, earthwork, and foundation phases of the work to determine that subsurface conditions are compatible with those used in the analysis and design and our recommendations have been properly implemented. Placement of backfill should be observed and tested to judge whether the proper placement conditions have been achieved. Compaction tests should be performed on each lift of material placed in areas proposed for support of structural components.
- We recommend a representative of the geotechnical engineer observe the drain and

dampproofing phases of the work to judge whether our recommendations have been properly implemented.

- If asphaltic concrete is placed for driveways or aprons near the structure we are available to provide testing of these materials during placement.

10.0 CONCLUSIONS

While we feel that it is feasible to develop this site as planned using relatively conventional techniques we feel that it is prudent for us to be part of the continuing design of this project to review and provide consultation in regard to the proposed development scheme as the project progresses to aid in the proper interpretation and implementation of the recommendations presented in this report. This consultation should be incorporated in the project development prior to construction at the site.

11.0 LIMITATIONS

This study has been conducted based on the geotechnical engineering standards of care in this area at the time this report was prepared. We make no warranty as to the recommendations contained in this report, either expressed or implied. The information presented in this report is based on our understanding of the proposed construction that was provided to us and on the data obtained from our field and laboratory studies. Our recommendations are based on limited field and laboratory sampling and testing. Unexpected subsurface conditions encountered during construction may alter our recommendations. We should be contacted during construction to observe the exposed subsurface soil conditions to provide comments and verification of our recommendations.

The recommendations presented above are intended to be used only for this project site and the proposed construction which was provided to us. The recommendations presented above are not suitable for adjacent project sites, or for proposed construction that is different than that outlined for this study.

This report provides geotechnical engineering design parameters, but does not provide foundation design or design of structure components. The project architect, designer or structural engineer must be contacted to provide a design based on the information presented in this report.

This report does not provide an environmental assessment nor does it provide environmental recommendations such as those relating to Radon or mold considerations. If recommendation relative to these or other environmental topics are needed and environmental specialist should be contacted.

The findings of this report are valid as of the present date. However, changes in the conditions of the property can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or the broadening of knowledge. Therefore, the recommendations presented in this report should not be relied upon after a period of two years from the issue date without our review.

We are available to review and tailor our recommendations as the project progresses and additional information which may influence our recommendations becomes available.

Please contact us if you have any questions, or if we may be of additional service.

Respectfully,
TRAUTNER GEOTECH

Jason A. Deem, P.G.
Engineering Geologist

Reviewed by,

Tom R. Harrison P.E.
Geotechnical Engineer

APPENDIX A

Field Study Results

TRAUTNER GEOTECH LLC

Field Engineer	: C. Deleon
Hole Diameter	: 4" Solid
Drilling Method	: Continuous Flight Auger
Sampling Method	: Mod. California Sampler
Date Drilled	: 10/19/2022
Total Depth (approx.)	: 18 feet
Location	: See Figure in Report

LOG OF TEST BORING TB-1

Lots 13 & 14, Block 76, Sultan Subdivision
5th the Greene Street
Silverton, CO
Attn: Steven Gawlik

57537GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- Water Level During Drilling
- Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0–1	CLAYEY GRAVEL WITH SAND AND COBBLES; with organics, loose, slightly moist, tan.	GC					
1–2	CLAYEY GRAVEL WITH SAND AND COBBLES, dense, moist, brown and light brown.						Man-placed fill to 1.5 feet
3–4					13/6		
4–5					24/6		
8–9					216		
9–10		GC			28/6		
10–11					20/6		
18–19	Practical auger drilling refusal at 18 feet on cobbles.						

TRAUTNER GEOTECH LLC

Field Engineer	: C. Deleon
Hole Diameter	: 4" Solid
Drilling Method	: Continuous Flight Auger
Sampling Method	: Mod. California Sampler
Date Drilled	: 10/19/2022
Total Depth (approx.)	: 4 feet
Location	: See Figure in Report

LOG OF TEST BORING TB-2

Lots 13 & 14, Block 76, Sultan Subdivision
5th the Greene Street
Silverton, CO
Attn: Steven Gawlik

57537GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

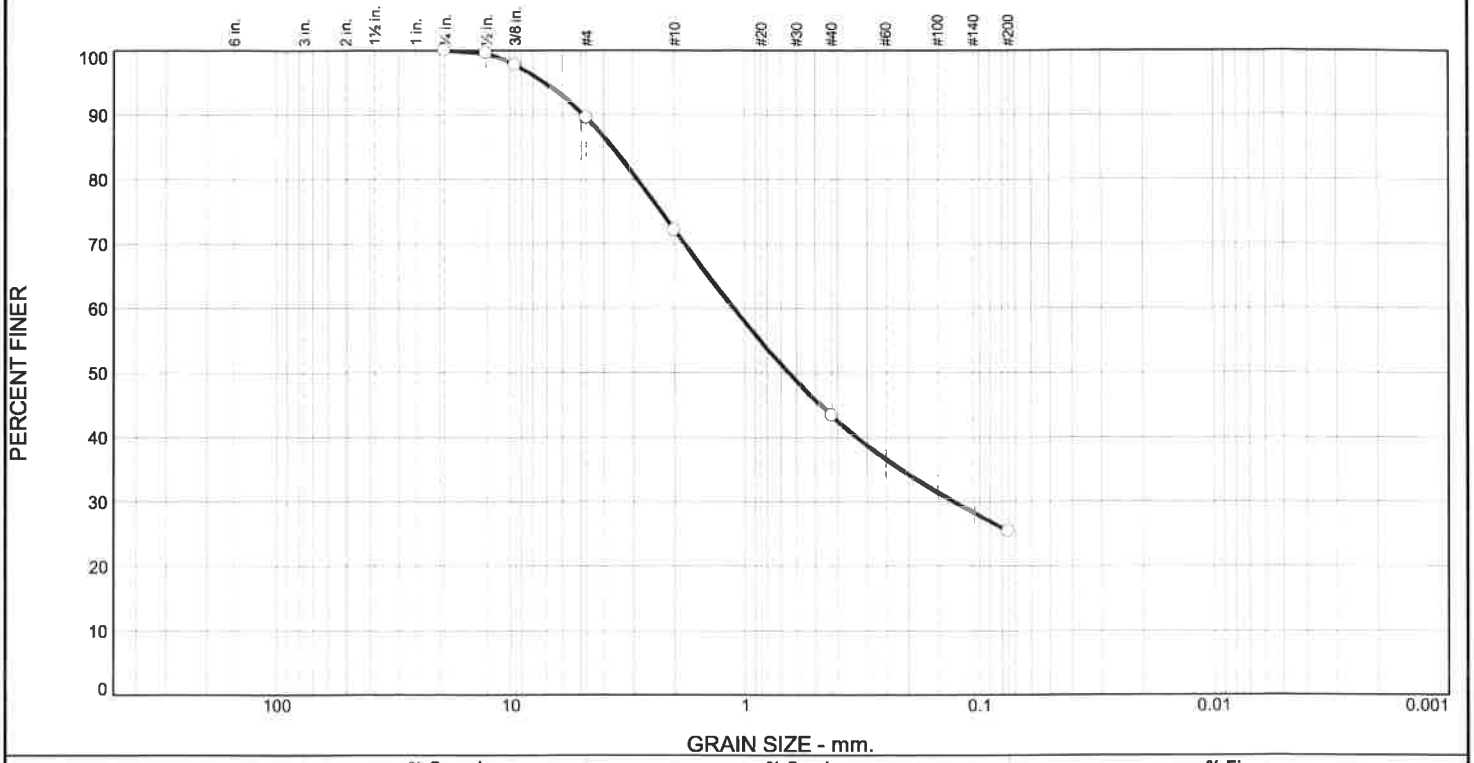
Water Level
- Water Level During Drilling
- Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	CLAYEY GRAVEL WITH SAND AND COBBLES; with organics, loose, slightly moist, tan.	GC					
1	CLAYEY GRAVEL WITH SAND AND COBBLES, scattered boulders, dense, moist, brown and light brown.	GC			23/6 24/6		Man-placed fill to 1 foot Offset boring 5 feet and encountered refusal at 3 feet on boulder
2							
3							
4	Practical auger drilling refusal at 4 feet on boulder.						

APPENDIX B

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	11	17	29	18	25	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100		
.50	100		
.375	98		
#4	89		
#10	72		
#40	43		
#200	25		

* (no specification provided)

Material Description

SC-SM-Silty Clayey Sand

Atterberg Limits

PL= 12 LL= 18 PI= 6

Coefficients

D_{90}= 4.9073 D_{85}= 3.6940 D_{60}= 1.1156
D_{50}= 0.6489 D_{30}= 0.1287 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC-SM AASHTO= A-1-b

Remarks

Source of Sample: Test Boring 1 **Depth:** 1 1/2'-3 1/2'
Sample Number: 12981-A **Date:** 10-19-22

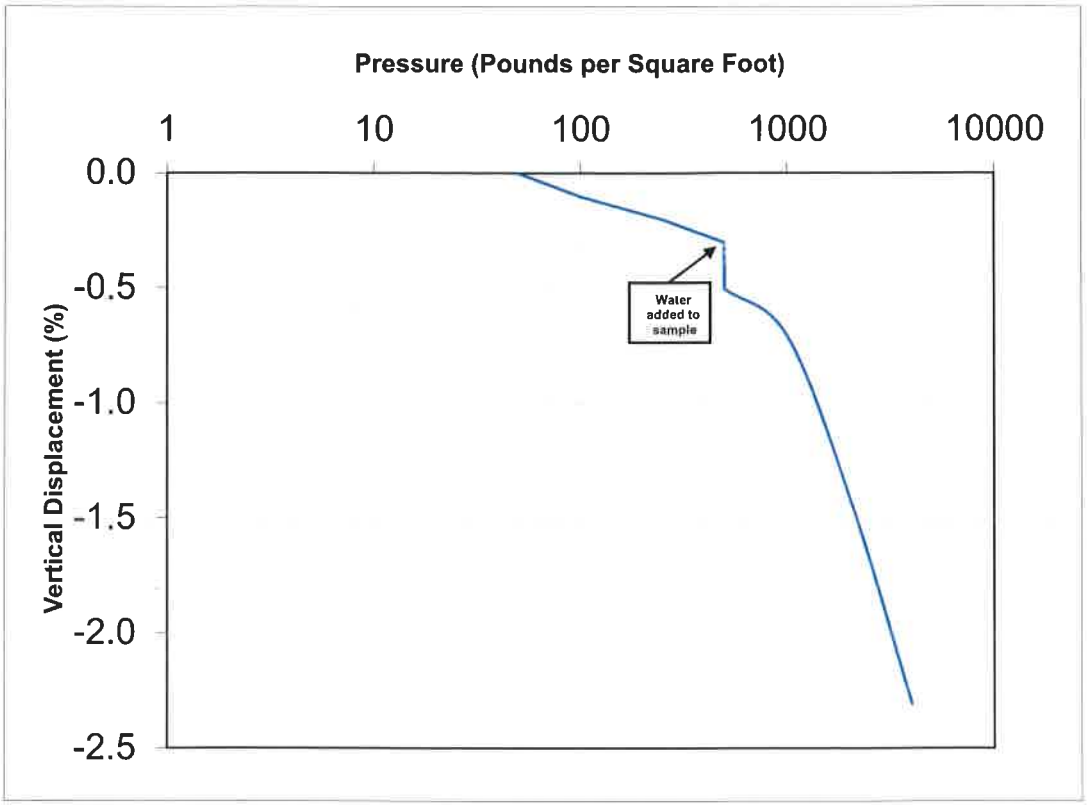
TRAUTNER GEOTECH LLC

Client: Steven Gawlik
Project: Green and 5th Street, Silverton

Project No: 57537GE **Figure** B.1

Tested By: P. Walston **Checked By:** J. Koch

SWELL - CONSOLIDATION TEST

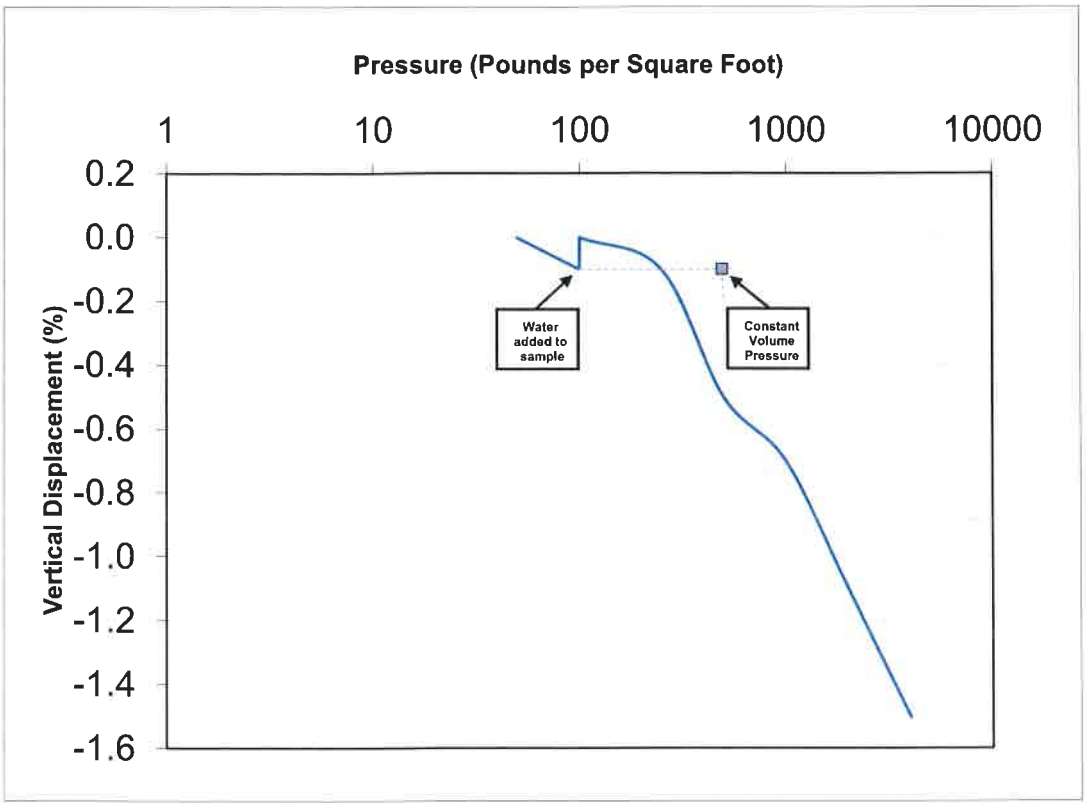


SUMMARY OF TEST RESULTS		
Sample Source:	TB-1 @ 3.5'	
Visual Soil Description:	GC	
Swell Potential (%)	-0.2%	
Constant Volume Swell Pressure (lb/ft^2):	0	
	Initial	**Final**
Moisture Content (%):	5.4	14.5
Dry Density (lb/ft^3):	121.2	123.4
Height (in.):	0.997	0.974
Diameter (in.):	1.94	1.94

Note: Remolded Sample; Molded from the portion of sample passing a #10 sieve. Consolidated under 500 PSF prior to initiating load sequence and wetting. Initial values represent the conditions under 50 PSF following the pre-consolidation under 500 PSF.

Project Number:	57537GE
Sample ID:	12981-B
Figure:	B.2

SWELL - CONSOLIDATION TEST



SUMMARY OF TEST RESULTS		
Sample Source:	TB-2 @ 2'	
Visual Soil Description:	SM w/gravels	
Swell Potential (%)	0.1%	
Constant Volume Swell Pressure (lb/ft^2):	490	
	Initial	**Final**
Moisture Content (%):	8.1	14.3
Dry Density (lb/ft^3):	122.1	124.8
Height (in.):	0.997	0.982
Diameter (in.):	1.94	1.94

Note: Remolded Sample; Molded from the portion of sample passing a #10 sieve. Consolidated under 500 PSF prior to initiating load sequence and wetting. Initial values represent the conditions under 50 PSF following the pre-consolidation under 500 PSF.

Project Number:	57537GE
Sample ID:	12981-F
Figure:	B.3

PUBLIC HEARING

PUBLIC NOTICE IS HEREBY GIVEN that the following public hearings will be held to consider 24-11 OVR Blk 76 Lots 13-14: A request by Shane and Becca Goranson for the New Construction of a Single-Family Dwelling and gabion fence within the Blue Avalanche Hazard District Overlay Zone Located at Block 76 Lots 13-14 TBD Greene Street.

The Planning Commission will hold a public hearing on Tuesday, May 21, 2024, at The County Court House: at 7:00pm. The Board of Trustees will hold a public hearing on May 27, 2024, at Town Hall: at 7:00pm.

NOTICE is further given that all persons may present written/oral testimony regarding the following applications prior to/during the Public Hearing. The applications, meeting agenda, and virtual meeting instructions are posted on the Town website. Citizen comments may be sent by email, mail, phone, or hand-delivered to: Town Hall, 1360 Greene Street, PO Box 250, Silverton, CO 81433. Contact Community Development Director Lucy Mulvihill (970) 946-9408 (lmulvihill@silverton.co.us) with any questions/comments about this Application.

Published in the Silverton Standard & the Miner: Thursday, May 2, 2024.

Town of Silverton

Community Planning Strategies

STAFF REPORT

To: Board of Trustees

From: Chris Masar, *Contracted Town Planner, CPS*

Through: Gloria Kaasch-Buerger, *Town Administrator*
Lucy Mulvihill, *Community Development Coordinator*

Date: May 13, 2024

RE: 24-12 PUD Block 7-8 Animas Overlook– A review of the Outline Development Plan for a proposed PUD located at Block 7 and 8 Blagues Addition.

PROJECT SITE: Block 7 and 8 (Address TBD), North of Blair Street, between 20th & 21st Streets. Block 7 Lots 17-23 and Block 8 Lots 1-34, Silverton, San Juan County, Colorado. Parcel #: 4829171080013.

APPLICANT: GFS LAND LLC through George Henderson

OWNERS: GFS LAND LLC through George Henderson

ZONING DISTRICT: Multi-Family Residential (R-2) District, Section 16-3-40, Silverton Town Code ("SMC")

OVERLAY DISTRICTS: Slope Hazard Overlay District along West property line.

PURPOSE OF REVIEW: SMC, Chapter 17, Article 2-20, states that prior to the filing of an application for approval of a preliminary plat, the subdivider shall submit to the Board of Trustees an outline development plan as specified in Section 17-3-20 of this Chapter. This procedure shall not require a formal application, fee or filing of a plat with the Board of Trustees.

APPLICATION: The applicant submitted the required documents for the review of an Outline Development Plan ("ODP") on March 5, 2024. An ODP does not require a formal application or fee.

PUBLIC COMMENT: As of May 17, 2024, no public comments have been received regarding this application.

ADJACENT PROPERTIES:

- North: unincorporated area, vacant
- South: Economic Development (E-D), Silverton Lakes Campground
- East: Multi-Family Residential (R-2) and Economic Development (E-D), vacant
- West: Multi-Family Residential (R-2), vacant

PARCEL SIZE AND ACCESS: The project site consists of forty-one existing lots that will be subdivided into sixteen lots through the proposed PUD. The proposed lots will range from 3,267 sq, ft. to 8,364 sq. ft. with an average lot size of 5,523 sq. ft.

CODE EVALUATION: The applicant submitted all required documents for an ODP outlined in Section 17-3-20 of the SMC and staff has reviewed the information provided for compliance. An ODP does not require a formal application, so the packet material does not include a complete land use application.

Sec. 17-3-20. - Outline development plan and data.

The submitted Outline Development Plan contains all materials required including a Location Map, Sketch Plan and general development information. The ODP does not include information on the typical lot width or lot depth. The applicant's presentation, submitted with the ODP application, provides context on why the lots do not have a typical lot width or depth. This concept is generally acceptable due to the subject site's unique shape and other site conditions which limit the lot layout. This proposal will be further evaluated during the subsequent subdivision review applications and process. No information was provided on the projected cost of the proposed lots or finished homes within the PUD; however, the applicant states the prices will be based on market conditions.

Sec. 17-4-20. - General site considerations.

The ODP states that the street right-of-way ("ROW") will be dedicated to the Town. The applicant is requesting that the open space requirement be waived for the PUD. If approved, no land will be allocated for public purposes with this development during the subdivision process. The portion of land located within this project that lies south of CR 2 currently does not have a plan for development. This site is almost entirely wetlands and may be a good fit to set aside for protection via open space or dedication to the Town. If the applicant wishes to pay the fee-in-lieu of dedicating open space, the applicant will have to provide gross land value and the projected gross residential floor area so staff can calculate the fee-in-lieu of land dedication at the time of subdivision. The applicant will have to use an appraiser agreed upon by the Town and applicant.

The subject site does not appear to be affected by environmental factors which will impact the potential danger to health and safety as required by subsection c) of 17-4-20. The western portion of the subject site is located within the Slope Hazard Overlay District which will require a Use Subject to Review application when the proposed lots affected by the overlay district are constructed. The subject site contains wetlands along CR 2 which will require federal permits. A water pollution prevention plan will be required in accordance with Section 17-4-20. d. of the SMC since the development will likely change the topography within 100 feet of the ditch along CR 2, and the delineated wetlands.

The surrounding properties do not include subdivisions, so the proposed PUD is separate and distinct from the surrounding property. The subject site is located along the northern boundaries of the Town, which does not follow the "typical" block and lot layout, or the typical street alignment compared to the rest of the Town. The proposed street is relatively similar to the alignment of the streets accessing the cemetery, and the existing streets present in the Silverton Lakes RV Park. The proposed street does not have a name, information was not submitted for the utility/drainage easements, and the proposal does not include open space, so staff was not able to review for compatibility with surrounding developed areas as required by section 17-4-20. f.

Sec. 17-4-30. - Streets.

The proposed street appears to be designed to best fit the topographic conditions, and proposed use of the subject site. The proposed street does not extend to the northeast portion of the subject site and dead ends at Lot 6. The extension of the proposed street to the extent of the property line (through lot 6) would not be advantageous for future development on adjacent lots because access to adjacent lots can be made from existing CR 34. The length of the proposed closed-end street was not provided, so staff was unable to verify if the proposal exceeds the 600' maximum length requirement in Section 17-4-30. b.1. The proposed closed-end street appears to dead-end without a circular turnaround and should be updated to include a circular turnaround having a minimum outside right-of-way diameter of 120 feet and a minimum pavement diameter of 90 feet as required by section 17-4-30. b. (2). The fire protection district may have additional concerns or requirements regarding the dead-end street.

Sec. 17-4-40. - Utility easements.
The ODP does not include easements required for the proposed sewer and water utility lines. A drainage report is not required for review of the ODP; however, it is required for a preliminary and final plat. The wetlands within the ditch along CR 2 should be within a drainage easement, and the roadway to access the subject site which crosses the wetlands should be designed to protect the wetlands and potential flow of water.

Sec. 17-4-60. - Lots.
The proposed lots vary in size with some lots having an area less than the minimum within the R-2 zone district. The ODP did not provide overall dimensions of each lot or the building envelope in relation to setback requirements. The proposed PUD will likely require a Limited Overlay District application where the minimum lot size and other regulations may be modified within this development. Staff was unable to verify whether the placement of buildings within the PUD will provide sufficient access, outdoor space, privacy, or views since the ODP did not include detailed building envelopes or lot specific plans.

Lots 9 and 10 are corner lots and do not appear to provide extra width to accommodate the required setbacks. The layout of lot 9 with the restrictions of being a corner lot, and the utilities running along the western lot line may greatly restrict or prevent development on the lot given the setback requirements.

Sec. 17-5-20. - Guarantee of completion.
The applicant is required to enter into a guarantee of completion agreement with the Town to ensure the required improvements in this section are provided. They shall post a performance bond, or certified check, prior to final approval of the final plat in an amount equal to the estimated cost of construction of improvements required as enumerated.

Sec. 17-5-30. - Street improvements.
A drainage report is required before staff can determine if the proposed street grading meets the requirements necessary to provide adequate surface drainage and convenient access to lots or sites. This will be reviewed upon submittal of a drainage report required during the preliminary or final plat process. Section 17-5-30. c. requires streets to be constructed of asphalt or concrete. The ODP states that the proposed road will be constructed of gravel which does not meet the asphalt or concrete requirement in Section 17-5-30. c. The lots along the proposed street do not appear to have driveways based on the ODP. Driveways should be added to the plan for the lots along the proposed road to ensure adequate access and adequate parking is provided for each of the proposed lots.

Sec. 17-5-40. - Public improvements required.
A storm drainage system and drainage plan are required for the proposed PUD in the preliminary and final plat process. The drainage system should take the existing wetlands into account to ensure the future runoff does not have a negative impact on the wetlands. It is unclear where fire hydrants will be placed in relation to the proposed PUD. A separate fire hydrant may be required to serve lots 12-15. The submitted ODP is requesting the removal of the street light requirements in Section 17-5-40. f. The Planning Commission should consider whether the proposed PUD should be required to install streetlights as required in Section 17-5-40 f. or if this requirement should be waived as requested by the applicant. If streetlights are required, a street lighting plan should be submitted, and the lights should be dark sky compliant.

Off-street parking is required for all structures with a minimum of one space for every dwelling unit. The applicant is seeking an exception to this requirement. Staff recommends the proposed PUD provide off-street parking for each lot to ensure adequate parking and prevent encroachment into the ROW which would potentially restrict access by first responders.

The ODP does not include any information on the proposed landscaping of the PUD. A landscape plan and planting list are required for the proposed PUD and will be tied to guarantee of completion agreement which is a required submittal in the preliminary and final plat process. Staff will review future landscape plans to ensure compliance with the SMC requirements in Section 17-5-40 k.

Sec. 17-6-10. - Dedication.
The ODP states that the street ROW will be dedicated to the Town. The applicant is requesting the open space requirement be waived for the PUD, and therefore, no land will be allocated for public purposes. The portion of land located south of CR 2 currently does not have a plan for development. This site is almost entirely wetlands and may be a good fit to set aside for protection via open space or dedication to the town. The applicant will have to provide gross land value and the projected gross residential floor area so staff can calculate the fee-in-lieu of land dedication. The applicant will have to use an appraiser agreed upon by the town and applicant.

Sec. 17-8-30. - Requirements.
Some of the dimensional requirements within the underlying zoning district may be modified as established within Section 17-8-30. B. subject to the approval of the Planning Commission and Board of Trustees to include the minimum lot area, minimum lot width, minimum setback, and minimum offset. The lot areas of the proposed lots vary in size with the smallest lot falling below the minimum for the underlying R-2 zone district. The applicant will seek a Limited Overlay District application in addition to the PUD application where a modification of the established lot area will be pursued. The ODP application did not include lot specific dimensional standards, so staff was unable to verify if modifications to the minimum lot width, minimum setback, or minimum offset requirements would be required.

The current layout includes a density of 8.4 units per acre, which falls below the 12 units per acre maximum density in section 17-8-30. c.2. The applicant is requesting an exception to the 30% open space requirement, however, there is an opportunity for the town to require the PUD set aside the property across CR 2 for the required open space. The property across CR 2 is comprised almost entirely by jurisdictional wetlands, which would make future development of the site difficult.

COMPASS MASTER PLAN EVALUATION: The Future Land Use Framework Map within the Compass Master Plan highlights the location of the subject site as an area for housing infill, specifically for single-family and duplexes. The Compass Master Plan supports the proposed PUD to include 16 additional single-family dwellings proposed on the subject site.

The proposed PUD complies with the Master Plan goals, actions plans, etc. listed below.

- Plan For Responsible Growth and Development That Contribute To Our Community And Sense Of Place: We want to see well-planned growth and quality development that supports our local community. We don't want to lose our small-town character but do want to provide housing & have more full-time residents to support businesses, the school, and expanded services and opportunities. (Page 39 of the Compass Master Plan)
- Expand Housing Choices, Opportunities And Affordability For Our Community: We want to ensure that we provide housing choices that are affordable to our people: the

elderly, young families, our workforce, the Hispanic community. (Page 39 of the Compass Master Plan)

ANALYSIS OF REQUEST: Section 17-2-50.4 of the SMC states "*Unless it is determined during the review of the outline development plan that a preliminary plat is necessary, the requirement for review of a preliminary plat shall be waived. In the event that preliminary plat review is required, the subdivider must provide 11 copies of the preliminary plat, as set forth in Section 17-3-30 of this Chapter, to the Town for review and approval prior to proceeding with the final plat review process; however, the Town will waive the requirement for payment of preliminary plat review fees.*" While reviewing the ODP application, staff has determined that the proposed PUD should follow the preliminary plat and final plat process since there are several submittal requirements within the preliminary plat process which would help staff better understand the existing conditions of the subject site and how the proposed PUD will be designed to mitigate existing conditions. The preliminary plat process will also allow the applicant to address the

PLANNING COMMISSION ACTION: The Planning Commission shall recommend approval as submitted, approval with conditions, table for additional review with the applicant's consent, or recommend denial of the application.

STAFF RECOMMENDATION: The applicant has submitted all required materials for the review of an ODP in accordance with Section 17-3-20 of the SMC. Staff therefore recommends approval of the ODP application for Animas Overlook located at Block 7 and 8 Blagues Addition as presented, with the following conditions:

1. The proposed PUD should be required to follow the preliminary plat requirements in section 17-3-30 prior to proceeding with the final plat review process.
2. The proposed PUD should provide off-street parking for each lot as required by section 17-5-40(j).
3. The proposed PUD should provide common open space as required by section 17-8-30(c).

However, this is a decision for the Planning Commission to make, and the Commission may choose to approve or deny the application based on the testimony and evidence it hears. Two sample motions are included below for convenience only. They do not limit the evidence the Commission can rely on or the decision the Commission makes.

SAMPLE MOTIONS:

Approval: I move to recommend approval of case 24-12, a review of the Outline Development Plan for Animas Overlook a proposed PUD located at Block 7 and 8 Blagues Addition as presented, finding the Outline Development Plan is in conformance with §17-3-20 of the SMC.

Approval with Conditions: I move to recommend approval of case 24-12 a review of the Outline Development Plan for Animas Overlook a proposed PUD located at Block 7 and 8 Blagues Addition as presented, finding the Outline Development Plan is in conformance with §17-3-20 of the SMC with the following conditions [insert conditions}.

Continuance: I move to continue case 24-12 a review of the Outline Development Plan for Animas Overlook a proposed PUD located at Block 7 and 8 Blagues Addition to the {Date Specific}.

Denial: I move to recommend denial of the Outline Development Plan for Animas Overlook a proposed PUD located at Block 7 and 8 Blagues Addition, as presented, finding the Outline Development Plan is NOT in conformance with §17-3-20 of the SMC [insert findings here].

ATTACHMENTS:

1. Cover Letter
2. Geotech Report
3. ODP Presentation
4. Land Title Survey
5. Wetlands Report

March 5th, 2024

George Henderson (Owner/Manager)
GFS Land LLC
gwhenderson@gmail.com

Dear Silverton Board of Trustees,

I want to thank you and the staff for reviewing our residential PUD proposal. I realize a lot is going on within the Town of Silverton right now and my intention is not to create unnecessary work for you or the Town Staff. The Town Staff has been tremendous to work with and are a huge asset to the Town.

The reason I am submitting my proposal now is that we believe our plan is consistent with the Compass Master plan and it does not conflict with wetlands concerns which The Town has been working through over the past 8+ months.

As it relates to the Compass Master Plan, we believe our proposal provides a creative way to develop residential hillside property in a way to maximize density given the land constraints the Town faces. The Master Plan clearly states that the Silverton residents would like responsible growth as a pathway to creating a year-round economy while being mindful of existing and environmental assets. As such, we took a thoughtful approach in planning over the last two years to create a plan that accomplishes these goals. We plan to make a significant investment in infrastructure that will be dedicated to the Town once the project is complete. In addition, we believe the project will provide job opportunities for Silverton residents and generate additional tax revenues and fees which will assist the Town in its budgetary goals.

As it relates to the wetlands, our project would only impact less than 1/10th on an acre of property as the proposed entry road crosses a man-made drainage ditch. Cottonwood Consulting performed a detailed wetlands study and we have had multiple conversations with the Army Corp of Engineers regarding this matter. As reference, the Town worked with Cottonwood a few years back to assist with a wetlands issue at the Silverton RV Park.

In our presentation we compare the Cottonwood Wetlands study to the map produced by Ironwood Consulting. While the Ironwood Consulting Map **does not** view the drainage ditch as a protected wetland under the Clean Water Act (pre or post Sackett ruling), we are taking the approach that the drainage ditch is potentially protected under the Clean Water Act as recommendation by Cottonwood Consulting. Therefore, we plan on applying for the necessary permits required by the Army Corp of Engineers per the guidelines of the Clean Water Act. We believe our presentation clearly outlines our approach and I look forward to discussing any questions you may have.

Again, I want to thank you for reviewing our proposal and look forward to working with you. I also want to thank the staff for all their help getting us to this point. They have been terrific.

Kind Regards,

George Henderson
GFS Land LLC (Owner)

TRAUTNER GEOTECH LLC
GEOTECHNICAL ENGINEERING, MATERIAL TESTING
AND ENGINEERING GEOLOGY

GEOTECHNICAL ENGINEERING STUDY
PROPOSED
SINGLE FAMILY RESIDENTIAL DEVELOPMENT
BLOCK 7 AND BLOCK 8 BLAGUE'S ADDITION
SILVERTON, COLORADO

August 15, 2022

PREPARED FOR:

George Henderson
gwhenderson@gmail.com

PROJECT NO. 57343GE

649 Tech Center Drive Suite A • Durango, CO 81301 • 970/259-5095 • Fax 970/382-2515

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Swell-Consolidation Test Results
Direct Shear Test Results

1.0 REPORT INTRODUCTION

This report presents our geotechnical engineering recommendations for the proposed single-family development to be located on Block 7 and Block 8, Blague's Addition, Silverton, Colorado. This report was requested by Mr. George Henderson and was prepared in accordance with our proposal dated April 1, 2022, Proposal No. 22114P.

