TOWN OF JACKSON
PLANNING & BUILDING DEPARTMENT
TRANSMITTAL MEMO

Town of Jackson
☒ Public Works/Engineering
☒ Building
☐ Environmental Stewardship
☒ Town Attorney
☒ Police

Joint Town/County
☒ Parks and Recreation
☒ Pathways
☒ Housing Department

Teton County
☐ Planning Division
☐ Engineer
☐ Surveyor
☐ Assessor
☐ Clerk and Recorder
☐ Road and Levee

State of Wyoming
☐ Teton Conservation
☒ WYDOT
☐ TC School District #1
☒ Game and Fish
☐ DEQ

Federal Agencies
☐ Army Corp of Engineers

Utility Providers
☐ Qwest
☐ Lower Valley Energy
☐ Bresnan Communications

Special Districts
☒ START
☒ Jackson Hole Fire/EMS
☒ Regional Transportation

Date: November 15, 2024

Item #: P24-171 & P24-172

Planner: Katelyn Page

Phone: 733-0440 ext. 1302

Email: kpage@jacksonwy.gov

Owner:
1400 South LLC
PO Box 802523
Dallas, TX 75380

Applicant:
Noble Development Group, LLC
2000 Monarch Tower
3424 Peachtree Road, N.E.
Atlanta, GA 30326

REQUESTS:

The applicant is submitting a request for a Sketch Plan and Hillside Conditional Use Permit for proposed two (2) building, seventy-five (75) unit multi-family apartment project located at 1400 and 1450 S. Hwy 89 legally known as PT. SW1/4 NW1/4, SEC. 5, TWP. 40, RNG. 116 PARCEL B and PT. SW1/4 NW1/4, SEC. 5, TWP. 40, RNG. 116.

PIDNS 22-40-16-05-2-00-010 and 22-40-16-05-2-00-012 respectively.

For questions, please call Katelyn Page at 307-733-0440 x 1302 or email the address shown to the left. Thank you.

Please respond by: December 6, 2024 (with Comments)

RESPONSE: For Departments not using SmartGov, please send responses via email to planning@jacksonwy.gov

PLANNING PERMIT APPLICATION
Planning & Building Department

150 E Pearl Ave.
P.O. Box 1687
Jackson, WY 83001

ph: (307) 733-0440
www.townofjackson.com

For Office Use Only

Fees Paid _____ Date & Time Received _____

Application #s _____ _____ _____

Please note: *Applications received after 3 PM will be processed the next business day.*

PROJECT.

Name/Description: S Hwy 89 - 75-Unit Multi-Family Apartment Project

Physical Address: 1400 & 1450 S Hwy 89, Jackson, WY 83001

Lot, Subdivision: _____ PIDN: 22-40-16-05-2-00-010 & 22-40-16-05-2-00-012

PROPERTY OWNER.

Name: 1400 SOUTH LLC Phone: 972-742-4834

Mailing Address: P.O. Box 802523, Dallas, TX ZIP: 75380

E-mail: john@360investtx.com

APPLICANT/AGENT.

Name: Owen Berry on behalf of Noble Development Group, LLC Phone: 404-682-1920

Mailing Address: 3424 Peachtree Rd. N.E., Suite 2000, Atlanta, GA ZIP: 30326

E-mail: owen.berry@nobleinvestment.com

DESIGNATED PRIMARY CONTACT.

_____ Property Owner X Applicant/Agent

TYPE OF APPLICATION. *Please check all that apply; review the type of application at www.townofjackson/200/Planning*

Use Permit

_____ Basic Use

X Conditional Use

_____ Special Use

Relief from the LDRs

_____ Administrative Adjustment

_____ Variance

_____ Beneficial Use Determination

_____ Appeal of an Admin. Decision

Physical Development

X Sketch Plan

_____ Development Plan

_____ Design Review

Subdivision/Development Option

_____ Subdivision Plat

_____ Boundary Adjustment (replat)

_____ Boundary Adjustment (no plat)

_____ Development Option Plan

Interpretations

_____ Formal Interpretation

_____ Zoning Compliance Verification

Amendments to the LDRs

_____ LDR Text Amendment

_____ Map Amendment

Miscellaneous

_____ **Other:** _____

_____ Environmental Analysis

PRE-SUBMITTAL STEPS. *To see if pre-submittal steps apply to you, go to www.townofjackson.com/200/Planning and select the relevant application type for requirements. Please submit all required pre-submittal steps with application.*

Pre-application Conference #: P24-095

Environmental Analysis #: P24-121

Original Permit #:

Date of Neighborhood Meeting: 10/23/24

SUBMITTAL REQUIREMENTS. *Please ensure all submittal requirements are included. The Planning Department will not hold or process incomplete applications. Partial or incomplete applications will be returned to the applicant. Go to www.townofjackson.com/200/Planning and select the relevant application type for submittal requirements.*

Have you attached the following?

X **Application Fee.** Fees are cumulative. Go to www.townofjackson.com/200/Planning and select the relevant application type for the fees.

X **Notarized Letter of Authorization.** A notarized letter of consent from the landowner is required if the applicant is not the owner, or if an agent is applying on behalf of the landowner. Please see the Letter of Authorization template at http://www.townofjackson.com/DocumentCenter/View/845/LetterOfAuthorization-PDF.

X **Response to Submittal Requirements**. The submittal requirements can be found on the TOJ website for the specific application. If a pre-application conference is required, the submittal requirements will be provided to applicant at the conference. The submittal requirements are at www.townofjackson.com/200/Planning under the relevant application type.

Note: Information provided by the applicant or other review agencies during the planning process may identify other requirements that were not evident at the time of application submittal or a Pre-Application Conference, if held. Staff may request additional materials during review as needed to determine compliance with the LDRs.

Under penalty of perjury, I hereby certify that I have read this application and associated checklists and state that, to the best of my knowledge, all information submitted in this request is true and correct. I agree to comply with all county and state laws relating to the subject matter of this application, and hereby authorize representatives of Teton County to enter upon the above-mentioned property during normal business hours, after making a reasonable effort to contact the owner/applicant prior to entering.

Owen D. Berry

Signature of Property Owner or Authorized Applicant/Agent

11/1/2024

Date

Owen Berry

Name Printed

Director, Pre-Development

Title

NOBLE

Project Team Information

Applicant:

Noble Development Group, LLC
3424 Peachtree Rd. N.E., Suite 2000
Atlanta, GA 30326
404-682-1920

Architecture:

Dynia
1085 W Hwy 22
Jackson, WY 83001
307-733-3766

Owner (provided for reference only):

1400 SOUTH LLC
PO BOX 802523
Dallas, TX 75380

Landscape Architecture:

Cairn Landscape Architects
215 S Gill Avenue,
Jackson, WY 83002
307-264-0939

Engineering:

Y2 Consultants
215 E Simpson Ave,
Jackson, WY 83001
307-733-2999

Environmental:

Alder Environmental
1130 Maple Way, Suite 1E,
Jackson, WY 83002
307-733-5031

NOBLE

November 4, 2024

Town of Jackson Council & Planning
P.O. Box 1687
Jackson, WY

RE: Sketch Plan and Hillside CUP Application: 1400 & 1400 S Hwy 89 Multi-Family Residential Project

Town Council and Planning Staff,

It is our pleasure to submit for your review and consideration the following Sketch Plan and Hillside Conditional Use Permit application package for the development of a multi-family residential apartment project to be located at 1400 & 1450 S Hwy 89 at the southern gateway to the Town of Jackson (the "Project"). While the Project is not required to complete the Sketch Plan review process, the Project team is opting to submit for Sketch Plan review alongside the Hillside CUP submittal to allow for the Town to provide valuable feedback, comments and perspective on the proposed development early in the design and development process that can then be synthesized and incorporated for the Development Plan submittal. Although we understand this is atypical to submit for an optional Sketch Plan review, the Project team understands the value that the Sketch Plan process and its associated feedback can provide to the Project at this current stage and help to inform the design alongside the Hillside CUP and contribute to a more successful development.

The Project will consist of the recombination of two (2) parcels (Parcel IDs: 22-40-16-05-2-00-010 & 22-40-16-05-2-00-012), totaling approximately 3.53-acres, for the development of a two (2)-building, 75-unit, 61,051-SF (56,013-SF total without the North Building basement area) multi-family apartment project with a 96-space surface parking lot, landscaping, utilities and additional site improvements.

The parcels are currently zoned Commercial Residential-3 (CR-3), and within the Natural Resource & Wildlife Urban Interface overlay districts. The site has largely been regraded over-time with the natural slopes having been modified and reshaped to facilitate prior uses. Town Planning previously approved Zoning Compliance Verification (ZCV Item P23-052), which confirmed that certain slopes within the property are manmade and therefore able to be developed with appropriate geotechnical investigation and design, even though they currently exceed 25% as per Section 5.4.1.B.1 Manmade Slopes (see Approved ZCV letter attached, dated

April 10, 2023). Therefore, the Project is proposed entirely within the area of the approved manmade slope line.

The existing uses on the site today are mostly temporary in nature, including a river raft depot, moving company van storage and a daycare. The current use as a day care is temporary and the day care is in the process of moving to another development. It is anticipated that the day care will be operational at the other location prior to the start of re-development of this site. The site, however, is largely underutilized and bare with limited to no landscaping, no internal paved access aisles or sidewalks, no signage, or planned grading and stormwater management measures.

The site's location is well-positioned to be developed as a multi-family residential project with a key focus on public transit and walkability. The site is directly across the street from the Eagle Village retail plaza which includes key amenities for Jackson residents, including a grocery, urgent care, sandwich shop, laundromat, gas station, and other services. There is also a START bus stop (Stop No. 60), located along the north side of High School Road at Smith's that would allow residents to utilize public transit in lieu of private vehicles.

As shown in the attached plan set and outlined in this submission, the Project will include the proposed development of an 8'-wide sidewalk along the property's Hwy 89 frontage, as well as a pedestrian crosswalk at the Hwy 89 and High School Road intersection, providing for safe passage and connecting the Project's tenants to the retail plaza and START bus stop, as well as the Pathway along the western frontage of Hwy 89.

Throughout the concept and schematic design stages, and following the feedback from Town Staff during the Pre-Application meeting on August 2, 2024, the Project has continued to evolve to address Town Staff's comments and concerns, proposed LDR changes, and site-specific constraints. For example, the proposed Project put before the Town during the Pre-App consisted of 118 residential units, the majority of which were studios, and was under-parked with only 82 parking spaces. As the design has evolved, we've adjusted the total unit count down to 75-units, and modified the unit mix to include more one and two bedroom units (see the attached plans and unit matrix). Additionally, we've modified the parking design to accommodate 96-parking spaces, complying with the requirements of the LDRs for a 75-unit project with the specific proposed unit mix.

As discussed above, the Project site is constrained in size and shape due to the existing cross slopes and the man-made slope line. These constraints pose certain engineering challenges for redevelopment while maintaining the parameters for a financially feasible project. The site plan was designed to address these concerns, from building placement to landscaping selections and proposed wall finishes.

The current design contemplates an architecturally stamped shotcrete and nail tie-back retaining wall along the east and portions of the north parking areas. The buildings were brought forward to the front building setback, which activate the street and screen the majority of the parking and retaining wall areas from public view, as well as provide a buffer between the wall and residential buildings. As shown in the modeled visual analysis, the proposed architectural stamped finish for the retaining wall allows the wall to blend seamlessly into the natural hillside. The addition of enhanced landscaping along the site's Hwy 89 frontage further limits visibility through the site to the wall and screens the development.

Specific to the Sketch Plan, and in compliance with Division 8.3.2.C, we ask that the Town consider the following findings for approval:

1. Is consistent with the desired future character described for the site in the Jackson/Teton County Comprehensive Plan; (**Complies**)
    a. The site is located in District 5, West Jackson, of the Comprehensive Plan for the Town of Jackson and Teton County. The future policy objectives of the district include emphasizing a variety of housing types, enhancing the Jackson gateways, and increasing the capacity for walking, biking carpooling and riding transit. Future character defining features for the district call for 2-3 story buildings, enhanced landscape buffers along the highway, screening parking, and consolidating multiple access points to the highway. The proposed development encapsulates these future characteristics and more:
        i. The proposed multi-family residential buildings are 3-stories and provide a variety of unit types including studios, one-bed and 2-bedroom units that properly address the street.
        ii. The site design includes a 20'-wide landscape buffer between the property line and the buildings, consolidates and formalizes the multiple vehicular entrances currently into the site by creating a single defined point of entry, and beautifies the southern gateway into Town, converting what is currently a disheveled, underutilized, multi-tiered site into a vibrant multi-family development to support Jackson's housing supply.
        iii. The Project includes the construction of an 8' wide sidewalk along the Hwy 89 frontage, as well as a crosswalk at the intersection of S Hwy 89 and High School Road, providing connectivity for pedestrians, bicyclists and the like from the Project on the currently disconnected east side of Hwy 89 to the retail, school and service amenities on the west side, which can also provide additional connectivity to services for the development to the north.

2. Achieves the standards and objective of the Natural Resource Overlay (NRO) and Scenic Resources Overlay (SRO), if applicable; (**Complies**)
    a. As outlined in the Environmental Analysis and Report Update by Alder Environmental (attached, EA P23-106 and EA Update P24-141), the property is designated as crucial mule deer winter/yearlong range and elk winter range by the Wyoming Game and Fish Department, and is confirmed to be within the NRO and has non-mesic shrub and non-mesic tall shrub present. In review of the proposed development, the EA finds the following:
        i. The inclusion of a proposed wildlife exclusion fence along the eastern boundary will not further degrade the quality of any existing wildlife crossing patters, and the fence will provide a net benefit by reducing human-wildlife conflict,
        ii. The proposed development will only have minor impacts on .03-acres of higher-quality habitats that can be mitigated at 2:1 with additional planting areas east of the proposed inclusion fence and development.
    b. Per the above-referenced assessment, and in keeping with the requirements of Division 5.2.1.E for impacting the NRO, the development minimizes the impacts of the protected areas, is developed largely in an area already inhabited and roughly developed through existing disturbances, and provides 2:1 mitigation on-site and in closer proximity to wildlife paths on that portion of the hillside.
    c. The site is not located within the SRO and therefore is not applicable.

3. Does not have significant impact on public facilities and services, including transportation, potable water and wastewater facilities, parks, schools, police, fire, and EMS facilities; (**Complies**)
    a. There are multiple transportation options that already exist within close proximity to the Project. With the installation of the 8'-wide sidewalk along the Project frontage at S Hwy 89, and the construction of the pedestrian crosswalk at High School Road, the Project will be connected to the pathway system and Town START Shuttle Stop No. 60 on the north side of High School Road at Smith's. It is anticipated that the tenants will utilize public transportation options, as well as the grocery, retail and services in the immediate vicinity to the project in lieu of private car travel.
    b. The Project will consist of rental apartment units, and not individually owned condos, therefore, the Park and School exactions are not applicable.
    c. The existing development is already connected to public utilities, and the Project will continue to utilize and enhance these facilities. The connection and enhancements of the services will continue to be evaluated as a part of the

design and approval process and the Applicant looks forward to further discussions with Town staff on the marginal additional impacts produced by this development, when compared to existing uses.

d. The Project is within the Town limits and is currently served by Police, Fire and EMT Servies and the development will not have an increased impact on these services.

4. Complies with all relevant standards of these LDRs and other Town Ordinances as can be determined by the level of detail of a sketch plan; and (**Complies**)
    a. The proposed project will comply with all relevant standards of the Town of Jackson's LDRs and Town Ordinances.

5. Is in substantial conformance with all standards or conditions of any prior applicable permits or approvals. (**Complies**)
    a. There are no known previous permits applicable to this property. The Hillside CUP is in conformance with the approved and attached ZCV Item No. P23-052 from the Town of Jackson, dated April 10, 2023, finding that physical development to the west of the disturbance line (man-made slope line), to not be subject to a variance for steel slope development.

Specific to the Conditional Use Permit, and in compliance with Division 8.4.2.C, we ask that the Town consider the following findings for approval:

1. Is compatible with the desired future character of the area: (**Complies**)
    a. As discussed above in response to the Sketch Plan findings for Division 8.3.2.C., the site is located in District 5, West Jackson, of the Comprehensive Plan for the Town of Jackson and Teton County. The future policy objectives of the district include emphasizing a variety of housing types, enhancing the Jackson gateways, and increasing the capacity for walking, biking carpooling and riding transit. Future character defining features for the district call for 2-3 story buildings, enhanced landscape buffers along the highway, screening parking, and consolidating multiple access points to the highway. The proposed development encapsulates these future characteristics and more:
        - The proposed multi-family residential buildings are 3-stories and provide a variety of unit types including studios, one-bed and 2-bedroom units that properly address the street.
        - The site design includes a 20'-wide landscape buffer between the property line and the buildings, consolidates and formalizes the multiple vehicular entrances currently into the site by creating a single defined point of entry,

and beautifies the southern gateway into Town, converting what is currently a disheveled, underutilized site into a vibrant multi-family development to support Jackson's housing supply.

- The Project includes the construction of an 8' wide sidewalk along the Hwy 89 frontage, as well as a crosswalk at the intersection of S Hwy 89 and High School Road, providing connectivity for pedestrians, bicyclists and the like from the Project on the currently disconnected east side of Hwy 89 to the retail, schools and service amenities on the west side.

2. Complies with the use specific standards of Division 6.1: (**Complies**)
    a. Per the Use Schedule in LDR Section 6.1.1.F, a multi-family residential apartment building in the CR-3 zoning district requires a basic use permit.

3. Minimizes adverse visual impacts: (**Complies**)
    a. As outlined in the approved ZCV (ZCV Item P23-052), the site has been continuously regraded in a somewhat sporadic, unplanned manner over the last several decades, dating back to at least 1955, if not earlier. The site today remains unsightly with no evident plan for circulation, hardscape, landscaping and conformed use with a variety of uses including a river raft and bus storage depot, moving van storage and a day care. The proposed Project will consist of the construction of two (2) three-story multi-family residential apartment buildings, surface parking improvements, coordinated drive aisles and circulation, a well-crafted and enhanced landscaping plan and an architecturally stamped shotcrete and nail tie back wall. The proposed retaining wall, along with its screening, will continue to be evaluated and refined as a part of the design and approval process. At present, the planned retaining wall will be 24' tall in one area, but will largely remain low in the remainder. As shown in the visual analysis, the wall will be screened by the enhanced landscaping along S Hwy 89 and by both buildings. Further, the wall will have a stamped architectural finish (see reference images), that will allow it to blend in seamlessly with the adjoining hillside. The South Building's position on the site, along with the trailing hillside that continues South along S Hwy 89 from High School Road, will further limit views of the retaining wall for travelers coming into Town from the South. The Project will improve on the existing visual impacts and substantially improve the Southern Gateway into Town.

4. Minimizes adverse environmental impacts: (**Complies**)

a. The direct and indirect natural environmental impacts associated with the proposed development were assessed by Alder Environmental, see the attached report and update (EA P23-106 and EA Update P24-141). The property is designated as crucial mule deer winter/yearlong range and elk winter range by the Wyoming Game and Fish Department, and is confirmed to be within the NRO and has non-mesic shrub and non-mesic tall shrub present. In review of the proposed development, the EA finds the following:
    i. The inclusion of a proposed wildlife exclusion fence along the eastern boundary will not further degrade the quality of any existing wildlife crossing patters, and the fence will provide a net benefit by reducing human-wildlife conflict,
    ii. The proposed development will only have minor impacts on .03-acres of higher-quality habitats that can be mitigated at 2:1 with additional planting areas east of the proposed inclusion fence and development.
b. Per the above-referenced assessment, and in keeping with the requirements of Division 5.2.1.E for impacting the NRO, the development minimizes the impacts of the protected areas, is developed largely in an area already inhabited and roughly developed, and provides 2:1 mitigation on-site and in closer proximity to wildlife paths on that portion of the hillside.

5. Minimizes adverse impacts from nuisances: (**Complies**)
    a. There are no anticipated nuisances with this development that would have adverse impacts to surrounding properties. The property does not immediately border any residential zones, and is surrounded to the North and West by commercial retail with undevelopable land to the East. All site lighting illumination will be 90 degree downcast and limited within the parcel area, and a photometric plan will be submitted for review further in the design and approval process.

6. Minimizes adverse impacts on public facilities: (**Complies**)
    b. As discussed above in the Sketch Plan findings:
        i. There are multiple transportation options that already exist within close proximity to the Project. With the installation of the 8'-wide sidewalk along the Project frontage at S Hwy 89, and the construction of the pedestrian crosswalk at High School Road, the Project will be connected to the pathway system and Town START Shuttle Stop No. 60 on the north side of High School Road at Smith's. It is anticipated that the tenants will utilize public transportation options, as well as the grocery, retail and

services in the immediate vicinity to the project in lieu of private car travel.

ii. The existing development is already connected to public utilities, and the Project will continue to utilize and enhance these facilities. The connection and enhancements of the services will continue to be evaluated as a part of the design and approval process.

iii. The Project is within the Town limits and is currently served by Police, Fire and EMT Servies and the development will not have an increased impact on these services. The buildings will also be fully sprinklered.

7. Complies with all other relevant standards of these LDRs and all other Town Ordinances: (**Complies**)
    a. The proposed project will comply with all relevant and applicable standards of the Town of Jackson's LDRs and Town Ordinances for the CR-3 Zone, NRO and Wildlife Urban Interface. See Division 5.4.1.C.5 below for hillside areas/steep slopes.

8. Is in substantial conformance with all standards or conditions of any prior applicable permits or approvals: (**Complies**)
    a. As discussed above in response to the Sketch Plan findings for Division 8.3.2.C., There are no previous permits applicable to this property. The Hillside CUP is in conformance with the approved and attached ZCV Item No. P23-052 from the Town of Jackson, dated April 10, 2023, finding that physical development to the west of the disturbance line (man-made slope line), to not be subject to a variance for steel slope development.

Specific to the Hillside Areas/Steep Slope requirements (Division 5.4.1.C.5), and in compliance with Division 8.4.2.C, we ask that the Town consider the following findings for approval:

1. The following finding shall be made before granting a Conditional Use Permit for hillside areas: that the mitigation measures identified will be effective in mitigating any adverse impacts identified, and associated with the proposed physical development, uses, development option, or subdivision: (**Complies**)
    a. The attached materials and supporting exhibits required under Division 5.4.1.C.6, including but not limited to the environmental assessment and associated updates, slope stability analysis and geotechnical report, visual model analysis, and grading and landscape plans sufficiently support the proposed development Project. The Slope Stability analysis provided by Y2 Consultants reviewed in detail four (4) cross slope sections which were

selected to represent critical conditions within the study area. The Slope Stability analysis concluded that the slope at the proposed condition is considered stable in the long-term in both static and seismic conditions. The proposed shotcrete and nail tie-back wall allows for incremental top-down excavation to mitigate any slope instabilities. Code-compliant BMPs will be further developed during the design and approval process.

b. The direct and indirect natural environmental impacts associated with the proposed development were assessed by Alder Environmental, see the attached report and update (EA P23-106 and EA Update P24-141). The property is designated as crucial mule deer winter/yearlong range and elk winter range by the Wyoming Game and Fish Department, and is confirmed to be within the NRO and has non-mesic shrub and non-mesic tall shrub present. In review of the proposed development, the EA finds the following:
    i. The inclusion of a proposed wildlife exclusion fence along the eastern boundary will not further degrade the quality of any existing wildlife crossing patters, and the fence will provide a net benefit by reducing human-wildlife conflict,
    ii. The proposed development will only have minor impacts on .03-acres of higher-quality habitats that can be mitigated at 2:1 with additional planting areas east of the proposed inclusion fence and development. The update memo, dated October 31, 2024, states hat the mitigation measures will involve planting native shrubs further east and up the hill from the development to areas less than 1,000-ft to Bridger Teton National Forest, and away from existing human development to the west.
c. As highlighted by the visual analysis and landscape plans, views of the retaining wall are mitigated by enhanced landscaping in the 20'-wide buffer along the S Hwy 89 frontage, as well as the proposed selection of an architecturally stamped shotcrete and tie back retaining wall that allows the wall to blend almost seamlessly into the hillside. The Project as proposed also does not maximize the allowable potential development for this site (allowable FAR with 2:1 bonus), which if constructed with those larger parameters, would require significantly more grading and excavation.

Thank you for your assistance with this request. We look forward to the Town's review of this Sketch Plan and Hillside CUP application and await your feedback for this proposed multi-family development Project.

Best,

Owen D. Berry

Owen Berry

Director, Pre-Development

NOBLE

Table of Contents:

Town of Jackson
150 E Pearl Avenue
PO Box 1687, Jackson, WY 83001
P: (307)733-3932 F: (307)739-0919
www.jacksonwy.gov

Date:

LETTER OF AUTHORIZATION

NAMING APPLICANT AS OWNER'S AGENT

PRINT full name of property owner as listed on the deed when it is an individual OR print full name and title of President or Principal Officer when the owner listed on the deed is a corporation or an entity other than an individual: John Huffman Title: MANAGER

Being duly sworn, deposes and says that 1400 SOUTH LLC is the owner in fee of the premises located at:
Name of legal property owner as listed on deed

Address of Premises: 1400 S Highway 89, Jackson, WY 83001

Legal Description: See Exhibit A attached
Please attach additional sheet for additional addresses and legal descriptions

And, that the person named as follows: Name of Applicant/agent: Kevin Grass and Owen Berry on behfalf of Noble Development Group, LLC

Mailing address of Applicant/agent: 3424 Peachtree Road, N.E., Suite 2000, Atlanta, GA 30326

Email address of Applicant/agent: kevin.grass@nobleinvestment.com & owen.berry@nobleinvestment.com

Phone Number of Applicant/agent: 404-682-1920

Is authorized to act as property owner's agent and be the applicant for the application(s) checked below for a permit to perform the work specified is this(these) application(s) at the premises listed above:

☑ Development/Subdivision Plat Permit Application ☐ Building Permit Application

☐ Public Right of Way Permit ☐ Grading and Erosion Control Permit ☐ Business License Application

☐ Demolition Permit ☐ Home Occupation ☑ Other (describe) Sketch Plan, Design Review Committee and Development Plan Submittals

Under penalty of perjury, the undersigned swears that the foregoing is true and, if signing on behalf of a corporation, partnership, limited liability company or other entity, the undersigned swears that this authorization is given with the appropriate approval of such entity, if required.

Property Owner Signature

MANAGER OF 1400 SOUTH, LLC
Title if signed by officer, partner or member of corporation, LLC (secretary or corporate owner) partnership or other non-individual Owner

STATE OF TEXAS)
) SS.
COUNTY OF DALLAS)

The foregoing instrument was acknowledged before me by JOHN HUFFMAN this 23rd day of OCTOBER, 2024. WITNESS my hand and official seal.

Notary Public

SHERRI CECOTTI
My Notary ID # 124249401
Expires November 16, 2025

My commission expires:

LEGAL DESCRIPTION, IDENTIFICATION NUMBERS & ADDRESS

EXHIBIT A

RECORD LEGAL DESCRIPTION (PER CORRECTIVE WARRANTY DEED RECORDED AS DOCUMENT 07361063; PARCEL NUMBERS REFER TO LEGAL DESCRIPTIONS FROM ABOVE-REFERENCED TITLE COMMITMENT)

PARCEL 1:

A PARCEL OF LAND BEING IDENTICAL WITH THAT TRACT OF RECORD IN THE OFFICE OF THE CLERK OF TETON COUNTY, WYOMING IN BOOK 14 OF DEEDS ON PAGE 144 (WHICH IS IDENTICAL WITH THE SECOND OF THREE TRACTS CONVEYED TO JOHN J. HORN BY THAT INSTRUMENT OF RECORD IN SAID OFFICE IN BOOK 70 OF PHOTO ON PAGES 469-470), TOGETHER WITH A 100 FOOT STRIP OF LAND WHICH IS A PORTION OF THE FIRST OF THOSE TRACTS CONVEYED BY SAID INSTRUMENT OF RECORD IN BOOK 70 OF PHOTO ON PAGES 469-470 TO JOHN J. HORN; SAID PARCEL IS LOCATED WITHIN THE INCORPORATED LIMITS OF THE TOWN OF JACKSON AND IS PART OF THE SW1/4NW1/4 OF SECTION 5, T40N, R116W, TETON COUNTY, WYOMING; SAID PARCEL IS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF SAID TRACT IN BOOK 14 WHICH LIES ON THE EAST RIGHT-OF-WAY LINE OF U.S. HIGHWAY 26, 89, 189 AND 191 AND FROM WHICH THE WEST ONE-QUARTER CORNER OF SAID SECTION 5 BEARS S13°19'58"W, 429.76 FEET;

THENCE ALONG THE WEST LINE OF SAID TRACT AND SAID EAST RIGHT-OF-WAY LINE N00°03'09"W, 208.89 FEET TO THE NORTHWEST CORNER OF SAID TRACT;

THENCE ALONG THE NORTH LINE OF SAID TRACT N89°48'14"E, 194.28 FEET TO THE NORTHEAST CORNER OF SAID TRACT;

THENCE CONTINUING ON A PROLONGATION OF SAID NORTH LINE N89°48'14"E, 100.00 FEET TO A POINT;

THENCE PARALLEL WITH THE EAST LINE OF SAID TRACT S00°48'26"W, 209.86 FEET TO A POINT;

THENCE PARALLEL WITH THE EAST LINE OF THAT TRACT OF RECORD IN SAID OFFICE IN BOOK 10 OF PHOTO ON PAGES 205-206, WHICH IS IDENTICAL WITH THE TRACT OF RECORD IN SAID OFFICE IN BOOK 183 OF PHOTO ON PAGE 672, S00°21'25"E, 125.00 FEET TO A POINT;

THENCE S89°59'18"W, 100.00 FEET TO THE INTERSECTION WITH SAID EAST LINE OF SAID TRACT IN BOOK 10 OF PHOTO;

THENCE ALONG THE EAST LINE OF SAID TRACT IN BOOK 10 OF PHOTO N00°21'25"W, 125.00 FEET TO THE SOUTHEAST CORNER OF SAID TRACT IN BOOK 14 OF DEEDS;

THENCE ALONG THE SOUTH LINE OF SAID TRACT IN BOOK 14 OF DEEDS S89°59'18"W, 191.13 FEET TO THE CORNER OF BEGINNING.

PARCEL 2:

THAT PART OF THE SW1/4NW1/4 OF SECTION 5, T40N, R116W, TETON COUNTY, WYOMING, IT BEING THE INTENT TO REDESCRIBE THAT TRACT OF RECORD IN THE OFFICE OF THE CLERK OF TETON COUNTY IN BOOK 10 OF PHOTO ON PAGES 205-206 DESCRIBED AS FOLLOWS:

BEGINNING AT A CORNER ON THE EAST RIGHT-OF-WAY LINE OF STATE HIGHWAY 26-89-187-189, N89°48.5'E, 86.00 FEET FROM THE WEST ONE-QUARTER CORNER OF SAID SECTION 5 WHERE FOUND A 2" GALVANIZED STEEL PIPE 30" LONG (BLM TYPE) WITH BRASS CAP INSCRIBED "T40N R116W 1/4 S6/S5 1965 A.F.W. L.S. 325";

THENCE N00°04'W, 417.96 FEET ALONG SAID EAST RIGHT-OF-WAY LINE TO THE SOUTH-WEST CORNER OF THAT TRACT OF RECORD IN THE SAID OFFICE IN BOOK 14 OF DEEDS ON PAGE 144;

THENCE EAST, 191.14 FEET ALONG THE SOUTH LINE OF SAID TRACT OF RECORD IN BOOK 14, COMMON TO THE NORTH LINE OF SAID TRACT OF RECORD IN BOOK 10, TO A CORNER;

THENCE S00°20.9'E, 417.58 FEET TO A CORNER;

THENCE S89°53'W, 193.19 FEET TO THE CORNER OF BEGINNING.

PARCEL IDENTIFICATION NUMBER & STREET ADDRESS

PARCEL 1
- PARCEL ID NUMBER: 22-40-16-05-2-00-010
- TAX ID NUMBER: 0J-002597
- STREET ADDRESS: 1400 S HIGHWAY 89, JACKSON, WYOMING

PARCEL 2
- PARCEL ID NUMBER: 22-40-16-05-2-00-012
- TAX ID NUMBER: 0J-002597
- STREET ADDRESS: 1450 S HIGHWAY 89, JACKSON, WYOMING

Wyoming Title & Escrow - Jackson
1110 Maple Way
Jackson, Wyoming 83001

GRANTOR: SANDS, CHARLES E TRUSTEE
GRANTEE: 1400 SOUTH LLC
Doc 1032018 Filed At 12:25 ON 01/31/22
Maureen Murphy Teton County Clerk fees: 21.00
By Vicki Carpenter Deputy Clerk

WARRANTY DEED

Charles E. Sands, Trustee of the Charles E. Sands Revocable Trust under agreement dated January 30, 2008, amended and restated March 10, 2011, and any further amendments thereto, GRANTOR(S), of Teton County, Wyoming, for Ten Dollars ($10.00) and other good and valuable consideration in hand paid and pursuant to an IRC, § 1031 tax deferred exchange on behalf of Grantor, receipt of which is hereby acknowledged, CONVEY(S) AND WARRANT(S) TO 1400 South LLC, a Wyoming limited liability company, GRANTEE(S), whose address is P.O. Box 802523, Dallas, TX 75380, the following described real estate, situated in the County of Teton, State of Wyoming, hereby releasing and waiving all rights under and by virtue of the homestead exemption laws of the State of Wyoming, to-wit:

See Attached Legal Description

Together and including all improvements thereon, and all appurtenances and hereditaments thereunto belonging. Subject to general taxes for the year of closing, local improvement districts, guaranteed revenues to utility companies, building and zoning regulations, city, county and state subdivision and zoning laws, easements, restrictive covenants, and reservations of record.

WARRANTY DEED

Charles E. Sands, Trustee of the Charles E. Sands Revocable Trust under agreement dated January 30, 2008, amended and restated March 10, 2011, and any further amendments thereto, GRANTOR(S), of Teton County, Wyoming, for Ten Dollars ($10.00) and other good and valuable consideration in hand paid and pursuant to an IRC, § 1031 tax deferred exchange on behalf of Grantor, receipt of which is hereby acknowledged, CONVEY(S) AND WARRANT(S) TO 1400 South LLC, a Wyoming limited liability company, GRANTEE(S), whose address is P.O. Box 802523, Dallas, TX 75380, the following described real estate, situated in the County of Teton, State of Wyoming, hereby releasing and waiving all rights under and by virtue of the homestead exemption laws of the State of Wyoming, to-wit:

See Attached Legal Description

Together and including all improvements thereon, and all appurtenances and hereditaments thereunto belonging. Subject to general taxes for the year of closing, local improvement districts, guaranteed revenues to utility companies, building and zoning regulations, city, county and state subdivision and zoning laws, easements, restrictive covenants, and reservations of record.

WITNESS the due execution and delivery of this Warranty Deed this 31 day of January, 2022.

The Charles E. Sands Revocable Trust under agreement dated January 30, 2008, amended and restated March 10, 2011, and any further amendments thereto

Charles E. Sands, Trustee

STATE OF Wyoming)
) ss.
COUNTY OF Teton)

The foregoing instrument was acknowledged before me by Charles E. Sands, Trustee of the Charles E. Sands Revocable Trust under agreement dated January 30, 2008, amended and restated March 10, 2011, and any further amendments thereto this 31 day of January, 2022.

WITNESS my hand and official seal.

JEREMY J. GOSINSKI - NOTARY PUBLIC
County of Teton
State of Wyoming
Commission Expires October 30, 2022

Signature of Notarial Officer

Notary
Title and Rank

My Commission Expires _____

EXHIBIT "A"
LEGAL DESCRIPTION

PARCEL 1:

A parcel of land being identical with that tract of record in the Office of the Clerk of Teton County, Wyoming in Book 14 of Deeds on page 144 (which is identical with the second of three tracts conveyed to John J. Horn by that instrument of record in said Office in Book 70 of Photo on pages 469-470), TOGETHER WITH a 100 foot strip of land which is a portion of the first of those tracts conveyed by said instrument of record in Book 70 of Photo on pages 469-470 to John J. Horn; said parcel is located within the Incorporated Limits of the Town of Jackson and is part of the SW¼NW¼ of Section 5, T40N, R116W, Teton County, Wyoming; said parcel is more particularly described as follows:

BEGINNING at the southwest corner of said tract in Book 14 which lies on the east right-of-way line of U.S. Highway 26, 89, 189 and 191 and from which the west one-quarter corner of said Section 5 bears S 13° 19' 58" W, 429.76 feet;
thence along the west line of said tract and said east right-of-way line N 00° 03' 09" W, 208.89 feet to the northwest corner of said tract;
thence along the north line of said tract N 89° 48' 14" E, 194.28 feet to the northeast corner of said tract;
thence continuing on a prolongation of said north line N 89° 48' 14" E, 100.00 feet to a point;
thence parallel with the east line of said tract S 00° 48' 26" W 209.86 feet to a point;
thence parallel with the
east line of that tract of record in said office in Book 10 of Photo on pages 205-206 which is identical with the tract of record in said Office in Book 183 of Photo on page 672, S 00° 21' 25" E, 125.00 feet to a point;
thence S 89° 59' 18" w, 100.00 feet to the intersection with said east line of said tract in Book 10 of Photo;
thence along the east line of said tract in Book 10 of Photo N 00° 21' 25" W, 125.00 feet to the southeast corner of said tract in Book 14 of Deeds;
thence along the south line of said tract in Book 14 of Deeds S 89° 59' 18" W, 191.13 feet to the CORNER OF BEGINNING

PARCEL 2:

That part of the SW¼NW¼ of Section 5, T40N, R116W, Teton County, Wyoming, it being the intent to redescribe that tract of record in the Office of the Clerk of Teton County in Book 10 of Photo on pages 205-206 described as follows:

BEGINNING at a corner on the east right-of-way line of State Highway 26-89-187-189,N 89° 48.5' E, 86.00 feet from the west one-quarter corner of said Section 5 where found a 2" galvanized steel pipe 30" long (BLM type) with brass cap inscribed "T40N R116W 1/4 S6/S5 1965 A.F.W. L.S. 325";

thence N 00° 04' W, 417.96 feet along said east right-of-way line to the south-west corner of that tract of record in the said office in Book 14 of Deeds on page 144;
thence East 191.14 feet along the south line of said tract of record in Book 14 common to the north line of said tract of record in Book 10 to a corner;
thence S 00° 20.9' E, 417.58 feet to a corner;
thence S 89° 53' W, 193.19 feet to the CORNER OF BEGINNING.

PIDN: 22-40-16-05-2-00-010 (Parcel 1), 22-40-16-05-2-00-012 (Parcel 2)

NOTES-ENCUMBRANCES
(EXCEPTIONS FROM SCHEDULE B, PART II OF TITLE COMMITMENT)

REFER TO TITLE COMMITMENT ORDER W-30497 PREPARED BY WYOMING TITLE & ESCROW, INC. AND DATED MAY 24, 2024:

ITEMS A, 1–2, 4–9		UNRECORDED FACTS, RIGHTS, INTERESTS, CLAIMS, EASEMENTS, LIENS; MINING CLAIMS, MINERAL INTERESTS, ASSESSMENTS AND TAXES–CANNOT BE GRAPHICALLY DEPICTED, BUT MAY AFFECT THE SUBJECT PROPERTY. ADJUDICATED AND UNADJUDICATED WATER RIGHTS OF RECORD AND ANY RECORDED MINERAL RIGHTS ARE NOT GRAPHICALLY DEPICTED, BUT MAY AFFECT THE SUBJECT PROPERTY.
ITEM 10	(10)	LIMITATIONS OF USE AND DEVELOPMENT WITHIN PARCEL 1 RECORDED IN BOOK 201 OF PHOTO, PAGE 988, RECORDS OF TETON COUNTY, WYOMING. AREA OF RESTRICTED DEVELOPMENT DEPICTED ON SHEET 2. REFER TO INSTRUMENT FOR LIMITATION DETAILS.
ITEM 11		MORTGAGE RECORDED IN DOCUMENT 1032019, RECORDS OF TETON COUNTY, WYOMING CANNOT BE GRAPHICALLY DEPICTED BUT MAY AFFECT THE SUBJECT PROPERTY.

LEGAL DESCRIPTION, IDENTIFICATION NUMBERS & ADDRESS

RECORD LEGAL DESCRIPTION (PER WARRANTY DEED RECORDED AS DOCUMENT 1032018; PARCEL NUMBERS REFER TO LEGAL DESCRIPTIONS FROM ABOVE-REFERENCED TITLE COMMITMENT)

PARCEL 1:

A PARCEL OF LAND BEING IDENTICAL WITH THAT TRACT OF RECORD IN THE OFFICE OF THE CLERK OF TETON COUNTY, WYOMING IN BOOK 14 OF DEEDS ON PAGE 144 (WHICH IS IDENTICAL WITH THE SECOND OF THREE TRACTS CONVEYED TO JOHN J. HORN BY THAT INSTRUMENT OF RECORD IN SAID OFFICE IN BOOK 70 OF PHOTO ON PAGES 469–470), TOGETHER WITH A 100 FOOT STRIP OF LAND WHICH IS A PORTION OF THE FIRST OF THOSE TRACTS CONVEYED BY SAID INSTRUMENT OF RECORD IN BOOK 70 OF PHOTO ON PAGES 469–470 TO JOHN J. HORN; SAID PARCEL IS LOCATED WITHIN THE INCORPORATED LIMITS OF THE TOWN OF JACKSON AND IS PART OF THE SW1/4NW1/4 OF SECTION 5, T40N, R116W, TETON COUNTY, WYOMING; SAID PARCEL IS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF SAID TRACT IN BOOK 14 WHICH LIES ON THE EAST RIGHT-OF-WAY LINE OF U.S. HIGHWAY 26, 89, 189 AND 191 AND FROM WHICH THE WEST ONE-QUARTER CORNER OF SAID SECTION 5 BEARS S13°19'58"W, 429.76 FEET;

THENCE ALONG THE WEST LINE OF SAID TRACT AND SAID EAST RIGHT-OF-WAY LINE N00°03'09"W, 208.89 FEET TO THE NORTHWEST CORNER OF SAID TRACT;

THENCE ALONG THE NORTH LINE OF SAID TRACT N89°48'14"E, 194.28 FEET TO THE NORTHEAST CORNER OF SAID TRACT;

THENCE CONTINUING ON A PROLONGATION OF SAID NORTH LINE N89°48'14"E, 100.00 FEET TO A POINT;

THENCE PARALLEL WITH THE EAST LINE OF SAID TRACT S00°48'26"W, 209.86 FEET TO A POINT;

THENCE PARALLEL WITH THE EAST LINE OF THAT TRACT OF RECORD IN SAID OFFICE IN BOOK 10 OF PHOTO ON PAGES 205–206, WHICH IS IDENTICAL WITH THE TRACT OF RECORD IN SAID OFFICE IN BOOK 183 OF PHOTO ON PAGE 672, S00°21'25"E, 125.00 FEET TO A POINT;

THENCE S89°59'18"W, 100.00 FEET TO THE INTERSECTION WITH SAID EAST LINE OF SAID TRACT IN BOOK 10 OF PHOTO;

THENCE ALONG THE EAST LINE OF SAID TRACT IN BOOK 10 OF PHOTO N00°21'25"W, 125.00 FEET TO THE SOUTHEAST CORNER OF SAID TRACT IN BOOK 14 OF DEEDS;

THENCE ALONG THE SOUTH LINE OF SAID TRACT IN BOOK 14 OF DEEDS S89°59'18"W, 191.13 FEET TO THE CORNER OF BEGINNING.

PARCEL 2:

THAT PART OF THE SW1/4NW1/4 OF SECTION 5, T40N, R116W, TETON COUNTY, WYOMING, IT BEING THE INTENT TO REDESCRIBE THAT TRACT OF RECORD IN THE OFFICE OF THE CLERK OF TETON COUNTY IN BOOK 10 OF PHOTO ON PAGES 205–206 DESCRIBED AS FOLLOWS:

BEGINNING AT A CORNER ON THE EAST RIGHT-OF-WAY LINE OF STATE HIGHWAY 26–89–187–189, N89°48.5'E, 86.00 FEET FROM THE WEST ONE-QUARTER CORNER OF SAID SECTION 5 WHERE FOUND A 2" GALVANIZED STEEL PIPE 30" LONG (BLM TYPE) WITH BRASS CAP INSCRIBED "T40N R116W 1/4 S6/S5 1965 A.F.W. L.S. 325";

THENCE N00°04'W, 417.96 FEET ALONG SAID EAST RIGHT-OF-WAY LINE TO THE SOUTH-WEST CORNER OF THAT TRACT OF RECORD IN THE SAID OFFICE IN BOOK 14 OF DEEDS ON PAGE 144;

THENCE EAST, 191.14 FEET ALONG THE SOUTH LINE OF SAID TRACT OF RECORD IN BOOK 14, COMMON TO THE NORTH LINE OF SAID TRACT OF RECORD IN BOOK 10 TO A CORNER;

THENCE S00°20.9'E, 417.58 FEET TO A CORNER;

THENCE S89°53'W, 193.19 FEET TO THE CORNER OF BEGINNING.

PARCEL IDENTIFICATION NUMBER & STREET ADDRESS

PARCEL 1
- PARCEL ID NUMBER: 22-40-16-05-2-00-010
- TAX ID NUMBER: 0J-002597
- STREET ADDRESS: 1400 S HIGHWAY 89, JACKSON, WYOMING

PARCEL 2
- PARCEL ID NUMBER: 22-40-16-05-2-00-012
- TAX ID NUMBER: 0J-002597
- STREET ADDRESS: 1450 S HIGHWAY 89, JACKSON, WYOMING

NOTES-TABLE A ITEMS

1. SEE SHEET 2 FOR LOCATION OF MONUMENTS.
2. SEE SECTION ABOVE FOR ADDRESSES OF SUBJECT PROPERTIES.
3. SEE NOTES THIS SHEET AT "FLOOD PLAIN NOTES" FOR INFORMATION.
4. GROSS LAND AREA: PARCEL 1 1.69± ACRES; PARCEL 2 1.84± ACRES
5. ELEVATIONS WERE DERIVED USING GPS RTK OBSERVATION METHODS AND REFERENCE NGVD29 DATUM. SITE BENCHMARK ELEVATION IS 6120.31' AT THE NW PROPERTY CORNER OF PARCEL 1 AS INDICATED.

6(A) & (B). SEE NOTES THIS SHEET AT "NOTES-DEVELOPMENT RESTRICTIONS." ZONING REPORT OR LETTER NOT PROVIDED BY CLIENT.

11. SEE NOTES THIS SHEET AT "NOTES-UTILITIES" FOR INFORMATION AND LIMITATIONS REGARDING UTILITY LOCATIONS.
14. SUBJECT PROPERTY IS IMMEDIATELY ADJACENT TO U.S. HIGHWAY 26/89/189/191.
16. EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS WAS NOT OBSERVED.
17. EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION WAS NOT OBSERVED. INFORMATION REGARDING PROPOSED CHANGES IN STREET RIGHT-OF-WAYS WAS NOT PROVIDED TO SURVEYOR.

FLOOD PLAIN NOTES

FROM "FLOOD INSURANCE RATE MAP" – TETON COUNTY, WYOMING AND INCORPORATED AREAS MAP NUMBER 56039C2908E (FEMA SEPTEMBER 16, 2015)

ALL OF SUBJECT PROPERTY IS WITHIN "ZONE X" AS DEFINED BELOW:

OTHER AREAS
ZONE X AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

NOTES-UTILITIES

UTILITIES SHOWN HEREON WERE VERIFIED DURING FIELD SURVEYS IN JULY 2024. UNDERGROUND UTILITY LOCATIONS WERE BASED ON ABOVE-GROUND EVIDENCE, GIS INFORMATION PROVIDED BY OTHERS, AND LOCATION SERVICES PROVIDED BY NU LOCATING IN JULY 2024.

LOWER VALLEY ENERGY, INC. (SUCCESSOR TO LOWER VALLEY POWER & LIGHT, INC.) PROVIDES ELECTRICAL POWER AND NATURAL GAS UTILITIES.

TOWN OF JACKSON PROVIDES SANITARY SEWER UTILITIES.

POTABLE WATER IS PROVIDED BY A PRIVATE, ON-SITE WELL. WATER SERVICE LINES FROM THE WELL TO THE BUILDINGS WERE NOT TRACEABLE AND WERE NOT MARKED BY NU LOCATING.

COMMUNICATION UTILITY PROVIDER UNKNOWN.

WYOMING DEPARTMENT OF TRANSPORTATION MAINTAINS U.S. HIGHWAY 26/89/189/191 (PUBLIC RIGHT-OF-WAY).

NOTES-ACCESS

PHYSICAL ACCESS IS VIA U.S. HIGHWAY 26/89/189/191; A PUBLIC RIGHT-OF-WAY.

NOTES-USAGE BY OTHERS

USAGE BY OTHERS WAS NOT OBSERVED.

NOTES-ENCROACHMENTS

ENCROACHMENTS WERE OBSERVED: STRUCTURES ON PARCEL 2 ENCROACH INTO HIGHWAY BUILDING SETBACK. FENCE ON PARCEL 2 ENCROACH INTO THE HIGHWAY RIGHT-OF-WAY. OVERHEAD & UNDERGROUND UTILITY LINES AND UNDERGROUND GAS SERVICES ARE NOT WITHIN AN EASEMENT. REFER TO SHEET 2 FOR DEPICTION OF ENCROACHMENTS.

GENERAL NOTES

1. BEARINGS ARE BASED ON A PROPRIETARY JORGENSEN ASSOCIATES, INC. GROUND-SCALED, TRANSVERSE MERCATOR COORDINATE SYSTEM.
2. RECORD DIMENSIONS DEPICTED HEREON ARE FROM THAT MAP OF SURVEY OF RECORD IN THE OFFICE OF THE CLERK OF TETON COUNTY, WYOMING AS MAP T-316B.
3. INFORMATION SHOWN IS FROM FIELD SURVEYS CONDUCTED DURING DECEMBER 2021 AND JULY 2024.
4. ENCUMBRANCES ARE FROM WYOMING TITLE & ESCROW, INC. TITLE COMMITMENT ORDER W-30497, DATED MAY 24, 2024.

NOTES-DEVELOPMENT RESTRICTIONS

ANY FUTURE DEVELOPMENT MUST CONFORM WITH ANY AND ALL APPLICABLE LAND DEVELOPMENT REGULATIONS OF THE TOWN OF JACKSON.

SUBJECT PROPERTY IS WITHIN THE COMMERCIAL RESIDENTIAL-3 (CR-3) ZONING DISTRICT AS DEFINED BY THE CURRENT TOWN OF JACKSON LAND DEVELOPMENT REGULATIONS (LDR).

SUBJECT PROPERTIES, WITH THE EXCEPTION OF A SMALL STRIP IN THE SOUTHERNMOST PORTION OF PARCEL 2, ARE WITHIN THE NATURAL RESOURCE OVERLAY (NRO) ZONING DISTRICT. SUBJECT PROPERTIES ARE ENTIRELY WITHIN THE WILDLAND URBAN INTERFACE. AS DEFINED BY SAID REGULATIONS, BOTH DESIGNATIONS MAY FURTHER RESTRICT DEVELOPMENT.

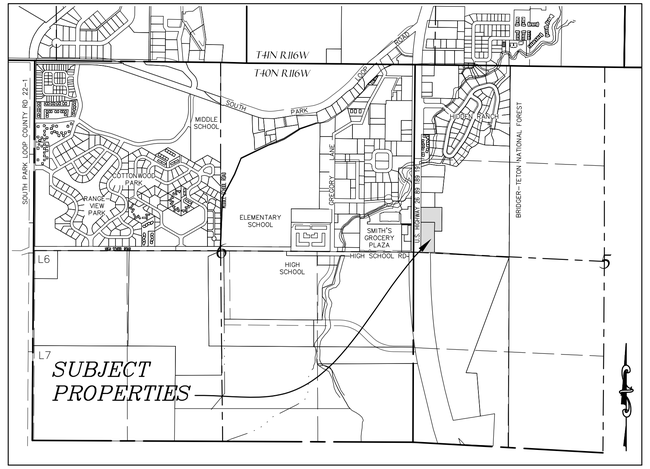
REFER TO ITEM 10 AT "NOTES-ENCUMBRANCES" THIS SHEET.

DIMENSIONAL LIMITATIONS

BUILDING SETBACKS, HEIGHT, AND OTHER DIMENSIONAL LIMITATIONS ARE GOVERNED BY THE TOWN OF JACKSON LAND DEVELOPMENT REGULATIONS FOR THE CR-3 ZONE (SEC.2.2.13).

CURRENT SETBACKS AS DEFINED BY THE TOWN OF JACKSON LAND DEVELOPMENT REGULATIONS ARE DEPICTED ON SHEET 2.

REFER TO TOWN OF JACKSON LAND DEVELOPMENT REGULATIONS FOR DIMENSIONAL REQUIREMENTS AND LIMITATIONS WITH RESPECT TO STREET FACADE, MULTI-STORY STORY STEPBACKS, HEIGHT, FLOOR AREA RATIO, LANDSCAPING, ACCESS, PARKING, AND OTHER DEVELOPMENT REGULATIONS.



VICINITY MAP
T40N, R116W
SCALE: 1" = 1000 FEET

SURVEYOR'S CERTIFICATE

TO 1400 SOUTH LLC, A WYOMING LIMITED LIABILITY COMPANY; WYOMING TITLE & ESCROW, INC., AND FIRST AMERICAN TITLE INSURANCE COMPANY;

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 3, 4, 5, 6(a)(b), 11(b), 13, 14, 16, 17, 18, & 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON JULY 9, 2024

DATE OF PLAT OR MAP: AUGUST 23, 2024

MATTHEW P. GOTHAM, WYOMING PLS 13002

SHEET INDEX

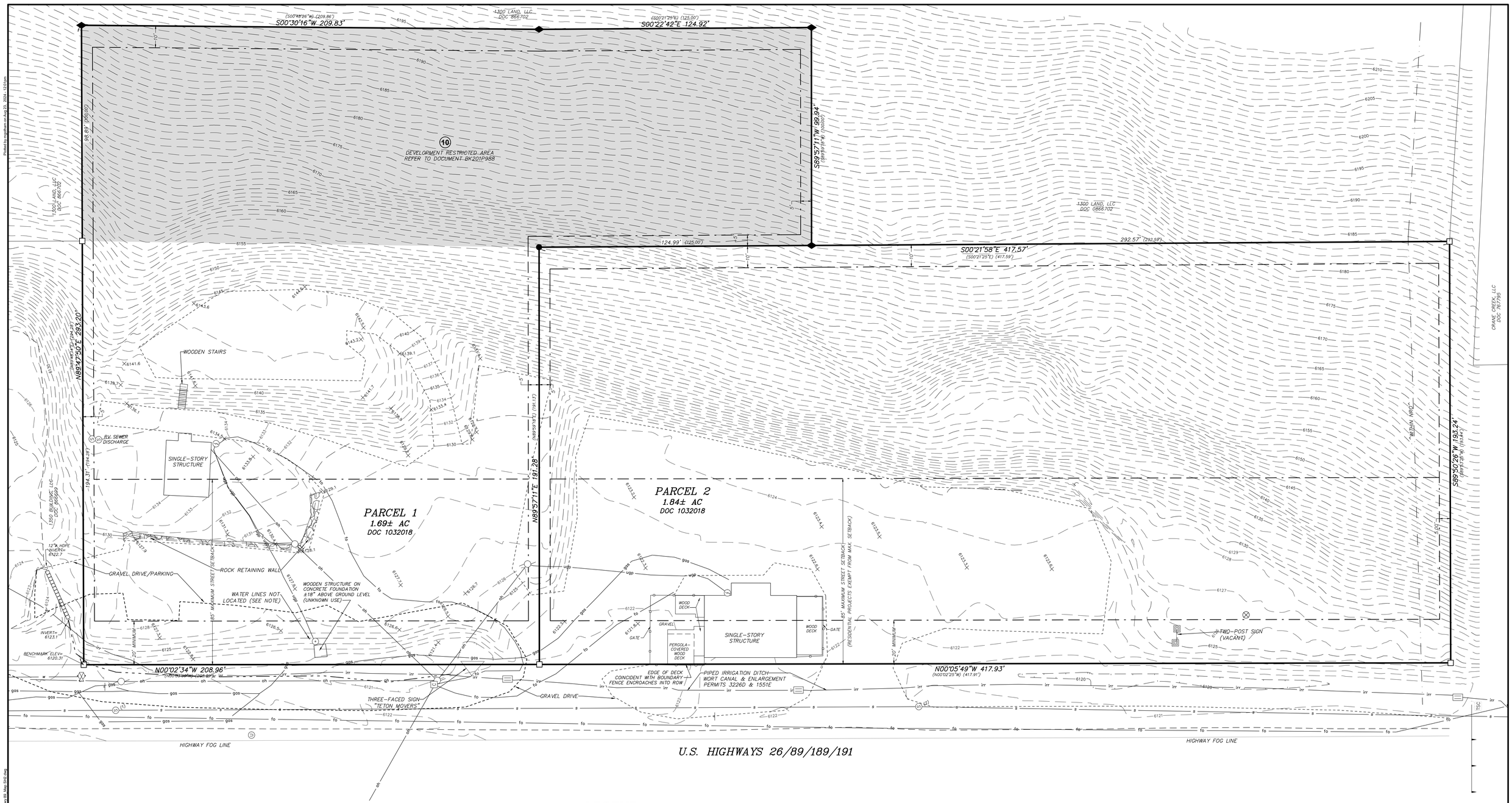
JORGENSEN
1315 HIGHWAY 89 S, STE. 201 307.733.5150
JACKSON, WY 83002-9550 www.jorgeng.com

ALTA/NSPS LAND TITLE SURVEY
Parcels 1 and 2
1400 South LLC Properties

LOCATED WITHIN
SW1/4NW1/4 SECTION 5,
T.40N., R.116W., 6TH P.M.
TOWN OF JACKSON
TETON COUNTY, WYOMING

SHEET 1 OF 2

SURVEYOR E-MAIL: MGOTHAM@JORGENG.COM
PREPARED BY: RHL/MPG MAP PREPARED: 08/23/2024 PROJECT NUMBER: 24039.60



SANITARY SEWER MANHOLE DETAILS

(1) RIM ELEVATION=6121.93'
INVERT IN/OUT ELEVATION=6110.58'
24"ø DIP

(2) RIM ELEVATION=6120.95'
INVERT IN (N) ELEVATION=6109.85'
INVERT IN (W) ELEVATION=6111.85'
INVERT OUT ELEVATION=6109.85'
N-S 24"ø DIP
W 8"ø PVC

(3) RIM ELEVATION=6120.80''
INVERT IN ELEVATION=6108.10'
INVERT OUT ELEVATION=6108.10'
24"ø DIP

NOTE: MANHOLE 3 NOT SHOWN
307'± SOUTH OF MANHOLE 2

LEGEND

- steel pipe with brass cap inscribed "RLS 164" with other appropriate markings
- T-stake with chromed cap inscribed "PETER M. JORGENSEN PE & LS 2612"
- reinforcing steel bar with 2" diameter aluminum cap inscribed "JORGENSEN ASSOCIATES, P.C. PLS 13002", set during 2021 survey
- boundary, subject properties
- boundary, building setback
- boundary, adjoining property
- boundary, Natural Resource Overlay
- N25°25'25"E 100.00' — measured bearing & distance or curve geometry
- (N25°25'25"E) (100.00') — record bearing & distance or curve geometry, Map T-316B
- edge of pavement
- fogline
- edge of gravel
- flowline of ditch
- toe of slope
- top of bank
- 6205 — index contour, 5' interval
- 6208 — intermediate contour, 1' interval
- 6201.5 — spot elevation
- sign
- fence, wood slat
- C — communications pedestal
- U — communications manhole
- fo — underground fiber optic line
- irr — irrigation line, underground pipe - 36" CMP
- gas — underground gas line
- E — electric meter
- utility pole
- oh — overhead power line
- ugp — underground power line
- S — sewer manhole
- s — sanitary sewer line
- storm drain inlet/irrigation pipe access
- culvert, as noted
- TSC — traffic signal control box
- traffic signal mast arm and pole
- hydrant, fire suppression
- well
- water valve
- w — water line
- ±2" capped PVC pipe

NOTE:
PARCEL NUMBERS ARE IN ACCORDANCE WITH TITLE COMMITMENT ORDER W-30497 PREPARED BY WYOMING TITLE & ESCROW, INC. AND DATED MAY 24, 2024.