As outlined within our proposal for services for this project the client is responsible for appropriate distribution of this report to other design professionals and/or governmental agencies unless specific arrangements have been made with us for distribution.

Geotechnical engineering is a discipline which provides insight into natural conditions and site characteristics such as; subsurface soil and water conditions, soil strength, swell (expansion) potential, consolidation (settlement) potential, and often slope stability considerations. The information provided by the geotechnical engineer is utilized by many people including the project owner, architect or designer, structural engineer, civil engineer, the project builder and others. The information is used to help develop a design and subsequently implement construction strategies that are appropriate for the subsurface soil and water conditions, and slope stability considerations. We are available to discuss any aspect of this report with those who are unfamiliar with the recommendations, concepts, and techniques provided below.

This geotechnical engineering report is the beginning of a process involving the geotechnical engineering consultant on any project. It is imperative that the geotechnical engineer be consulted throughout the design and construction process to verify the implementation of the geotechnical engineering recommendations provided in this report. Often the design has not been started or has only been initiated at the time of the preparation of the geotechnical engineering study. Changes in the proposed design must be communicated to the geotechnical engineer so that we have the opportunity to tailor our recommendations as needed based on the proposed site development and structure design.

The following outline provides a synopsis of the various portions of this report;

- Sections 1.0 provides an introduction and an establishment of our scope of service.
- Sections 2.0 and 3.0 of this report present our geotechnical engineering field and laboratory studies
- Sections 4.0 through 8.0 presents our geotechnical engineering design parameters and recommendations which are based on our engineering analysis of the data obtained.
- Section 9.0 provides a brief discussion of construction sequencing and strategies which may influence the geotechnical engineering characteristics of the site. Ancillary information such as some background information regarding soil corrosion and radon considerations is also presented as general reference.
- Section 10.0 provides our general construction monitoring and testing recommendations.
- Sections 11.0 and 12.0 provides our conclusions and limitations.

The data used to generate our recommendations are presented throughout this report and in the attached figures.

All recommendations provided within this report must be followed in order to achieve the intended performance of the foundation system and other components that are supported by the site soil.

1.1 Proposed Construction

We reviewed a Architectural details and grading plans were not available at the time of this report. We understand the proposed residential development will include construction of 13 single-family residential structures supported by steel reinforced concrete foundation systems. Grading for the structures will include cuts of approximately 3 to 10 feet below the adjacent ground surface. We assume relatively light foundation loadings, typical of the proposed type of construction. The project will also include construction of new roads, utilities, and associated infrastructure.

When final building locations, grading and loading information have been developed, we should be notified to re-evaluate the recommendations presented in this report.

2.0 FIELD STUDY

2.1 Site Description and Geomorphology

The approximately 1.76 acre parcel is currently vacant. The ground surface slope down to the south. Vegetation consists of native grasses and few small trees.

2.2 Subsurface Soil and Water Conditions

We advanced 8 test borings in the vicinity of the proposed structure. A schematic showing the approximate boring locations is provided below as Figure 1. The logs of the soils encountered in our test borings are presented in Appendix A.

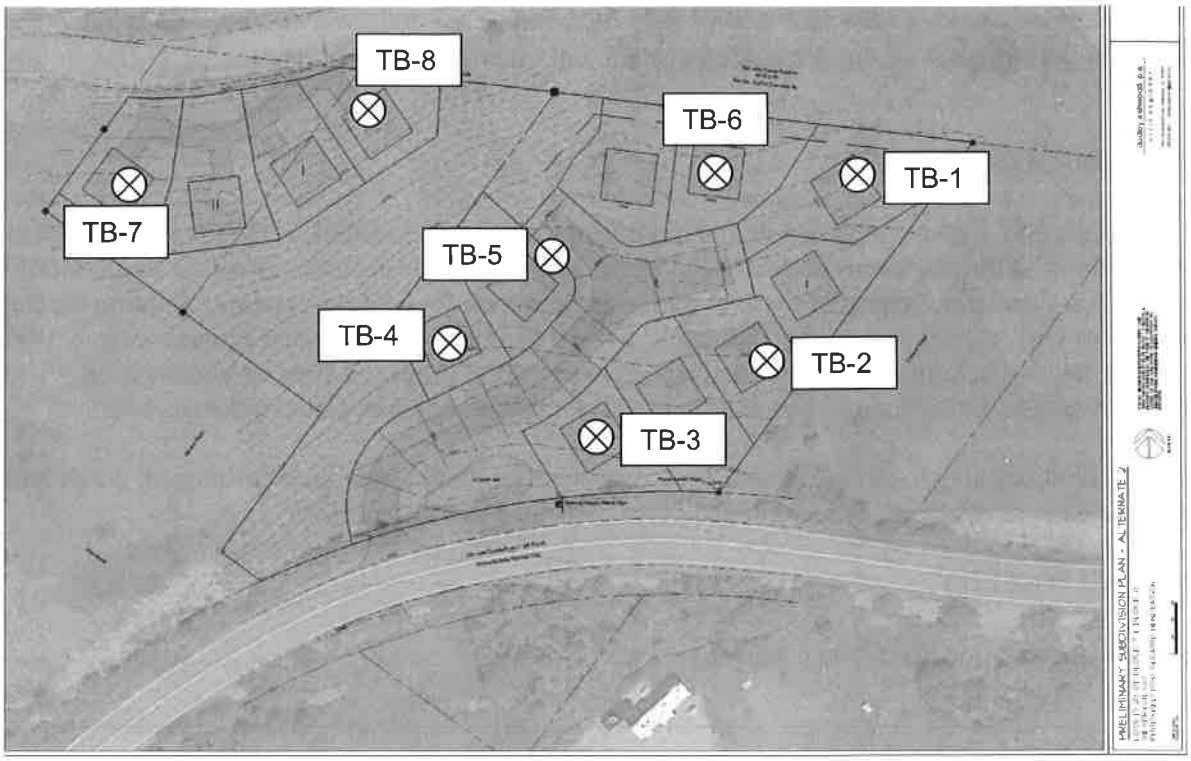


Figure 1; Test Boring Location Map

The schematic presented above was prepared using notes and field measurements obtained during our field exploration and is intended to show the approximate test boring locations for reference purposes only.

The subsurface conditions encountered in our test borings consisted of upper layer of organic silty, clayey sand from the ground surface to depths of 6 to 18 inches. Below the upper organic soil layer, we encountered clayey sand with gravel (SC) or clayey gravel and cobbles with sand (GC) to the bottom of our test borings. We encountered practical auger refusal at depths that ranged from 3 ½ feet to 24 feet.

Free subsurface water was encountered in TB-1 through TB-6 at depths that ranged from approximatley 2 to 7 feet below the adjacent ground surface during drilling. We suspect that the subsurface water elevation and soil moisture conditions will be influenced by snow melt and/or precipitation and local irrigation.

The logs of the subsurface soil conditions encountered in our test borings are presented in Appendix A. The logs present our interpretation of the subsurface conditions encountered in the test borings at the time of our field work. Subsurface soil and water conditions are often variable across relatively short distances. It is likely that variable subsurface soil and water conditions will be encountered during construction. Laboratory soil classifications of samples obtained may differ from field classifications.

3.0 LABORATORY STUDY

The laboratory study included tests to estimate the strength, swell and consolidation potential of the soils tested. We performed the following tests on select samples obtained from the test borings. The laboratory test results are provided in Appendix B.

- Moisture Content and Dry Density
- Sieve Analysis (Gradation)
- Atterberg Limits, Liquid Limit, Plastic Limit and Plasticity Index
- Swell Consolidation Tests
- Direct Shear Strength Test
- Moisture Content Dry Density Relationship Test

A synopsis of some of our laboratory data for some of the samples tested is tabulated below.

Sample Designation	Percent Passing #200 Sieve	Atterberg Limits LL/PI	Moisture Content (percent)	Dry Density (PCF)	Measured Swell Pressure (PSF)	Swell or Consolidation Potential
TB-1 @ 0-3'	28	29/9	11.9	-	-	-
TB-1 @ 3'	-	-	7.7	119.9	880*	0.1 (% under 500 psf load)
TB-1 @ 4-8'	28	27/10	11.1	-	-	-
TB-2 @ 4'	-	-	14.4	120.5	0	0.0 (% under 100 psf load)
TB-3 @ 0-3.5'	20	31/11	7.1	-	-	-
TB-3 @ 3.5'	-	-	6.0	117.7	0*	0.0 (% under 100 psf load)
TB-4 @ 3'	-	-	7.8	120.4	1,310*	2.6 (% under 100 psf load)
TB-5 @ 0-3'	26	36/12	20.6	-	-	-
TB-5 @ 3'	-	-	7.5	116.7	0*	-0.1 (% under 500 psf load)
TB-7 @ 3.5-7.5'	-	-	6.9	121.8	2,740*	2.9 (% under 100 psf load)

*NOTES:

1. We determine the swell pressure as measured in our laboratory using the constant volume method. The graphically estimated load-back swell pressure may be different from that measured in the laboratory.
2. Negative Swell-Consolidation Potential indicates compression under conditions of loading and wetting.
3. * = Swell-Consolidation test performed on remolded sample due to rock content. Test results should be considered an estimate only of the swell or consolidation potential at the density and moisture content indicated.

Direct Shear Strength Tests (Residual Strength Tests): We performed residual strength direct shear strength tests on minus #10 sieve screen size particles obtained from Test Boring TB-8 at depths ranging from about 0 to 3 feet below the ground surface elevation. We obtained an angle of internal friction (phi) of about 31 degrees and cohesion of about 45 pounds per square foot.

4.0 FOUNDATION RECOMMENDATIONS

There are two general types of foundation system concepts, "deep" and "shallow", with the designation being based on the depth of support of the system. We have provided a discussion of viable foundation system concepts for this project below. The choice of the appropriate foundation system for the project is best made by the project structural engineer or project architect. We should be contacted once the design choice has been made to provide consultation regarding implementation of our design parameters.

4.1 Deep Foundation System Discussion

Deep foundation system design concepts will provide the least likelihood of post-construction movement associated with volume changes within the soil. Deep foundation system design concepts may be viable for this project; however, we anticipate that only a shallow foundation system design is being considered at this time. We are available to develop deep foundation design parameters if desired.

4.2 Shallow Foundation System Concepts

Subsurface data indicate that clayey gravel and cobble with sand will likely be the predominant soil type encountered beneath shallow foundations. Based on the laboratory analysis, the soils encountered in our borings were found to have a low to moderate swell potential and low consolidation potential. The anticipated soils at the foundation level are considered suitable for shallow foundation support. Deep foundation system design concepts which include isolation of shallow components including floor systems from shallow soils are less likely to experience post-construction movement due to volume changes in the site soil.

There are numerous types of shallow foundation systems and variants of each type. Shallow foundation system concepts discussed below include:

- Spread Footings (continuous) and stem walls

The integrity and long-term performance of each type of system is influenced by the quality of workmanship which is implemented during construction. It is imperative that all excavation and fill placement operations be conducted by qualified personnel using appropriate equipment and techniques to provide suitable support conditions for the foundation system.

4.2.1 Spread Footings

A spread footing foundation system consists of a footing which dissipates, or spreads, the loads imposed from the stem wall (or beam) from the structure above. Remolded soil samples tested from the anticipated support elevations in our test borings had measured swell pressure that ranged from about 0 to 2,740 pounds per square foot and the swell potential magnitude ranged from about 0 to 2.9 percent under 100 to 500 pound per square foot surcharge loading. The owner must understand that regardless of the expansive soil mitigation design concepts presented below, if the swell pressure generated by the expansive soil on this site exceeds the minimum dead load which is imposed by the spread footing or other structural components, and the expansive site soils

become wetted, uplift of the foundation system and other structural components is highly likely. Drilled piers, or other deep foundation system design will provide the least likelihood of post construction movement associated with soil volume changes.

The actual magnitude of the potential uplift of the foundation system depends on the volume (or depth) of the support soils which become moistened after construction. It is difficult to predict the amount of soil which will become moistened after construction, some theories suggest that with time the entire soil mantle may become moistened. Based on our experience in the area we feel that it is possible for at least 3 to 5 feet of soil below the footings to be influenced by subsurface moisture. Based on the assumed depth of moistened soil, laboratory test data, and the soil characteristics we estimate that the magnitude of the potential uplift associated with swelling of the expansive support soil materials may be in the range of about 1 to 1.5 inches. If the entire soil mantle becomes moistened the total potential uplift may be considerably higher. The project structural engineer or architect should determine if the potential uplift is tolerable for the proposed structure on this project site.

Uplift associated with swelling soils occurs only where the foundation support soils have been exposed to water; therefore, the uplift may impose shear stresses in the foundation system. The magnitude of the imposed shear stress is related to the swell pressure of the support soil, but is difficult to estimate. Properly designed and constructed continuous spread footings with stem walls (or beams) have the ability to distribute the forces associated with swelling of the support soil. The rigidity of the system helps reduce differential movement and associated damage to the overlying structure. Swelling of the soil supporting isolated pad footings will result in direct uplift of the columns and structural components supported by the columns. Damage to the structure due to this type of movement can be severe. We recommend that isolated pad footings be avoided and that the foundation system be designed as rigid as is reasonably possible.

We recommend that the footings be designed with a high dead load and supported by a layer of moisture conditioned and compacted natural soil which is overlain by a layer of compacted structural fill material. This concept is outlined below:

- The foundation excavation should be excavated to at least 12 inches below the proposed footing support elevation.
- The natural soils exposed in the bottom of the excavation should be scarified to a depth of about 6 to 8 inches
- The scarified soil should be thoroughly moisture conditioned to about 2 percent above the laboratory determined optimum moisture content and then compacted.
- After completion of the compaction of the moisture conditioned natural soil a 12 inch thick layer of granular aggregate base course structural fill material should be placed, moisture conditioned and compacted.
- The moisture conditioned natural soil material and the granular soils should be compacted as discussed under the Compaction Recommendations portion of this report below.
- In the absence of structural engineering design and for general geotechnical engineering purposes, we recommend the stem walls be designed to act as beams and reinforced with continuous steel reinforcement, 4 reinforcement bars, 2 top and 2 bottom. Taller walls may require additional reinforcement bar.

- The structural engineer should be contacted to provide the appropriate reinforcement bar diameter and locations.

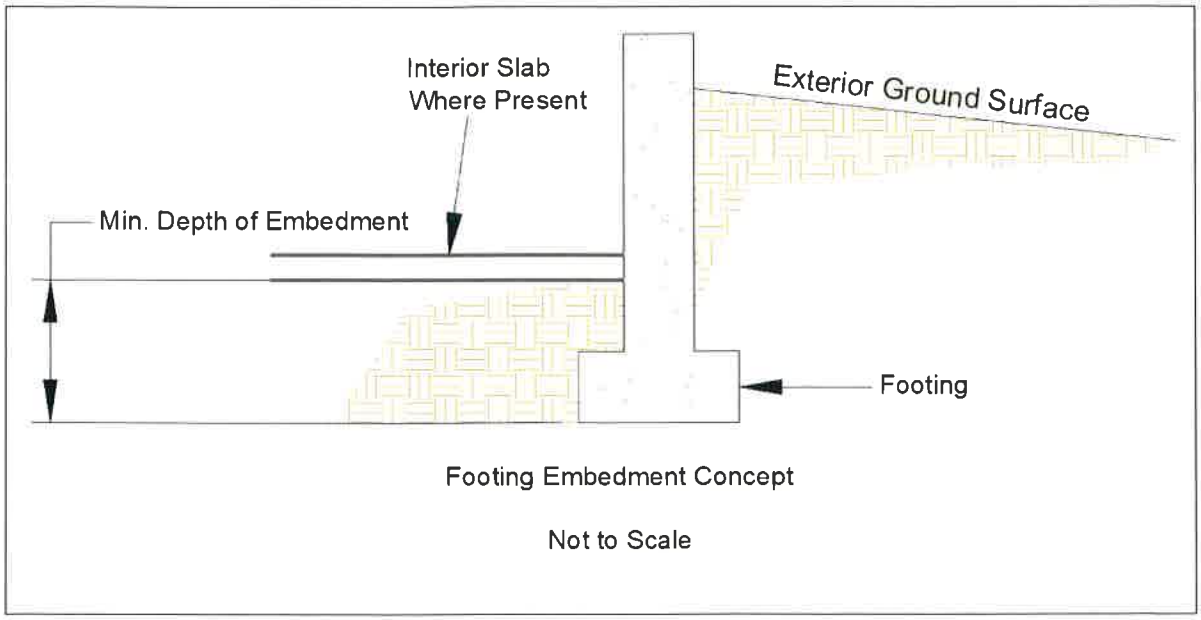
We recommend that particular attention and detail be given to the following aspects of the project construction for this lot;

- A subsurface drain system should be installed adjacent to the residential structure foundation system. Concepts for a subsurface drain system are presented in Section 6.0 of this report.
- The landscaping drainage concept provided in Section 8.5 below is imperative for this site to limit the moisture available to the foundation bearing soils.
- The exterior foundation backfill must be well compacted and moisture conditioned to above optimum moisture content. Recommendations for exterior foundation backfill are provided later in this report.

We recommend below-grade construction, such as retaining walls, crawlspace and basement areas, be protected from wetting and hydrostatic pressure buildup by an underdrain and wall drain system. Topographic conditions on the site may influence the ability to install a subsurface drain system which promotes water flow away from the foundation system. The subsurface drain system concept is discussed under the Subsurface Drain System section of this report below.

The footing embedment is a relatively critical, yet often overlooked, aspect of foundation construction. The embedment helps develop the soil bearing capacity, increases resistance of the footing to lateral movement and decreases the potential for rapid moisture changes in the footing support soils, particularly in crawl space areas. Interior footing embedment reduces the exposure of the crawl space support soils to dry crawl space air. Reduction in drying of the support soil helps reduce downward movement of interior footings due to soil shrinkage.

All footings should have a minimum depth of embedment of at least one 1 foot. The embedment concept is shown below.



Footing Embedment Concept

Not to Scale

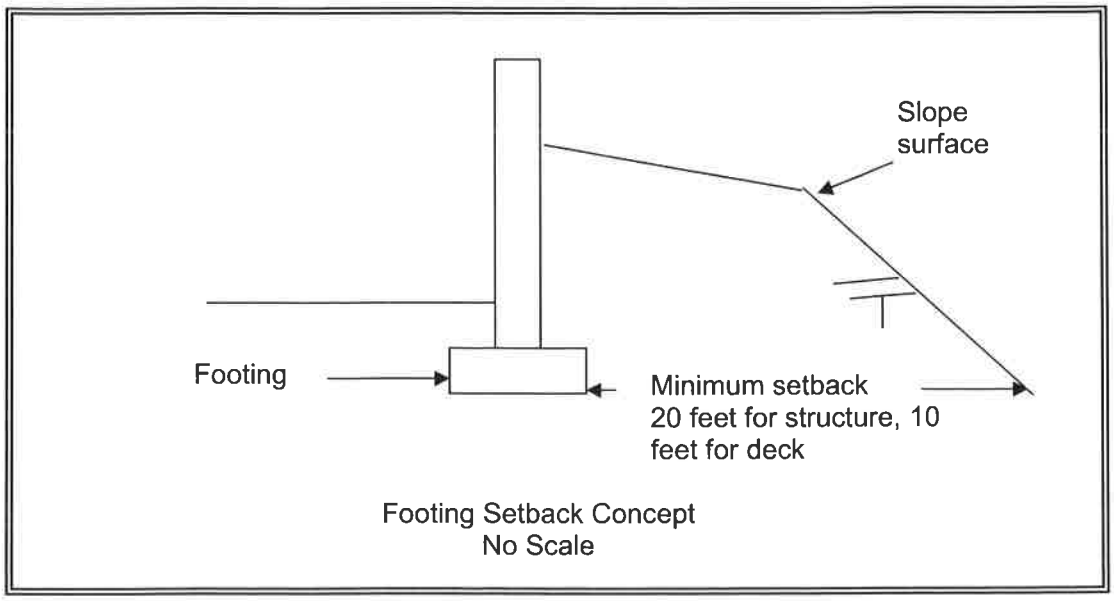
Spread footings located away from sloped areas may be designed using the bearing capacity information tabulated below.

Minimum Depth of Embedment (Feet)	Continuous Footing Design Capacity (psf)	Isolated Footing Design Capacity (psf)
1	1,300	Not Recommended
2	1,600	Not Recommended
3	1,900	Not Recommended

The bearing capacity values tabulated above may be increased by 20 percent for transient conditions associated with wind and seismic loads. Snow loads are not transient loads.

The bearing capacity values above were based on footing placed directly on the natural soils and on a continuous spread footing width of 1.5 feet. Larger footings and/or footings placed on a blanket of compacted structural fill will have a higher design soil bearing capacity. Development of the final footing design width is usually an iterative process based on evaluation of design pressures, footing widths and the thickness of compacted structural fill beneath the footings. We should be contacted as the design process continues to re-evaluate the design capacities above based on the actual proposed footing geometry.

Footings located on, or near slopes, should have additional embedment to establish a stable footing/slope stability condition. We recommend that the main structure footings along the slope be setback at least 20 feet from the slope surface interface with at least 4 feet of embedment on the exterior side. Deck footings should be embedded at least 4 feet below the ground surface, and should have a minimum setback of at least 10 feet from outside edge of the bottom of footing elevation to the slope surface interface. This setback concept is shown below.



Footing Setback Concept
No Scale

If it is preferred that the structure or deck footing be placed closer to the slope surface, then additional depth of embedment of these piers is recommended. Additional revetment or restraint of the slope may be conducted, if needed, to improve the stability of the slope. This may include installation of vertical micro-piles placed under this portion of the structure footings and/or soil nail installation on the slopes below the structure. We should be contacted to provide further consultation if the structure or deck footings will be located closer to the slope surface, as described above.

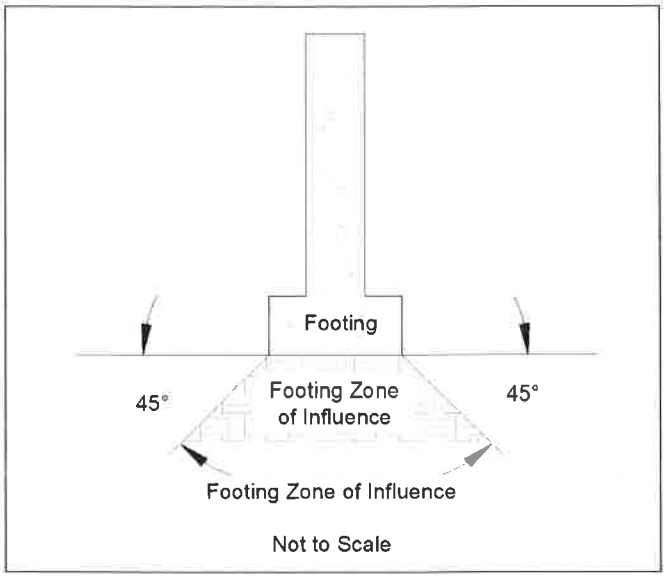
The settlement of the spread footing foundation system will be influenced by the footing size and the imposed loads. We estimated the total post construction settlement of the footings based on our laboratory consolidation data, the type and size of the footing. Our analysis below assumed that the highest bearing capacity value tabulated above was used in the design of the footings. The amount of post construction settlement may be reduced by placing the footings on a blanket of compacted structural fill material.

The estimated settlement for continuous footing with a nominal width of about 1½ to 2½ feet are tabulated below.

Thickness of Compacted Structural Fill (feet)	Estimated Settlement (inches)
0	¾ - 1
B/2	½ - ¾
B	¼ - ½

B is the footing width

The compacted structural fill should be placed and compacted as discussed in the Construction Considerations, "Fill Placement Recommendations" section of this report, below. The zone of influence of the footing (at elevations close to the bottom of the footing) is often approximated as being between two lines subtended at 45 degree angles from each bottom corner of the footing. The compacted structural fill should extend beyond the zone of influence of the footing as shown in the sketch below.



A general and simple rule to apply to the geometry of the compacted structural fill blanket is that it should extend beyond each edge of the footing a distance which is equal to the fill thickness.

We estimate that the footings designed and constructed above will have a total post construction settlement of about 1 inch or less.

All footings should be support at an elevation deeper than the maximum depth of frost penetration for the area. This recommendation includes exterior isolated footings and column supports. Please contact the local building department for specific frost depth requirements.

The post construction differential settlement may be reduced by designing footings that will apply relatively uniform loads on the support soils. Concentrated loads should be supported by footings that have been designed to impose similar loads as those imposed by adjacent footings.

Under no circumstances should any footing be supported by more than 3 feet of compacted structural fill material unless we are contacted to review the specific conditions supporting these footing locations.

The design concepts and parameters presented above are based on the soil conditions encountered in our test borings. We should be contacted during the initial phases of the foundation excavation at the site to assess the soil support conditions and to verify our recommendations.

4.2.2 General Shallow Foundation Considerations

Some movement and settlement of any shallow foundation system will occur after construction. Movement associated with swelling soils also occurs occasionally. Utility line connections through and foundation or structural component should be appropriately sleeved to reduce the potential for damage to the utility line. Flexible utility line connections will further reduce the potential for damage associated with movement of the structure.

5.0 RETAINING STRUCTURES

We understand that laterally loaded walls will be constructed as part of this site development. Lateral loads will be imposed on the retaining structures by the adjacent soils and, in some cases, additional surcharge loads will be imposed on the retained soils from vehicles or adjacent structures. The loads imposed by the soil are commonly referred to as lateral earth pressures. The magnitude of the lateral earth pressure forces is partially dependent on the soil strength characteristics, the geometry of the ground surface adjacent to the retaining structure, the subsurface water conditions and on surcharge loads.

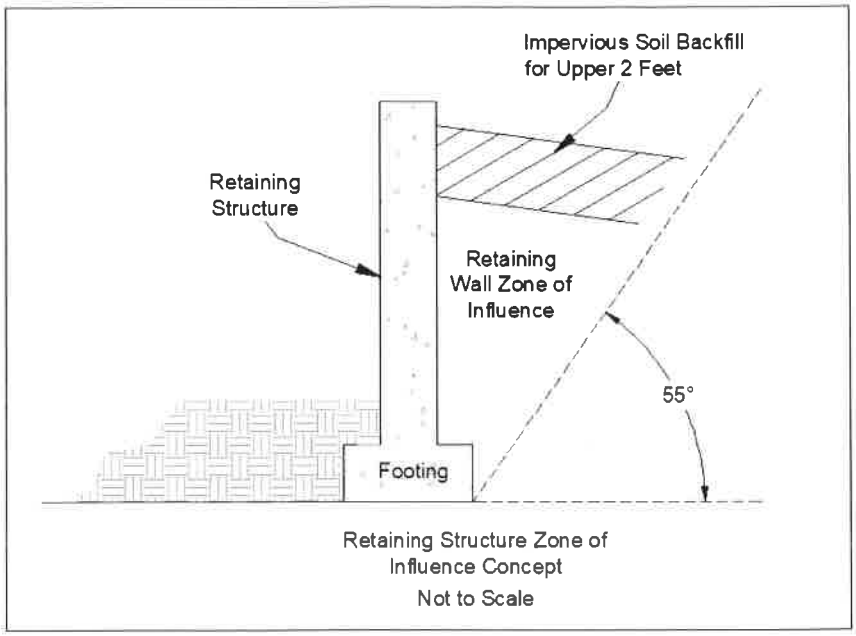
The site soils have a measured swell pressure of 2,740 pounds per square foot. A 2,740 pound per square foot swell pressure will exert approximately 21,920 pounds of force per lineal foot for a wall that retains 8 feet of soil. Due to the expansive nature of the site soils we do not recommend that the natural clay soils be used for retaining wall backfill. The retaining walls may be designed using the lateral earth pressure values for imported granular soil that are tabulated below.

Type of Lateral Earth Pressure	Level Granular Soil Backfill (pounds per cubic foot/foot)
Active	35
At-rest	55
Passive	460
Allowable Coefficient of Friction	0.45

The granular soil that is used for the retaining wall backfill may be permeable and may allow water migration to the foundation support soils. There are several options available to help reduce water migration to the foundation soils, two of which are discussed here. An impervious geotextile layer and shallow drain system may be incorporated into the backfill, as discussed in Section 9.5, Landscaping Considerations, below. A second option is to place a geotextile filter material on top of the granular soils and above that place about 1½ to 2 feet of moisture conditioned and compacted site clay soils. It should be noted that if the site clay soils are used volume changes may occur which will influence the performance of overlying concrete flatwork or structural components.

The values tabulated above are for well drained backfill soils. The values provided above do not include any forces due to adjacent surcharge loads or sloped soils. If the backfill soils become saturated the imposed lateral earth pressures will be significantly higher than those tabulated above.

The granular imported soil backfill values tabulated above are appropriate for material with an angle of internal friction of 35 degrees, or greater. The granular backfill must be placed within the retaining structure zone of influence as shown below in order for the lateral earth pressure values tabulated above for the granular material to be appropriate.



Retaining Structure Zone of Influence Concept
Not to Scale

If an open graded, permeable, granular backfill is chosen it should not extend to the ground surface. Some granular soils allow ready water migration which may result in increased water access to the foundation soils. The upper few feet of the backfill should be constructed using an impervious soil such as silty-clay and clay soils from the project site, if these soils are available. The 55 degree angle shown in the figure above is approximately correct for most clay soils. The angle is defined by $45 + (\varphi/2)$ where "φ" if the angle of internal friction of the soil.

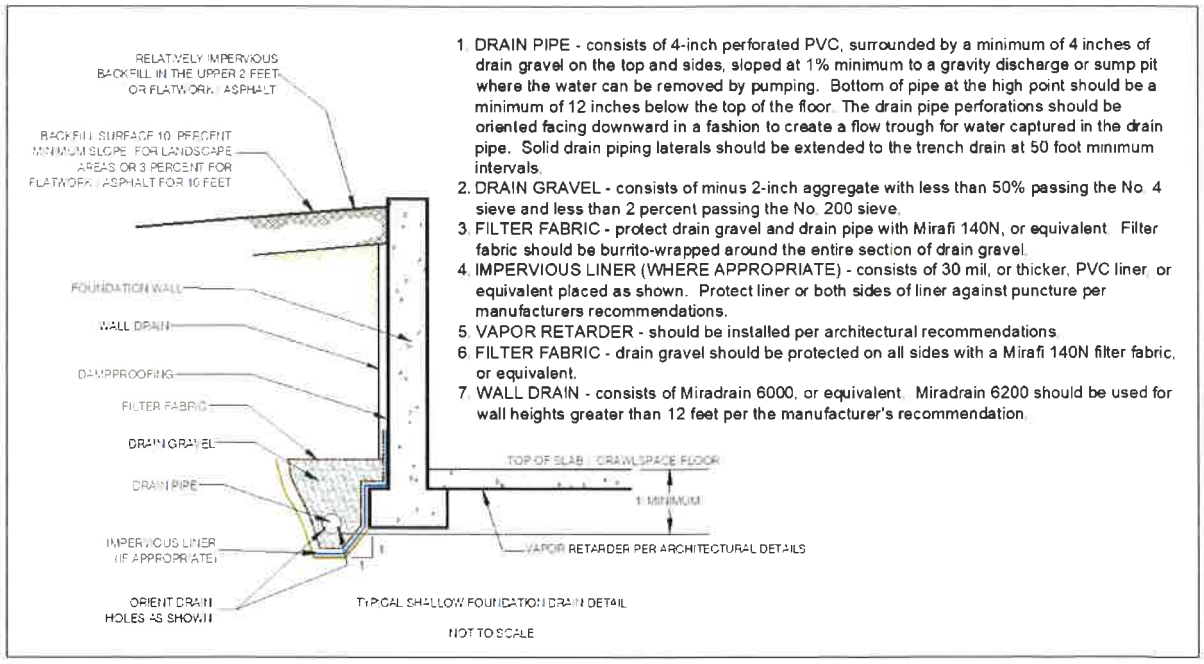
Backfill should not be placed and compacted behind the retaining structure unless approved by the project structural engineer. Backfill placed prior to construction of all appropriate structural members such as floors, or prior to appropriate curing of the retaining wall concrete, may result in severe damage and/or failure of the retaining structure.

6.0 SUBSURFACE DRAIN SYSTEM

We recommend below-grade construction, such as retaining walls, crawlspace and basement areas, be protected from wetting and hydrostatic pressure buildup by an underdrain and wall drain system. Exterior retaining structures may be constructed with weep holes to allow subsurface water migration through the retaining structures. Topographic conditions on the site may influence the ability to install a subsurface drain system which promotes water flow away from the foundation system. The subsurface drain system concept is discussed under the Subsurface Drain System section of this report below.

A drain system constructed with a free draining aggregate material and a 4 inch minimum diameter perforated drain pipe should be constructed adjacent to retaining structures and/or adjacent to foundation walls. The drain pipe perforations should be oriented facing downward. The system should be protected from fine soil migration by a fabric-wrapped aggregate which surrounds a rigid perforated pipe. We do not recommend use of flexible corrugated perforated pipe since it is not possible to establish a uniform gradient of the flexible pipe throughout the drain system alignment. Corrugated drain tile is perforated throughout the entire circumference of the pipe and therefore water can escape from the perforations at undesirable locations after being collected. The nature of the perforations of the corrugated material further decreases its effectiveness as a subsurface drain conduit.

The drain should be placed at each level of excavation and at least 12 inches below lowest adjacent finish floor or crawlspace grade. The drain system pipe should be graded to surface outlets or a sump vault. The drain system should be sloped at a minimum gradient of about 2 percent, but site geometry and topography may influence the actual installed pipe gradient. Water must not be allowed to pool along any portion of the subsurface drain system. An improperly constructed subsurface drain system may promote water infiltration to undesirable locations. The drain system pipe should be surrounded by about 2 to 4 cubic feet per lineal foot of free draining aggregate. If a sump vault and pump are incorporated into the subsurface drain system, care should be taken so that the water pumped from the vault does not recirculate through pervious soils and obtain access to the basement or crawl space areas. An impervious membrane should be included in the drain construction for grade beam and pier systems or other foundation systems such as interrupted footings where a free pathway for water beneath the structure exists. A generalized subsurface drain system concept is shown below.



1. DRAIN PIPE - consists of 4-inch perforated PVC, surrounded by a minimum of 4 inches of drain gravel on the top and sides, sloped at 1% minimum to a gravity discharge or sump pit where the water can be removed by pumping. Bottom of pipe at the high point should be a minimum of 12 inches below the top of the floor. The drain pipe perforations should be oriented facing downward in a fashion to create a flow trough for water captured in the drain pipe. Solid drain piping laterals should be extended to the trench drain at 50 foot minimum intervals.
2. DRAIN GRAVEL - consists of minus 2-inch aggregate with less than 50% passing the No. 4 sieve and less than 2 percent passing the No. 200 sieve.
3. FILTER FABRIC - protect drain gravel and drain pipe with Mirafi 140N, or equivalent. Filter fabric should be burrito-wrapped around the entire section of drain gravel.
4. IMPERVIOUS LINER (WHERE APPROPRIATE) - consists of 30 mil, or thicker, PVC liner, or equivalent placed as shown. Protect liner or both sides of liner against puncture per manufacturers recommendations.
5. VAPOR RETARDER - should be installed per architectural recommendations.
6. FILTER FABRIC - drain gravel should be protected on all sides with a Mirafi 140N filter fabric, or equivalent.
7. WALL DRAIN - consists of Miradrain 6000, or equivalent. Miradrain 6200 should be used for wall heights greater than 12 feet per the manufacturer's recommendation.

There are often aspects of each site and structure which require some tailoring of the subsurface drain system to meet the needs of individual projects. Drain systems that are placed adjacent to void forms must include provisions to protect and support the impervious liner adjacent to the void form. We are available to provide consultation for the subsurface drain system for this project, if desired.

Water often will migrate along utility trench excavations. If the utility trench extends from areas above the site, this trench may be a source for subsurface water within the proposed basement or crawl space. We suggest that the utility trench backfill be thoroughly compacted to help reduce the amount of water migration. The subsurface drain system should be designed to collect subsurface water from the utility trench and direct it to surface discharge points.

7.0 CONCRETE FLATWORK

We anticipate that both interior and exterior concrete flatwork will be considered in the project design. Concrete flatwork is typically lightly loaded and has a limited capability to resist shear forces associated with uplift from swelling soils and/or frost heave. It is prudent for the design and construction of concrete flatwork on this project to be able to accommodate some movement associated with swelling soil conditions.

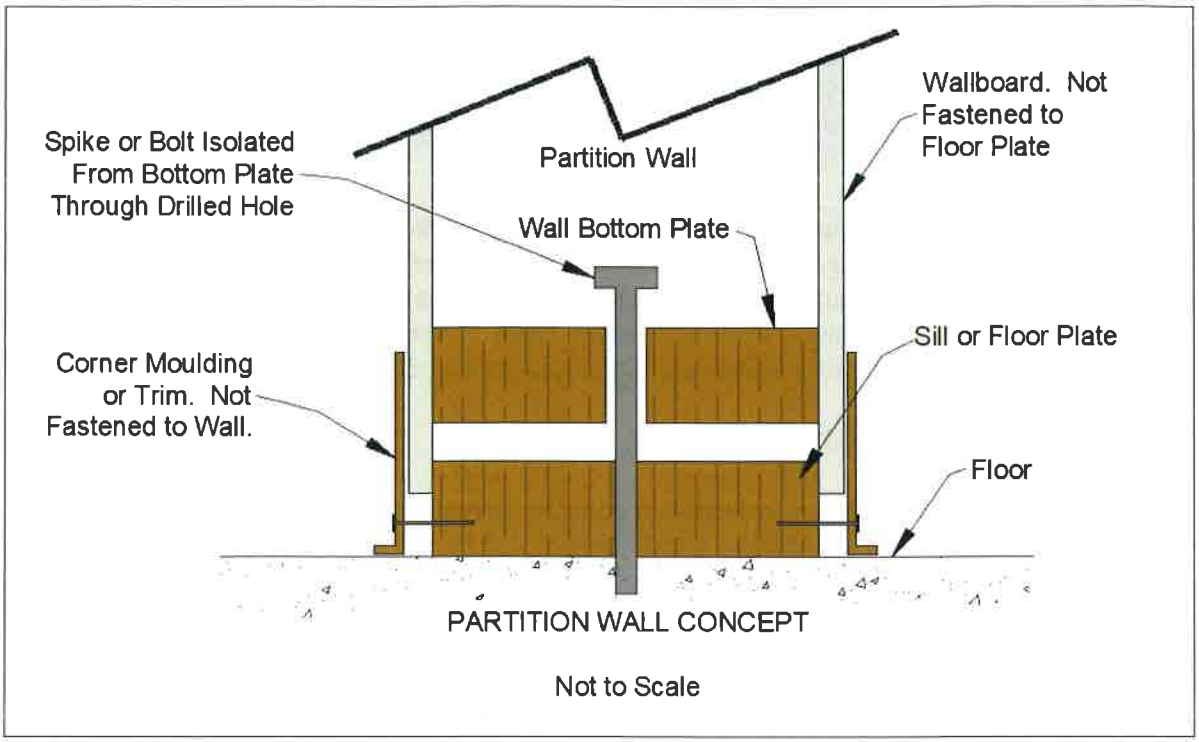
The soil samples tested have a measured swell pressure up to about 2,740 pounds per square foot and a magnitude swell potential up to about 2.9 percent under a 100 pound per square foot surcharge load. Due to the measured swell potential and swell pressure, interior floors supported over a crawl space are less likely to experience movement than are concrete slabs support on grade. The following recommendations are appropriate for garage floor slabs and for interior floor slabs if the owner is willing to accept the risk of potential movement beyond normal tolerances.

7.1 Interior Concrete Slab-on-Grade Floors

A primary goal in the design and construction of concrete slab-on-grade floors is to reduce the amount of post construction uplift associated with swelling soils, or downward movement due to consolidation of soft soils. A parallel goal is to reduce the potential for damage to the structure associated with any movement of the slab-on-grade which may occur. There are limited options available to help mitigate the influence of volume changes in the support soil for concrete slab-on-grade floors, these include:

- Preconstruction scarification, moisture conditioning and re-compaction of the natural soils in areas proposed for support of concrete flatwork, and/or,
- Placement and compaction of granular compacted structural fill material

Damage associated with movement of interior concrete slab-on-grade floor can be reduced by designing the floors as "floating" slabs. The concrete slabs should not be structurally tied to the foundations or the overlying structure. Interior walls or columns should not be supported on the interior floor slabs. Movement of interior walls or columns due to uplift of the floor slab can cause severe damage throughout the structure. Interior walls may be structurally supported from framing above the floor, or interior walls and support columns may be supported on interior portions of the foundation system. Partition walls should be designed and constructed with voids above, and/or below, to allow independent movement of the floor slab. This concept is shown below.



The sketch above provides a concept. If the plans include isolation of the partition walls from the floor slab, the project architect or structural engineer should be contacted to provide specific details and design of the desired system.

If the owner chooses to construct the residence with concrete slab-on-grade floors, the floors should be supported by a layer of granular structural fill overlying the processed natural soils. Interior concrete flatwork, or concrete slab-on-grade floors, should be underlain by scarification, moisture conditioning and compaction of about 6 inches of the natural soils followed by placement of at least 12 inches of compacted granular structural fill material that is placed and compacted as discussed in the Construction Considerations, "Fill Placement Recommendations" section of this report, below.

The above recommendations will not prevent slab heave if the expansive soils underlying slabs-on-grade become wet. However, the recommendations will reduce the effects if slab heave occurs. All plumbing lines should be pressure tested before backfilling to help reduce the potential for wetting. The only means to completely mitigate the influence of volume changes on the performance of interior floors is to structurally support the floors over a void space. Floors that are suspended by the foundation system will not be influenced by volume changes in the site soils. The suggestions and recommendations presented in this section are intended to help reduce the influence of swelling soils on the performance of the concrete slab-on-grade floors.

7.1.1 Capillary and Vapor Moisture Rise

Capillary and vapor moisture rise through the slab support soil may provide a source for moisture in the concrete slab-on-grade floor. This moisture may promote development of mold or mildew in poorly ventilated areas and may influence the performance of floor coverings and mastic placed directly on the floor slabs. The type of floor covering, adhesives used, and other considerations that are not related to the geotechnical engineering practice will influence the design. The architect, builder and particularly the floor covering/adhesive manufacturer should be contacted regarding the appropriate level of protection required for their products.

Comments for Reduction of Capillary Rise

One option to reduce the potential for capillary rise through the floor slab is to place a layer of clean aggregate material, such as washed concrete aggregate for the upper 4 to 6 inches of fill material supporting the concrete slabs.

Comments for Reduction of Vapor Rise

To reduce vapor rise through the floor slab, a moisture barrier such as a 6 mil (or thicker) plastic, or similar impervious geotextile material is often be placed below the floor slab. The material used should be protected from punctures that will occur during the construction process.

There are proprietary barriers that are puncture resistant that may not need the underlying layer of protective material. Some of these barriers are robust material that may be placed below the compacted structural fill layer. We do not recommend placement of the concrete directly on a moisture barrier unless the concrete contractor has had previous experience with curing of concrete placed in this manner. As mentioned above, the architect, builder and particularly the floor covering/adhesive manufacturer should be contacted regarding the appropriate level of moisture and vapor protection required for their products.

7.1.2 Slab Reinforcement Considerations

The project structural engineer should be contacted to provide steel reinforcement design considerations for the proposed floor slabs. Any steel reinforcement placed in the slab should be placed at the appropriate elevations to allow for proper interaction of the reinforcement with tensile stresses in the slab. Reinforcement steel that is allowed to cure at the bottom of the slab will not provide adequate reinforcement.

7.2 Exterior Concrete Flatwork Considerations

Exterior concrete flatwork includes concrete driveway slabs, aprons, patios, and walkways. The desired performance of exterior flatwork typically varies depending on the proposed use of the site and each owner's individual expectations. As with interior flatwork, exterior flatwork is particularly prone to movement and potential damage due to movement of the support soils. This movement and associated damage may be reduced by following the recommendations discussed under interior flatwork, above. Unlike interior flatwork, exterior flatwork may be exposed to frost heave, particularly on sites where the bearing soils have a high silt content. It may be prudent to

remove silt soils from exterior flatwork support areas where movement of exterior flatwork will adversely affect the project, such as near the interface between the driveway and the interior garage floor slab. If silt soils are encountered, they should be removed to the maximum depth of frost penetration for the area where movement of exterior flatwork is undesirable.

If some movement of exterior flatwork is acceptable, we suggest that the support areas be prepared by scarification, moisture conditioning and re-compaction of about 6 inches of the natural soils followed by placement of at least 12 inches of compacted granular fill material. The scarified material and granular fill materials should be placed as discussed under the Construction Considerations, "Fill Placement Recommendations" section of this report, below.

It is important that exterior flatwork be separated from exterior column supports, masonry veneer, finishes and siding. No support columns, for the structure or exterior decks, should be placed on exterior concrete unless movement of the columns will not adversely affect the supported structural components. Movement of exterior flatwork may cause damage if it is in contact with portions of the structure exterior.

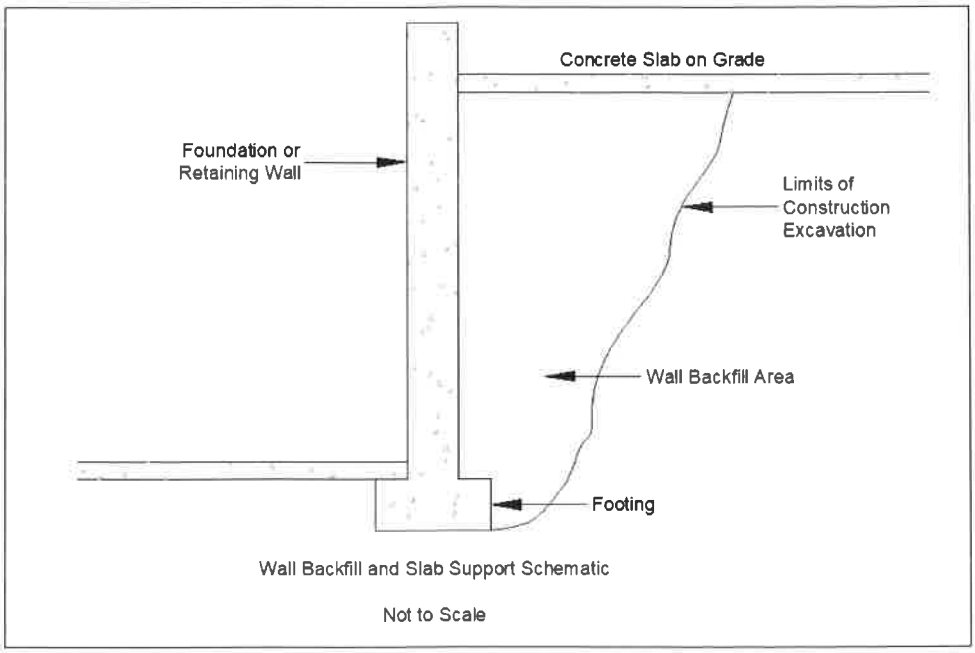
It should be noted that silt and silty sand soils located near the ground surface are particularly prone to frost heave. Soils with high silt content have the ability to retain significant moisture. The ability for the soils to accumulate moisture combined with a relatively shallow source of subsurface water and the fact that the winter temperatures in the area often very cold all contribute to a high potential for frost heave of exterior structural components. We recommend that silty soils be removed from the support areas of exterior components that are sensitive to movement associated with frost heave. These soils should be replaced with a material that is not susceptible to frost heave. Aggregate road base and similar materials retain less water than fine-grained soils and are therefore less prone to frost heave. We are available to discuss this concept with you as the plans progress.

Landscaping and landscaping irrigation often provide additional moisture to the soil supporting exterior flatwork. Excessive moisture will promote heave of the flatwork either due to expansive soil, or due to frost action. If movement of exterior slabs is undesirable, we recommend against placement of landscaping that requires irrigation. The ground surfaces near exterior flatwork must be sloped away from flatwork to reduce surface water migration to the support soil.

Exterior flatwork should not be placed on soils prepared for support of landscaping vegetation. Cultivated soils will not provide suitable support for concrete flatwork.

7.3 General Concrete Flatwork Comments

It is relatively common that both interior and exterior concrete flatwork is supported by areas of fill adjacent to either shallow foundation walls or basement retaining walls. A typical sketch of this condition is shown below.



Settlement of the backfill shown above will create a void and lack of soil support for the portions of the slab over the backfill. Settlement of the fill supporting the concrete flatwork is likely to cause damage to the slab-on-grade. Settlement and associated damage to the concrete flatwork may occur when the backfill is relatively deep, even if the backfill is compacted.

If this condition is likely to exist on this site it may be prudent to design the slab to be structurally supported on the retaining or foundation wall and designed to span to areas away from the backfill area as designed by the project structural engineer. We are available to discuss this with you upon request.

8.0 PAVEMENT SECTION THICKNESS DESIGN RECOMMENDATIONS

A pavement section is a layered system designed to distribute concentrated traffic loads to the subgrade. Performance of the pavement structure is directly related to the physical properties of the subgrade soils and traffic loadings. Our recommendations are provided below.

8.1 *Subgrade Preparation*

We recommend that the subgrade soils be proof-rolled prior to the scarification and processing operations. Any soft areas observed during the proof-rolling operations should be removed and replaced with properly processed materials and/or granular aggregate materials as part of the subgrade preparation. Due to the increased moisture content of the existing site soils and the increased amount of silty soils near the ground surface, we anticipate portions of the site will require additional stabilization efforts on the subgrade material in order construct the pavement section. Soil stabilization recommendations are presented in Section 9.1.1.

The site subgrade pavement section support soils must be scarified to a depth of 8 inches, moisture conditioned and compacted prior to placement of the overlying aggregate pavement section materials. The material should be moisture conditioned to within about 2 percent of the optimum moisture content and compacted to at least 90 percent of maximum dry density as determined by the modified Proctor test, ASTM D1557.

The surface of the subgrade soil should be graded and contoured to be approximately parallel to the finished grade of the asphalt or concrete pavement surface.

8.2 *Traffic Estimates*

Traffic projections and corresponding 18,000 pound (18k) equivalent single axel load (ESAL) factors were not available at the time of this report. We have provided pavement section thickness recommendations for an assumed ESAL values of 50,000 and 100,000. The designer should verify if the estimated traffic loads are valid for the project. If higher 18k-ESAL values are anticipated, the pavement sections presented in this report should be re-evaluated.

8.3 *Flexible Pavement Design Recommendations*

The aggregate materials used within the pavement section should conform to the requirements outlined in the current Specifications for Road and Bridge Construction, Colorado Department of Transportation (CDOT). The aggregate base material should be a ¾-inch minus material that conforms to the CDOT Class 6 aggregate base course specifications and have an R-value of at least 78. The aggregate sub-base course should conform to the CDOT specifications for Class 2 material and should have a minimum R-value 70. Other material may be suitable for use in the pavement section, but materials different than those listed above should be tested and observed by us prior to inclusion in the project design or construction. Aggregate sub-base and base-course materials should be compacted to at least 95 percent of maximum dry density as defined by the modified Proctor test, ASTM D1557.

We recommend that the asphalt concrete used on this project be mixed in accordance with a design prepared by a licensed professional engineer, or an asphalt concrete specialist. We should be contacted to review the mix design prior to placement at the project site. We recommend that the asphalt concrete be compacted to between 92 and 96 percent of the maximum theoretical density.

We have provided several pavement section design thicknesses below for both 50,000 and 100,000 estimated ESALs. The structural support characteristics of each section are approximately equal. The project civil engineer, or contractor can evaluate the best combination of materials for economic considerations.

Based on the laboratory test results, we estimated an R-value of 10 for the on-site soils, which correlates to a resilient modulus of 3,560 pounds per square inch. Other assumptions made for our analysis are listed below.

- Reliability Factor R(%)=85%
- Overall Standard Deviation, S_o=.44

- Estimated Total 18K-ESAL value(s)= 50,000 and 100,000
- Effective Roadbed Soils Resilient Modulus, M_r=3,560
- Change is serviceability index, Delta PSI=2.5
- Structural Coefficient of Asphalt Pavement = 0.44
- Structural Coefficient of Aggregate Base Course=0.11
- Structural Coefficient of Aggregate Sub-Base Course=0.09
- Modifying Structural Layer Coefficients for aggregate base course and aggregate sub-base course layers, m_i=1.0 (fair drainage conditions with 5%-25% saturation frequency)

Based on the above assumptions and laboratory test data obtained for the native on-site soil materials, we obtained a required structural number (SN) equal to 2.6 for an assumed 50,000 18k-ESAL and a SN of 2.88 for an assumed 100,000 18k-ESAL. Our pavement thickness design recommendations are provided below. We have shown alternate pavement sections below that meet the minimum structural numbers. Pavement sections with both 3 and 4 inch asphalt concrete sections are shown; however, we generally feel that the design with the thicker (4 inch) asphalt mat will be more resilient and able to withstand the rigors associated with exposure to heavy equipment traffic during construction of buildings at the site. The 4 inch mat will also provide for a better milling surface for future maintenance operations. We do not recommend aggregate base course layers of less than 4 inches or aggregate sub-base layers of less than 6 inches.

Pavement Section Design Thickness – 50,000 ESAL (SN=2.60)

Pavement Section Component	Alternative Thickness of Each Component (inches)			
Asphalt Concrete	3	3	4	4
Class 6 Roadbase	4	12	4	8
Class 2 Sub-Base	10	0	6	0

Pavement Section Design Thickness – 100,000 ESAL (SN=2.88)

Pavement Section Component	Alternative Thickness of Each Component (inches)			
Asphalt Concrete	3	3	4	4
Class 6 Roadbase	5	6	4	10
Class 2 Sub-Base	12	10	8	0

The pavement section thicknesses tabulated above are appropriate for the post-construction commercial traffic use. Heavy construction equipment traffic will have a significant influence on the quality, character, and design life of the pavement sections tabulated above. If possible, we recommend that a partial section be constructed followed by construction of an overlay after

completion of the construction operations. We are available to discuss this with you as the project progresses.

Water intrusion into the pavement section support materials will negatively influence the performance of the parking lot surface. Water from irrigation, water from natural sources that migrates into the soils beneath landscapes surface and water from any source that gains access to the support materials can all decrease the life of the parking lot surface. Care should be taken along curbs and any edge of the parking lot to develop an interface between the material that will reduce subsurface and surface water migration into the support soil and pavement section materials. Landscape islands and other irrigated features often promote water migration since no surface flow from these features typically occurs. The same can occur along perimeter cub areas.

Water will often migrate along the interface of concrete curbs and gutter areas early in the life of any parking area. The tendency for this type of migration often decreases with time but can be reduced by compaction of materials along the outside base of curb areas adjacent to the interface of the concrete curb and the underlying soil prior to placement of landscaping soil above this interface.

8.4 *Portland Cement Concrete Pavement Section*

For concrete pavements (rigid pavements), we recommend a minimum of 5-inches of Portland cement concrete (PCC). Concrete pavement underlain by 6 inches Class 6 aggregate base course is recommended 1) to create a uniform subbase/base, 2) to limit potential of pumping of fines from beneath the pavement, 3) provide a working platform for construction, and 4) to help control frost heave soils.

All concrete should be based on a mix design established by a qualified engineer. A CDOT Class P or D mix would be acceptable. The design mix should consist of aggregate, Portland cement, water, and additives which will meet the requirements contained in this section. The concrete should have a modulus of rupture of third point loading of 650 psi. Normally, concrete with a 28-day compressive strength of 4,200 psi will meet this requirement. Concrete should contain approximately 6 percent entrained air. Maximum allowable slump should not exceed 4 inches.

The concrete should contain joints not greater than 10 feet on centers. Joints should be sawed or formed by pre-molded filler. The joints should be at least 1/3 of the slab thickness. Joints should be reinforced with dowels to provide load transfer between slabs. Concrete pavement joints should meet the requirements of CDOT Standard Plan No. M 412-1 and CDOT Standard Specifications Section 412.13. Expansion joints should be provided at the end of each construction sequence and between the concrete slab and adjacent structures. Expansion joints, where required, should be filled with a ½-inch thick asphalt impregnated fiber. Concrete should be cured by protecting against loss of moisture, rapid temperature changes and mechanical injury for at least three days after placement. After sawing joints, the saw residue shall be removed and the joint sealed.

9.0 CONSTRUCTION CONSIDERATIONS

This section of the report provides comments, considerations and recommendations for aspects of the site construction which may influence, or be influenced by the geotechnical engineering considerations discussed above. The information presented below is not intended to discuss all aspects of the site construction conditions and considerations that may be encountered as the project progresses. If any questions arise as a result of our recommendations presented above, or if unexpected subsurface conditions are encountered during construction we should be contacted immediately.

9.1 Fill Placement Recommendations

There are several references throughout this report regarding both natural soil and compacted structural fill recommendations. The recommendations presented below are appropriate for the fill placement considerations discussed throughout the report above.

All areas to receive fill, structural components, or other site improvements should be properly prepared and grubbed at the initiation of the project construction. The grubbing operations should include scarification and removal of organic material and soil. No fill material or concrete should be placed in areas where existing vegetation or fill material exist.

9.1.1 Subgrade Soil Stabilization

We encountered subsurface water within our test borings above the elevation of some of the anticipated footing support elevations. We suspect that soft, yielding soil conditions may be encountered at various locations on the project site during construction. This material may be challenging to compact in preparation for placement of overlying fill material. We have provided two general categories of concepts to stabilize these soils to provide a suitable substrate for placement and compaction of overlying compacted fill. These include:

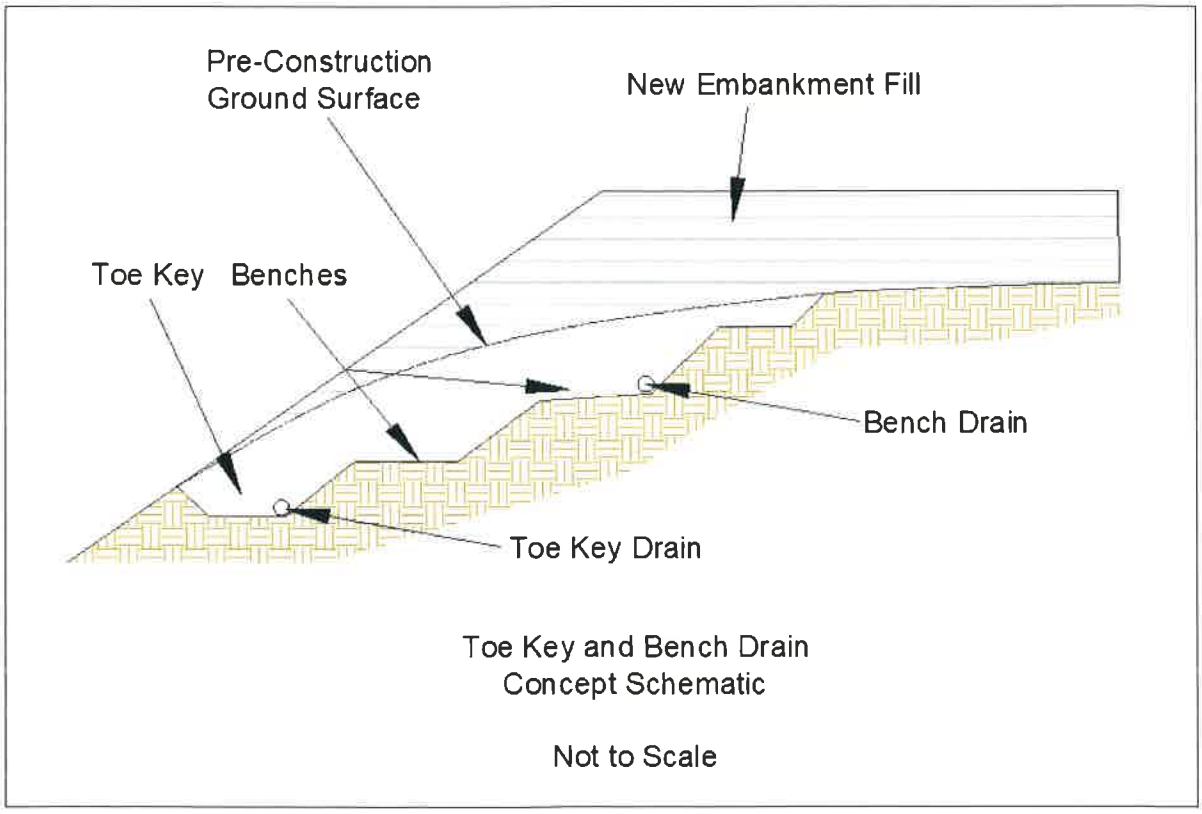
1.) Mechanical Stabilization; using soil and/or geotextile materials, and,
2.) Chemical Stabilization; using dry Portland cement.

Mechanical stabilization of soil often includes placement of aggregate material and/or larger cobbles (3-4 inch size) into an area where the soils are yielding. The most predictable technique is to over-excavate these soft areas by about 8 to 12 inches, (or more, if needed) lightly proof compact the exposed soil, place a layer of woven geosynthetic or geogrid-type material, such as or Mirifi RS 280i or BXG 120 geogrid, followed by placement of a "clean crushed aggregate" material with a nominal maximum size of 3 inches and not more than about 5 percent passing the #4 sieve. This clean crushed aggregate material should then be consolidated with a plate-type compactor. A less robust fabric, such as a non-woven geofabric, (such as Mirifi 140N) is placed on top of this aggregate layer followed by placement and compaction of the overlying fill material. For sites with extremely soft conditions it may be necessary to increase the clean aggregate layer to about 18 inches and place an intermediate layer of geogrid (or fabric) at mid-height of this layer.

Chemical stabilization using Portland cement is effective for most soils. Generally, this technique is more suitable for isolated soft areas. Generally dry Portland cement powder may be placed on the surface of the soft yielding material and subsequently mixed into the soil. The effectiveness of this technique is partially dependent upon the thoroughness of the mixing. If it can be thoroughly mixed the application rate of the Portland cement need not be more than 10 percent, and often an application of 5 to 7 percent will provide a significant decrease in free water and stabilize the material. After mixing, the material should be allowed to "rest" for about two of more hours prior to compaction. The treated material will often yield some during initial compaction, but will generally increase in rigidity as the process of hydration begins takes place. If yielding under compaction is excessive, the material should be allowed "cure" additionally prior to continued compaction effort being applied. Often it takes more time, such as overnight, to allow the cement to fully stabilize the material so this strategy is often implemented in an area at the end of a work day and allowed to cure overnight followed by subsequent fill placement on the following day.

9.1.2 Embankment Fill on Slopes

Embankment fill placed on slopes must be placed in areas that have been properly prepared prior to placement of the fill material. The fill should be placed in a toe key and benches constructed into the slope. The concept is shown below.



The width of the toe key should be at least one-fourth of the height of the fill. The elevation difference between each bench, width, and geometry of each bench is not critical; however, the elevation difference between each lift should not exceed about 3 to 4 feet. The benches should be of sufficient width to allow for placement of horizontal lifts of fill material; therefore, the size of the compaction equipment used will influence the bench widths.

Embankment fill material thicker than 5 feet should be analyzed on a site-specific basis. The fill mass may impose significant loads on, and influence the stability of the underlying slope. We suggest that no fill slopes steeper than two and one-half to one (2½:1, horizontal to vertical) be constructed unless a slope stability analysis of the site is conducted.

The toe key and bench drains shown above should be placed to reduce the potential for water accumulation in the embankment fill and in the soils adjacent to the embankment fill. The placement of these drains is more critical on larger fill areas, areas where subsurface water exists and in areas where the slopes are marginally stable.

The toe key and bench drains may consist of a perforated pipe which is surrounded by a free draining material which is wrapped by a geotextile filter fabric. The pipe should be surrounded by 4 to 6 cubic feet of free draining material per lineal foot of drain pipe.

9.1.3 Natural Soil Fill

Any natural soil used for any fill purpose should be free of all deleterious material, such as organic material and construction debris. Natural soil fill includes excavated and replaced material or in-place scarified material. Due to the expansive characteristics of the natural soil we do not recommend that it be used as fill material for direct support of structural components. The natural soils may be used to establish general site elevation. Our recommendations for placement of natural soil fill are provided below.

- The natural soils should be moisture conditioned, either by addition of water to dry soils, or by processing to allow drying of wet soils. The proposed fill materials should be moisture conditioned to between about optimum and about 2 percent above optimum soil moisture content. This moisture content can be estimated in the field by squeezing a sample of the soil in the palm of the hand. If the material easily makes a cast of soil which remains in-tact, and a minor amount of surface moisture develops on the cast, the material is close to the desired moisture content. Material testing during construction is the best means to assess the soil moisture content.
- Moisture conditioning of clay or silt soils may require many hours of processing. If possible, water should be added and thoroughly mixed into fine grained soil such as clay or silt the day prior to use of the material. This technique will allow for development of a more uniform moisture content and will allow for better compaction of the moisture conditioned materials.
- The moisture conditioned soil should be placed in lifts that do not exceed the capabilities of the compaction equipment used and compacted to at least 90 percent of maximum dry density as defined by ASTM D1557, modified Proctor test.
- We typically recommend a maximum fill lift thickness of 6 inches for hand operated equipment and 8 to 10 inches for larger equipment.

- Care should be exercised in placement of utility trench backfill so that the compaction operations do not damage underlying utilities.
- The maximum recommended lift thickness is about 6 to 8 inches. The maximum recommended rock size for natural soil fill is about 3 inches. This may require on-site screening or crushing if larger rocks are present. We must be contacted if it is desired to utilize rock greater than 3 inches for fill materials.

9.1.4 Granular Compacted Structural Fill

Granular compacted structural fill is referenced in numerous locations throughout the text of this report. Granular compacted structural fill should be constructed using an imported commercially produced rock product such as aggregate road base. Many products other than road base, such as clean aggregate or select crusher fines may be suitable, depending on the intended use. If a specification is needed by the design professional for development of project specifications, a material conforming to the Colorado Department of Transportation (CDOT) "Class 6" aggregate road base material can be specified. This specification can include an option for testing and approval in the event the contractor's desired material does not conform to the Class 6 aggregate specifications. We have provided the CDOT Specifications for Class 6 material below.

Grading of CDOT Class 6 Aggregate Base-Course Material	
Sieve Size	Percent Passing Each Sieve
1 inch	100
¾ inch	95-100
#4	30-65
#8	25-55
#200	3-12

Liquid Limit less than 30

All compacted structural fill should be moisture conditioned and compacted to at least 90 percent of maximum dry density as defined by ASTM D1557, modified Proctor test. Areas where the structural fill will support traffic loads under concrete slabs or asphalt concrete should be compacted to at least 95 percent of maximum dry density as defined by ASTM D1557, modified Proctor test.

Although clean-screened or washed aggregate may be suitable for use as structural fill on sites with sand or non-expansive silt soils, or on sites where shallow subsurface water is present, clean aggregate materials must not be used on any site where expansive soils exist due to the potential for water to accumulate in the voids of the clean aggregate materials.