WATER SERVICE LINES FROM WELL TO BUILDINGS WERE NOT TRACEABLE AND NOT MARKED BY NU LOCATING.

JORGENSEN
1315 HIGHWAY 89 S, STE. 201 307.733.5150
JACKSON, WY 83002-9550 www.jorgeng.com

0 20 40 60
SCALE: 1 INCH = 20 FEET
THIS SCALE VALID ONLY FOR 24x36 PRINTS

ALTA/NSPS LAND TITLE SURVEY
Parcels 1 and 2
1400 South LLC Properties

LOCATED WITHIN
SW1/4NW1/4 SECTION 5,
T.40N., R.116W., 6TH P.M.
TOWN OF JACKSON
TETON COUNTY, WYOMING

SHEET 2 OF 2

SURVEYOR E-MAIL: MGOTHAM@JORGENG.COM
PREPARED BY: RHU/MPG MAP PREPARED: 08/23/2024 PROJECT NUMBER: 24039.60

PLANNING & BUILDING DEPARTMENT

April 10, 2023

Jorgensen Associates
PO Box 9550
Jackson, WY 83002

RE: Item P23-052
Zoning Compliance Verification (ZCV)
Properties Addressed at 1400 & 1450 S. Highway 89

Dear Applicant:

After reviewing the Town Planning & Building files and the information provided in your submittal for the "Property" referenced above, the Planning Director has determined the following regarding the question you submitted:

1. *Please confirm if certain slopes within the Property (see exhibits and figures) are manmade and therefore able to be developed, with appropriate geotechnical investigation and design, even though they currently exceed 25%, as per Section 5.4.1.B.1 "Manmade Slopes.".*

   The specific exception in question is LDR Section 5.4.1.B.1, which is an exemption that allows physical development on manmade slopes over 25% without the need for a variance provided that the proposed finish grade complies with all other applicable standards of these LDRs. As noted in the applicant's submittal, historical data and slope analysis show areas of slope greater than 25% that resulted from manmade activities done in multiple phases through the years. From the disturbance line to the western property line, the applicant estimates that the original native slope was approximately 19%. Staff finds the applicant's submitted materials and analysis to be fair and reasonable and so we conclude that physical development at the subject Property west of the disturbance line is not subject to a Variance. With that being said, the site has average cross-slopes greater than 10%, and thus a Hillside Conditional Use Permit (CUP) is required prior to the issuance of a physical development permit.

Should you have any questions or need additional information, please contact me at 307-733-0440, ext. 1305 or by email at tvalentine@jacksonwy.gov.

Sincerely,

Tyler Valentine
Senior Planner

KEY PROJECT DATA

LOT INFORMATION:

GROSS SITE AREA:	3.35 ACRES 153,767 SF
ZONING:	CR3
ZONING OVERLAY:	NATURAL RESOURCE OVERLAY CRITICAL WILDLIFE HABITAT WILDLAND URBAN INTERFACE

BUILDING SETBACKS:

HIGHWAY 89 PROPERTY LINE SETBACK	20' ALLOWED/ 20' PROPOSED
SIDE YARD SETBACK	5' ALLOWED/ >50' PROPOSED
REAR YARD SETBACK	10'/ >75' PROPOSED

LANDSCAPING:

LANDSCAPE SURFACE RATIO	10% MIN 16074 SF REQUIRED/ 90961 SF PROPOSED

BUILDING INFORMATION:

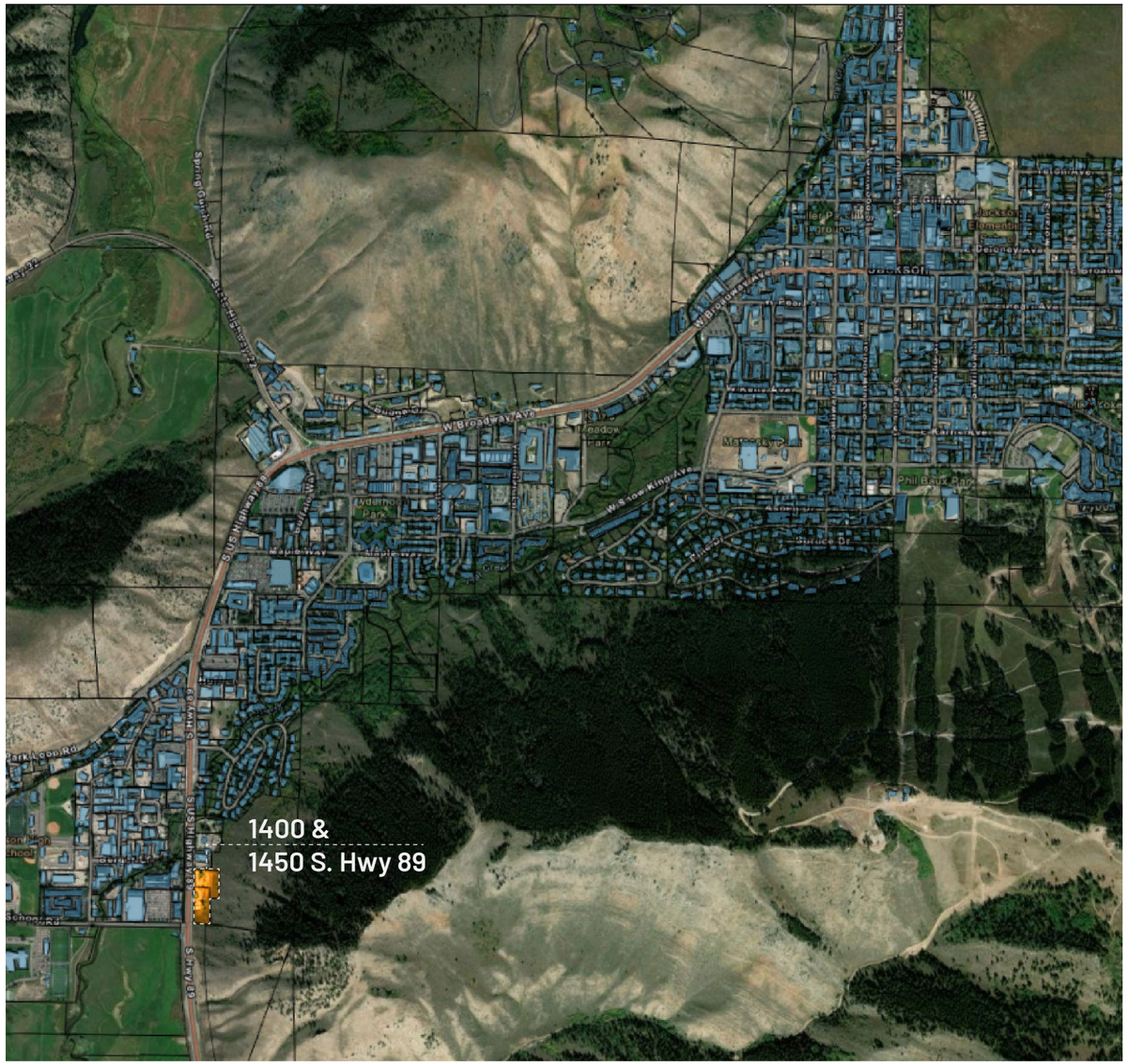
FLOOR AREA RATIO	.4
FLOOR AREA	61,506 SF ALLOWED/56,013SF PROPOSED
STORIES	3 ALLOWED/ 3 PROPOSED
HEIGHT	42' ALLOWED/ 41' PROPOSED.
FIRST LEVEL FLOOR AREA (NORTH/SOUTH)	7557 SF / 11114 SF
SECOND LEVEL FLOOR AREA (NORTH/SOUTH)	7557 SF / 11114 SF
THIRD LEVEL FLOOR AREA (NORTH/SOUTH)	7557 SF / 11114 SF

BUILDING PROGRAM

BUILDINGS ARE 100% RESIDENTIAL	
RESIDENTIAL UNIT COUNT	75

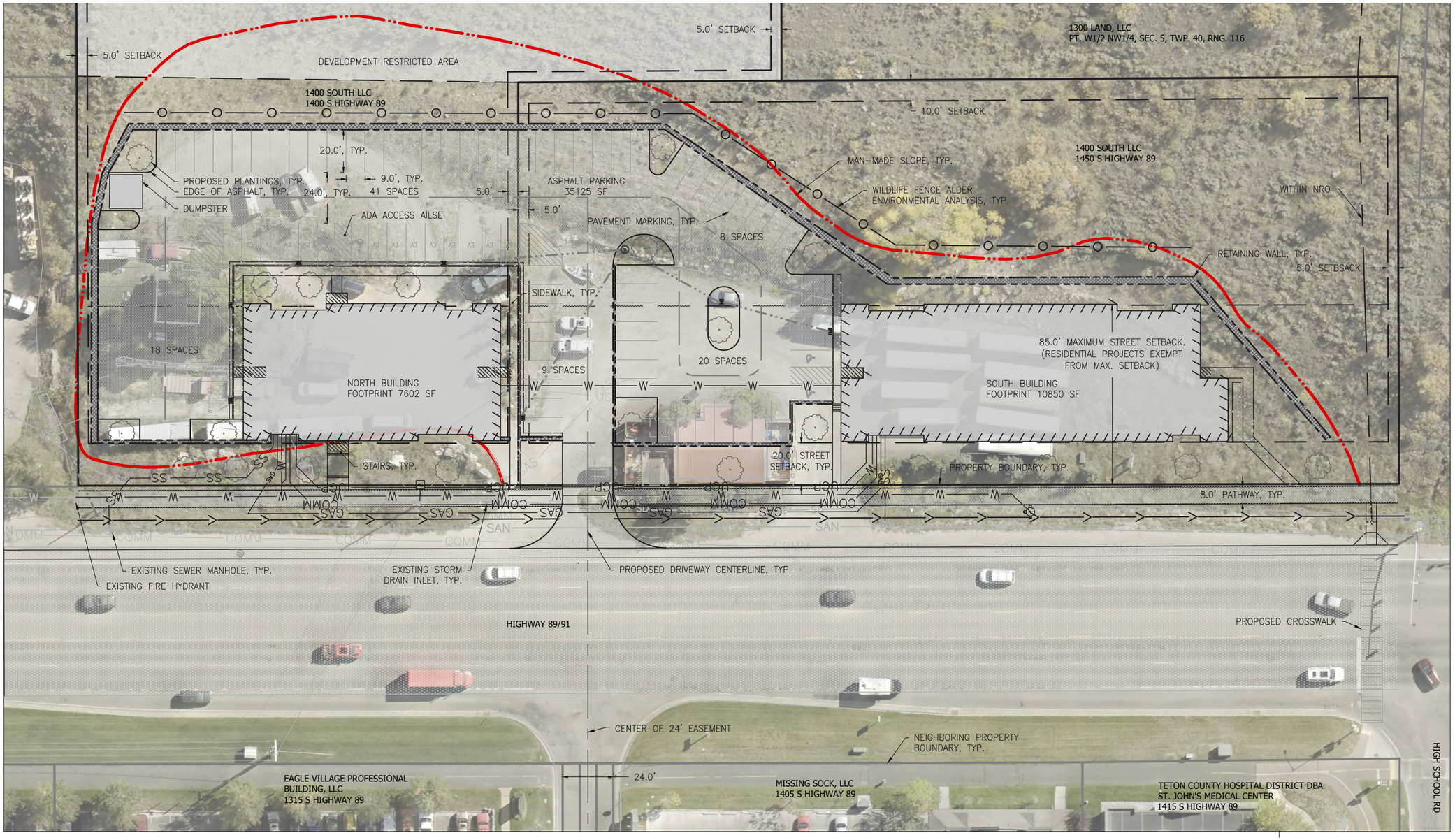
PARKING

PARKING IS 100% SURFACE	
VEHICLE PARKING	96 REQUIRED / 96 PROPOSED
BICYCYLE PARKING REQUIRED	86 REQUIRED / 86 PROPOSED



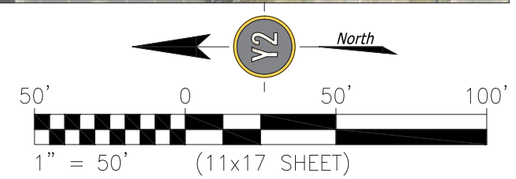
PROJECT VICINITY MAP

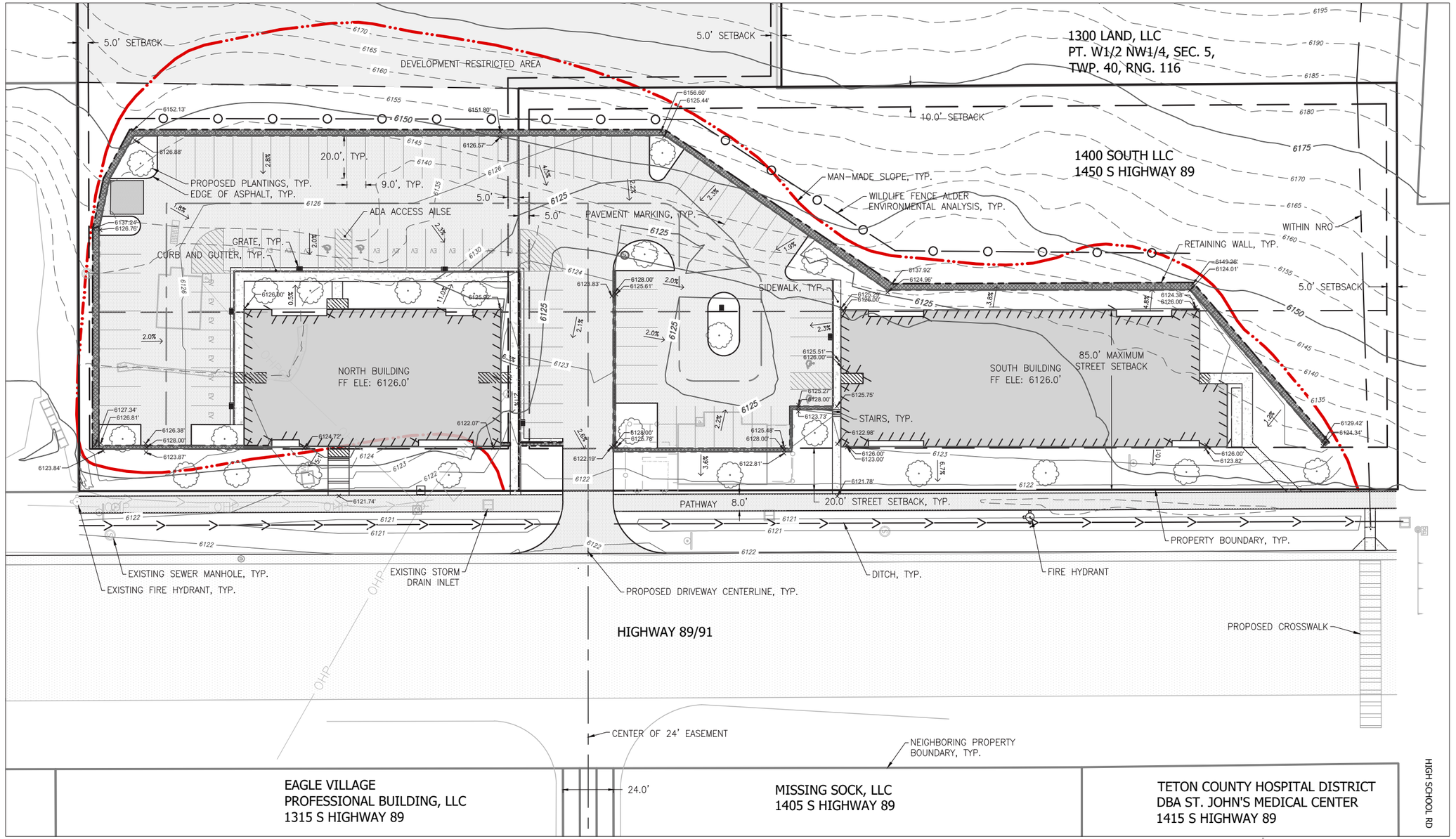
AERIAL IMAGE TAKEN FROM TETON COUNTY GIS



NOTE:
1. EXISTING LINE WORK BASED ON FIELD SURVEYS CONDUCTED DURING DECEMBER 2021 BY JORGENSEN ASSOCIATES, INC.
2. ADDITIONAL DATA SOURCES:
   2.1. SITE PLAN WAS PRODUCED USING TETON COUNTY GIS DATA INCLUDING 2022 AERIAL IMAGES AND PROPERTY BOUNDARIES.
3. TOTAL PARKING SPACES PROVIDED: 96

SITE PLAN





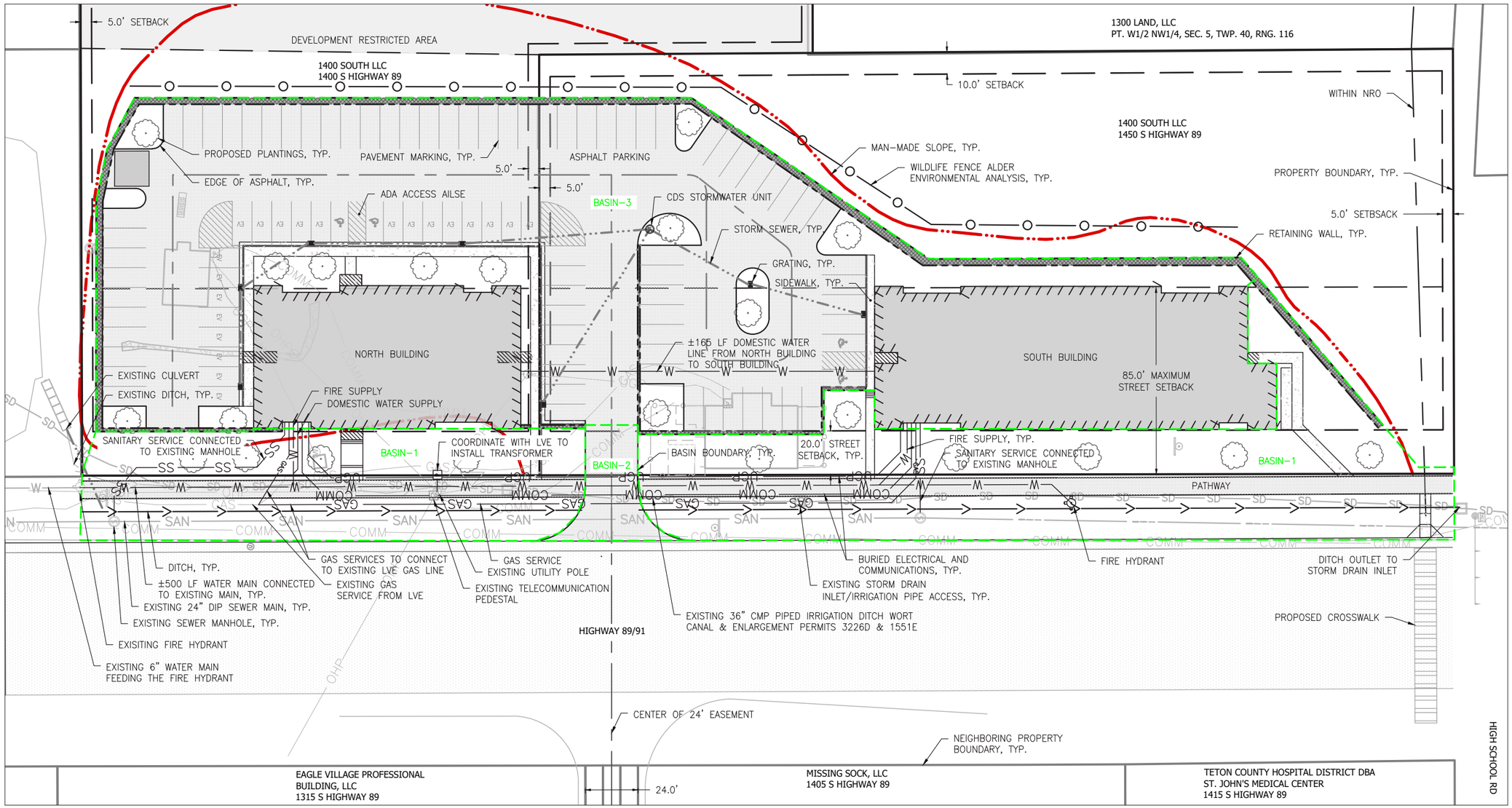
NOTE:
1. EXISTING LINE WORK BASED ON FIELD SURVEYS CONDUCTED DURING DECEMBER 2021 BY JORGENSEN ASSOCIATES, INC.
2. ADDITIONAL DATA SOURCES:
   2.1. SITE PLAN WAS PRODUCED USING TETON COUNTY GIS DATA INCLUDING 2022 AERIAL IMAGES AND PROPERTY BOUNDARIES.
3. TOTAL PARKING SPACES PROVIDED: 96

GRADING PLAN

North

50' 0 50' 100'

1" = 50' (11x17 SHEET)



UTILITIES PLAN

STORMWATER NARRATIVE

STORMWATER HAS BEEN MODELED TO A CONCEPTUAL LEVEL TO PROVIDE INSIGHT INTO THE INTENDED PLAN TO MANGE STORMWATER GENERATED ON SITE AS A RESULT OF THE PROPOSED DEVELOPMENT.

EXISTING CONDITION

EXISTING SITE CURRENTLY HAS NO DISCERNIBLE STORMWATER BASINS. ALL ON SITE DRAINAGE IS DIRECTED WEST TOWARDS HIGHWAY 89, LIKELY BEING CAUGHT IN THE SHALLOW SWALE AND INLET ALONG 89 OR BEING BEING ALLOWED TO INFILTRATE ALONG THE SHOULDER OF HIGHWAY 89. FOR THESE REASON THE SITE WAS ANALYZED AS A SINGLE BASIN.
EXISTING SITE IMPERVIOUS AREA: 27.0%

EXISTING SITE MAKE UP		
SURFACE TYPE	AREA (ACRES)	COEFFICIENT
PAVEMENTS AND ROOFS	0.07	0.90
GRAVEL PAVEMENT	0.85	0.85
LAWNS	1.07	0.35
COMPOSITE	1.99	0.58

FLOW PATH LENGTH OF TRAVEL: 195 FT
AVERAGE SLOPE: 10%
Cf: 1.25
Tc (MIN): 12
Td (MIN): 15
I (IN/HR): 1.9

Qpre (CFS): 2.73

PROPOSED CONDITION

PROPOSED SITE HAS BEEN SPLIT INTO THREE BASINS BASED ON GENERAL MAKE UP AND FLOW PATH CHARACTERISTICS. TWO OF THE BASINS DIRECTLY SHED WATER OFFSITE IN THE SAME MANNER AS THE EXISTING CONDITIONS. THE THIRD BASIN COLLECTS THE MAJORITY OF THE WATER PRODUCED ONSITE FROM THE DEVELOPED AREAS, LIKE PARKING AREAS, SIDEWALKS, AND BUILDINGS. STORMWATER COLLECTED FROM SIDEWALKS AND PARKING AREAS SHALL BE TREATED PRIOR TO RELEASE. THESE BASINS HAVE BEEN ROUGHLY DEPICTED ABOVE.
PROPOSED SITE IMPERVIOUS AREA: 42.4%

PROPOSED SITE MAKE UP		
SURFACE TYPE	AREA (ACRES)	COEFFICIENT
PAVEMENTS AND ROOFS	1.50	0.90
GRAVEL PAVEMENT	0.00	0.85
LAWNS	0.47	0.35
COMPOSITE	1.97	0.76

North

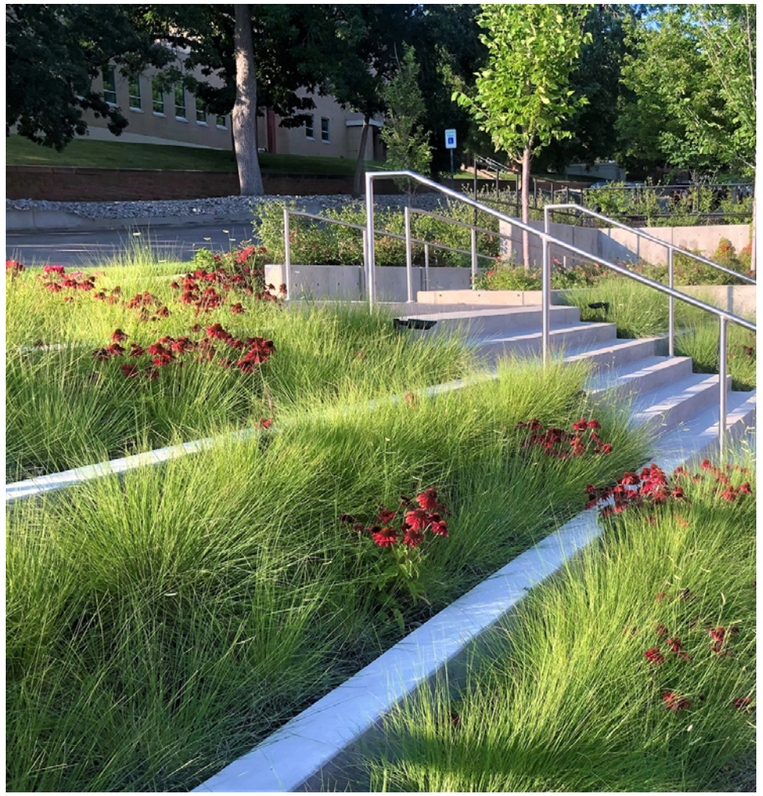
50' 0 50' 100'

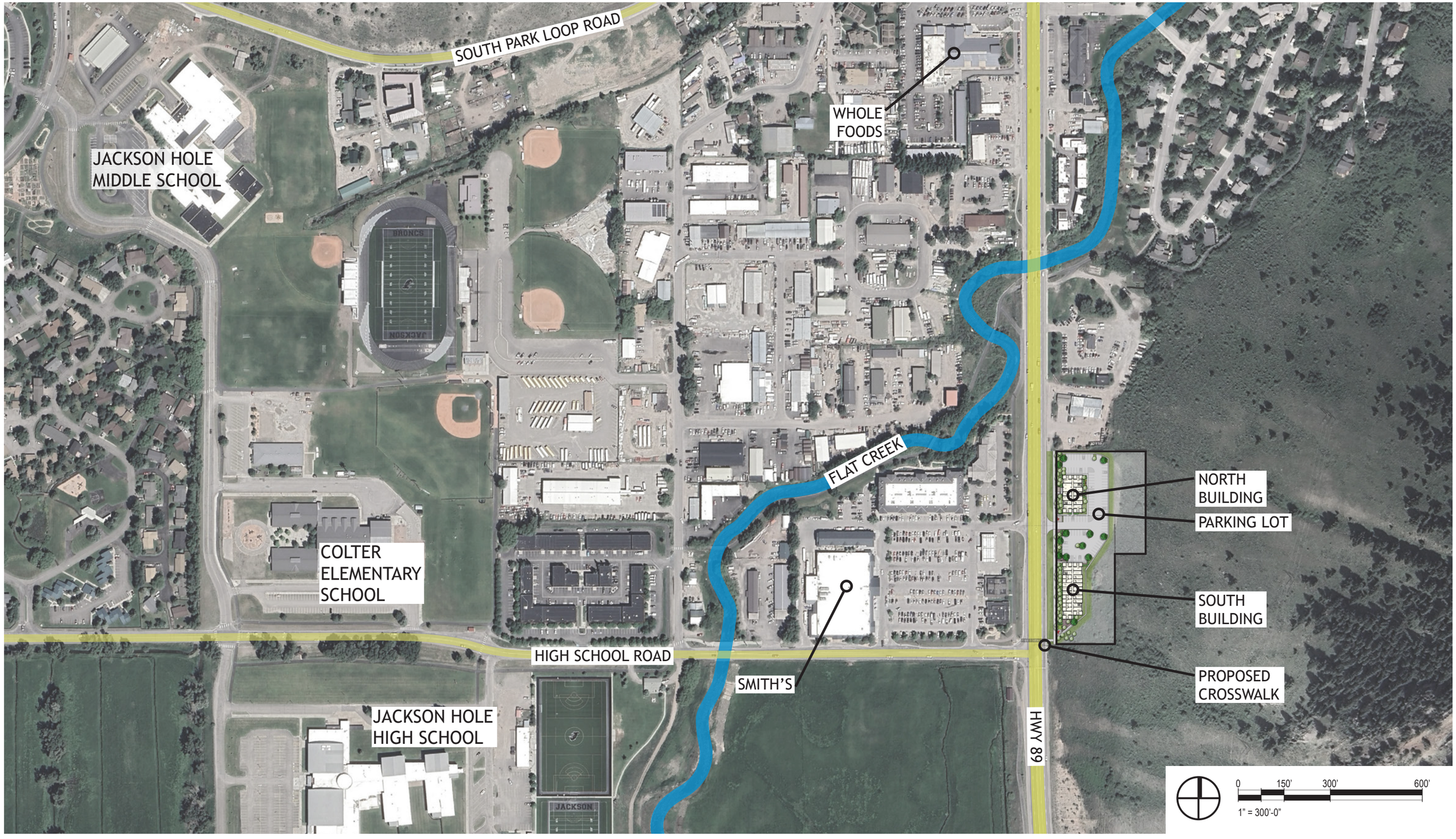
1" = 50' (11x17 SHEET)

NOBLE | DYNIA | CAIRN LANDSCAPE ARCHITECTS

LANDSCAPE-CHARACTER IMAGERY

1400 & 1450 S. HWY 89

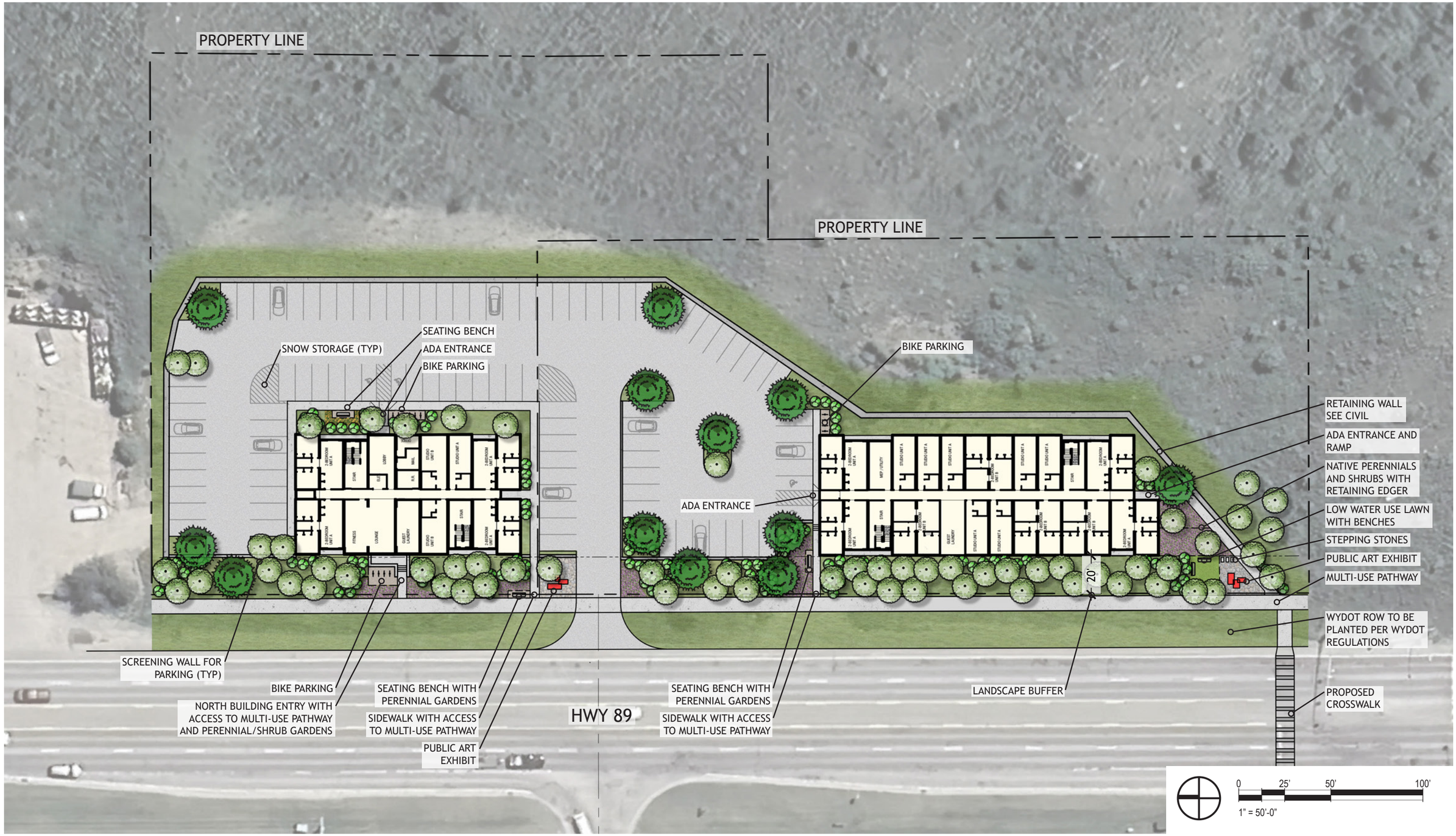




NOBLE | DYNIA | CAIRN LANDSCAPE ARCHITECTS

CONTEXT SITE PLAN

1400 & 1450 S. HWY 89



NOBLE | DYNIA | CAIRN LANDSCAPE ARCHITECTS

RENDERED SITE PLAN

1400 & 1450 S. HWY 89

BIKE STANDARDS FOR PROPERTY
114 X .75 = 86 BIKE PARKINGS SPOTS (64 LONG TERM, 22 SHORT TERM)
64 LONG TERM TERM ARE IN BASEMENT OF NORTH BUILDING

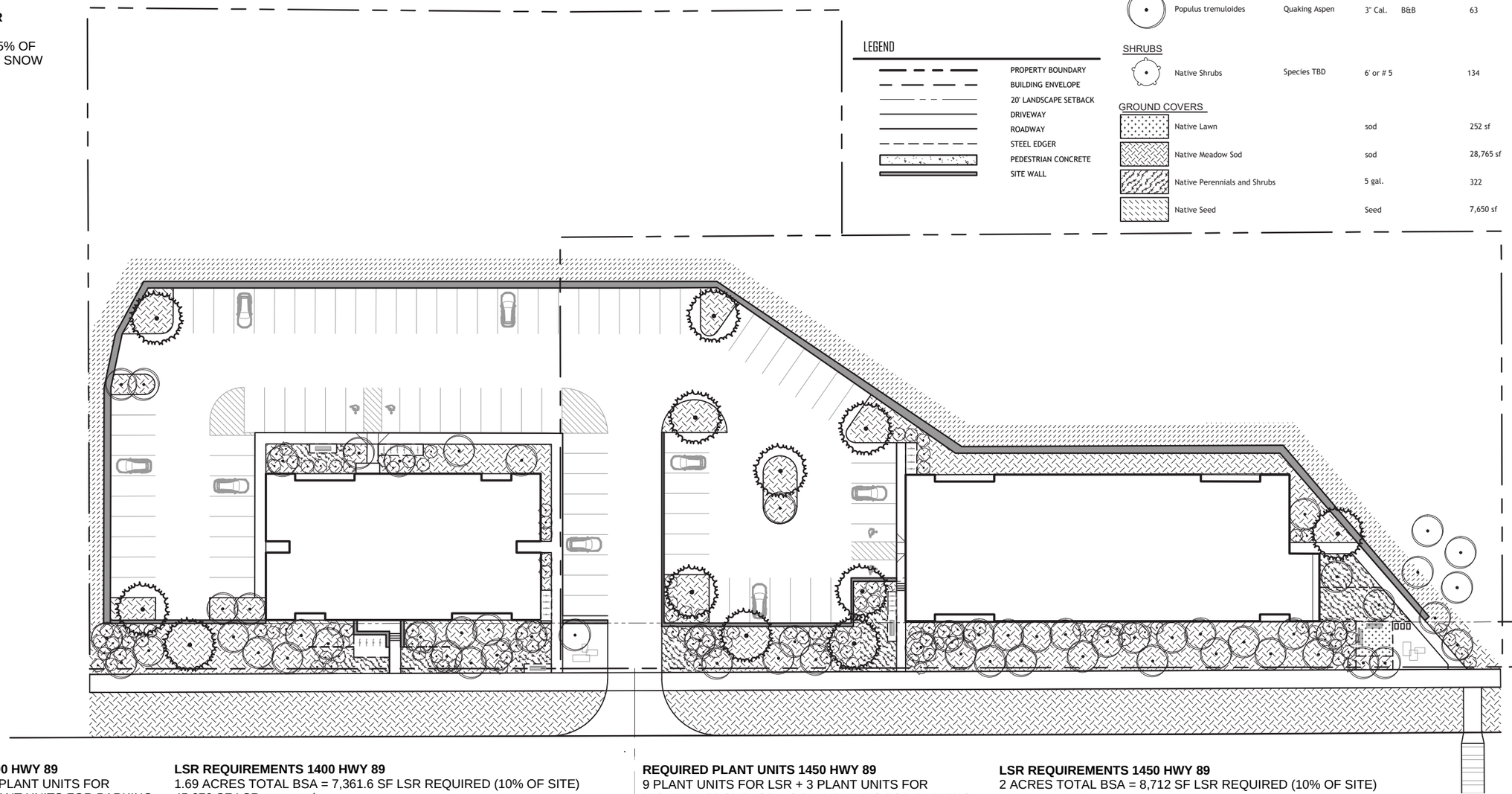
SNOW STORAGE FOR PROPERTY
SNOW STORAGE = 2.5% OF PARKING = 903 SF OF SNOW STORAGE

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER	QTY
TREES					
	Picea pungens	Colorado Spruce	24'	B&B	12
	Populus tremuloides	Quaking Aspen	3" Cal.	B&B	63
SHRUBS					
	Native Shrubs	Species TBD	6' or # 5		134
GROUND COVERS					
	Native Lawn		sod		252 sf
	Native Meadow Sod		sod		28,765 sf
	Native Perennials and Shrubs		5 gal.		322
	Native Seed		Seed		7,650 sf

LEGEND

- PROPERTY BOUNDARY
- BUILDING ENVELOPE
- 20' LANDSCAPE SETBACK
- DRIVEWAY
- ROADWAY
- STEEL EDGER
- PEDESTRIAN CONCRETE
- SITE WALL



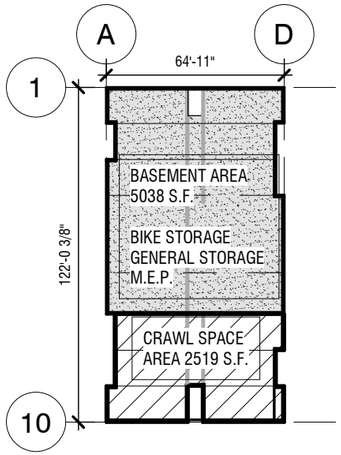
REQUIRED PLANT UNITS 1400 HWY 89
8 PLANT UNITS FOR LSR + 2 PLANT UNITS FOR HIGHWAY FRONTAGE + 5 PLANT UNITS FOR PARKING = 15 PLANT UNITS TOTAL REQUIRED
PLANT UNITS PROPOSED
1 PU FOR EXISTING VEGETATION RETAINED
1 PU UNIT FOR PUBLIC ART
1 PU FOR A BENCH
1 PU USING ALTERNATIVE C
11 PU USING ALTERNATIVE A

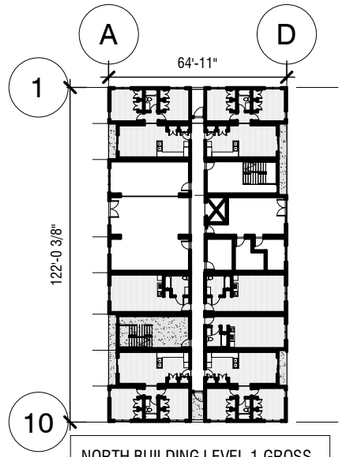
LSR REQUIREMENTS 1400 HWY 89
1.69 ACRES TOTAL BSA = 7,361.6 SF LSR REQUIRED (10% OF SITE)
45,270 SF LSR proposed

REQUIRED PLANT UNITS 1450 HWY 89
9 PLANT UNITS FOR LSR + 3 PLANT UNITS FOR HIGHWAY FRONTAGE + 3 PLANT UNITS FOR PARKING = 15 PLANT UNITS TOTAL REQUIRED
PLANT UNITS PROPOSED
1 PU FOR EXISTING VEGETATION RETAINED
1 PU UNIT FOR PUBLIC ART
1 PU FOR A BENCH
2 PU USING ALTERNATIVE C
10 PU USING ALTERNATIVE A

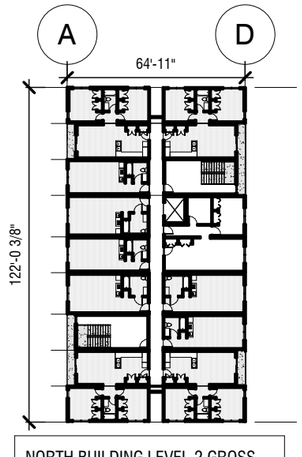
LSR REQUIREMENTS 1450 HWY 89
2 ACRES TOTAL BSA = 8,712 SF LSR REQUIRED (10% OF SITE)
46,691 SF LSR proposed

0 25' 50' 100'
1" = 50'-0"

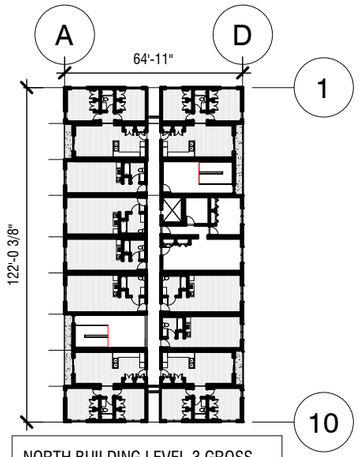




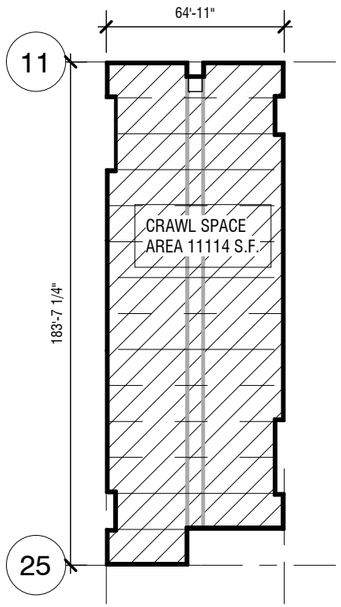
NORTH BUILDING LEVEL 1 GROSS
AREA= 7557 SQUARE FEET



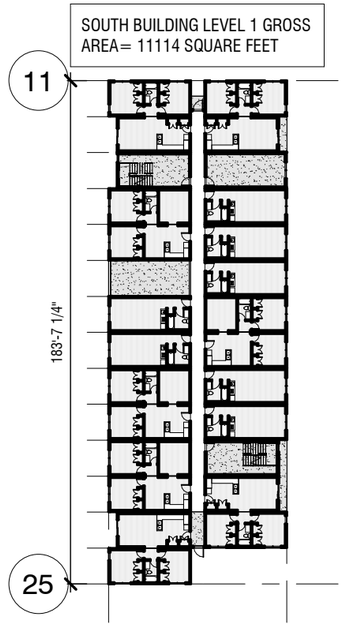
NORTH BUILDING LEVEL 2 GROSS
AREA= 7557 SQUARE FEET



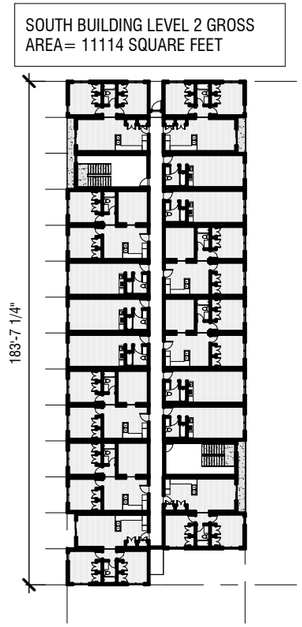
NORTH BUILDING LEVEL 3 GROSS
AREA= 7557 SQUARE FEET



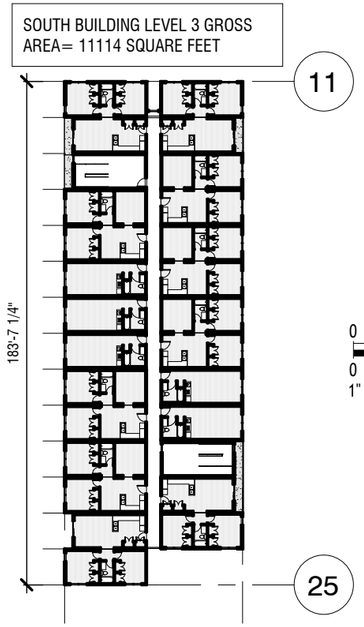
SOUTH BUILDING LEVEL 1 GROSS
AREA= 11114 SQUARE FEET

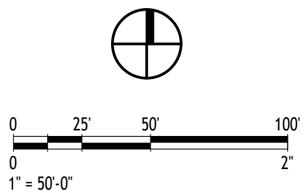


SOUTH BUILDING LEVEL 2 GROSS
AREA= 11114 SQUARE FEET

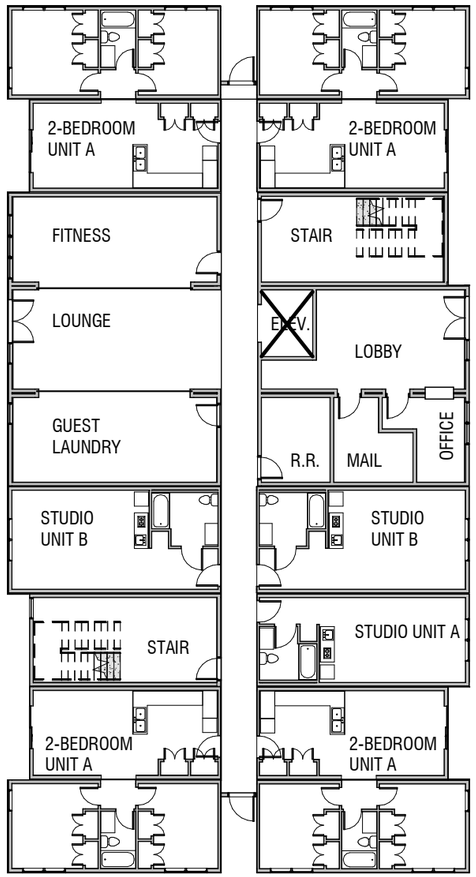


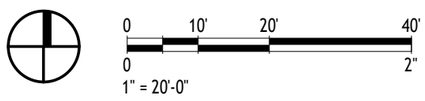
SOUTH BUILDING LEVEL 3 GROSS
AREA= 11114 SQUARE FEET



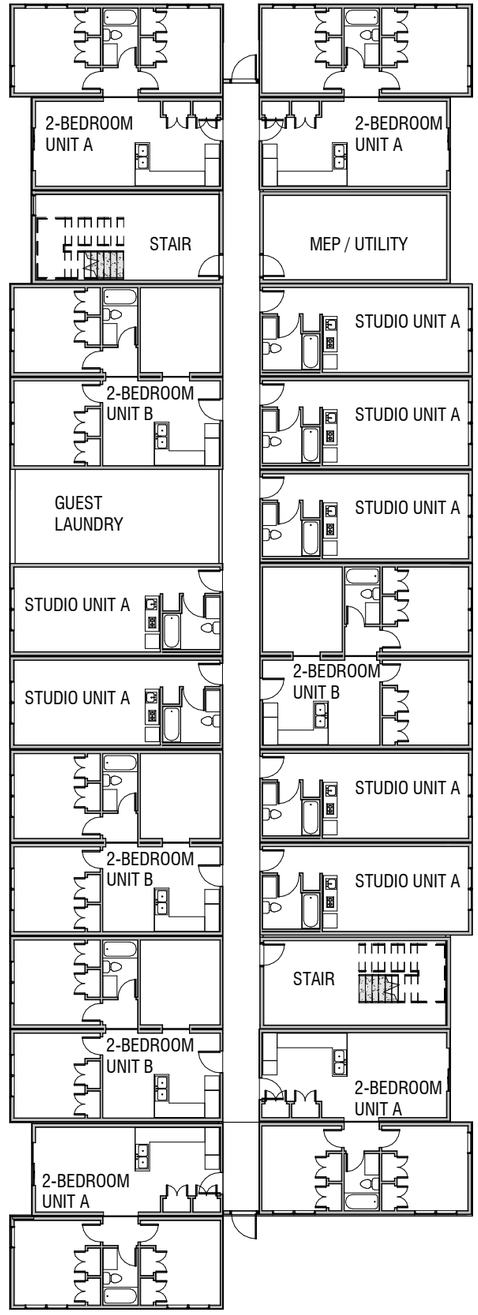


FIRST STORY - NORTH

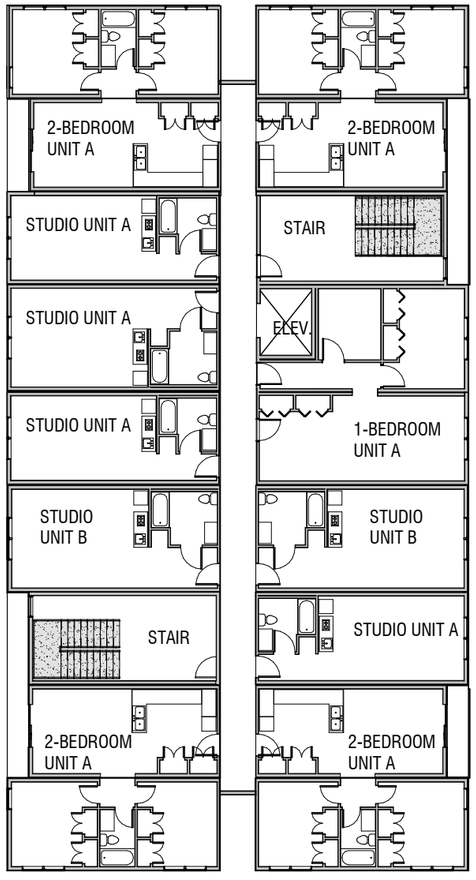


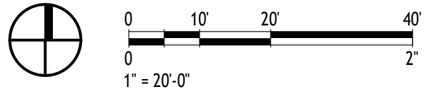


FIRST STORY - SOUTH

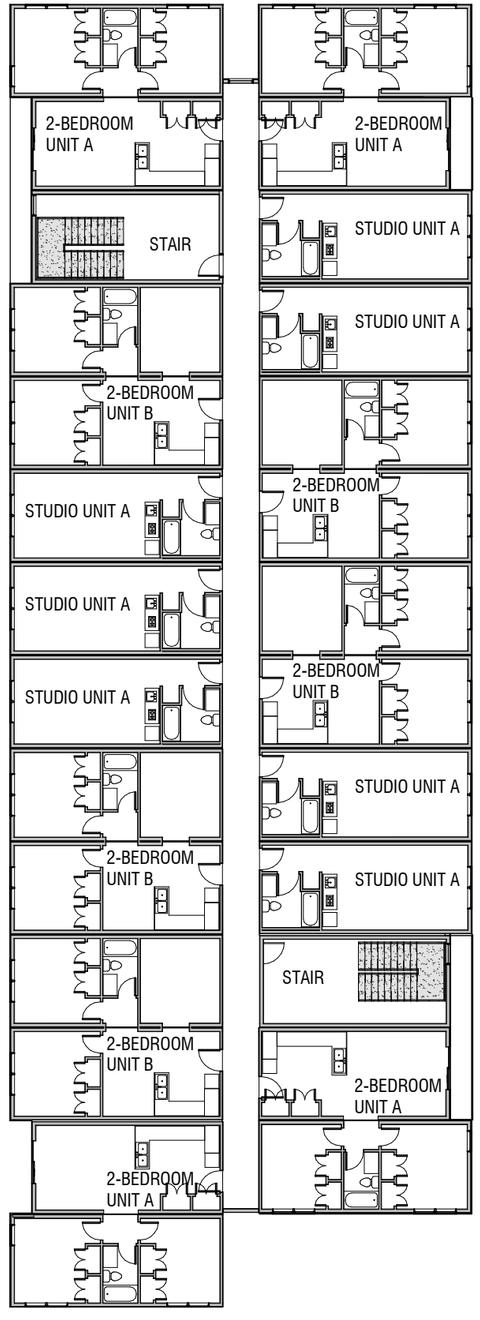


SECOND STORY - NORTH

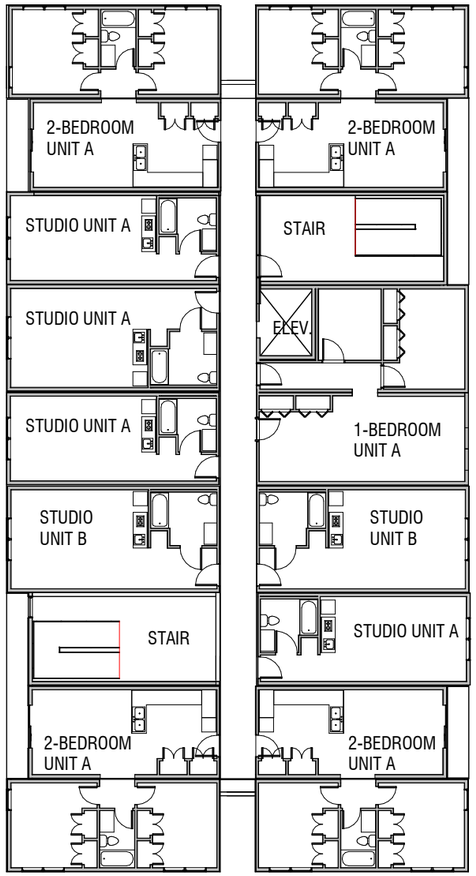


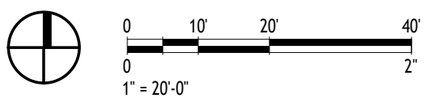


SECOND STORY - SOUTH

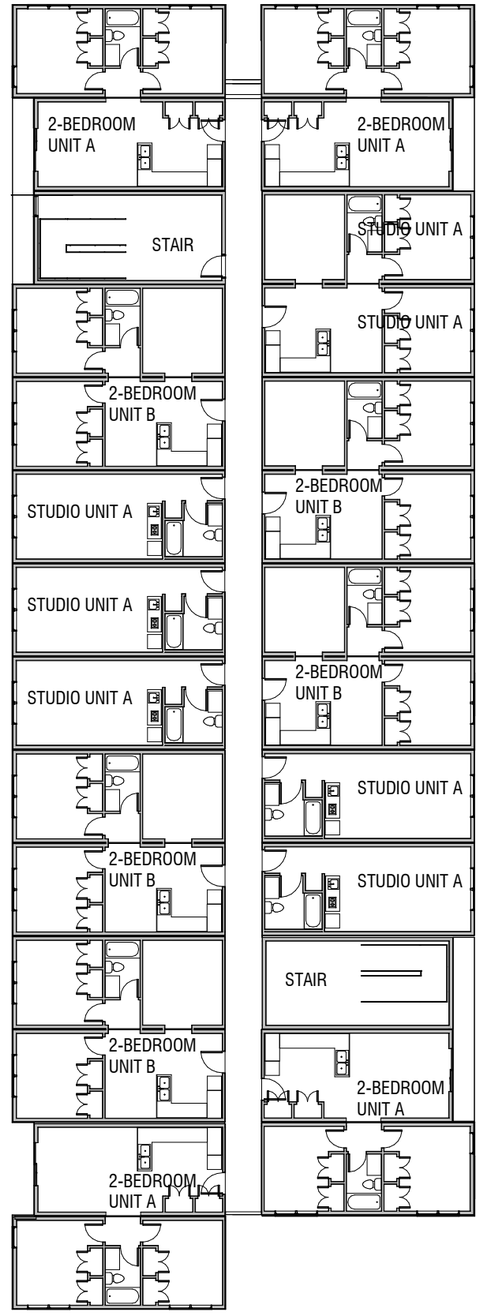


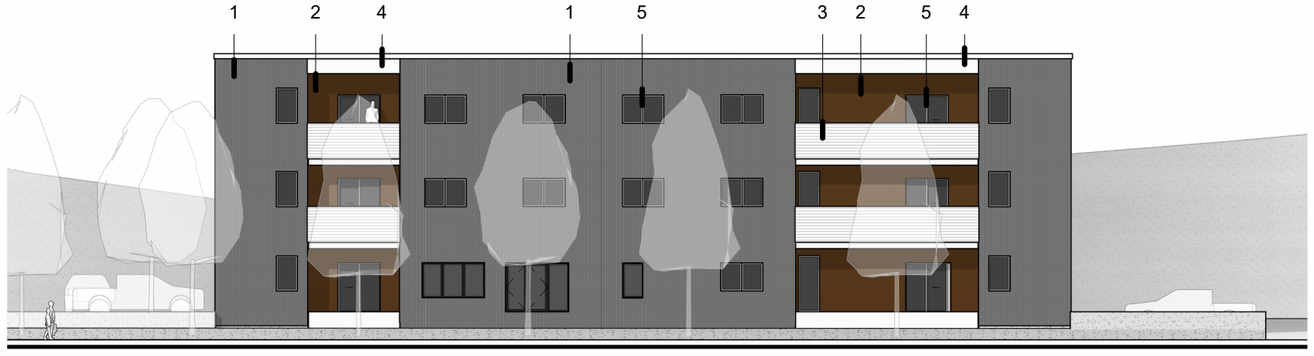
THIRD STORY - NORTH



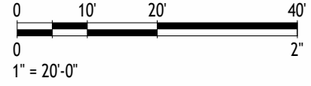


THIRD STORY - SOUTH



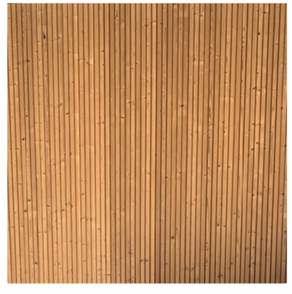


WEST ELEVATION - NORTH BUILDING



1" = 20'-0"

1. CORRUGATED BLACK METAL
NON-REFLECTIVE MATTE FINISH
22. GA

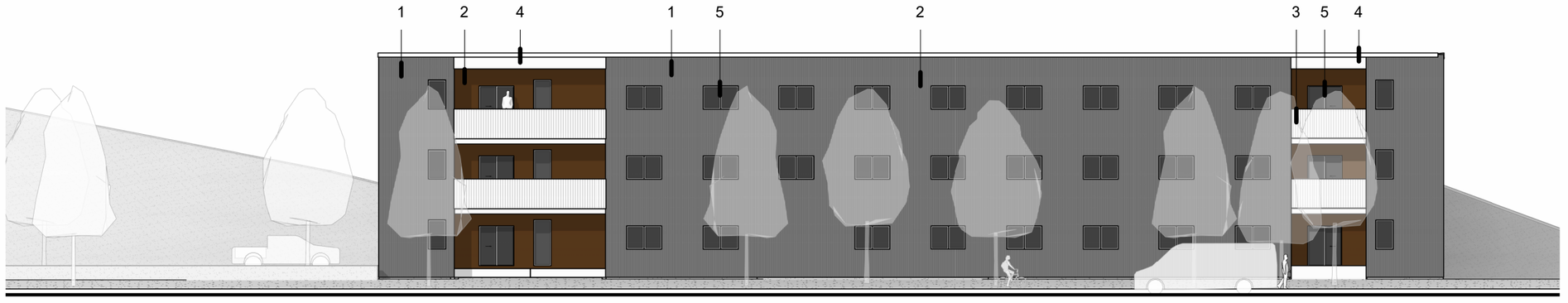


2. THERMAL TREATED SPRUCE
"LUNAWOOD TRIPLE"
NATURAL FINISH

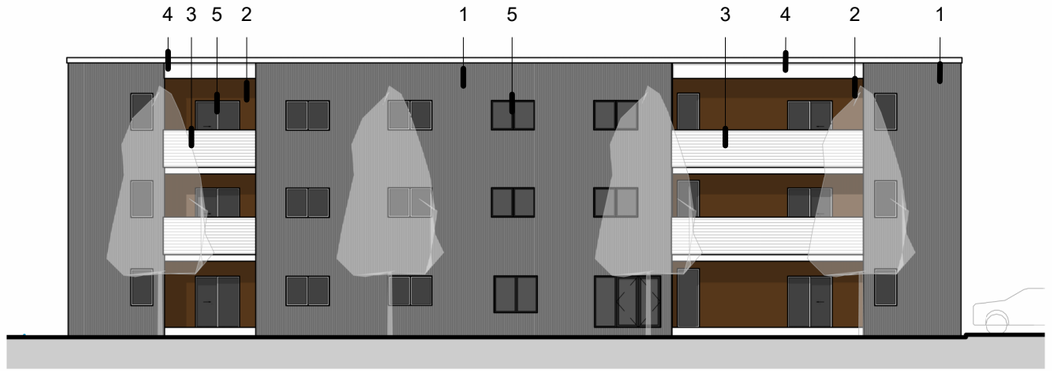
3. PERFORATED CORRUGATED SILVER METAL
STAGGERED ROUND 1/8" DIA 3/16" CENTERS
40 % OPEN AREA