Clean aggregate fill, if appropriate for the site soil conditions, must not be placed in lifts exceeding 8 inches and each lift should be thoroughly vibrated, preferably with a plate-type vibratory compactor prior to placing overlying lifts of material or structural components. We should be contacted prior to the use of clean aggregate fill materials to evaluate their suitability for use on this project.

9.1.5 Deep Fill Considerations

Deep fills, in excess of approximately 3 feet, should be avoided where possible. Fill soils will settle over time, even when placed properly per the recommendations contained in this report. Natural soil fill or engineered structural fills placed to our minimum recommended requirements will tend to settle an estimated 1 to 3 percent; therefore, a 3 foot thick fill may settle up to approximately 1 inch over time. A 10 foot thick fill may settle up to approximately 3½ inches even when properly placed. Fill settlement will result in distress and damage to the structures they are intended to support. There are methods to reduce the effects of deep fill settlement such as surcharge loading and surveyed monitoring programs; however, there is a significant time period of monitoring required for this to be successful. A more reliable method is to support structural components with deep foundation systems bearing below the fill envelope. We can provide additional guidance regarding deep fills up on request.

9.2 Excavation Considerations

Unless a specific classification is performed, the site soils should be considered as an Occupational Safety and Health Administration (OSHA) Type C soil and should be sloped and/or benched according to the current OSHA regulations. Excavations should be sloped and benched to prevent wall collapse. Any soil can release suddenly and cave unexpectedly from excavation walls, particularly if the soils is very moist, or if fractures within the soil are present. Daily observations of the excavations should be conducted by OSHA competent site personnel to assess safety considerations.

We encountered subsurface water in our test borings. We suspect that it may be necessary to dewater excavations to provide for suitable working conditions.

Large boulders are known to be present throughout the vicinity of Silverton. Due to the size of the boulders encountered in the vicinity, if encountered, they may be difficult to remove using conventional excavation techniques and equipment. Removal of large boulders can also create a void of loose soil beneath structural components, which may require additional removal of loose soil and replacement with structural fill. In some instances, it may be preferable to leave boulders in place. Reduction in the thickness of the recommended structural fill beneath footings and slabs may also be prudent to limit disturbance to the bearing soils. If large boulders are encountered in the building footprint, a representative of the geotechnical engineer can provide field observations and provide additional recommendations for subgrade preparation.

If possible, excavations should be constructed to allow for water flow from the excavation the event of precipitation during construction. If this is not possible it may be necessary to remove water from snowmelt or precipitation from the foundation excavations to help reduce the influence of this water on the soil support conditions and the site construction characteristics.

9.2.1 Excavation Cut Slopes

We anticipate that some permanent excavation cut slopes may be included in the site development. Temporary cut slopes should not exceed 5 feet in height and should not be steeper than about 1:1 (horizontal to vertical) for most soils. Permanent cut slopes greater than 5 feet or

steeper than 2½:1 must be analyzed on a site-specific basis.

We did not observe evidence of existing unstable slope areas influencing the site, but due to the steepness and extent of the slopes in the area we suggest that the magnitude of the proposed excavation slopes be minimized and/or supported by retaining structures.

9.3 Utility Considerations

Subsurface utility trenches will be constructed as part of the site development. Utility line backfill often becomes a conduit for post construction water migration. If utility line trenches approach the proposed project site from above, water migrating along the utility line and/or backfill may have direct access to the portions of the proposed structure where the utility line penetrations are made through the foundation system. The foundation soils in the vicinity of the utility line penetration may be influenced by the additional subsurface water. There are a few options to help mitigate water migration along utility line backfill. Backfill bulkheads constructed with high clay content soils and/or placement of subsurface drains to promote utility line water discharge away from the foundation support soil.

Some movement of all structural components is normal and expected. The amount of movement may be greater on sites with problematic soil conditions. Utility line penetrations through any walls or floor slabs should be sleeved so that movement of the walls or slabs does not induce movement or stress in the utility line. Utility connections should be flexible to allow for some movement of the floor slab.

9.4 Exterior Grading and Drainage Comments

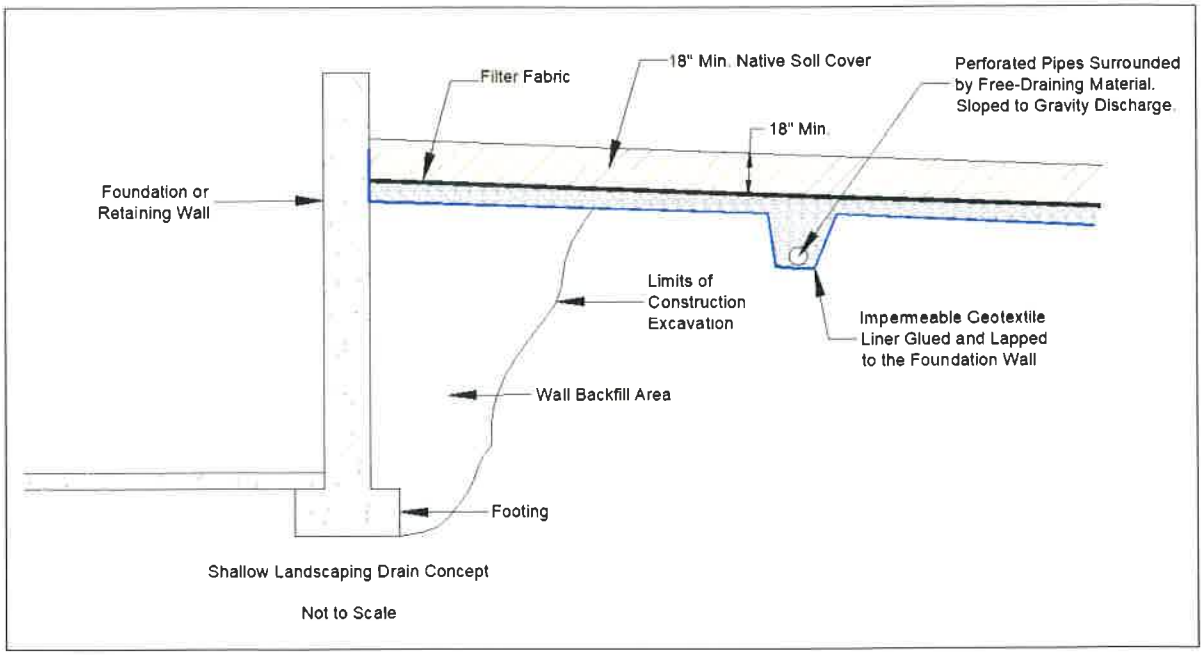
The following recommendations should be following during construction and maintained for the life of the structure with regards to exterior grading and surface drainage.

- The ground surface adjacent to the structure should be sloped to promote water flow away from the foundation system and flatwork.
- Snow storage areas should not be located in areas which will allow for snowmelt water access to support soils for the foundation system or flatwork.
- The project civil engineer, architect or builder should develop a drainage scheme for the site. We typically recommend the ground surface surrounding the exterior of the building be sloped to drain away from the foundation in all directions. We recommend a minimum slope of 12 inches in the first 10 feet in unpaved areas and a minimum slope of 3 inches in the first 10 feet in paved areas.
- Water flow from the roof of the structure should be captured and directed away from the structure. If the roof water is collected in an eave gutter system, or similar, the discharge points of the system must be located away from areas where the water will have access to the foundation backfill or any structure support soils. If downspouts are used, provisions should be made to either collect or direct the water away from the structure.
- Care should be taken to not direct water onto adjacent property or to areas that would negatively influence existing structures or improvements.

9.5 Landscaping Considerations

We recommend against construction of landscaping which requires excessive irrigation. Generally landscaping which uses abundant water requires that the landscaping contractor install topsoil which will retain moisture. The topsoil is often placed in flattened areas near the structure to further trap water and reduce water migration from away from the landscaped areas. Unfortunately, almost all aspects of landscape construction and development of lush vegetation are contrary to the establishment of a relatively dry area adjacent to the foundation walls. Excess water from landscaped areas near the structure can migrate to the foundation system or flatwork support soils, which can result in volume changes in these soils.

A relatively common concept used to collect and subsequently reduce the amount of excess irrigation water is to glue or attach an impermeable geotextile fabric or heavy mill plastic to the foundation wall and extend it below the topsoil which is used to establish the landscape vegetation. A thin layer of sand can be placed on top of the geotextile material to both protect the geotextile from punctures and to serve as a medium to promote water migration to the collection trench and perforated pipe. The landscape architect or contractor should be contacted for additional information regarding specific construction considerations for this concept which is shown in the sketch below.



A free draining aggregate or sand may be placed in the collection trench around the perforated pipe. The perforated pipe should be graded to allow for positive flow of excess irrigation water away from the structure or other area where additional subsurface water is undesired. Preferably the geotextile material should extend at least 10 or more feet from the foundation system.

Care should be taken to not place exterior flatwork such as sidewalks or driveways on soils that have been tilled and prepared for landscaping. Tilled soils will settle which can cause damage to the overlying flatwork. Tilled soils placed on sloped areas often "creep" down-slope. Any structure or structural component placed on this material will move down-slope with the tilled soil and may become damaged.

9.6 Soil Sulfate and Corrosion Issues

The requested scope of our services did not include assessment of the chemical constituents of corrosion potential of the site soils. Most soils in southwest Colorado are not typically corrosive to concrete. There has not been a history of damage to concrete due to sulfate corrosion in the area.

We are available to perform soluble sulfate content tests to assess the corrosion potential of the soils on concrete if desired.

9.7 Radon Issues

The requested scope of service of this report did not include assessment of the site soils for radon production. Many soils and formational materials in western Colorado produce Radon gas. The structure should be appropriately ventilated to reduce the accumulation of Radon gas in the structure. Several Federal Government agencies including the Environmental Protection Agency (EPA) have information and guidelines available for Radon considerations and home construction. If a radon survey of the site soils is desired, please contact us.

9.8 Mold and Other Biological Contaminants

Our services do not include determining the presence, prevention or possibility of mold or other biological contaminants developing in the future. If the client is concerned about mold or other biological contaminants, a professional in this special field of practice should be consulted.

10.0 CONSTRUCTION MONITORING AND TESTING

Engineering observation of subgrade bearing conditions, compaction testing of fill material and testing of foundation concrete are equally important tasks that should be performed by the geotechnical engineering consultant during construction. We should be contacted during the construction phase of the project and/or if any questions or comments arise as a result of the information presented below. It is common for unforeseen, or otherwise variable subsurface soil and water conditions to be encountered during construction. As discussed in our proposal for our services, it is imperative that we be contacted during the foundation excavation stage of the project to verify that the conditions encountered in our field exploration were representative of those encountered during construction. Our general recommendations for construction monitoring and testing are provided below.

- Consultation with design professionals during the design phases: This is important to ensure that the intentions of our recommendations are properly incorporated in the design, and that any changes in the design concept properly consider geotechnical aspects.

- Grading Plan Review: A grading plan was not available for our review at the time of this report. A grading plan with finished floor elevations for the proposed construction should be prepared by a civil engineer licensed in the State of Colorado. Trautner Geotech should be provided with grading plans once they are complete to determine if our recommendations based on the assumed bearing elevations are appropriate.
- Observation and monitoring during construction: A representative of the Geotechnical engineer from our firm should observe the foundation excavation, earthwork, and foundation phases of the work to determine that subsurface conditions are compatible with those used in the analysis and design and our recommendations have been properly implemented. Placement of backfill should be observed and tested to judge whether the proper placement conditions have been achieved. Compaction tests should be performed on each lift of material placed in areas proposed for support of structural components.
- We recommend a representative of the geotechnical engineer observe the drain and dampproofing phases of the work to judge whether our recommendations have been properly implemented.
- If asphaltic concrete is placed for driveways or aprons near the structure we are available to provide testing of these materials during placement.

11.0 CONCLUSIONS

While we feel that it is feasible to develop this site as planned using relatively conventional techniques we feel that it is prudent for us to be part of the continuing design of this project to review and provide consultation in regard to the proposed development scheme as the project progresses to aid in the proper interpretation and implementation of the recommendations presented in this report. This consultation should be incorporated in the project development prior to construction at the site.

12.0 LIMITATIONS

This study has been conducted based on the geotechnical engineering standards of care in this area at the time this report was prepared. We make no warranty as to the recommendations contained in this report, either expressed or implied. The information presented in this report is based on our understanding of the proposed construction that was provided to us and on the data obtained from our field and laboratory studies. Our recommendations are based on limited field and laboratory sampling and testing. Unexpected subsurface conditions encountered during construction may alter our recommendations. We should be contacted during construction to observe the exposed subsurface soil conditions to provide comments and verification of our recommendations.

The recommendations presented above are intended to be used only for this project site and the proposed construction which was provided to us. The recommendations presented above are not suitable for adjacent project sites, or for proposed construction that is different than that outlined for this study.

This report provides geotechnical engineering design parameters, but does not provide foundation design or design of structure components. The project architect, designer or structural engineer must be contacted to provide a design based on the information presented in this report.

This report does not provide an environmental assessment nor does it provide environmental recommendations such as those relating to Radon or mold considerations. If recommendation relative to these or other environmental topics are needed and environmental specialist should be contacted.

The findings of this report are valid as of the present date. However, changes in the conditions of the property can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or the broadening of knowledge. Therefore, the recommendations presented in this report should not be relied upon after a period of two years from the issue date without our review.

We are available to review and tailor our recommendations as the project progresses and additional information which may influence our recommendations becomes available.

Please contact us if you have any questions, or if we may be of additional service.

Respectfully,
TRAUTNER GEOTECH

Tom R. Harrison, P.E.
Geotechnical Engineer

APPENDIX A

Field Study Results

TRAUTNER GEOTECH LLC

GEOTECHNICAL ENGINEERING, MATERIALS TESTING AND ENGINEERING GEOLOGY
849 Tech Center Drive, Durango, Colorado, 81301 (970) 259-5095 www.trautnergeotech.com

Field Engineer	T. Harrison
Hole Diameter	4" Solid
Drilling Method	Continuous Flight Auger
Sampling Method	Mod. California Sampler
Date Drilled	07/07/22
Total Depth (approx.)	24 feet
Location	See Figure 1 in Report

LOG OF BORING TB-1

Block 7 and Block 8, Blague's Addition
Silverton Colorado
George Henderson

Project Number: 57343GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- Water Level During Drilling
- Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	Silty and Sand with organics, soft, very moist, dark brown	ML/SM					
1	Clayey Sand with gravel and few cobbles, medium dense, moist to very moist, brown	SC					
2							
3	Clayey Gravel and Cobble with Sand, dense, very moist to wet, brown to tan	GC			21/6		
4					19/6		
5							
6							
7	Clayey Sand and Gravel, few cobbles, dense, wet, brown to tan					▼	Subsurface water measured at 7 feet after drilling
8					19/6		
9					23/6		
10					20/6		
11							
12							
13							
14							
15		GC					
16							
17							
18							
19							
20							
21							
22							
23							
24	Practical Auger Refusal at 24 feet						
25							

TRAUTNER GEOTECH LLC

GEOTECHNICAL ENGINEERING, MATERIALS TESTING AND ENGINEERING GEOLOGY
849 Tech Center Drive, Durango, Colorado, 81301 (970) 259-5095 www.trautnergeotech.com

Field Engineer	: T. Harrison
Hole Diameter	: 4" Solid
Drilling Method	: Continuous Flight Auger
Sampling Method	: Mod. California Sampler
Date Drilled	: 07/07/22
Total Depth (approx.)	: 8.5 feet
Location	: See Figure 1 in Report

LOG OF BORING TB-2

Block 7 and Block 8, Blague's Addition
Silverton Colorado
George Henderson

Project Number: 57343GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- Water Level During Drilling
- Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	Silty and Sand with organics, soft, very moist, dark brown	ML/SM					
1	Clayey Sand with gravel, loose, very moist to wet, tan	SC				▼	Subsurface water measured at 2 feet after drilling
2							
3							
4	Clayey Gravel and Cobble with Sand, dense, wet, tan	GC			12/6 19/6		
5							
6							
7							
8							
9	Practical Auger Refusal at 8.5 feet						

08-15-2022 T:\Current GE\57300GE thru 57399GE\57343GE, Block 7 and Block 8, Blague's Addition\Logs of Test Borings\Blague's Addition_TB-2.bor

TRAUTNER GEOTECH LLC

GEOTECHNICAL ENGINEERING, MATERIALS TESTING AND ENGINEERING GEOLOGY
649 Tech Center Drive, Durango, Colorado 81301 (970) 259-5095 www.trautnergeotech.com

Field Engineer	: T. Harrison
Hole Diameter	: 4" Solid
Drilling Method	: Continuous Flight Auger
Sampling Method	: Mod. California Sampler
Date Drilled	: 07/07/22
Total Depth (approx.)	: 6 feet
Location	: See Figure 1 in Report

LOG OF BORING TB-3

Block 7 and Block 8, Blague's Addition
Silverton Colorado
George Henderson

Project Number: 57343GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- Water Level During Drilling
- Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	Silty and Sand with organics, soft, very moist, dark brown	ML/SM					
1	Clayey Gravel and Cobble with Sand, dense to very dense, moist to wet, tan	GC			24/6 30/6	▼	Subsurface water measured at 5 feet after drilling
2							
3							
4							
5							
6	Practical Auger Refusal at 6 feet						
7							

08-15-2022 T:\Current GE\57300GE thru 57399GE\57343GE, Block 7 and Block 8, Blague's Addition\Logs of Test Borings\Blague's Addition_TB-3 bor

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Field Engineer	T. Harrison
Hole Diameter	4" Solid
Drilling Method	Continuous Flight Auger
Sampling Method	Mod. California Sampler
Date Drilled	07/07/22
Total Depth (approx.)	6 feet
Location	See Figure 1 in Report

LOG OF BORING TB-4

Block 7 and Block 8, Blague's Addition
Silverton Colorado
George Henderson

Project Number: 57343GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- Water Level During Drilling
- Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	Silty Sand with organics, soft, moist, dark brown	ML					
1							
2	Clayey Gravel and Cobble with Sand, dense to very dense, moist, brown	GC			15/6 17/6		
3							
4							
5							
6	Practical Auger Refusal at 6 feet						
7							

08-15-2022 T:\Current GE\57300GE thru 57399GE\57343GE, Block 7 and Block 8, Blague's Addition\Logs of Test Borings\Blague's Addition_TB-3.bor

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Field Engineer	: T. Harrison
Hole Diameter	: 4" Solid
Drilling Method	: Continuous Flight Auger
Sampling Method	: Mod. California Sampler
Date Drilled	: 07/07/22
Total Depth (approx.)	: 7.5 feet
Location	: See Figure 1 in Report

LOG OF BORING TB-5

Block 7 and Block 8, Blague's Addition
Silverton Colorado
George Henderson

Project Number: 57343GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- Water Level During Drilling
- Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	Silty Sand with organics, few gravels and cobbles, loose, moist, dark brown	SM					
1							
2	Clayey Gravel with Sand and Cobbles, dense, moist, brown to tan	GC				▽	Subsurface Water measured at 2.5 feet after drilling
3					15/6		
4					17/6		
5							
6							
7							
8	Practical Auger Refusal at 7.5 feet						

08-15-2022 T:\Current GE\57300GE thru 57399GE\57343GE, Block 7 and Block 8, Blague's Addition\Logs of Test Borings\Blague's Addition_TB-5.bor

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Field Engineer	: T. Harrison
Hole Diameter	: 4" Solid
Drilling Method	: Continuous Flight Auger
Sampling Method	: Mod. California Sampler
Date Drilled	: 07/07/22
Total Depth (approx.)	: 3.5 feet
Location	: See Figure 1 in Report

LOG OF BORING TB-6

Block 7 and Block 8, Blague's Addition
Silverton Colorado
George Henderson

Project Number: 57343GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- Water Level During Drilling
- Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	Silty Sand with organics, few gravels, loose, moist, dark brown	SM					
1	Clayey Gravel with Sand and Cobbles, dense to very dense, moist, brown to tan	GC					
2							
3							
	Practical Auger Refusal at 3.5 feet						
4							

08-15-2022 T:\Current GE\57300GE thru 57399GE\57343GE, Block 7 and Block 8, Blague's Addition\Logs of Test Borings\Blague's Addition_TB-6.bor

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Field Engineer	: T. Harrison
Hole Diameter	: 4" Solid
Drilling Method	: Continuous Flight Auger
Sampling Method	: Mod. California Sampler
Date Drilled	: 07/07/22
Total Depth (approx.)	: 10.5 feet
Location	: See Figure 1 in Report

LOG OF BORING TB-7

Block 7 and Block 8, Blague's Addition
Silverton Colorado
George Henderson

Project Number: 57343GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- Water Level During Drilling
- Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	Silty Sand with organics, few gravels, loose, moist, dark brown	SM					
1	Clayey Gravel with Sand and Cobbles, dense, moist, brown to tan	GC			15/6 10/0 bounce 17/6 25/6 25/6		
11	Practical Auger Refusal at 10.5 feet						

08-15-2022 T:\Current GE\57300GE thru 57399GE\57343GE, Block 7 and Block 8, Blague's Addition\Logs of Test Borings\Blague's Addition_TB-7.bor

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649 Tech Center Drive, Durango, Colorado, 81301 (970) 259-5095 www.trautnergeotech.com

Field Engineer	: T. Harrison
Hole Diameter	: 4" Solid
Drilling Method	: Continuous Flight Auger
Sampling Method	: Mod. California Sampler
Date Drilled	: 07/07/22
Total Depth (approx.)	: 5 feet
Location	: See Figure 1 in Report

LOG OF BORING TB-8

Block 7 and Block 8, Blague's Addition
Silverton Colorado
George Henderson

Project Number: 57343GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- Water Level During Drilling
- Water Level After Drilling

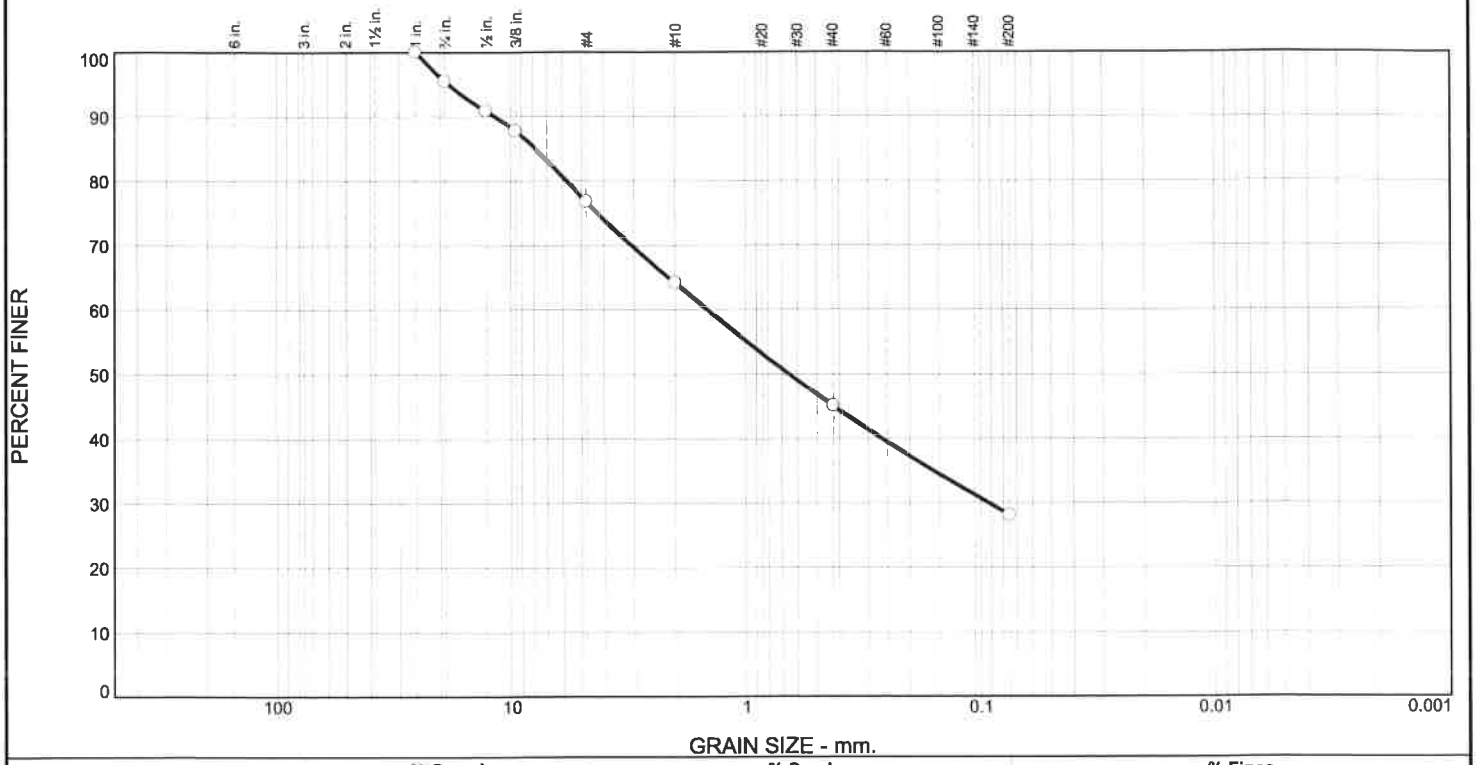
Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	Silty Sand with organics, few gravels, loose, moist, dark brown	SM					
	Clayey Gravel with Sand and Cobbles, dense to very dense, slightly moist, brown to tan	GC					
5	Practical Auger Refusal at 5 feet						
6							

08-15-2022 T:\Current GE\57300GE thru 57399GE\57343GE, Block 7 and Block 8, Blague's Addition\Logs of Test Borings\Blague's Addition_TB-7.bor

APPENDIX B

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	5	18	13	19	17	28	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	95		
1/2"	91		
3/8"	88		
#4	77		
#10	64		
#40	45		
#200	28		

* (no specification provided)

Material Description

SC-Claycy Sand with Gravel

Atterberg Limits

PL= 20 LL= 29 PI= 9

Coefficients

D_{90}= 11.6728 D_{85}= 7.8225 D_{60}= 1.4590
D_{50}= 0.6557 D_{30}= 0.0926 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-4(0)

Remarks

Location: Test Boring 1
Sample Number: 12932-A **Depth:** 0'-3' **Date:** 7-7-22

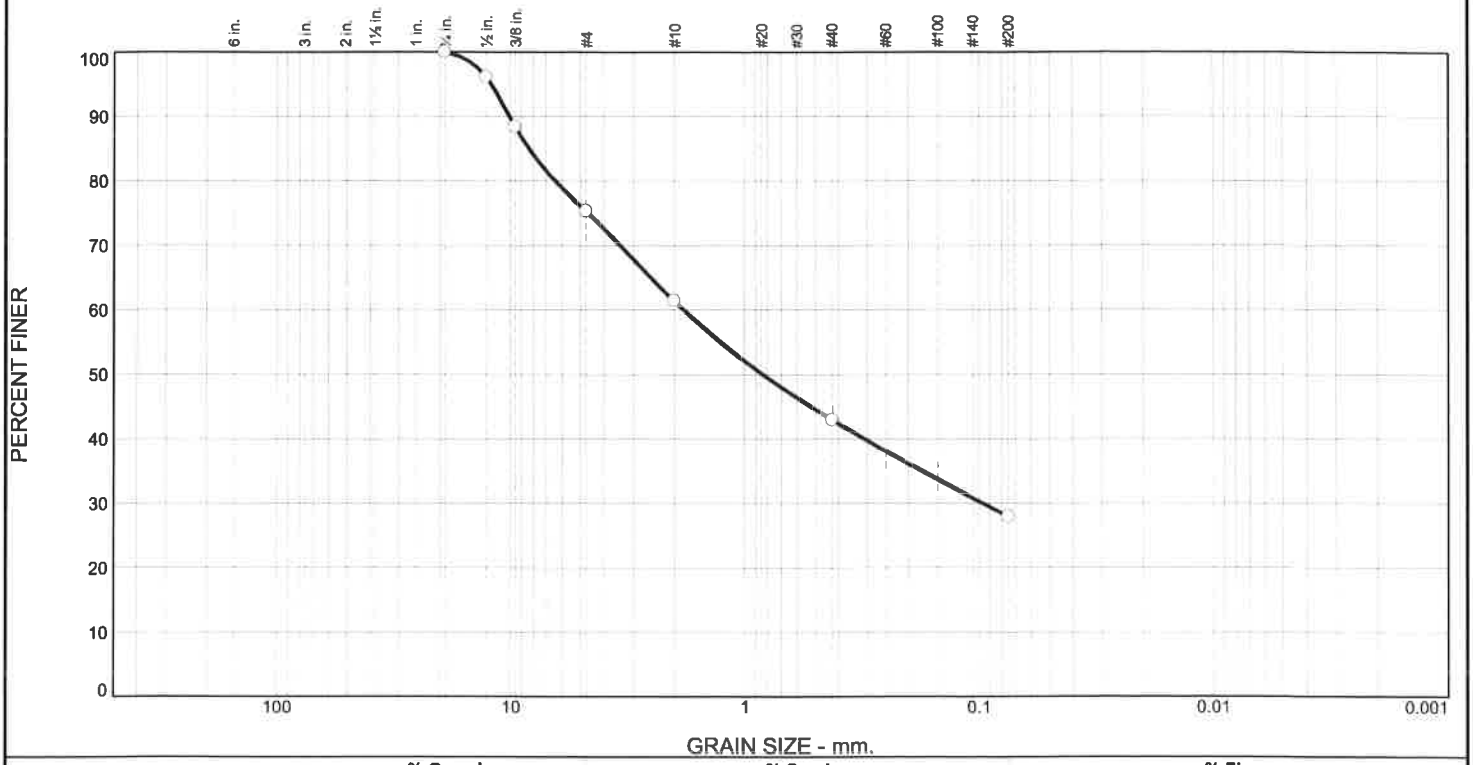
TRAUTNER GEOTECH LLC

Client: George Henderson
Project: Block 7 and Block 8 Blague's Addition

Project No: 57343GE **Figure** B.1

Tested By: C. Manchester **Checked By:** N. Winiecki

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	25	14	18	15	28	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100		
.50	96		
.375	88		
#4	75		
#10	61		
#40	43		
#200	28		

* (no specification provided)

Material Description

SC-Clayey Sand with Gravel

Atterberg Limits

PL= 17 LL= 27 PI= 10

Coefficients

D_{90}= 10.1077 D_{85}= 8.3258 D_{60}= 1.8244
D_{50}= 0.8386 D_{30}= 0.0966 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-4(0)

Remarks

Location: Test Boring 1
Sample Number: 12932-C **Depth:** 4'-8' **Date:** 7-7-22

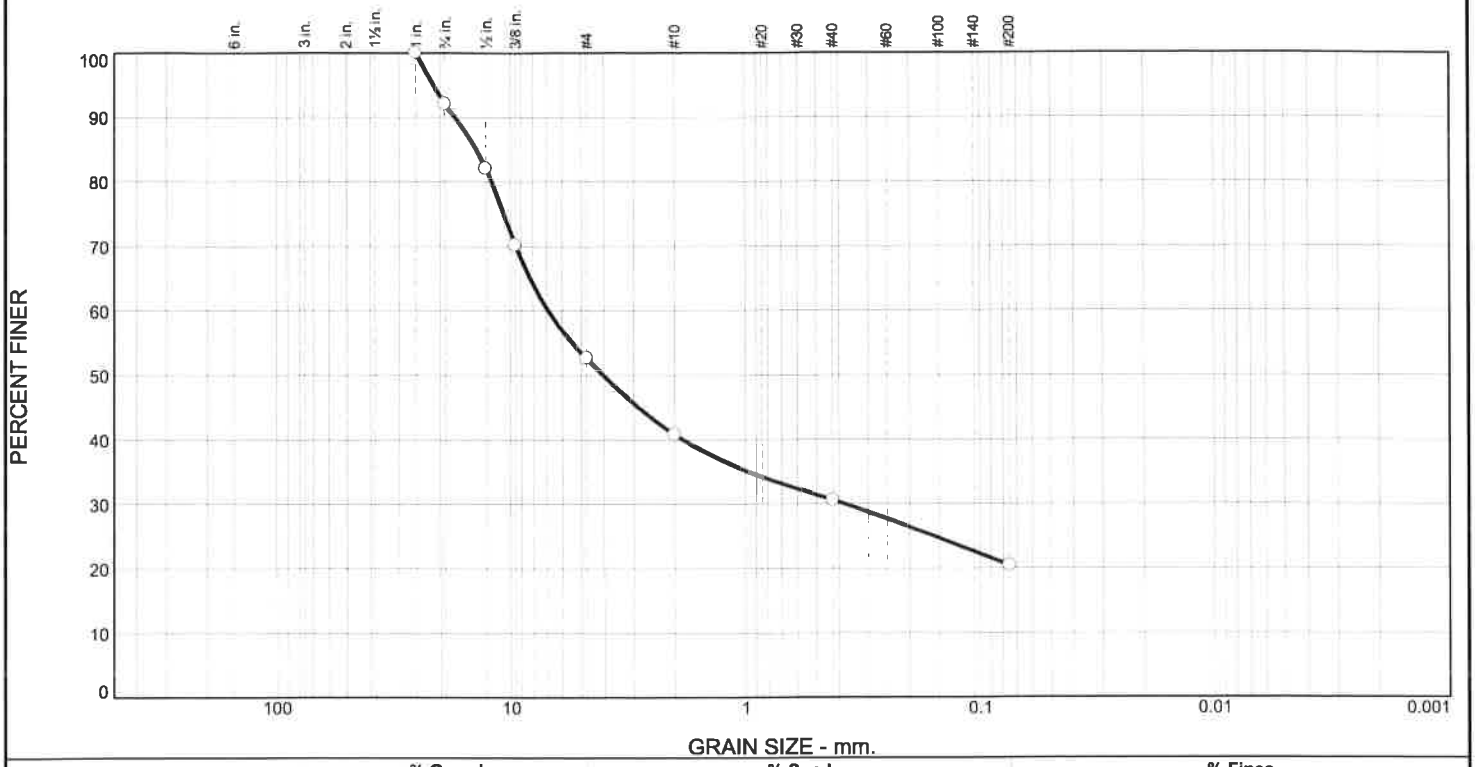
TRAUTNER GEOTECH LLC

Client: George Henderson
Project: Block 7 and Block 8 Blague's Addition

Project No: 57343GE **Figure** B.2

Tested By: C. Manchester **Checked By:** N. Winiecki

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	8	39	12	10	11	20	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	92		
1/2"	82		
3/8"	70		
#4	53		
#10	41		
#40	31		
#200	20		

* (no specification provided)

Material Description

GC-Clayey Gravel with Sand

Atterberg Limits

PL= 20 LL= 31 PI= 11

Coefficients

D_{90}= 17.3392 D_{85}= 13.9785 D_{60}= 6.9032
D_{50}= 4.0529 D_{30}= 0.3797 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= GC AASHTO= A-2-6(0)

Remarks

Location: Test Boring 3
Sample Number: 12932-G **Depth:** 0'-3 1/2' **Date:** 7-7-22

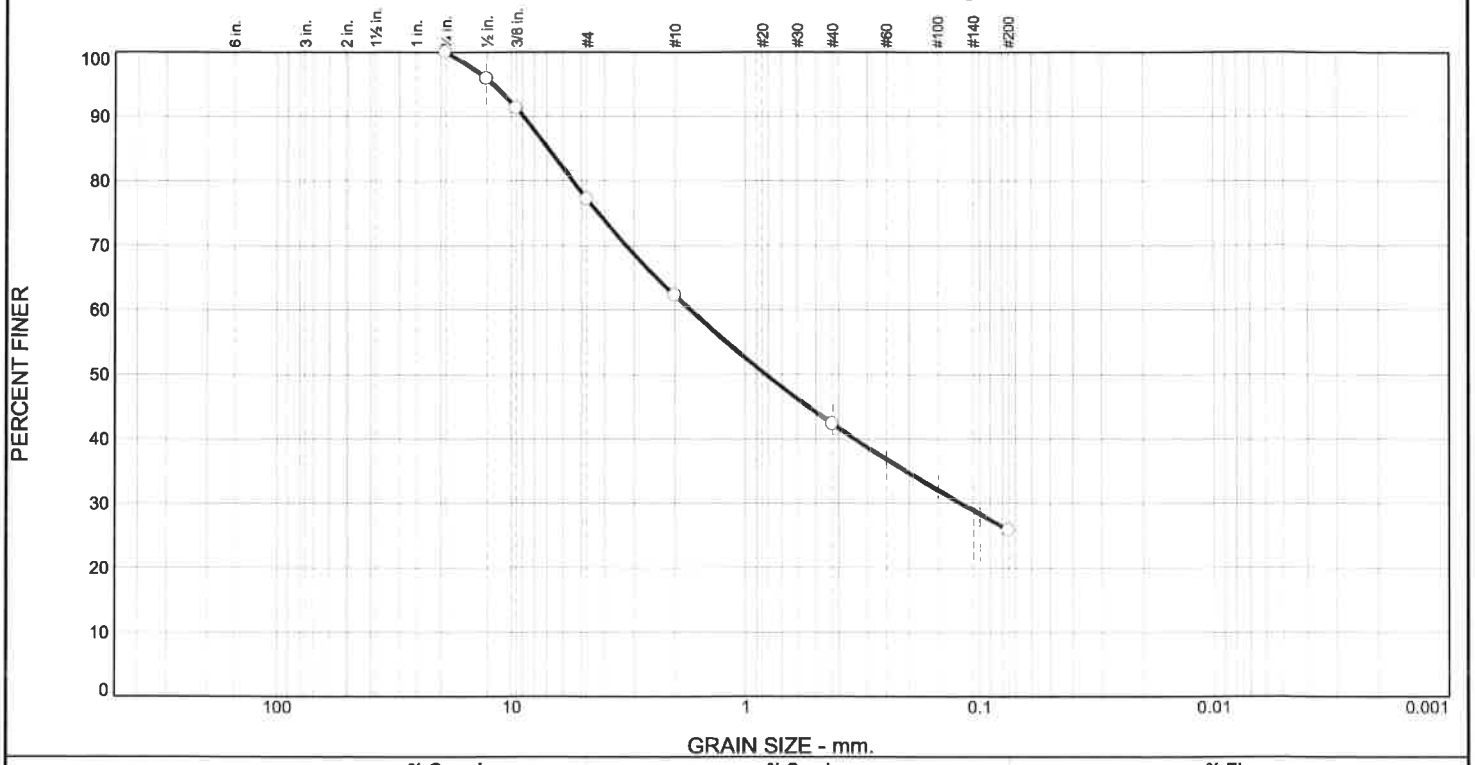
TRAUTNER GEOTECH LLC

Client: George Henderson
Project: Block 7 and Block 8 Blague's Addition

Project No: 57343GE **Figure** B.3

Tested By: P. Walston **Checked By:** N. Winiecki

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	23	15	20	16	26	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100		
.50	96		
.375	91		
#4	77		
#10	62		
#40	42		
#200	26		

* (no specification provided)

Material Description

SC-Clayey Sand with Gravel

Atterberg Limits

PL= 24 LL= 36 PI= 12

Coefficients

D_{90}= 8.8930 D_{85}= 6.9323 D_{60}= 1.7190
D_{50}= 0.8220 D_{30}= 0.1202 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-6(0)

Remarks

Location: Test Boring 5
Sample Number: 12932-K **Depth:** 0'-3' **Date:** 7-7-22

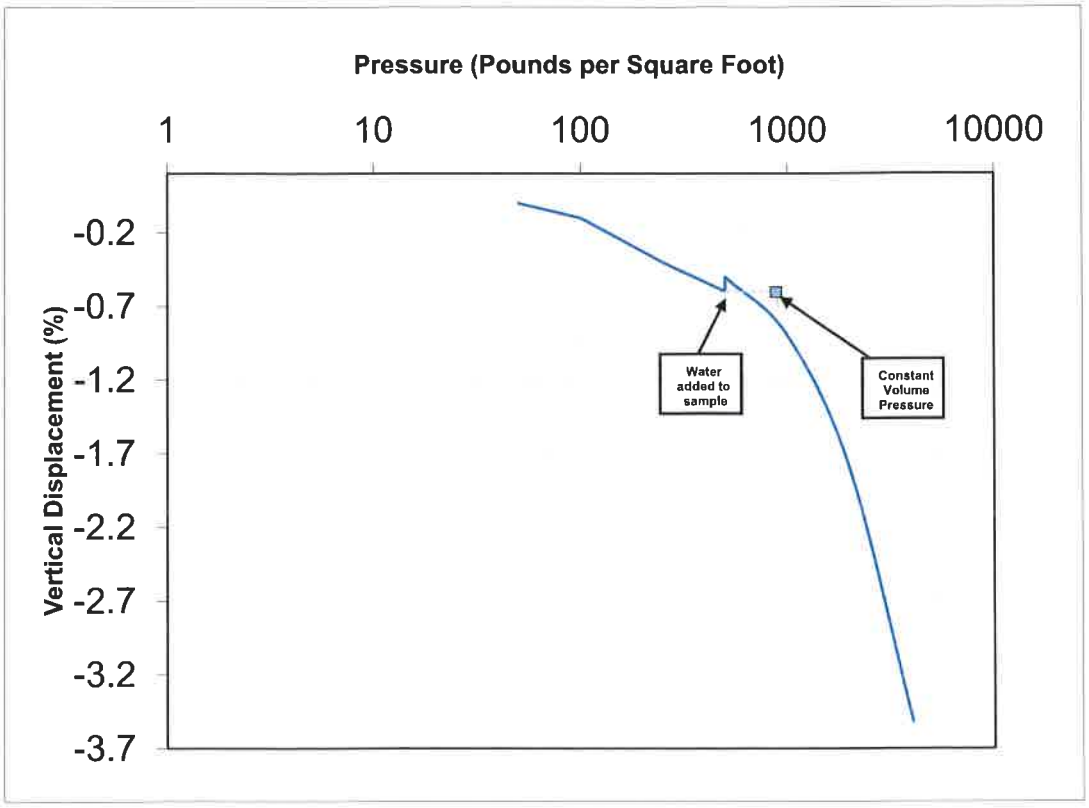
TRAUTNER GEOTECH LLC

Client: George Henderson
Project: Block 7 and Block 8 Blague's Addition

Project No: 57343GE **Figure** B.4

Tested By: C. Manchester **Checked By:** N. Winiecki

SWELL - CONSOLIDATION TEST

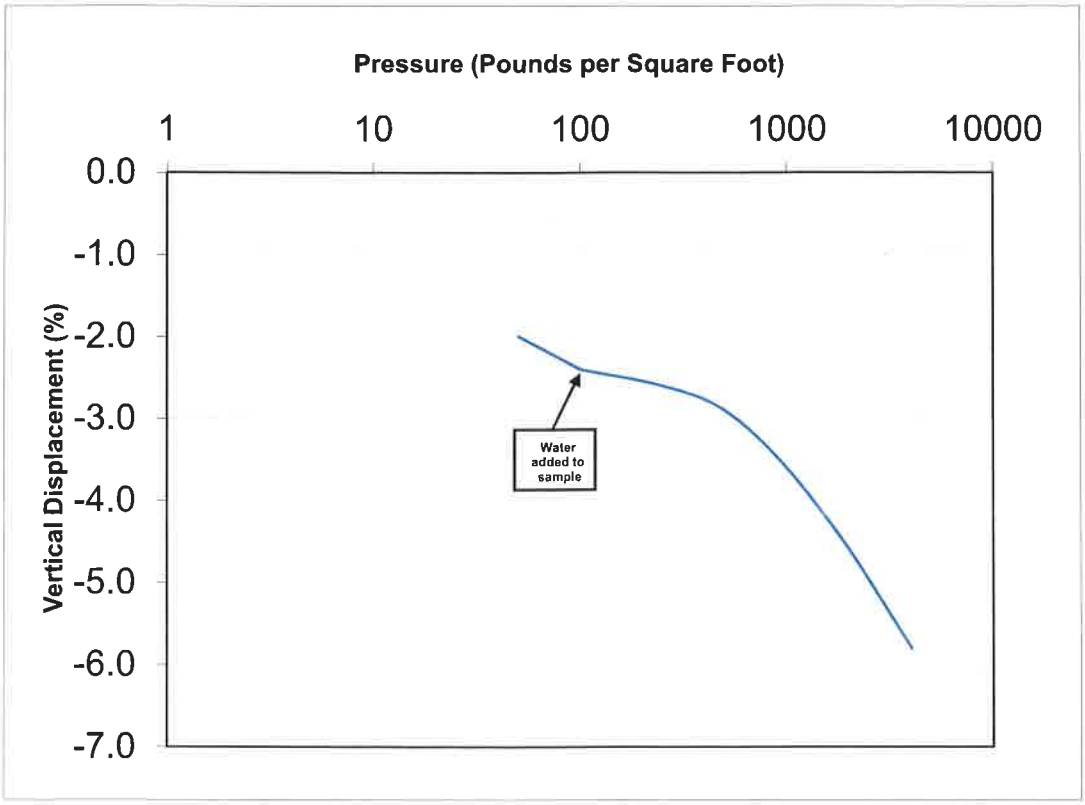


SUMMARY OF TEST RESULTS		
Sample Source:	TB-1 @ 3'	
Visual Soil Description:	GC	
Swell Potential (%)	0.1%	
Constant Volume Swell Pressure (lb/ft^2):	880	
	Initial	**Final**
Moisture Content (%):	7.7	14.3
Dry Density (lb/ft^3):	119.9	123.5
Height (in.):	0.995	0.960
Diameter (in.):	1.94	1.94

Note: Remolded Sample; Molded from the portion of sample passing a #10 sieve. Consolidated under 500 PSF prior to initiating load sequence and wetting. Initial values represent the conditions under 50 PSF following the pre-consolidation under 500 PSF.

Project Number:	57343GE
Sample ID:	12932-B
Figure:	B.5

SWELL - CONSOLIDATION TEST



SUMMARY OF TEST RESULTS		
Sample Source:	TB-2 @ 4'	
Visual Soil Description:	GC	
Swell Potential (%)	0.0%	
Constant Volume Swell Pressure (lb/ft^2):	0	
	Initial	**Final**
Moisture Content (%):	14.4	14.3
Dry Density (lb/ft^3):	120.5	125.7
Height (in.):	1.000	0.942
Diameter (in.):	1.94	1.94

Project Number:	57343GE
Sample ID:	12932-F
Figure:	B.6

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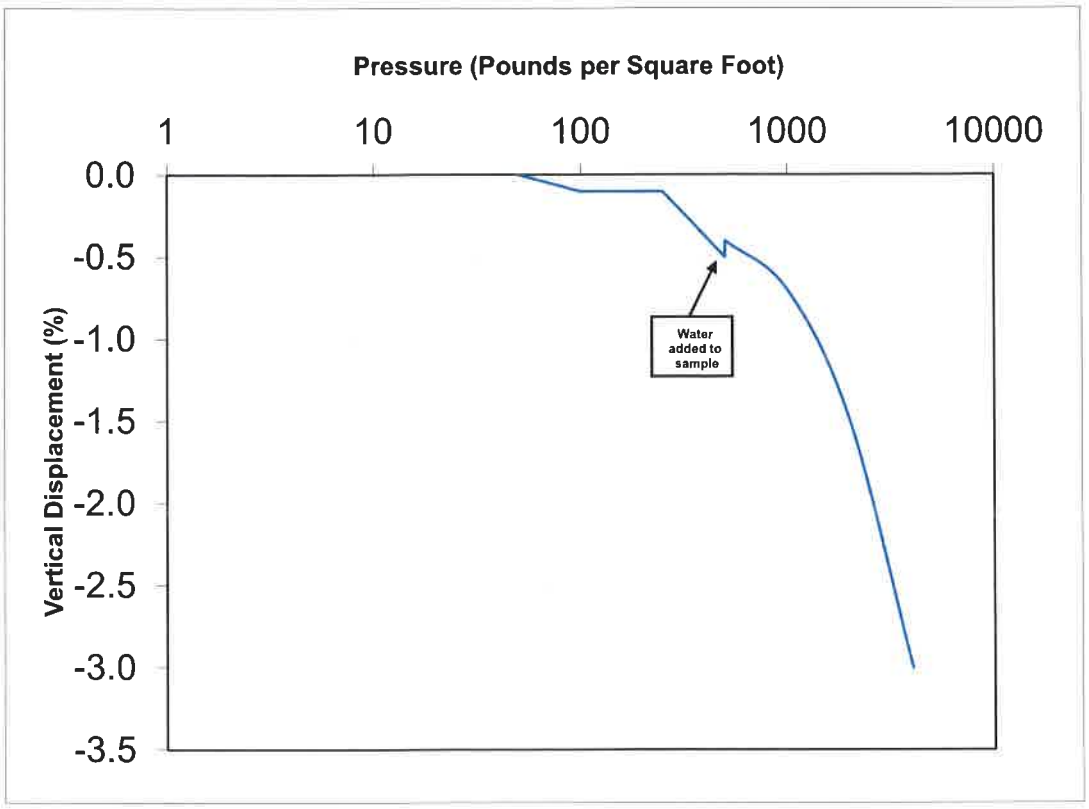
GEOTECHNICAL ENGINEERING, MATERIAL TESTING
AND ENGINEERING GEOLOGY

SWELL - CONSOLIDATION TEST

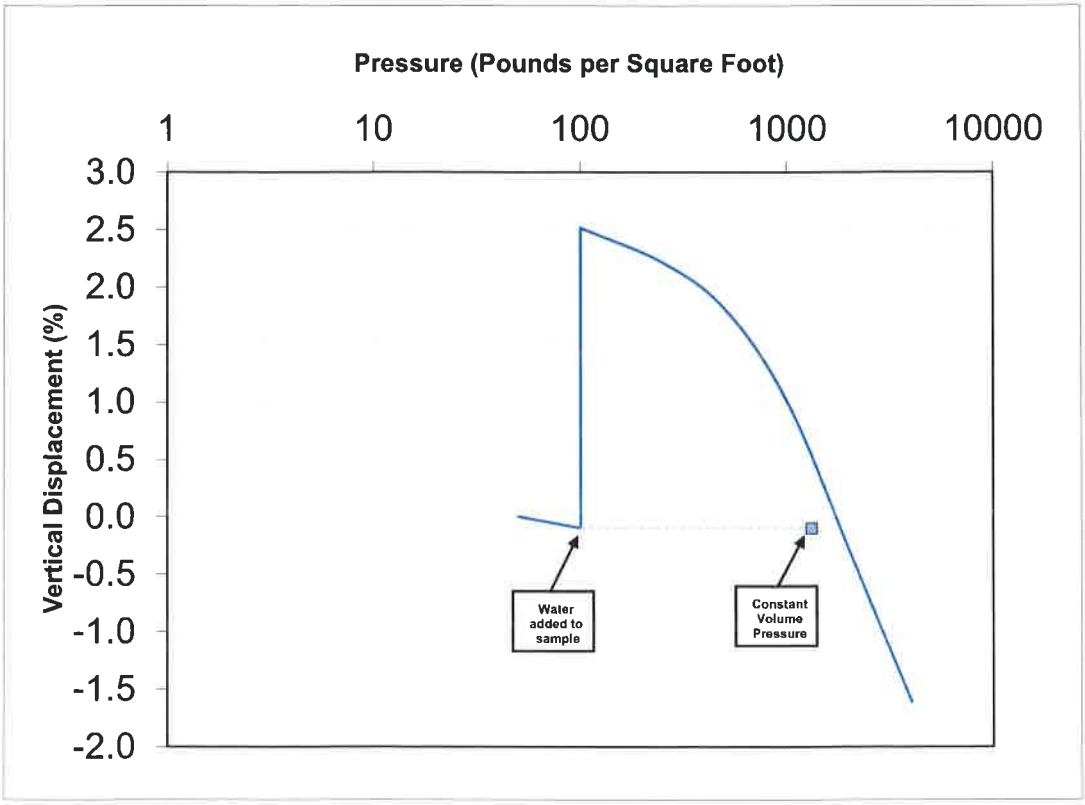


SUMMARY OF TEST RESULTS		
Sample Source:	TB-3 @ 3.5'	
Visual Soil Description:	GC	
Swell Potential (%)	0.1%	
Constant Volume Swell Pressure (lb/ft^2):	0	
	Initial	Final
Moisture Content (%):	6.0	16.5
Dry Density (lb/ft^3):	117.7	120.7
Height (in.):	0.997	0.967
Diameter (in.):	1.94	1.94

Note: Remolded Sample; Molded from the portion of sample passing a #10 sieve. Consolidated under 500 PSF prior to initiating load sequence and wetting. Initial values represent the conditions under 50 PSF following the pre-consolidation under 500 PSF.

Project Number:	57343GE
Sample ID:	12932-H
Figure:	B.7

SWELL - CONSOLIDATION TEST

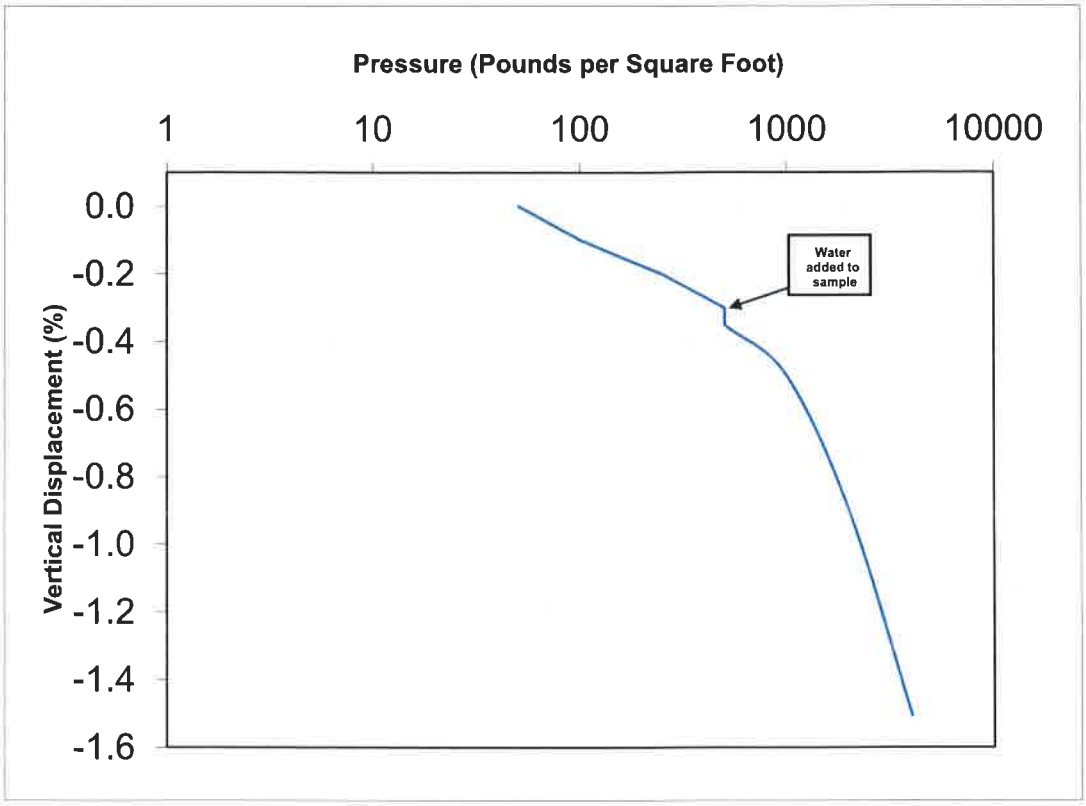


SUMMARY OF TEST RESULTS		
Sample Source:	TB-4 @ 3'	
Visual Soil Description:	SC	
Swell Potential (%)	2.6%	
Constant Volume Swell Pressure (lb/ft^2):	1,310	
	Initial	**Final**
Moisture Content (%):	7.8	16.2
Dry Density (lb/ft^3):	120.4	121.6
Height (in.):	0.994	0.978
Diameter (in.):	1.94	1.94

Note: Remolded Sample; Molded from the portion of sample passing a #10 sieve. Consolidated under 500 PSF prior to initiating load sequence and wetting. Initial values represent the conditions under 50 PSF following the pre-consolidation under 500 PSF.

Project Number:	57343GE
Sample ID:	12932-J
Figure:	B.8

SWELL - CONSOLIDATION TEST

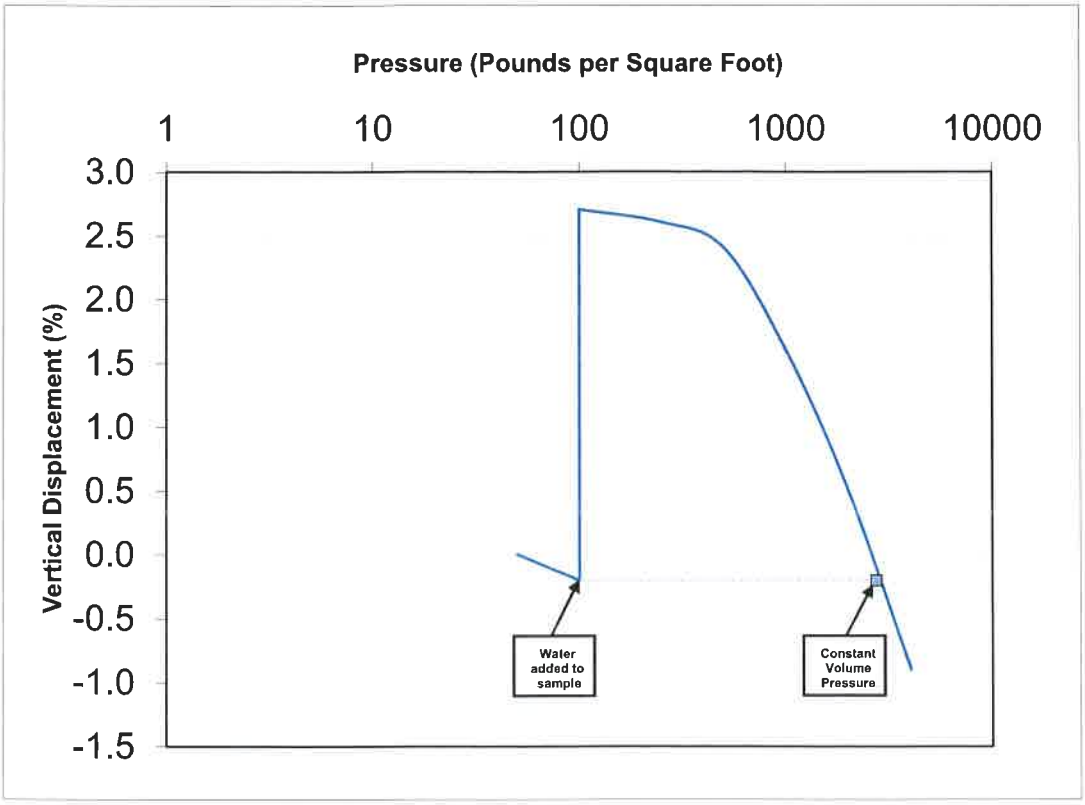


SUMMARY OF TEST RESULTS		
Sample Source:	TB-5 @ 3'	
Visual Soil Description:	SC w/gravels	
Swell Potential (%)	-0.1%	
Constant Volume Swell Pressure (lb/ft^2):	0	
	Initial	**Final**
Moisture Content (%):	7.5	17.2
Dry Density (lb/ft^3):	116.7	116.1
Height (in.):	0.996	0.981
Diameter (in.):	1.94	1.94

Note: Remolded Sample; Molded from the portion of sample passing a #10 sieve. Consolidated under 500 PSF prior to initiating load sequence and wetting. Initial values represent the conditions under 50 PSF following the pre-consolidation under 500 PSF.

Project Number:	57434GE
Sample ID:	12932-L
Figure:	B.9

SWELL - CONSOLIDATION TEST



SUMMARY OF TEST RESULTS		
Sample Source:	TB-7 3.5-7.5'	
Visual Soil Description:	GC	
Swell Potential (%)	2.9%	
Constant Volume Swell Pressure (lb/ft^2):	2,740	
	Initial	Final
Moisture Content (%):	6.9	15.4
Dry Density (lb/ft^3):	121.8	122.0
Height (in.):	0.997	0.988
Diameter (in.):	1.94	1.94

Note: Remolded Sample; Molded from the portion of sample passing a #10 sieve. Consolidated under 500 PSF prior to initiating load sequence and wetting. Initial values represent the conditions under 50 PSF following the pre-consolidation under 500 PSF.

Project Number:	57343GE
Sample ID:	12932-N
Figure:	B.10

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AND ENGINEERING GEOLOGY

Direct Shear Test Results:

ASTM D-3080

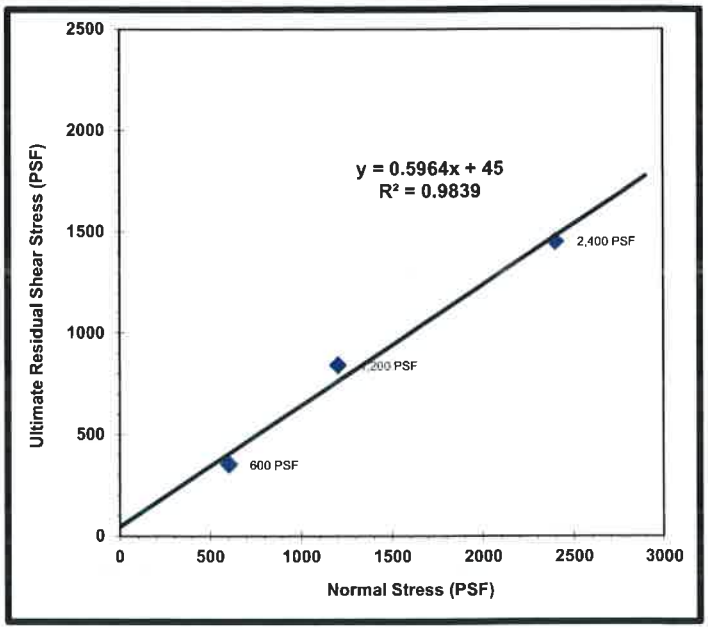
Project: Block 7 and Block 8, Blague's Addition

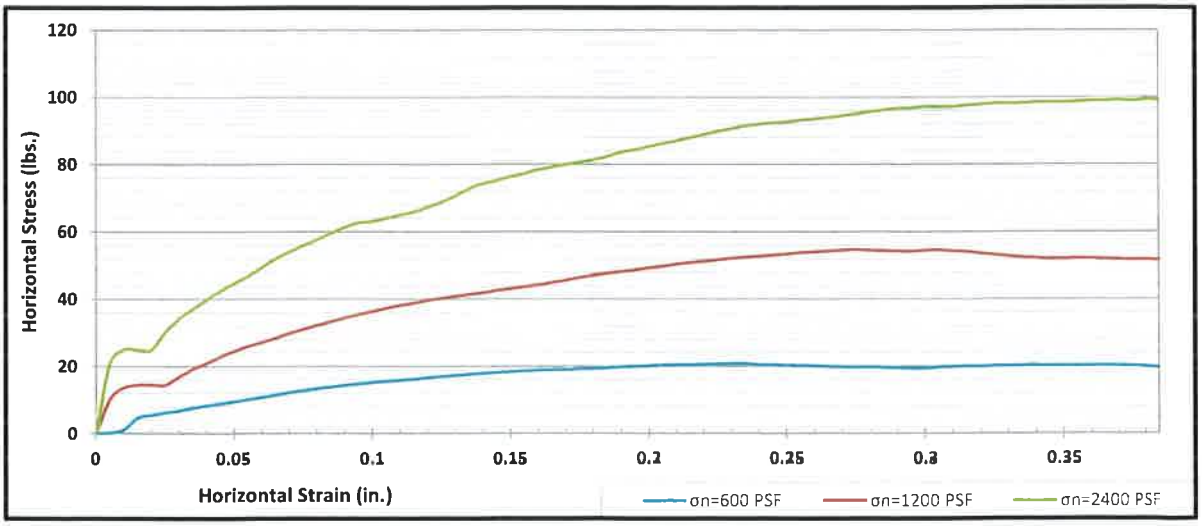
Project Number:	57343GE	**Sample Source:**	TB-8 0-3'
Laboratory Sample ID:	12932-P	**Visual Soil Description:**	GC-GM
Sample Date:	7/7/2022	**Type of Specimen:**	Remolded Square Shear Box
Test Date:	7/25/2022	Diameter:	2.5 in
Technician:	GJ	Height:	1.0 in

Direct Shear Test Results:			
Normal Stress, σ_n (PSF):	2400	1200	600
Ultimate Shear Stress, τ_{ult} (PSF):	1450	840	350

Summary of Sample Data:	
Initial Moisture Content (%):	8.0
Intial Dry Density (PCF):	105.0
Final Moisture Content (%):	15.3
Final Dry Density (PCF):	99.4

ESTIMATED STRENGTH PARAMETERS	
Angle of Internal Friction, ϕ (°):	**31**
Cohesion (PSF):	**45**
Horizontal Strain (in.)	**0.1**





Animas Overlook

("working name")

OUTLINE DEVELOPMENT PLAN

GFS LAND

Project Overview and Executive Summary

GFS Land is requesting that the Board of Trustees, and subsequently, the Planning Commission approve the proposed Outline Development Plan and permit GFS Land to begin the application for Final Plat approval.

- GFS Land LLC "GFS Land" acquired two land tracts on Blague Hillside in January 2022 – Block 8 of Blagues Addition (Lots 1-34) and Block 7 of Blagues Addition (Lots 17-23)
- The current status of the property is vacant land zoned for R2 (single family and multifamily residential development) so no zoning change is necessary.
- GFS Land is proposing a Planned Unit Development "PUD" to develop 16 single family home sites.
- The proposed PUD is consistent with the vision outlined in the 2022 Compass Master Plan
- Information on the "GFS Group":
  - GFS Land is a sister company to GFS Hospitality LLC which is a local business owner/employer in the Town of Silverton. GFS Hospitality owns the Triangle Motel, Prospector Motel and Kendall Mountain Lodge.
  - The owners of "GFS Group" are building a single-family residence on the corner of Reese and 10th Street and believe in and support the current vision of the Compass Master Plan.

Steps Taken to Date

- GFS Land engaged Monadock Mineral Services located in Ouray (Tim Pasek) to survey the property prior to purchasing the properties
- GFS Land engaged Dudley Ashwood P.E. located in Hesperus to design the site plan layout. The site plan includes: homesite layout, optimal street routing, utility access and preliminary development planning
- GFS Land engaged Trautner Geotech LLC located in Durango to produce a geotechnical report to determine the viability of vertical/horizontal construction based on the site slopes and soils
- GFS Land engaged Cottonwood Consulting located in Durango (Kyle Siesser, P.G) to perform a Wetland review
- GFS Land has had discussions with the Army Corp of Engineers (Tucker Feyder) on the required permitting
- GFS Land has worked with several employees of the Town of Silverton and the Planning Department to ensure the project meets the code standards of the Town of Silverton and fits into vision of the recently approved Town of Silverton Master Plan (Lucy Mulvihill, John Sites, Bill MacDougall, Bevan Harris, etc.).
- GFS Land has met with neighboring landowners in an effort to work together to produce a plan which best serves each owners' interests.