4. MATTE FINISH SILVER SHEET METAL
22 GAUGE FLAT
EXPOSED FASTENERS

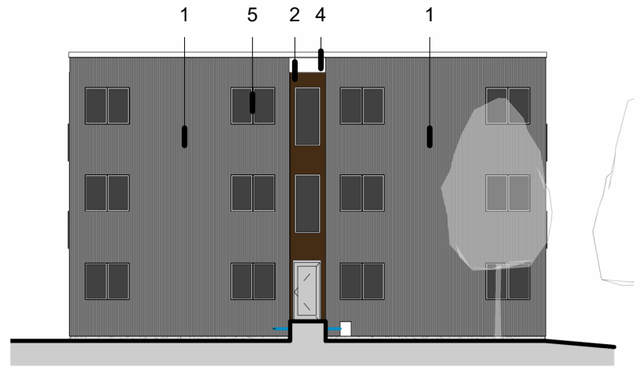
5. BLACK CLAD WINDOW / DOOR
MATCH BLACK SIDING



WEST ELEVATION - SOUTH BUILDING

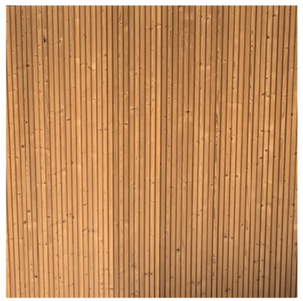


EAST ELEVATION - NORTH BUILDING



TYPICAL NORTH AND SOUTH ELEVATION

1. CORRUGATED BLACK METAL
NON-REFLECTIVE MATTE FINISH
22. GA



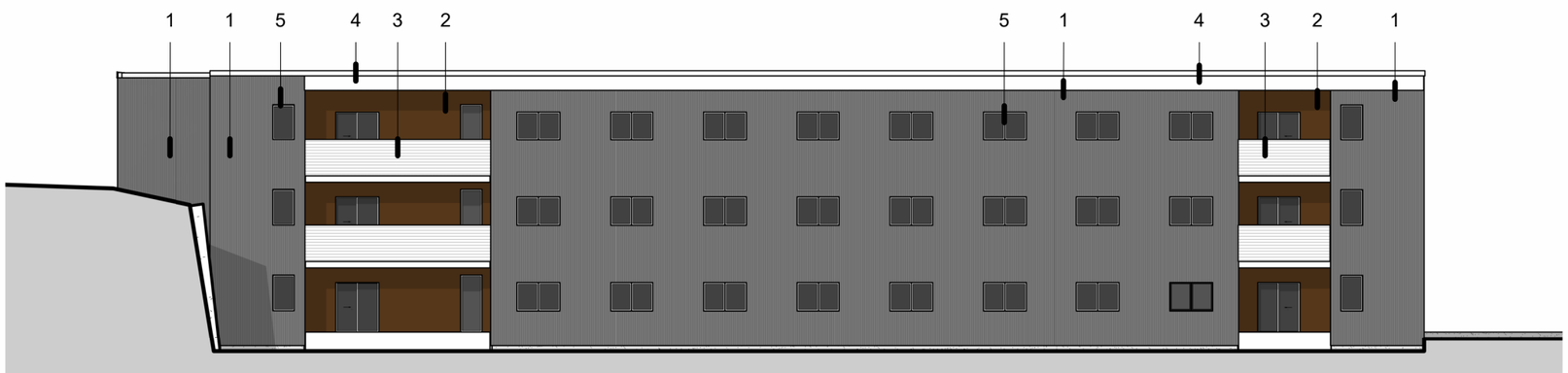
2. THERMAL TREATED SPRUCE
"LUNAWOOD TRIPLE"
NATURAL FINISH

3. PERFORATED CORRUGATED SILVER METAL
STAGGERED ROUND 1/8" DIA 3/16" CENTERS
40 % OPEN AREA

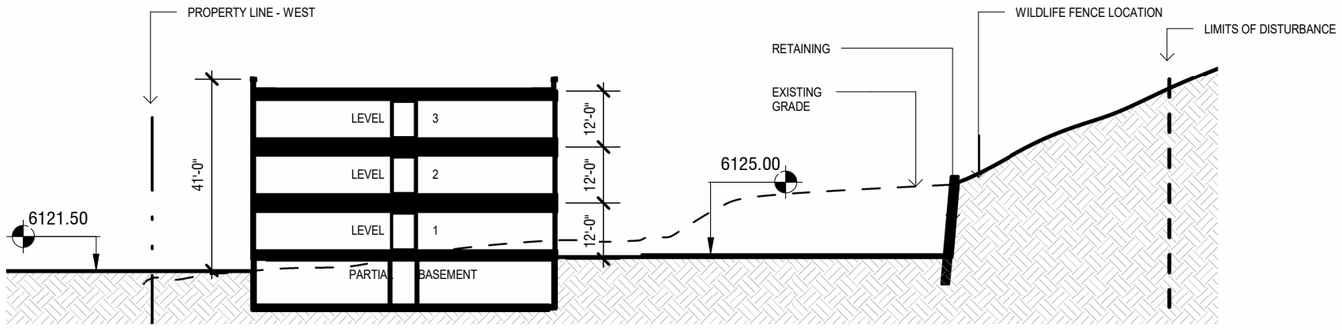
4. MATTE FINISH SILVER SHEET METAL
22 GAUGE FLAT
EXPOSED FASTENERS

5. BLACK CLAD WINDOW / DOOR
MATCH BLACK SIDING

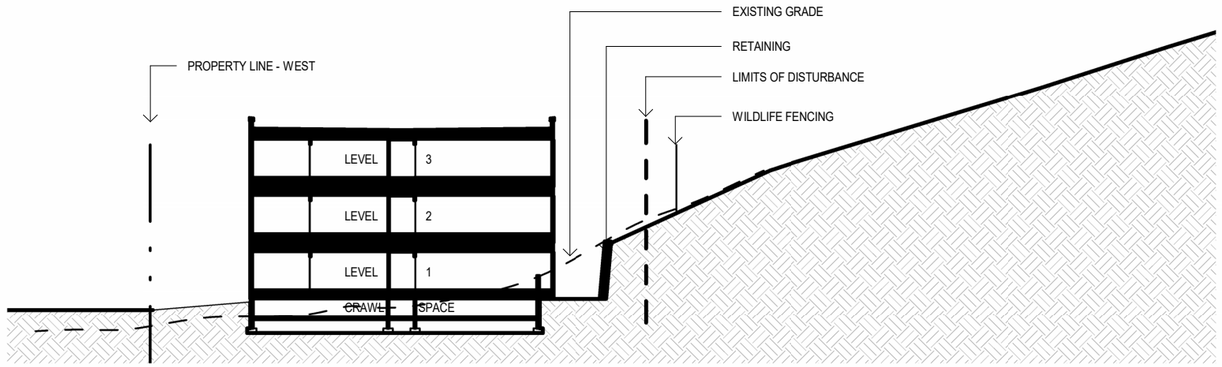
0 10' 20' 40'
0 2"
1" = 20'-0"



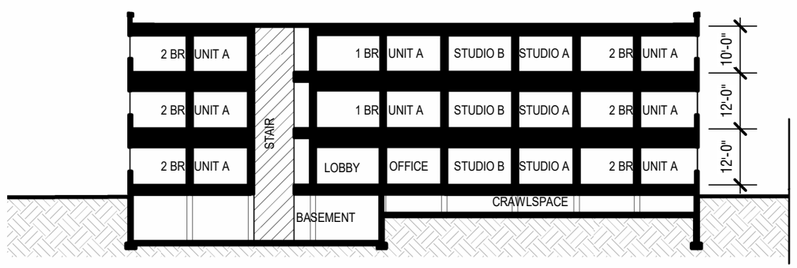
EAST ELEVATION - SOUTH BUILDING



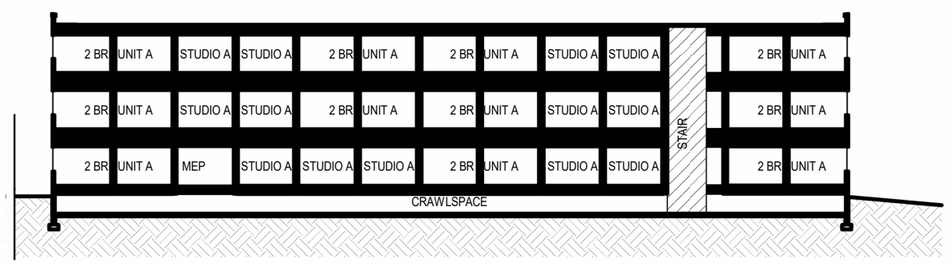
SECTION AT NORTH BUILDING



SECTION AT NORTH BUILDING



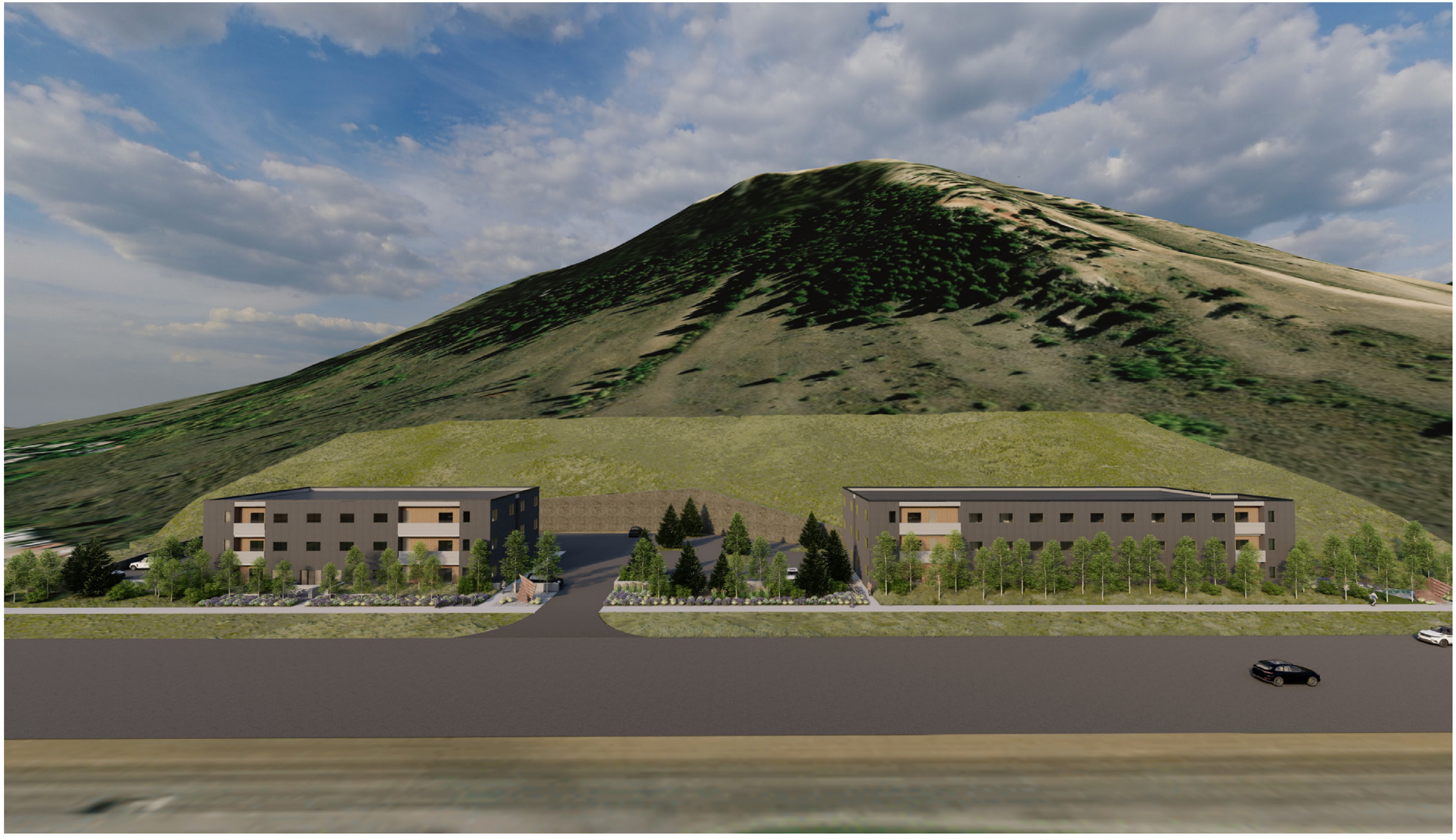
LONGITUDINAL SECTION NORTH



LONGITUDINAL SECTION SOUTH

South Elevation

West Elevation



NOBLE | DYNIA | CAIRN LANDSCAPE ARCHITECTS

DYNIA

November 4, 2024

1400 & 1450 S. Hwy 89

Land Development Regulation Compliance and Narrative

The following narrative describes a multi-family housing project at 1400 & 1450 South Highway 89 in Jackson, Wyoming. These are parcels identified as 22-40-16-05-2-00-010 and 22-40-16-05-2-00-012, zoned CR-3. Combined the lots are 3.53 acres or 153,767 square feet. The proposed project is 100 percent residential. The following addresses the proposed project in terms of the Town of Jackson Land Development Regulations as defined in section 2.2.13 of the current LDR's

A. Intent

Character Zone CR-3 is intended for vibrant mixed-use and buildings of all residential use are encouraged. Buildings can be up to three or four stories, and parking should be on-site. The proposed project consists of two 100% residential buildings of three stories and all parking is on-site.

B. Physical Development

- Lot Standards – Setbacks.
    - CR-3 Zoning requires a 20' minimum setback from the property line at the highway. An 85' foot maximum setback does not apply to residential buildings. The proposed project is set on that line to provide for maximum parking area behind the buildings. No curb is established at this location, and side and rear setbacks are well distanced from the projects with the building footprint >80 feet from the side and over 100 feet from the rear.
- Lot Standards - Landscaping
    - The zoning requires a Landscape Surface Ratio with a minimum amount of 10% or 16,074 square feet. The proposed project is 90,961 square feet.
- Lot Standards - Plant Units
    - A total of 30 plant units are required for the two lots. 30 plant units are proposed including 2 for public art as the site acts as the southern gateway to town.
- Lot Standards - Parking Setbacks
    - Parking setbacks are required to be 20' from Highway 89 property line. The majority of the parking is concealed behind the north building but where it wraps

the building the edge of parking is at the 20’ setback. There are no other streets at the site.

- Lot Standards - Access
    - The single curb cut is proposed to be 24’ in width and is aligned with the entrance to Smith’s shopping center directly across from the project.

- Bulk Standards – Street Façade
    - The width of ground and second story in primary street setback ranges is required to be 50% minimum. The proposed buildings total 306 linear feet along the highway which is equal to 49% of the two sites 626 feet of highway 89 frontage.
- Bulk Standards – Building Height
    - The proposed buildings will be constructed with roofs flatter than 5/12. The maximum height above grade is limited to 42’. The proposed buildings are 41’ above proposed grade.
    - Three stories buildings (maximum) are allowed and three stories are proposed.
    - A 24 foot minimum height is required in street setback range. The proposed project will have a 41 foot height in the setback range.
- Bulk Standards – Building Stepback
    - Building step backs are not applicable to residential projects with 4 or more units.
- Bulk Standards – Scale of Development
    - A floor area ratio of 0.40 is enforced in zoning CR-3. This allows for approximately 61,500 square feet of development. The proposed buildings floor areas are 33,342 square feet and 22,671 square feet or a total of 56,013 square feet.
    - Deed restricted and Workforce housing are not proposed for this development.

- Form Standards – Pedestrian Frontage
    - Trees in lawn are proposed in the pedestrian frontage.
- Form Standards – Building frontage is shown as residential.

- Residential frontage story heights are required to be 9’ minimum. Proposed story heights are 12’.
- Residential ground floor elevation is required to be in a range of 0-5’ Proposed ground floor elevations are approximately 2’ out of grade for the entire project.
- Residential Transparency is required to be 20% minimum. Proposed project is greater than 20% transparency.
- Blank Wall Area along Highway 89 is not to exceed 35’ in width and height. The largest blank wall area is approximately 8 ½’
- Pedestrian Access is required facing highway 89 and is provided for at the lobby area. Individual units are entered from the double loaded corridor.

- Form Standards – Parking Type – Surface parking is proposed.

- Fencing – No fencing is proposed except for wildlife fencing as required by the environmental report.

- Environmental Standards
  - Natural resource setbacks are not applicable. Flat Creek South of Hansen Avenue is located more than 50’ from the property.
  - Irrigation Ditch Setback. Existing Wort Canal is located more than 15’ from the development.

- Scenic Standards – Exterior Lighting. An exterior lighting plan will be developed in compliance with Town of Jackson Standards.

- Natural Hazards
  - A separate Hillside CUP has been applied for.
  - The project is in the Wildland Urban Interface and will comply with the Fire Marshall requirements for the site.

- Signs (non-residential) – The proposed project is 100 percent residential.

- Grading, Erosion Control and Stormwater management are accounted for.

- Physical Development Permits Required
    - Greater than 19,500 square feet, residential only.
    - Sketch Plan is optional
    - Development plan, building permit, DRC review, Grading permit required.

C. Use Standards

- Allowed Uses. Residential Apartment is allowed with Basic Use Permit
- Operational Standards
    - Outdoor storage is prohibited in CR-3 zone. Proposed storage is in basement of the north building.
    - Refuse and recycling is required for this project and locations are noted on the site plan.

D. Development Options and Sub-Division N/A

E. Additional Zone-specific Standards

- Non-Residential, Non-Lodging parking N/A
- Loading Requirements. Loading is through lobby area, off street access.
- Heavy service use are not proposed.
- Workforce housing is not proposed.
- Streetscape Standards are accounted for with landscape strip, screening wall shown.
- Highway 89 Height and Material standards are accounted for and shown.
- No historic preservation program applicable.
- No mini-storage use proposed.

NOBLE

Parking, Bicycle, and EV Charging Summary

Vehicular Parking:

Per Division 2.2.13.C, Table 1, Use Standards, Apartments, (6.1.4.D), parking requirements for apartment units require 1 parking space per dwelling unit if less than 2-bedrooms, and less than 500-SF, otherwise, 1.5-spaces per dwelling unit are required. Based on the below 75-unit mix, 96-parking spaces are required and are provided in the surface parking lot at the North, East and South portions of the Project. While 96-parking spaces will be provided, it is anticipated that the majority of the tenants will utilize public transit, including the START Bus, with Bus Stop No. 60 being less than 750' walking from the Project.

Unit Mix by Type	Unit Qty	Unit SF	Parking per Unit	Total Parking
Studio Unit	34	348-SF	1	34
1-Bedroom Unit	2	624-SF	1.5	3
2-Bedroom Type 1	24	660-SF	1.5	36
2-Bedroom Type 2	15	696-SF	1.5	22.5
Total	75			95.5
Total Required				**96**
Total Provided				***96***

Bicycle Parking:

Per Division 6.2.2.D.1, required bicycle parking, multi-family apartment projects with more than 5-units per lot require .75-bicycle parking stalls per bedroom. Based on the below unit mix of 75 units, there are 114-total bedrooms, which require 22 short-term and 65 long-term bicycle parking stalls. The 22-short term will be provided outside in bicycle racks spread along the interior circulation routes and adjacent to building entries, and the 65-long term spaces will be provided indoors in the basement of the North Building. Access to the basement for bike storage will be provided through the elevator and stairs.

Unit Mix by Type	Bedroom Quantity	Unit Qty	Total Bedrooms	Bicycle Stalls Required
Studio Unit	1	34	34	25.5
1-Bedroom Unit	1	2	2	1.5
2-Bedroom Type 1	2	24	48	36
2-Bedroom Type 2	2	15	30	22.5
Total		**75**	**114**	**85.5**
Total Required (Rounded)				**86**
Total Short Term Provided (Rounded Up)				***22***
Total Long-Term Provided (Rounded Up)				***65***

EV Charging:

Per Division 6.2.2.F.1 for apartment units, 30% of the required parking spaces are required to be EV capable, of which, 5% need to be provided with installed EV chargers. Based on the 96 required parking spaces, 29 spaces are required to be Ev-capable, of which 5 are required to have EV chargers installed.

NOBLE

November 4, 2024

Town of Jackson Council & Planning
P.O. Box 1687
Jackson, WY

RE: Sketch Plan Application: 1400 & 1400 S Hwy 89 Multi-Family Residential Project Comment Responses

Town Council and Planning Staff,

Pursuant to the Pre-Application comments provided by the Town Staff and respective departments during our August 2, 2024, pre-application meeting, and subsequent Pre-Application Summary provided on August 5, 2024, please find responses to the individual items below.

Planning Department Comments:

1. This property is located at the southern gateway into Town and the Comprehensive Plan envisions this area to have projects that enhance the visual appeal in the public realm. Public art projects are strongly encouraged both on public and private property. Staff recommends the provision of some public art that embodies the character of Jackson (*Comp Plan Policies 4.4.a. & 4.4.b.).*
    a. Please see the attached landscape plan. The Developer understands the importance of the site's location at the southern entry to the Town and will strongly consider the Town's recommendation to utilize public art or sculpture at the site as the Project moves through the development process.
2. The base FAR of .40 allows +/-61,500 sf of above-ground habitable for this 3.53-acre (153,767 sf) development site. The plan for roughly 57,000 sf appears to conform. However, please keep in mind that when calculating the base FAR, hallways, mechanical spaces, stairs, and elevators count as habitable toward the 0.4 FAR. Stairs are counted every two floors and elevators are counted only once. As it relates to the 4th story bonus, should that be used, all associated circulation spaces that serve the bonus units are exempt from the Base FAR calculation.
    a. The North building is approximately 22,671-SF, plus a 5,038-SF basement (27,709-SF total), and the South building is approximately 33,342-SF, for a total of 56,013-SF without basement area, 61,051-SF with basement), below the .40 allowable FAR of 61,507-SF based on a combined site area of 3.53-acres (153,767 sf). No 4th story bonus or FAR max will be utilized for this project.
3. As you are likely aware, the Town Council recently approved an emergency moratorium on commercial/mixed-use buildings larger than 35,000 sf. Since these buildings are 100% residential, the moratorium does not apply to this development. However, the fact that the town approved a moratorium on big buildings indicates the community's sensitivity to new larger developments. Staff highly recommends that the proposed development remains as at least two buildings, as opposed to a single building, and that the architecture includes visual breaks in the massing to reduce the perceived bulk and scale.
    a. Please see the attached floor plans, elevations and renderings, showing the project proposed as two buildings of 3-stories each. The North building is approximately

22,671-SF, plus a 5,038-SF basement (27,709-SF total), and the South building is approximately 33,342-SF, for a total of 56,013-SF without basement area, 61,051-SF with basement).

4. The CR-3 currently has no density limits. However, the LDRs state in Section 1.6.2 that ***"Maximum densities and intensities are not guaranteed to be achievable by the terms of these LDRs. All standards and requirements shall be met and actual achievable densities and intensities may be limited by factors such as product type, site location and configuration, natural and scenic resource limitations, or parking requirements."*** This section is essentially saying that proposed density and/or building size are not guaranteed, even though bonuses such as the 4th Story Bonus are permitted, and that the density and building size may need to be reduced and/or broken up as part of complying with the Design Guidelines and supplemental standards applicable to the 4th Story Bonus. Bonuses by nature are "extras" and their use is predicated on good design that breaks up the bulk and scale of larger buildings. If the 4th Story Bonus is used, the applicant should not expect the footprint of the 4th story to match that of the story below, nor should the applicant assume that making minor step backs on the 4th story will be sufficient in reducing the perceived bulk and scale.
    a. The 4th story bonus will not be used. Please see the attached floor plans, elevations and renderings, showing the project proposed as two buildings of 3-stories each.
5. The recent Loop project struggled to get their development (Over 200,000 sf and 194 units) through the DRC and they also used the 2:1 Bonus and 4th Story Bonus. The DRC reviewed the project 5 times. That project was on South Park Loop Road which isn't a prominent/highly visible location and they broke the project up into 2 buildings. Although there is no standard requiring multiple buildings or max building size, this gateway project will be more heavily scrutinized by the DRC compared to the Loop project. As stated above, staff highly advises keeping this project to at least 2 buildings, if not more.
    a. Please see the attached floor plans, elevations and renderings, showing the project proposed as two buildings of 3-stories each. The North building is approximately 22,671-SF, plus a 5,038-SF basement (27,709-SF total), and the South building is approximately 33,342-SF, for a total of 56,013-SF without basement area, 61,051-SF with basement).
6. It appears this development may be modular which is permitted provided that the Town Building Official is aware and has consulted with the modular manufacturer.
    a. At this current time, no decision has been made on which project delivery method will be utilized (traditional on-site construction and modular construction), however, the Developer will consult with the Town Building Official ahead of our decision to choose or not choose modular construction.
7. Based on DRC comments about The Loop, the design needs to focus on providing variety to the roof line.
    a. Please see the attached elevations. The design will continue to evolve throughout the design and approval stages, as well as following feedback from the DRC and Council.
8. As the building design moves further along, consider additional storage space for most, if not all, units. Storage is generally shown on the floor plans, but it is not clear how the storage is used or designated.
    a. Storage will be provided for some individual units in the basement of the North Building.
9. Staff recommends that the applicant provide a variety of unit types and sizes versus providing primarily studios. If the 4th Story Bonus is used, the applicant will need to consider providing more variety in units (i.e., one-beds and two-beds). The Loop project was highly scrutinized for the high amount of studios, and in the end, they ended up providing more 1-bed and 2-bed units

a. Please see the attached floor plans and unit matrix. The 75-unit development will generally consist of 34 studio units, two (2) 1-bedroom units and 39 2-bedroom units ranging from 348-SF to 696-SF.

10. The affordable housing requirement cannot be determined until staff knows the exact breakdown and size of each individual unit. That information has not yet been provided. As a hypothetical, 118 units at 480 sf would require 1.664 units minus any existing housing credits from the existing commercial business and single-family home. It appears there are 1.410 units of credit which means there may not even be a requirement to build any affordable housing. Any requirement of less than one unit is a fee in lieu.
    a. See the housing and mitigation exhibit attached. Based on the Pre-App comments, effective August 5, 2024, the existing development on the site provides for 1.41 existing workforce housing credits. Based on the 75-unit matrix, the amount of affordable workforce housing required is 1.192 units, below the existing credit amount.
11. Planning has concerns over the potential for large retaining walls to the east of the parking lot that were not part of the previous pre-application submittal back in 2022. The Environmental Analysis (EA) will need to be updated to analyze limiting retaining wall heights to reduce wildlife conflicts and barriers. Staff is also concerned over the visual appearance of retaining walls that appear to reach 24' in height. The original EA also recommended against wildlife fencing on a project-by-project basis but recommended that be done through a comprehensive approach. The EA may impact the proposed site plan, retaining walls, and fencing.
    a. Please see the Environmental Assessment and Environmental Assessment Update attached addressing the wildlife fencing and retaining wall.
12. Is the plan to keep these as apartment rentals or ownership units?
    a. All units in this development will be rental units.
13. Please be sure to reference Section "E" in the CR-3 zone as highway-fronting developments have some additional standards. This includes a 1.5 plant unit (Alternative C) requirement for every 125' linear feet of frontage which is a requirement above and beyond the normal pant unit required that is tied to LSR and surface parking. In addition, a screen wall will need to be provided at the vehicular entrance and in front of the surface parking in the northwest corner of the property.
    a. Please see the attached landscape plan, which includes the required 20'-wide landscape buffer as well as plantings above the minimum requirements.
14. Please be sure to reference Section 2.2.1 as it provides additional development standards pertaining to minimum story height, minimum transparency requirements per floor, blank wall requirements, etc. This project is required to comply with the "Residential" Frontage standards which also require a pedestrian entrance facing the street for each ground floor unit.
    a. Please see the attached LDR compliance exhibit outlining the Project's compliance with the applicable LDR requirements. There will be an 8'-wide sidewalk running the length of the property as well as multiple pedestrian connections to the buildings.
15. The site plan will need to include multiple pedestrian connections from the building to the sidewalk in the right-of-way that are engaging and welcoming. Staff recommends that the applicant use the Design Guidelines early on to address the building, pedestrian realm, site, etc.
    a. Please see the attached LDR compliance exhibit outlining the Project's compliance with the applicable LDR requirements. There will be an 8'-wide sidewalk running the

length of the property as well as multiple pedestrian connections to the buildings. If permitted by WYDOT and the Town, a pedestrian crossing at the Hwy 89 and High School Road intersection will be installed to connect the building tenants to the retail and bus stop on the west side of Hwy 89.

16. The site, as proposed, is under-parked by approximately 35-40 spaces. The applicant needs to demonstrate compliance with the minimum parking standards. Based on the proposed parking, the density will need to be reduced or additional parking needs to be provided. In addition, considering there is no on- street parking or nearby public parking lots, the applicant should strongly consider providing guest parking versus pursuing a parking reduction. Staff is not supportive of a parking reduction for market units. The recent Loop project, also located in an area with no on-street parking, provided 14 guest spaces above and beyond their minimum requirement. The Sagebrush Apartment project also provided guest parking spaces for their 90-unit apartment complex. Dimensionally, parking spaces must be 9'x20' and drive aisles must be 24' wide.
    a. Please see the attached site plan and unit matrix. The Project has been adjusted since the original Pre-App submittal down from 118-units to 75 units. Based on the 75-unit mix and unit sizes, 96 parking spaces are required and are provided within the surface parking lot on the site.
    b. Although the Project contains the required number of off-street vehicle parking spaces, per Section 6.2.2.D.3, the Applicant would like to review with the Planning Director the Alternative Compliance option of replacing up to 10% of the required off-street vehicle parking spaces with at least the same number of additional long-term bicycle parking spaces. The additional long-term bicycle spaces would be included in the basement of the North Building along with the planned long-term spaces outlined below. As discussed throughout this submittal and in the attached narrative, the Project will have a public transit focus, with the installation of the crosswalk at High School Road, which would give tenants easy access to the START stop no. 60 and the pathway on the west side of S Hwy 89.
17. ADA Parking according to Section 6.2.2.C.1 of the LDRs requires a minimum of 1 ADA space per 25 on-site parking spaces. The first ADA space must be van accessible (8' wide space + 8' loading zone).
    a. Please see the attached site plan depicting the four (4) ADA parking spaces provided. ADA parking spaces will comply with all applicable use and design guidelines.
18. EVSE parking standards will apply and require that 30% of the total parking be EVSE capable and 5% be EVSE installed.
    a. Please see the attached site plan. Based on a 96-space parking lot, 29-spaces are required to be EV capable, of which, the Developer would install chargers for a minimum of five (5) of those spaces.
19. The Town recently adopted new short-term and long-term bike parking/storage standards (Ordinance attached). For residential, 0.75 bike parking spaces are required. Of that total, 25% must be short- term spaces and 75% must be long-term spaces.
    a. Please see the attached site plans and floor plans. Based on the proposed 114 bedrooms, 86 bike parking spaces are required. Short term bike parking for a minimum of 22 spaces will be provided adjacent to the buildings, and long-term bike parking for a minimum of 65 bikes will be provided in the basement of the North Building.
    b. Although the Project contains the required number of off-street vehicle parking spaces, per Section 6.2.2.D.3, the Applicant would like to review the Alternative

Compliance option of replacing up to 10% of the required off-street vehicle parking spaces with at least the same number of additional long-term bicycle parking spaces. The additional long-term bicycle spaces would be included in the basement of the North Building along with the planned long-term spaces outlined below.

20. The applicant should consider private spaces (balconies) for some, if not all, units. This will further help break up the building's bulk and scale.
    a. Please see the attached building elevations. Currently, no balconies are planned for the project. However, variations in the façade are created by changes in building depth, material and ornament, along with a dense landscape buffer along the building frontage, which allow the building to blend seamlessly into its surroundings.
21. How will deliveries take place? Where do packages go?
    a. Please find the attached plan set that addresses this question. There is a mail and package room in the common area in the North Building.
22. What is proposed within the basement?
    a. The basement in the North Building will house mechanical and electrical rooms, tenant and building storage and bike storage.
23. With the Development Plan submittal the applicant shall provide a preliminary construction management plan with a narrative and site plan.
    a. See the attached preliminary construction management plan. A full construction management plan will be provided further in the process during the Development Plan application process when the construction delivery method has been confirmed (traditional vs modular).
24. Hillside CUP Criteria and Standards.
    a. In addition to the general Conditional Use Permit criteria and standards, the following standards shall be considered:
        i. The amount of terrain disturbance related to the otherwise allowable or conditioned uses for the property and the proposed mitigation efforts;
        ii. Retention or replacement of native, existing vegetation consistent with any proposed lawful use of the property;
        iii. Mitigation measures for mitigating impacts on wildlife or crucial winter range; and
        iv. Mitigation measures for avoiding or minimizing visual impacts, subsurface, and any other natural hazards associated with hillside development.
    b. Findings. The following finding shall be made before granting a Conditional Use Permit for hillside areas: "*that the mitigation measures identified will be effective in mitigating any adverse impacts identified, and associated with the proposed physical development, uses, development option, or subdivision.*"
    c. Submittal Requirements. In addition to the required information set forth in this Section, additional submittals and information may be required by the Planning Director. The purpose of such submittals and additional information shall be to assure compliance with the special criteria and standards set forth in this Section. Such submittals and additional information may include, but shall not be limited to the following:
        i. Report summarizing wildlife use of the subject property and any potential impacts from the proposed development.
        ii. Reconnaissance level soil and subsurface investigation.
        iii. Visual impact analysis.

iv. A complete grading and drainage plan to include existing and proposed contours at 2-foot intervals containing grading, stabilization, revegetation, and structural elements pertaining to retention stabilization and protection systems for all disturbed terrain. The provided materials shall also include proposed access drives, the areas of encroachment into the public right-of-way for said access drives, as well as the grading and drainage work to be completed in the public right-of-way.
v. Plan for any proposed supplementary landscaping or plant materials.

a. This application is a combined Sketch Plan and Hillside CUP application, incorporating the above referenced required findings, drawings, submittals and reference documents. As highlighted in the attached ZCV, dated April 10, 2023, the Town approved the man-made slope line as shown on the plans as the site had been previously graded and modified over the years to accommodate its prior uses. The proposed development will be within the area of previous development. The proposed retaining wall will be constructed of shotcrete and nail tie-backs with a stamped architectural finish, blending in with the natural hillside. Additionally, landscaping, both in front of the wall and enhanced at the property ROW, along with the buildings fronting the street, will largely obscure the view of the wall from street level. The retaining wall and grading plan will continue to be developed and refined throughout the design development process.

25. Because the Hillside CUP will require a geotechnical report that will likely go out for a third-party review, it is in the best interest of the applicant to know who the third party reviewer will be so they can coordinate early on in the process.
    a. Information on the third-party reviewer, along with a request for a meeting, has been requested from Town Engineering.
26. The Lockhart diversion pipe appears to cross over the northwest corner of this property (need a survey to verify) and then runs parallel (more or less) to the property line adjacent to Hwy 89. The applicant will need to work with the water rights owner if they plan to relocate the pipe or enter into a maintenance agreement. Either way, the final landscape plan will need to be considerate of the pipe and ensure that no trees are planted above or adjacent to the pipe.
    a. Per the attached survey, the diversion pipe crosses the site at the very northwest corner of the site and continues south in the ROW along the length of the site. Utility connections and routing are still being reviewed and will be finalized at Development Plan.
27. According to WYDOT, the access drive will need to line up with the access drive to the west that serves Smiths which is what's shown on the plan. In addition, the WYDOT ROW area must be landscaped with new sod (just like Farmhouse frontage a few properties to the north and Smith's frontage directly across the street).
    a. Please see the attached site plan and landscape plan. The site plan shows the alignment of the entrance drive with the adjacent retail on the west side of Hwy 89, along with sod groundcover in the WYDOT ROW.
28. Need to discuss how pedestrians will cross the highway to access Smiths, whether that is north of the development at the pathway underpass, or south at the High School Road traffic light where a highway crosswalk currently does not exist. Staff understands that some pedestrians will ultimately take the most direct route and cross the highway without a formal crossing. However, the preferred method to safely get pedestrians across the highway is to include a new crosswalk at the High School Road traffic light.
    a. As mentioned above, if WYDOT and Town approval is provided, the Developer will

plan to install a pedestrian crosswalk at the north side of the Hwy 89 and High School Road intersection to provide for pedestrian connectivity from the proposed development to the retail and public transit bus stop on the west side of Hwy 89. Although tenants will be allowed to have cars, and the Project is parked per the Town requirements, it is expected that the majority of tenants will not own vehicles and will utilize public transit. The pedestrian crosswalk at this intersection will greatly benefit both the Town and the Project's tenants and provide safe passage from the east side of Hwy 89 to the west.

Engineering Department Comments

1. Provide a Utility Plan, including water, sewer and stormwater plans. Include a Work Ditch, existing water and sewer, proposed utility abandonment, and street lighting at the intersection and along the highway corridor (if appropriate).
    a. See the attached preliminary utility plan. Utility connections and routing are still being reviewed and will be finalized through the design and approval process. A preliminary water and sewer demand analysis is attached for review.
    b. Street lighting is currently provided at the intersection of Hwy 89 and High School Road at the area of the proposed future crosswalk, however, is not provided elsewhere along Hwy 89, therefore, it is not proposed.
2. Water main on west side of highway may need to be upgraded, depending on analysis.
    a. Utility connections and routing are still being reviewed and evaluated and will be finalized during the design and approval process. The proposed development will likely utilize a 6" combined domestic water and fire protection water meter and tap. The Developer will work with consultants and the Town Public Works to determine if the water main will need to be upgraded as a part of the proposed development Project.
3. Provide hydrants at the site for flushing and fire protection.
    a. See the attached preliminary utility plan showing proposed hydrant locations. Required fire department connections will continue to be reviewed and evaluated as a part of the design and approval process.
4. Access, utility and landscaping permits are required.
    a. The Developer will work with the Town and applicable State and County agencies and its consultants to procure all required permits applicable to the Project in order to permit development prior to the start of construction.
5. Provide data to determine if acceleration and deceleration lanes are warranted.
    a. If required, The Developer will complete a traffic impact analysis for the Development Plan.
6. Provide connectivity and access for a pedestrian crossing at High School Road signal.
    a. As mentioned above, if WYDOT and Town approval is provided, the Developer will plan to install a pedestrian crosswalk at the north side of the Hwy 89 and High School Road intersection to provide for pedestrian connectivity from the proposed development to the retail and public transit bus stop on the west side of Hwy 89. Although tenants will be allowed to have cars, and the Project is parked per the Town requirements, it is expected that the majority of tenants will not own vehicles and will utilize public transit. The pedestrian crosswalk at this intersection will greatly benefit both the Town and the Project's tenants and provide safe passage from the east side of Hwy 89 to the west.

7. Slope Analysis and Geotech Report is required.
    a. Please see the attached Geotech Report and slope stability analysis.
8. Avalanche analysis is required.
    a. Avalanche mitigation will be evaluated and provided if required.
9. Address how fencing and access through retaining walls for wildlife will be achieved.
    a. Please see the attached Environmental Analysis for detailed information on the proposed wildlife fence.
10. Based on recent experience it is very likely that the Work Ditch pope crosses the northwest portion of the development property. Provisions for easements or relocation need to be accounted for in the plan.
    a. Please see the attached preliminary grading and utility plan showing proposed adjustments to the ditch. The ditch will be further studied, and further evaluation completed as a part of the design and approval process.
11. Stability analysis per the IBC for retaining walls over 6' high is required.
    a. The retaining wall design documents will be provided by the engineer of record further in the design and approval process. Please refer to the Geotech Report and slope stability analysis for information about the slope stability.

TOJ Code:

1. A construction staging narrative shall be submitted for review and approval with the Development Plan Application
    a. See the attached preliminary construction management plan. A full construction management plan will be provided further in the process during the Development Plan application process when the construction delivery method has been confirmed (traditional vs modular).
2. Plans provided shall show all work to be completed within the Town's right of way.
    a. The requested information will be shown on the drawings and provided in the full site plan package through the design and approval process. The properties street frontage, however, abuts the WYDOT right of way.
3. Show all encroachments into the Town's right of way or easements. Encroachment agreements are required for encroachments of buildings, retaining walls, foundation, canopies, balconies, roofs, shoring, etc.
    a. The requested information will be shown on the drawings and provided in the full site plan package through the design and approval process. The property's street frontage, however, abuts the WYDOT right of way.
4. A demolition permit is required for each existing structure to be removed from the site. Water and sewer services to be abandoned for the project shall be abandoned at the main during the demolition phase of the project.
    a. All required permits will be applied for following Development Plan approval. Existing water and sewer services not utilized for the proposed development will be abandoned at the main or other approved termination through coordination with the Town Public Works.

Land Development Regulations:

1. Development shall comply with the physical development standards for its zoning.
    a. The Developer will comply with the applicable Land Development Regulations and the proposed plan set attached addresses the Town's comments to meet the aforementioned required code and ordinances.

Wildlife Friendly Fencing & Natural Resource Setback

1. Show location and height of fencing. No fencing is allowed within the right-of-way.
    a. Please see the attached Environmental Analysis for detailed information on the proposed wildlife fence.
2. Protect sight triangles at intersections.
    a. Sight triangles will be evaluated through the design and approval process to ensure that all sight triangles are maintained at intersections.
3. Provide a plan that shows compliance with these setbacks.
    a. Please see the attached Environmental Analysis for detailed information on any required NRO setbacks and associated plan set addressing such required setbacks.

Natural Hazards Protection Standards

1. Steep Slopes: For development in Hillside Areas, identify any unstable soils and show compliance with this section. At a minimum, provide a slope analysis, reconnaissance level soil and subsurface investigation. Provide a complete grading and drainage plan that meet the criteria of 5.4.1.C.6.d
    a. Please see the attached Geotech Report and slope stability analysis, as well as the proposed grading and drainage plan for information on the slope stability analysis and planned on-site grading design in compliance with the requirements of LDR Section 5.4.1.C.6.d.
2. Unstable Soils: Identify any unstable soils and show compliance with this section.
    a. Please see the attached Geotech Report and slope stability analysis which did not identify any unstable soils, and the slope stability analysis concluded that the slope at the proposed condition is considered stable in the long-term in both static and seismic conditions.
3. Faults: Identify any unstable soils and show compliance with this section.
    a. No fault lines are identified on this site.
4. Floodplains: Identify any floodplains or floodways and show compliance with the municipal code and/or the LDRs.
    a. No flood plains or floodways are identified on this site. However, per the attached survey, the Lockhart Diversion Pipe crosses the property at the very NW corner and extends south the length of the property. Please see the proposed grading and drainage plan for proposed rerouting of the diversion pipe ditch.

Landscape Standards:

1. Provide a plan that complies with the LDRs and addresses erosion control and slope stability for Hillside Area developments.
    a. See the attached preliminary landscape plan complying with the applicable LDRs for this site and CR-3 zoning. The landscape plan will continue to be developed and refined as a part of the development and approval process. Please also see the attached Geotech Report and slope stability analysis, as well as the proposed grading and drainage plan for information on the slope stability analysis and planned on-site grading design. Detailed erosion control plans will be prepared as a part of the development and approval process.

Grading, Erosion Control and Stormwater:

1. Grading Permit Required: Provide information on how the application will comply with this section, including the Geotechnical Report.
    a. The Developer will work with the Town and its consultants to procure all required permits applicable to the Project in order to permit development, including grading permits that abide by the applicable grading standards of LDR Section 5.7.1. Please also see the attached Geotech Report.
2. Grading Standards: Provide a grading plan that shows compliance with this section. Plan shall include existing and proposed site contours with elevation labels, spot elevations, high and low points, grade breaks. Provide easements for grading proposed on adjacent properties
    a. Please see the attached preliminary grading plan showing existing and proposed contours, spot elevations and grade breaks. The grading plan will continue to be refined as a part of the development and approval process.
3. Erosion Control Standards: Provide an erosion control plan that shows compliance with this section.
    a. Detailed erosion control plans will be prepared as a part of the development and approval process.
4. Stormwater Management Standards: Provide an erosion control plan that shows compliance with this section.
    a. Detailed erosion control plans will be prepared as a part of the development and approval process.

Parking and Loading Standards:

1. Required Parking and Loading: Provide a plan that shows the proposed parking in compliance with this section. Include location and dimension of parking spaces, accessible spaces, including van accessible spaces, and bicycle parking. For uses that require deliveries, show the proposed loading facilities.
    a. Please see the attached site plan and unit matrix. The Project has been adjusted since the original Pre-App submittal down from 118-units to 75 units. Based on the 75-unit mix and unit sizes, 96 parking spaces are required and are provided within the surface parking lot on the site. Four (4) ADA parking spaces are provided. ADA parking spaces will comply with all applicable use and design guidelines. Based on a 96-space parking lot, 29-spaces are required to be EV capable, of which, the Developer would install chargers for a minimum of five (5) of those spaces. Based on the proposed 75-unit mix, which includes 114 bedrooms, 86 bike parking spaces are required. Short term bike parking for a minimum of 22 spaces will be provided adjacent to the buildings along interior site circulation paths, and long-term bike parking for a minimum of 64 bikes will be provided in the basement of the North Building.
2. Off-Street Parking and Loading Design Standards: Provide a parking plan in compliance with this section. Include surface materials and drainage plans, access and circulation, and snow storage.
    a. The attached plan set details the proposed surface parking lot and interior drive aisles, snow storage areas, and drainage plan. The plan set will continue to be refined as a part of the development and approval process.

Operational Standards:

1. Outside Storage: Provide a Construction Management Plan / Narrative, for any offsite storage address compliance with this section.
    a. See the attached preliminary construction management plan. A full construction management plan will be provided further in the process during the Development Plan application process when the construction delivery method has been confirmed (traditional vs modular).
2. Noise: Provide a statement to address compliance with this section.
    a. See the attached preliminary construction management plan. A full construction management plan will be provided further in the process during the Development Plan application process when the construction delivery method has been confirmed (traditional vs modular). The Project will comply with all applicable noise level restrictions of LDR Section 6.4.3.
3. Vibration: Provide a statement to address compliance with this section.
    a. See the attached preliminary construction management plan. A full construction management plan will be provided further in the process during the Development Plan application process when the construction delivery method has been confirmed (traditional vs modular). The Project will comply with all applicable vibration displacement restrictions of LDR Section 6.4.4.

Subdivision Standards:

1. Provide plans and specifications for roads, streets, alleys, sidewalks, and pathways including street light, signage, and markings.
    a. Please reference the attached plan set. No roads, streets or alleys are included in this proposed development.
2. Provide a sanitary sewer wastewater plan.
    a. Please reference the attached plan set. Sanitary sewer connections and required upgrades, if applicable, will continue to be evaluated as a part of the development and approval process.
3. Provide a water supply plan.
    a. Please reference the attached plan set. Domestic water, fire protection and irrigation supply/connections and required upgrades, if applicable, will continue to be evaluated as a part of the development and approval process.
4. Provide a storm drainage plan, basins, calculations, treatment method. Stormwater discharged to a public storm sewer or right of way requires treatment. Wyoming DEQ 5D2 permits are required for subsurface discharges.
    a. Preliminary storm drainage plans, basins, calculations and treatment methods are provided in the attached plan set. The stormwater management design will continue to be evaluated and developed as a part of the development and approval process.
5. Provide an irrigation plan or statement.
    a. An irrigation plan or statement complying with the applicable LDR requirements will be provided in the Development Plan.
6. Provide a plan for all other utilities, such as telephone, cable TV, electric, fiber, gas.
    a. Plans for dry utilities and gas service complying with the applicable LDR requirements will be provided in the Development Plan and will continue to be evaluated with the individual utility providers.
7. Provide a plan for permanent reference monuments, property corners, etc.

    a. Please see the attached survey for reference. Permanent reference monument and property corner plans will be provided in the design and approval process.
8. Permits are required prior to construction of development improvements.
    a. The Developer will work with the Town and applicable State and County agencies and its consultants to procure all required permits applicable to the Project in order to permit development prior to the start of construction.
9. All improvement shall be designed by a professional engineer licensed to do such work in the State of Wyoming.
    a. All improvements will be designed by a professional engineer licensed to do such work in the State of Wyoming.
10. The Town Council may require installation and construction of utilities, pavement and other land improvements in excess of subdivision design needs, to assure adequate service to future development areas.
    a. The Developer is looking forward to hearing feedback from the Town Council on the installation and construction of utilities, pavement and other land improvements and will work with its consultants and contractors to implement commercially feasible improvements. In the event utilities are required to be upsized due to the proposed development, Developer will pay its proportionate share of such required upgrades.

Transportation Facility Standards:

1. Access to Roads, Streets and Highways: Provide a plan showing the point of access. Show compliance with the standards for access and justification for access to collector and arterial roads.
    a. Please see the attached plan set identifying both vehicular and pedestrian points of access to the Project. Per WYDOT request, the vehicular access driveway is aligned with the adjacent retail driveway on the west side of Hwy 89.
2. Streets Alleys and Easements: Provide a plan showing all proposed streets, alleys, and easements. Show compliance with the general standards, extension, engineering access, right-of way, pavement widths, urban and rural classification, alignment, profile, grades, and intersections.
    a. Please see the attached plan set identifying the requested information. No roads, streets or alleys are included in this proposed development.
3. Provide a plan that generally complies with the Community Streets plan and Bicycle improvements plan. Include property lines, dimensions, radii, elevations, slopes, grade changes, etc.
    a. Please see the attached plan set.
4. For all pedestrian areas provide a plan that includes: dimensions, radii, elevations, slopes (running and cross slopes, not oblique slopes), ramp slopes, grade breaks, stair dimensions, handrails, guards, etc. showing compliance with ADA, IBC, and Town standards.
    a. Please see the attached plan set. Pedestrian circulation and access, along with ADA, IBC and Town standard details will continue to be developed through the design and approval process and incorporated into the plan set.

Required Utilities:

1. Provide a water supply plan and estimated average day, maximum day, and maximum hour, required fire flows, and per capita maximum daily demands. Demands shall be determined by

one of the following: Wyoming DEQ Chapter 12 Section 8 (equivalent per capita water use shall be at least 125 gpd and 340 gpd for average and maximum day respectively); Wyoming DEQ Chapter 25 Tables 1 and 2 with consumption and irrigation factored in, metered water supply data from another development where similar water demands have been demonstrated, AWWA M22 method, or other Town Engineer approved source.

   a. As mentioned above, utility connections and routing are still being reviewed and evaluated and will be finalized during the design and approval process. The Developer will work with consultants and the Town Public Works to determine if the existing water main will need to be upgraded as a part of the proposed development Project. A preliminary utility plan and water and sewer demand analysis are attached for review.

2. Provide right-of-way or easements as required, 30 feet minimum width with 10 feet minimum to either side.
   a. Please reference the attached materials.
3. Provide a water system analysis indicating the required domestic and fire flow demands. Identify impacts to or upgrade requirements for the existing distribution, supply, or treatment system.
   a. As mentioned above, utility connections and routing are still being reviewed and evaluated and will be finalized during the design and approval process. The Developer will work with consultants and the Town Public Works to determine if the existing water main will need to be upgraded as a part of the proposed development Project. A preliminary utility plan and water and sewer demand analysis are attached for review.
4. Show compliance with state regulations, construction standards, connections for lots of record, provisions for system expansion, and fire protection. Provide information on planned metering and backflow prevention locations.
   a. Please reference the attached materials. A preliminary utility plan and water and sewer demand analysis are attached for review.
5. State whether the water system will be privately or publicly owned. Water services over 2-inch in diameter require engineering design. Water mains larger than 8-inch and or longer than 250 feet require a Wyoming DEQ permit.
   a. The water system will be privately owned. It is not anticipated that the Project will require a WY DEQ permit as no service is anticipated to be longer than 250', or larger than 8" in diameter and the Project will utilize existing water mains.
6. Provide a sanitary sewer wastewater plan and estimated average day, maximum day, and peak hour for the design of the project, per capita design flows, extraneous flows, and industrial and/or commercial waste volumes. Volumes shall be determined by one of the following: Wyoming DEQ Chapter 25 Tables 1 and 2; metered water supply data from another development where similar water demands have been demonstrated; or other Town Engineer approved source.
   a. See the attached Sewer demand analysis. As mentioned above, utility connections and routing are still being reviewed and evaluated and will be finalized during the design and approval process. The Developer will work with consultants and the Town Public Works to determine if the existing sewer system will need to be upgraded as a part of the proposed development Project. In the event utilities are required to be upsized due to the proposed development, Developer will pay its proportionate share of such required upgrades. A preliminary utility plan and water and sewer demand analysis are attached for review.
7. Sanitary Sewer System - Provide right-of-way or easements as required, 30 feet minimum width with 10 feet minimum to either side.

    a. Please reference the attached materials.
8. Provide a sanitary sewer analysis. Identify downstream impacts on existing sewers, lift stations, and treatment facilities.
    a. As mentioned above, utility connections and routing are still being reviewed and evaluated and will be finalized during the design and approval process. The Developer will work with consultants and the Town Public Works to determine if the existing sewer system will need to be upgraded as a part of the proposed development Project. A preliminary utility plan and water and sewer demand analysis are attached for review.
9. Show compliance with state regulations, construction standards, maximum allowable infiltration, connections for lots of record, provisions for system expansion.
    a. Please reference the attached materials. A preliminary utility plan and water and sewer demand analysis are attached for review.
10. State whether the sewer system will be privately or publicly owned.
    a. The sanitary sewer system within the site's boundaries will be privately owned.
11. Provide an irrigation plan when the system is for the entire development or the system will be owned by the Town. For all systems provide the irrigation water demand, type of backflow preventer, location, and whether irrigation will be metered separately from domestic
    a. Addressed in the Subdivision Standards section above, irrigation plan to be provided further into the design process. Code compliant irrigation will be provided.
12. Show compliance with surface water rights (if applicable), irrigation surface water runoff, setbacks to ditches, and access to ditches.
    a. Addressed in the Subdivision Standards section above. The stormwater management and irrigation system design will continue to be evaluated and developed as a part of the development and approval process.
13. Show compliance to standards for any alteration of an irrigation ditch.
    a. Please see the attached preliminary grading and utility plan showing proposed adjustments to the ditch. The ditch will be further studied, and further evaluation completed as a part of the design and approval process.
14. A Wyoming Department of Transportation license is required for irrigation systems and landscaping located within the WYDOT right-of-way.
    a. The Developer will work with the Town and applicable State and County agencies and its consultants to procure all required permits applicable to the Project in order to permit development prior to the start of construction. Per comment responses from WYDOT in the Pre-Application meeting, WYDOT was supportive of the Project to consolidate the existing multiple entrances into the site, stating "Per previous conversations what they have proposed for access is acceptable. It is a net decrease from 2 to 1, and access spacing is met for the proposed commercial multi-residential development."
15. Provide a plan for all other utilities, such as telephone, cable TV, electric, fiber, gas. All utilities shall be installed underground. Provide right-of-way or easements as required. Show that private utilities can be located on private properties, e.g. transformers.
    a. Addressed in the Subdivision Standards section above. Plans for dry utilities and gas service complying with the applicable LDR requirements will be provided in the Development Plan and will continue to be evaluated with the individual utility providers.
16. Provide a plan showing any buried fuel storage tanks. All fuel storage tanks for private residential use, except for LP (liquid petroleum) gas and kerosene, shall be underground. All fuel tanks shall meet setbacks for accessory structures in the applicable zone, and no fuel may be buried within 50 feet from any stream, excluding irrigation ditches.

a. Not applicable to the Project. At this time no buried fuel storage tanks are anticipated to be utilized in the development or operation of the Project.

Fire Department Review:

1. Buildings exceeding three stories or 30 feet in height and multiple-family residential projects having more than 100 dwelling units shall have not fewer than two means of fire apparatus access for each structure.
    a. The Project contains 75-dwelling units.
2. Fire apparatus access roads shall have an unobstructed width of not less than 20 feet, exclusive of shoulders, and an unobstructed vertical clearance of not less than 13 feet 6 inches. Aerial fire apparatus access roads and/or where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet, exclusive of shoulders. Roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced to provide all-weather driving capabilities. The angles of approach and departure shall be based on the fire departments apparatus.
    a. Please reference the attached plan set.
3. Exterior doors and openings shall be maintained with ready access for emergency access by the fire department. An approved access walkway leading from the fire apparatus access roads to exterior openings shall be provided where required by the fire code official.
    a. Please reference the attached plan set.
4. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property.
    a. Understood. Address identification will be legible and will be placed in a position that is visible from Hwy 89.
5. Fire-flow calculations shall be in accordance with the type of construction and square footage per Table B105.1(2) of the IFC.
    a. Fire flow calculations shall be provided during the design and approval process.
6. Number of fire hydrants, average spacing between hydrants and maximum distance from any point on street or road frontage to a hydrant shall be based on the fire flow requirement and in accordance with the minimum specifications of Table C102.1 of the IFC.
    a. See the attached preliminary utility plan showing proposed hydrant locations. Required fire department connections will continue to be reviewed and evaluated as a part of the design and approval process.
7. A knox box shall be provided for fire department access to a structure with secured openings and/or where immediate access is necessary for life-saving or firefighting purposes.
    a. Knox boxes will be provided for fire department access at both the North and South Buildings.
8. An automatic sprinkler system installed in accordance with Section 903.3 and the applicable NFPA standard shall be provided throughout all buildings with a Group R fire area.
    a. A fully automatic NFPA-compliant fire sprinkler system will be provided.
9. Fire alarm systems and smoke alarms shall be installed in Group R-2 occupancies as required in Section 907.2.9.1 and 907.2.9.3 of the IFC. Alarm systems shall meet the requirements of NFPA 72.
    a. An NFPA-72 compliant fire alarm and smoke alarm system will be provided.
10. Approved in-building emergency responder communications enhancement system (ERCES) for emergency responders shall be provided in all new buildings per the requirements of Section 510 of the IFC. Exceptions may apply.
    a. The ERCES system will be studied and evaluated during the design and approval process.

Joint Housing Department Comments:

1. Unrestricted market-rate apartments generate a housing mitigation requirement per the standards of Town of Jackson Land Development Regulations (LDRs) Division 6.3. A Housing Mitigation Plan demonstrating compliance with the standards of Division 6.3 is a required component of any sufficient application for the employee-generating development.
    a. See the Housing Mitigation and Checklist attached.

WYDOT Comments:

1. The property owner eventually will need to obtain an M-3 access permit from WYDOT.
    a. The Developer will procure all required permits applicable to the Project in order to permit development prior to the start of construction, including the M-3 access permit from WYDOT.
2. It is suggested that a Traffic Impact Study be performed.
    a. A Traffic Impact Study will be completed for the Development Plan.
3. Are any improvements (i.e. sidewalk, curb and gutter, pathway, landscape) being planned or considered; along or within the US 89 highway frontage? It would be desirable to direct foot traffic north up to the Flat Creek pedestrian underpass.
    a. Please reference the attached plan set. An 8'-wide sidewalk and sod groundcover is being proposed in the ROW Hwy 89 frontage from the intersection of Hwy 89 and High School Road at the south, extending to the site's northern boundary.
4. WYDOT would not object to a pedestrian crossing to the south intersection which could be worked out through a cooperative agreement between Town and WYDOT
    a. Please see the attached plan set. As mentioned above, if permitted by WYDOT and the Town, a pedestrian crossing at the Hwy 89 and High School Road intersection will be installed to connect the building tenants to the retail and bus stop on the west side of Hwy 89.