Site Location

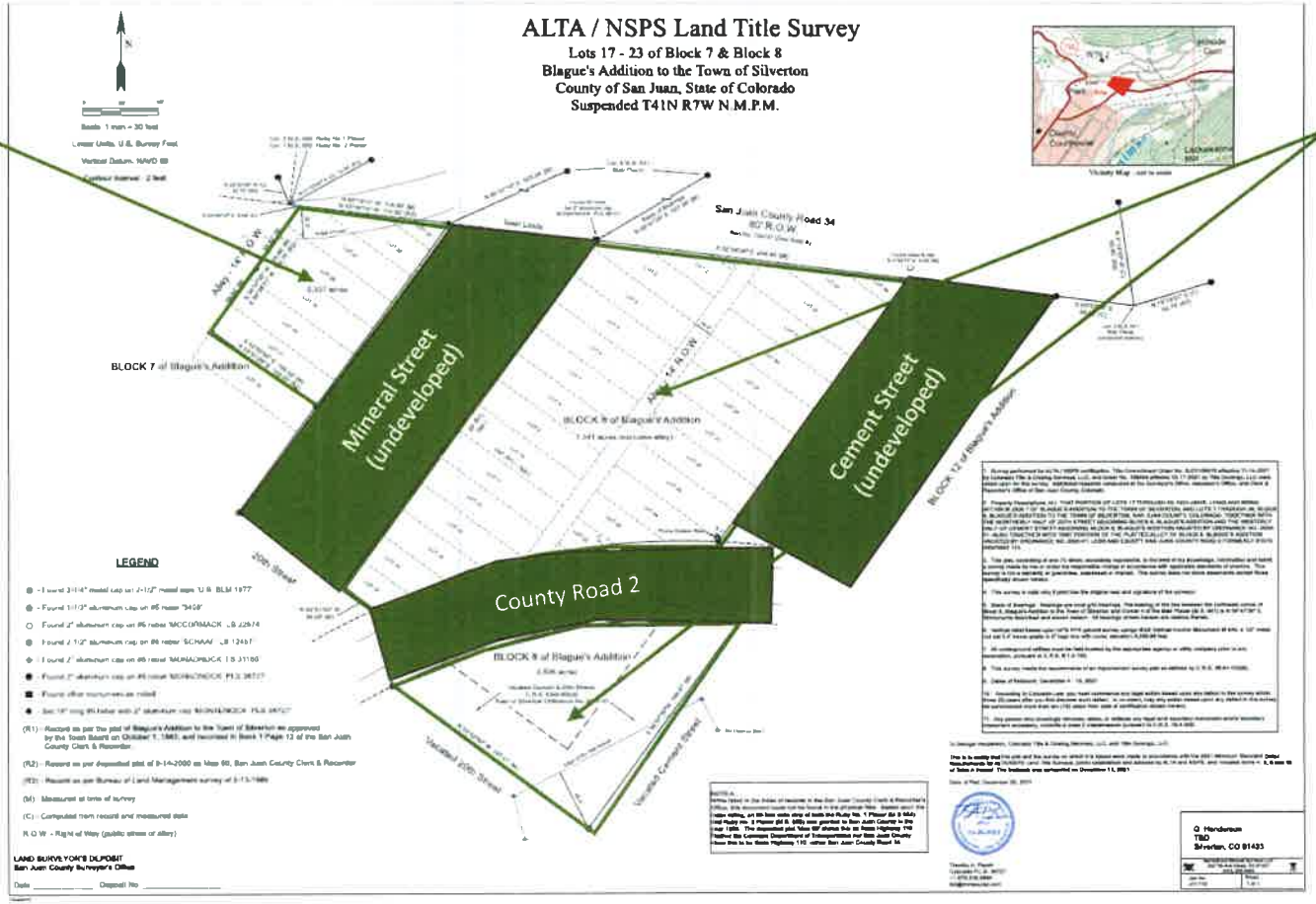
Below is a Google Earth image of Block 7 of Blagues Addition (Lots 17-23) and Block 8 of Blagues Addition (Lots 1-34)

Survey

GFS Land engaged Monadock Mineral Services (Tim Pasek) to survey the property prior to purchasing the properties in January of 2022.

Block 7 of Blagues Addition (Lots 17-23)

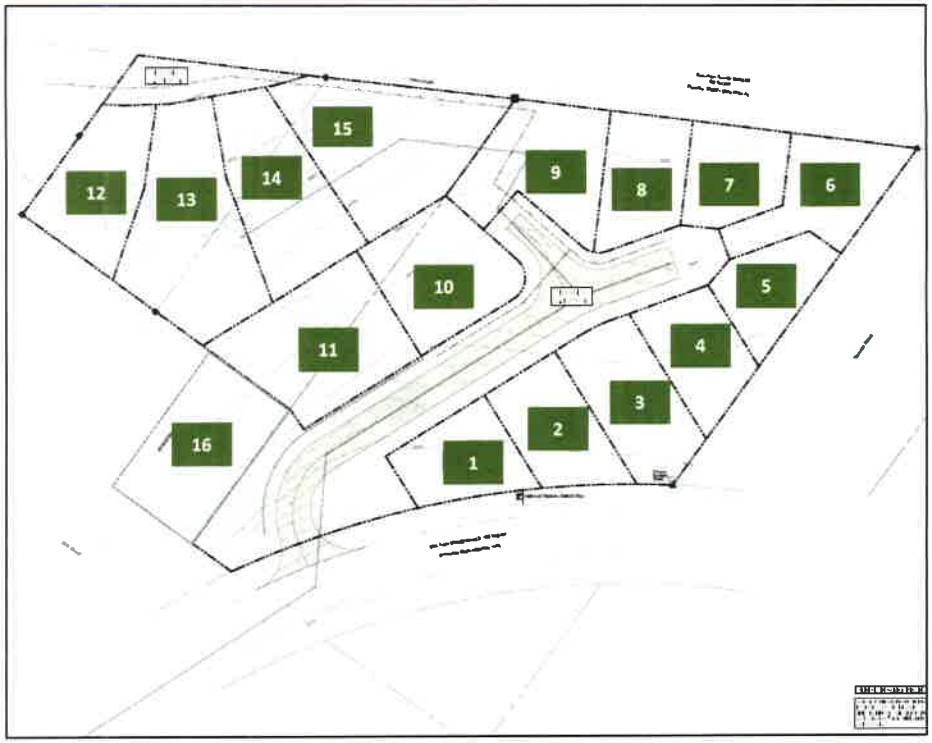
Block 8 of Blagues Addition (Lots 1-34)



Proposed Site Plan

GFS Land engaged Dudley Ashwood P.E. to assist with the site plan layout. The site plan includes: Homesite layout, Optimal street routing, Utility access and preliminary development planning.

- The plan contemplates 16 single family residential lots ranging in size from 3,267 SF to 8,364 SF (average 5,523 SF per lot)
- The lots do not have uniform depths and widths and were designed to best fit the contours of the site based on the survey from Monadock Mineral Services and the geotechnical report from Trautner Geotech.
- Finished lot pricing has yet to be determined and is subject to market conditions and final infrastructure costs.
- Finished home sizes will be based on the size of the buildable envelop within the lot, subject to topography and required setbacks.



Lot Number	Acreage	SF	Lot Number	Acreage	SF
1	0.081	3,528	9	0.126	5,489
2	0.092	4,008	10	0.125	5,445
3	0.114	4,966	11	0.162	7,057
4	0.084	3,659	12	0.109	4,748
5	0.075	3,267	13	0.192	8,364
6	0.103	4,487	14	0.145	6,316
7	0.079	3,441	15	0.19	8,276
8	0.087	3,790	16	0.138	6,000
			Total (16 Lots)	**1.902**	**82,840**
			Average/Lot	**0.127**	**5,523**

**Lot 16 is estimated SF and acreage*

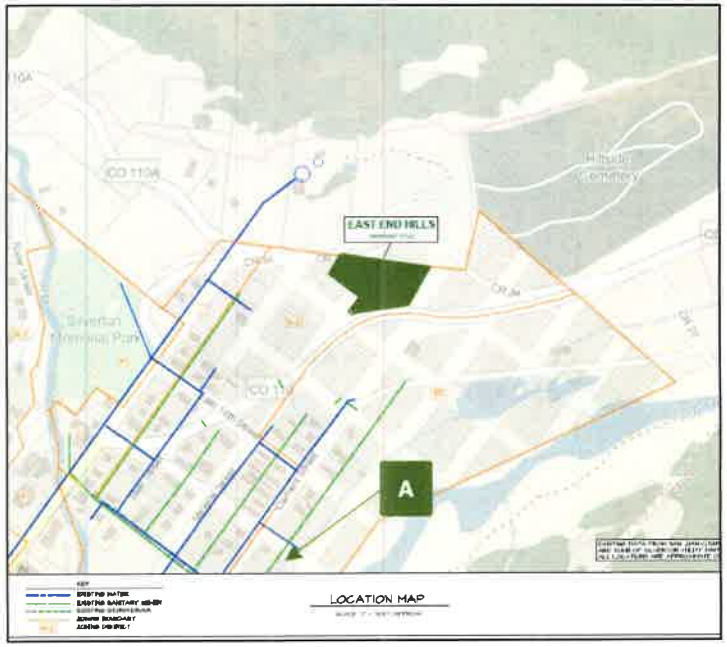
Proposed Site Plan (Block 8 South excluded)

GFS Land also owns .506 acres across County Road 2 adjacent to the Silverton Lakes RV Park referred to as Block 8 South. GFS Land is not contemplating development on this acreage as part of this development approval request as portions of it were deemed wetlands by Cottonwood Consulting. GFS is exploring its options as it relates to its potential best uses.

Infrastructure – Sewer Access

GFS Land has had several discussions with John Sites (Director of Public Works) to determine the most efficient and economic way to bring sewer access to the site.

- GFS Land intends to build a gravity-based sewer system that connects directly into the Town of Silverton's sewer grid.
- GFS Land will dedicate the to be developed sewer line to the Town of Silverton allowing the town to collect fees to maintain the system.
- The current plan outlined shows the to be developed sewer line connecting into the existing manhole on 18th Street, just south of Cement Street per the Town's request (See reference A on the map).

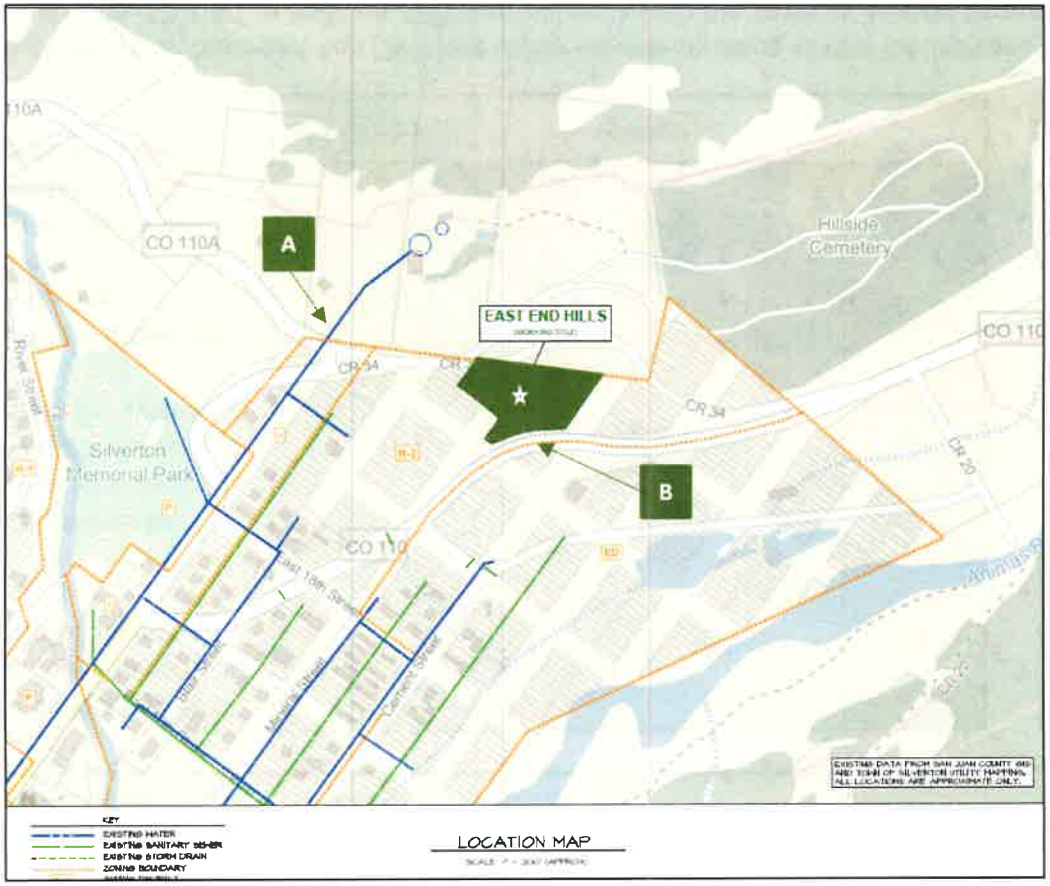


- GFS land will work with the Town to ensure Ten (10') foot utility easements along all rear lot lines and where utilities are located per the Silverton Municipal Code, 17-4-40. In addition, GFS land will work with the Town as it works through more detailed engineering plans to construct future sanitary sewer connections and easements which will allow for future development.

Infrastructure – Water and Electric Access

GFS LAND

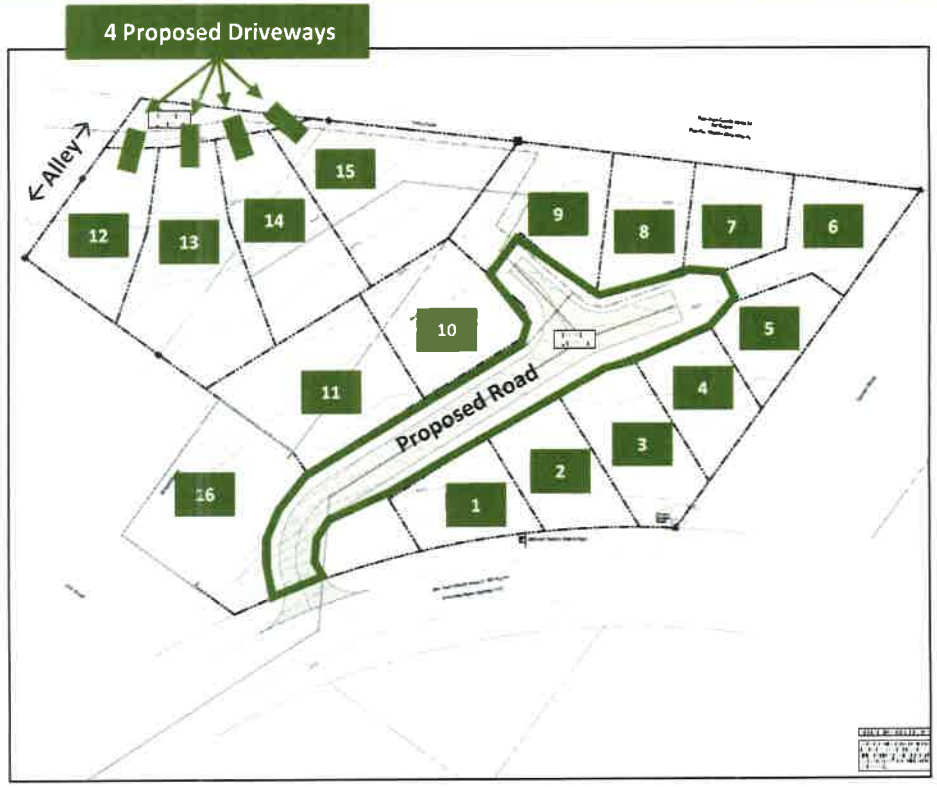
GFS Land intends to tap into an existing hydrant located nearby to the east of Block 7 (see reference A below) and will work with San Miguel Power Association "SMPA" to determine to the best access point to bring power to the site. There is an existing electric hookup on the southern portion of Block 8 (see reference B below)



Infrastructure – Roads

GFS Land intends to build one gravel road to access the lower 12 finished residential lots. The 4 upper finished lots will be accessed directly from County Road 34 via driveways.

- The primary access road for the lower 12 lots will be from County Road 2. It is designed to have no more than a 10% slope. In addition, it is designed so that a firetruck can turn around in accordance with the municipal code.
- The primary access for the upper 4 lots will be from County Road 34 and will be accessed by driveways directly from the road. It should also be noted that GFS Land is working the two existing lot owners below lots 12 and 13 to put in an access road which would lead to the alley adjacent to lot 12.
- No names have been determined for the roads and the roads will be dedicated to the Town of Silverton and available for public access.



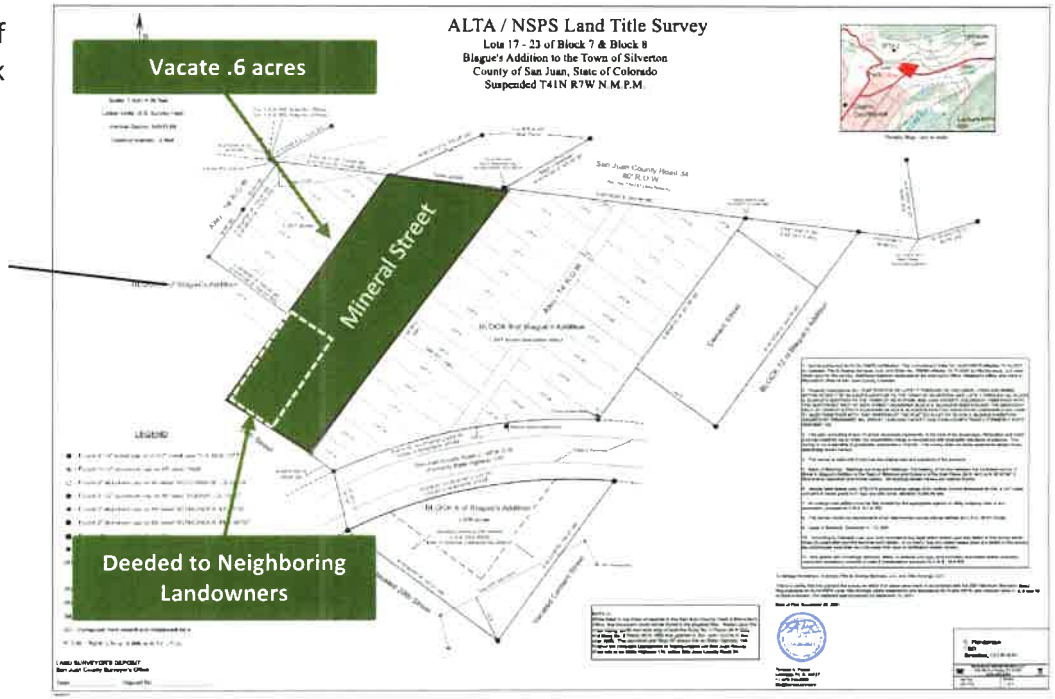
Vacating Mineral Street

GFS Land is proposing that the Town vacate Mineral Street in between Block 7 and 8 and deed the land to owners on either side (i.e. GFS Land).

- Due to the steep slope of the existing plat of Mineral Street in between Block 7 and Block 8, it would not be feasible for the Town of Silverton to build a road which is evident by the grading outlined in the Monadock Survey and was confirmed by conversations with Dudley Ashwood PE and Trautner Geotech.

- GFS Land is proposing to vacate Mineral Street between Block 7 and Block 8. The vacated acreage of Mineral Street equates to ~.6 acres. A portion of the lower vacation would go to neighboring landowners (see map).

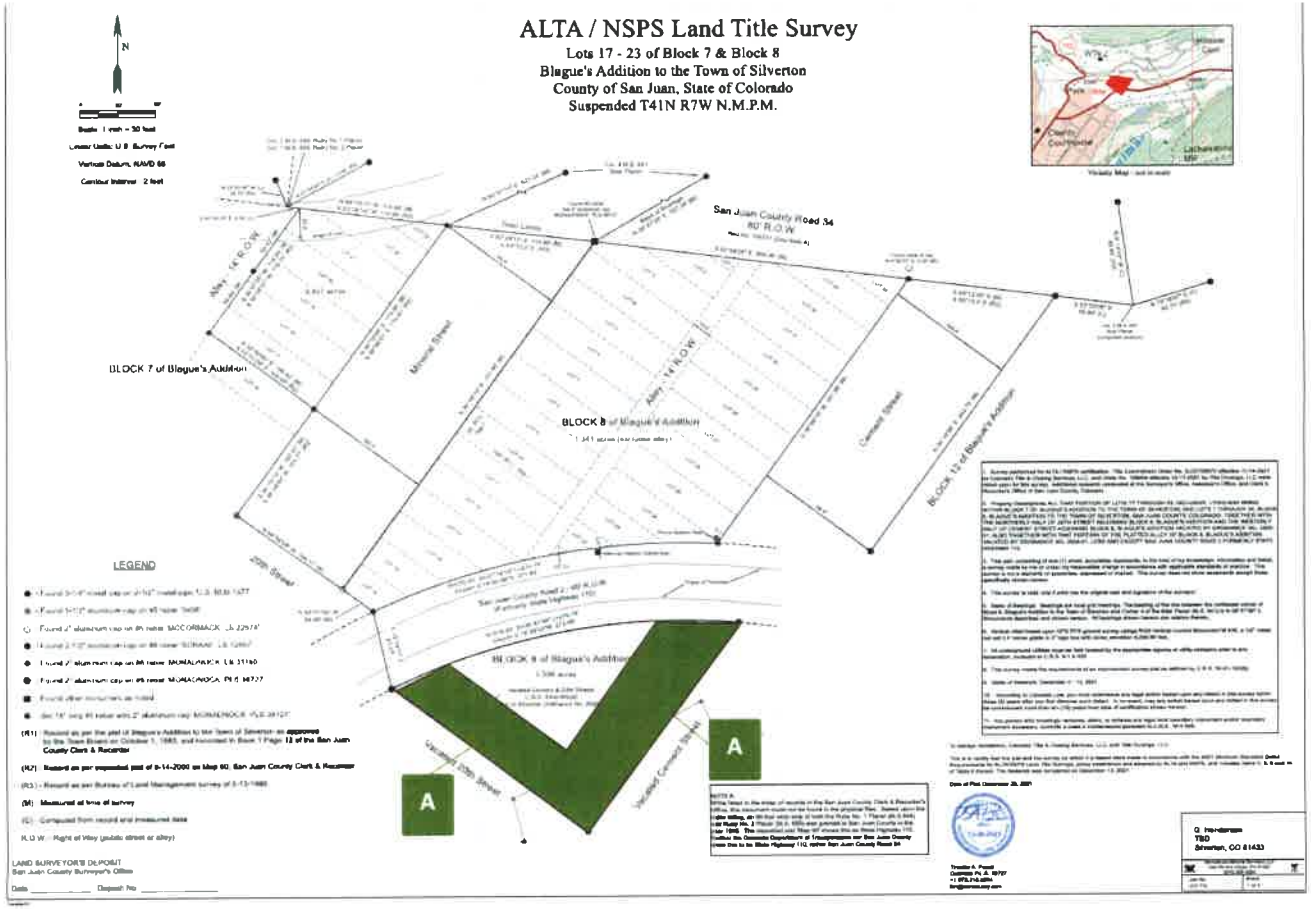
- It should also be noted that .048 acres of County Road 34 crosses GFS Land property in Block 7. GFS Land is proposing to deed this land to the County rather than rerouting the road. GFS Land intends to work with the County to resolve any issues related to easements.



- Per Sec. 17-1-50 of the Municipal Code - A landowner may make application to vacate any plat of record, or portion thereof, provided that the plat is a legal plat of record and its vacation will not interfere with development or deny access via public right-of-way to adjoining properties, utility service or other improvements, and will not be contrary to the Silverton-San Juan County Comprehensive Plan

Vacating Mineral Street (Precedent)

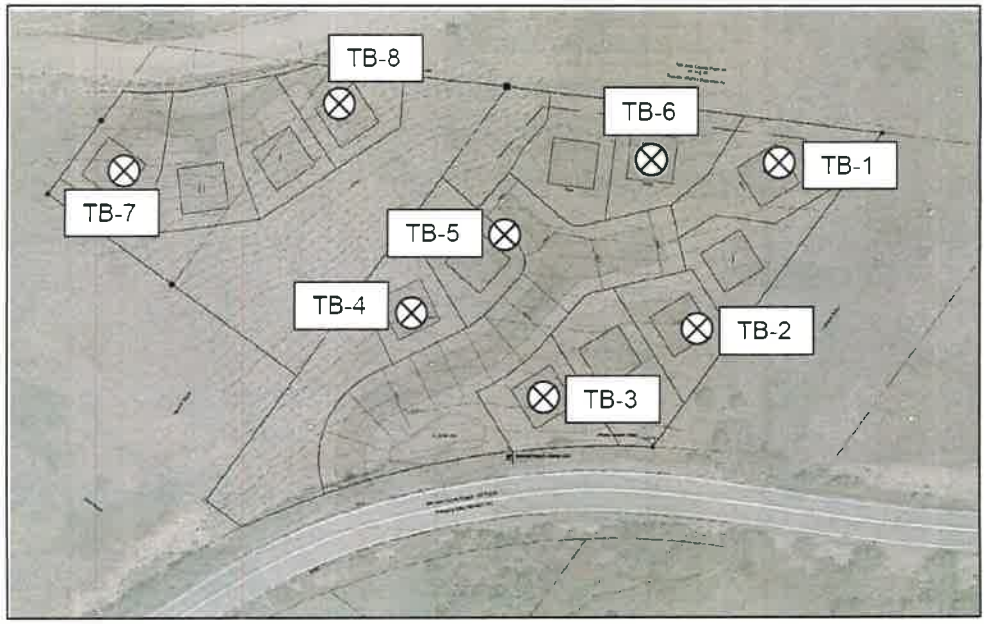
There is precedent of the Town of Silverton vacating unusable streets in the past to adjacent landowners. The Town of Silverton vacated portions of 20th Street and Cement Street to the adjacent landowners on the portion of Block 8 (owned by GFS land) to the south of County Road 8 (See reference A below).



Geotech Report

Trautner Geotech conducted a geotechnical study of the site in July of 2022 and provided GFS Land with a written report on August 15th, 2022, and concluded that the site was developable based on the site characteristics.

- The report provided a general review of the site based on 8 test borings in the vicinity of the proposed infrastructure and vertical structures (See test boring map to the right).
- Trautner Geotech concluded the following: "While we feel that it is feasible to develop this site as planned using relatively conventional techniques we feel that it is prudent for us to be part of the continuing design of this project to review and provide consultation in regard to the proposed development scheme as the project progresses to aid in the proper interpretation and implementation of the recommendations presented in this report. This consultation should be incorporated in the project development prior to construction at the site."
- Per Trautner's recommendation, GFS Land intends to consult with Trautner as it works through more detailed engineering plans for both the infrastructure and design of the single-family structures.



Wetland Report – Cottonwood Consulting

Based on the wetland delineation report conducted June 1, 2023, there are no wetlands present within the proposed subdivision property boundaries with exception of where the entrance to the subdivision road is intended to be built. GFS Land requests that the Town allow it to operate under the current Army Corp of Engineers guidelines for jurisdictional wetlands.

Methodology

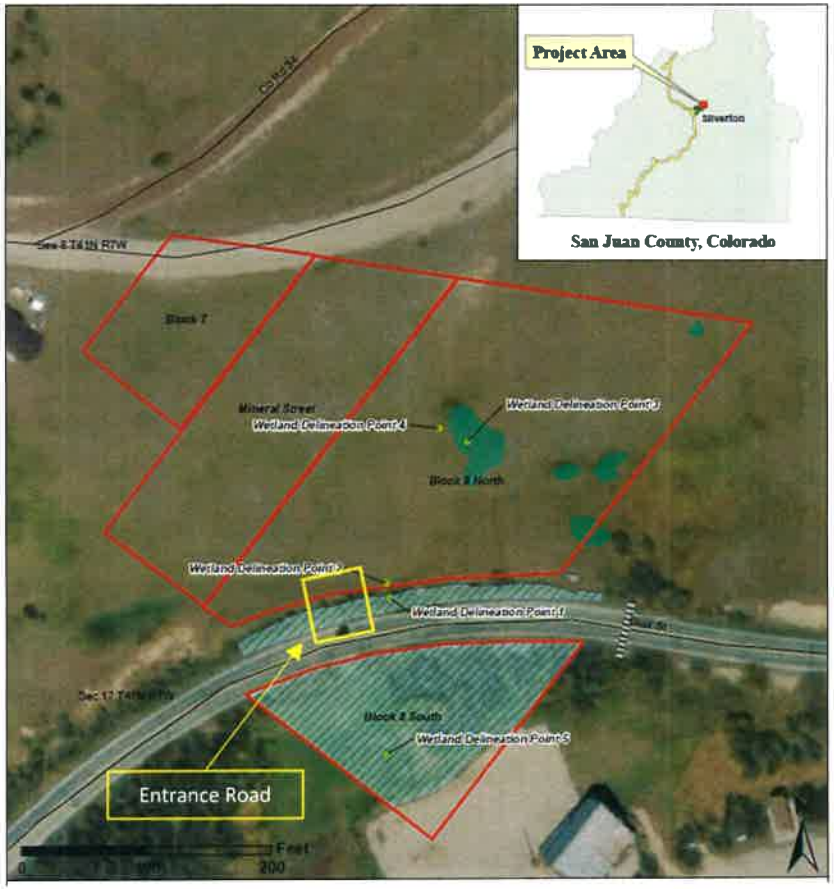
- Delineations of Waters of the US were conducted within the project area on June 1, 2023 by Cottonwood staff Emma Millar and Kyle Siesser. The delineations were conducted in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual and the 2010 Regional supplement the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Regions. (5 delineation points within the project were reviewed)

- Wetland delineation points were characterized to determine the presence or absence of the three wetland parameters (vegetation, soils, and hydrology). The wetland indicator status of plant species was based on the US Department of Agriculture Natural Resource Conservation Service Plants Database. Soil colors were measured using the Munsell Soil Color Charts.

Permits Required

- The proposed access road for the eastern portion of the subdivision would be constructed within a wetland in a San Juan County Road ROW along the roadside ditch on the north side of Blair St/County Road 2. The fill resulting from this road would be less than 0.1 acre.

- Cottonwood recommends proceeding under a Nationwide Permit 29 – Linear Transportation Projects and submitting a Preconstruction Notification to the Corps and obtaining a 401 Water Quality Certification. No mitigation would be required for the project.



Wetlands – Pre-Sackett vs. Post Sackett

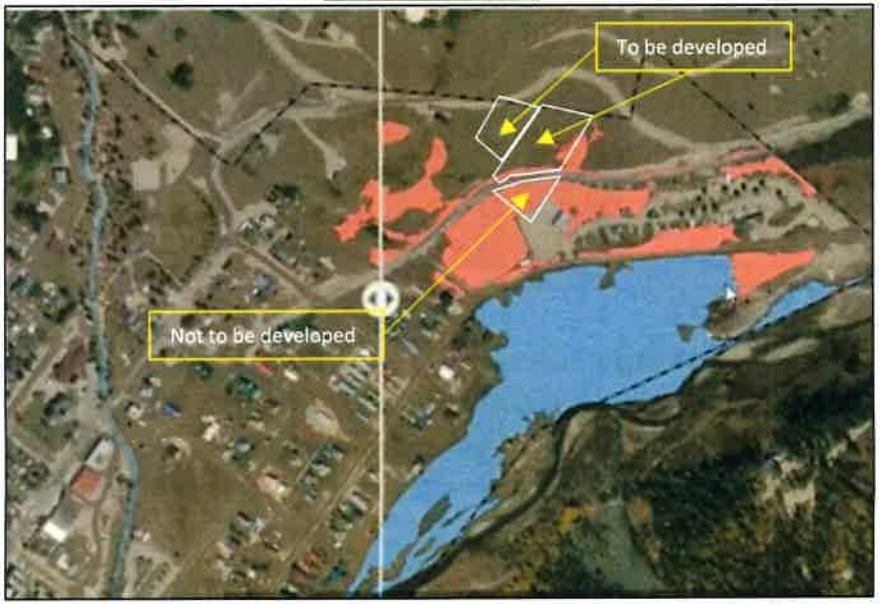
- Below is a comparison of the effects of Pre-Sackett ruling vs. Post Sackett ruling using the Ironwood Consulting Map presented in the January 8th Board of Trustees Regular Meeting.
- The Sackett ruling **does not impact any of the land proposed to be develop.**
- The Sackett ruling **does** impact the lower portion of Block 8 which GFS Land does not intend to development and is not included as part of the current PUD Preliminary Development Plan.
- Therefore, GFS Land requests that the Town refer to the detailed Cottonwood Wetland Report which was conducted in June 2023 as none of the land proposed to be developed was impacted by the Sackett Ruling. **It should be noted that the Cottonwood report takes a more protective view on wetlands as it relates to the drainage ditch just north of County Road 2.**
- The following slide shows a detailed comparison of the Ironwood map to the Cottonwood map.

Potential Wetlands **not protected** by the Clean Water Act as mapped by Ironwood Consulting

Wetlands **protected** by the Clean Water Act as mapped by Ironwood Consulting

Pre - Sackett

Post - Sackett



Wetlands – Cottonwood Map vs. Ironwood Map

- Below is a comparison of the Cottonwood Wetlands map from the report conducted June 1, 2023 to the Ironwood Wetlands Map presented to the Silverton Town Trustees on January 8th 2024.
- The key difference is that the Cottonwood Wetland report deems that the drainage ditch north of County Road 2 to be potentially **jurisdictional wetlands** and therefore protected by the Army Corp of Engineers/Clean Water Act. This was confirmed by Tucker Feyder of the Army Corp of Engineers.
- Mr. Feyder recommended applying for a Nationwide Permit 29 – Linear Transportation Projects and submitting a Preconstruction Notification to the Corps and obtaining a 401 Water Quality Certification. No mitigation would be required for the project.
- Cottonwood also addressed the potential wetlands on the north portion of the site and concluded there were no wetlands based on the three wetland parameters (vegetation, soils, and hydrology).
- It should be noted that the Cottonwood report takes a more protective view on wetlands as it relates to the drainage ditch just north of County Road 2.

Potential Wetlands **not protected** by the Clean Water Act as mapped by Ironwood Consulting

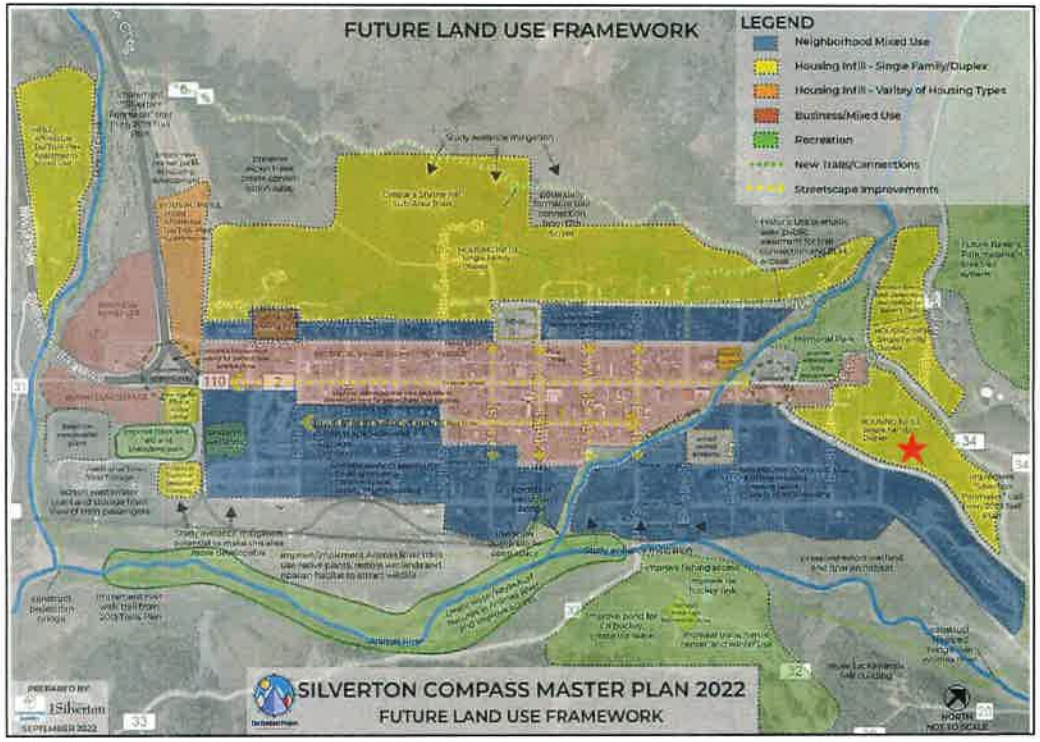
Wetlands **protected** by the Clean Water Act as mapped by Ironwood Consulting

Cottonwood Map

Ironwood Map (Post – Sackett)

Project Benefits to the Town of Silverton

- **Complementary to the Compass Master Plan Vision**
  - Project is consistent with Master Plan Future Land Use Map
  - Project provides an avenue for population growth to support a year-round economy
  - Project is mindful of the existing environmental and nature assets
- **Provides additional homesites to the Town of Silverton which are in short supply**
  - Plan creates additional density which is consistent with the Compass Master Plan goals (lot sizes ranging from 3k to 8k SF)
- **Investment of significant infrastructure dollars in the form of utilities and roads at no cost to the Town**
  - Preliminary infrastructure cost estimate is $1MM to $1.5MM
  - Neighboring property owners will be able to utilize/access developed infrastructure
- **Potential to generate job opportunities for Silverton residents**
- **Will generate additional tax revenue/fees for the town (property tax, sales tax, development fees, etc.)**



★ **Site Location**

PUD Exception Requests to Subdivision Code

Exception	Code Reference	Code Language	Request
Lots	Sec. 16-3-30 (3)	(1) Minimum lot area: 5,000 square feet. (2) Minimum lot width: 50 feet.	Allow for lot size, width, depth, shape and orientation outlined in the proposed plan
Streets/Roads	Sec. 17-4-30 (b) (1)	The maximum allowable length of closed-end streets in a single-family residential and multifamily residential development shall be 600 feet.	Allow for the street outlined in the proposed plan
Streets/Roads	Sec. 17-4-30 (b) (2)	Closed-end streets shall be provided with circular turnarounds having a minimum outside right-of-way diameter of 120 feet and a minimum pavement diameter of 90 feet.	Allow for the street outlined in the proposed plan
Streets/Roads	Sec. 17-4-30 (f)	Local Street Sidewalk requirement: 4 feet	Remove sidewalk requirement
Streets/Roads	Sec. 17-4-30 (f)	Local Right-of-way required is 80'	Remove requirement or allow for 40' ROW
Streets/Roads	Sec. 17-4-30 (f)	Local Pavement Width required is 36'	Remove requirement of allow for 20' width
Streets/Roads	Sec. 17-4-30 (h) (2)	Local street grade should no more than 8%	Allow street grade of no more than 10%
Streets/Roads	Sec. 17-5-30 (c)	Pavement shall be constructed of asphalt or concrete of sufficient thickness to support the contemplated traffic load.	Allow gravel pavement
Streets/Roads	Sec. 17-5-30 (e)	All streets shall be provided with concrete curbs and gutters for the pavement edging. Such curbs and gutters shall be designed as an integral part of the pavement.	Remove concrete curb and gutter requirement
Public Improvements (Street Lights)	Sec. 17-5-40 (f)	Ornamental street lighting and associated underground street lighting supply circuits shall be installed.	Remove requirement

PUD Exception Requests to Subdivision Code (cont.)

Exception	Code Reference	Code Language	Request
Off-street parking	Sec. 17-5-40 (j)	Off-street parking shall be constructed for all structures and facilities, with a minimum of one such space for every dwelling unit.	Remove requirement
PUD Requirements (Open Space)	Sec. 17-8-30 (c) (3)	Minimum common open space shall be 30 percent of the gross acreage of the site.	Remove requirement
PUD Requirements (United Ownership)	Sec. 17-8-30 (c) (4)	There shall be united ownership of the site.	Remove requirement to allow for sale of lots to individual owners

Final Plat – Next Steps

- Detailed Preliminary Plat and required data to be completed by Dudley Ashwood P.E. (Silverton Municipal Code Sec. 17-3-30)
- Detailed drainage plan with a SWPPP (Stormwater Pollution Prevention Plan) to provide the Town with the appropriate information in order to take over the utilities/road and subsequent maintenance. GFS Land will engage a consultant to conduct and drainage study. (Silverton Municipal Code Sec. 17-3-30)
- Detailed Utility plan to be completed by Dudley Ashwood P.E. (Silverton Municipal Code Sec. 17-3-30)
- Provide the Town with required Preliminary Plat Supplemental Data (Silverton Municipal Code Sec. 17-3-30)
- PUD Application through Preliminary Plat process (Silverton Municipal Code, Chapter 17, Article 8)
- Use by Special Review for steep slopes (Silverton Municipal Code, Chapter 16, Article 4, Division 3)
- Right-of-way vacation application (Silverton Municipal Code, 16-1-70)
- Nationwide Permit 29 – Linear Transportation Projects and submitting a Preconstruction Notification to the Corps and obtaining a 401 Water Quality Certification.

Conclusion/Request

In conclusion, GFS Land is requesting that the Board of Trustees, and subsequently, the Planning Commission approve the proposed Outline Development Plan and allow GFS Land to begin the application for preliminary plat approval.

GFS Land believes the proposed plan is consistent with the findings in the Compass Master Plan and will bring much needed finished residential lots to the market at no cost to the Town of Silverton while generating jobs opportunities to Town residents and increasing the tax base for the Town of Silverton and San Juan County.

Appendix - Cottonwood Wetland Report Conclusion

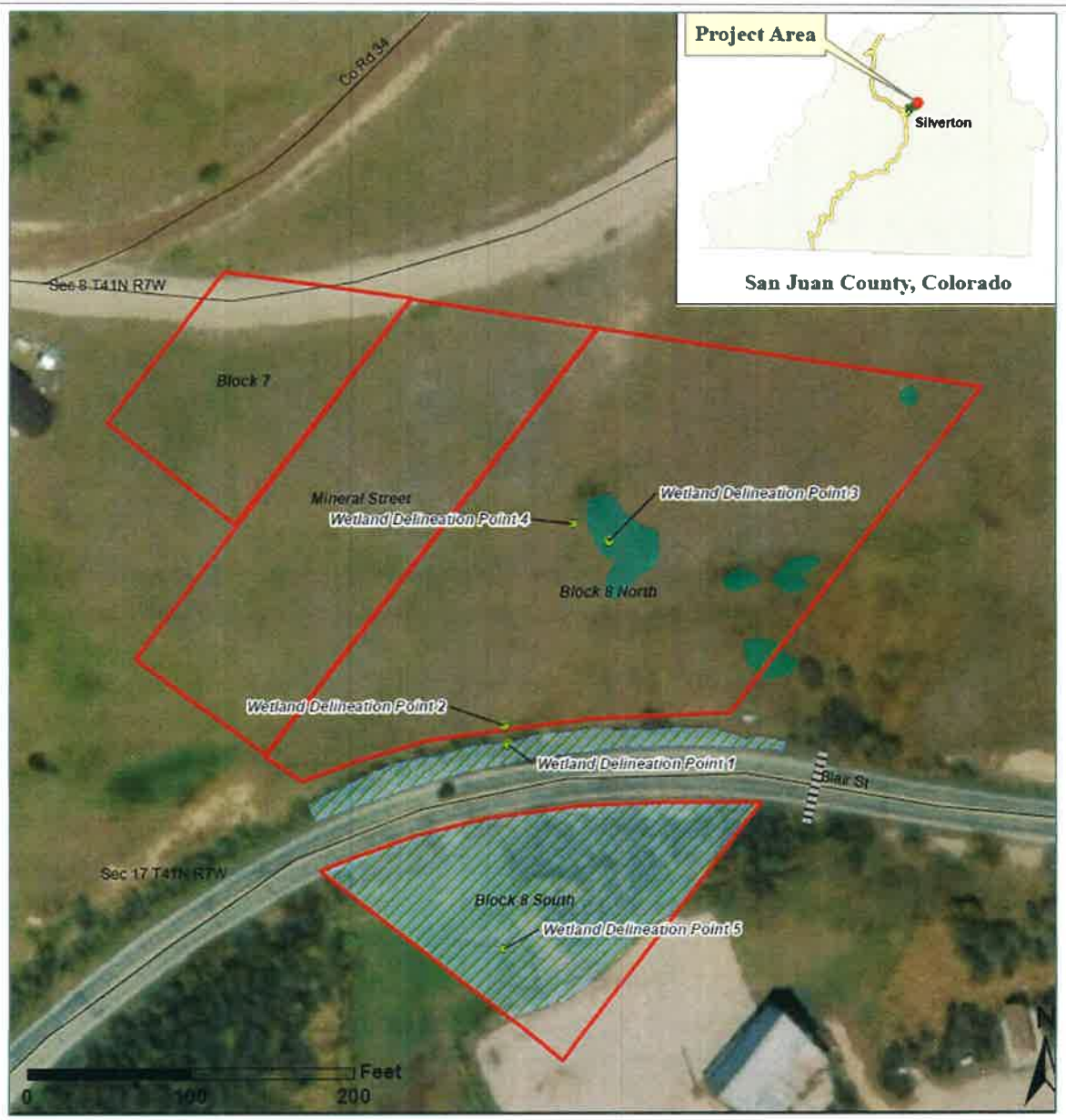
Conclusion

- Based on the presence/absence of indicators of wetland hydrology, vegetation, and soils, **no wetlands are present within the proposed subdivision area. Multiple upland areas of rushes were observed on the hillside within Block 8 North; however, the areas lacked the hydric soils and hydrology necessary to be considered a wetland.**

- **Wetlands are present along the roadside ditch on the northern side of County Road 2, between the road and the property.** This area is a San Juan County Road right-of-way (ROW). The proposed access road for the eastern portion of the subdivision would result in a fill of this wetland. The fill would be less than 0.1 acre.

- Cottonwood identified and delineated a wetland within the Block 8 South portion of the property. No ground disturbance is proposed for this area and the wetland would not be impacted.

Appendix – Wetlands Map (Enlarged)



Appendix – Wetlands Site Photos

Photo 1: Proposed East End Hills Subdivision area, 6/1/2023.

Photo 2: Proposed East End Hills Subdivision area, 6/1/2023.

Photo 3: Wetland delineation point #1 collected from the ditch adjacent to project area, 6/1/2023.

Photo 5: Wetland delineation point #2 collected from hillslope within project area, 6/1/2023.

ALTA / NSPS Land Title Survey

Lots 17 - 23 of Block 7 & Block 8
Blague's Addition to the Town of Silverton
County of San Juan, State of Colorado
Suspended T41N R7W N.M.P.M.

Vicinity Map - not to scale

LEGEND

- ✠ - Found 3-1/4" metal cap on 2-1/2" metal pipe 'U.S. BLM 1977'
- ◉ - Found 1-1/2" aluminum cap on #5 rebar '3408'
- ○ - Found 2" aluminum cap on #5 rebar 'MCCORMACK LS 22574'
- ● - Found 2-1/2" aluminum cap on #6 rebar 'SCHAAF LS 12457'
- ◆ - Found 2" aluminum cap on #5 rebar 'MONADNOCK LS 31160'
- ● - Found 2" aluminum cap on #5 rebar 'MONADNOCK PLS 38727'
- ■ - Found other monument as noted
- ⊕ - Set 18" long #5 rebar with 2" aluminum cap 'MONADNOCK PLS 38727'

(R1) - Record as per the plat of Blague's Addition to the Town of Silverton as approved by the Town Board on October 1, 1883, and recorded in Book 1 Page 12 of the San Juan County Clerk & Recorder.

(R2) - Record as per deposited plat of 9-14-2000 as Map 50, San Juan County Clerk & Recorder

(R3) - Record as per Bureau of Land Management survey of 2-13-1985

(M) - Measured at time of survey

(C) - Computed from record and measured data

R.O.W. - Right of Way (public street or alley)

LAND SURVEYOR'S DEPOSIT:
San Juan County Surveyor's Office

Date: _____ Deposit No. _____

1. Survey performed for **ALTA / NSPS certification**. Title Commitment Order No. SJ2210870 effective 11-14-2021 by Colorado Title & Closing Services, LLC, and Order No. 105404 effective 12-17-2021 by Title Durango, LLC were relied upon for this survey. Additional research conducted at the Surveyor's Office, Assessor's Office, and Clerk & Recorder's Office of San Juan County, Colorado.

2. Property Descriptions: ALL **THAT PORTION** OF LOTS 17 THROUGH 23, INCLUSIVE, LYING AND BEING WITHIN BLOCK 7 OF BLAGUE'S ADDITION TO THE TOWN OF SILVERTON, AND LOTS 1 THROUGH 24, BLOCK 8, BLAGUE'S ADDITION TO THE TOWN OF SILVERTON, SAN JUAN COUNTY, COLORADO, TOGETHER WITH THE NORTHERLY HALF OF 20TH STREET ADJOINING BLOCK 8, BLAGUE'S ADDITION AND THE WESTERLY HALF OF CEMENT STREET ADJOINING BLOCK 8, BLAGUE'S ADDITION VACATED BY ORDINANCE NO. 2020-01, ALSO TOGETHER WITH THAT PORTION OF THE PLATTED ALLEY OF BLOCK 8, BLAGUE'S ADDITION VACATED BY ORDINANCE NO. 2020-01, LESS AND EXCEPT SAN JUAN COUNTY ROAD 2 FORMERLY STATE HIGHWAY 110.

3. This plat, consisting of one (1) sheet, accurately represents, to the best of my knowledge, information and belief a survey made by me or under my responsible charge in accordance with applicable standards of practice. This survey is not a warranty or guarantee, expressed or implied. This survey does not show easements except those specifically shown hereon.

4. This survey is valid only if print has the original seal and signature of the surveyor.

5. **Basis of Bearings**. Bearings are local grid bearings. The bearing of the line between the northwest corner of Block 8, Blague's Addition to the Town of Silverton and Corner 4 of the Blair Placer (M.S. 841) is N 59°47'26" E. Monuments described and shown hereon. **All bearings shown hereon are relative thereto.**

6. Vertical relief based upon GPS RTK ground survey using NGS Vertical Control Monument M 439, a 1/2" metal rod set 0.4' below grade in 6" logo box with cover, elevation 9,280.96 feet.

7. All underground utilities must be field located by the **appropriate agency or utility company** prior to any excavation, pursuant to C.R.S. 9-1.5-103.

8. **This survey meets the requirements of an Improvement survey plat as defined by C.R.S. 38-51-102(9).**

9. **Dates of fieldwork: December 4 - 13, 2021**

10. According to Colorado Law, you must commence any legal action based upon any defect in this survey within three (3) years after you first discover such defect. In no event, may any action based upon any defect in this survey be commenced more than ten (10) years from date of certification shown hereon.

11. Any person who knowingly removes, alters, or defaces any legal land boundary monument and/or boundary monument accessory, commits a class 2 misdemeanor pursuant to C.R.S. 18-4-508.

NOTE A:
While listed in the index of records in the San Juan County Clerk & Recorder's Office, this document could not be found in the physical files. Based upon the index listing, an 80-foot wide strip of both the Ruby No. 1 Placer (M.S. 654) and Ruby No. 2 Placer (M.S. 655) was granted to San Juan County in the year 1968. The deposited plat Map 50 shows this as State Highway 110. Neither the Colorado Department of Transportation nor San Juan County show this to be State Highway 110, rather San Juan County Road 34.

To George Henderson, Colorado Title & Closing Services, LLC, and Title Durango, LLC

This is to certify that this plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes items 4, 5, 8 and 16 of Table A thereof. The fieldwork was completed on December 13, 2021.

Date of Plat: December 29, 2021

Timothy A. Passek
Colorado PLS 38727
+1 970.318.6894
tim@mmsurvey.com

G. Henderson
TBD
Silverton, CO 81433

Monument Mineral Services, LLC
141 7th Ave Ouray, CO 81427
(970) 325-0870

Job No.	Sheet
221.113	1 of 1

Cottonwood CONSULTING

P.O. Box 1653
Durango, Colorado 81302
(970) 764-7356
www.cottonwoodconsulting.com

June 13, 2023

George Henderson
GFS Land LLC
140 Summa Street
West Palm Beach, FL 33405

RE: Wetland Delineation
East End Hills Subdivision
Silverton, Colorado

Dear Mr. Henderson,

Cottonwood Consulting LLC (Cottonwood) is pleased to provide GFS Land LLC (GFS Land) with the results of the wetland delineation conducted on June 1, 2023 in Silverton, Colorado. Details are summarized below.

Background

Cottonwood was retained by GFS Land to provide a Delineation of Waters of the United States (US; delineation) within the proposed project area. For the purpose of this review, the project area was defined as certain portions of Block 7, Block 8 North, Block 8 South, and Mineral Street. The purpose of the delineation is to identify and quantify Waters of the US within the proposed project area that may fall within the jurisdiction of the US Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act (CWA). Delineations are preliminary, as determination of Waters of the US must be verified by the Corps.

Project Area

The proposed East End Subdivision (subdivision) is located in Sections 8 and 17 of Township 41 North Range 7 West New Mexico Principal Meridian in San Juan County, Colorado. The subdivision is approximately 2.233 acres and would consist of 13 lots with associated roads and open space. Elevation at the site is approximately 9,260 feet above mean sea level.

Climate

Based on the available climate data, the average annual precipitation in the area is approximately 23 inches. Average annual snowfall is around 180 inches.

Vegetation

Vegetation within the proposed subdivision area is characterized as upland with interspersed areas of rushes (*Juncus* sp.). Dominant vegetation species includes woolly cinquefoil (*Potentilla*

hippiana), dandelion (*Taraxacum officinale*), and western wheatgrass (*Pascopyrum smithii*). Other species observed include common yarrow (*Achillea millefolium*), and goldenrod (*Solidago* sp.). Block 8 South, south of Blair St., is dominated by sedges (*Carex* sp.) and some willows (*Salix* sp.).

Soils

Based on review of the Natural Resources Conservation Service Web Soil Survey data, the soils within the proposed subdivision areas consist primarily of Quazar very cobbly loam, 5-25 percent (%) slopes and Howardsville gravelly loam, 1-6% slopes. The Quazar very cobbly loam parent material is alluvium derived from volcanic rock. The Quazar very cobbly loam is well drained with a medium runoff class. It is not considered prime farmland.

The Howardsville gravelly loam parent material is alluvium derived from rhyolite, tuff, and similar volcanic rocks. The Howardsville gravelly loam is well-drained with a high runoff class. It is not considered prime farmland.

Hydrology

The project area is generally located within the Animas River drainage in the San Juan Mountains. The Animas River is a tributary of the San Juan River with its headwaters in the San Juan Mountains above Silverton. From its headwaters, the Animas River flows south into New Mexico.

Methodology

Delineations of Waters of the US were conducted within the project area on June 1, 2023 by Cottonwood staff Emma Millar and Kyle Siesser. The delineations were conducted in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual and the 2010 Regional supplement the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Regions. Wetland delineation points were characterized to determine the presence or absence of the three wetland parameters (vegetation, soils, and hydrology). The wetland indicator status of plant species was based on the US Department of Agriculture Natural Resource Conservation Service Plants Database. Soil colors were measured using the Munsell Soil Color Charts.

Once delineated, the boundaries of the location of all wetland delineation points were mapped using a Trimble® GeoXH series Global Positioning System unit, capable of sub-meter accuracy.

Results

Based on the presence/absence of indicators of wetland hydrology, vegetation, and soils, no wetlands are present within the proposed subdivision area. Multiple upland areas of rushes were observed on the hillside within Block 8 North; however, the areas lacked the hydric soils and hydrology necessary to be considered a wetland. Wetlands are present along the roadside ditch on the northern side of Blair St, between the road and the property. This area is a San Juan County

Road right-of-way (ROW). The proposed access road for the eastern portion of the subdivision would result in a fill of this wetland. The fill would be less than 0.1 acre.

Cottonwood identified and delineated a wetland within the Block 8 South portion of the property. No ground disturbance is proposed for this area and the wetland would not be impacted.

Figure 1 is a Wetland Delineation Map. Data forms are included as Attachment 1, a photographic log is included as Attachment 2, and a survey plat indicating the location of the proposed access road is included as Attachment 3. Results from each wetland delineation point are summarized in Table 1.

Table 1. Wetland delineation points.

Delineation Points	Latitude/Longitude	Wetland Present?	Description
Delineation Point #1 (roadside ditch)	37.81740°, -107.65570°	Yes	Wetland delineation point in roadside ditch adjacent to proposed subdivision.
Delineation Point #2 (hillslope)	37.81743°, -107.65571°	No	Wetland delineation point from hillslope within proposed subdivision.
Delineation Point #3 (rush area)	37.81775°, -107.65550°	No	Wetland delineation point from rush area within proposed subdivision.
Delineation Point #4 (hillslope)	37.81778°, -107.65558°	No	Wetland delineation point from hillslope within proposed subdivision.
Delineation Point #5 (Block 8 South)	37.81706°, -107.81706°	Yes	Wetland delineation point from sedge area in Block 8 South.

Conclusion

Based on the preliminary wetland delineation conducted June 1, 2023, there are no wetlands present within the proposed subdivision property boundaries. The proposed access road for the eastern portion of the subdivision would be constructed within a wetland in a San Juan County Road ROW along the roadside ditch on the north side of Blair St. The fill resulting from this road would be less than 0.1 acre. GFS Land does not propose development in the Block 8 South wetland area.

Cottonwood recommends proceeding under a Nationwide Permit 14 – Linear Transportation Projects and submitting a Preconstruction Notification to the Corps. No mitigation would be required for the project.

Should you have any questions, please do not hesitate to contact me at 970-764-7356. Cottonwood appreciates the opportunity to provide services to GFS Land.

Sincerely,

Kyle D. Siesser

Kyle Siesser, P.G.
Cottonwood Consulting LLC

Attachments: Figure 1 – Project Area Map
Attachment 1 – Data Forms
Attachment 2 – Photographic Log
Attachment 3 – Survey Plat

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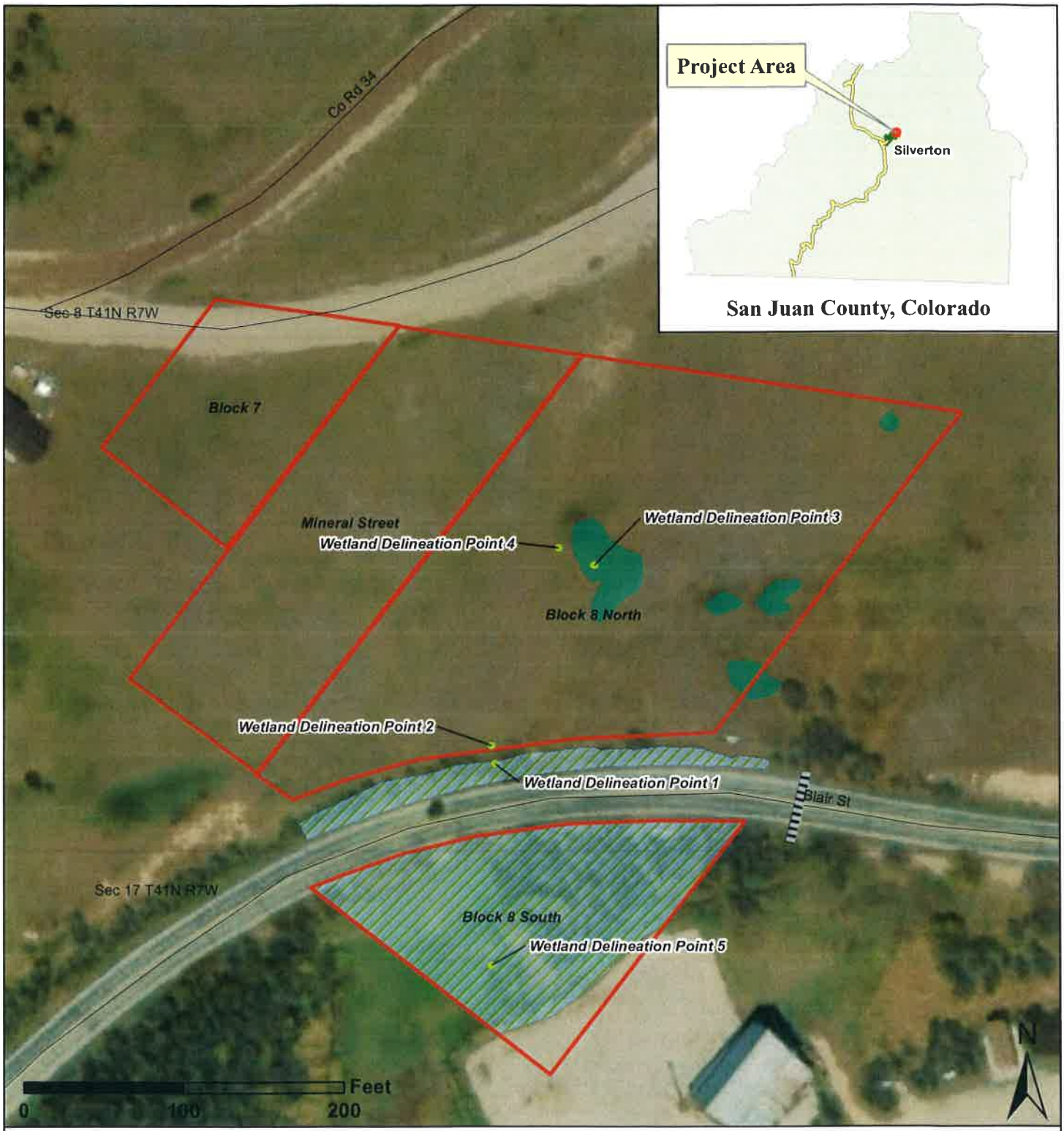
FIGURE 1



Notes: Wetland delineation conducted 6/1/2023.

Legend

- Wetland Delineation Point
- Proposed Project Area
- Rush (Juncus sp.) Area
- Wetland Area
- Culvert
- Roads

Cottonwood CONSULTING

Mapping by: E. Millar, 6/5/2023
Coordinate System:
NAD 1983 UTM Zone 13 N

Location: Sec 8 & 17 T41N R7W NMPM

Figure 1
East End Hills Subdivision
Wetland Delineation Map
GFS Land LLC

Cottonwood
CONSULTING

ATTACHMENT 1

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: East End Subdivision City/County: Silverton, San Juan Sampling Date: 6/1/23
Applicant/Owner: GFG Land LLC State: CO Sampling Point: 1
Investigator(s): K. Siesser, E. Miller Section, Township, Range:
Landform (hillslope, terrace, etc.): roadside ditch Local relief (concave, convex, none): concave Slope (%): 0%
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes Y No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Sample point w/i roadside ditch. Wetland created by the road.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 5ft rad)			
1. willow	15	N	
2.			
3.			
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot size: 5ft rad)			
1. rush	50	Y	FACW
2. dandelion	5	N	
3. yarrow	2	N	
4. bog bean	2	N	
5. moss	10	N	
6. western wheatgrass	5	N	
7. smooth brome	5	N	
8.			
9.			
10.			
11.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)
Total Number of Dominant Species Across All Strata: ____ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
X 1 - Rapid Test for Hydrophytic Vegetation
__ 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ 5 - Wetland Non-Vascular Plants[1]
__ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 2.5/3							abundant roots
10-16	gley 1 5/10Y							gravel present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- X Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks: grave

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): <1 in

Water Table Present? Yes X No ____ Depth (inches): 7 16 in

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 7 16 in

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: East End Subdivision City/County: Silverton, San Juan Sampling Date: 6/1/23

Applicant/Owner: GFS Land LLC State: CO Sampling Point: 2

Investigator(s): K. Siesser, S. Millar Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 25

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks: sample from hillslope above borrow ditch

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5ft rad)			
1. rush	60	N	
2. yarrow	5	N	
3. field pussytoes	8	N	
4. western wheatgrass	20	Y	FACU
5. cinquefoil (prairie)	25	Y	FACU
6. goldenrod	15	N	
7. dandelion	5	N	
8. spring flower rockjasmine	2	N	
9. field bindweed	5	N	
10.			
11.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

__ 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ 5 - Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: rushes present, not dominante

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	7.5YR 5/3	100						abundant roots

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: gravel/cobble

Depth (inches): 6

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): ____

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: East End City/County: Silverton, San Juan Sampling Date: 6/1/23

Applicant/Owner: GPS Land State: CO Sampling Point: 3

Investigator(s): Section, Township, Range:

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 10

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: sample from patch of rushes on hillside.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5ft rad)			
1. Rushes	70	Y	FACW
2. dandelion	10	N	
3. western wheat	20	N	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

__ 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ 5 - Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: ~~2~~ 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 3/2	100						abundant roots

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: gravel / cobble

Depth (inches): 10

Hydric Soil Present? Yes _____ No X

Remarks:

medium crumb size

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: East End Subdivision City/County: ~~San Juan~~ Silverton, San Juan Sampling Date: 6/1/23

Applicant/Owner: GFS Land State: CO Sampling Point: 4

Investigator(s): K. Siesser, E. Miller Section, Township, Range:

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 10

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5ft rad)			
1. cinquefoil	other 15	Y	FACU
2. dandelion	other 15	Y	FACU
3. sagebrush buttercup	1	N	
4. yarrow	4	N	
5. western wheatgrass	3	N	
6. rush	1	N	
7. yellow toadflax	1	N	
8. goldenrod	10	N	
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 50

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

__ 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ 5 - Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 3/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: GFS to East End subdivision City/County: Silverton, San Juan Sampling Date: 6/1/23

Applicant/Owner: GFS Land State: CO Sampling Point: 5

Investigator(s): K. Siesser, E. Miller Section, Township, Range: _____

Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes _____	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5Ft rad)			
1. sedge	85	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	5/2	2.5YR 3/6	5				some redox features
6-12	7.5YR 3/1		2.5YR 3/6	5				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 7 12 in

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Cottonwood
CONSULTING

ATTACHMENT 2

Cottonwood CONSULTING

Wetland Delineation
Photographic Log
GFS Land LLC

Photo 1: Proposed East End Hills Subdivision area, 6/1/2023.