Parks and Recreation Department Comments:

1. Will watch approval process for more information on streetscape design and crossing information related to snow removal if required.
    a. Please see the attached plan set for streetscape design, crossing information and snow storage information.

Pathways Department Comments:

1. Applicant shall provide a multiuse pathway (12' wide) connecting to the signal at High School Road and, at a minimum, to the north end of the property. The pathway should be set back 20' from the future curb line along South 89 to allow for vehicle queuing that does not place the queued vehicle in conflict with the pathway (reference the Smith's entry road across the highway as an example). The pathway crossing of the entry driveway shall be a raised, continuous crossing with high visibility crosswalk markings.
    b. Please see the attached plan set. An 8'-wide sidewalk and sod groundcover is being proposed in the ROW Hwy 89 frontage from the intersection of Hwy 89 and High School Road at the south, extending to the site's northern boundary. The sidewalk and crossing details will continue to be developed as a part of the design and approval process.

2. There needs to be coordination between the applicant and WYDOT to provide a pedestrian/bicyclist crossing of S89 at High School Road.
    a. Please see the attached plan set. As mentioned above, if permitted by WYDOT and the Town, a pedestrian crossing at the Hwy 89 and High School Road intersection will be installed to connect the building tenants to the retail and bus stop on the west side of Hwy 89.
3. Bicycle parking shall be provided per Town of Jackson bicycle parking regulations adopted February 26, 2024.
    a. Please see the attached site plans and floor plans. Based on the proposed 114 bedrooms, 86 bike parking spaces are required. Short term bike parking for a minimum of 22 spaces will be provided adjacent to the buildings, and long-term bike parking for a minimum of 64 bikes will be provided in the basement of the North Building.

NOBLE

Neighborhood Meeting Summary

Meeting Information:

Meeting Date: Wednesday, October 23, 2024

Meeting Location: The Fireside Room at The Lodge at Jackson Hole

Meeting Time: 5:30 PM to 7:30 PM MST

Format: Open House

Attendees:

Noble Development Group, LLC (Kevin Grass and Owen Berry)

Stefan Fodor (Fodor Law Office)

Doug Halsey (Dynia)

Karen Parent (Dynia)

Bill Van Gelder

Summary:

The Neighborhood Meeting was held as an open-house style format for 2-hours with three (3) presentation boards set up throughout the room, allowing attendees to view the current plans to be submitted to the Town of Jackson for the Sketch Plan and Hillside CUP submittal and ask questions of the applicant.

No questions were asked by the attendees present.

NOBLE

Housing Mitigation Plan – 1400 & 1450 S Hwy 89, Jackson, WY

Housing Credits:

In review of the prior uses on the site, the housing credit calculator provides 1.410-credits for the Project site. These prior uses include the following:

1. Detached single-family unit – prior use as single family unit (480-SF), current use as office for misc. services on the site. This prior use equates to .01-credits
2. Outfitter/Tour Operator – operation of a river raft tour outfitter. This prior use allows for 1.4-credits.
    a. The Outfitter/Tour Operator is an independent calculation, which uses the following previously accepted formula by the Town (for JH Mountain Guides), of 1.09 units per 1,000-SF (0.00109 units/sf).

Pursuant to the Housing Mitigation calculator (attached), the proposed development mix for the 75-unit Project would require 1.201 mitigation units. Therefore, the site's prior uses credit of 1.410-credits is above the required mitigation generated by the proposed Project.

While the current plan does not include any deed restricted affordable housing or deed-restricted workforce housing units as allowed for by the current LDRs, the intended use of the Project is to provide housing for employees currently living and working in the Town of Jackson and Teton County. The applicant is actively engaged with the Jackson/Teton County Affordable Housing Department about the option to voluntarily deed restrict a limited number of workforce housing units and will continue those discussions through the design and approval process.

Jackson/Teton County Affordable Housing Checklist - Housing Mitigation Plan

(LDR Division 6.3.6)

Every development application must include a Housing Mitigation Plan for sufficiency. Every Housing Mitigation Plan is required to contain the following information:

Applicability (LDR 6.3.6.A.3.a)

1. Does your development qualify for an exemption from a housing mitigation requirement? Yes ☑ No ☐
If yes, explain and refer to the proper LDR See below, sufficient credits are available due to existing uses

2. Are there credits associated with your development? Yes ☑ No ☐ If yes, explain where the existing credits came from, provide the calculation, and refer to the proper LDR. Existing uses on the site include a small detached family unit that of 480-SF, and the remaining site's use as a Outfitter/Tour Operator. These existing provide for an exsiting workforce housing credit of 1.410 (see the Housing Mitigation Calculator attached). The proposed 75-unit apartment project would require 1.201 units of affordable housing.

Calculation of Requirement (LDR 6.3.6.A.3.b)

Calculation for outfitter/Tour Operator utilized at 1,09-units per 1,000-SF based on previously accepted methodology for an Outfitter/Tour Operator in the Town/County.

3. Does your development require or are you otherwise requesting approval of an Independent Calculation (LDR section 6.3.3.B)? Yes ☑ No ☐

If yes, provide the calculation according to 6.3.3.B.2 along with impact analysis, verifiable local information, industry specific rather than business specific data, etc. The Planning Department is available to help with this calculation prior to submittal of your application. Attach as a separate sheet.

☐ I have attached a separate sheet with the calculation and supporting data for my Independent Calculation

Housing Mitigation Requirements Calculator. If no to 1 and 3 above, calculate your development's requirement, using the Housing Mitigation Requirements Calculator. The calculator can be found at this link: www.jacksonwy.gov/200/Planning Attach a copy of the first page of the calculator showing the calculations and requirements with your Housing Mitigation Plan. The Planning Department is available to help with this calculation prior to submittal of your application.

☑ I have attached a copy of the first page of the Housing Mitigation Requirements Calculator which includes my requirement and unit types.

Type of Affordable Housing Provided – Standard Restrictions. (LDR 6.3.4)

4. How many ownership or rental units are you proposing in which income ranges with how many bedrooms? Please complete the matrix below:

Bedrooms	0 – 50%	50% - 80%	80% - 120%	Workforce	Ownership or Rental
1-bedroom					
2-bedroom					
3-bedroom					

Special Restriction. The Special Restriction is a contract between The Board of County Commissioners or the Town Council and the owner of real property developed or designated to satisfy the development requirements. The Special Restrictions will be recorded on the property. Appropriate restriction templates can be obtained from the Jackson/Teton County Affordable Housing Department or at this link: www.tetonwyo.org/1856/Deed-Restriction-Templates .

☐ I have attached a draft of the Standard Restrictions for each unit.

Livability Standards (LDR 6.3.4.D and E) (Rules and Regs Section 2-3). Restricted housing must comply with the Livability Standards in the Jackson/Teton County Housing Department Rules and Regulations. The Livability Standards include amount of cabinetry/counter space, storage, closets, room sizes, appliances, laundry facilities, bathrooms, etc. The Rules and Regulations can be found at this link: www.tetonwyo.org/1332/Housing-Rules-and-Regulations .

☐ I have reviewed the Livability Standards and understand the requirements. I have/will contact the Housing Department for approval of my units early in the design process to get their approval prior to submitting for building permit.

Method for Providing Required Housing (LDR 6.3.5)**:**
One or a combination of the below methods may be proposed to satisfy your housing requirement. They are listed in the order of preference/priority. Highest priority must be used unless it is demonstrated that a higher priority is impracticable (LDR 6.3.5.C)

1. Construction of new units either on-site or off-site (LDR 6.3.5.D.1).
2. Conveyance of land for affordable/workforce housing (LDR 6.3.5.D.2).
3. Utilization of a banked affordable or workforce housing unit (LDR 6.3.5.D.3).
4. Restriction of an existing residential units as an affordable/workforce housing unit (LDR 6.3.5.D.4).
5. Payment of an in-lieu fee (LDR 6.3.5.D.5).

☐ I have attached a detailed explanation of my proposed method of providing Required Housing.

Phasing Plan (LDR 6.3.5.A.3). Restricted Housing Units shall be ready for occupancy no later than the free market portion of the development is occupied. If the free market portion is to be developed in phases, then the Restricted Housing Units shall be developed prior to or in proportion to the free market portion.

☐ I have attached a detailed description of my phasing plan as it pertains to Affordable/Workforce units.

Housing Mitigation Plan

updated 1/8/21

Development of a new house, hotel, or commercial space generates the need for employees. The construction workforce builds the space, the commercial workforce or residential service workforce works in the space, and first responders are needed to protect the space. Only about 27% of the employees generated by development can afford housing in the community, but the community's "community first" character goal is that 65% of employees live locally. To bridge this affordability gap, each development is required to include affordable workforce housing proportional to the employees it generates.
These housing mitigation requirements are established in Division 6.3 of the Land Development Regulations. This worksheet is intended to assist in meeting the requirements for a project. However, an error in the worksheet does not amend the actual standard; if you find an error please notify the Planning Department. Fill in the highlighted cells, all the other cells will autopopulate.

Calculating the Requirement (Sec. 6.3.2 & 6.3.3)

Step 1: Location — Town of Jackson

The applicable regulations vary by jurisdiction please identify the location of your project using the above dropdown options.

The required housing is based on the existing and proposed use of the site. Step 2 is to enter the existing use and Step 3 is to enter the proposed use. Section 6.3.2 of the LDRs establishes the applicability of the affordable workforce housing standards and Section 6.3.3 establishes the specifics on calculation of the requirement. Enter each use in its own row, add rows if needed. If a building has multiple units with the same use, describe each unit in its own row. (For example: if a duplex is composed of a 2,300 sf attached unit and a 1,700 sf attached unit, put each unit in its own row do not put in 4,000 sf of attached single-family.) If a unit type (e.g. apartment floor plan, or commercial tennant space) is replicated exactly multiple times, you may use the "Use Quantity" column to avoid adding multiple rows.

Step 2: Existing Development

Housing is only required for new development. Please describe the existing use of the site so that it can be credited from the housing requirement. The definition of existing use is Section 6.3.2.A.1 of the LDRs. Generally, the existing use to enter is the use with the highest housing requirement that either existed in 1995, or has been permitted since 1995. Please attach proof of existence.

Existing Use (Sec. 6.3.2.A)	Housing Requirement (Sec. 6.3.3.A)	Use Size: bedrooms	Use Size: habitable sf	Use Quantity	Housing Required
Detached Single-Family Unit (Unre	0.000017*sf+(Exp(-15.49+1.59*Ln(sf)))/2.176		480	1	0.010
Outfitter/Tour Operator	independent calculation		1290	1	1.400

Existing Workforce Housing Credit 1.410

Step 3: Proposed Development

Please describe the proposed use of the site to determine if affordable workforce housing is required as part of the development. Describe the end result of the proposed development. (For example: in the case of an addition do not enter the square footage of the addition, enter the size of the unit upon completion of the addition.)

Proposed Use	Housing Requirement (Sec. 6.3.3.A)	Use Size: bedrooms	Use Size: habitable sf	Use Quantity	**Housing Required**
Apartment (Unrestricted)	0.000017*sf+(Exp(-14.17+1.59*Ln(sf)))/2.176	Studio	348	34	**0.322**
Apartment (Unrestricted)	0.000017*sf+(Exp(-14.17+1.59*Ln(sf)))/2.176	1-Bedroom	573	2	**0.035**
Apartment (Unrestricted)	0.000017*sf+(Exp(-14.17+1.59*Ln(sf)))/2.176	2-Bedroom A	660	24	**0.506**
Apartment (Unrestricted)	0.000017*sf+(Exp(-14.17+1.59*Ln(sf)))/2.176	2-Bedroom B	696	15	**0.338**

Affordable Workforce Housing Required: 0.000 units

Fee-in-Lieu Amount: $ -

If the amount of required affordable workforce housing is less than one unit, you may pay the above fee in-lieu of providing the required housing. If you elect to pay the fee, your Housing Mitgation Plan is complete. If the requirement is greater than one unit, or you would like to provide a unit to meet the requirement, please proceed to the Unit Type Sheet.

NOBLE

Preliminary Construction Management Plan

Multi-Family Apartment Project - 1400 & 1450 S Hwy 89, Jackson, WY

Per Division 12.08.045 of the LDRs, below is a preliminary construction management plan for the construction of the 75-unit multi-family apartment project at 1400 & 1450 S Hwy 89 in Jackson.

As the Project is in early design and development stages, and the construction delivery method (modular or traditional on-site construction), is yet to be confirmed, the below construction management plan is preliminary. Per Division 12.08.045.C, the final construction management plan will be submitted to the Public Works Director prior to the issuance of construction-related permits.

Project Scope:

The proposed Project consists of the development of a two (2) building, 75-unit multi-family apartment project at 1400 & 1450 S Hwy 89 in Jackson. The Project will also include a 96-space surface parking lot, retaining wall, and landscape and utility improvements. The Project will consolidate and formalize the multiple entrances currently available from S Hwy 89 into the site to a single point of access, to be located directly east of the existing Eagle Village retail plaza entrance. The Project schedule will be finalized once a construction delivery method (modular or traditional on-site construction), has been confirmed and necessary entitlements received.

Public Impact:

The Project Team will work with the Town of Jackson to identify a list of neighbors, residents and businesses who may be impacted by the proposed improvements. Prior to final approval of the Construction Management Plan, the Project Team will hold another Neighborhood Meeting with respective parties to discuss the proposed plan (in addition to the Neighborhood Meeting held on October 23, 2024), any use of WYDOT's wide northbound right of way on S Hwy 89, required lane restrictions (if any), utility tie in locations and plan for connections, and construction staging (if modular delivery method is to be utilized). The Project Team will work to minimize any impact on the respective parties and will notify the parties at least 48-hours prior to any proposed construction sequence that may result in such impacts. There is

currently no sidewalk along the property frontage, so impact to pedestrian traffic is not anticipated.

Construction Parking:

The Project is located at the southern end of Town, not in close proximity to the downtown areas. The Contractor shall implement a clear and self-enforcing construction parking plan that does not use/or encumber downtown on street and/or public parking lot parking spaces. The plan specifies that employees or contractor parking within time restricted parking zones, the Home Ranch, East Deloney, Miller Park and/or the Parking Garage lots is not allowed. The Contractor will encourage carpooling and bus riding, and when possible, provide shuttles to the Project from pre-leased parking areas. The Project team does not plan to utilize, or allow for, construction parking at adjacent retail, including Eagle Village retail plaza (Smith's).

Site Logistics:

It is anticipated that work hours will be Monday – Friday 7 AM to 7PM, Weekends and Holidays 8 AM – 5PM, but may vary depending on construction sequencing and project delivery method (modular or on-site traditional construction). With respect to any work that may impact the ROW or northbound lane of S Hwy 89, we would consider delaying work until after 9 AM MST when morning commute traffic has subsided. There is no single-family residential within 200-LF of the Project Site so impact to residents at home is expected to be limited, if not none at all. Once the project delivery method has been confirmed, the Contractor will prepare a detailed Temporary Facilities and Circulation plan, showing the proposed location of construction trailers, trash, recycling, bathrooms, concrete washouts, staging areas, and hauling routes. Such facilities will be located on private property and screened when feasible.

Streets. Alleys and Public Property:

At times, the Project may encroach on WYDOT's northbound right of way in order to complete specific construction tasks. There is currently no sidewalk along the property frontage, so impact to pedestrian traffic is not anticipated. Site barriers shall not interfere with Town snow removal. The Contractor shall be responsible for all snow removal from along the barrier after each time the Town plows. Snow removed by the contractor will NOT be hauled to the Town fairgrounds. Construction materials and equipment shall not be placed or stored so as to obstruct free approach to any fire hydrants, fire department connection, utility pole, fire or police alarm boxes, catch basins or manholes, or so as to interfere with the passage of water in the gutter. Protection against damage shall be provided to such utility fixtures during the progress of the work, but sight of them shall not be obstructed. All applicable permits will be obtained from the respective jurisdictions for right of way work. Traffic control will be implemented on an as needed basis, paid for by the Project Team, and notifications of planned

traffic control measures sent to respective parties at least 48-hours prior to implementation. Scheduling of any right of way work will be determined further in the design and approval process.

Stormwater Management:

A detailed erosion control and sediment phasing plan will be provided in the for-permit construction drawings. All erosion control measures, and best management practices (BMPs) will be implemented, maintained and adhered to by the Project Team.

Crane:

If the Project is confirmed to be modular, a crane plan will be developed showing crane set location and crane swing radius. If a crane is to be utilized, it will be a mobile lifting crane, not a tower or fixed crane, and can be moved and relocated around the site as needed to set the individual unit modules. A Crane Swing Agreement will be drafted and executed prior to crane erection if crane swings encroach on the Town's right of way or other public space, although this is not anticipated.

Protection of Pedestrians:

There is currently no sidewalk along the property frontage and pedestrian foot traffic in this part of Town and on this side of the street is currently limited, so impact to pedestrian traffic is not anticipated. However, in the event that pedestrian protection is required, barriers not less than 6' in height will be provided, will extend the full length of the site, and openings will be protected.

Stabilized Construction Access:

The Project will consolidate and formalize the existing multiple, non-paved access driveways into the site. A detailed erosion control and sediment phasing plan will be provided in the for-permit construction drawings, which will include the proposed stabilized construction access area(s). Stabilized construction access points will be maintained by the Contractor, and the Contractor will provide sweeping to remove tracked soil and mud from the roadway as necessary. All dumpster/refuse loads from the site will be covered per municipal code 8.12.140.

Traffic Control:

Traffic control will be implemented on an as needed basis, paid for by the Project Team, and notifications of planned traffic control measures sent to respective parties at least 48-hours prior to implementation (if required). There is currently no sidewalk along the property

frontage and pedestrian foot traffic in this part of Town and on this side of the street is currently limited, so impact to pedestrian traffic is not anticipated. However, in the event that pedestrian protection is required, barriers not less than 6' in height will be provided, will extend the full length of the site, and openings will be protected.

Shoring:

Shoring plans will be provided with the for-permit construction drawings and application.

Staging:

Staging plans and locations will be identified when the construction delivery method (modular or traditional on-site construction) is confirmed, and staging area requirements are better defined.

Performance Bonds and Guarantees:

The Project Team will procure and provide any and all required performance bonds and guarantees required in order to complete the Project.

Y2 CONSULTANTS

y2consultants.com

ENGINEERING, SURVEYING & PLANNING
NATURAL RESOURCE SERVICES, GIS

October 31, 2024 Delivery via email

Noble Investment Group
Attn: Owen Berry
2000 Monarch Tower
3424 Peachtree Rd, NE
Atlanta, Georgia 30326
Owen.Berry@nobleinvestment.com
404-682-1920

RE: 1400 S Hwy 89 Workforce Housing Development
Utility Demand Analysis

Dear Owen Berry,

Per request, Y2 Consultants has estimated the water and sewer demands for the proposed development of the Workforce Housing at 1400 S Hwy 89. See enclosed summary and tables of findings.

Regards,

Sincerely,

Skyler Helffrich, PE
Civil Engineering Dept. Manager
Skyler@Y2Consultants.com

Proposed Site Development Utility Demand Estimate

Two buildings are proposed for the development of workforce housing at 1400 S Highway 89. A water and sewer service connection is proposed for each building connecting to the Town of Jackson water sewer mains that parallel Highway 89. For the purpose of this review, Y2 consultants has estimated water and sewer demands for each building based on current building design and Wyoming Department of Environmental Quality design guidelines. The tables below summarizes the demand analysis of each building. Supporting tables and analysis methodology are provided herein.

Table 1. North Building Utility Demand Summary

North Building Summary	
Sanitary Maximum Daily Flow (gpd)	4,920
Sanitary Average Daily Flow (gpd)	3,296
Sanitary Peak Hour (gpm)	17.1
Water Maximum Daily Flow (gpd)*	13,940
Water Average Daily Flow (gpd)*	5,125
Water Peak Hour (gpm)*	48

*See additional information for calculation methods

Table 2. South Building Utility Demand Summary

South Building Summary	
Sanitary Maximum Daily Flow (gpd)	8,760
Sanitary Average Daily Flow (gpd)	5,869
Sanitary Peak Hour (gpm)	60.8
Water Maximum Daily Flow (gpd)*	24,820
Water Average Daily Flow (gpd)*	9,125
Water Peak Hour (gpm)*	86

*See additional information for calculation methods

Analysis Details

Below table indicates the components of the two proposed buildings and are noted as North and South buildings. The total bedroom count for each building is identified for calculating the water and sewer demands of the proposed development.

Table 3. North and South Building Bedroom Count

North Building	Quantity	Bedroom
Standard Queen Bedroom	5	5
Standard Double Queen Bedroom	10	10
1-Bedroom	2	2
2-Bedroom Type 1	12	24
2-Bedroom Type 2	0	0
Total		**41**
South Building	**Quantity**	**Bedroom**
Standard Queen Bedroom	19	19
Standard Double Queen Bedroom	0	0
1-Bedroom	0	0
2-Bedroom Type 1	12	24
2-Bedroom Type 2	15	30
Total		**73**

SANITARY SEWER DEMAND

The sanitary sewer demand for each building was estimated using the following assumptions:

1. The sewer demand based on WYDEQ Chapter 25 Table 2 for bedroom count in an apartment building is 120 gallons per day (gpd) per bedroom
2. Hourly peak flow rates were calculated by multiplying the maximum daily flow by a peaking factor of 5
3. The average daily flow is estimated as 67% of the maximum daily flow

Table 4. North and South Building Sewer Demand Summary

North Building Summary – Sanitary Demand	
Maximum Daily Flow (gpd)	4920
Maximum Daily Flow (gpm)	3.4
Average Daily Flow (gpd)	3296
Average Daily Flow (gpm)	2.3
Peak Hour (gpm)	17.1
South Building Summary – Sanitary Demand	
Maximum Daily Flow (gpd)	8760
Maximum Daily Flow (gpm)	6.1
Average Daily Flow (gpd)	5869
Average Daily Flow (gpm)	4.1
Peak Hour (gpm)	60.8

WATER DEMAND

The water demand for each building was estimated using the following assumptions:

1. Per WYDEQ Chapter 12 Section 8(a) – where water use records are not available the equivalent per capita water use shall be at least 125 gpd and 340 gpd per capita for the average and maximum daily water demand respectively
2. This analysis assumes that each bedroom is occupied by one person and therefore the per capita flow rates are applied to the building bedroom totals
3. Irrigation demand estimated from "Guidelines for Estimating Unmetered Landscaping Water Use." U.S. Department of Engergy. Federal Energy Management Program. July 2010
4. Irrigation is planned to be conducted in evening hours outside of normal operational hours for other water service demands, so this does not have an effect peak hour rates. The total irrigatioin flow as calculated is negligible and therefore not considered in final summary
5. Fire supression flows not considered as part of this analysis
6. Hourly peak flow rates were calculated by multiplying the maximum daily flow by a peaking factor of 5
7. The average daily flow is estimated as 67% of the maximum daily flow

Table 5. North and South Building Water Demand Summary

North Building Summary – Water Demand	
Maximum Daily Flow (gpd)	13940
Maximum Daily Flow (gpm)	9.7
Average Daily Flow (gpd)	5125
Average Daily Flow (gpm)	3.6
Peak Hour (gpm)	48
South Building Summary – Water Demand	
Maximum Daily Flow (gpd)	24820
Maximum Daily Flow (gpm)	17.2
Average Daily Flow (gpd)	9125
Average Daily Flow (gpm)	6.3
Peak Hour (gpm)	86
Site Irrigation	
Total (gpd)	1320
Total (gpm)	0.9

Fire Suppression information to be provided later during the design and approval process.

PLANNING & BUILDING DEPARTMENT

September 11, 2024

Alder Environmental
Attn: Heidi Bellorado
PO Box 6519
Jackson, WY 83002

RE: Determination of Sufficiency
P24-141: Environmental Analysis Update at 1400/1450 S Highway 89

SENT VIA EMAIL

Dear Applicant,

This letter is to inform you that on September 11, 2024, your application for an Environmental Analysis update at the above-referenced properties was determined "**sufficient**" by the Planning Department.

Your application has been circulated for review to all applicable Departments for a twenty-one (21) day review period from the date of sufficiency of this application. The Planning Department will forward all departmental comments and conditions upon completion of all the reviews.

Should you have any questions or need additional information, please contact me at 307-733-0440 x1305 or by email at tvalentine@jacksonwy.gov.

Sincerely,

Tyler Valentine, AICP
Senior Planner

ALDERENVIRONMENTAL

water | wetlands | ecological consulting

October 31, 2024

To: Tyler Valentine, Town of Jackson

Cc: Owen Berry, Noble Development Group, LLC
Kevin Grass, Noble Development Group, LLC

From: Heidi Bellorado, Senior Consultant, Alder Environmental, LLC

Re: Environmental Analysis Update Follow-Up for 1400 & 1450 S Highway 89 (P24-141)

At the request of the Town of Jackson, Alder Environmental, LLC (Alder) is providing additional information regarding the Environmental Analysis Update (P24-141; dated August 26, 2024) on behalf of Noble Development Group, LLC for the proposed development at 1400 and 1450 S Highway 89. This follow-up details the proposed retaining wall, as provided to Alder on October 25, 2024. The enclosed site plan by Y2 Consultants (Site Plan C1.1) has been annotated by Alder to illustrate the varying heights of the wall. Unless otherwise noted, the information in P24-141 remains accurate to the best of Alder's knowledge.

The site plan has not changed since the EA Update. The proposed development is strategically positioned to primarily impact lower-ranked vegetative cover types (non-mesic grassland, lawns, disturbed grassland, and disturbed areas), with only 0.03 acres of impact to higher-quality non-mesic tall shrub and shrub. Mitigation for these areas will include 0.06 acres of plantings specified in a Habitat Enhancement Plan, to be submitted with future permit applications. The 0.06 acres of mitigation will involve planting native shrubs further east and up hill of the development with connectivity (<1,000ft) to the Bridger Teton National Forest.

The retaining wall was incorporated into the design to minimize grading and avoid higher impacts on valuable wildlife habitat. As shown in C1.1, the retaining wall will range from 8.95 ft to 28.31 ft in height along the eastern edge of the Limits of Disturbance (LOD). A wildlife exclusion fence adjacent to the retaining wall will mitigate wildlife risk of falling or becoming trapped. Without the retaining wall, accommodating the proposed development would require more extensive grading, encroaching on higher-quality vegetative areas, and potentially endangering wildlife with increased access to the road and development. The addition of a wildlife exclusion fence along the eastern boundary ensures the retaining wall will not pose a hazard to wildlife, reducing potential conflicts, and protecting sensitive habitat along the project perimeter.

The site is already developed, located adjacent to Highway 89 in an area with high-density development and activity. The proposed site plan clusters development and parking near existing dense development, primarily affecting low-quality vegetative cover to minimize disturbance to intact habitat. In Alder's professional opinion, including the wildlife fencing with the retaining wall will help maintain viable and safe habitat for wildlife use.

ENCL.

C1.1 Site Plan Exhibits

NOTE:
1. EXISTING LINE WORK BASED ON FIELD SURVEYS CONDUCTED DURING DECEMBER 2021 BY JORGENSEN ASSOCIATES, INC.
2. ADDITIONAL DATA SOURCES:
   2.1. SITE PLAN WAS PRODUCED USING TETON COUNTY GIS DATA INCLUDING 2022 AERIAL IMAGES AND PROPERTY BOUNDARIES.
3. TOTAL PARKING SPACES PROVIDED: 99

North

1" = 20' (24x36 SHEET)

DEVELOPMENT RESTRICTED AREA

5.0' SETBACK

1400 SOUTH LLC
1400 S HIGHWAY 89

1300 LAND, LLC
PT. W1/2 NW1/4, SEC. 5,
TWP. 40, RNG. 116

10.0' SETBACK

1400 SOUTH LLC
1450 S HIGHWAY 89

23.45'

28.31'

8.26'

8.95'

23.02'

1.11'

PROPOSED PLANTINGS, TYP.

EDGE OF ASPHALT, TYP.

ADA ACCESS AISLE

20.0', TYP.

9.0', TYP.

MAN-MADE SLOPE, TYP.

WILDLIFE FENCE ALDER ENVIRONMENTAL ANALYSIS, TYP.

PAVEMENT MARKING, TYP.

RETAINING WALL, TYP.

WITHIN NRO

NORTH BUILDING
FOOTPRINT 7564 SF
FF ELE: 6130.0'

SOUTH BUILDING
FOOTPRINT 10875 SF
FF ELE: 6130.0'

85.0' MAXIMUM STREET SETBACK
(RESIDENTIAL PROJECTS EXEMPT FROM MAX. SETBACK)

20.0' STREET SETBACK, TYP.

EXISTING STORM DRAIN INLET

EXISTING SEWER MANHOLE, TYP.

PROPERTY BOUNDARY, TYP.

PROPOSED DRIVEWAY CENTERLINE, TYP.

PROPOSED CROSSWALK

HIGHWAY 89/91

CENTER OF 24' EASEMENT

NEIGHBORING PROPERTY BOUNDARY, TYP.

24.0'

EAGLE VILLAGE
PROFESSIONAL BUILDING, LLC
1315 S HIGHWAY 89

MISSING SOCK, LLC
1405 S HIGHWAY 89

TETON COUNTY HOSPITAL DISTRICT
DBA ST. JOHN'S MEDICAL CENTER
1415 S HIGHWAY 89

LAST SAVED: 10/16/2024 4:12 PM BY: JOLIEN FAST (P:\ JOB\24-140\PROJ\ 1400 & 1450 S HIGHWAY 89 DEVELOPMENT.DWG)

Job No.	24140
Drafter:	AN
Reviewer:	SAH

Y2 CONSULTANTS
ENGINEERING, SURVEYING & PLANNING
LANDSCAPE ARCHITECTURE, GIS
NATURAL RESOURCE SERVICES
y2consultants.com
307 733 2999

1400 & 1450 S HIGHWAY 89 DEVELOPMENT
1400 SOUTH LLC
1400 & 1450 S HIGHWAY 89
TETON COUNTY, WY

Set Title:
SITE PLAN EXHIBITS

Plot Date:	10/16/24
Desc.	Date
SITE PLAN	10/08/24

GRADING PLAN

C1.2

ALDERENVIRONMENTAL
water | wetlands | ecological consulting

August 22, 2024

To: Tyler Valentine, Town of Jackson

Cc: Owen Berry, Noble Investment Group
Kevin Grass, Noble Investment Group

From: Heidi Bellorado, Senior Consultant, Alder Environmental, LLC
Hannah Cangilla, Natural Resources Scientist, Alder Environmental, LLC

Re: Environmental Analysis Update for 1400 & 1450 S Highway 89 (update to application P23-106)

This memo serves as a request to update the previously submitted Environmental Analysis (EA, P23-106) on behalf of Noble Investment Group for proposed development located at 1400 and 1450 S Highway 89 and depicted in Figure 1 (the Property; 22-40-16-05-2-00-010 & 22-40-16-05-2-00-012). This update serves to document the changes to the proposed development area since the previous EA (dated December 15, 2022). Alder conducted a site visit on August 21, 2024, to assess current property conditions and vegetative cover.

This EA Update proposes slight modifications to the development area since the original EA (P23-106). Alder Environmental LLC (Alder) verified the existing conditions on the Property and in the vicinity, conducted a habitat inventory, and identified wildlife resources and use. Unless noted below, the information presented in P23-106 remains true and accurate to the best of our knowledge.

VEGETATIVE COVER TYPES

The vegetative cover types have not changed since P23-106 as depicted in Figure 1. The limits of disturbance (LOD) changed slightly from what was proposed in P23-106 and the LOD now accommodates a multi-building design with increased site permeability. As a result, a minor expansion to the LOD occurs in the southern portion of the site, slightly increasing impacts to the surrounding vegetative cover (Table 1).

Table 1. Change in permanent impacts to vegetative cover types between 2023 (P23-106) and 2024

Vegetative Cover Type	Cover Type Ordinal Ranking (10 is the highest)	Total Area (ac)	% of Total Area	2023 Proposed Impacts (ac)	2024 Proposed Impacts (ac)	Change in Impacts (ac)
Non-Mesic Tall Shrub	8	0.41	11.50%	0.01	0.02	0.01
Juniper	6	0.02	0.63%	0.00	0.00	-
Non-Mesic Shrub	5	0.93	26.35%	0.01	0.01	-
Higher Ranked Cover Types (≥ 3) - Mitigation Required		**1.36**	**38.47%**	**0.02**	**0.03**	**0.01**
Non-Mesic Grassland	3	0.11	3.13%	0.06	0.09	0.03
Lawns and Landscaping	1	0.36	10.20%	0.30	0.30	-
Disturbed Grassland	1	0.84	23.84%	0.79	0.82	0.03
Disturbed	1	0.86	24.36%	0.86	0.86	-
Lower Ranked Cover Types (≤ 3) - Mitigation Not Required		**2.18**	**61.53%**	**2.01**	**2.06**	**0.06**
GRAND TOTAL		**3.54**	**100%**	**2.03**	**2.09**	**0.07**

WILDLIFE RESOURCES AND PROPOSED EXCLUSION FENCING

Wildlife resources have not changed since P23-106. Based on Wyoming Game and Fish Department (WGFD) designated ranges, the Property contains mule deer and elk winter habitat. The upper western facing slopes are designated as WGFD mule deer and elk crucial winter habitat.

Nesting and winter habitat for Trumpeter Swans and spawning habitat for Snake River cutthroat trout are not present on the Property due to a lack of aquatic resources. High quality nesting habitat for Bald Eagles is also not present on the Property; however, a Bald Eagle nest is located 0.65 miles east of the Property (WGFD, 2022) and Bald Eagles may utilize trees on the Property for roosting year-round.

In order to protect the crucial habitat and reduce negative human/wildlife interactions, Alder proposes a wildlife exclusion fence bordering the eastern boundary of the proposed development area. The purpose of the fence is to isolate human and pet traffic within the development thus reducing conflict and negative impacts to wildlife, particularly during the winter months when the crucial hillside habitat is being utilized. As the site currently exists, there is not a safe or preferable wildlife crossing of Highway 89. Alder supports the idea of developing wildlife fencing, when necessary, in a comprehensive matter to reduce unintended negative consequences. However, the inclusion of a wildlife fence would not further degrade the quality of any existing wildlife crossing patterns. The inclusion of the fencing in the final site plan will provide a net benefit by reducing human-wildlife conflict. For more detail, see the *Follow Up to Environmental Analysis* (P23-106) for 1400 & 1450 S Highway 89 that Alder submitted to the Town of Jackson on August 29, 2023, which directly addresses WGFD, Teton Conservation District, and Town of Jackson concerns relating to the proposed exclosure fencing.

PROPOSED MITIGATION

Alder visited the Property to identify a potential mitigation area to be planted with tall shrubs (*Amelanchier* and *Symphoricarpos spp.*) to compensate for impacts (0.03 ac) to high quality habitat (Figure 1). This is a conceptual mitigation plan for the purpose of the EA Update. A final Habitat Enhancement Plan that provides the final site development plan and specifications on plantings, establishment, and monitoring will be submitted with future development permit applications. A surety estimate will accompany the final Habitat Enhancement Plan. Table 2 summarizes the impact to high quality vegetative cover types (with an ordinal ranking higher than 3) and the required mitigation.

Table 2. Vegetative cover types and required mitigation

Vegetative Cover Types	Cover Type Ordinal Ranking (10 is the highest)	Permanent Impacts (ac)	Permanent Impacts (sf)	Required Mitigation (ac)	Required Mitigation (sf)
Non-Mesic Tall Shrub	8	0.02	869.94	0.04	1,739.87
Juniper	6	0	0	NA	NA
Non-Mesic Shrub	5	0.01	435.21	0.02	870.42
TOTAL		**0.03**	**1305.15**	**0.06**	**2,610.29**

SUMMARY

Based on the August 21, 2024, site visit, there have been no significant changes on the Property since the 2022 EA except for minor changes to the Limits of Disturbance. No development has occurred within the vicinity of the Property that would significantly alter wildlife patterns or habitat.

Thank you for your consideration of this Environmental Analysis Update for 1400 & 1450 S Highway 89.

REFERENCES

Alder. 2022. Environmental Analysis, 1400 South LLC (P23-106). Town of Jackson, Wyoming. Alder Environmental LLC, Jackson, WY. December 15, 2022.

Town of Jackson. 2024. Land Development Regulations. August 14, 2024. Jackson, WY.

WGFD. 2012. Big Game Ranges Geographic Information Systems Layers. Cheyenne, WY.

WGFD. 2022. Bald Eagle Nest Data. Wyoming Game and Fish Department, Jackson, WY.

ENCL.

Photos

Figure 1. Vegetative Cover & Proposed Development

Photo 1. Looking northwest, view of proposed mitigation area for tall shrub plantings with Highway 89 and dense development in the background (August 21, 2024).

Photo 2. Looking west, view of mesic shrub with Highway 89 and dense development in the background, not suitable for safe wildlife crossing (August 21, 2024).

ENVIRONMENTAL ANALYSIS

1400 South LLC
1400 & 1450 S Highway 89
Town of Jackson, WY
Parcels: 22-40-16-05-2-00-010
22-40-16-05-2-00-012

December 15, 2022

Prepared for:
1400 South LLC
P.O. Box 802523
Dallas, TX 75380-2523

Prepared by:

ALDERENVIRONMENTAL
water | wetlands | ecological consulting
Jackson, WY alderenvironmental.com

TABLE OF CONTENTS

INTRODUCTION

The purpose of this document is to provide an Environmental Analysis (EA) for the 1400 South LLC Property which consists of two adjacent parcels (the Property) in the Town of Jackson, WY. The Property is on a west facing slope within close proximity to Bridger-Teton National Forest and lies completely within the Natural Resources Overlay (NRO) (Appendix A – Figure 1). The Property is designated as crucial mule deer winter/yearlong range and elk winter range by Wyoming Game and Fish Department (WGFD). The Property itself also has steep west facing slopes and should be considered crucial mule deer winter habitat and therefore is confirmed to be within the NRO.

The landowner is proposing to build a four-story residential apartment building. This EA documents potential impacts to protected natural resources and wildlife habitat as a result of the proposed activities (Appendix A – Figure 5). The landowner is requesting that the Town of Jackson determines the proposed development complies with the Town of Jackson LDRs, Div. 5.2 *Environmental Standards Applicable in Specific Areas*.

METHODS

Alder Environmental staff inventoried the natural resources and existing conditions within the Property on October 3, 2022. Wildlife habitat and vegetative cover types were mapped based on the site visit, Wyoming Game and Fish Department (WGFD) wildlife layers, relevant mule deer studies, and the 2017 Teton County Focal Species Habitat Mapping Project (Alder, 2017). Figure 2 displays the existing conditions and vegetative cover types present within the Property. Photos of current conditions of the Property are provided in Appendix B.

HABITAT INVENTORY

SITE CONDITIONS

In this analysis, the Property includes two parcels. The north parcel is 1.69 acres and shares property boundaries with the south parcel on two sides. Highway 89 is adjacent to the western boundary of both parcels. Existing development on the north parcel consists of an office, driveway, parking areas, and landscaping. The property is also used to store vehicles. The south parcel consists of 1.86 acres and contains a building (daycare facility), parking areas, landscaping, and vehicle storage. Both parcels are in the Town of Jackson and zoned CR-3.

Both parcels lie within the NRO due to steep west facing slopes with non-mesic shrub and non-mesic tall shrub that provide winter range for mule deer and elk.

VEGETATIVE COVER TYPES

Town of Jackson Land Development Regulations state that development should be located to avoid higher quality habitats or vegetative cover (LDR 5.2.1.E.1 *Minimizes Wildlife Impact*). However, the Town of Jackson LDRs do not define higher quality vegetative cover types, so this report defers to the types and ordinal rankings as defined in the Teton County LDRs (LDR 5.2.1.F, *Vegetative Cover Type Standards*).

The Property's vegetative cover consists of non-mesic shrub, non-mesic grassland, non-mesic tall shrub, juniper, lawns and landscaping, disturbed grassland, and disturbed areas (Appendix A – Figure 2). Non-mesic shrub comprises the largest portion of the Property with abundant big sagebrush (*Artemisia tridentata)* and rubber rabbitbrush (*Ericameria nauseosa)* intermixed with native grass and forb species.

The following is a summary of the vegetative cover types on the Property, including their Ordinal Ranking values.

Table 1. Vegetative Cover Types within the Property and Habitat Priority Ordinal Ranking

Vegetative Cover Type	Area (acres)	% of Total Area	Habitat Priority Ordinal Ranking (10 being the highest value)
Non-Mesic Tall Shrub	0.41	12%	8
Juniper	0.02	<1%	6
Non-Mesic Shrub	0.93	26%	6
Non-Mesic Grassland	0.11	3%	3
Lawn & Landscaping	0.36	10%	1
Disturbed Grassland	0.85	24%	1
Disturbed	0.87	25%	NA
TOTAL	**3.55**	**100%**	

Tall Shrub

A total of 0.41 acres (12%) of the Property consists of non-mesic tall shrub cover type dominated by serviceberry (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*), snowberry (*Symphoricarpos albus*), forbs, and bunchgrasses. Tall shrub cover types have an ordinal ranking of 8 due to their value as wildlife habitat and browse for ungulates.

Juniper

A total of 0.02 acres (1%) of the Property contains juniper cover type (non-mesic, coniferous forest) consisting of widely spaced Rocky Mountain juniper (*Juniperus scopulorum*) with a forb and bunchgrass understory. This cover type has an ordinal ranking of 6 due to its value as wildlife habitat, and though it comprises a small area of the Property, it is connected to a larger area of juniper upslope from the Property.

Non-Mesic Shrub

The dominant cover type on the Property is non-mesic shrub, with a total of 0.93 acres or 26% cover and comprising most of the undeveloped slopes of East Gros Ventre Butte on the Property. Big sagebrush (*Artemesia tridentata*) and rubber rabbitbrush (*Ericameria nauseosa*) dominate with abundant forb and bunchgrass species as well. This cover type has an ordinal ranking of 5 due to its importance for wildlife habitat, particularly for mule deer crucial winter habitat.

Non-Mesic Grassland

A total of 0.11 acres (3%) of the Property consists of non-mesic grassland made up of native and non-native grasses. This cover type has an ordinal ranking of 3 and also provides valuable winter habitat for mule deer.

Lawns & Landscaping/Disturbed Grassland/Disturbed

A total of 0.36 acres (10%) of the Property consists of lawns and landscaping. A total of 1.72 acres (48%) of the Property is existing development with structures, driveways, parking areas, and a disturbed grassland slope. These areas have an ordinal ranking of 1.

Protected Water Bodies and Wetlands

There are no waterbodies or wetlands on the Property.

Wildlife Habitats Protected By the NRO

Alder conducted an ecological review of the Property and Wyoming Game and Fish Department (WGFD) designated wildlife habitat to determine protected wildlife resources. Alder's review indicates that the Property provides habitat for Teton County and the Town of Jackson protected wildlife species, mule deer and elk winter range. The western facing slopes on the Property are designated as mule deer and elk crucial winter habitat by Wyoming Game and Fish Department (WGFD) and protected by the Town of Jackson (LDR Section 5.2.1.F, *Crucial Habitat Protection Standards*) (Figure 3). The 2017 Teton County

Focal Species Habitat Mapping Project confirms that the Property provides valuable habitat for these two species (Alder, 2017). Table 2 summarizes the Town of Jackson protected habitat and their associated wildlife species within 0.5 miles of the Property.

Table 2. Habitat Types Protected by the NRO and Presence within 0.5 Miles of the Property.

HABITAT TYPE	PRESENCE IN THE PROPERTY	PRESENCE WITHIN ½ MI OF PROPERTY
Moose Crucial Winter Habitat	Possible	Possible
Elk Migration Corridors	No	Yes
Elk Crucial Winter Range	Yes	Yes
Mule Deer Migration Corridors	Yes	Yes
Mule Deer Crucial Winter Range	Yes	Yes
Trumpeter Swan Nesting Habitat	No	Possible
Trumpeter Swan Winter Habitat	No	Possible
Snake River Cutthroat Trout Spawning Areas	No	Yes
Bald Eagle Nesting Habitat	No	No
Bald Eagle Crucial Winter Habitat	Yes	Yes

Moose – Crucial Winter Habitat

The Property does not contain WGFD designated crucial moose winter range (WGFD, 2012). Moose rely on palustrine-shrub or forest habitats, cottonwood, cottonwood/spruce, or subalpine fir forest, and, less frequently, xeric, and mesic sagebrush grasslands, and mixed shrub habitat. The non-mesic tall shrub habitat could be used by moose in the harder winter months. Additionally, the 2017 Teton County Focal Species Habitat Mapping Project identified a small area on the Property on the southeast corner as suitable winter habitat for moose. However, the area's close proximity to residential and commercial development and S Highway 89 might render winter use less hospitable.

Mule Deer – Crucial Winter Range & Migration Corridors

The Town of Jackson LDRs identify the west slopes along WY Highway 89 above and to the east of South Park as one of the five primary areas of mule deer crucial winter range which generally occurs at low elevations in shrub scrub-grassland habitat types (LDR Section 5.2.1.C.3, *Mule Deer*). WGFD designated crucial mule deer winter range/yearlong range is mapped within the Property (WGFD, 2012). Additionally, the 2017 Teton County Focal Species Habitat Mapping Project indicates that mule deer winter habitat and migration route exist on the Property (Alder 2017). Mule deer winter range is characterized by sagebrush or mesic shrub slopes (Riginos et al. 2013). The west facing slopes of the Property, dominated by mesic shrub and grasslands, provide winter habitat. The Property is also designated as spring/summer/fall habitat for mule deer by WGFD and extensive signs of mule deer including game trails and scat were observed during the October 2022 site visit.

A mule deer GPS collar study tracked the movement ecology of 40 mule deer between December 2010 and 2012 (Riginos et al. 2013). This study indicated that 25% of all mule deer crossings occurred just north of the Property, between High School Butte and the southern end of the Elk Refuge Road (Figure 4). The study demonstrated that mule deer do not avoid roadways and busy areas in close proximity to high quality winter habitat. There were 41 documented mule deer crossings near the Property at mile marker 152. The study also indicated that mule deer road crossings were more likely to occur in areas with no fence along either side of the road (Riginos et al. 2013). The Property currently contains and provides access to mule deer crucial winter range.

Elk Winter Range & Migration Corridors

WGFD designated elk crucial winter range and a migration route are mapped on the Property. The 2017 Teton County Focal Species Habitat Mapping Project indicates ungulate migration routes through the Property (Alder 2017). Elk generally use grassland and shrub habitats with interspersed

forests during the winter months (Boyce et al. 2003). The Property currently contains and provides access to elk crucial winter range.

Trumpeter Swan – Crucial Winter Habitat & Nesting Habitat

Suitable Trumpeter Swan winter habitat does not exist on the Property. Winter Trumpeter Swan surveys conducted by Wyoming Game and Fish Department (WGFD) in 2013, 2015, and 2018 documented one Trumpeter Swan sighting within 0.5 mile of the Property to the southwest on Flat Creek (Figure 3) (data provided to Alder by S. Patla, WGFD). Flat Creek Flows north to south to the west of the Property across from S Highway 89. Portions of Flat Creek provide suitable winter habitat for Trumpeter Swans. The 2017 Teton County Focal Species Habitat Mapping Project indicates Trumpeter Swan winter habitat along the Flat Creek corridor to the southwest of the Property (Alder 2017).

Snake River Cutthroat Trout – Spawning Habitat

Snake River Cutthroat Trout spawning habitat does not exist on the Property, but within a 0.5-mile radius of the Property due to the location of Flat Creek. Flat Creek has Snake River Cutthroat Trout spawning habitat and is designated by WGFD. The 2017 Teton County Focal Species Habitat Mapping Project also identifies Flat Creek as providing suitable spawning habitat (Alder 2017). Cutthroat trout generally spawn in cold, well oxygenated streams with gravel bottoms.

Bald Eagle – Crucial Winter Habitat & Nesting Habitat

No Bald Eagle nests have been documented within 0.5 miles of the Property. The nearest nest is located 0.75 miles to the northwest. The Property contains crucial elk and mule deer winter habitat, which provides Bald Eagle with carrion during winter months. Therefore, the Property contains Bald Eagle crucial winter habitat (LDR Section 5.2.1.C.7, *Bald Eagle*).

THREATENED AND ENDANGERED SPECIES

Of the current list of federally threatened and endangered species for Teton County, WY (Table 3) (USFWS, 2021), none are expected to nest or breed on the Property.

Table 3. Threatened and Endangered Species of Teton County, WY in Jackson Hole Valley (USFWS, 2021)

SPECIES	STATUS	PRESENT ON PROPERTY
Birds		
Yellow-Billed Cuckoo (*Coccyzus americanus*)	Threatened	No
Insects		
Monarch Butterfly (*Danaus plexippus*)	Candidate	Possible
Fish		
None		No
Mammals		
Canada Lynx (*Lynx Canadensis*)	Threatened	No
Grizzly Bear (*Ursus arctos horribilis*)	Threatened	Possible, Incidental Use
North American Wolverine (*Gulo gulo luscus*)	Proposed Threatened	No
Plants		
Whitebark pine (*Pinus albicaulis*)	Proposed Threatened	No

The Yellow-billed Cuckoo range in Wyoming is within woody, riparian areas with dense understory vegetation (Bennett and Keinath 2003). It is not expected to occur on the Property due to a lack of riparian areas with dense understory habitat.

Canada lynx are known to use subalpine coniferous forests with extensive horizontal cover that also support snowshoe hare populations (Squires et al. 2010). This species is unlikely to occur on the Property.

Protections for grizzly bears within the Greater Yellowstone Ecosystems were recently restored in September 2018. The distribution of grizzly bears within the Greater Yellowstone Ecosystem has expanded throughout Teton County in recent years (Bjornlie and Haroldson 2018). Grizzly bear habitat exists on the Property. However, the Property's proximity to downtown development implicates that meaningful habitat is not present and wildlife managers do not encourage grizzly bear use in residential and urban areas.

Whitebark pine was not observed in the Study Area during the 2021 site inventory and is not expected to grow on lower elevation slopes.

Monarch butterflies visit the Rocky Mountains during the summer months on their migration to overwintering sites, like Mexico and California. Monarchs depend on diverse nectar sources including species found in mesic shrub and mesic grasslands: Sulphur-flower buckwheat (*Eriogonum umbellatum*), Canada goldenrod (*Solidago canadensis*) and Rubber rabbitbrush (*Ericameria nauseosa*) (Fallon et al. 2016).

DEVELOPMENT IMPACT ASSESSMENT

DESCRIPTION OF PROPOSED DEVELOPMENT

The applicant is proposing to build a 191-unit apartment complex with a parking garage. The proposed development will directly impact predominantly low-quality habitats: lawn and landscaping, disturbed grassland, and disturbed areas with minor impacts (0.03 ac) to higher quality habitats (non-mesic shrub and non-mesic tall shrub) (Appendix A – Figure 5). The development will indirectly impact elk and mule deer movement, creating a movement barrier to high quality habitat above and to the east of the Property.

PROTECTED RESOURCES & HABITAT SETBACKS/BUFFERS

The proposed development area is located outside of any protected natural resource setbacks. A small portion of the proposed development will impact higher quality habitats (non-mesic shrub and non-mesic tall shrub). Mitigation for loss of these habitats will be required according to Town of Jackson LDRs 5.2.E.2. *Habitat Enhancement*.

HABITAT IMPACT ASSESSMENT

Even though the proposed development area and driveway do not significantly impact high quality vegetative cover, the development is located within crucial mule deer and elk winter habitat. Within their crucial winter habitat, mule deer depend heavily on mesic sagebrush-grasslands and mixed shrub types (Town of Jackson 2018). The slopes to the east of S Highway 89 provide crucial winter habitat for mule deer with west facing slopes dominated by sagebrush (*Artemisia tridentata*) and rubber rabbitbrush (*Ericameria nauseosa)* (Alder 2017).

The proposed development area will create a movement barrier or obstacle for wintering mule deer to access valuable habitat, including non-mesic shrub and tall shrub. Existing human activity on the Property already impacts the wildlife but provides more permeability for wildlife movement. The proposed development will increase human activity and decrease mule deer access to crucial winter range in a highly trafficked wildlife area.

A summary of the potential habitat impacts is provided in Table 4.

Table 4. Assessment of the proposed development impacts to wildlife habitat and protected resources.

HABITAT IMPACTS	DEVELOPMENT IMPACTS	DESCRIPTION OF AREA	PROTECTED HABITAT IMPACTED
Areas rendered unusable by proposed development for protected species	Partial	The development area is primarily located in disturbed cover types and partially located in non-mesic shrub, non-tall shrub, and non-mesic grassland habitat (Appendix A – Figure 5).	Crucial Mule Deer and Elk Winter Range and Crucial Bald Eagle Winter Habitat
Areas impacted, degraded, or fragmented to the extent they no longer support long-term use by protected species	Yes	Development will create a movement barrier to high quality winter habitat.	Crucial Mule Deer and Elk Winter Range
Areas unaffected by proposed development where the quality of wildlife habitat is maintained	Yes	Non-mesic tall shrub, non-mesic shrub, juniper, and non-mesic grassland are located outside of the development area.	Crucial Mule Deer and Elk Winter Range and Crucial Bald Eagle Winter Habitat
Areas enhanced as wildlife habitat relative to current conditions	Yes	Habitat enhancement areas or wildlife mitigation measures will be determined later based on impacts to higher ranking habitats as a result of the proposed impacts.	Crucial Mule Deer and Elk Winter Range
Areas where development poses a threat to the water quality of protected waterbodies and wetlands	Possible	None. There are not any wetlands and waterbodies located on the Property. Stormwater runoff should be retained and treated.	Flat Creek
Locations where protected species may be displaced to by proposed development and the new location's habitat suitability for survival of affected species	Yes	Mule deer will no longer have access through the Property to high quality winter habitat.	Crucial Mule Deer and Elk Winter Range

PROJECT VICINITY IMPACT STATEMENT

To the north of the Property are commercial properties. To the east and south are undeveloped properties owned by private landowners. These properties border Bridger-Teton National Forest to the east. South Highway 89 borders the western boundary of the Property with commercial properties on the other side. The proximity of S Highway 89 and existing dense commercial properties negatively affect wildlife species. Daily and seasonal movements of wildlife will be impacted within the Property due to the proposed activities will contribute to the cumulative impacts of other properties and uses within the vicinity.

Alder proposes to construct a wildlife exclosure fence east of the proposed building and to impose winter human use closures on the eastern half of the Property to help mitigate negative impacts to wildlife. See more details under Wildlife Mitigation Measures.

HUMAN USE RECOMMENDATIONS

The following recommendations would assist with improving the quality of habitat available on the Property for use by wildlife once development has occurred.

Lighting – Bright lights will detrimentally affect wildlife movement and hinder avian species navigation abilities (Section 5.3.1 *Exterior Lighting Standards*). Motion sensor lights should be discouraged and when not needed (e.g., the residence is unoccupied), lights should remain off for the benefit of wildlife. Bare light bulbs should be shielded from direct view when they can be seen from 5 feet above the ground and light fixtures shall be arranged to shine at an angle less than 90 degrees.

HABITAT ENHANCEMENT PLAN

Higher habitat value areas permanently impacted by future development and rendered unusable to wildlife will require mitigation in the form of habitat enhancements. Higher value vegetative cover types include non-mesic tall shrub and non-mesic shrub and if impacted, will require mitigation by the Town of Jackson Planning Department at a 2:1 spatial ratio (mitigation to impact) per the Town of Jackson Land Development Regulations (Section 5.2.1.E, Impacting the NRO). Table 5 summarizes the existing vegetative cover within the proposed development area and access driveway.

Table 5. Vegetative cover types within the development area and access driveway

COVER TYPE (ORDINAL RANKING)	DEVELOPMENT IMPACTS (AC)	REQUIRED MITIGATION 2:1 (AC)
Non-mesic Tall Shrub (8)	0.02	0.04
Non-mesic Shrub (5)	0.01	0.02
Non-mesic Grassland (3)	0.07	NA
Lawn & Landscaping (1)	0.31	NA
Disturbed Grassland (1)	0.64	NA
Disturbed (1)	0.86	NA
TOTAL	**1.91**	**0.06**

Future mitigation will be required due to permanent vegetative cover impacts from the development area. Because the direct impacts to high quality habitat are minor (0.03 ac), the required mitigation (0.06 ac) would not provide a significant improvement to wildlife habitat on the Property. Alder proposes that mitigation also account for the indirect impacts to wildlife movement in the section below.

WILDLIFE MITIGATION MEASURES

Additional to habitat enhancement shrub plantings, Alder recommends providing measures to mitigate development impacts and prevent negative human-wildlife interactions. These measures include constructing a wildlife exclosure fence to the immediate east of the proposed building (Appendix A – Figure 5). In order to avoid vehicle collisions with wildlife (particularly mule deer) and to prevent negative human-wildlife interactions, Alder proposes that the applicant construct a wildlife barrier fence to separate the proposed development from high quality mule deer and elk winter habitat. The fence must be at least 8 ft tall and impermeable (i.e., made of wire mesh or wood slats). The fence will guide mule deer to safer (better visibility) and less populated areas to cross S Highway 89. Additionally, Alder proposes enacting a human use winter closure on the slopes to the east of the proposed development. An official winter closure will prevent humans and pets from disturbing mule deer during harsh winter months when they need to conserve their energy. These two measures should help to mitigate for the proposed development and prevent harmful impacts to protected wildlife species.

Alder will provide a Habitat Enhancement Plan to provide specifications on the wildlife exclosure fence, winter closure, and shrub plantings for habitat enhancement. Final permanent development impacts will be determined during the grading and building plan design and included in the Habitat Enhancement Plan will. A surety estimate will accompany the final Habitat Enhancement Plan.

REFERENCES

Alder 2017. Final Report: Focal Species Habitat Mapping for Teton County, WY. Alder Environmental LLC. Jackson, WY. April 2017.

Bennett, J. and D. A. Keinath. 2003. Species assessment for Yellow-billed Cuckoo (*Coccyzus americanus*) in Wyoming. Wyoming Natural Diversity Database, Laramie, WY.

Bjornlie, D. D., and M. A. Haroldson. 2019. Grizzly bear occupied range in the Greater Yellowstone Ecosystem, 1990-2018. Pages 25-28 in F. T. van Manen, M. A. Haroldson, and B. E. Karabensh, editors. Yellowstone grizzly bear investigations: annual report of the Interagency Grizzly Bear Study Team, 2018. U. S. Geological Survey, Bozeman, Montana, U.SA.

Biota Research and Consulting, Inc. (Biota). 2000. Environmental Analysis of the Halpin Property (EVA2000-Halpin). Teton County, WY.

Boyce. M. S., Mao, J. S., Merrill, E. H., Fortin., D., Turner, M. G., Fryxell, J., and P. Turchin. 2003. Scale and heterogeneity in habitat selection by elk in Yellowstone National Park. Ecoscience 10:421-431.

Fallon, C., Adamson, N.L., Jepsen, S., & Vaughan, M. 2016. Monarch Nectar Plants Rocky Mountains. Xerces Society for Invertebrate Conservation. Portland, OR.

Riginos, C., Krasnow, K., Hall, E., Graham, M., Sundaresan, S., Brimeyer, D., Fralick, G., and D. Wachob. 2013. Mule Deer (*Odocoileus hemionus*) movement and habitat use patterns in relation to roadways in northwest Wyoming. Conservation Research Center and Teton Science Schools, Report No. FHWA-WY-13/08F, Jackson, WY.

Squires, J. R., Decesare, N. J., Kolbe, J. A., and L. F. Ruggiero. 2010. Seasonal resource selection of Canada Lynx in managed forests of the Northern Rocky Mountains. Journal of Wildlife Management 74:1648-1660.

Teton County. 2018. Land Development Regulations. May 3, 2021. Jackson, WY.

Town of Jackson. 2018. Land Development Regulations. March 30, 2021. Jackson, WY.

USFWS. 2021. iPaC – Information, Planning and Conservation System Teton County, WY Endangered Species Act species list. https://ecos.fws.gov (Accessed January 2021).

WGFD. 2012. Big Game Ranges Geographic Information Systems Layers. Cheyenne, WY.

WGFD. 2020. Bald Eagle Nest Flight Survey Data. Wyoming Game and Fish Department. Jackson, WY

APPENDIX A: FIGURES

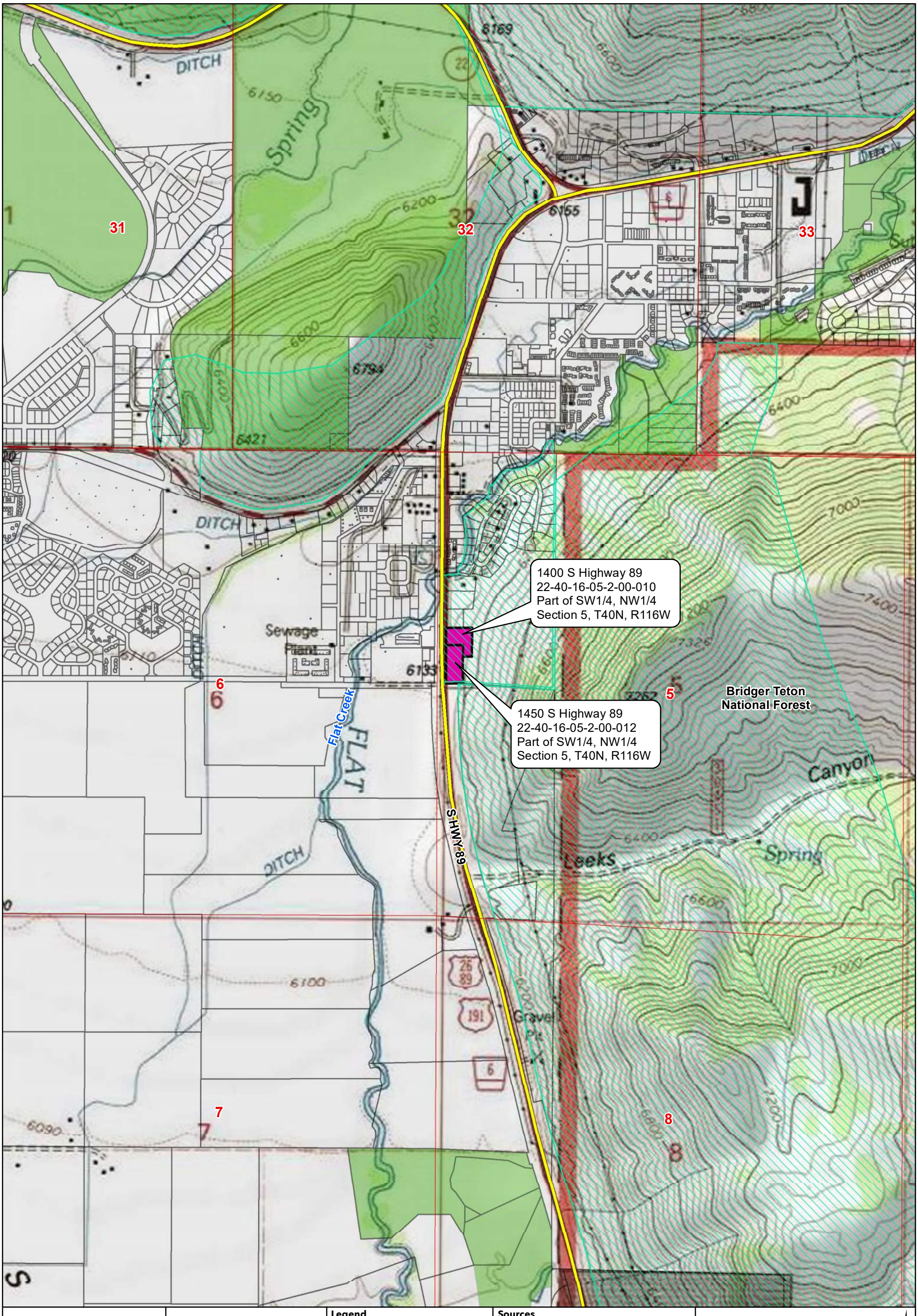


Figure 1

Location

December 15, 2022

1400 South LLC
ENVIRONMENTAL ANALYSIS
1400, 1450 S HWY 89
Teton County, WY

Legend

- PLSS Section Lines
- State & County Roads
- Natural Resources Overlay
- JHLT Conservation Easement
- Subject Property
- Lots & Parcels

Sources

ESRI
- Topography

Teton County
- Ownership Boundaries
- Roads
- PLSS Section Lines

1 inch = 1,000 feet

0 250 500 1,000 Feet

N

ALDERENVIRONMENTAL
water | wetlands | ecological consulting
Jackson, WY alderenvironmental.com

1350 Building LLC

1400 S Highway 89
22-40-16-05-2-00-010

1450 S Highway 89
22-40-16-05-2-00-012

1300 Land LLC

Crane Creek LLC

S HWY 89

Vegetative Cover (ordinal ranking)
- Non-Mesic Tall Shrub (8)
- Juniper (6)
- Non-Mesic Shrub (5)
- Non-Mesic Grassland (3)
- Lawns and Landscaping (1)
- Disturbed Grassland (1)
- Disturbed (1)

Figure 2

Vegetative Cover

December 15, 2022

1400 South LLC
ENVIRONMENTAL ANALYSIS
1400, 1450 S HWY 89
Teton County, WY

Legend
- Subject Property
- Lots & Parcels

Sources
TETON COUNTY
- Aerial Imagery, June 2019
- Ownership Boundaries

Alder Environmental, LLC
- Vegetative Cover (9/28.22)

Mass & Surface Architecture
- Site Plan
- 25% Slope Line
- Limits of Disturbance

1 inch = 50 feet
0 12.5 25 50 Feet
N

ALDERENVIRONMENTAL
water | wetlands | ecological consulting
Jackson, WY alderenvironmental.com

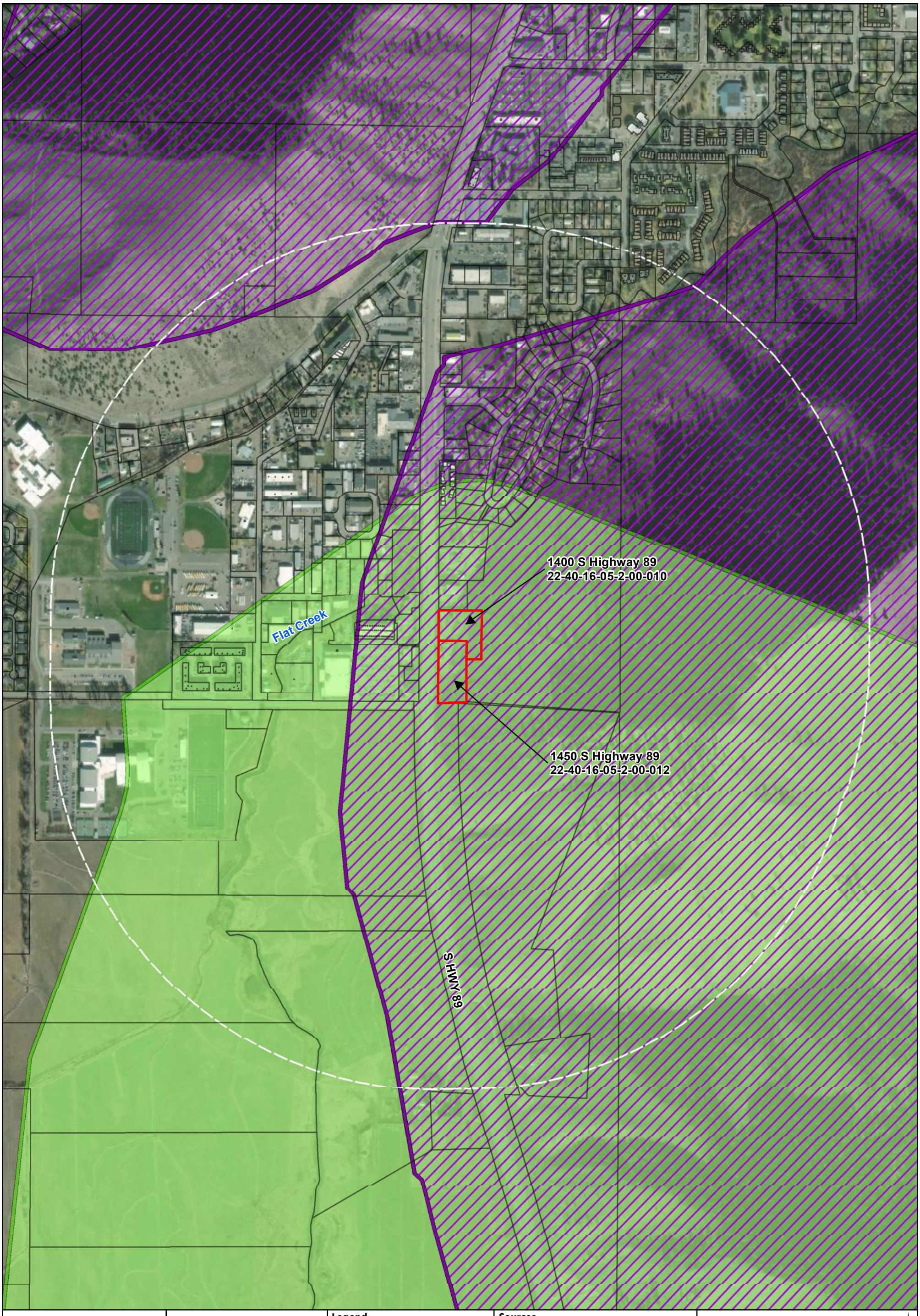


Figure 3

Protected Wildlife Resources

December 15, 2022

1400 South LLC
ENVIRONMENTAL ANALYSIS
1400, 1450 S HWY 89
Teton County, WY

Legend

- Subject
- Lots & Parcels
- 0.5 mile Buffer
- Mule Deer Crucial Winter/Yearlong Range
- Elk Crucial Winter

Sources

Teton County
- Aerial Imagery, June 2019
- Ownership Boundaries

WY Game and Fish Dept. (WGFD)
- Elk & Mule Deer Crucial Winter/ Yearlong Range

1 inch = 600 feet

0 150 300 600 Feet

N

ALDERENVIRONMENTAL
water | wetlands | ecological consulting
Jackson, WY alderenvironmental.com

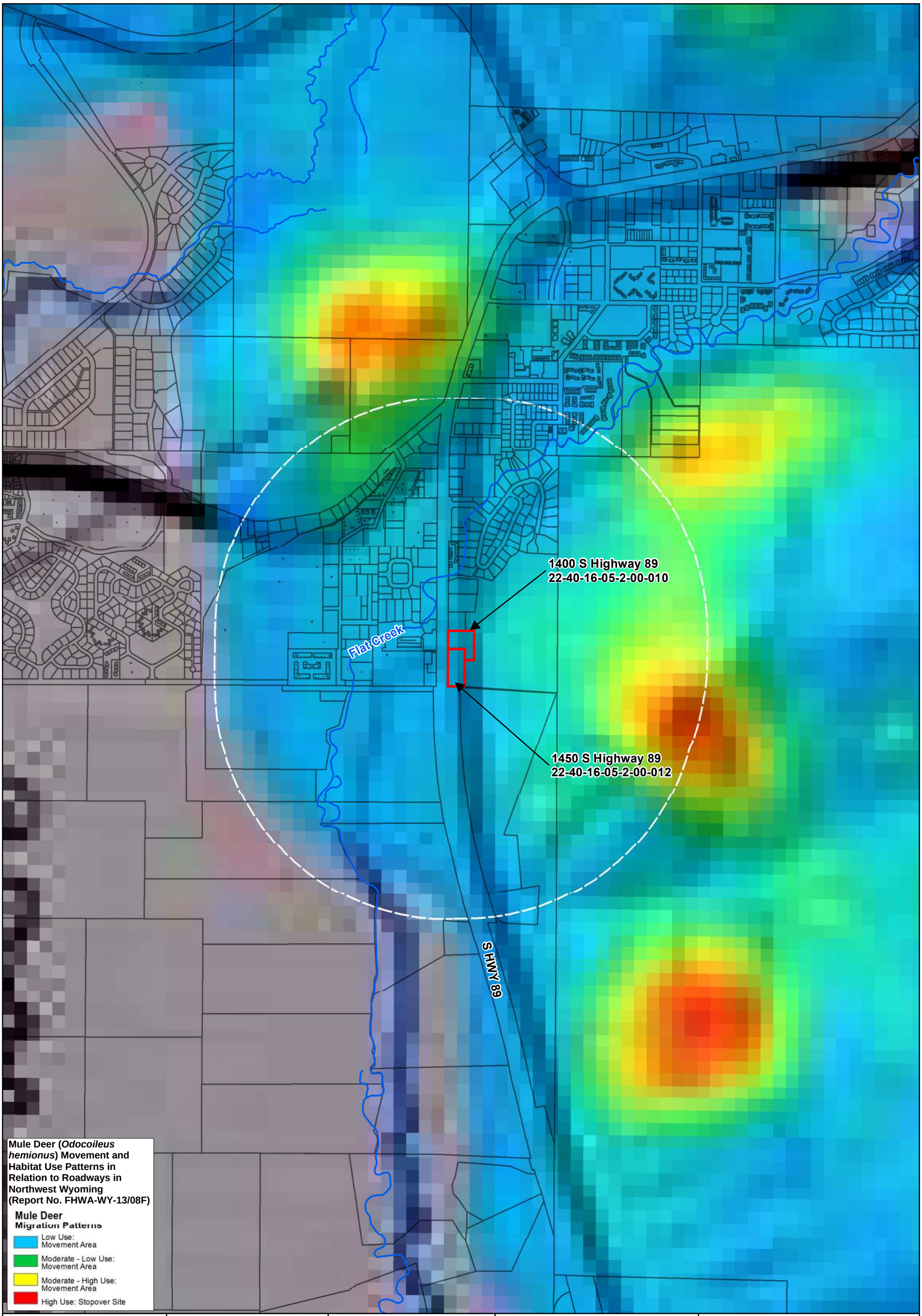


Figure 4

Mule Deer Migration Patterns

December 15, 2022

1400 South LLC
ENVIRONMENTAL ANALYSIS
1400, 1450 S HWY 89
Teton County, WY

Legend
- Subject Property
- Lots & Parcels
- 0.5 mile Buffer
- Creeks

Sources
Teton County
- Aerial Imagery, June 2019
- Ownership Boundaries
Conservation Research Center and Teton Science Schools, Report No. FHWA-WY-13/08F
- Mule Deer Migration Patterns
Teton Conservation District (TCD)
- Surface Water Inventory (SWI)

1 inch = 1,000 feet
0 250 500 1,000 Feet
N

ALDERENVIRONMENTAL
water | wetlands | ecological consulting
Jackson, WY alderenvironmental.com

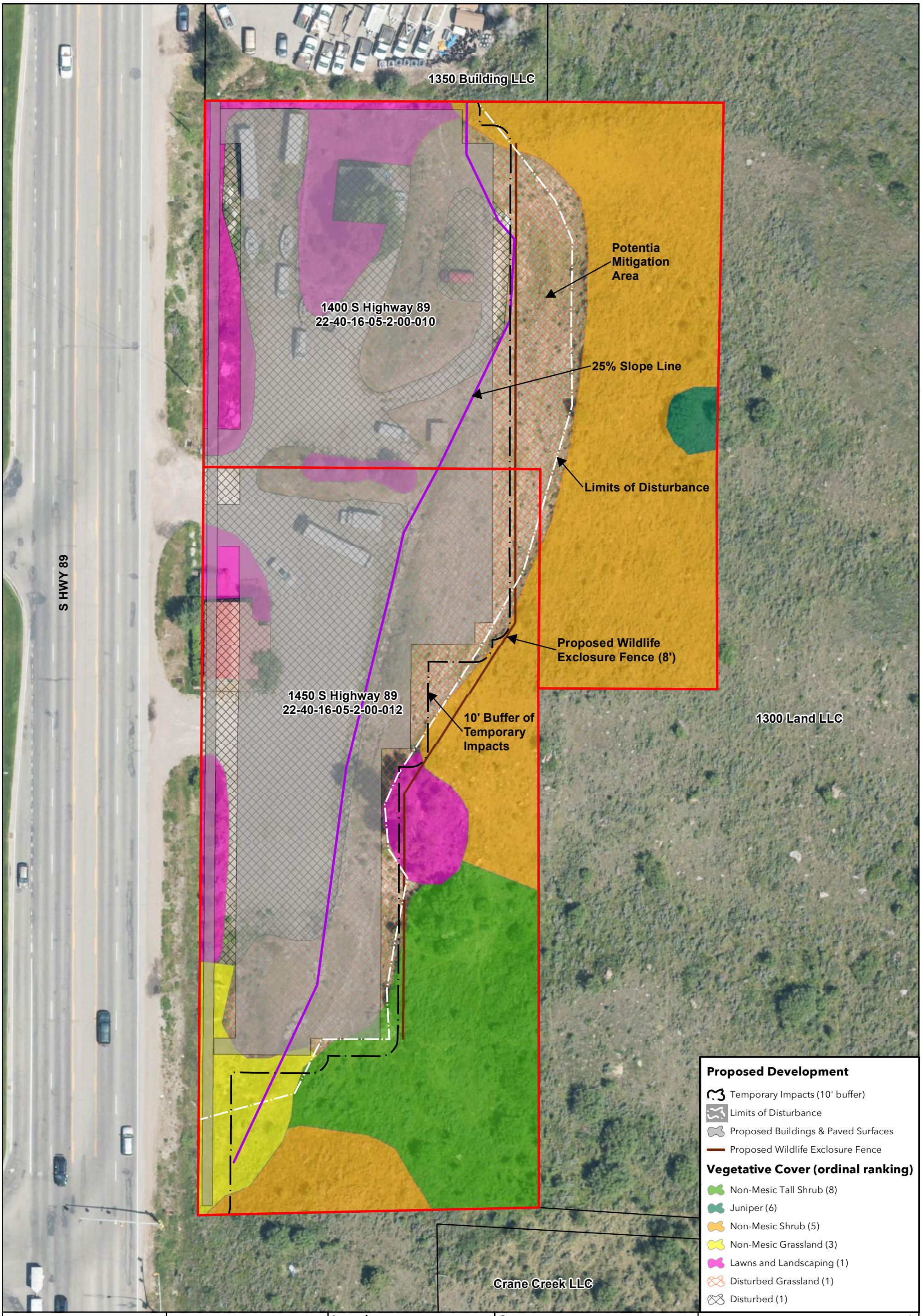


Figure 5

Vegetative Cover & Proposed Development

December 15, 2022

1400 South LLC
ENVIRONMENTAL ANALYSIS
1400, 1450 S HWY 89
Teton County, WY

Legend
- Subject Property
- Lots & Parcels
- Temporary Impacts (10' buffer)
- 25% Slope Line (toe)
- Limits of Disturbance
- Proposed Buildings & Paved Surfaces
- Proposed Wildlife Exclosure Fence

Sources
TETON COUNTY
- Aerial Imagery, June 2019
- Ownership Boundaries

Alder Environmental, LLC
- Vegetative Cover (9/28.22)
- Proposed Wildlife Fence

Mass & Surface Architecture
- Site Plan
- 25% Slope Line
- Limits of Disturbance

1 inch = 50 feet

0 12.5 25 50 Feet

N

ALDERENVIRONMENTAL
water | wetlands | ecological consulting
Jackson, WY alderenvironmental.com

APPENDIX B: PHOTOGRAPHS

1400 SOUTH LLC EA UPDATE PHOTOGRAPHS

Photo 1. Disturbed grassland and parking area in the foreground with non-mesic shrub in the middle ground of the north parcel, looking southeast.

Photo 2. Disturbed grassland in the foreground with the parking area and office in the middle ground of the north parcel, looking southwest.

Photo 3. Non-mesic shrub and tall shrub in the south parcel, looking south.

Photo 4. Non-mesic shrub and tall shrub in the foreground of the south parcel with vehicle storage, buildings, and landscaping in the middle ground, looking north.

Y2 CONSULTANTS
y2consultants.com
ENGINEERING, SURVEYING & PLANNING
NATURAL RESOURCE SERVICES, GIS

November 4, 2024 Delivery via email

Noble Investment Group
Attn: Owen Berry
2000 Monarch Tower
3424 Peachtree Rd, NE
Atlanta, Georgia 30326
Owen.Berry@nobleinvestment.com
404-682-1920

RE: 1400 S Hwy 89 Workforce Housing Development
Slope Stability Analysis

Dear Owen Berry,

Per request, Y2 Consultants has analyzed the globabl stability of the development in association with the hillside residing directly to the East.

Zia Yasrobi, PE
Owner/ Geotechnical Lead
Zia@Y2Consultants.com

SLOPE STABILITY ANALYSIS

Y2 geotechnical engineers conducted a slope stability analysis for the hill located in the Town of Jackson adjacent to the site at 1400 Hwy 89 South. The proposed development at the site would include construction of a new multi-storey building with the associated at grade parking area and engineered retaining wall.

A geotechnical investigation was previously conducted for the site (by others). The slope stability analysis conducted as part of this assignment is based on the findings and recommendations of the previous geotechnical report. This report can be found in Appendix C.

Four (4) slope cross sections (Sections 1 to 4) were derived from the topographic information provided by the client, for slope stability analysis. The location of the cross-section was selected based on the slope height and inclination to represent the critical slope conditions within the study area, and to obtain enough coverage of the subject valley slope. The locations of the slope cross sections are presented in Figure 1, and the details of the corresponding slope profile are presented in slope stability analysis results in Appendix B.

A detailed engineering analysis of slope stability was carried out for the cross section. The slope stability analysis was carried out by computer software Slide, utilizing several standard methods of limit equilibrium analysis (Bishop's, Janbu, and Spencer). These methods of analysis allow the calculation of Factors of Safety for hypothetical or assumed failure surfaces through the slope.

For a specific failure surface, the Factor of Safety is defined as the ratio of the available soil strength resisting movement, divided by the gravitational forces tending to cause the movement. The Factor of Safety of 1.0 represents a "limiting equilibrium" condition where the slope is at a point of pending failure as the soil resistance is equal to forces tending to cause movement. It is usual to require a Factor of Safety greater than 1.0 to ensure stability of the slope. The typical Factor of Safety used for engineering design of slopes for stability, ranges from about 1.3 to 1.5 for developments situated close to the slope crest. The most common design guidelines are based on a 1.5 minimum Factor of Safety against potential slope slides.

The analyses were carried out by preparing a model of the slope geometry and subsurface conditions and analysing numerous failure surfaces through the slope in search of the minimum or critical Factor of Safety for specific slope conditions. The pertinent data obtained from topographic survey, slope mapping and the borehole information were input for the slope stability analysis. Many calculations were carried out to examine the Factor of Safety for varying depths of potential failure surfaces.

The analyses were conducted for static and seismic conditions. A horizontal coefficient of kh=0.26 was applied to the seismic condition. The seismic force would be equal to the mass of the slip slice times the seismic coefficient.

Based on the geotechnical investigation results, the following average soil properties were utilized for the soil strata in the slope stability analysis:

Stratum	Unit Weight (pcf)	Cohesion (psf)	Angle of Internal Friction (degree)
Lean Clay Alluvium	120	620	25.2
Colluvium	130	500	41.9
Loess	120	500	30
Stony Alluvium	135	500	42
Bedrock	120	Infinite Strength	

The above soil strength parameters are based on effective stress analysis for long-term slope stability.

The results of the slope stability analysis are presented in Appendix B and summarized as follows:

Section	Factor of Safety	
	Static Condition	Seismic Condition
2	2.56	1.35
3	2.37	1.30
4	2.57	1.33
5	2.31	1.30

The typical Factor of Safety used for engineering design of slopes for long-term stability ranges from about 1.3 to 1.5 for static condition and 1.05 to 1.1 for seismic conditions.

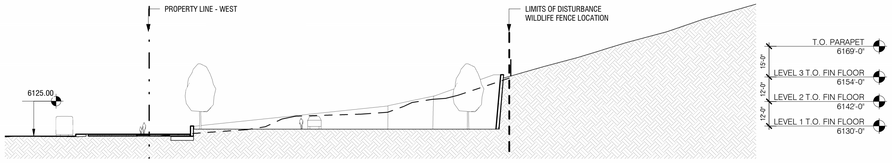
The computed factors of safety for the overall stability of Sections 1 to 4 for static condition vary from 2.31 to 2.57 which are higher than the minimum 1.5 required factor of safety. Moreover, the computed factors of safety for the overall stability of Sections 1 to 4 for seismic condition vary from 1.30 to 1.35 which are higher than the minimum 1.1 required factor of safety.

Based on the above, the slope at the proposed condition is considered stable in the long-term in both static and seismic conditions.

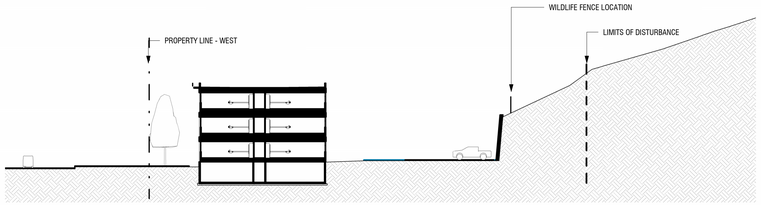
Y2 CONSULTANTS

APPENDIX A

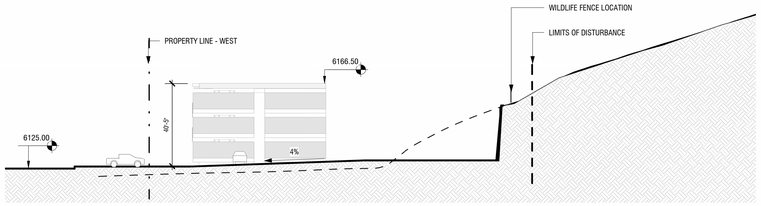
CONCEPT PLAN



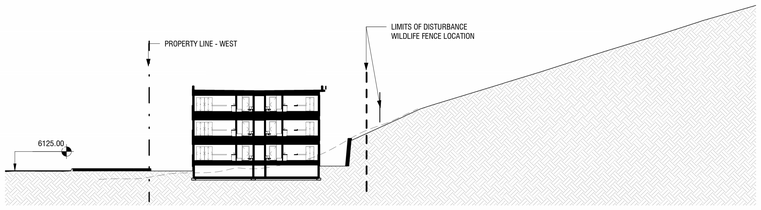
2 A1.0 SITE SECTION AT NORTH PARKING
1" = 30'-0"



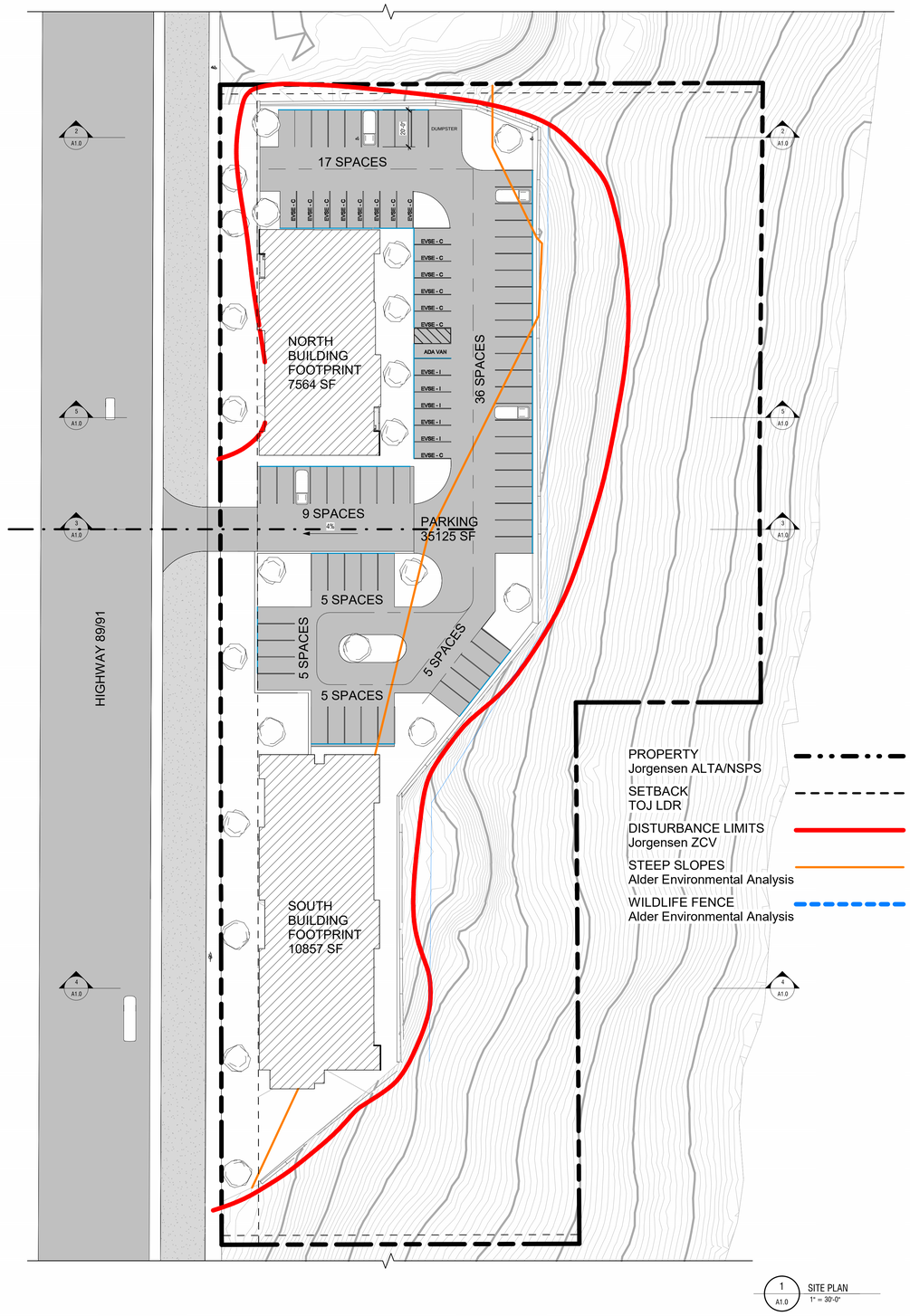
5 A1.0 SITE SECTION AT NORTH BUILDING
1" = 30'-0"



3 A1.0 SITE SECTION AT DRIVE
1" = 30'-0"



4 A1.0 SITE SECTION AT SOUTH END
1" = 30'-0"



1 A1.0 SITE PLAN
1" = 30'-0"

SITE PLAN AND SECTIONS

NOBLE 24
180 EAST DELONEY
JACKSON WYOMING
PIDN: 22-42-18-05-1-00-003

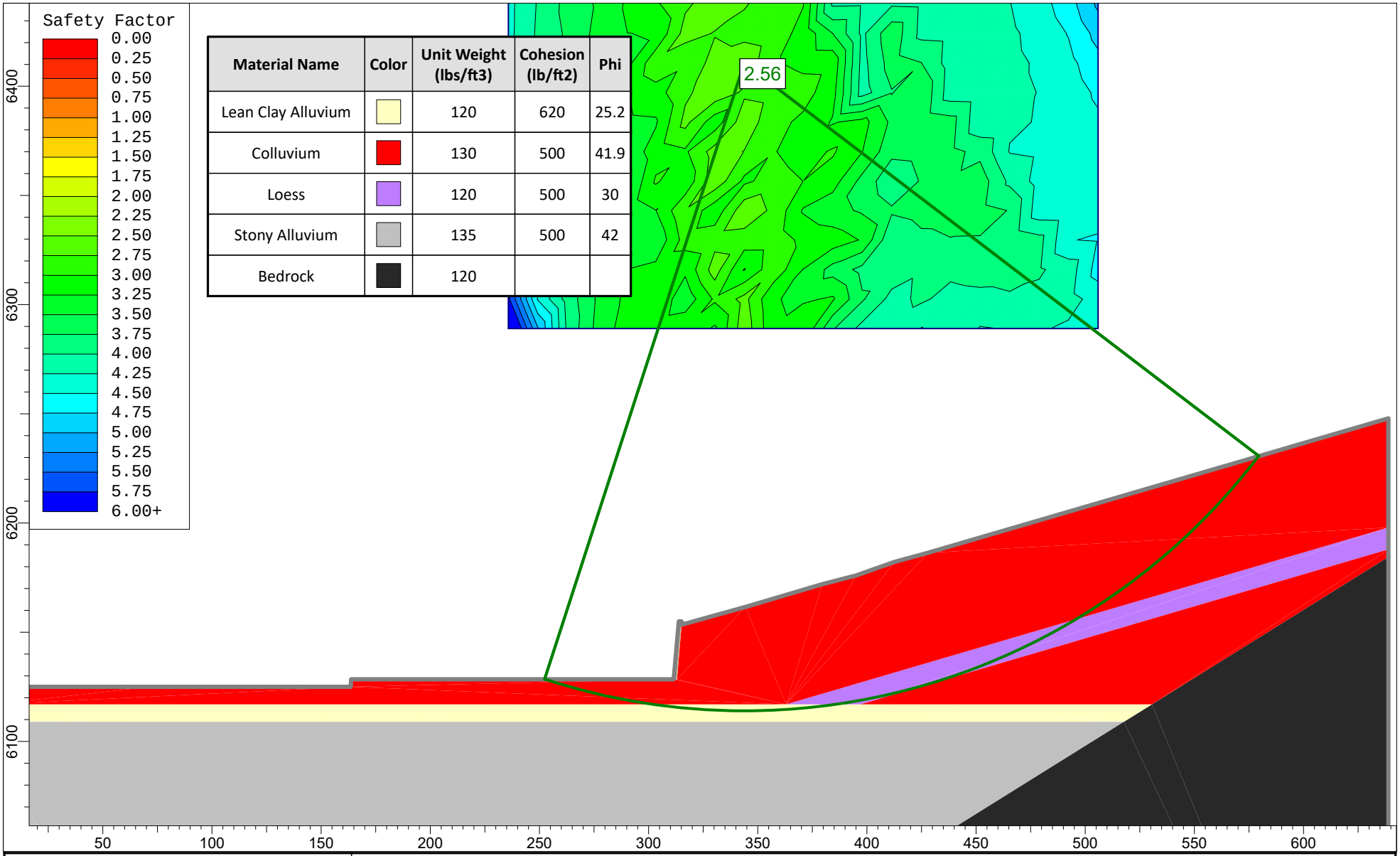
DYNIA
PO Box 4356 1085 W Hwy 22 Jackson, WY 83001
T: 307.733.3766 F 307 733 1762 www.dynia.com

A1.0

Y2 CONSULTANTS

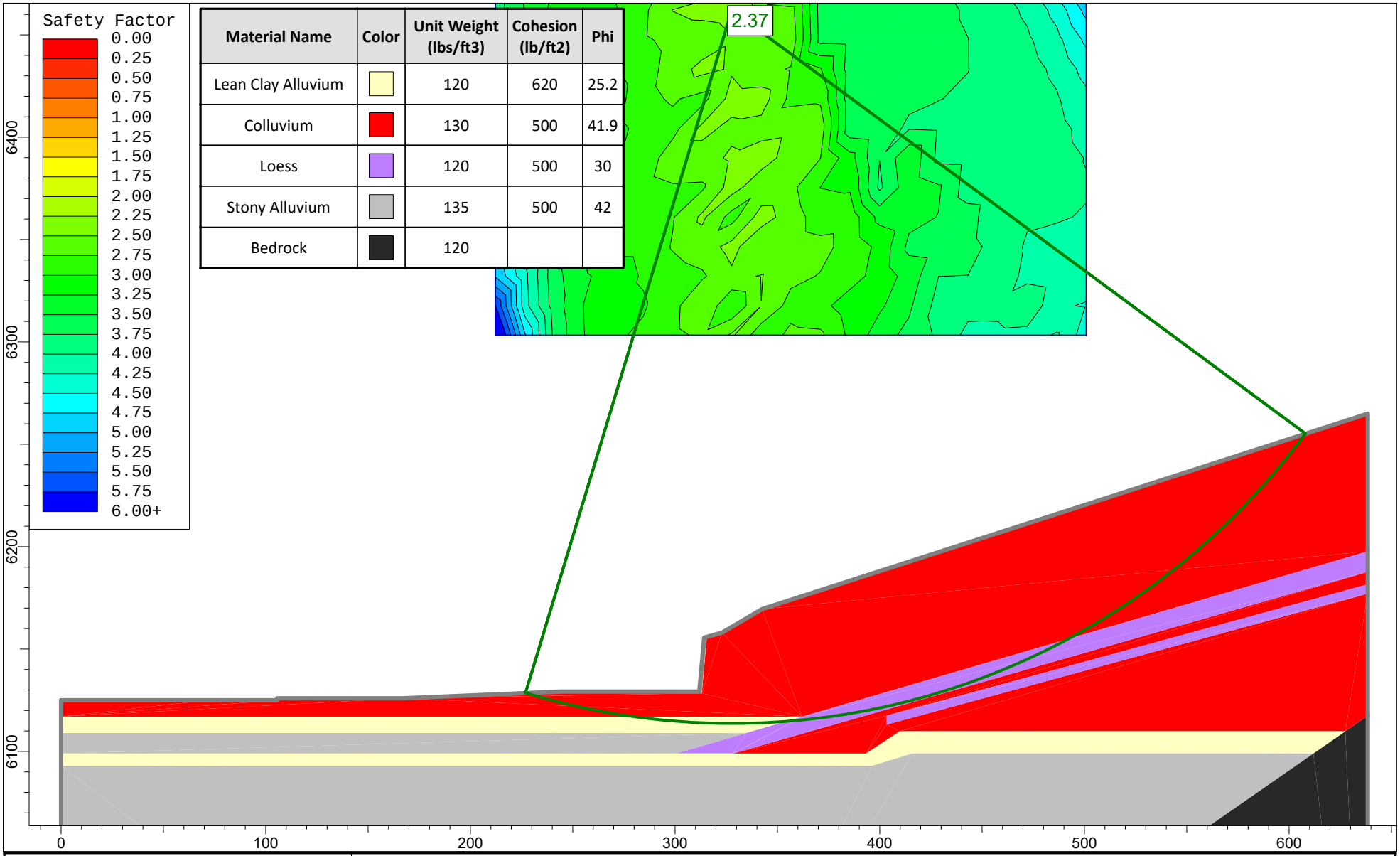
APPENDIX B

SLOPE STABILITY ANALYSIS RESULTS



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (lb/ft2)	Phi
Lean Clay Alluvium		120	620	25.2
Colluvium		130	500	41.9
Loess		120	500	30
Stony Alluvium		135	500	42
Bedrock		120		

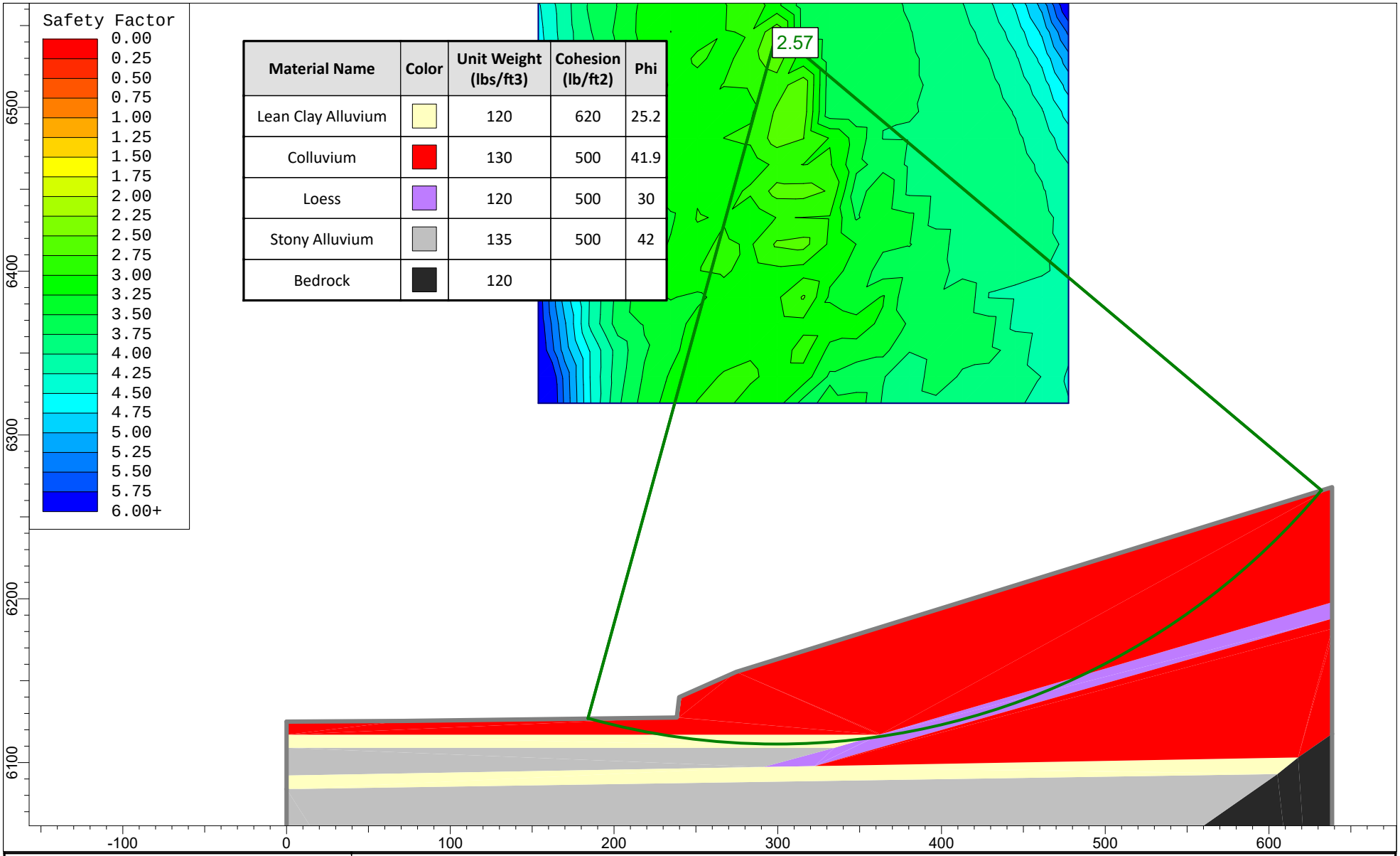
	Project	1400 S HWY 89, Teton County, Wyoming	
	Analysis Description	Long Term Slope Stability Analysis - Proposed Condition - Section 2 - Static	
	Drawn By	NH	*Company* Y2 Consultants, LLC
SLIDEINTERPRET 6.009	*Date*	10/24/2024, 4:17:42 PM	*File Name* Sec 2 - A.slim



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (lb/ft2)	Phi
Lean Clay Alluvium		120	620	25.2
Colluvium		130	500	41.9
Loess		120	500	30
Stony Alluvium		135	500	42
Bedrock		120		

Project	1400 S HWY 89, Teton County, Wyoming		
Analysis Description	Long Term Slope Stability Analysis - Proposed Condition - Section 3 - Static		
Drawn By	NH	*Company*	Y2 Consultants, LLC
Date	10/24/2024	*File Name*	Sec 3 - C.slim

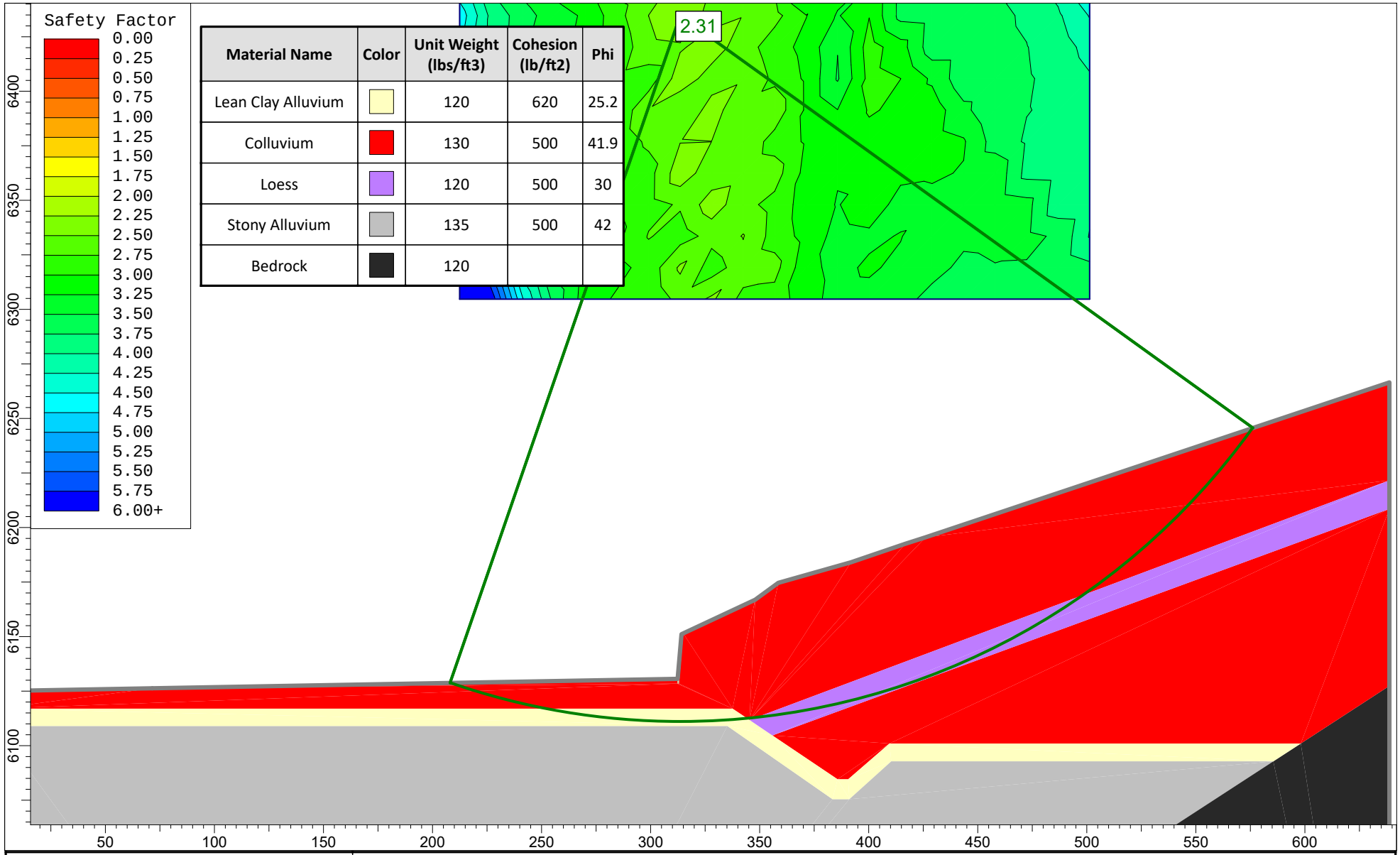
SLIDEINTERPRET 6.009



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (lb/ft2)	Phi
Lean Clay Alluvium		120	620	25.2
Colluvium		130	500	41.9
Loess		120	500	30
Stony Alluvium		135	500	42
Bedrock		120		

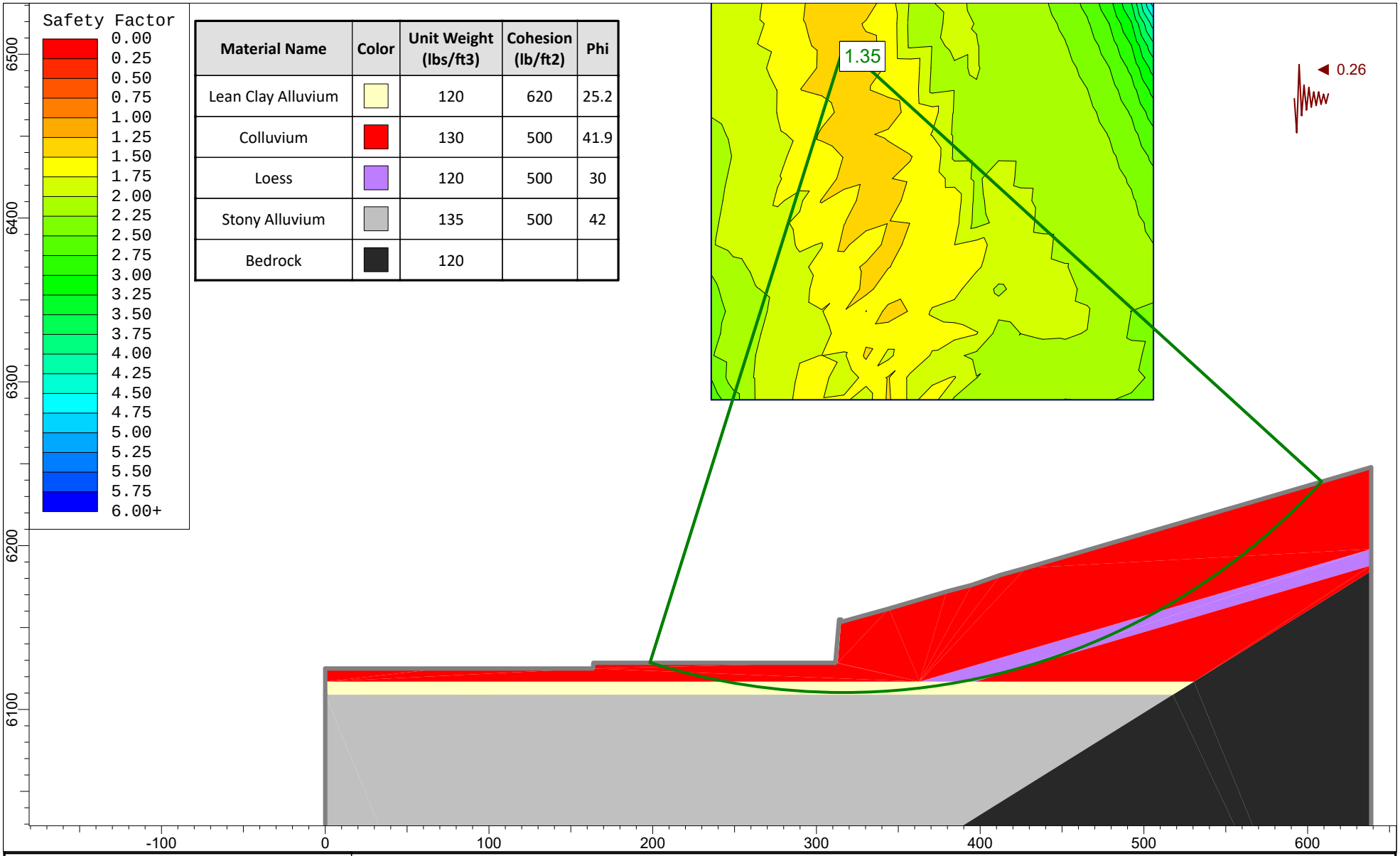
SLIDEINTERPRET 6.009

Project	1400 S HWY 89, Teton County, Wyoming		
Analysis Description	Long Term Slope Stability Analysis - Proposed Condition - Section 4 - Static		
Drawn By	NH	*Company*	Y2 Consultants, LLC
Date	10/24/2024	*File Name*	Sec 4 - D.slim



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (lb/ft2)	Phi
Lean Clay Alluvium		120	620	25.2
Colluvium		130	500	41.9
Loess		120	500	30
Stony Alluvium		135	500	42
Bedrock		120		

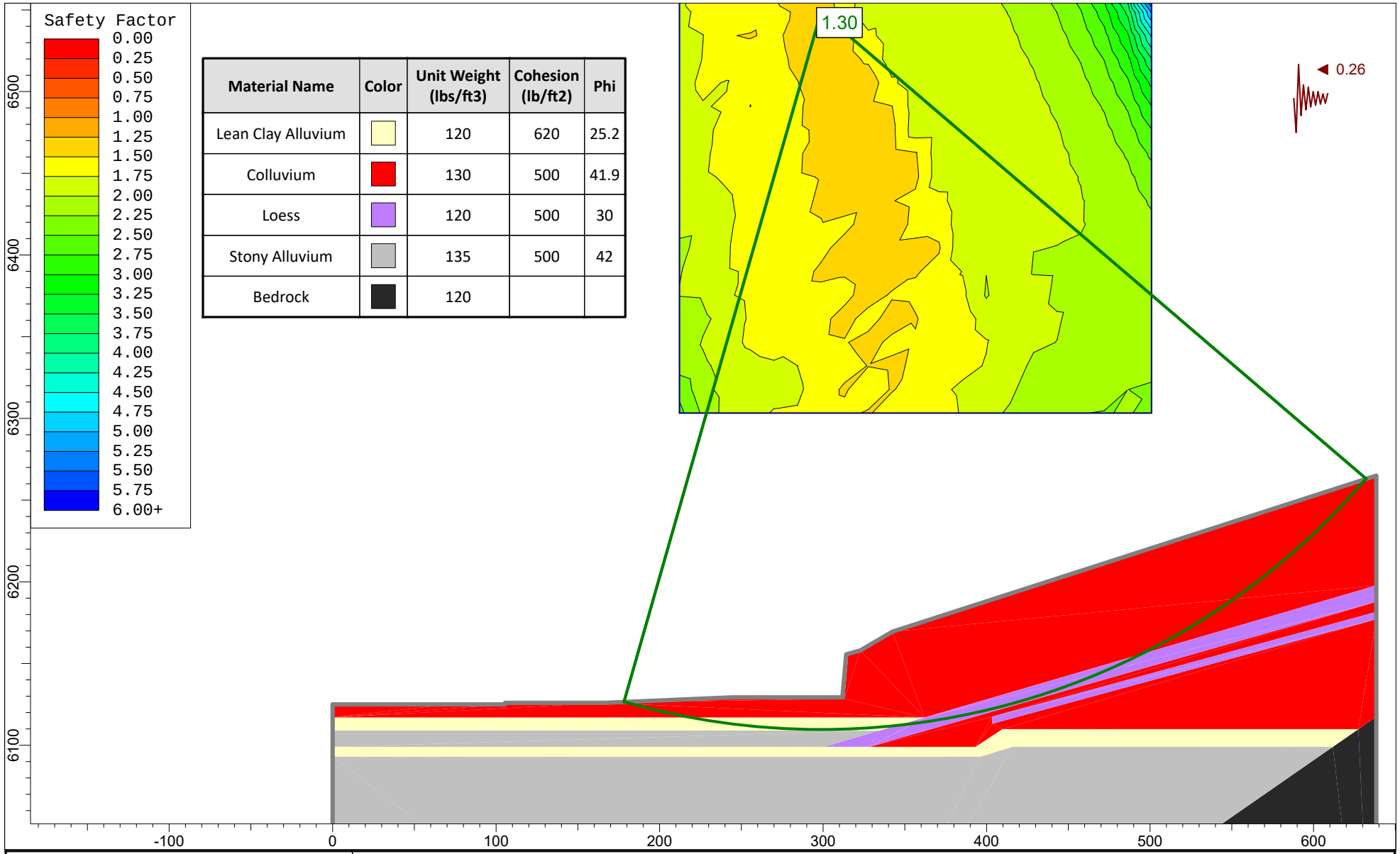
SLIDEINTERPRET 6.009	*Project*	1400 S HWY 89, Teton County, Wyoming	
	Analysis Description	Long Term Slope Stability Analysis - Proposed Condition - Section 5 - Static	
	Drawn By	NH	*Company* Y2 Consultants, LLC
	Date	10/24/2024	*File Name* Sec 5 - B.slim



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (lb/ft2)	Phi
Lean Clay Alluvium		120	620	25.2
Colluvium		130	500	41.9
Loess		120	500	30
Stony Alluvium		135	500	42
Bedrock		120		

Project	1400 S HWY 89, Teton County, Wyoming		
Analysis Description	Long Term Slope Stability Analysis - Proposed Condition - Section 2 - Seismic		
Drawn By	NH	*Company*	Y2 Consultants, LLC
Date	10/24/2024, 4:17:42 PM	*File Name*	Sec 2 - A - Seismic.slim

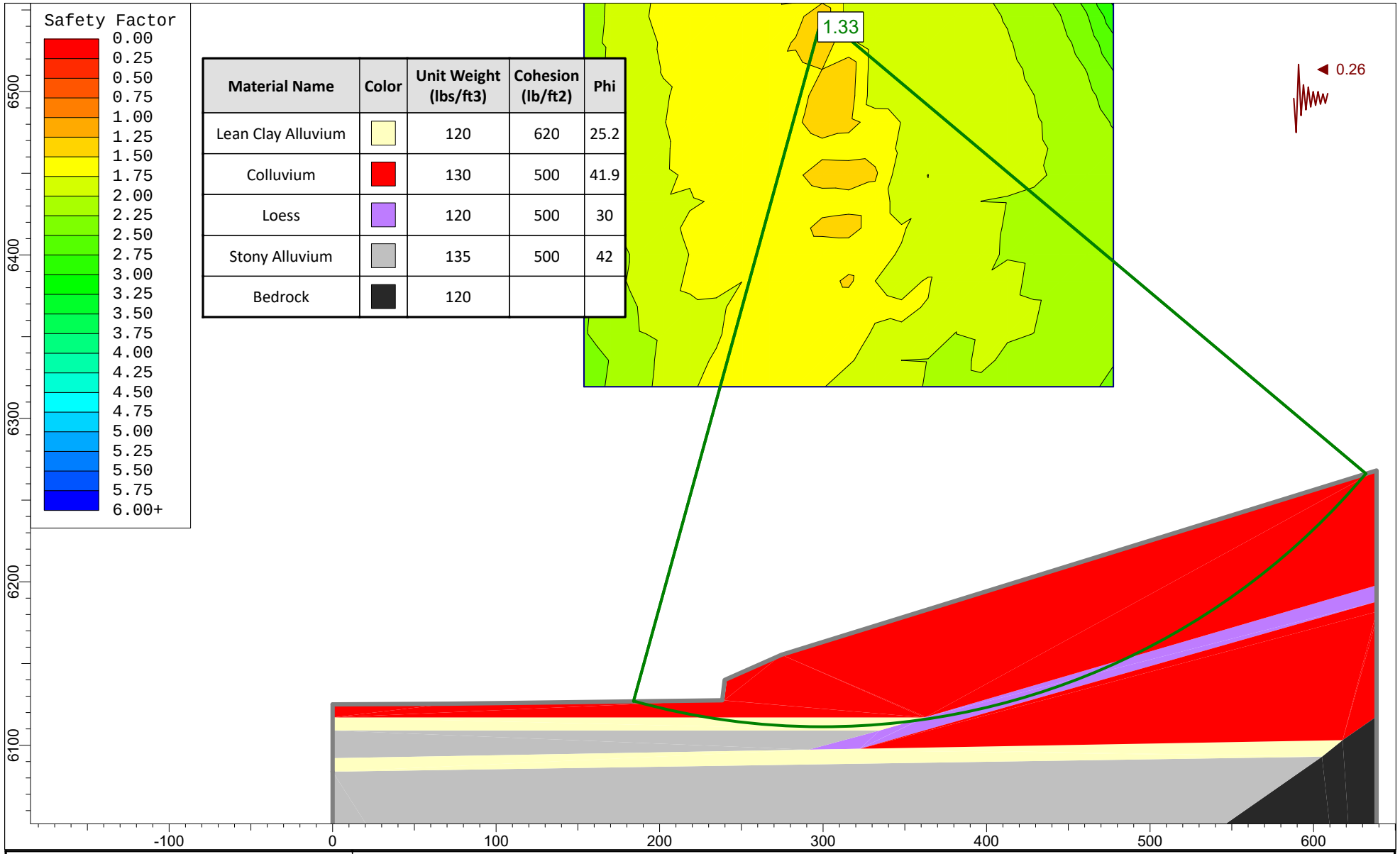
SLIDEINTERPRET 6.009



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (lb/ft2)	Phi
Lean Clay Alluvium		120	620	25.2
Colluvium		130	500	41.9
Loess		120	500	30
Stony Alluvium		135	500	42
Bedrock		120		

SLIDEINTERPRET 6.009

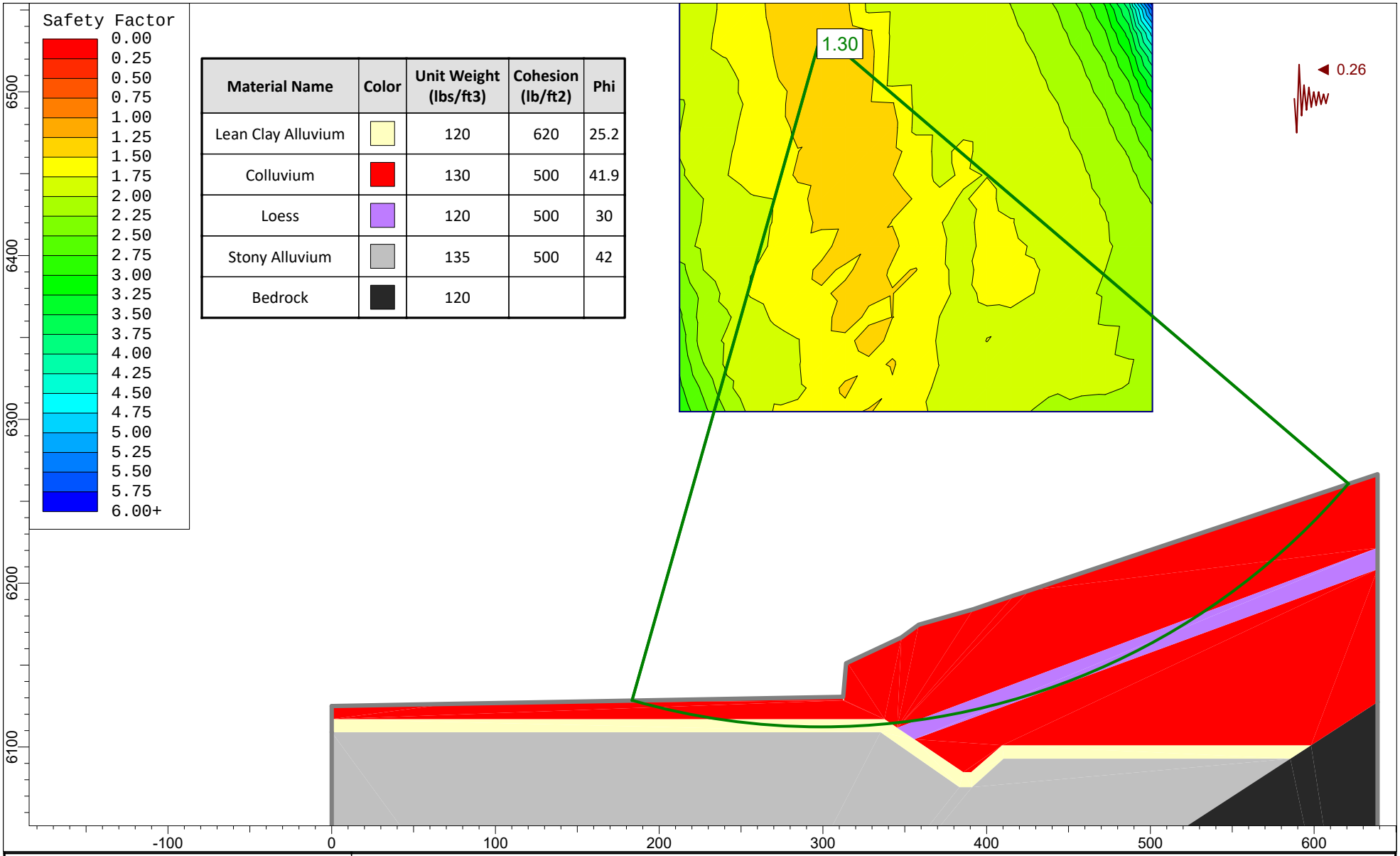
Project	1400 S HWY 89, Teton County, Wyoming		
Analysis Description	Long Term Slope Stability Analysis - Proposed Condition - Section 3 - Seismic		
Drawn By	NH	*Company*	Y2 Consultants, LLC
Date	10/24/2024	*File Name*	Sec 3 - C - Seismic.slim



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (lb/ft2)	Phi
Lean Clay Alluvium		120	620	25.2
Colluvium		130	500	41.9
Loess		120	500	30
Stony Alluvium		135	500	42
Bedrock		120		

SLIDEINTERPRET 6.009

Project	1400 S HWY 89, Teton County, Wyoming		
Analysis Description	Long Term Slope Stability Analysis - Proposed Condition - Section 4 - Seismic		
Drawn By	NH	*Company*	Y2 Consultants, LLC
Date	10/24/2024	*File Name*	Sec 4 - D - Seismic.slim



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (lb/ft2)	Phi
Lean Clay Alluvium		120	620	25.2
Colluvium		130	500	41.9
Loess		120	500	30
Stony Alluvium		135	500	42
Bedrock		120		

SLIDEINTERPRET 6.009

Project	1400 S HWY 89, Teton County, Wyoming		
Analysis Description	Long Term Slope Stability Analysis - Proposed Condition - Section 5 - Seismic		
Drawn By	NH	*Company*	Y2 Consultants, LLC
Date	10/24/2024	*File Name*	Sec 5 - B - Seismic.slim

Y2 CONSULTANTS

APPENDIX C

GEOTECHNICAL-ENGINEERING REPORT

JORGENSEN
GEOTECHNICAL, LLC

PO Box 9550 · 1315 HWY 89 S., Suite 201
Jackson, WY 83002
PH: 307.733.5150
|www.jorgeng.com

October 27, 2023

John Huffman
1400 SOUTH LLC
PO Box 802513
Dallas, TX 75380

RE: GEOTECHNICAL-ENGINEERING REPORT, 1400 AND 1450 HWY 89 SOUTH, TETON COUNTY, WYOMING
PROJECT NO: 22212

Dear Mr. Huffman,

We are pleased to present this geotechnical-engineering report for the proposed apartment complex at 1400 and 1450 Hwy 89 South in Jackson, Wyoming. In the report we describe site conditions observed during the subsurface exploration, summarize engineering analyses, and provide recommendations to support the design and construction of foundation elements.