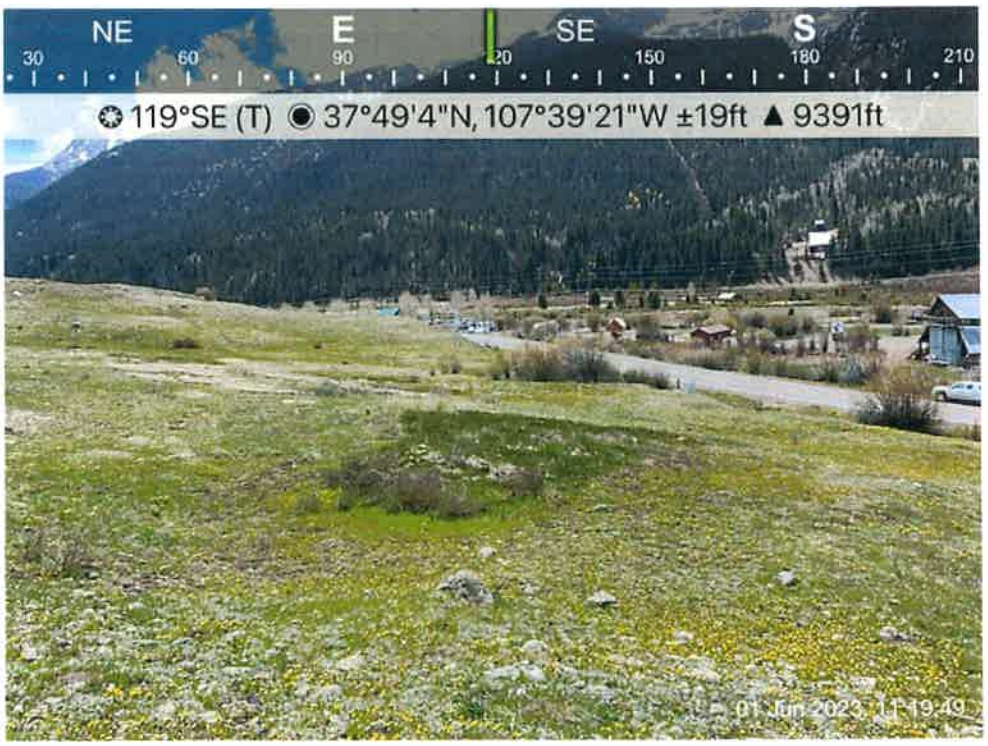


Photo 2: Proposed East End Hills Subdivision area, 6/1/2023.

Photo 3: Wetland delineation point #1 collected from the ditch adjacent to project area, 6/1/2023.

Photo 4: Wetland delineation point #1 collected from the ditch adjacent to project area, 6/1/2023.

Cottonwood CONSULTING

Wetland Delineation
Photographic Log
GFS Land LLC

Photo 5: Wetland delineation point #2 collected from hillslope within project area, 6/1/2023.

Photo 6: Wetland delineation point #2 collected from hillslope within project area, 6/1/2023.

Photo 7: Wetland delineation point #3 collected from rush area within project area, 6/1/2023.

Photo 8: Wetland delineation point #3 collected from rush area within project area, 6/1/2023.

Photo 9: Wetland delineation point #4 collected from hillslope within project area, 6/1/2023.

Photo 10: Wetland delineation point #4 collected from hillslope within project area, 6/1/2023.

Photo 11: Wetland delineation point #5 collected from Block 8 South area, 6/1/2023.

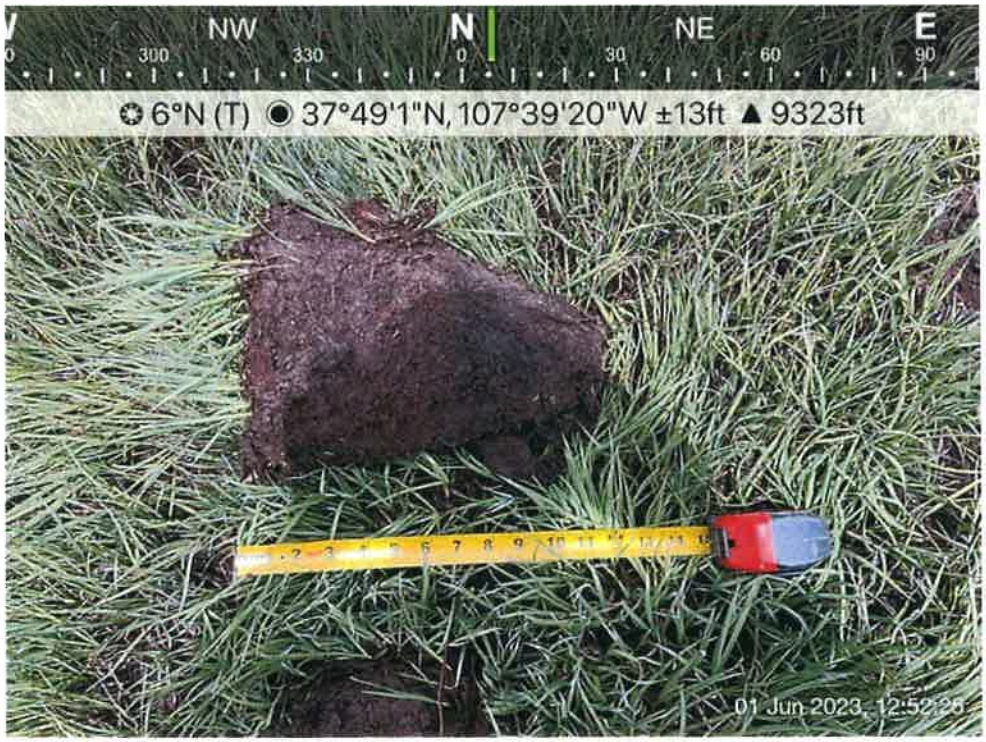


Photo 12: Wetland delineation point #5 collected from Block 8 South area, 6/1/2023.

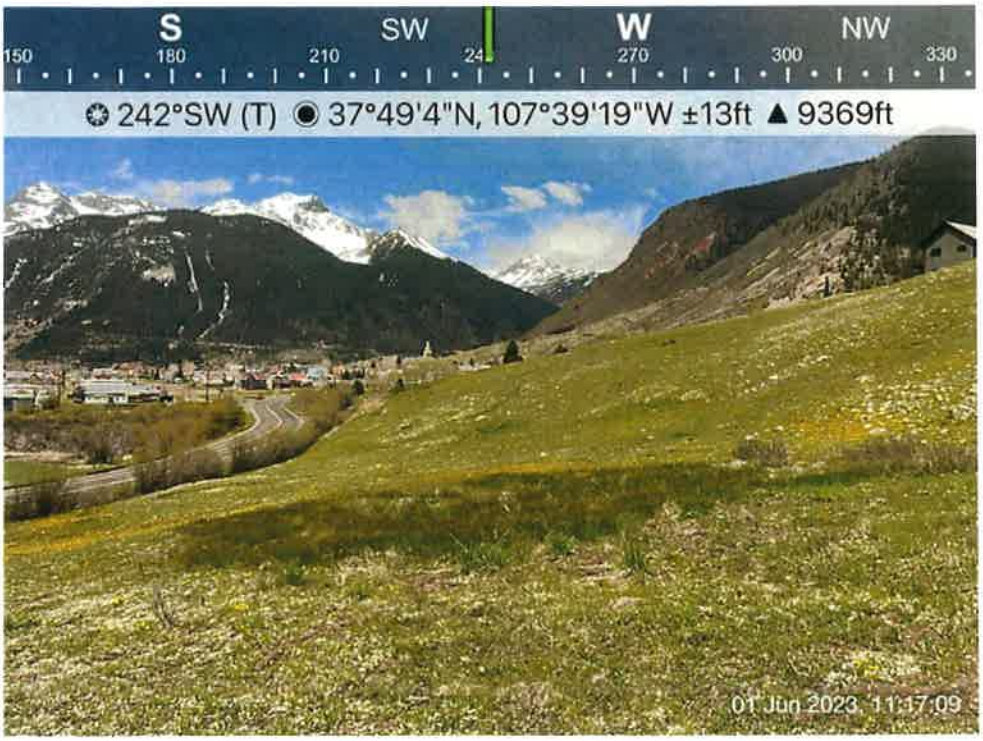


Photo 13: Rush area within project area, 6/1/2023.

Photo 14: Block 8 South area, 6/1/2023.

Cottonwood
CONSULTING

ATTACHMENT 3

KEY

- EXISTING WATER
- EXISTING SANITARY SEWER
- EXISTING STORM DRAIN
- ZONING BOUNDARY
- R-2 ZONING DISTRICT

LOCATION MAP

PROPOSED OFF-SITE UTILITY

KEY

- PROPOSED WATER
- PROPOSED SANITARY SEWER

ACREAGES

EXISTING	
BLOCK 7	1.337 ac
BLOCK 8	.432 ac
PROPOSED VACATED	
MINERAL STREET	.464 ac
TOTAL	2.233 ac

PROPOSED	
ROADS	0.413 ac
OPEN SPACE	0.596 ac
LOT 1	0.088 ac
LOT 2	0.110 ac
LOT 3	0.080 ac
LOT 4	0.092 ac
LOT 5	0.131 ac
LOT 6	0.101 ac
LOT 7	0.094 ac
LOT 8	0.080 ac
LOT 9	0.075 ac
LOT 10	0.090 ac
LOT 11	0.107 ac
LOT 12	0.088 ac
LOT 13	0.080 ac
TOTAL	2.233 ac

dudley ashwood, p.e.

PRELIMINARY SUBDIVISION PLAN

EAST END HILLS [WORKING TITLE]
SILVERTON, CO

OCTOBER 8, 2020

S1

AERIAL IMAGERY FROM SAN JUAN COUNTY GIS

SURVEY INFORMATION FROM "ALTA/NSPS LAND TITLE SURVEY, LOTS 17-23 OF BLOCK 7 & BLOCK 8, BLABUE'S ADDITION TO THE TOWN OF SILVERTON, COUNTY OF SAN JUAN, STATE OF COLORADO" BY TIMOTHY PASEK, MONADNOCK MINERAL SURVEY, 1/17/2021.

KEY

EXISTING CONTOUR
PROPERTY LINE
PROPOSED SANITARY SEWER
PROPOSED WATER

0 10 20

dudley ashwood, p.e.

PRELIMINARY SUBDIVISION PLAN

EAST END HILLS (WORKING TITLE)
SILVERTON, CO

OCTOBER 8, 2021
SCALE: 1" = 20'

S2

Town of Silverton

Community Planning Strategies

STAFF REPORT

To:	San Juan County Regional Planning Commission
From:	Shelia Booth, *Contracted Town Planner, CPS*
Through:	Gloria Kaasch-Buerger, *Town Administrator* Lucy Mulvihill, *Community Development Coordinator*
Date:	May 21, 2024
RE:	Consideration of an initial Zoning request to Multiple Family Residential District R-2 Limited (R-2-L) for the Anvil Mountain Subdivision annexation, located north of US Highway 50 and south of Shrine Road

PROJECT SITE: Anvil Mountain Subdivision.

APPLICANT: Town of Silverton

CURRENT COUNTY ZONING DISTRICT: Mountain Zone District & Town County of Mutual Interest Overlay District

OVERLAY DISTRICTS: None.

PURPOSE OF REVIEW: Colorado Revised Statutes (C.R.S.) 31-12-115 states: *(1) An annexing municipality may institute the procedure outlined in state statutes or municipal charter to make land subject to zoning at any time after a petition for annexation or a petition for an annexation election has been found to be valid in accordance with the provisions of section 31-12-107. The proposed zoning ordinance shall not be passed on final reading prior to the date when the annexation ordinance is passed on final reading. If the zoning process is commenced prior to the effective date of the annexation ordinance, the legal protest area for zoning shall be determined solely on geographic location, irrespective of whether the land in such legal protest area is within or without or partly within and partly without the annexing municipality. (2) If the municipality has a zoning ordinance, any area annexed on or after January 1, 1966, shall be brought under such zoning ordinance and map within ninety days after the effective date of the annexation ordinance, irrespective of any legal review which may be instituted pursuant to section 31-12- 116.*

Sec. 15-1-30(a)(4) of the Silverton Municipal Code ("SMC") states: *The Planning Commission shall review the annexation map, master plan and zoning request at a public hearing and shall submit a written recommendation to the Board of Trustees.*

Sec. 16-1-40. Of the Silverton Municipal code states: Amendments or changes *Pursuant to Sections 31-23- 304 and 31-23-305, C.R.S., the regulations, restrictions and boundaries established by this Chapter and the official use district map may be amended, supplemented, changed, modified or repealed by the Board of Trustees, following review and recommendation by the Planning Commission. Such amendments or changes may be initiated by the Board of Trustees, the Planning Commission or application of any person residing, owning or leasing property in the Town.*

APPLICATION: A request by the Town of Silverton to apply the Multiple Family Residential District R-2 Limited (R-2-L) to the recently annexed property known as Anvil Mountain Subdivision.

PUBLIC NOTICE:

- Posted on Town website on Thursday May 2, 2024.
- Posted within the Silverton Standard and Miner newspaper on Thursday May 2, 2024.

PUBLIC COMMENT: As of May 15, 2024, no public comments have been received regarding this application.

ADJACENT PROPERTIES:

- North – undeveloped property in the County
- South – US Hwy 550 and undeveloped property in the County
- East – undeveloped property zoned Business Automobile District (B-A) and Multiple Family Residential District (R-2)
- West - undeveloped property in the County

PARCEL SIZE AND ACCESS: The Anvil Mountain Subdivision annexation covers 11.73 acres. It includes 35 residential lots and dedicated areas of open space. Access to the subdivision is taken from 5th Street.

ANALYSIS OF REQUEST: The Town annexed the Anvil Mountain Subdivision on March 25, 2024, by Ordinance No. 2024-05 and March 27, 204 by Ordinance No. 2024-06. The Town must apply zoning to the annexed lands within 90 days of annexation per C.R.S. 31-12-115. After a review of the existing structures and the approved County zoning regulations for the property, the Town is requesting a Limited Overlay, Planned Unit Development zoning with a base of Multiple Family Residential District (R-2). The R-2-L zone district, if approved, would allow the development of Anvil Mountain Subdivision to continue as it was originally proposed in the County with a few minor exceptions. The attached PUD Development Guide serves as the regulatory document for the development and identifies the specific deviations from the base R-2 zone district standards. In any area where the PUD Development Guide is silent on a development standard, the Silverton Municipal Code, as it exists or may be amended, will govern.

Land Use & Dimensional Standards:

Table 1 shows the dimensional requirements for the R-2 zone district compared to those proposed in the Anvil Mountain Development Guide.

Table 1:

Standard	Required	PUD Proposed
Minimum Lot Area	5,000 sq. ft.	2,000 sq. ft (P1 & P4) 5,000 sq. ft. (P2) 6,000 sq. ft. (P3) 1,500 sq. ft. Townhome
Maximum Lot Area	---	8,500 sq. ft. (P1) No Maximum (P2) No Maximum (P3&4)
Lot Coverage	---	None (all)
Front Setback	7'	20' (all)
Rear Setback	7'	10' (all) 0' Duet Units
Side Setback	7'	7' (all) 0' Townhome internal
Minimum Floor Area of Dwelling Unit: - **SF Unit** - **MF Unit**	750 sq. ft. 500 sq. ft. for a total of 1,250 sq. ft.	---

Minimum Lot Width	50′	20′ (P1,P3,P4) 50′ (P2)
Height	30′	35′(all)
Parking	---	1 off street (all)

The open space area within the development will follow the Public (P) zone district standards.

CODE STANDARD EVALUATION:

Sec. 16-1-40. - Amendments or changes.

(b) Application procedure.

(1) The application for such action by a person shall be filed in writing with the Planning Director.

The Town has initiated the request to zone the property per C.R.S. and SMC requirements.

(2) The application for amendment or change in the use district map shall contain the following information:

a. Description of land area, including lot and block numbers to be rezoned, and requested new classification, along with a drawing to scale showing boundaries of the area requested to be rezoned.

The application materials include a scaled plan for the property along with the legal description.

b. A statement of justification for the rezoning requested.

Per C.R.S., the property must be zoned within 90 days of annexation. The Town is complying with C.R.S. requirements. The Town reviewed the existing development regulations against the Twon's zoning district standards and chose the zone district that most closely resembled the County approved development regulations.

c. Time schedule for any contemplated new construction or uses.

The Town anticipates that the subdivision will continue to steadily develop over the next five years. There is additional anticipation of possible affordable housing development within the next year.

COMPASS MASTER PLAN EVALUATION:

The Future Land Use Framework map within the Compass Master Plan does not include the subject site; however, property to the south and southeast are identified as areas of housing infill.

Goal: Plan for responsible growth and development that contribute to our community and sense of place.

Strategy A: Update Local Land Use Policies

2. Update dimensional standards to provide more flexibility for a variety of building types while maintaining the historic character.

3. Limit regulation of uses and building types to provide flexibility for home/building reuse, and non-traditional creative/marker/office spaces n neighborhoods.

Strategy D: Create a Subarea Plan for the Town Entrance

1. The Town should work with the County and CDOT through a community process to develop and advance a subarea plan for the area around highway 550 and the Anvil Subdivision.
2. Identify potential locations in this area for: b. additional affordable housing

Goal: Expand housing choices, opportunities and affordability for our community.

Strategy D: Address code and policy barriers to encourage housing choices and affordability.

2. Update dimensional standards and parking requirements to allow diverse housing options.
3. Ensure plans identify areas best suited for expanding housing opportunities.
4. Ensure desired housing types are designated "use by right" in desired areas

Strategy E: Identify potential locations for affordable housing.

4. Use annexations to expand workforce housing (i.e. Anvil & Boulder Gulch/Hwy 110 Cement Creek, Howardsville)

STAFF RECOMMENDATION:
Staff finds that all required materials have been submitted within the timeframe required and all materials comply with the conditions of §Sec. 15-1-30(a)(4) and 16-1-40 of the SMC. Staff therefore recommends approval to zone the Anvil Mountain Subdivision to Multi-Family Residential Limited Overlay (R-2-L), as presented.

However, this is a decision for the Planning Commission to make, and the Commission may choose to approve or deny the zoning application based on the testimony and evidence it hears. Two sample motions are included below for convenience only. They do not limit the evidence the Planning Commission can rely on or the decision the Commission makes.

SAMPLE MOTIONS:

Approval:
I move to recommend approval of zoning the Anvil Mountain Subdivision to Multi-Family Residential Limited Overlay (R-2-L), as presented, finding the zoning in conformance with §15-1-30(a)(4) and §16-1-40 of the SMC.

Approval with Conditions:
I move to recommend approval of zoning the Anvil Mountain Subdivision to Multi-Family Residential Limited Overlay (R-2-L), as presented, finding the zoning in conformance with §15-1-30(a)(4) and §16-1-40 of the SMC with the following conditions: {list conditions}

Denial:
I move to deny the zoning of Anvil Mountain Subdivision to Multi-Family Residential Limited Overlay (R-2-L) finding the zoning is NOT in conformance with §15-1-30(a)(4) and §16-1-40 of the SMC.

ATTACHMENTS:
1. Anvil Mountain Legal Description
2. Development Guide
3. Public Notice

LEGAL DESCRIPTION:

Part of suspended section 18, Township 41 North, Range 7 West, of the New Mexico Principal Meridian, San Juan County Colorado, more particularly described as follows:

Beginning at a point on line 3 – 5 of the Silverton Town Site, whence corner no. 3 of the said Silverton Town Site bears N. 36°16'27" E., 1158.87 ft. dist.; thence N. 54°45'47" W., 529.79, ft. dist.; thence S. 79°13'01" W., 320.14, ft. dist., to the Northwest corner of Lot 2 of said Silverton Town Site; thence S. 54°40'06" W., 61.03, ft. dist., to the Angle Point of Lot 2 of said Silverton Town Site; thence S. 02°23'59" W., 35.42, ft. dist., to the Southwest corner of Lot 2 of said Silverton Town Site and also being on the North Right of Way line of Fifth Street; thence N. 87°36'14" W., 32.50, ft. dist., along the North Right of Way line of Fifth Street to a point on the East line of Lot 1 of said Silverton Town Site; thence S. 02°23'46" W., 28.99, ft. dist., to the Southeast corner of Lot 1 of said Silverton Town Site; thence S. 25°45'47" W., 42.15, ft. dist., to the Northeast corner of Lot 30 of said Silverton Town Site; thence S. 25°06'27" W., 157.80, ft. dist., to the Southeast corner of Lot 30 of said Silverton Town Site and also being on the North Right of Way line U. S. Highway 550; thence along the North Right of Way line of said U. S. Highway 550 on a curve turning to the right with an arc length of 326.88 ft. dist., with a radius of 3539.99 ft. dist., of which a chord bearing of S. 64°38'29" E.; thence S. 62°01'24" E., 403.27, ft. dist., to a point on line 3 – 5 of the Silverton Town Site; thence N. 36°16'27" E., 449.61, ft. dist., more or less, to the point of beginning.

Beginning at the Northeast corner of Lot 34 of the Anvil Mountain Subdivision, whence corner no. 3 of the Silverton Town Site bears N. 60°39'38" E., 1282.92 ft. dist.; thence S. 79°13'01" W., 320.14, ft. dist., to the Northwest corner of Lot 2 the said Anvil Mountain Subdivision; thence S. 54°40'06" W., 61.03, ft. dist., to the Angle Point of Lot 2 of the said Anvil Mountain Subdivision; thence S. 02°23'59" W., 35.42, ft. dist., to the Southwest corner of Lot 2 of the said Anvil Mountain Subdivision and also being on the North Right of Way line of Fifth Street; thence N. 87°36'14" W., 32.50, ft. dist., along the North Right of Way line of Fifth Street to a point on the East line of Lot 1 of the said Anvil Mountain Subdivision; thence S. 02°23'46" W., 28.99, ft. dist., to the Southeast corner of Lot 1 of the said Anvil Mountain Subdivision; thence S. 25°45'47" W., 42.15, ft. dist., to the Northeast corner of Lot 30 of the said Anvil Mountain Subdivision; thence S. 25°06'27" W., 157.80, ft. dist., to the Southeast corner of Lot 30 of the said Anvil Mountain Subdivision and also being on the North Right of Way line U. S. Highway 550; thence along the North Right of Way line of said U. S. Highway 550 on a curve turning to the Left with an arc length of 356.75 ft. dist., with a radius of 3539.99 ft. dist., of which a chord bearing of N. 70°10'25" W., to the Southwest corner of Lot 30 of the said Anvil Mountain Subdivision; thence N. 37°20'49" E., 115.03, ft. dist., to the Northwest corner of Lot 30 of the said Anvil Mountain Subdivision; thence N. 53°32'38" E., 122.83, ft. dist., to the Southwest corner of Lot 32 of the said Anvil Mountain Subdivision; thence N. 61°42'36" E., 94.59 ft. dist., to the Angle Point of Lot 32 of the said Anvil Mountain Subdivision; thence N. 70°37'14" E., 39.39 ft. dist., to the Northwest corner of Lot 32 of the said Anvil Mountain Subdivision; thence N. 33°59'59" E., 75.26 ft. dist., to the Southwest corner of Lot 33 of the said Anvil Mountain Subdivision; thence N. 70°15'48" E., 72.92 ft. dist., to the Angle Point of Lot 33 of the said Anvil Mountain Subdivision; thence N. 51°30'48" E., 130.07 ft. dist., to the Southwest corner of Lot 34 of the said Anvil Mountain Subdivision; thence N. 68°45'48" E., 51.79 ft. dist., to the Northwest corner of Lot 34 of the said Anvil Mountain Subdivision; thence S. 54°45'47" E., 331.00 ft. dist., to the Northeast corner of Lot 34 of the said Anvil Mountain Subdivision more or less, to the point of beginning.

Anvil Mountain Development Guide

The Anvil Mountain development has been divided into the following Planning Areas and as identified on Exhibit A Land Use and Planning Areas. Each area shall follow the development standards of the Town of Silverton's base zone district, as identified for each Planning Area below. Where the Development Guidelines are silent, the standards and regulations within the Silverton Municipal Code, as currently exist or may be amended, shall apply.

All development standards within the base zone district shall apply with the following exceptions:

Planning Area 1:

R-2 Multiple Family Residential District

Uses Permitted –

- Dwelling, Single-Unit Detached
- Dwelling, Duplex
- Accessory Dwelling Units
- Cottage Industry
- Dwelling, Single-Unit Attached (Townhome)
- Open Space: Follows standards within the Public zone district.

Use Subject to Review –

- Dwelling, Triplex
- Dwelling, Fourplex
- Dwelling, Multiunit

Uses Not Permitted –

- Manufactured Home Park
- Moveable Tiny Home Park
- Continuing Care Facility
- Group Home
- Religious Assembly
- Day Care Center, Adult
- Day Care Center, Child
- School, Elementary or Secondary
- Bed and breakfast establishment
- Vacation Rental
- Utility, Minor

Minimum Lot Area: 2,000 square feet

Maximum Lot Area: 8,500 square feet

Lot Coverage: No Lot Coverage Maximum

Setbacks:

- Front: 20 feet
- Rear: 10 feet
    - "Duet Units": 0 feet
- Side: 7 feet
- Townhome Lots: 0 feet internal (shared wall) side yard setback; 5' external lot boundary side yard setback

Lot Width: 20 feet

Height: 35 feet

Parking: one off-street parking space per dwelling unit

Planning Area 1A, 1B & 1C:

R-2 Multiple Family Residential District

Uses Permitted –

- Dwelling, Duplex
- Dwelling, Single-Unit Attached (Townhome)
- Dwelling, Triplex
- Dwelling, Fourplex
- Dwelling, Multiunit
- Accessory Dwelling Units
- Cottage Industry

Uses Subject to Review –

- Dwelling, Single-Unit Detached

Uses Not Permitted –

- Manufactured Home Park
- Moveable Tiny Home Park
- Continuing Care Facility
- Group Home
- Religious Assembly
- Day Care Center, Adult
- Day Care Center, Child
- School, Elementary or Secondary
- Bed and breakfast establishment
- Vacation Rental
- Utility, Minor

Minimum Lot Area: 2,000 square feet

Minimum Townhome Lot Area: 1,500 square feet

Maximum Lot Area: 6,000 square feet

Lot Width: 25 feet

Lot Coverage: No Lot Cover Maximum

Setbacks:

- Front: 20 feet
- Rear: 10 feet
- Side: 7 feet
- Townhome Lots: 0' internal (shared wall) side yard setback; 5' external lot boundary side yard setback

Height: 35 feet

Parking: one off-street parking space per dwelling unit

Planning Area 2:

R-2 Single-Family Residential District

Uses Permitted–

- Dwelling, Single-Unit Detached
- Accessory Dwelling Units
- Cottage Industry
- Open Space: Follows standards within the Public zone district.

Uses Subject to Review –

- Dwelling, Duplex
- Dwelling, Single-Unit Attached (Townhome)
- Dwelling, Triplex
- Dwelling, Fourplex
- Dwelling, Multiunit

Uses Not Permitted –

- Manufactured Home Park
- Moveable Tiny Home Park
- Continuing Care Facility
- Group Home
- Religious Assembly
- Day Care Center, Adult
- Day Care Center, Child

- School, Elementary or Secondary
- Bed and breakfast establishment
- Vacation Rental
- Utility, Minor

Minimum Lot Area: 5,000 square feet

Maximum Lot Area: No Maximum lot area

Lot Width: Minimum 50 feet

Setbacks:

- Front: 20 feet
- Rear: 10 feet
- Side: 7 feet

Height: 35'

Parking: two off-street parking spaces per dwelling unit

Planning Area 3:

R-2 Single-Family Residential District

Used Permitted –

- Dwelling, Duplex
- Dwelling, Single-Unit Attached (Townhome)
- Dwelling, Triplex
- Dwelling, Fourplex
- Dwelling, Multiunit
- Accessory Dwelling Units
- Cottage Industry
- Open Space: Follows standards within the Public zone district.

Uses Subject to Review

- Dwelling, Single Family Detached

Uses Not Permitted –

- Manufactured Home Park
- Moveable Tiny Home Park
- Continuing Care Facility
- Group Home
- Religious Assembly

- Day Care Center, Adult
- Day Care Center, Child
- School, Elementary or Secondary
- Bed and breakfast establishment
- Vacation Rental
- Utility, Minor

Minimum Lot Area: 6,000 square feet

Minimum Townhome Lot Area: 1,500 square feet

Maximum Lot Area: No Maximum lot area

Minimum Lot Width: 20 feet

Lot Coverage: No Lot Cover Maximum

Setbacks:

- Front: 20 feet
- Rear: 10 feet
- Side: 7 feet
- Townhome Lots: 0' internal (shared wall) side yard setback; 5' external lot boundary side yard setback

Height: 35 feet

Parking: one off-street parking space per dwelling unit

Planning Area 4:

R-2 Single-Family Residential District

Used Permitted –

- Dwelling, Single Family Detached
- Dwelling, Duplex
- Dwelling, Single-Unit Attached (Townhome)
- Dwelling, Triplex
- Dwelling, Fourplex
- Dwelling, Multiunit
- Accessory Dwelling Units
- Cottage Industry
- Open Space: Follows standards within the Public zone district.

Uses Subject to Review

- Manufactured Home Park
- Moveable Tiny Home Park

Uses Not Permitted –

- Continuing Care Facility
- Group Home
- Religious Assembly
- Day Care Center, Adult
- Day Care Center, Child
- School, Elementary or Secondary
- Bed and breakfast establishment
- Vacation Rental
- Utility, Minor

Minimum Lot Area: 2,000 square feet

Minimum Townhome Lot Area: 1,500 square feet

Maximum Lot Area: No Maximum lot area

Lot Width: 20 feet

Lot Coverage: No Lot Cover Maximum

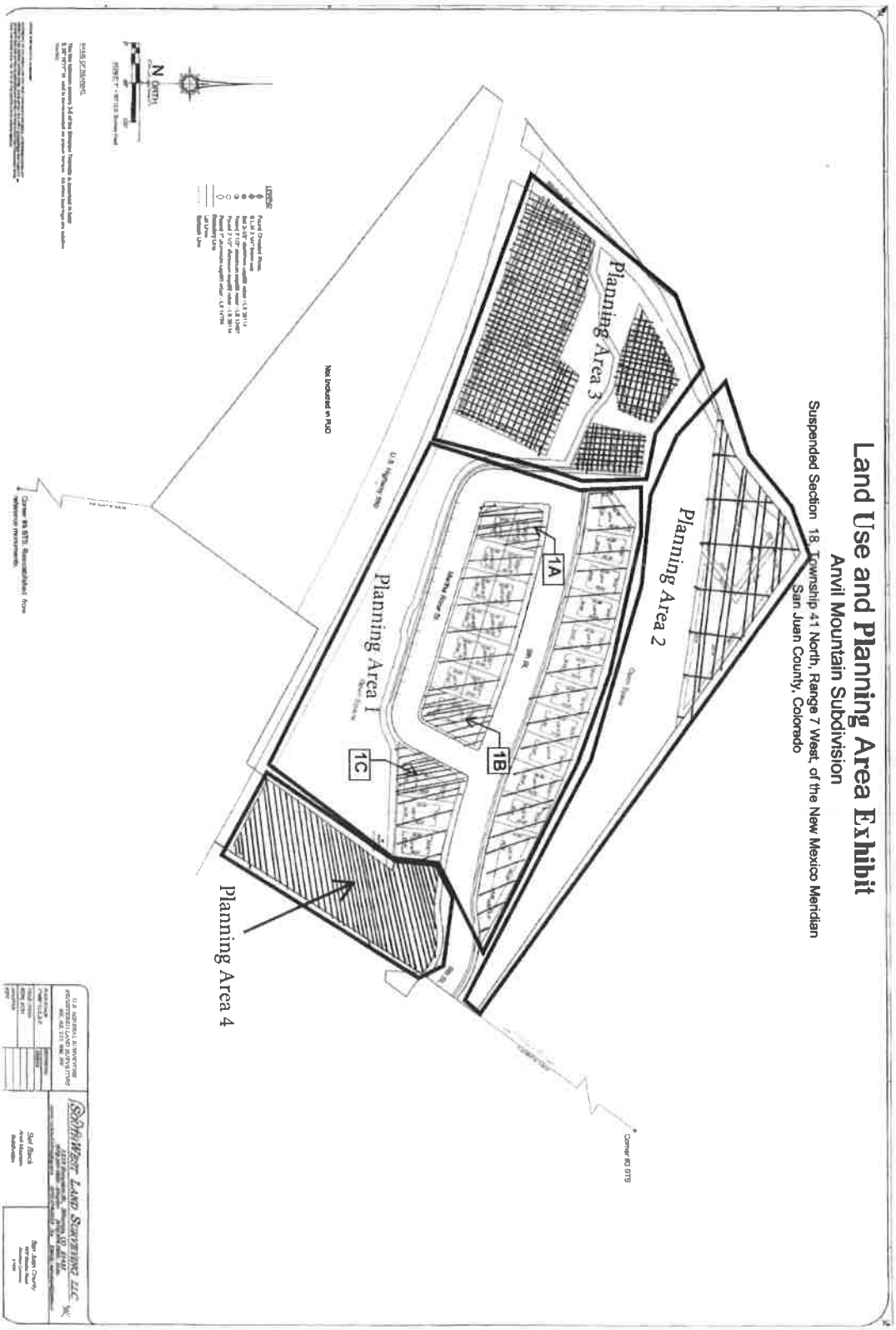
Setbacks:

- Front: 20 feet
- Rear: 10 feet
- Side: 7 feet
- Townhome Lots: 0' internal (shared wall) side yard setback; 5' external lot boundary side yard setback

Height: 35 feet

Parking: one off-street parking space per dwelling unit

EXHIBIT A – LAND USE & PLANNING AREAS



PUBLIC HEARING

PUBLIC NOTICE IS HEREBY GIVEN that a public hearing will be held to consider 24-14 PUD Anvil Mountain Subdivision: A request by the Town of Silverton to zone the annexed area known as Anvil Addition to R-2 Multiple Family Residential District Limited Overlay (R-2-L) including the approval of a Planned Unit Development for property located at the Anvil Mountain Subdivision.

The Planning Commission will hold a public hearing on Tuesday, May 21, 2024, at the County Couthouse: at 5:00pm. The Board of Trustees will hold a public hearing on May 28, 2024, at Town Hall: at 7:00pm.

NOTICE is further given that all persons may present written/oral testimony regarding the following applications prior to/during the Public Hearing. The applications, meeting agenda, and virtual meeting instructions are posted on the Town website. Citizen comments may be sent by email, mail, phone, or hand-delivered to: Town Hall, 1360 Greene Street, PO Box 250, Silverton, CO 81433. Contact Community Development Director Lucy Mulvihill (970) 946-9408 (lmulvihill@silverton.co.us) with any questions/comments about this Application.

Published in the Silverton Standard & the Miner: Thursday, May 2, 2024.