Several soil types are present at the site. We observed stony alluvium at depth, which we consider to be adequate to support foundation loads. Overlying the stony alluvium, we encountered fine-grained alluvium, fine- to coarse-grained colluvium, and fine-grained loess. All fine-grained soils at the site are anticipated to be compressible (i.e., prone to settlement) under load and should not be relied upon to support foundation elements.

The steep slopes above the project site do represent a risk of slope instability depending on the final design of the proposed structure. The foundation walls may need to be thicker and/or more heavily reinforced than is typical for this area. Shoring systems may be required to assist with providing adequate support of the slopes. As the project design advances, additional project specific geotechnical-engineering studies may help improve the economy of the aforementioned designs.

If you have any questions about this report, or if we may provide other services to you, please contact us. As the project progresses, we will be available to answer questions for you.

Respectfully submitted,

JORGENSEN GEOTECHNICAL, LLC

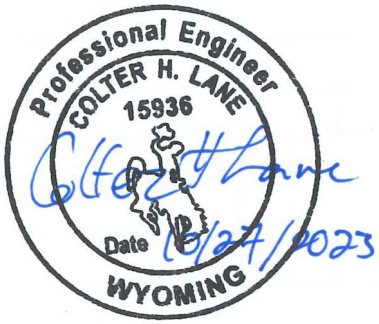
Dominique Brough, P.G.
Geotechnical Project Manager

Colter H. Lane, P.E.
Geotechnical Engineering Manager

Geotechnical-Engineering Report
1400 and 1450 Hwy 89 South
Teton County, Wyoming

Prepared for:

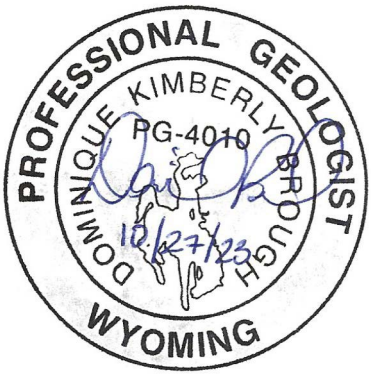
John Huffman
1400 SOUTH LLC
PO Box 802523
Dallas, TX 75380



Prepared by:

JORGENSEN
GEOTECHNICAL, LLC

PO Box 9550
Jackson, WY 83002



October 27, 2023

CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

At your request, Jorgensen Geotechnical (JG) conducted a subsurface exploration at the location of the proposed multi-family apartment complex in Jackson, Wyoming (Figure 1). We observed the drilling of nine boreholes between January 16th and 18th, 2023, the excavation of four exploratory test pits on January 24th, and the drilling of an additional six boreholes March 20th and 21st. Approximate borehole and test pit locations are shown on Figure 2. The purposes of our services were to observe soil and groundwater conditions, evaluate soil engineering properties, perform laboratory testing, and provide recommendations to support the design and construction of the building's foundation elements. The scope included recording data collected from exploratory boreholes and test pits, performing engineering analyses, and preparing this geotechnical-engineering report.

2.0 PROPOSED CONSTRUCTION

We understand the proposed construction to be an apartment complex consisting of one or more buildings intended as housing. The structures will comprise drive-in parking structures with approximately 212 residential units above. Final site plans were not available at the time of this report; however, current plans, titled *S Hwy 89 Apartments* dated 9/1/2022 from Mass and Surface Architecture, indicate that the lowest level of parking will be level with Highway 89 South and the building will comprise four stories.

3.0 INVESTIGATION PROCEDURES

3.1 Subsurface Exploration

We were onsite for the drilling effort between January 16th and January 18th, 2023. Nine boreholes (BH-1 through BH-9) were drilled by a crew from Inberg-Miller Engineers (IME) to depths ranging from 15 feet bgs (below ground surface) to 40 feet bgs using a truck mounted CME 550 drill rig. We observed the excavation of test pits on January 24th, 2023. Four test pits were excavated by FC Excavation to depths ranging from 12.5 feet bgs to 15.5 feet bgs, using a Hitachi 135UR steel-tracked excavator. Finally, we observed the drilling of six additional boreholes on March 20th and 21st to further characterize the site and obtain samples for lab testing. These boreholes were drilled to depths ranging from 220 feet to 35 feet bgs using a track-mounted, CME 550 drill rig.

Jorgensen personnel observed and documented soil type, thickness, consistency, and relative moisture in the field. Approximate borehole and test pit locations are shown on Figure 2, and detailed logs are presented graphically in Appendix A. Subsurface conditions are inherently uncertain, even though conditions appear to be consistent between boreholes and test pits. Actual soil conditions may differ from those represented in the borehole and test pit logs.

3.2 Laboratory Analysis

We obtained disturbed and undisturbed samples during the exploration, which we sent to the soil laboratory of SK Geotechnical in Billings, Montana, to classify the soil and estimate engineering parameters. Laboratory testing included consolidation and direct shear testing of relatively undisturbed samples, and particle-size analysis, Atterberg limits, and in-situ moisture content of disturbed samples. Soil laboratory testing results are discussed in Section 4.3, and lab data sheets are presented graphically in Appendix B.

3.3 Report Preparation

In this report, we describe the geologic conditions of the site and include a site-location map (Figure 1), borehole and test-pit location map (Figure 2), borehole and test pits logs, and six geologic cross-sections. Borehole and test-pit logs are presented graphically in Appendix A, laboratory testing results are included as in Appendix B. Cross-sections are in Appendix C, a description of the selection of material parameters is in Appendix D, and slope stability analysis methodology and results are in Appendix E.

4.0 SITE CONDITIONS

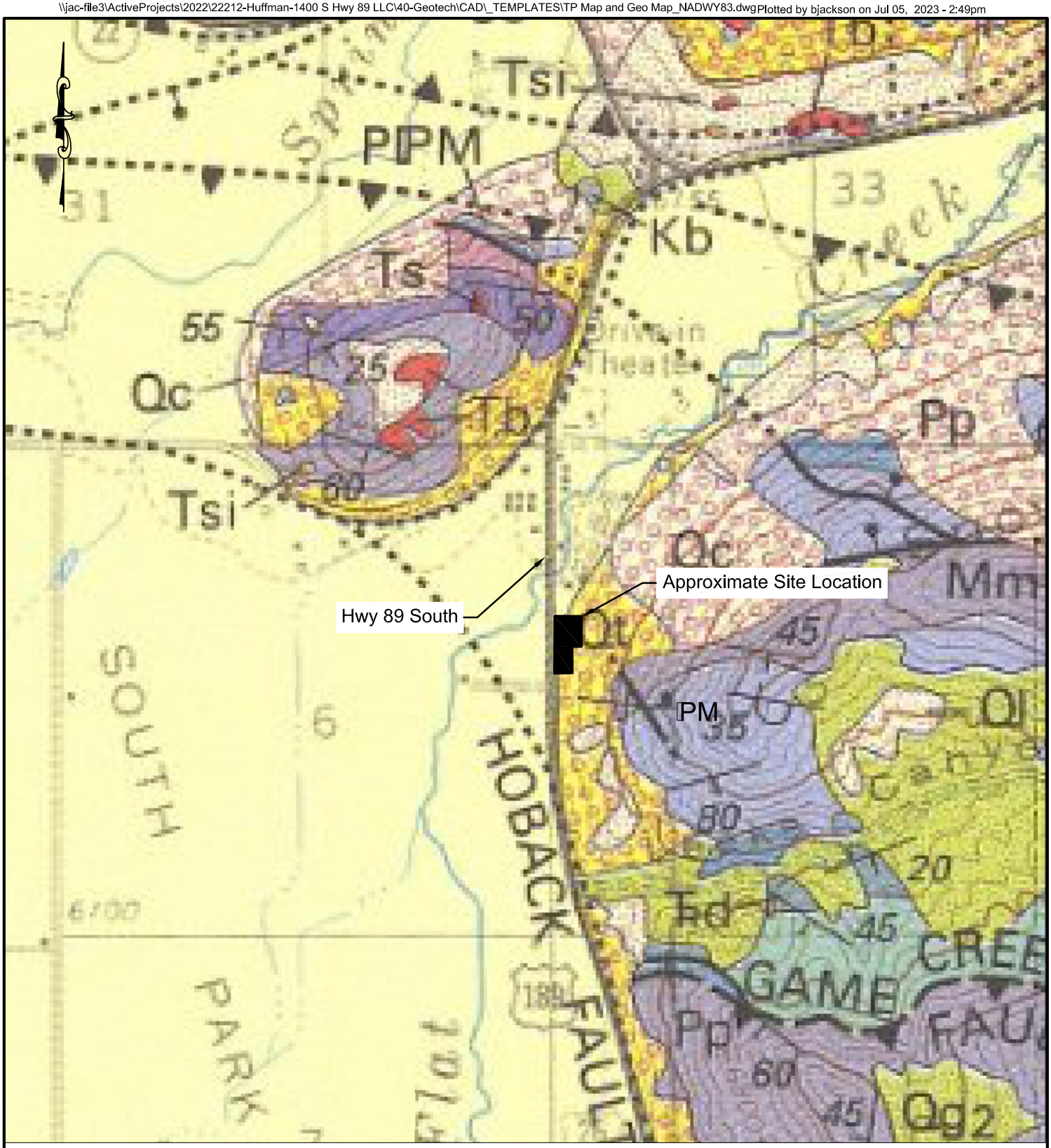
4.1 Description

The site is located in Jackson, Wyoming, and is situated along Highway 89 South on the south side of town. The entire development area is comprised of two lots, with the addresses 1400 and 1450 Hwy 89 South. In total, the lots are currently occupied by one residential rental unit, rented business space for tourism, and a daycare facility (all of which will either be demolished or moved for this new project). The properties are also serving as bus storage for Jackson Hole Whitewater. We situated the exploratory boreholes and test pits to span the entire development area (Figure 1). The development area abuts natural slopes on the east side of the project area with slopes ranging from approximately 16% to 32%. Two manmade benches are present at the site and appear to have been constructed during previous development. Elevations at the site range from approximately 6,126 feet above mean sea level (ASML) to the southwest, and 6,151 feet AMSL on the northeastern portion of the development area.

4.2 Geology

The Geologic Map of Grand Teton National Park, published by Love et. al (1992), encompasses the project location and is adapted as Figure 1. The map shows the location of surficial deposits, bedrock units, and geologic features (i.e., faults and folds). According to the geologic map, the project location is covered by Quaternary-age talus and related deposits, with alluvium, colluvium, and bedrock units in the surrounding area. Observations made during the site investigation generally agree with the mapped geology of the area, though our interpretation does not include talus but does include loess (in addition to the colluvium and alluvium). Bedrock was not observed at the site, but we do assume limestone bedrock of the Madison formation to be located at depth. Soil types encountered during the exploration are described in detail below.

Numerous Quaternary-aged (relatively young and potentially active) faults have been mapped in the Jackson Hole area (USGS, 2006) most notably the Teton Fault system along the eastern flank of the Teton Range, approximately 4.5-miles west of the project site. The Teton Fault is considered a major structural component of the region. The annual slip rate of the Teton Fault is between 0.2 and 1.0 mm/yr. The geologic map indicates the Hoback Fault is also located near the project site, though the exact location is unknown. The Hoback Fault is a class B fault, meaning it does not extend deep enough into the subsurface to be a potential source of significant earthquakes. The Hoback Fault has an estimated slip rate of less than 0.2 mm/yr.



0 1500 3000

SCALE: 1 INCH = 1500 FEET

THIS SCALE VALID ONLY FOR 8.5x11 PRINTS

Map symbols:

Qc - Colluvium
Qt - Talus and related deposits
Qa - Alluvium - stream and river deposits
Mm - Madison Limestone (Upper and Lower Mississippian
PM - Tensleep Sandstone (Upper and Middle Pennsylvanian and Amsden Formation (Lower Pennsylvanian and Upper Mississippian)

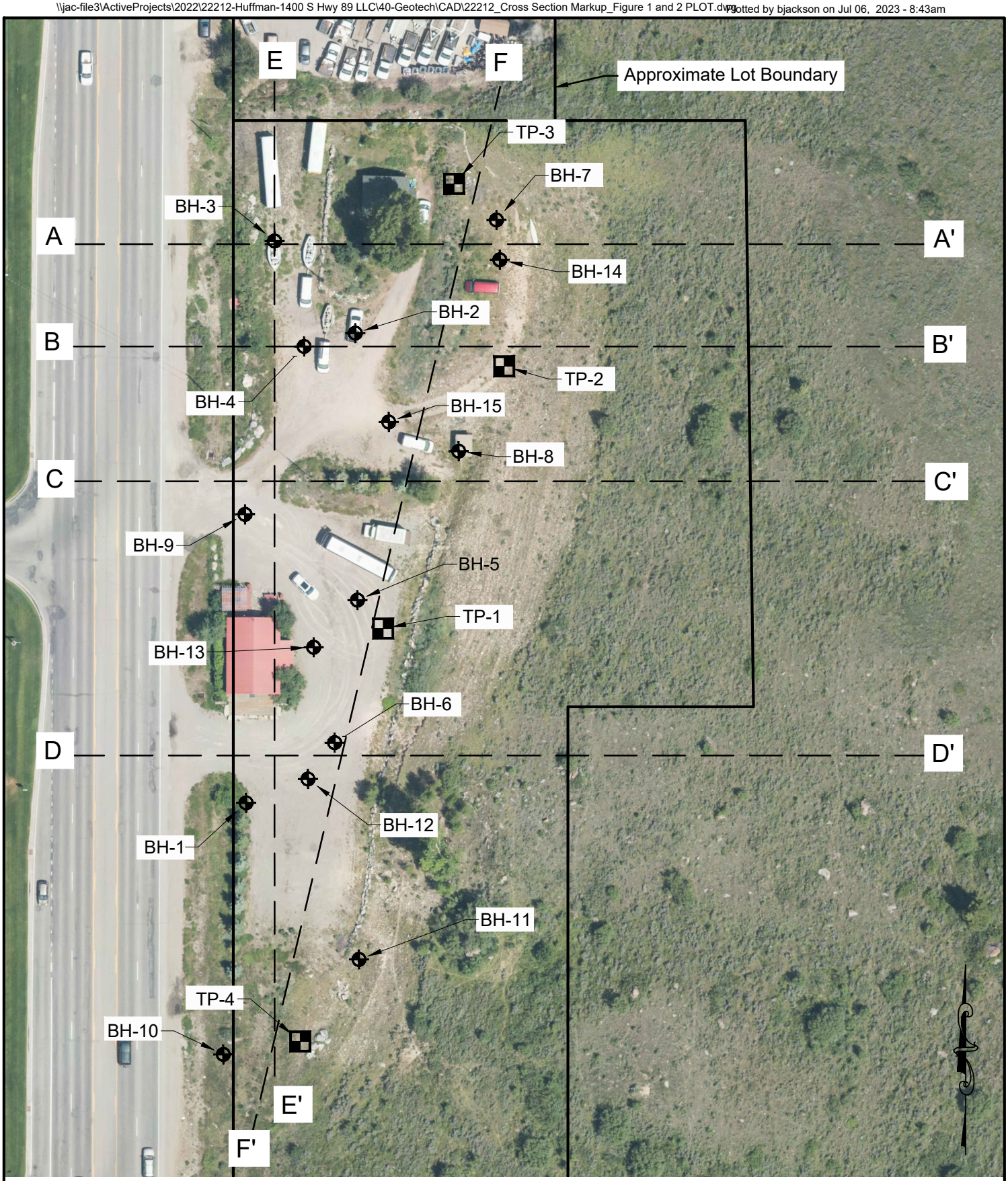
From Love et. al, Geologic Map of Grand Teton National Park, 1992

DRAFTED BY:	JBJ
REVIEWED BY:	DB
PROJECT NUMBER	22212

SHEET TITLE:
Figure 1
Site Location and
Geologic Map

PROJECT TITLE:
Geotechnical-Engineering Report
1400 & 1450 Hwy 89 South
Teton County, Wyoming

JORGENSEN
Geotechnical, LLC
307-733-5150 www.jorgeng.com



0 75 150

SCALE: 1 INCH = 75 FEET
THIS SCALE VALID ONLY FOR 8.5x11 PRINTS

BH-XX represent borehole locations, TP-XX represent test pit locations. Borehole and test pit locations acquired via GNSS/GPS reciever with submeter accuracy. Aerial imagery provided by Teton County, 2019.

DRAFTED BY:	JBJ
REVIEWED BY:	CHL
PROJECT NUMBER	22212

SHEET TITLE:
Figure 2
Borehole, Test Pit, and Cross Section Location Map

PROJECT TITLE:
Geotechnical-Engineering Report
1400 & 1450 Hwy 89 South
Teton County, Wyoming

JORGENSEN
Geotechnical, LLC
307-733-5150 www.jorgeng.com

4.3 Soils

We prepared cross-sections by correlating borehole and test-pit data to assist with the site characterization and geologic interpretation of the site as well as our engineering recommendations. We categorized soils into five types, which we describe in the following sections. Soil classifications are based on the Unified Soil Classification System (USCS). We included laboratory testing results in Appendix B, and generalized geologic cross-sections are in Appendix C.

In general, we interpolated horizontal deposition of fine-grained alluvium in the northern and western portions of the site, while the southern and eastern portions of the site contained "hillside deposits" (loess and colluvium interbedded) and pinching-out of the fine-grained alluvium within the transition zone between horizontal and hillside deposition.

4.3.1 Fill

We observed construction fill in the majority of the boreholes and test pits, which extended to depths ranging from 2 to 4.5 feet bgs. We observed the fill to be slightly moist to moist, light gray or brown, and medium dense, and classified these soils in the field as poorly graded gravel with silt. We assume this fill material was placed during the previous development of the lots.

4.3.2 Loess

We observed loess - a fine-grained windblown deposit - in BH-07, BH-08, BH-10, BH-11, BH-12, BH-14, BH-15, TP-2, and TP-4. The thickness of the loess was variable across the site, with thicknesses of approximately 2 to 7-ft ranging from 4-ft bgs in BH-15, to 17-ft bgs in BH-07. In general, we logged the loess in the field as dry to slightly moist, brown, and hard, with pinhole voids and lime stringers.

Aeolian (i.e., wind-deposited) soils, such as loess, tend to have very low dry density due to an internal structure supported by cohesive clay particles and calcite cementation. Although stiff when dry to slightly moist, the strength dramatically decreases and the internal structure breaks down when the soil becomes wet, which leads to consolidation. Settlement of any structures placed on loess is possible, and we recommend removing the loess from below all foundation elements.

We assumed the loess deposits follow the slope of the hill and extend to the east of the project site. Refer to Appendix C for geologic cross-sections of the site. The thin layer of loess within the slope uphill of the project site heavily influences the results of slope stability analysis (Section 5.5; Appendix E). Within the slope stability model, we extrapolated the observed layers of loess in the northeast portion of the exploration area. Once development plans are finalized, we recommend exploring soil conditions further up slope to verify or exclude the presence of a continuous layer of the loess within the colluvium.

4.3.3 Colluvium

We observed colluvium – a coarse-grained gravity-deposited soil usually comprising a wider range of soil particles from clays and silts to gravels and boulders – in all boreholes and test pits except for BH-09. We logged the colluvium in the field as slightly moist to moist, and brown. We noted in the field that the colluvium had a wide range of consistencies with depth. This soil was generally classified as a silty gravel with sand.

4.3.4 Fine-grained Alluvium

Alluvium is deposited by streams and rivers. We observed fine-grained alluvial deposits in all boreholes and test pits except for BH-5, TP-1, TP-2, and TP-3. We logged this soil in the field as moist to wet, brown and light tan, and very soft. We encountered an upper layer of the fine-grained alluvium within an elevation band of approximately 6,119 to 6,122-ft AMSL. We observed a lower, or older, layer of fine-grained alluvium that appears to be deeper than 6,112 to 6,114-ft AMSL. Field observations and lab testing results generally classify the deposit as sandy, silty clay or sandy, lean clay with gravel. We predict the fine-grained alluvium to experience consolidation under the anticipated foundation loads.

4.3.5 Stony Alluvium

We encountered stony alluvium consisting of sandy gravels and cobbles below the colluvium and fine-grained alluvium. These soils were observed to be dry, light gray tan, and very dense, and we estimated samples in the field to contain approximately 20-30% cobbles by volume and the remaining soil split into 40% gravel, 55% sand, and 5% fines by mass. Although not encountered in the boreholes and test pits, pockets of soft fine-grained soils or loose sands may be present within the stony alluvium. If encountered, all lenses or pockets of fine-grained or loose sands should be removed from below foundation elements prior to construction.

4.4 Groundwater

Groundwater was not directly encountered during the site investigation. Two standpipe piezometers were installed in BH-7 and BH-10 during the additional drilling to use for monitoring through the spring and summer of 2023. Groundwater at this site is influenced primarily by spring runoff and flows in nearby Flat Creek.

We measured groundwater levels weekly except for the second-to-final observation, which was two weeks after the previous observation, and the final observation which was two months after the previous. We conducted the measurements manually with a groundwater tape. All measurements were taken from the top of casing and corrected for the ground surface as datum. Groundwater monitoring results are provided below.

Date of Observation	BH-7 (feet bgs)	BH-10 (feet bgs)
5/24/2023	35.1	Dry
5/30/2023	35.0	Dry
6/5/2023	35.1	Dry
6/14/2023	35.1	18.3
6/22/2023	34.6	17.8
6/27/2023	34.6	18.0
7/5/2023	34.1	17.1
7/17/2023	35.1	19.7
9/18/2023	Dry	20.0

These data consist of recordings in May through September 2023 only and may not be representative of all possible groundwater conditions. It is prudent to take a conservative approach to site groundwater levels as they tend to fluctuate seasonally. However, in our opinion, it is unlikely that groundwater will pose issues with design or have an impact during the proposed construction.

If construction occurs during the spring and summer, the coarse-grained colluvium and underlying stony alluvium may, albeit unlikely, transport water to the surface of any excavations. If such conditions are observed during construction, the construction of a cutoff drain above the excavations may be necessary.

4.5 Earthquakes and Ground Shaking

The project site is located on the eastern flank of the Intermountain Seismic Belt, a zone of seismicity that extends from southern Utah through eastern Idaho, western Montana, and Western Wyoming (Smith and Arabasz, 1991). Predicted recurrence intervals for maximum credible earthquakes have passed for most of the fault systems capable of generating magnitude 7.5 earthquakes in western Wyoming (Case, 1997), implying the risk of major earthquakes is relatively high. The owner should be aware that in the event of a large magnitude earthquake (i.e., approximately 7.5), strong ground shaking, liquefaction, or slope movement could potentially cause damage to structures (Smith, et al., 1993).

Ground motion accelerations should be derived for the project site in accordance with the general procedure defined in the International Building Code (IBC). The IBC references ASCE 7-16 to determine the ground motion accelerations. Based on subsurface soils, mapped geology, and our experience in the area, we recommend the site be classified as Site Class D ("Stiff Soil"). For your convenience, Seismic Design Maps (SEAOC, 2023) values are summarized in Table 4-1.

Table 4-1: U.S. Seismic Deign Maps Summary

Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameters	
Short Period (S_s) = 1.052	
1-Second Period (S_1) = 0.346	
Site Coefficients and Adjusted MCE Spectral Response Acceleration Parameters	
F_a = 1.079	S_{MS} = 1.135
F_v = 1.954	*S_{M1} = 0.676
Design Spectral Response Parameters	
S_{DS} = 0.757	
*S_{D1} = 0.41	

Note: Values for F_v are based on linear interpolation of Table 11.4-2 of ASCE Standard 7-16. Values for S_{M1}, and S_{D1} are calculated from F_v. Per Section 11.4.8 of ASCE 7-16, if the proposed structure foundation will include seismic isolators or damping systems, a site response analysis shall be performed in accordance with Section 21.1 ASCE of 7-16.

The project site is in an area of moderate seismic activity. The current site-modified peak horizontal acceleration (PGA_M) with a probability of occurrence of 2% in 50 years is approximately 0.529g (SEAOC, 2023). This has been applied for the analysis of seismic lateral loading on retaining walls Section 5.4.

The provisions of the IBC are intended to provide uniform levels of performance for structures depending on their intended occupancy and use, and the risk inherent to their failure. The approach adopted in the IBC is intended to provide a uniform margin of safety against collapse at the design motion. The design earthquake ground motion is selected at a ground shaking level that is 2/3 of the maximum considered earthquake (MCE) ground motion, which has a likelihood of exceedance of 2% in 50 years (corresponding to a return period of 2,500 years). The owner should be aware that the IBC is not intended to prevent damage or loss of function during a major earthquake; it is intended to reduce the risk of loss of life. Structural design should follow the level of risk tolerable to the owner.

4.6 Geologic and Geotechnical Hazards

4.6.1 Seismic and Fault Related Hazards

The owner should be aware that in the event of a large magnitude earthquake (i.e., approximately 7.5), strong ground shaking and ground cracking could potentially cause damage to structures (Smith et al., 1993). The owner may wish to consider the option of carrying earthquake insurance. The majority of the faults mapped in the immediate vicinity of the property are believed to be old and inactive. Therefore, surface rupture or displacement due to faulting at this site is **very unlikely.**

Soils susceptible to liquefaction tend to be loose, saturated, clean sands. The alluvial deposits encountered at the site appear to either contain too many fines or appear too dense to be liquefiable. Therefore, liquefaction and slope instability associated with liquefaction (e.g., lateral spreading and lateral flow) are **not predicted to occur.**

4.6.2 Slope-Related Hazards

Mississippian Madison Limestone is mapped uphill of the project location, and visibly outcrops above it. Boulders derived from the Madison Limestone are scattered above and adjacent to the project location. Therefore, a rockfall hazard is present at this project site. We have proposed to evaluate the rockfall hazard for the project. Results from the rockfall hazard evaluation will be provided under separate cover.

In the event of an earthquake or extreme precipitation event, rockfall, debris flows, or avalanches produced from the steep slope to the east of the property could potentially cause damage, especially following a forest fire. We do not observe evidence of an alluvial fan at the site and, therefore, do not predict the risk of debris flows to be present except for very unusual environmental conditions.

We observed wet slide avalanches northeast of the project during the spring of 2023 where there are steeper initiation zones. A deep, low-elevation snowpack and rapid warming during the spring caused many natural avalanches near the Town of Jackson. During this period, avalanche debris did not impact the subject property, which may indicate the risk of avalanches at this site to be low. However, we share this observation as information only. This does not constitute an evaluation of risk by an avalanche professional, which we understand will be accomplished by others.

4.6.3 Collapsible or Compressible Soils

In our opinion, collapsible and compressible soils represent the greatest geotechnical hazards at this site. Based on our geologic cross-sections and subsurface interpretation of the site, we anticipate both loess and fine-grained alluvium will be encountered below the proposed foundation depths. Based on lab testing results (Appendix B), the fine-grained alluvial soils are compressible, and settlement may occur under load. The loess is known to be collapsible. Collapse-induced settlement tends to occur locally as a result of unusual moisture events: broken sprinkler lines, broken water service lines, or concentration of surface water adjacent to foundations due to poor surface runoff control. As such, collapse can be particularly damaging.

We recommend treating all fine-grained soils encountered at the site as collapsible and/or compressible, and such soils should be removed from below all foundation elements and sensitive exterior elements, such as brittle hardscapes. Development and maintenance of this property will require careful construction and ongoing management of water to prevent wetting of collapsible soils, particularly on the southern portion of the project area.

5.0 ENGINEERING ANALYSES

5.1 Settlement

See appendix D for discussion of consolidation parameters. We predict the fine-grained alluvium to be moderately compressible and consider the loess collapsible. We recommend removing both the fine-grained alluvium and the loess from below all foundation elements (Section 6.2) and sensitive exterior elements, such as hardscapes and patios (Section 6.9).

Significant consolidation of the stony alluvial deposits encountered below the fine-grained alluvium and the loess is not anticipated. Foundation elements should be placed directly on the native stony alluvial material or approved engineered fill. Any overlying topsoil or fine-grained deposits should be removed, and no such material should be incorporated into any foundation subgrades. Lenses of loose sand or fine-grained material may occur in the stony material; if encountered during construction, they should be removed and replaced with structural fill, consisting of imported stony "pit-run" or re-compacted native stony alluvial material.

5.2 Bearing Capacity

Bearing capacity of soil refers to its ability to resist shear failure under load and was calculated using Terzaghi's bearing capacity equation for isolated strip footings (Bowles, 1996). See appendix D for discussion of soil parameters (i.e., inputs to the bearing capacity equation). Allowable bearing capacity of the stony alluvial deposits or engineered fill is 5,000 psf. This value assumes footings will be placed directly on the stony alluvium or approved engineered fill; additional discussion regarding over-excavation and replacement of fine-grained material is in Section 6.2.

Soil bearing capacity is dependent not only on its strength, but also the geometry of the foundation elements. The calculated allowable bearing capacity has been determined assuming 2-ft "strip" or spread footings placed 3-ft below final grade with groundwater up to a maximum of 6-ft below final grade. If footing size and depth differs remarkably from these assumptions, this office should be notified to evaluate our recommendations. It is often the case that heavily loaded, isolated footings may be optimized (i.e., made smaller) using a larger bearing capacity, thereby reducing the quantity of concrete required. Please contact JG for an evaluation during the design process.

5.3 Lateral Pressures

Lateral pressures were calculated using methods suggested by Bowles (1996). Lateral pressures were calculated for at-rest, active, and passive conditions assuming level backfill, and are presented in Table 5-2. These values assume stony site material will be used as exterior backfill. We assumed an estimated internal friction angle of 32° and a unit weight of 125 pcf. See appendix D for additional discussion of soil parameters.

Table 5-1: Lateral Pressure Parameters for Native Stony Site Soils

Condition	Coefficient of Earth Pressures	γK (equivalent fluid pressure)
Static Conditions		
Level Backfill	$K_o = 0.47$	59 pcf
	$K_a = 0.31$	38 pcf
	$K_p = 3.25$	407 pcf
Earthquake Conditions		
Level Backfill	$K_{ae} = 0.50$	62 pcf

	K_{pe} = 2.73	341 pcf

5.3.1 Active Pressures

For lateral pressure design of retaining walls, which are allowed to deflect and develop an active soil wedge, the calculated equivalent fluid pressure (γK_a) is 38 pcf (pounds per cubic foot). This pressure distribution would be equivalent to a force of approximately $19H^2$ pounds per horizontal foot of wall acting at one-third the wall height (H) above the base.

Lateral pressures on retaining walls from earthquakes were estimated using the Mononobe-Okabe equations (Bowles, 1996; Duncan et al, 1990). Because the maximum acceleration occurs only briefly during an earthquake, it is common practice when designing dams and other earth structures to reduce the design acceleration to ½ of the maximum design acceleration (Hynes-Griffin and Franklin, 1984). Thus, we have calculated seismic lateral pressures using a horizontal acceleration k_h of 0.26g (1/2 of k_h max) per SEAOC (2023).

Research has indicated that lateral pressures due to earthquakes are non-hydrostatic in distribution, and the resultant acts above the lower third-point of the wall (Bakeer, et al, 1990). Accordingly, active soil pressures must be divided into two components that act at different wall heights. The static force acts at the lower third-point, as discussed above. The resultant force from seismic lateral pressures is applied at 60% of the wall height above the base with a magnitude equal to the difference between seismic and static active pressures; i.e., $1/2(\gamma K_{ae} - \gamma K_a)H^2$ or $12H^2$ pounds per horizontal foot of wall applied.

5.3.2 At-Rest Pressures

For lateral pressure design of basement walls, which are restrained and not allowed to deflect, the calculated at-rest earth pressure (γK_o) is 57 pcf. Design control of such walls shall be whichever generates the higher resultant force: at-rest pressures or active seismic pressures.

5.3.3 Passive Pressures

For passive pressure design, the earth pressure coefficient (γK_p) is about 407 pcf, assuming a horizontal ground surface adjacent to the wall, and reduced to 341 pcf for seismic conditions. Passive pressure design should neglect loose fill and soil located within the frost zone.

5.4 Soil Friction

Terzaghi, et al (1996), suggest use of the internal strength of the soil for the friction angle along a concrete base in granular soils, with a maximum value of 30°. Accordingly, a friction value of 0.58, which is the tangent of 30°, is suggested if foundation elements are founded on native stony alluvial deposits or compacted, granular structural fill. The friction value may be combined with the passive pressure to resist horizontal loads.

5.5 Slope Stability Analysis

We performed slope stability analyses to assess historical, current, and proposed conditions. We describe the methodology in Appendix E. Resulting factors of safety (FS) are summarized in Table E-2. Figures E-1 through E-40 in Appendix E are outputs from the modeling software, and each show the modeled geometry, a legend with soil-engineering parameters, critical slip surface, and the FS associated with the slip surface. Additional output files, reports, convergence data, or other data from the modeling software (Geostudio SLOPE/W) may be made available upon request.

Critical slip surfaces (i.e., those with lowest factors of safety automatically selected by the software) in all modeled geometries and soil conditions remained within the colluvium uphill of the project site. The models do not appear sensitive to the low strength values estimated for the alluvial clay underlying the proposed building footprint. Conversely, all models appear very sensitive to the strength of the colluvium and the strength of the layer of loess within the colluvium.

We compared FS values with and without the layer of loess. For the existing conditions model, static FS values are approximately 15 to 30% higher in models that don't include the layer of loess. In these same models, most of the seismic analysis results excluding the loess are greater than 1.0, whereas those including the loess indicate FS less than 1.0. Future geotechnical studies of the site should:

1. explore conditions upslope of the existing benches with the purpose of ruling out the existence of a continuous layer of loess, and
2. increase sampling and lab testing of loess and/or colluvium to increase confidence in the modeled slope stability.

Proposed-conditions models result in FS less than 1.5 and 1.0 (i.e., industry-standards for minimum FS) for static and seismic analyses, respectively. These results indicate the final design of the building will need to consider higher lateral loads to satisfy global seismic slope stability. A shoring system - such as piles, tie-back anchors, or soil nails - may be required to accommodate the anticipated loads.

Due to the preliminary nature of the current design, we did not optimize required building lateral resistance or advance shoring system designs. Additional exploration and laboratory testing are expected to optimize the analyses and save money in future design.

6.0 RECOMMENDATIONS

6.1 Foundation Recommendations

In our opinion, the native stony alluvial material observed below the colluvium, loess, and fine-grained alluvium will provide adequate support for anticipated foundation loads. We recommend foundation systems be placed entirely on the native stony material or engineered fill consisting of imported "pit-run" or re-compacted stony site soils. We recommend removing any fine-grained deposits below all footings. We included additional recommendations regarding over-excavation and replacement in Section 6.2 below. Disturbed stony soil should be re-compacted following excavation and before fill placement as described in Section 6.3.

All footings should be placed below the frost line, including exterior footings for awnings and porches. The building code for Teton County requires that footings be placed at a minimum depth of 34 inches from finished grade, with a minimum foundation exposure of 6 inches above finished grade.

Minor cracks in the foundation walls, floor slabs, and sheetrock are normal and should not be a cause for concern. A structural engineer should review the plans to check that adequate lateral restraint is provided to foundation walls by the floor joists.

6.2 Over-Excavation and Replacement of Fine-Grained Site Soils

Over-excavation and replacement of fine-grained soils (alluvium and loess) with an approved engineered fill will significantly reduce the risk of future settlement. The over-excavation shall extend to the surface of the approved bearing soil. We anticipate fine-grained alluvium within an elevation band of

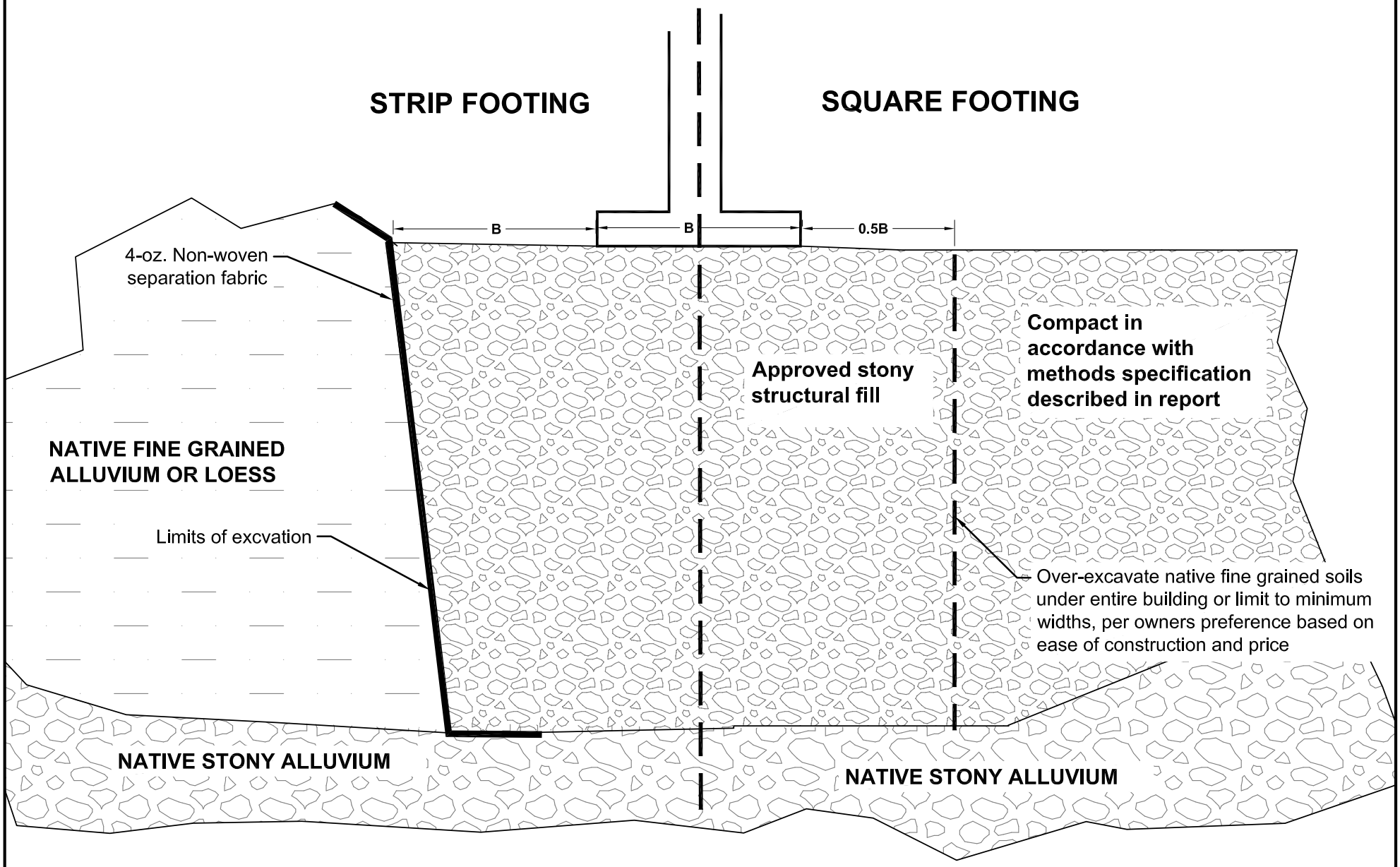
approximately 6,118 to 6,122-ft AMSL, which will require approximately 6-ft of over-excavation below the predicted bottom of foundation elevation of 6,124-ft AMSL. Fine-grained soil shall be over-excavated to one footing width laterally on either side of continuous (i.e., strip) footings and ½ footing width on all sides of square or circular footings, as shown on Figure 3.

Engineered fill to replace fine-grained soils may consist of stony material, either site-derived or imported (i.e., "pit-run"). Placement and compaction of the fill shall follow the recommendations of Section 6.5. Structural fill should be separated from fine-grained site soils using a 4-oz. non-woven separation fabric (e.g., Mirafi 140N).

6.3 Site Preparation

At the start of construction, the site should be cleared and stripped of topsoil, fine grained soils, and organic debris. No brush, roots, frozen material, or other deleterious or unsuitable materials shall be incorporated in the foundation subgrade or site-derived engineered fill. All exposed subgrade surfaces should be free of mounds and depressions which could prevent uniform compaction. If unexpected fills or obstructions are encountered during site clearing or excavation, such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction. If fine-grained soils are observed at foundation depth, they should be removed and replaced with an approved engineered fill, such as pit-run or select site soils. All excavations should be inspected by representative of JG prior to fill or concrete placement, especially if questionable materials are exposed.

During excavation for the foundation system, removal of large cobbles and boulders may disturb and loosen the surrounding material. All disturbed areas should be compacted with a smooth-drum vibratory roller, in vibratory mode with a minimum of three passes, prior to placement of structural fill and/or footing construction. The actual number of passes should be determined by observing whether the surface is yielding after each pass. If the surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed and approved by JG.



DRAFTED BY:	JBJ
REVIEWED BY:	CHL
PROJECT NUMBER	22212

SHEET TITLE:
Figure 3
Over-Excavation and Replacement of Native Fine-Grained Soils

PROJECT TITLE:
Geotechnical Engineering Report
1400 & 1450 Hwy 89 South
Teton County, Wyoming

JORGENSEN
Geotechnical, LLC
307-733-5150 www.jorgeng.com

6.4 Excavation and Cut Slope Stability

OSHA regulations (29CFR1926) appear to classify the loess at the site as Type A soil and the colluvium as Type B soil. For planning and design purposes, cut slopes should be no steeper than 1H:1V for excavations extending through areas of loess and into the colluvium. These are recommendations based on visual classifications at the time of the investigation. The contractor shall ultimately be responsible for adherence to OSHA and other safety regulations by observing soil conditions at the time of construction.

We anticipate shoring will be required to support the proposed construction. Typical systems include solder pile and lagging – with or without tie-back anchors – or soil nail walls. Both have been successfully utilized on similar projects in the Town of Jackson. Shoring design will need to consider global slope stability conditions, specifically with respect to seismic conditions. Detailed shoring design is beyond the scope of this work, but JG may provide such designs, if requested.

6.5 Compaction of Stony Materials

Stony fill – such as locally available alluvial "pit-run" – will compact into a dense, strong, well-draining engineered fill and strict moisture control is usually not required, making it a preferred soil for construction. However, compaction testing with a nuclear density gauge is usually problematic due to the presence of large stones. Therefore, we recommend compacting stony fills using a **method specification**, for which Table 6-1 provides initial guidelines.

Table 6-1: Compaction Parameters for Stony Fill

Compactor Type	Lift Thickness	Maximum Particle Size	Minimum Number of Passes*
5-ton vibratory	12 inches	9-inch**	3
1.5-ton vibratory	9 inches	6-inch	5
Hand-held	4 inches	4-inch	5

*The actual number of passes should be determined by observing whether the surface is yielding after each pass. If the surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed.

** Occasional clasts to 12-inch are permitted, if encountered, but should not be nested.

The method specification may be established as follows:

- The contractor will place fill in loose lifts no greater than specified in Table 6-1 for whichever class of compactor is used.
- Fill will be compacted with the *minimum* number of passes specified in Table 6-1. The actual number of passes should be determined by observing compaction after each pass to determine if the surface is non-yielding. If the fill surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed.
- Once the number of passes is determined, this **method** (unique to the material type, compactor, lift thickness, and number of passes) may be continued for the rest of the project as long as fill material properties and subgrade soil conditions remain the same.

It is important to establish a method specification as early in the construction as possible and apply it consistently for the entirety of the project. JG should observe lift thickness, number of passes, and equipment used during compaction. Additional guidance on construction observations may be found in Section 6.12.

6.6 Foundation Drains

Due to the moisture sensitivity and poor drainage properties of loess, proper water management is extremely important. We recommend constructing foundation drains at the base of foundation elements. Damp proofing, rather than water proofing, is anticipated to be adequate for foundation walls at this site.

Two drainage alternatives are described as follows:

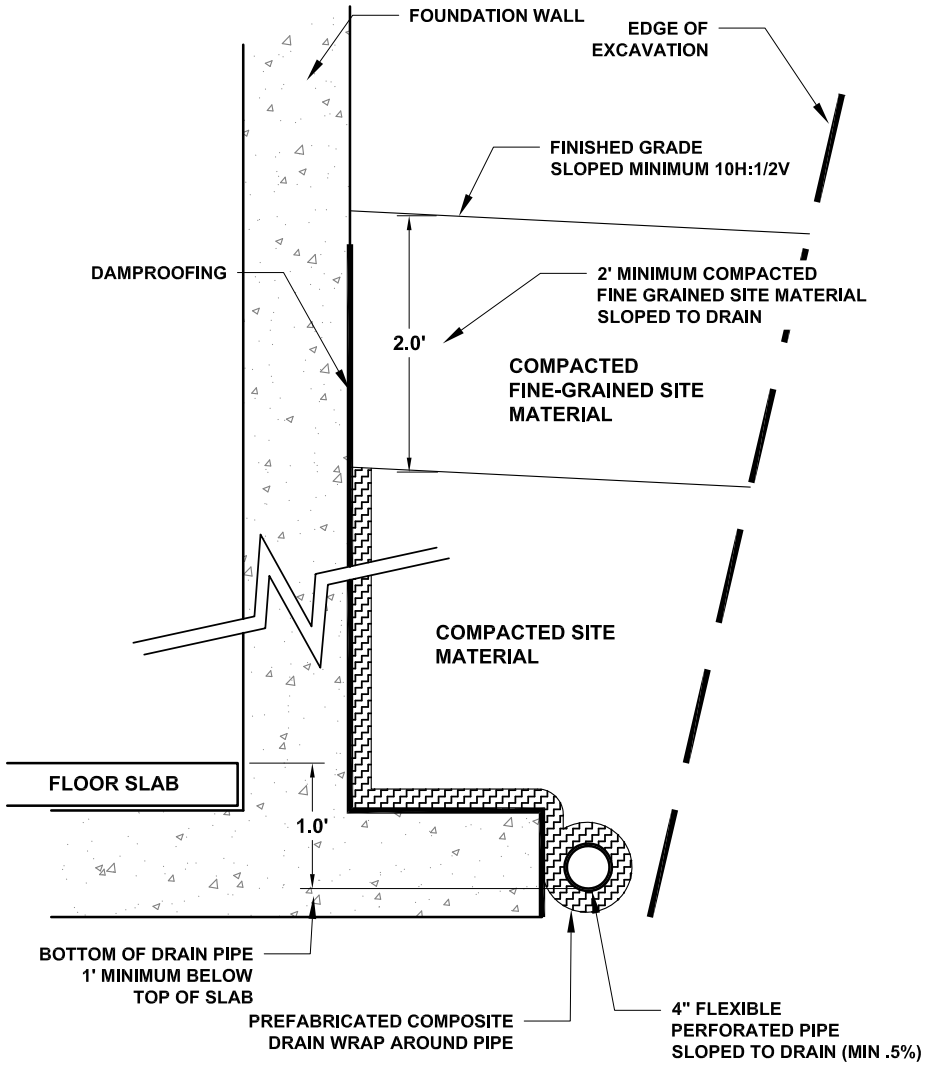
1. One alternative is a prefabricated composite drain, which consists of an open wick layer laminated to filter fabric to reduce infiltration of soil. The exterior of the wall is damp-proofed and the drain is laid against the damp-proofing layer. The excavation is backfilled with compacted site material and the drain is covered by at least 2 feet of compacted site soil that is sloped to drain (minimum 5% for 10 feet). The composite drain is wrapped around a perforated drain pipe located a minimum of 1 foot below the top of the slab. The drain pipe may slope at a minimum of 0.5% and drain to daylight on the slope. <u>This drain alternative (prefabricated composite drain) is required for foundations placed greater than 6-ft below final grade.</u>

2. A second alternative involves placement of clean angular drain gravel or crushed stone between the foundation wall and the edge of the excavation. Drainage tiles, perforated pipe, or other approved systems should be installed at or below the area to be protected and should discharge by gravity or mechanical means into an approved drainage system. The drain pipe may slope at a minimum of 0.5% and drain to daylight or a sump. Gravel drains should extend at least 1 foot beyond the outside edge of the footing and 6 inches above the top of the footing. The gravel backfill is wrapped in an approved filter fabric. At least 2 feet of compacted fine-grained backfill (sloped to drain) is placed above the gravel envelope. The advantage of this technique is that the gravel backfill can usually be placed without compaction, reducing backfill cost and difficulty.

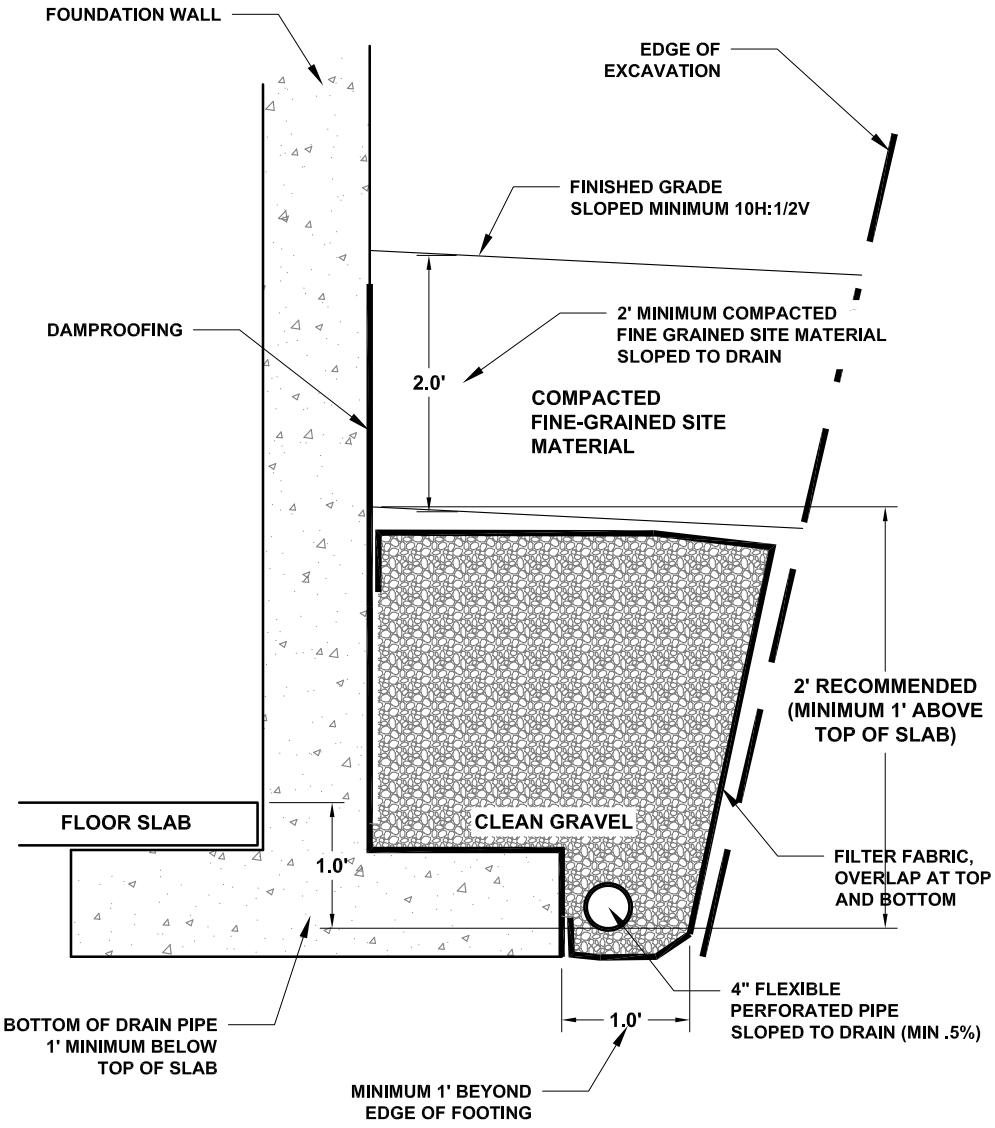
It is important to place the foundation drains low enough to adequately collect and discharge any water that may accumulate in utility trenches below the footings or in the gravel capillary break beneath concrete floor slabs. Drains that are placed too shallow or with insufficient gradient may fail to perform. JG is available to review the foundation drain design to ensure consistency with our recommendations.

ALTERNATIVE #1:
USING PREFABRICATED COMPOSITE DRAIN

(REQUIRED FOR FOUNDATIONS PLACED GREATER THAN 6-FT BELOW FINAL GRADE)



ALTERNATIVE #2:
USING DRAIN GRAVEL AND FILTER FABRIC



DRAFTED BY:	JBJ
REVIEWED BY:	CHL
PROJECT NUMBER	22212

SHEET TITLE:
Figure 4
Foundation Drain Alternatives

PROJECT TITLE:
Geotechnical Engineering Report
1400 & 1450 Hwy 89 South
Teton County, Wyoming

JORGENSEN
Geotechnical, LLC
307-733-5150 www.jorgeng.com

6.7 Final Backfilling and Grading

Properly compacted backfill and site drainage are important. Final grading should provide positive drainage of at least 0.5 foot in the first 10 feet away from the structure. Adequate gutters are strongly recommended. Roof runoff should be discharged at least 3 feet away from the building or exterior slabs. Swales or other moisture collection points should be avoided within 20 feet of the footings. Drainage swales should slope a minimum of 2%. There should be no irrigation within 5 feet of foundation walls. Irrigation pipes should be pressure-tested when installed and checked annually for leaks.

Stony fill (e.g., site-derived gravel and cobble colluvium or imported "pit-run") will compact into a dense, strong engineered fill, and strict moisture control is usually not required, making it a preferred alternative for many contractors for exterior backfills, utility trenches, and subbase under interior and exterior slabs. All stony fill shall be conducted in accordance with the methods specification described in Section 6.5 and Table 6-1.

Exterior backfill around buildings should consist of moisture-conditioned site materials placed in lifts and compacted to at least 92% of the maximum dry density as determined by Standard Proctor testing (ASTM D698). Soil should be moisture conditioned to between -1% and +3% of the optimum moisture content. Fine-grained soils require a sheepsfoot or padfoot roller.

Exterior backfills should be placed as early as possible. Do not over-compact exterior backfills against "green" foundation walls. Utility trenches should also be backfilled in lifts and lightly compacted. The stony soils will require a vibrating smooth-drum roller or vibratory plate (i.e., hoe-pack or "jumping jack") for compaction.

6.8 Interior Slabs-on-Grade

Interior slabs should be at least 4 inches thick, and any slabs bearing vehicles should be at least 6 inches thick, or as approved by a Structural Engineer. Minor floor cracking of slab-on-grade construction is difficult, if not impossible, to prevent. Such cracking is normal and should be expected to occur with time. Buildings are almost never free of cracks, and cracking is caused by many factors other than soil movement, such as concrete shrinkage or curling, or daily and seasonal variability in temperature and humidity.

Performance of interior slabs placed in areas with loess can be improved by removing 2-feet of native soils and replacing them with 18-inches of approved coarse-grained native soils or imported pit-run compacted to a non-yielding sate, and at least 6 inches of road mix gravel (e.g., WYDOT Grading H) compacted to a dry density of 95% ASTM D698. The gravel and the compacted subgrade should be separated by a lightweight, non-woven geotextile (e.g., Mirafi 140N). Expansion joints are recommended in all concrete flatwork.

An impermeable layer (usually plastic) is suggested beneath interior slabs, underlain by 4 inches of clean drain gravel that will act as a capillary break to reduce dampness. Two options are available to reduce the tendency for the concrete to crack or curl as it dries:

1. A blotter layer may be placed under the slab. In the past, loose sand has been used for this purpose, but is no longer recommended. A cover of 4 inches of trimmable, compactible, granular material may be placed over the impermeable layer to receive the concrete slab. This material usually consists of "crusher run material", which varies in size from about 1.5-inch down to rock

dust. Alternatively, 3 inches of compacted, fine-graded material such as crusher fines or manufactured sand may be used.

2. The blotter layer may be eliminated if the concrete is reinforced properly. The attached article entitled "Controlling Curling and Cracking in Floors to Receive Coverings" provides a discussion of proper floor slab reinforcement. If the contractor needs additional guidance on reinforcement, a Structural Engineer should provide it.

Three articles from the American Concrete Institute (ACI) that discuss these options are listed in the references section (Holland & Walker, 1998; Suprenant & Malish, 1998 & 1999). We can offer additional guidance if requested.

6.9 Exterior Slabs-on-Grade

Exterior slabs (e.g., sidewalks, patios, driveways, hardscapes, etc.) typically sustain the greatest damage. Cracking is almost impossible to avoid, and freeze-thaw adds to the difficulty caused by soil movement. Exterior slabs should be at least 4 inches thick, 6 inches if supporting vehicles, or as approved by the Structural Engineer. Exterior slabs should not be tied to foundation walls. Any movement of exterior slabs may be transmitted to the foundation walls, resulting in damage. Posts for patios or other exterior columns should not bear on exterior slabs. If the slabs settle or rise, the movement can be transmitted to the post, resulting in damage to the structure. Expansion joints are recommended in all concrete flatwork.

In addition to being moisture-sensitive, silty loess is especially prone to frost action. Therefore, exterior elements placed on loess may be particularly susceptible to damage. **"Hardscapes" that cannot tolerate movement are not recommended.** Any sensitive exterior elements should be supported by using the same care as interior elements.

It may be reasonable to simply assume that exterior slabs will require periodic replacement as a maintenance item. However, performance of exterior slabs bearing on the fine-grained material at this site may be improved by over-excavation and re-compaction of 2-ft of native material with tight moisture control (at least 92% ASTM D698 between -1 and +2% of optimum moisture) and seating the slab on at least 6 inches (preferably 12 inches) of road mix gravel (e.g., WYDOT Grading H or W). A lightweight separation geotextile may be used to separate the gravel from fine-grained site soils.

If a large water feature (such as a pool, fountain, hot tub, etc.) is constructed in the loess, it should be supported in the same manner as the building foundation system. Plumbing attached to any water features should be attached to the supported structure (e.g., the structural pool floor) to reduce the chance for breakage, if soil collapse occurs. **Landscapers and water feature designers should be provided with the geotechnical report and formally briefed about the necessity to manage water and grades at the site.** Notes should be taken of meetings and instructions conveyed to all designers.

6.10 Crawlspace Ventilation and Radon

Evaluation of radon was beyond the scope of work; local codes should be followed and specialty contractors employed, if necessary. The building contractor is ultimately responsible for following local building codes. Ventilation to reduce moisture and potential accumulation of radon gas is required by code for habited and inhabited spaces below grade. A capillary break layer, such as is described in Section 0, may accommodate a radon pipe.

6.11 Reinforcing, Utilities Testing, and Concrete Considerations

Footings, slabs, and foundation walls should be reinforced to resist differential movement. Consultation with a Structural Engineer to specify adequate reinforcement is suggested. Water and sewer lines should be pressure tested before backfilling. Exterior concrete should contain 5% to 7% entrained air.

6.12 Observation during Construction

Recommendations in this report are contingent upon our involvement. If any unexpected soils or conditions are revealed during construction, this office should be notified immediately to survey the conditions and make necessary modifications. All excavations and foundation subgrades should be observed by JG staff prior to fill or concrete placement, especially if questionable materials are exposed. Notice shall be provided at a minimum of 24 hours before the requested observation.

We can provide the most value observing site conditions at the following times:

1. Upon completion of site preparation to verify all topsoil and unsuitable material have been removed in accordance with Sections 6.2 and 6.3, and to verify soil types present in the excavation, and
2. During placement of fill as described in Sections 6.5 and 6.7.

7.0 LIMITATIONS

This report has been prepared based on a limited amount of data. Actual site conditions may vary. These services have been performed in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty is made or implied.

This report is site-specific and has been prepared in support of the proposed project. This report is for the sole use of the current property owner and their design and construction team and shall be considered non-transferable to future property owners without the written consent of Jorgensen Geotechnical. Under no circumstances are the figures and text to be used separately.

8.0 REFERENCES

Abramson, L.W., Lee, T.S., Sharma, S., and Boyce, G.M., 2002, Slope Stability and Stabilization Methods, 2nd ed., John Wiley & Sons, Inc.

American Concrete Institute, 1997, Guide for Concrete Floor and Slab Construction: ACI 302.1R-96.

American Society of Civil Engineers, Minimum Design Loads for Building and Other Structures: ASCE/SEI Standard 7-16

Bakeer, R.M., S.K. Bhatia, and I. Ishibashi, 1990, Dynamic Earth Pressure with Various Gravity Wall Movements *in* Design and Performance of Earth Retaining Structures (P.C. Lambe and L.A. Hansen, ed.): ASCE Geotechnical Special Publication 25, p. 887-899

Bowles, J.E., 1996, Foundation Analysis and Design, 5th Ed.: McGraw Hill.

Case, J.C., 1997, Earthquakes and Active Faults in Wyoming; Wyoming State Geological Survey, Preliminary Hazards Report 97-2.

Fang, H.Y., 1991, Foundation Engineering Handbook, 2nd Ed.: Chapman & Hall, New York.

Gilbert, J.D., D. Ostenaa, and C. Wood, 1983, Seismotectonic Study Jackson Lake Dam and Reservoir, Minidoka Project, Idaho-Wyoming: Seismotectonic Report 83-8, US Bur. Reclam.

Holland, J.A., and W. Walker, 1998, Controlling Curling and Cracking in Floors to Receive Coverings: Concrete Construction Publication Number C980603

Hynes-Griffin, M.E., and Franklin, A.G., 1984, Rationalizing the Seismic Coefficient Method: U.S. Army Corps of Engineers, Waterways Experiment Station, Miscellaneous Paper GL-84-13

International Building Code, 2021.

Ladd, C.C., et al, 1977, "Stress-Deformation and Strength Characteristics," Proceedings of the Ninth International Conference on Soil Mechanics and Foundation Engineering, Tokyo, v. 2, p. 421-494.

Love, J.D., Reed, J.C., and Cristiansen, A.C., 1992, Geologic Map of Grand Teton National Park, Teton County, Wyoming: Geologic Investigation Series Map I-2031, Scale 1:62,500.

Machette, N.M., Pierce, K.L., McCalpin, J.P., Haller, K.M., and Dart, R.L., 2001, Map and Data for Quaternary faults and folds in Wyoming, United States Geological Survey, Open-File Report 01-461.

Makdisi, F.I., and Seed, H.B.,1977, A Simplified Procedure for Estimating Earthquake-Induced Deformations in Dams and Embankments: Report UCB/EERC-77/19, U. California, Berkeley.

O'Connell, D.R.H., Wood, C.K., Ostenaa, D.A., Block, L.V., and LaForge, R.C., 2003, Final Report, Ground Motion Evaluation for Jackson Lake Dam, Minidoka Project, Wyoming: U.S. Bureau of Reclamation Report 2003-2.

Pit Slope Manual, 1982, Chapter 9, Waste Embankments: Mining Research Laboratories, CANMET Report 77-01.

Smith, R.B. and Arabasz, W.J., 1991, Seismicity of the Intermountain Seismic Belt, in Slemmons, D.B., Engdahl, E.R., Zoback, M.L., and Blackwell, D.D., editors, Neotectonics of North America: Geological Society of America, Decade Map Volume 1, p. 185-228.

Smith, R.B., Byrd, J.O.D., and Susong, D.D., 1993, The Teton fault, Wyoming: Seismotectonics, Quaternary History, and Earthquake Hazards, in Snoke, Q.W., Steidtmann, J.R., and Roberts, S.M., editors, Geology of Wyoming; Geological Survey of Wyoming Memoir No. 5, p. 628-667.

Structural Engineers Association of California, U.S. Seismic Design Maps, accessed February 9, 2023, from SEAOC website: https://seismicmaps.org/

Suprenant, B.A., and W.R. Malisch, 1999, Don't Use Loose Sand under Concrete Slabs: Concrete Construction, Publication Number C99C0223.

Suprenant, B.A., and W.R. Malisch, 1998, Where to Place the Vapor Retarder: Concrete Construction, Publication Number C980427.

Terzaghi, K., R.B. Peck, and G. Mesri, 1996, Soil Mechanics in Engineering Practice, 3rd Ed.: John Wiley & Sons.

U.S. Geological Survey, 2006, Quaternary fault and fold database for the United States, accessed February 9, 2023, from USGS web site: http//earthquake.usgs.gov/hazards/qfaults/.

Voight, B., 1973, "Correlations between Atterberg Plasticity Limits and Residual Shear Strength of Natural Soils," Geotechnique, No. 23, pp. 265-267.

Whitman, R.V., 1990, Seismic Design and Behavior of Gravity Retaining Walls in Design and Performance of Earth Retaining Structures (P.C. Lambe and L.A. Hansen ed): ASCE Geotechnical Special Publication 25, p. 817-842.

Youd, T.L., and I.M. Idriss, 1997, Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils: Technical Report NCEER-97-0022.

Zellman, M.S., DuRoss, C.B., and Thackray, G.D., 2019, The Teton fault—Teton County, Wyoming: Wyoming State Geological Survey Open File Report 2019-1, scale 1:75,000.

Zhang, J.M., Y. Shamoto, and K. Tokimatsu, 1998, Earth Pressures on Rigid Walls during Earthquakes in Proceedings of the Specialty Conference on Geotechnical Earthquake Engineering and Soil Dynamics III (P. Dahoulas, M. Yegian, and R.D. Holtz ed), p. 1057-1069.

JORGENSEN GEOTECHNICAL, LLC

PO Box 9550 · 1315 HWY 89 S., Suite 201
Jackson, WY 83002
PH: 307.733.5150
www.jorgeng.com

APPENDIX A

Borehole and Test-Pit Logs

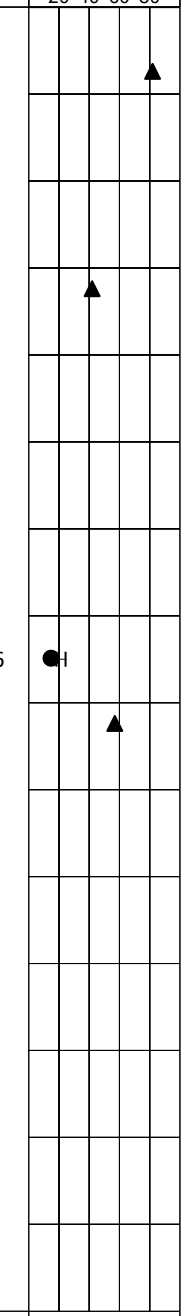
JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-01

Client: John Huffman
Project Number: 22212
Date Started: Jan 16 2023 **Completed:** Jan 16 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 15.7 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459011 **Longitude:** -110.793005 **Elevation:** 6126.97
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
0		D-1	87	8-10-13 33		GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].					
2		D-2	87	6-6-5 17		Silty SAND with Gravel (SM): slightly moist to moist, brown, medium dense, homogeneous, 30 % gravel, 40 % sand, 30 % fines, fine to coarse grained, [COLLUVIUM].					
5		U-1			3.50	Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, 1% gravel, 33.2% sand, 65.8% fines, [FINE-GRAINED ALLUVIUM].					
7		D-3	67	2-5-9 23	1.50		15		25	19	6
9						Well-Graded SAND with Silt and Gravel (GW): dry, light gray tan, very dense, 40% gravel, 55% sand, 5% fines, fine to coarse grained, strong, [STONY ALLUVIUM].					
10		D-4	53	20-29-18 63							
12		D-5		13-35-34 97							
14											



JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-01

Client: John Huffman
Project Number: 22212
Date Started: Jan 16 2023 **Completed:** Jan 16 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 15.7 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459011 **Longitude:** -110.793005 **Elevation:** 6126.97
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16			D-6	71	9-14-50/2" 90		Well-Graded SAND with Silt and Gravel (GW): dry, light gray tan, very dense, 40% gravel, 55% sand, 5% fines, fine to coarse grained, strong, [STONY ALLUVIUM].					
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-02

Client: John Huffman
Project Number: 22212
Date Started: Jan 16 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 35.9 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459761 **Longitude:** -110.792775 **Elevation:** 6133.51
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Material Description
0					Gravel with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45 % gravel, 35 % sand, 20 % fines, fine to coarse grained, [FILL].
2					Silty SAND with Gravel (SM): dry to slightly moist, reddish brown, medium dense to medium dense, 35% gravel, 50% sand, 15% fines, iron oxide staining, strong, [COLLUVIUM].
3		D-1	60	12-13-12 35	
5		D-2	63	12-10-7 24	
8		D-3	47	9-9-7 21	
10		D-4	100	50/2" 72	
		D-5			

Pocket Pen. (tsf)	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Plastic Limit	Plasticity Index

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
□ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-02

Client: John Huffman
Project Number: 22212
Date Started: Jan 16 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 35.9 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459761 **Longitude:** -110.792775 **Elevation:** 6133.51
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	▲ SPT N1(60) 8 16 24 32 / ● MC (%) / ⊢ PL & LL (%) 20 40 60 80 / □ Fines Content (%) 20 40 60 80
16				20	14-11-10 26		Silty SAND with Gravel (SM): dry to slightly moist, reddish brown, medium dense to medium dense, 35% gravel, 50% sand, 15% fines, iron oxide staining, strong, [COLLUVIUM].						▲ at 16
17													
18													
19													
20			D-6	100	5-4-5 12								▲ at 20
21						1.00							
22							Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].						
23			U-1										
24													
25													
26			D-7	67	3-1-1 3								▲ at 26
27													
28													
29							Well-Graded SAND with Silt and Gravel (SW-SM): dry to slightly moist, reddish tan, very dense, 40% gravel, 55% sand, 5% fines, [STONY ALLUVIUM].						
			D-8										

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-02

Client: John Huffman
Project Number: 22212
Date Started: Jan 16 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 35.9 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459761 **Longitude:** -110.792775 **Elevation:** 6133.51
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
31				71	45-49-50/5" 91		Well-Graded SAND with Silt and Gravel (SW-SM): dry to slightly moist, reddish tan, very dense, 40% gravel, 55% sand, 5% fines, [STONY ALLUVIUM].					
32												
33												
34												
35			D-9	100	45-50/5" 46							
36												
37												
38												
39												
40												
41												
42												
43												
44												

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊥ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-03

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 21.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459907 **Longitude:** -110.792953 **Elevation:** 6131.53
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
0						GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].					
2		D-1	67	8-9-11 23		SILTY GRAVEL with Sand (GM): slightly moist, reddish brown, loose, 60 % gravel, 25 % sand, 15 % fines, iron oxide staining, weak, [COLLUVIUM].					
5		D-2	47	4-5-5 13							
7		D-3	70	6-6-8/0" 17							
9						Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].					
10		D-4	87	3-4-5 12	1.75						
12		U-1									
13						Well-Graded GRAVEL with Sand (GW): slightly moist, light tan brown, dense to dense, 39% gravel, 43.6% sand, 17.4% fines [STONY ALLUVIUM].					
14		D-5									

SPT N1(60) 8 16 24 32
MC (%)
PL & LL (%) 20 40 60 80
Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-03

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 21.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459907 **Longitude:** -110.792953 **Elevation:** 6131.53
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16				53	6-10-9 23		Well-Graded GRAVEL with Sand (GW): slightly moist, light tan brown, dense to dense, 39% gravel, 43.6% sand, 17.4% fines [STONY ALLUVIUM].					
17												
18												
19												
20			D-6	60	15-15-19 38							
21												
22												
23												
24												
25												
26												
27												
28												
29												

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊥ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-04

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 20.4 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459739 **Longitude:** -110.792887 **Elevation:** 6132.36
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
0						GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, Partially frozen. [FILL].					
2		D-1	100	23-36-18 78	3.50	SILTY SAND with Gravel (CL-ML): slightly moist, blackish brown, very stiff, 15 % gravel, 40 % sand, 45 % fines, [COLLUVIUM].					
5		D-2									
6		D-2	73	6-10-8 20							
7		D-4									
8			80	5-6-10 18							
10		U-1				Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].					
13						Well-Graded GRAVEL with Sand (GW): dry to slightly moist, light tan white, very dense, 60% gravel, 40% sand, [STONY ALLUVIUM].					
14		D-5									

SPT N1(60) 8 16 24 32
MC (%)
PL & LL (%) 20 40 60 80
Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-04

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 20.4 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459739 **Longitude:** -110.792887 **Elevation:** 6132.36
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16				57	21-19-31 72		Well-Graded GRAVEL with Sand (GW): dry to slightly moist, light tan white, very dense, 60% gravel, 40% sand, [STONY ALLUVIUM].					
17												
18												
19												
20			D-6	44	27-50/5" 72							
21												
22												
23												
24												
25												
26												
27												
28												
29												

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-05

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 20.7 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459336 **Longitude:** -110.792765 **Elevation:** 6128.04
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Material Description
1–4		D-1	67	6-6-7 20	GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].
5–7		D-2	73	5-6-6 19	SILTY GRAVEL with Sand (GM): slightly moist, reddish brown tannish gray, medium dense, 65% gravel, 20% sand, 15% fines, [COLLUVIUM].
8–9		D-3			
10–11		D-4	83	6-7-9 24	
12–14		D-5	80	6-6-9 23	

Atterberg Limits: Liquid Limit, Plastic Limit, Plasticity Index

Moisture Content (%); Dry Unit Wt. (pcf); Pocket Pen. (tsf)

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-05

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 20.7 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459336 **Longitude:** -110.792765 **Elevation:** 6128.04
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16			U-1				SILTY GRAVEL with Sand (GM): slightly moist, reddish brown tannish gray, medium dense, 65% gravel, 20% sand, 15% fines, [COLLUVIUM].					
17												
18							Well-Graded GRAVEL with Sand (GW): dry, tannish white, very dense, 52% gravel, 34.5% sand, 13.5% FINES [STONY ALLUVIUM].					
19												
20			D-6	71	30-50/2" 58							
21												
22												
23												
24												
25												
26												
27												
28												
29												

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-06

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 20.4 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459108 **Longitude:** -110.792812 **Elevation:** 6128.47
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Material Description
0					GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].
2		D-1	57	5-9-11 29	Silty GRAVEL with Sand (GM): dry, tannish white reddish brown, medium dense, 50% gravel, 30% sand, 20% fines, subangular, strong, [COLLUVIUM].
5		D-2	73	13-10-17 36	
7		D-3	80	5-12-12 35	
12		D-4	67	5-9-8 25	
14		D-5			Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].

Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Plastic Limit	Plasticity Index

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
□ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-06

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 17 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 20.4 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459108 **Longitude:** -110.792812 **Elevation:** 6128.47
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16				73	2-3-5 13	1.25	Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].					
17												
18							Well-Graded GRAVEL with Sand (GW): dry, whitish tan, very dense, 45 % gravel, 55 % sand, subrounded, strong, [STONY ALLUVIUM].					
19												
20			D-6	75	50/5" 76							
21												
22												
23												
24												
25												
26												
27												
28												
29												

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊥ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-07

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 18 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 40.9 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459943 **Longitude:** -110.792468 **Elevation:** 6151.79
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
0							GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].					
2			D-1	33	5-5-7 15		SILTY GRAVEL with Sand (GM): slightly moist, reddish brown, medium dense, 50 % gravel, 25 % sand, 25 % fines, angular, weak, [COLLUVIUM].					
5			D-2	33	6-7-6 16							
7			D-3	30	4-8-7 20							
10			D-4		14-7-7 17							
14			D-5									

SPT N1(60) 8 16 24 32
MC (%)
PL & LL (%) 20 40 60 80
Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-07

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 18 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 40.9 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459943 **Longitude:** -110.792468 **Elevation:** 6151.79
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16				47	5-9-8 22		SILTY GRAVEL with Sand (GM): slightly moist, reddish brown, medium dense, 50 % gravel, 25 % sand, 25 % fines, angular, weak, [COLLUVIUM].					
17												
18			U-1				LEAN CLAY with Sand (CL): slightly moist, light brown, stiff to medium stiff, pinholed, 15% sand, 85% fines, Gray clay skins [LOESS].					
19												
20			U-2				SILTY GRAVEL with Sand (GM): dry to slightly moist, reddish brown tannish white, medium dense, clast supported, 48% gravel, 26.7% sand, 25.7% fines, subangular, strong, [COLLUVIUM].					
21												
22												
23												
24												
25			D-6	80	10-13-11 27			8		19	18	1
26												
27												
28												
29							SANDY LEAN CLAY with Gravel (CL-ML): moist, brown, medium stiff to medium stiff, 10% gravel, 30% sand, 60% fines, [FINE-GRAINED ALLUVIUM].					
			D-7									

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-07

Client: John Huffman
Project Number: 22212
Date Started: Jan 17 2023 **Completed:** Jan 18 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 40.9 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459943 **Longitude:** -110.792468 **Elevation:** 6151.79
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
31				80	4-6-4 13		SANDY LEAN CLAY with Gravel (CL-ML): moist, brown, medium stiff to medium stiff, 10% gravel, 30% sand, 60% fines, [FINE-GRAINED ALLUVIUM].					
32			U-3									
33												
34							Well-Graded SAND with Gravel (SW): dry to slightly moist, tannish brown, very dense, 45% gravel, 55% sand, subrounded, [STONY ALLUVIUM].					
35			D-8									
36				60	28-27-50 88							
37												
38												
39												
40			D-9	89	22-50/5" 63							
41												
42												
43												
44												

SPT N1(60) 8 16 24 32
MC (%)
PL & LL (%) 20 40 60 80
Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-08

Client: John Huffman
Project Number: 22212
Date Started: Jan 18 2023 **Completed:** Jan 18 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 31.0 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459574 **Longitude:** -110.792546 **Elevation:** 6138.80
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
1							GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].					
2												
3			D-1	60	7-8-9 23							
4							SILTY GRAVEL with Sand (GM): slightly moist, reddish brown tan, medium dense to medium dense, clast supported, 55 % gravel, 15 % sand, 30 % fines, subangular, [COLLUVIUM].					
5			D-2	67	9-11-10 27							
6												
7			D-3	40	5-8-6 21							
8												
9						4.50	LEAN CLAY with Gravel (CL): dry to slightly moist, brown, hard, pinholed, Lime stringers [LOESS].					
10			U-1									
11							SILTY GRAVEL with Sand (GM): slightly moist, reddish brown tan, medium dense, clast supported, 55 % gravel, 15 % sand, 30 % fines, subangular, [COLLUVIUM].					
12												
13			D-4	47	8-26-13 52							
14												
			D-5									

SPT N1(60) 8 16 24 32
MC (%)
PL & LL (%) 20 40 60 80
Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-08

Client: John Huffman
Project Number: 22212
Date Started: Jan 18 2023 **Completed:** Jan 18 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 31.0 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459574 **Longitude:** -110.792546 **Elevation:** 6138.80
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16				100	7-10-10 27		SILTY GRAVEL with Sand (GM): slightly moist, reddish brown tan, medium dense, clast supported, 55 % gravel, 15 % sand, 30 % fines, subangular, [COLLUVIUM].					
17												
18							Sandy LEAN CLAY with Gravel (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, 21% gravel, 24.1% sand, 54.9% fines, [FINE-GRAINED ALLUVIUM].					
19												
20			D-6					20		25	17	8
21				87	3-3-4 11							
22												
23							Well-Graded GRAVEL with Sand (GW): dry to slightly moist, grayish tan, dense, clast supported, 70% gravel, 25% sand, 5% fines, subrounded, strong, Shattered cobbles [STONY ALLUVIUM].					
24												
25			D-7									
26				65	34-50 54							
27												
28												
29												
			D-8									

SPT N1(60) 8 16 24 32
MC (%)
PL & LL (%) 20 40 60 80
Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-08

Client: John Huffman
Project Number: 22212
Date Started: Jan 18 2023 **Completed:** Jan 18 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 31.0 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459574 **Longitude:** -110.792546 **Elevation:** 6138.80
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
31				75	35-50 53		Well-Graded GRAVEL with Sand (GW): dry to slightly moist, grayish tan, dense, clast supported, 70% gravel, 25% sand, 5% fines, subrounded, strong, Shattered cobbles [STONY ALLUVIUM].					

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊥ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-09

Client: John Huffman
Project Number: 22212
Date Started: Jan 18 2023 **Completed:** Jan 18 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: Truck Mount
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 11.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459471 **Longitude:** -110.793013 **Elevation:** 6126.63
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	▲ SPT N1(60) 8 16 24 32 / ● MC (%) / ⊢ PL & LL (%) 20 40 60 80 / ☐ Fines Content (%) 20 40 60 80
1–4			D-1	100	16-28-14 50		GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].						
4–7			D-2	80	4-6-7 18		Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].						▲
7–11			D-3 D-4	67 53	17-23-39 70 7-21-22 53		Well-Graded GRAVEL with Sand (GW): dry to slightly moist, grayish tan, dense, clast supported, 70 % gravel, 25 % sand, 5 % fines, subrounded, strong, [STONY ALLUVIUM].						
12–14													

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-10

Client: John Huffman
Project Number: 22212
Date Started: Mar 20 2023 **Completed:** Mar 20 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 21.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.458610 **Longitude:** -110.793050 **Elevation:** 6130.17
Notes: Stopped at request. No groundwater encountered during drilling. Installed groundwater sandpiper to total depth. Capped with flushmount.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
1			D-1	33	2-4-6 17		GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].					
2												
3			U-1									
4							Slightly moist, dark brown, soft, homogeneous, 20 % sand, 80 % fines, [TOPSOIL].					
5			D-2	60	3-5-3 13							
6												
7							SANDY SILT (ML): moist, tan, very stiff, pinholed, 20 % sand, 80 % fines, [LOESS].					
8			D-3	60	2-3-4 12							
9			D-3									
10			U-2			4.50						
11												
12												
13							LEAN CLAY with Gravel (CL): moist, grayish red, medium stiff, matrix supported, 15% gravel, 20% sand, 65% fines, low plasticity, angular, poorly graded, Ash present [COLLUVIUM].					
14												

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-10

Client: John Huffman
Project Number: 22212
Date Started: Mar 20 2023 **Completed:** Mar 20 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 21.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.458610 **Longitude:** -110.793050 **Elevation:** 6130.17
Notes: Stopped at request. No groundwater encountered during drilling. Installed groundwater sandpiper to total depth. Capped with flushmount.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16			D-4	90	4-3-4		Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].					
			D-4		12							
17												
18							Well-Graded GRAVEL with Sand (GW): dry, whitish tan, medium dense, 45 % gravel, 55 % sand, subrounded, [STONY ALLUVIUM].					
19												
20			D-5	60	24-30-37							
21					76							
22												
23												
24												
25												
26												
27												
28												
29												

SPT N1(60) 8 16 24 32
MC (%)
PL & LL (%) 20 40 60 80
Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-11

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 25.8 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.458730 **Longitude:** -110.792900 **Elevation:** 6131.83
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
1		D-1	70	4-9-22/0" 42		GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].					
3		D-2	30	3-3-3/0" 10		LEAN CLAY with Sand (CL): moist, reddish brown, medium stiff, 10 % sand, 90 % fines, [COLLUVIUM].					
5		D-3	87	1-3-4 12		LEAN CLAY with Sand (CL): slightly moist to moist, light reddish brown, medium stiff, pinholed, 10 % sand, 90 % fines, [LOESS].					
8		U-1				SILTY GRAVEL with Sand (GM): very moist, light reddish tan, very loose, 30% gravel, 30 % sand, 40 % fines, Ruined shelby [COLLUVIUM].					
11		D-5	60	6-7-9 23							

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-11

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 25.8 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.458730 **Longitude:** -110.792900 **Elevation:** 6131.83
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16			D-6	93	2-1-3		SILTY GRAVEL with Sand (GM): very moist, light reddish tan, very loose, 30% gravel, 30 % sand, 40 % fines, Ruined shelby [COLLUVIUM].					
			D-6		7							
			U-1				Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].	13				
17												
18												
19												
20			D-7	56	35-50/5"		Well-Graded GRAVEL with Sand (GW): dry, tannish white brown, very dense, 60 % gravel, 40 % sand, subrounded, [STONY ALLUVIUM].					
21					45							
22												
23												
24												
25			D-8	56	32-50/4"							
					45							
26												
27												
28												
29												

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
□ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-12

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 26.0 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459050 **Longitude:** -110.792870 **Elevation:** 6127.83
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
0		D-1	300	50/1" 94		GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, Frozen [FILL].					
2		G-1 U-1				SILTY GRAVEL with Sand (GM): slightly moist, reddish brown, medium dense, 40% gravel, 35% sand, 25% fines, Shoe appears to be Loess [COLLUVIUM].					
5		D-3	67	5-8-6 20							
7						LEAN CLAY with Sand (CL): light tan, pinholed, 10 % sand, 90 % fines, [LOESS].					
8		U-2									
9						SILTY GRAVEL with Sand (GM): brown, medium dense, 45 % gravel, 25 % sand, 30 % fines, [COLLUVIUM].					
10		U-1									
14						Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].					

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-12

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 26.0 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459050 **Longitude:** -110.792870 **Elevation:** 6127.83
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16		D-5	53	5-6-6 18	Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].	19				
17										
18		U-2								
19					Well-Graded GRAVEL with Sand (GW): whitish tan brown, very dense, 60 % gravel, 40 % sand, subrounded, [STONY ALLUVIUM].					
20										
21		D-6	67	17-28-36 65						
22										
23										
24										
25		D-7	67	35-50/5" 45						
26										
27										
28										
29										

Pocket Pen. (tsf)

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
□ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-13

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 26.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459260 **Longitude:** -110.792860 **Elevation:** 6127.47
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Material Description
0		D-1	70	32-50 47	GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].
2		D-2	107	10-13-20 40	Well-Graded GRAVEL with Sand (GW): whitish tan brown, medium dense, 30 % gravel, 40 % sand, 20 % fines, subrounded, Rock in shoe [COLLUVIUM].
5		D-3	87	8-7-9 23	
7		U-1			
10		D-4	60	13-11-12 33	

Pocket Pen. (tsf)

Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Plastic Limit	Plasticity Index

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊢ PL & LL (%) 20 40 60 80
☐ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-13

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 26.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459260 **Longitude:** -110.792860 **Elevation:** 6127.47
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16		D-5	80	6-8-8 22	Well-Graded GRAVEL with Sand (GW): whitish tan brown, medium dense, 30 % gravel, 40 % sand, 20 % fines, subrounded, Rock in shoe [COLLUVIUM].					
19					Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].					
20		D-6	100	0-0-1 2						
22					Well-Graded GRAVEL with Sand (GW): whitish tan brown, very dense, 60 % gravel, 40 % sand, subrounded, [STONY ALLUVIUM].					
25		D-7	60	17-34-45 72						

SPT N1(60) 8 16 24 32
MC (%)
PL & LL (%) 20 40 60 80
Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-14

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 35.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459880 **Longitude:** -110.792460 **Elevation:** 6147.92
Notes: Stopped at request. No groundwater encountered during drilling. Installed groundwater sandpiper to total depth. Capped with flushmount.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
0			D-1	90	35-50 47		GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].					
2							SILTY GRAVEL with Sand (GM): slightly moist, reddish brown, loose, 60 % gravel, 25 % sand, 15 % fines, iron oxide staining, weak HCL reaction, [COLLUVIUM].					
3			D-2	50	12-13-9 30							
5			D-3	53	7-7-6 19							

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊥ PL & LL (%) 20 40 60 80
□ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-14

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 35.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459880 **Longitude:** -110.792460 **Elevation:** 6147.92
Notes: Stopped at request. No groundwater encountered during drilling. Installed groundwater sandpiper to total depth. Capped with flushmount.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16							SILTY GRAVEL with Sand (GM): slightly moist, reddish brown, loose, 60 % gravel, 25 % sand, 15 % fines, iron oxide staining, weak HCL reaction, [COLLUVIUM].					
17												
18			U-1				SANDY LEAN CLAY with Gravel (CL): moist, stiff, 15 % gravel, 15 % sand, 70 % fines, Partially colluvium [LOESS].	13				
19							SILTY GRAVEL with Sand (GM): slightly moist, reddish brown, loose, 60 % gravel, 25 % sand, 15 % fines, iron oxide staining, weak HCL reaction, [COLLUVIUM].					
20												
21												
22												
23												
24												
25												
26												
27												
28												
29							Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].					

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊥ PL & LL (%) 20 40 60 80
□ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-14

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 35.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459880 **Longitude:** -110.792460 **Elevation:** 6147.92
Notes: Stopped at request. No groundwater encountered during drilling. Installed groundwater sandpiper to total depth. Capped with flushmount.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
31			U-2				Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].	24				
32												
33							Well-Graded GRAVEL with Sand (GW): whitish tan brown, very dense, 60 % gravel, 40 % sand, subrounded, [STONY ALLUVIUM].					
34												
35			D-4	80	50 91							
36												
37												
38												
39												
40												
41												
42												
43												
44												

▲ SPT N1(60) 8 16 24 32
● MC (%)
⊥ PL & LL (%) 20 40 60 80
□ Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-15

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 26.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459620 **Longitude:** -110.792700 **Elevation:** 6134.82
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	▲ SPT N1(60) 8 16 24 32 / ● MC (%) / ⊢ PL & LL (%) 20 40 60 80 / □ Fines Content (%) 20 40 60 80
1–4							GRAVEL with Silt and Sand (GM): slightly moist to moist, light gray brown, medium dense, homogeneous, 45% gravel, 35% sand, 20% fines, fine to coarse grained, [FILL].						
4–11							Sandy LEAN CLAY with Gravel (CL): moist, loose, 25% gravel, 15% sand, 60% fines, Partially colluvium [LOESS].						
8			D-1	47	6-4-5 15								▲ at 15
10			U-1 D-2										
11–14							Well-Graded GRAVEL with Sand (GW): whitish tan brown, medium dense, 65 % gravel, 20 % sand, 15 % fines, subrounded, [COLLUVIUM].						
13				73	4-6-10 25								▲ at 25

JORGENSEN GEOTECHNICAL, LLC
1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Borehole ID: BH-15

Client: John Huffman
Project Number: 22212
Date Started: Mar 21 2023 **Completed:** Mar 21 2023
Drilling Contractor: Inberg-Miller
Drilling Method: 4-1/4" Hollow stem auger
Equipment: CME 550
Hammer Type: Automatic hammer

Project Name: Huffman - 1400 S Hwy 89
Project Location: Teton County, Wyoming
Total Depth: 26.5 ft
Logged By: Bruce Jackson **Checked By:** DB
Latitude: 43.459620 **Longitude:** -110.792700 **Elevation:** 6134.82
Notes: Stopped at request. No groundwater encountered during time of drilling. Backfilled with cuttings.

Depth	Graphic	Sampler Type	Number	Recovery % RQD	SPT Blow Count (N1)60	Pocket Pen. (tsf)	Material Description	Moisture Content (%)	Dry Unit Wt. (pcf)	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index
16							Well-Graded GRAVEL with Sand (GW): whitish tan brown, medium dense, 65 % gravel, 20 % sand, 15 % fines, subrounded, [COLLUVIUM].					
17												
18												
19												
20							Sandy SILTY CLAY (CL-ML): slightly moist to moist, dark brown, stiff to medium stiff, trace gravel, 30-35% sand, 65-70% fines, [FINE-GRAINED ALLUVIUM].					
21			U-2					19				
22							Well-Graded GRAVEL with Sand (GW): whitish tan brown, very dense, 60 % gravel, 40 % sand, subrounded, [STONY ALLUVIUM].					
23												
24												
25												
26			D-3	73	22-25-26 62							
27												
28												
29												

SPT N1(60) 8 16 24 32
MC (%)
PL & LL (%) 20 40 60 80
Fines Content (%) 20 40 60 80

JORGENSEN GEOTECHNICAL, LLC

PO Box 9550 · 1315 HWY 89 S., Suite 201
Jackson, WY 83002
PH: 307.733.5150
www.jorgeng.com

APPENDIX B

Laboratory Procedures and Results

Laboratory Testing

Laboratory Testing Procedures

Jorgensen Geotechnical field staff collected disturbed (i.e., SPT and grab) samples and relatively undisturbed (i.e., thin-walled, Shelby tubes) during the field exploration in January and March 2023. We submitted specimens for testing to the SK Geotechnical soils laboratory in Billings, Montana. Laboratory testing included natural moisture content, Atterberg limits, grain-size distribution, direct shear, direct shear, and consolidation-swell testing. Results are shown on the following pages.

The laboratory testing program consisted of:

- Seven (7) Moisture Content (ASTM D2216)
- Five (5) Atterberg Limits (ASTM D4318)
- Seven (7) Grain Size Analysis (ASTM C136)
- Five (5) Consolidation (ASTM D2435)
- Four (4) Direct Shear (ASTM D3080)

Laboratory Test Results: Detailed Summary

Laboratory testing included index testing, for classification and indirect correlation with engineering parameters, and direct testing of strength and compressibility. Classification test results – including Atterberg limits and grain-size analysis – are summarized in Table 4.1, and the results of direct shear testing and consolidation tests are summarized in tables 4-2 and 4-3. Full laboratory data sheets included in this appendix.

Table 4-1: Classification Testing Result Summary

Bore Hole	Sample ID	Depth (ft)	Soil Unit	Gravel (%)	Sand (%)	Fines (%)	Moisture Content (%)	Liquid Limit	Plasticity Index
TP-1	D1	10	Colluvium	55.0	22.2	22.8	7.3	23	6
BH-7	D6	25	Colluvium	48.0	26.7	25.3	8.1	19	1
BH-3	D6	20	Stony Alluvium	39.0	43.6	17.4	4.4	-	-
BH-5	D6	20	Stony Alluvium	52.0	34.5	13.5	3.5	-	-
BH-8	D6	20	Fine-grained Alluvium	21.0	24.1	54.9	20.1	25	8
TP-2	D2	9	Loess	2.0	5.5	92.5	24.7	28	6

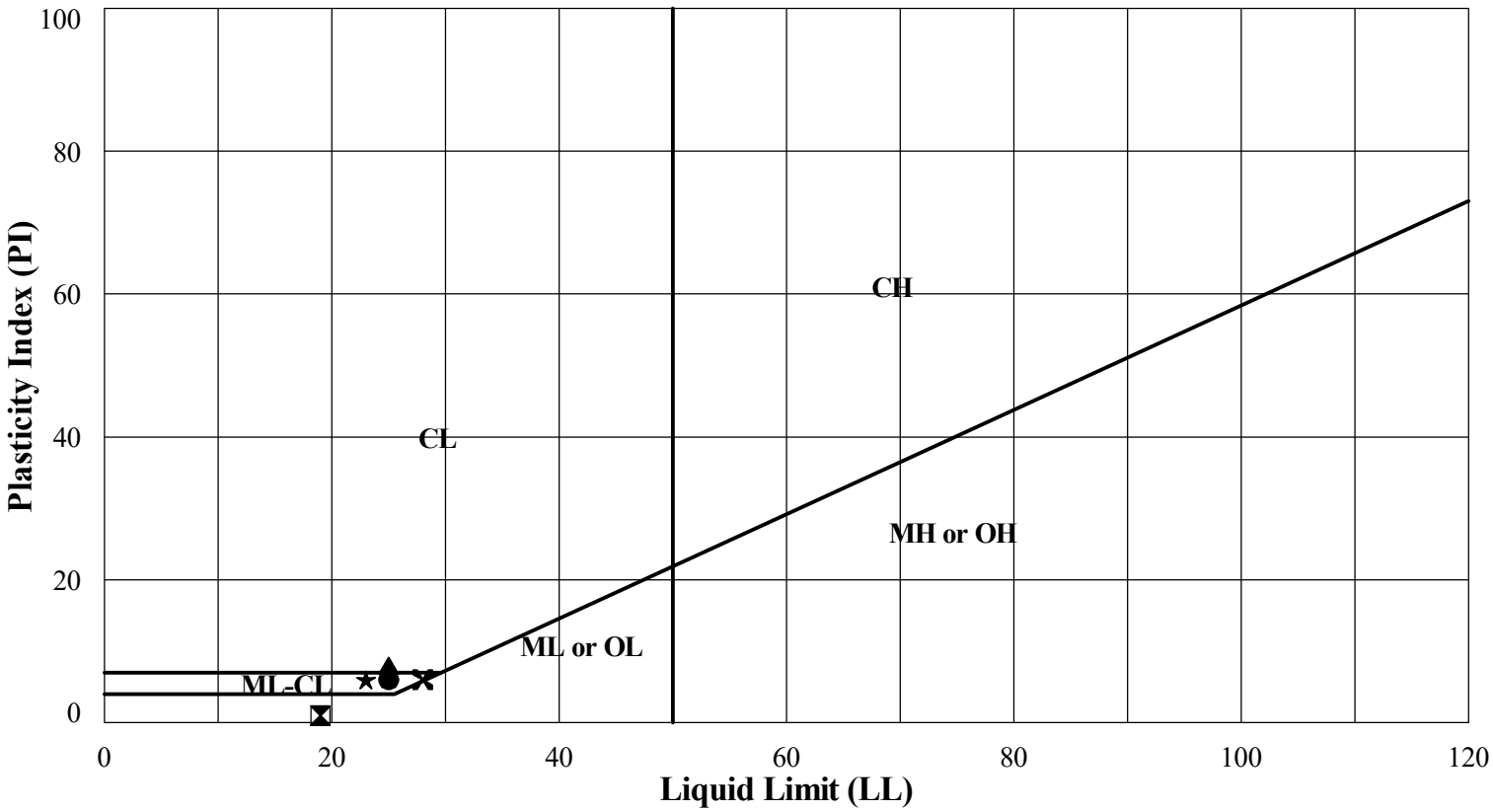
Table 4-2: Direct Shear Testing Result Summary

Bore Hole	Sample ID	Depth (ft)	Soil Unit	Dry Density (pcf)	Peak Angle ϕ', °	Peak Cohesion C, psf	Residual Angle ϕ_r', °	Residual Cohesion C_r, psf
BH-11	U2	16	Fine-grained Alluvium	98.4	25.3	860.2	23.4	768.6
BH-15	U2	21	Fine-grained Alluvium	106.6	25.1	308.5	24.6	407.9

BH-10	U2	10	Loess	106.0	26.0	702.7	23.7	771.1
BH-14	U1	17.5	Loess	126.9	28.9	644.8	28.4	423.2

Table 4-3: Consolidation Test Result Summary

Bore Hole	Sample ID	Depth (ft)	Soil Unit	Dry Density (pcf)	C_c	C_s	Void Ratio, e_0
BH-15	U2	21	Fine-grained Alluvium	106.6	0.16	0.01	0.552
BH-14	U2	30	Fine-grained Alluvium	94.6	0.26	0.02	0.749
BH-12	U2	17.5	Fine-grained Alluvium	106.3	0.15	0.01	0.556
BH-11	U1	16	Loess	86.5	0.23	0.02	0.912
BH-14	U1	17.5	Loess	117.6	0.10	0.02	0.407



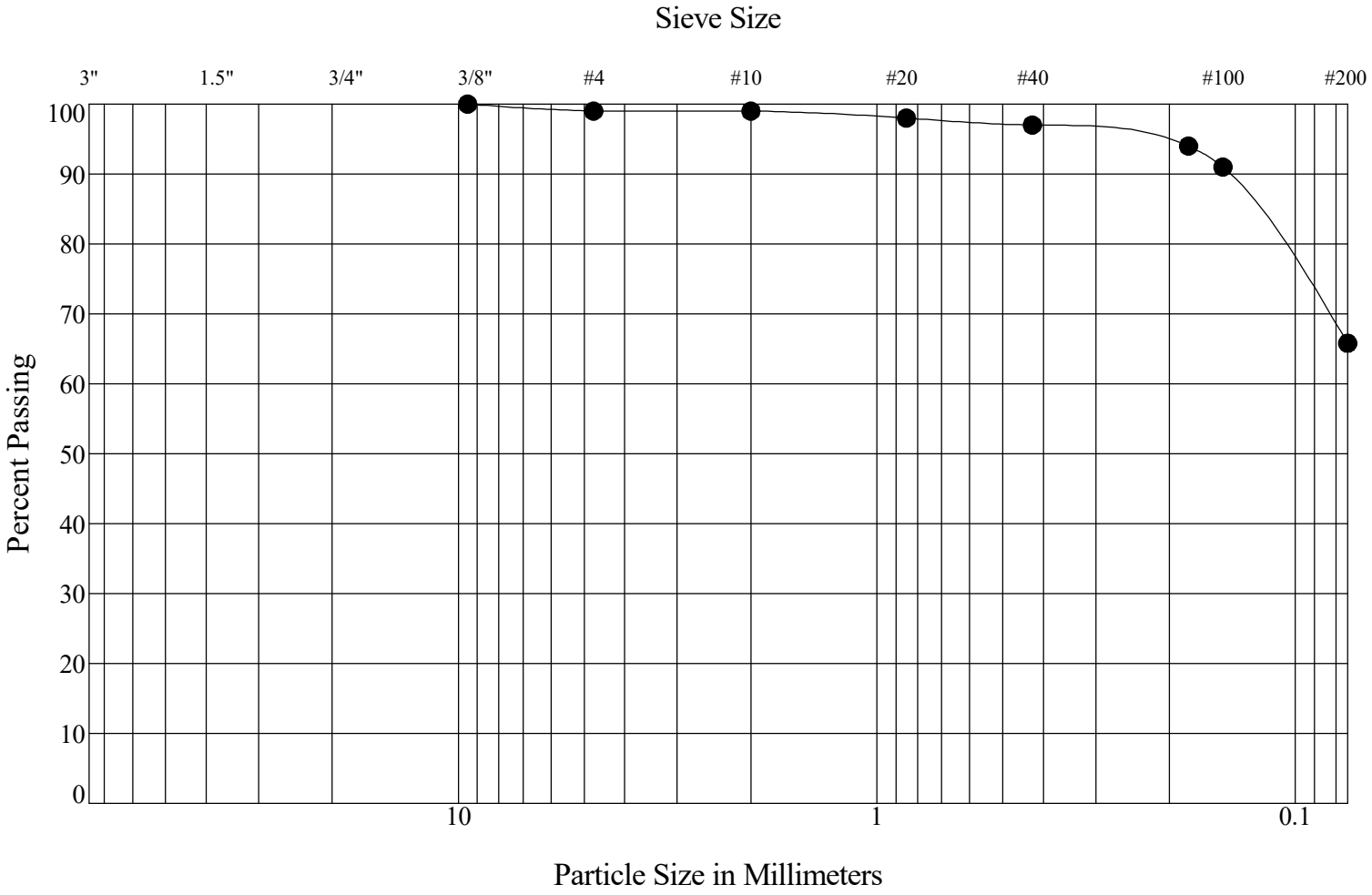
Legend	Boring	Sample No.	Depth	LL	PL	PI	P 200, %	MC	Classification
●	BH-1	D3	7.5'	25	19	6	65.8	15.4%	CL-ML
⊠	BH-7	D6	25'	19	18	1	25.3	8.1%	GM
▲	BH-8	D6	20'	25	17	8	54.9	20.1%	CL
★	TP-1	D1	10'	23	17	6	22.8	7.3%	GC-GM
✕	TP-2	D2	9'	28	22	6	92.5	24.7%	CL-ML

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Atterberg Limits Tests

Project Number: 15-3404L
22212 - 1400 S Hwy 89
Jorgensen Geotechnical

2/3/23



Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
			100	99	99	98	97	94	91	65.8

Borehole: BH-1
Sample No.: D3
Depth: 7.5'

Date Received: 2/2/2023

Liquid Limit:	25
Plastic Limit:	19
Plasticity Index:	6
Classification:	CL-ML
Moisture Content:	15.4%

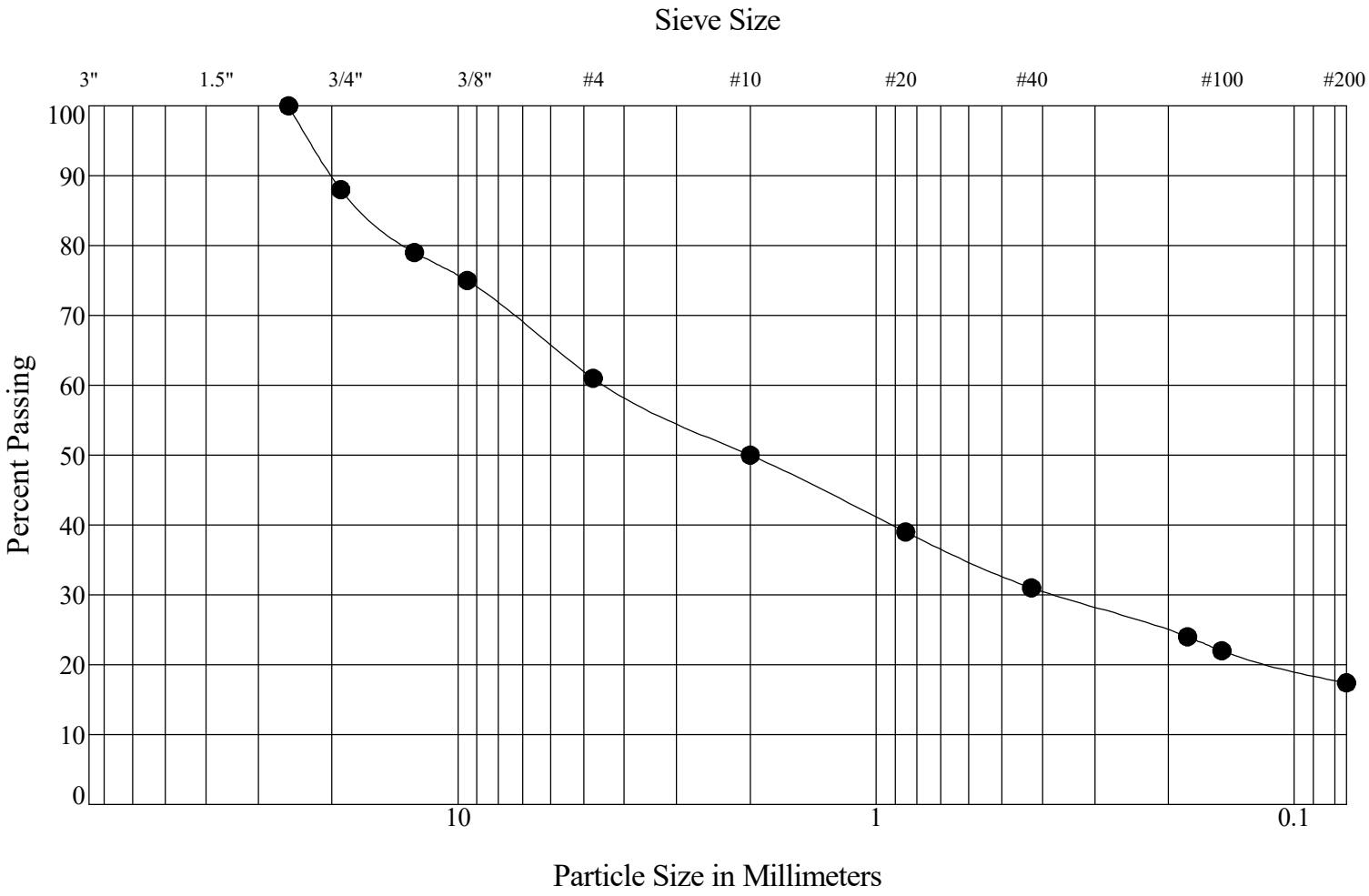
Percent Gravel: 1.0
Percent Sand: 33.2
Percent Silt + Clay: 65.8
ASTM Group Name: SANDY SILTY CLAY

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 15-3404L
22212 - 1400 S Hwy 89
Jorgensen Geotechnical

2/3/23



Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
		88	75	61	50	39	31	24	22	17.4

Borehole: BH-3
Sample No.: D6
Depth: 20'

Date Received: 2/2/2023

Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
Classification:	
Moisture Content:	4.4%

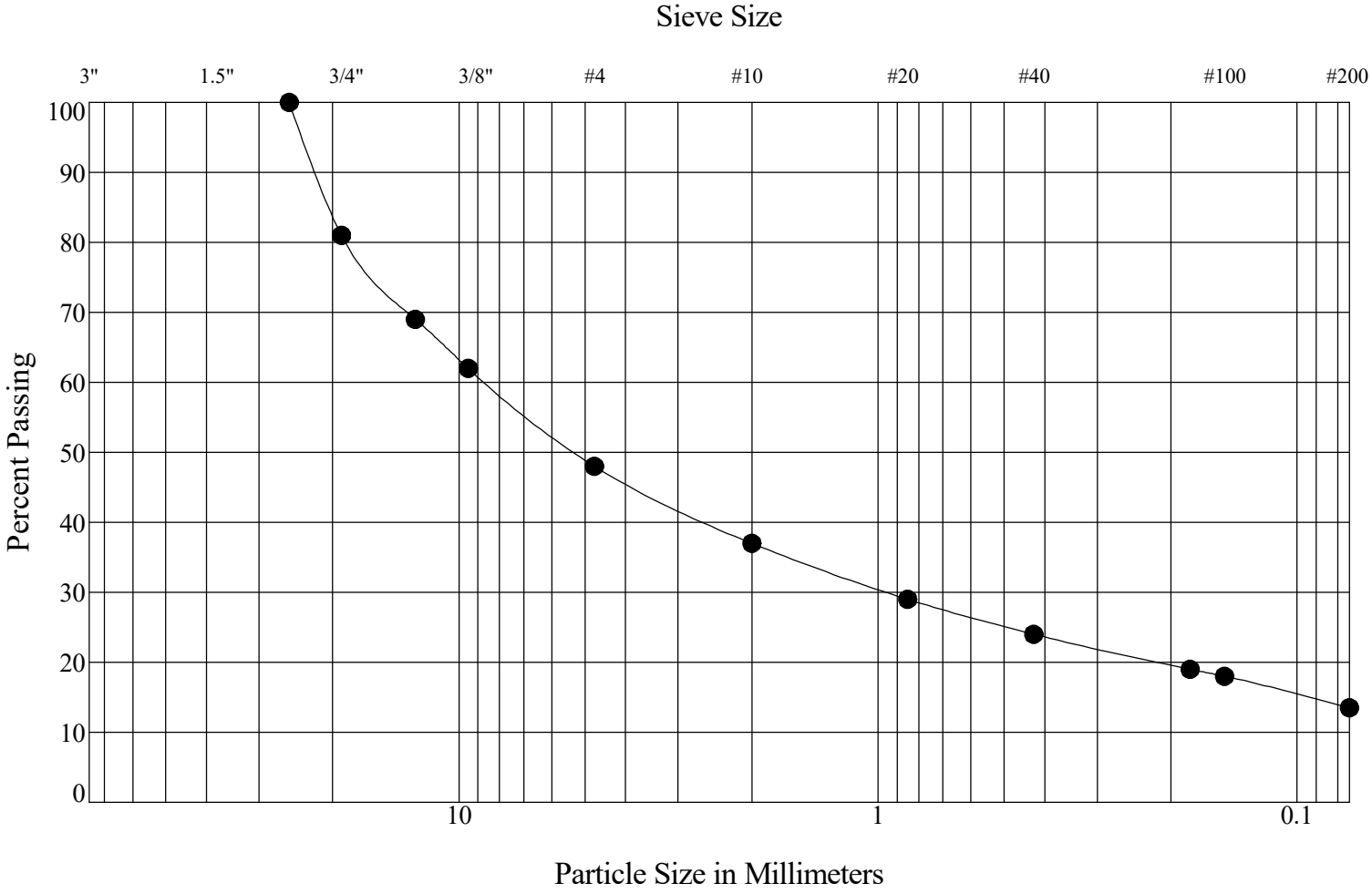
Percent Gravel: 39.0
Percent Sand: 43.6
Percent Silt + Clay: 17.4
ASTM Group Name:

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 15-3404L
22212 - 1400 S Hwy 89
Jorgensen Geotechnical

2/3/23



Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
		81	62	48	37	29	24	19	18	13.5

Borehole: BH-5
Sample No.: D6
Depth: 20'

Date Received: 2/2/2023

Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
Classification:	
Moisture Content:	3.5%

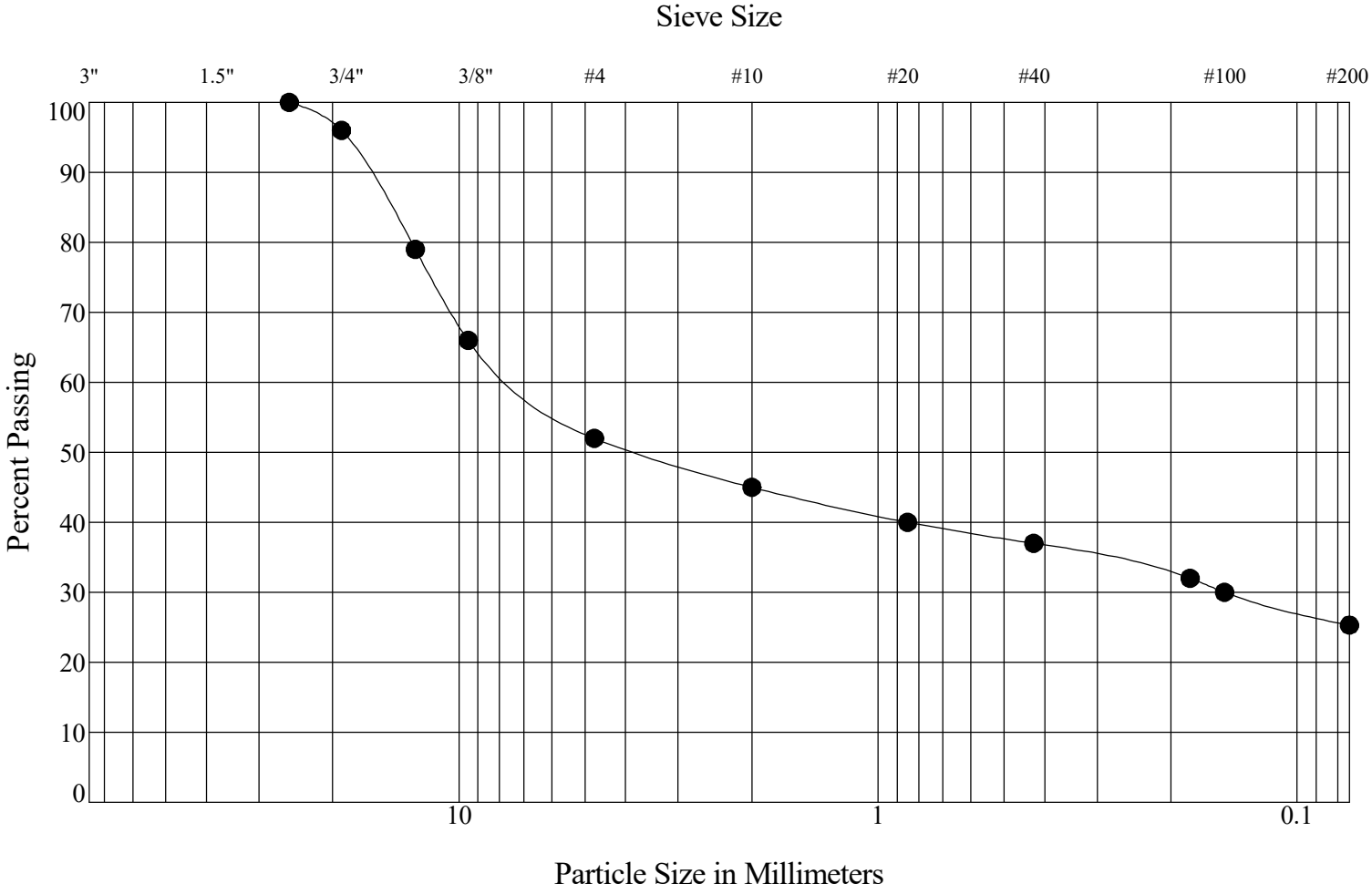
Percent Gravel: 52.0
Percent Sand: 34.5
Percent Silt + Clay: 13.5
ASTM Group Name:

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 15-3404L
22212 - 1400 S Hwy 89
Jorgensen Geotechnical

2/3/23



Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
		96	66	52	45	40	37	32	30	25.3

Borehole: BH-7
Sample No.: D6
Depth: 25'

Date Received: 2/2/2023

Liquid Limit:	19
Plastic Limit:	18
Plasticity Index:	1
Classification:	GM
Moisture Content:	8.1%

Percent Gravel: 48.0
Percent Sand: 26.7
Percent Silt + Clay: 25.3
ASTM Group Name: SILTY GRAVEL with SAND

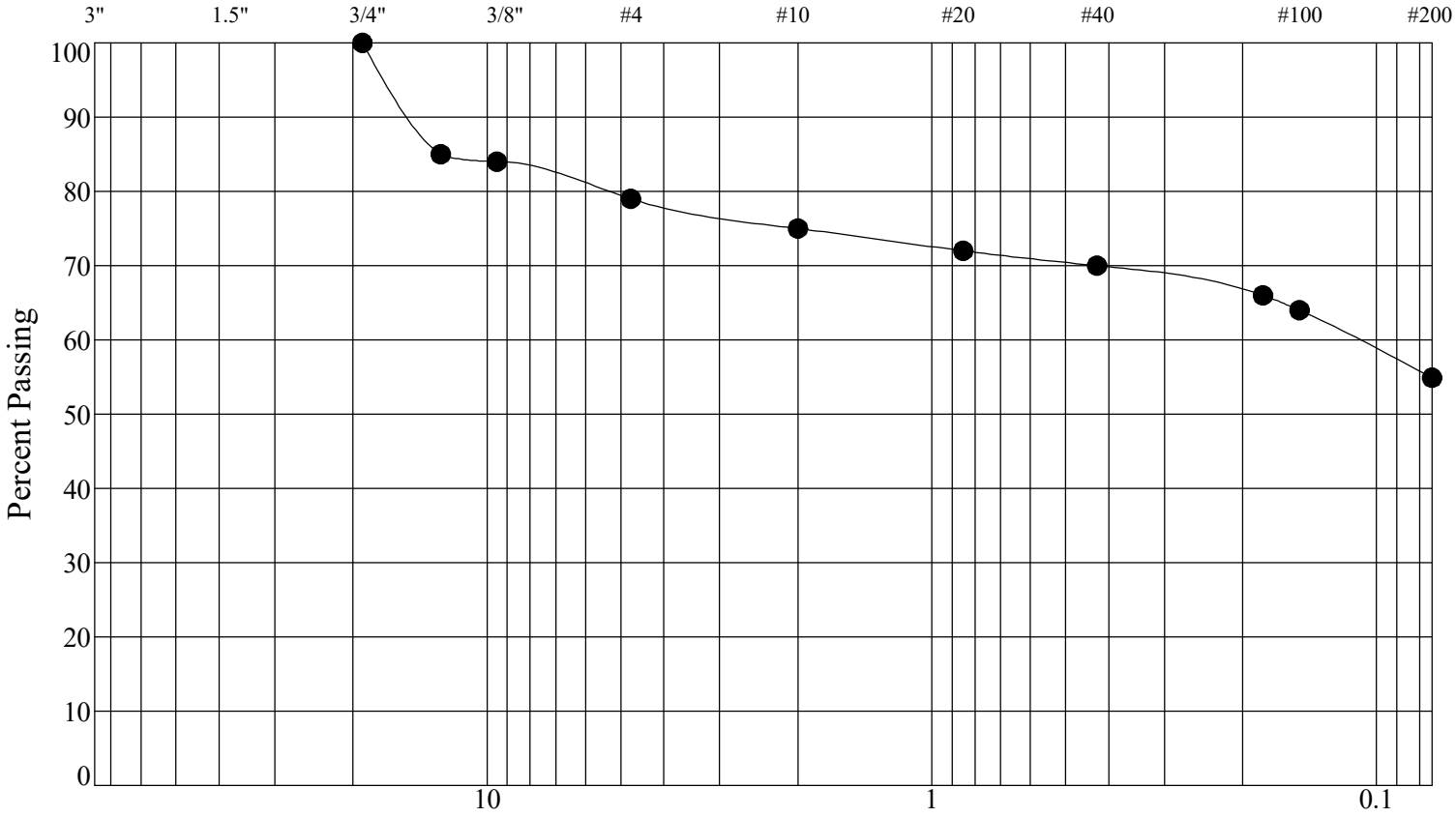
SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 15-3404L
22212 - 1400 S Hwy 89
Jorgensen Geotechnical

2/3/23

Sieve Size



Particle Size in Millimeters

Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
		100	84	79	75	72	70	66	64	54.9

Borehole: BH-8
Sample No.: D6
Depth: 20'

Date Received: 2/2/2023

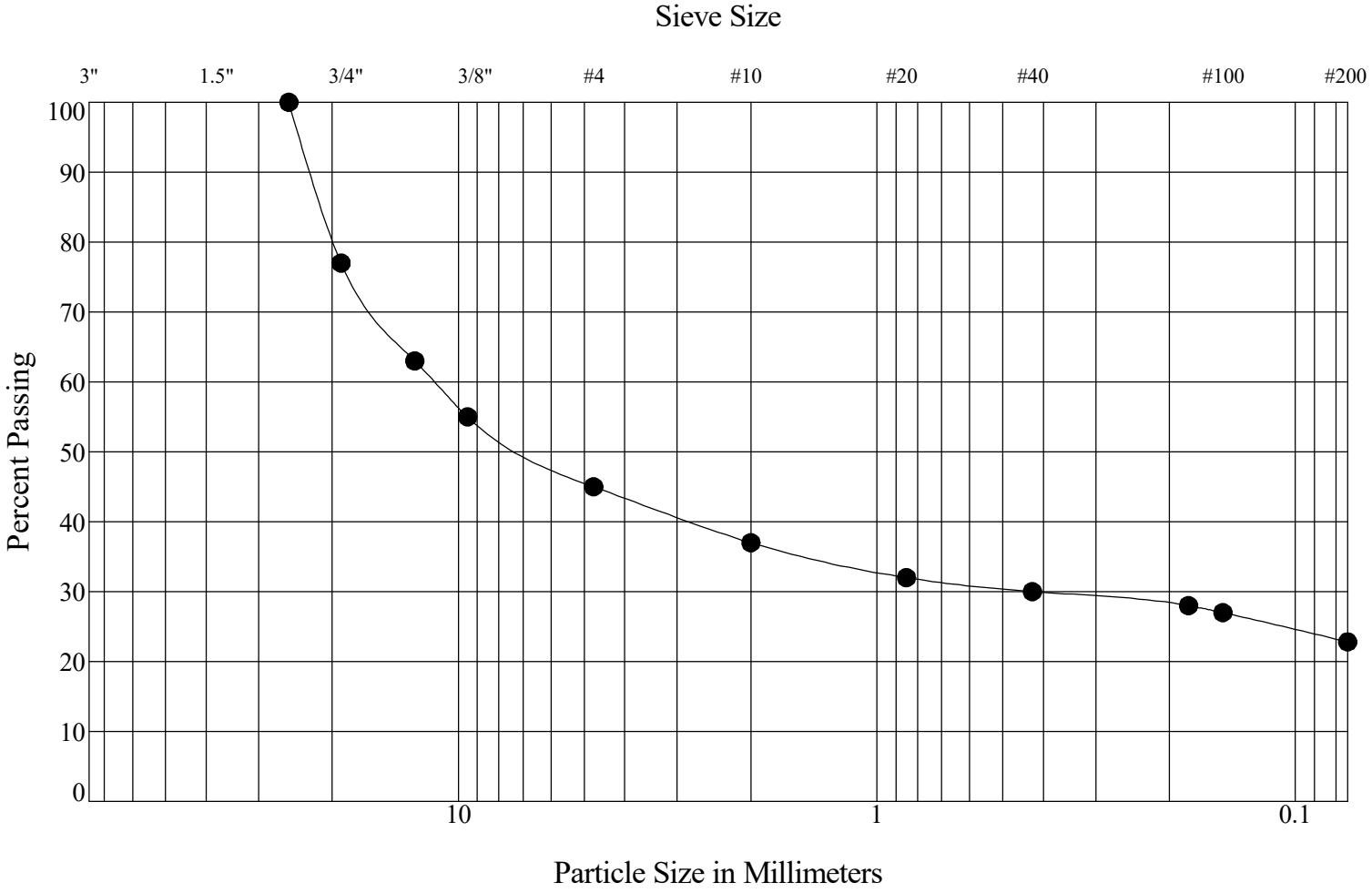
Liquid Limit:	25
Plastic Limit:	17
Plasticity Index:	8
Classification:	CL
Moisture Content:	20.1%

Percent Gravel: 21.0
Percent Sand: 24.1
Percent Silt + Clay: 54.9
ASTM Group Name: SANDY LEAN CLAY with GRAVEL

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis
Project Number: 15-3404L
22212 - 1400 S Hwy 89
Jorgensen Geotechnical

2/3/23



Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
		77	55	45	37	32	30	28	27	22.8

Borehole: TP-1
Sample No.: D1
Depth: 10'

Date Received: 2/2/2023

Liquid Limit:	23
Plastic Limit:	17
Plasticity Index:	6
Classification:	GC-GM
Moisture Content:	7.3%

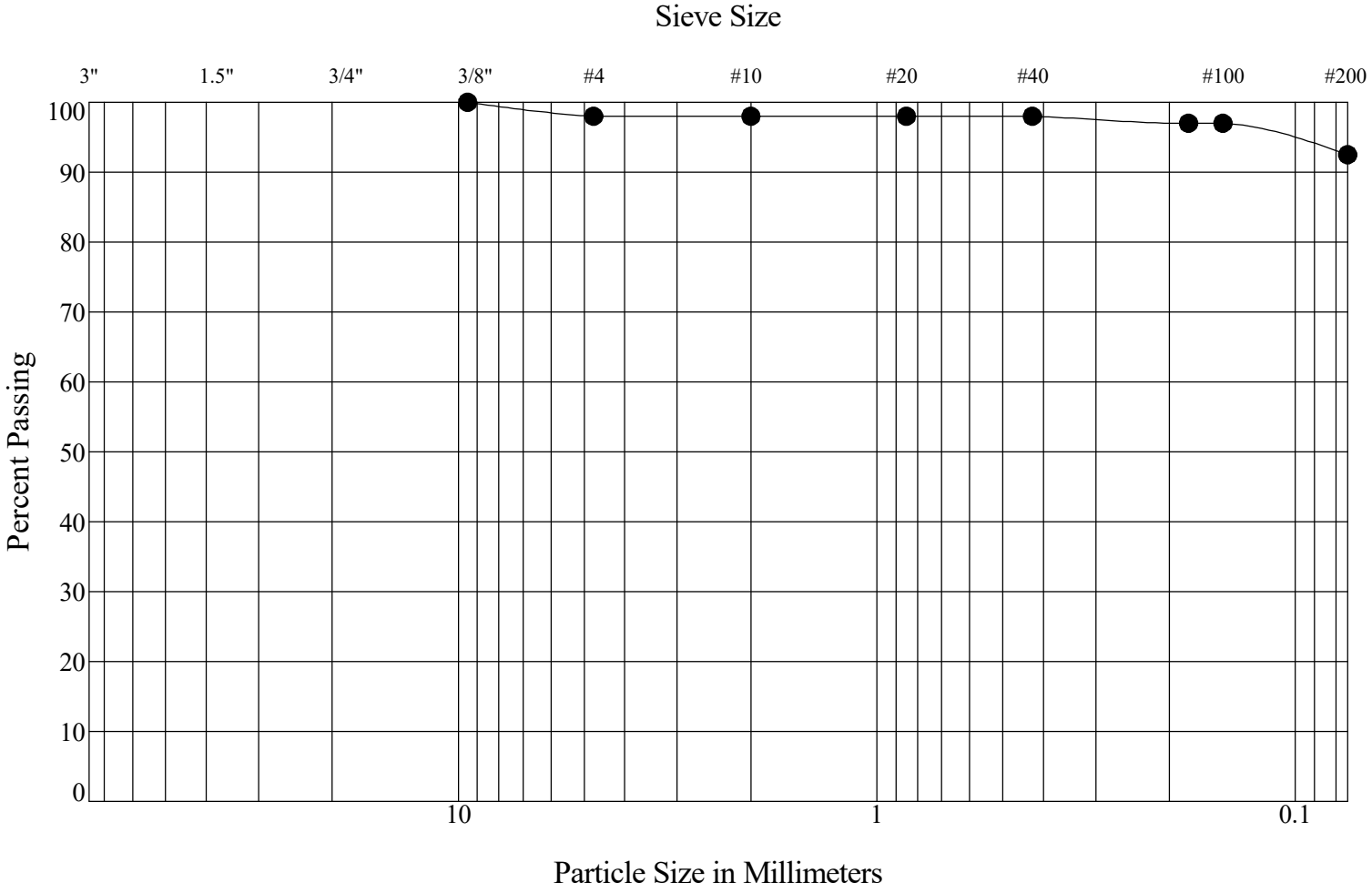
Percent Gravel: 55.0
Percent Sand: 22.2
Percent Silt + Clay: 22.8
ASTM Group Name: SILTY, CLAYEY GRAVEL with SAND

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 15-3404L
22212 - 1400 S Hwy 89
Jorgensen Geotechnical

2/3/23



Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
			100	98	98	98	98	97	97	92.5

Borehole: TP-2
Sample No.: D2
Depth: 9'

Date Received: 2/2/2023

Liquid Limit:	28
Plastic Limit:	22
Plasticity Index:	6
Classification:	CL-ML
Moisture Content:	24.7%

Percent Gravel: 2.0
Percent Sand: 5.5
Percent Silt + Clay: 92.5
ASTM Group Name: SILTY CLAY

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 15-3404L
22212 - 1400 S Hwy 89
Jorgensen Geotechnical

2/3/23

Direct Shear of Soils Under Consolidated Drained Conditions, ASTM D3080

Date: May 11, 2023

Project: **15-3404L Laboratory Testing**
Jorgensen 22212
Huffman, 1400 S Hwy 89

Client: Mr. Bruce Jackson
Jorgensen Geotechnical
PO Box 9550, 1315 HWY 89 S., Suite 201
Jackson, Wyoming 83002

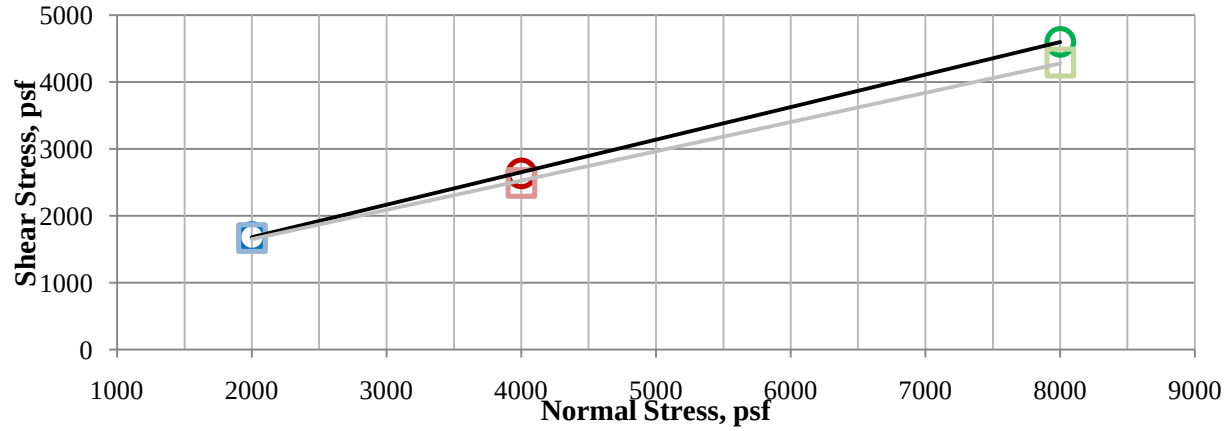
Sample Data:

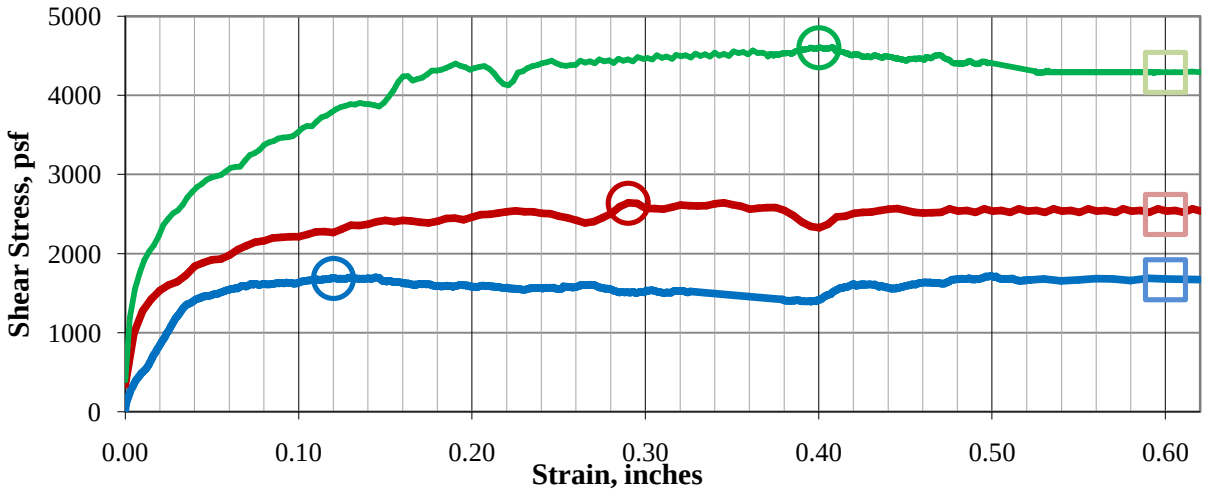
Boring: BH-10 U2 **Depth:** 10-11' **Density:** 106.0 moist pcf

Description: Silt (ML) with sand, trace lean clay and pinholes, orangish brown, moist, rather stiff

Normal Stress, psf	Initial Moisture,%	Final Moisture,%	Consol + Collapse,%	Final Wet Density, pcf	Final Dry Density, pcf	Max Shear Stress, psf	Failure Strain,%
2000	15.4	25.9	6.4	123.5	98.1	**1686**	**4.2**
4000	15.4	23.9	9.4	125.5	101.3	**2637**	**10.1**
8000	15.4	22.0	12.2	127.5	104.5	**4603**	**13.9**

Peak Angle, ϕ°	**26.0**	Peak Cohesion, C, psf	**702.7**	Strain rate, %/hour	**0.58**
Residual ϕ_r°	**23.7**	Residual C_r psf	**771.1**		





Remarks: Friction angle and cohesion in practice are sensitive to several other material properties, and conditions, in the field and lab. No individual lab property of a material can substitute for overall best practices in geotechnical design, construction, and field testing by qualified professionals.

Direct Shear of Soils Under Consolidated Drained Conditions, ASTM D3080

Date: May 11, 2023

Project: **15-3404L Laboratory Testing**
Jorgensen 22212
Huffman, 1400 S Hwy 89

Client: Mr. Bruce Jackson
Jorgensen Geotechnical
PO Box 9550, 1315 HWY 89 S., Suite 201
Jackson, Wyoming 83002

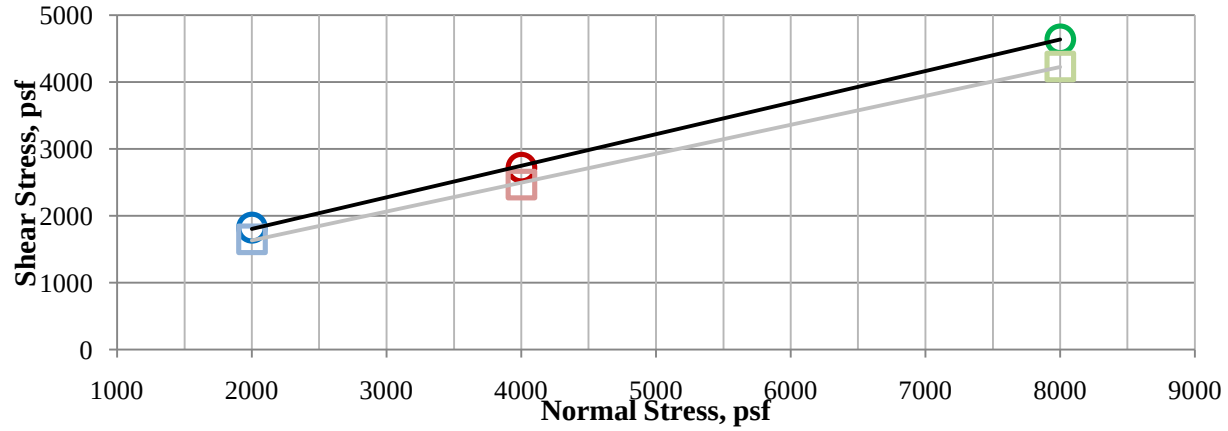
Sample Data:

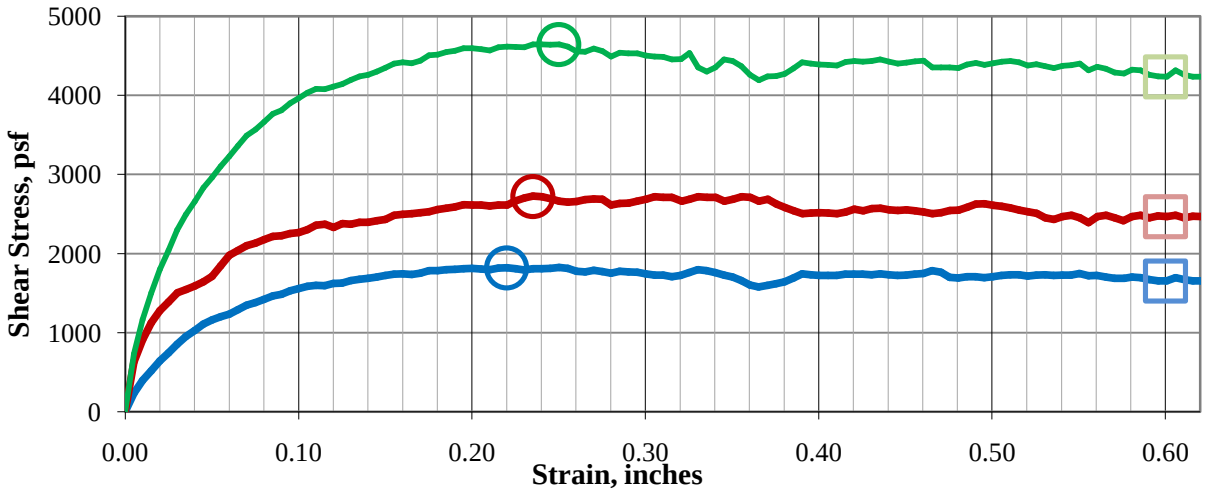
Boring: BH-11 U2 **Depth:** 16-17' **Density:** 98.4 moist pcf

Description: Lean clay (CL), low plasticity, trace gravel, pinholes, FeO, lignite, reddish brown, rather dry, very loose

Normal Stress, psf	Initial Moisture,%	Final Moisture,%	Consol + Collapse,%	Final Wet Density, pcf	Final Dry Density, pcf	Max Shear Stress, psf	Failure Strain,%
2000	13.1	30.9	4.3	119.0	90.9	**1821**	**7.7**
4000	13.1	28.8	7.2	120.8	93.8	**2722**	**8.2**
8000	13.1	26.0	11.1	123.4	97.9	**4643**	**8.7**

Peak Angle, ϕ°	**25.3**	Peak Cohesion, C, psf	**860.2**	Strain rate, %/hour	**0.58**
Residual ϕ_r°	**23.4**	Residual C_r psf	**768.6**		





Remarks: Friction angle and cohesion in practice are sensitive to several other material properties, and conditions, in the field and lab. No individual lab property of a material can substitute for overall best practices in geotechnical design, construction, and field testing by qualified professionals.

Direct Shear of Soils Under Consolidated Drained Conditions, ASTM D3080

Date: May 11, 2023

Project: **15-3404L Laboratory Testing**
Jorgensen 22212
Huffman, 1400 S Hwy 89

Client: Mr. Bruce Jackson
Jorgensen Geotechnical
PO Box 9550, 1315 HWY 89 S., Suite 201
Jackson, Wyoming 83002

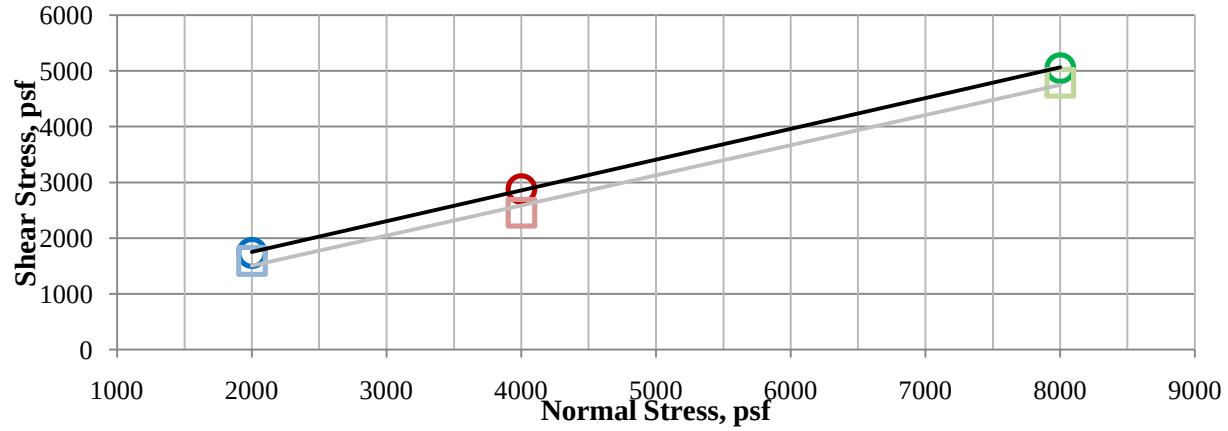
Sample Data:

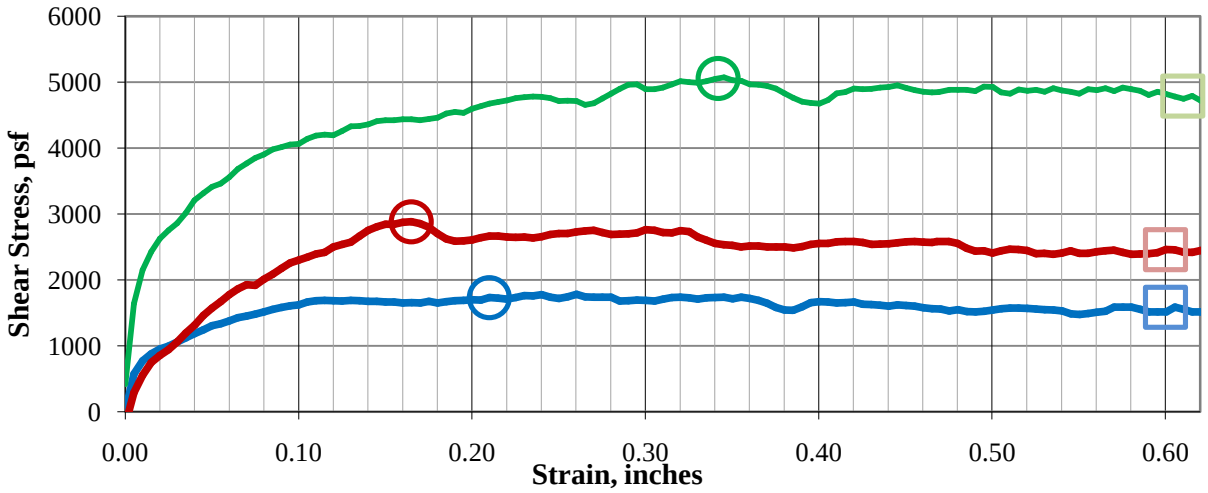
Boring: BH-14 U1 **Depth:** 17.5-18.5' **Density:** 126.9 moist pcf

Description: Lean clay (CL) with gravel, medium plasticity, trace sand, reddish brown, moist, stiff

Normal Stress, psf	Initial Moisture,%	Final Moisture,%	Consol + Collapse,%	Final Wet Density, pcf	Final Dry Density, pcf	Max Shear Stress, psf	Failure Strain,%
2000	12.5	15.4	4.0	135.5	117.4	**1731**	**7.3**
4000	12.5	14.7	5.3	136.5	119.0	**2883**	**5.7**
8000	12.5	13.7	7.1	138.0	121.3	**5054**	**11.9**

Peak Angle, ϕ°	**28.9**	Peak Cohesion, C, psf	**644.8**	Strain rate, %/hour	**0.58**
Residual ϕ_r°	**28.4**	Residual C_r psf	**423.2**		





Remarks: Friction angle and cohesion in practice are sensitive to several other material properties, and conditions, in the field and lab. No individual lab property of a material can substitute for overall best practices in geotechnical design, construction, and field testing by qualified professionals.

Direct Shear of Soils Under Consolidated Drained Conditions, ASTM D3080

Date: May 11, 2023

Project: **15-3404L Laboratory Testing**
Jorgensen 22212
Huffman, 1400 S Hwy 89

Client: Mr. Bruce Jackson
Jorgensen Geotechnical
PO Box 9550, 1315 HWY 89 S., Suite 201
Jackson, Wyoming 83002

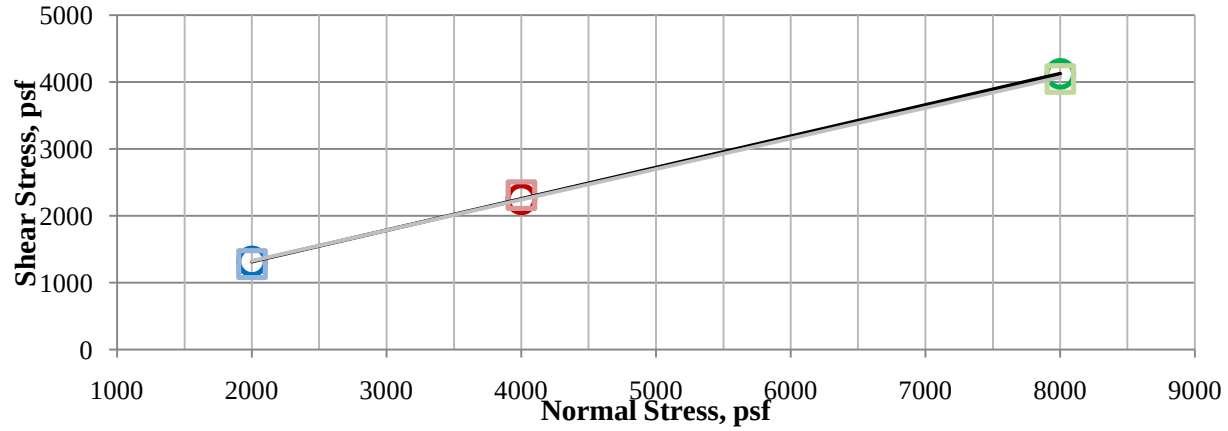
Sample Data:

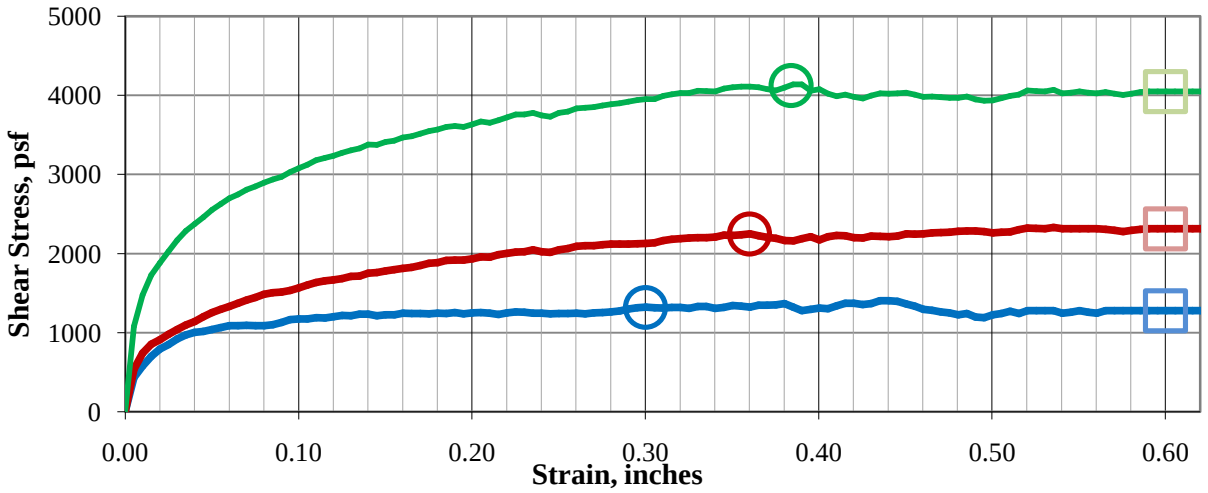
Boring: BH-15 U2 **Depth:** 21-22' **Density:** 106.6 moist pcf

Description: Lean clay (CL) with gravel, medium plasticity, reddish brown, rather wet, stiff

Normal Stress, psf	Initial Moisture,%	Final Moisture,%	Consol + Collapse,%	Final Wet Density, pcf	Final Dry Density, pcf	Max Shear Stress, psf	Failure Strain,%
2000	19.0	27.9	5.7	121.6	95.0	**1320**	**10.5**
4000	19.0	26.7	7.5	122.7	96.9	**2246**	**12.5**
8000	19.0	25.3	9.5	124.1	99.0	**4124**	**13.4**

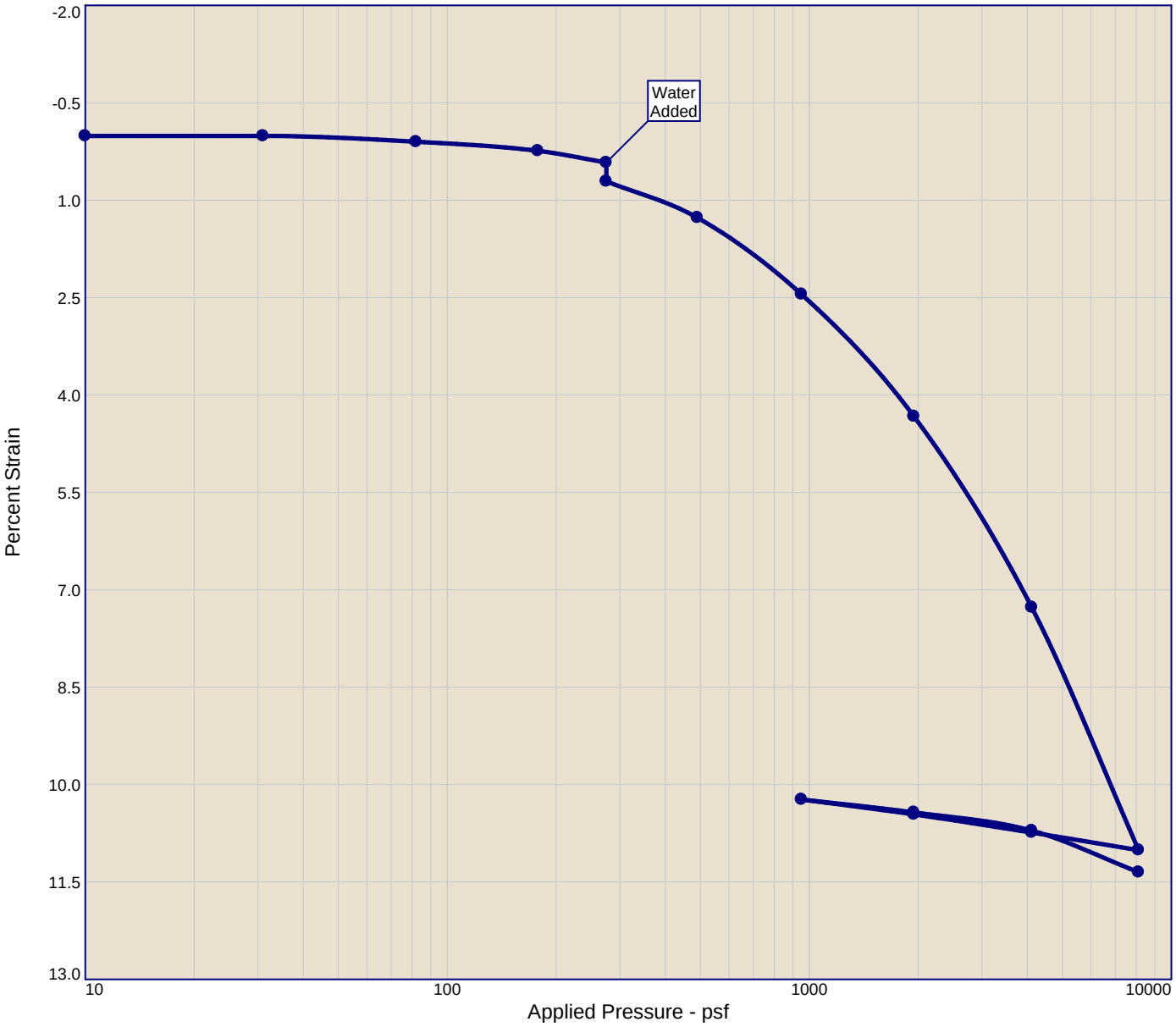
Peak Angle, ϕ°	**25.1**	Peak Cohesion, C, psf	**380.5**	Strain rate, %/hour	**0.58**
Residual ϕ_r°	**24.6**	Residual C_r psf	**407.9**		





Remarks: Friction angle and cohesion in practice are sensitive to several other material properties, and conditions, in the field and lab. No individual lab property of a material can substitute for overall best practices in geotechnical design, construction, and field testing by qualified professionals.

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
Sat.	Moist.											
38.1 %	13.1 %	86.5			2.65	1664	1910	0.23	0.02		0.3	0.912

MATERIAL DESCRIPTION	USCS	AASHTO
Lean clay (CL), low plasticity, trace gravel and pinholes, reddish brown, rather moist, medium	CL	

Project No. 15-3404L **Client:** Jorgensen Geotechnical

Project: 22212 - Huffman 1400 S Hwy 89

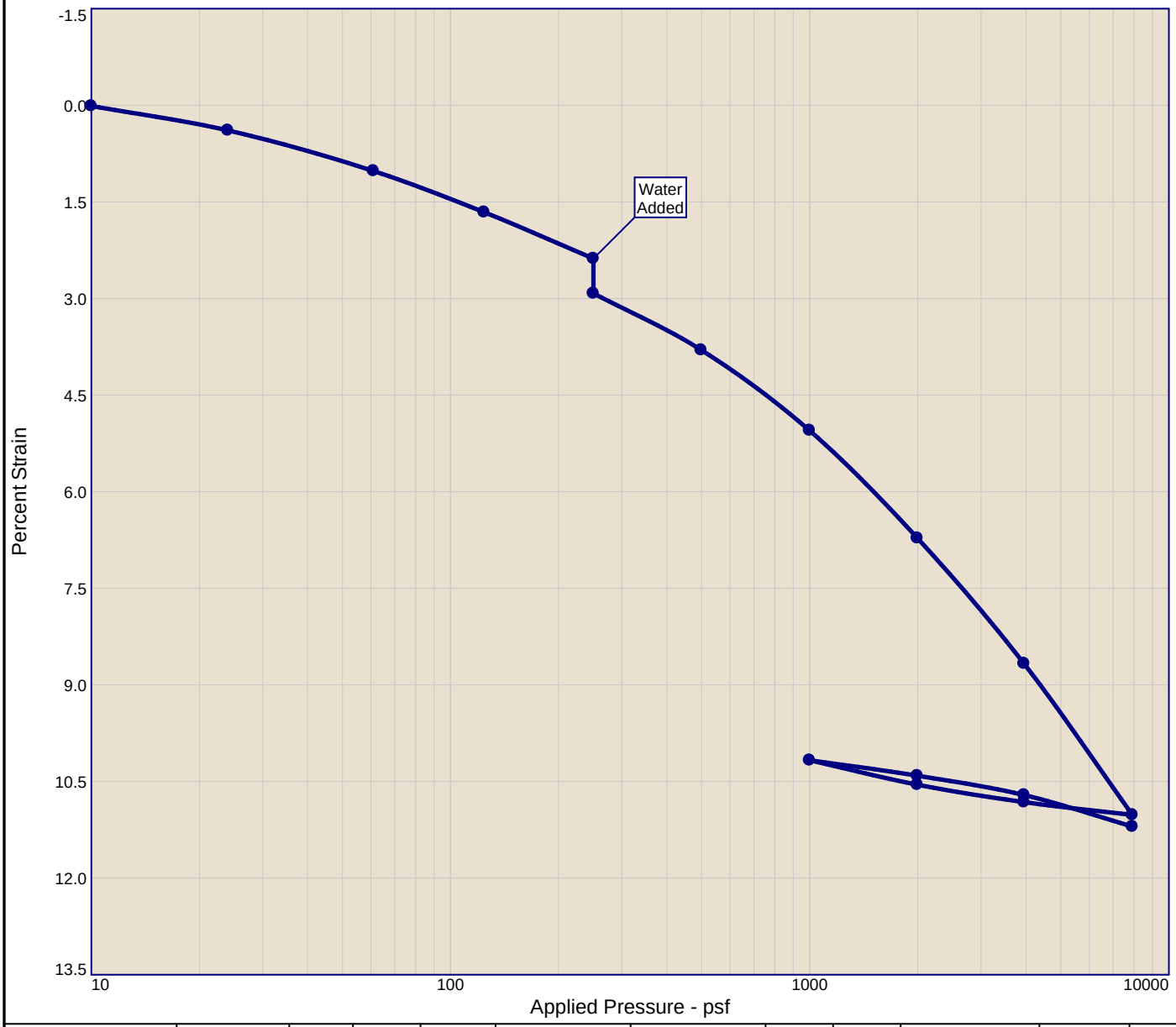
Location: BH-11 **Depth:** 16 - 17 ' **Sample Number:** U1

Remarks:

SK GEOTECHNICAL CORP.

Figure

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
Sat.	Moist.											
92.0 %	19.3 %	106.3			2.65	2347	2371	0.15	0.01		0.5	0.556

MATERIAL DESCRIPTION	USCS	AASHTO
Lean clay (CL) with gravel, medium plasticity, trace sand, reddish brown, rather wet, stiff	CL	

Project No. 15-3404L **Client:** Jorgensen Geotechnical

Project: 22212 - Huffman 1400 S Hwy 89

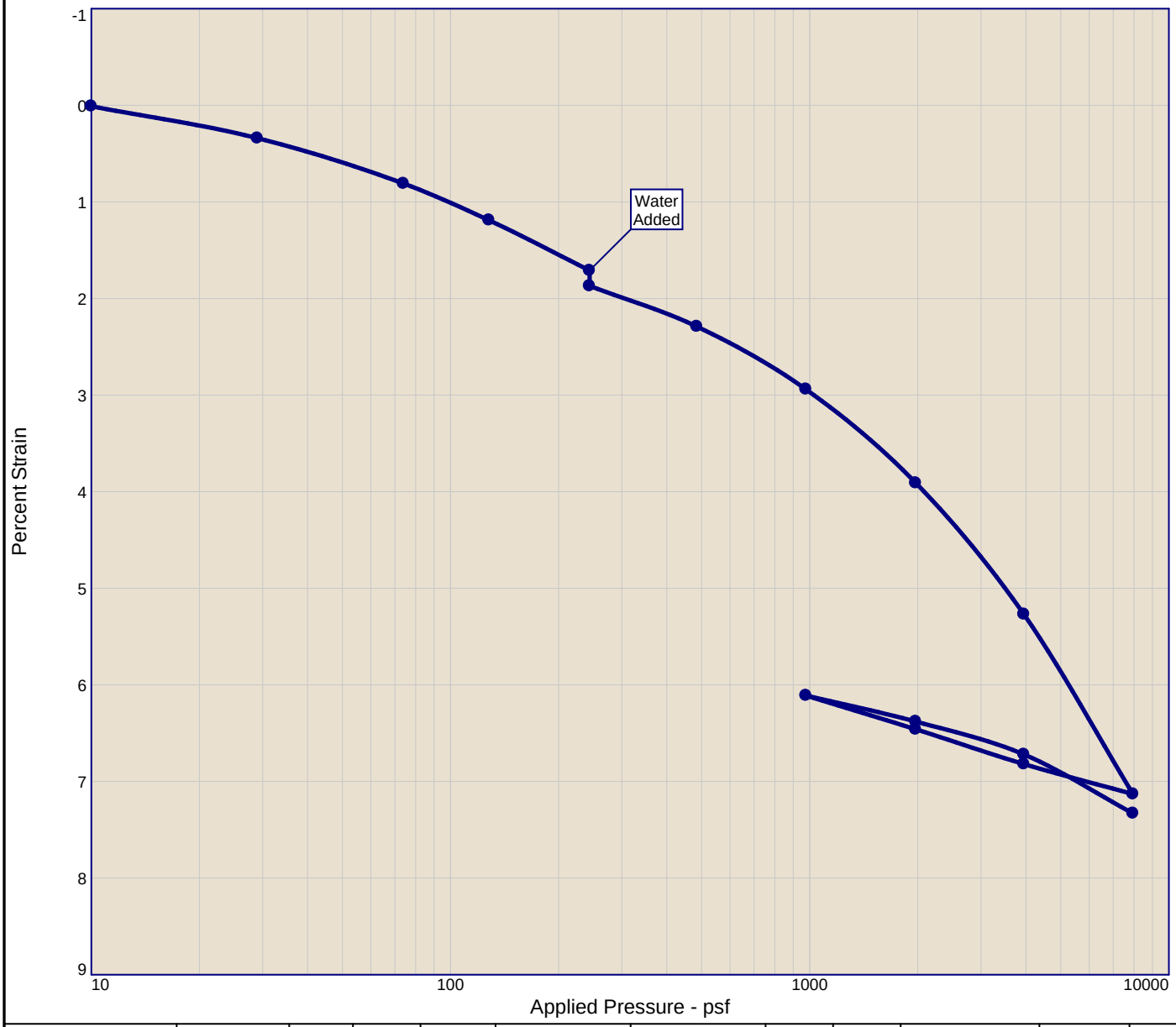
Location: BH-12 **Depth:** 17.5 - 18.5 ' **Sample Number:** U2

Remarks:

SK GEOTECHNICAL CORP.

Figure

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
Sat.	Moist.											
81.5 %	12.5 %	117.6			2.65	2448	2492	0.10	0.02		0.2	0.407

MATERIAL DESCRIPTION	USCS	AASHTO
Lean clay (CL) with gravel, medium plasticity, trace sand, reddish brown, moist, stiff	CL	

Project No. 15-3404L **Client:** Jorgensen Geotechnical

Project: 22212 - Huffman 1400 S Hwy 89

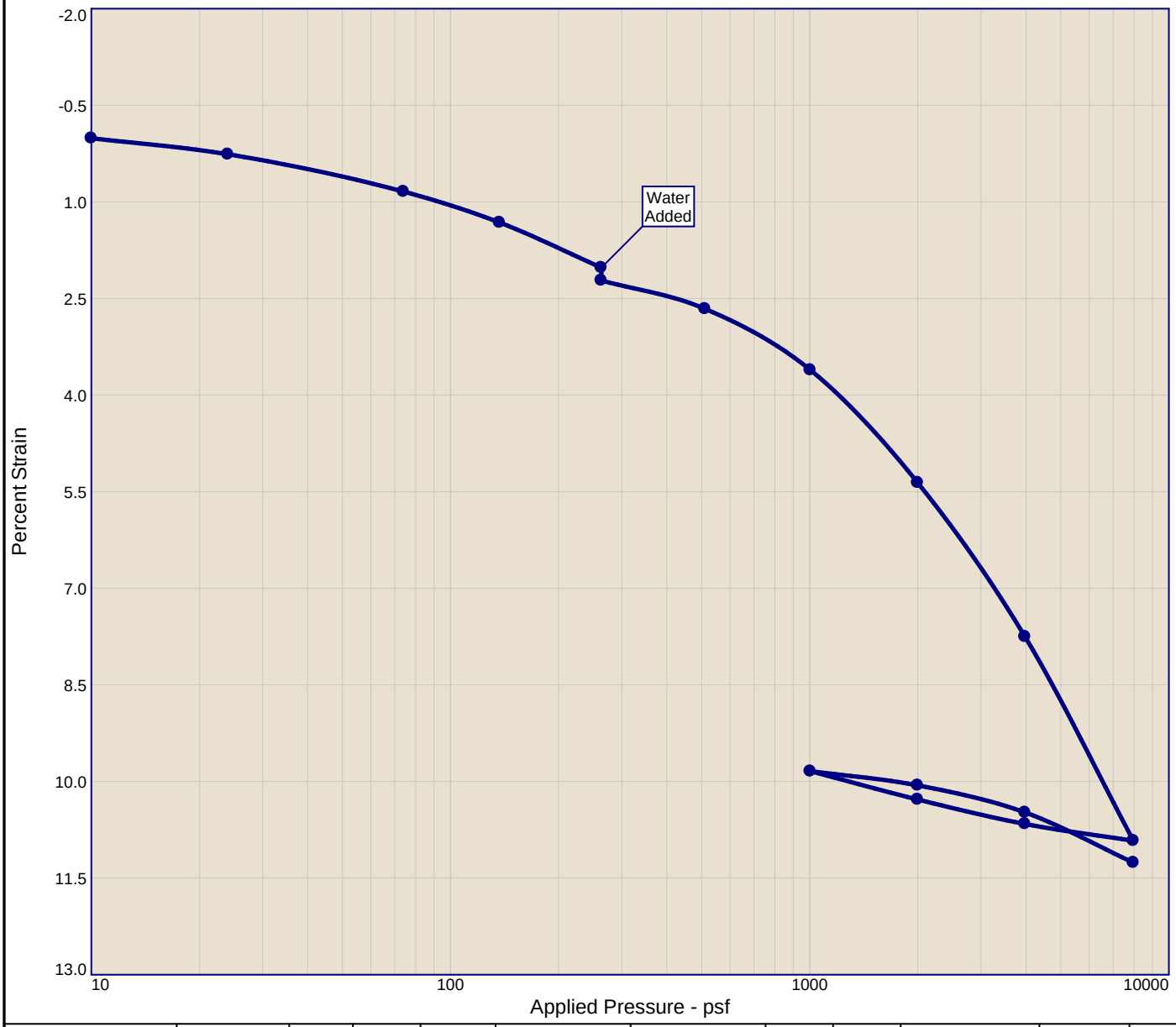
Location: BH-14 **Depth:** 17.5 - 18.5 ' **Sample Number:** U1

Remarks:

SK GEOTECHNICAL CORP.

Figure

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
Sat.	Moist.											
84.5 %	23.9 %	94.6			2.65	3632	3638	0.26	0.02		0.2	0.749

MATERIAL DESCRIPTION	USCS	AASHTO
Lean clay (CL) with gravel, medium plasticty, reddish brown, moist, stiff	CL	

Project No. 15-3404L **Client:** Jorgensen Geotechnical

Project: 22212 - Huffman 1400 S Hwy 89

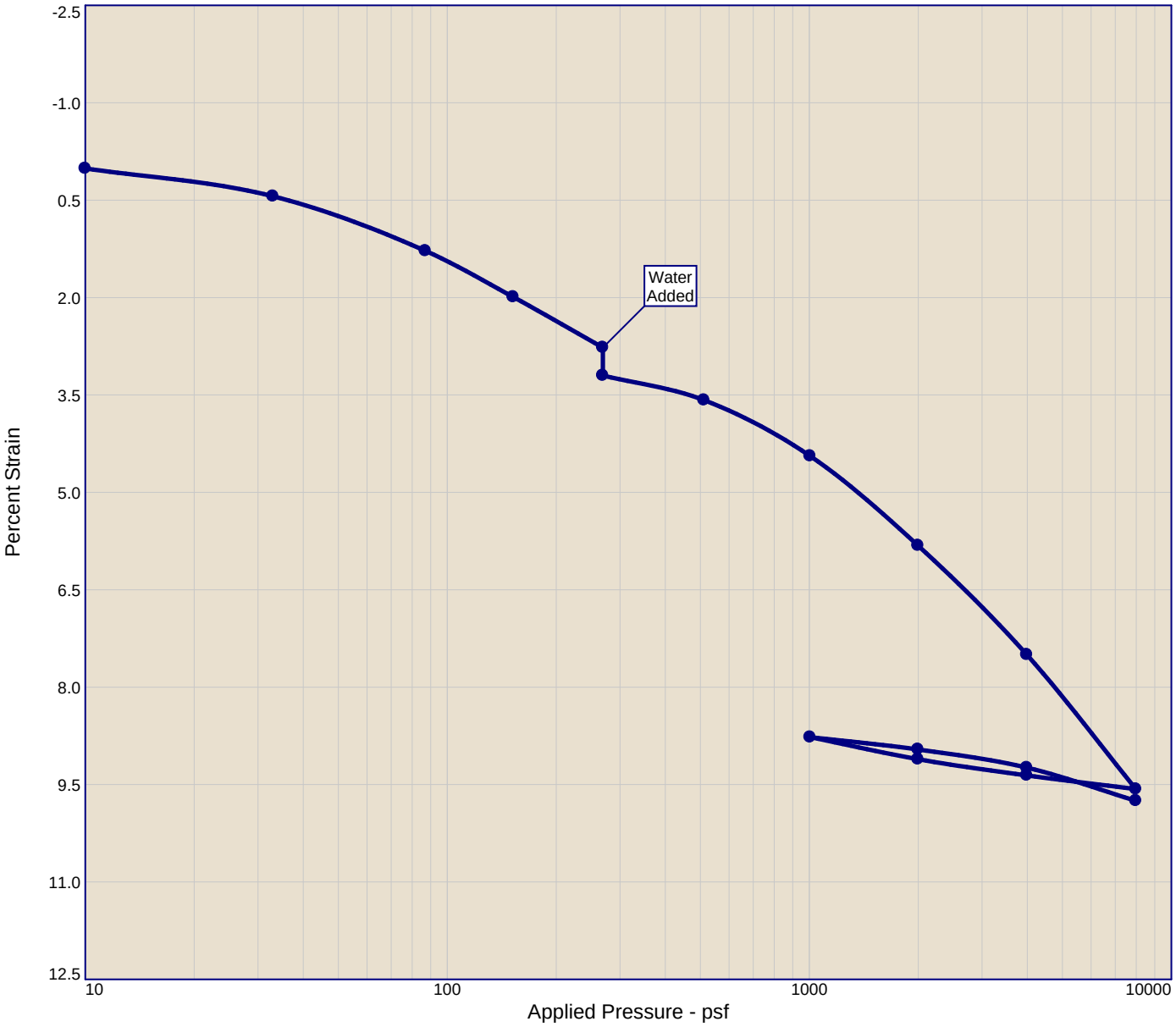
Location: BH-14 **Depth:** 30 -31 ' **Sample Number:** U2

Remarks:

SK GEOTECHNICAL CORP.

Figure

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
Sat.	Moist.											
91.3 %	19.0 %	106.6			2.65	2791	2803	0.16	0.01		0.4	0.552

MATERIAL DESCRIPTION	USCS	AASHTO
Lean clay (CL) with gravel, medium plasticity, reddish brown, rather wet, stiff		

Project No. 15-3404L **Client:** Jorgensen Geotechnical

Project: 22212 - Huffman 1400 S Hwy 89

Location: BH-15 **Depth:** 21 - 22 ' **Sample Number:** U2

Remarks:

SK GEOTECHNICAL CORP.

Figure

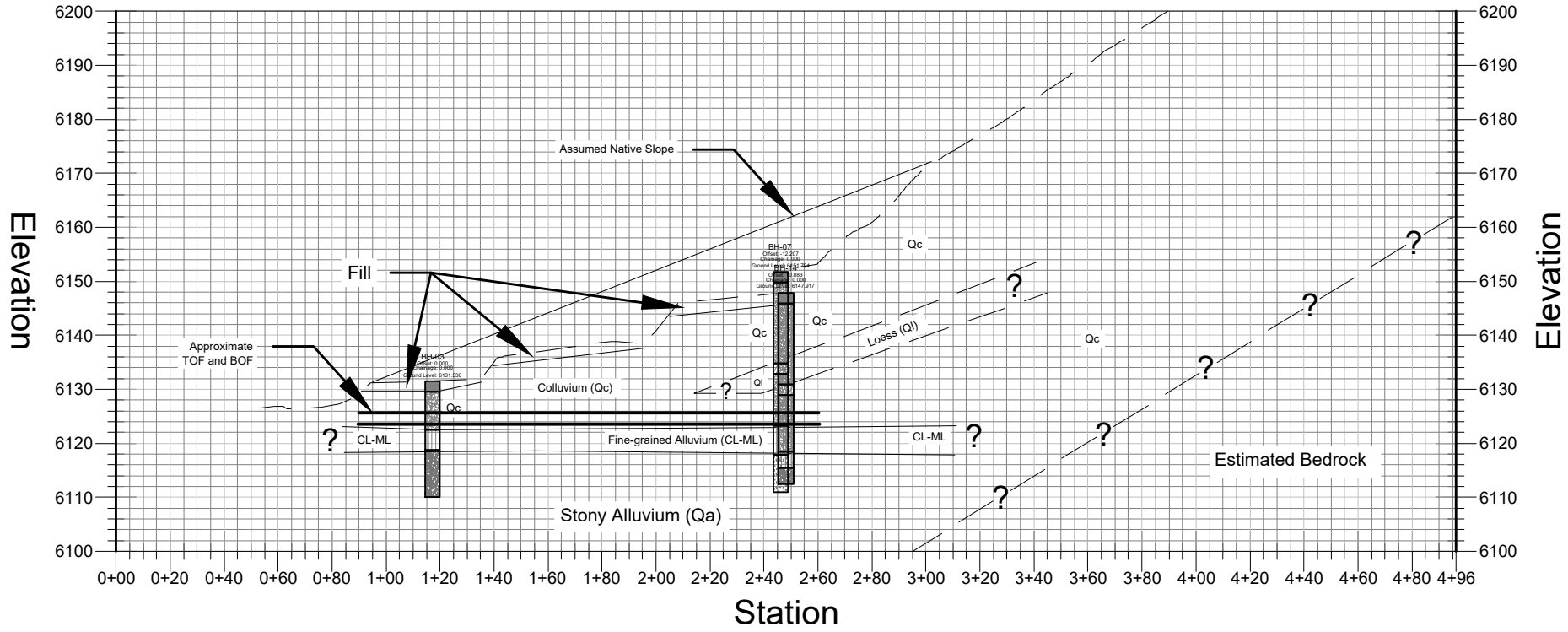
JORGENSEN
GEOTECHNICAL, LLC

PO Box 9550 · 1315 HWY 89 S., Suite 201
Jackson, WY 83002
PH: 307.733.5150
www.jorgeng.com

APPENDIX C

Geologic Cross-Sections

Cross section A-A'



SCALE
H 1:1
V 2:1

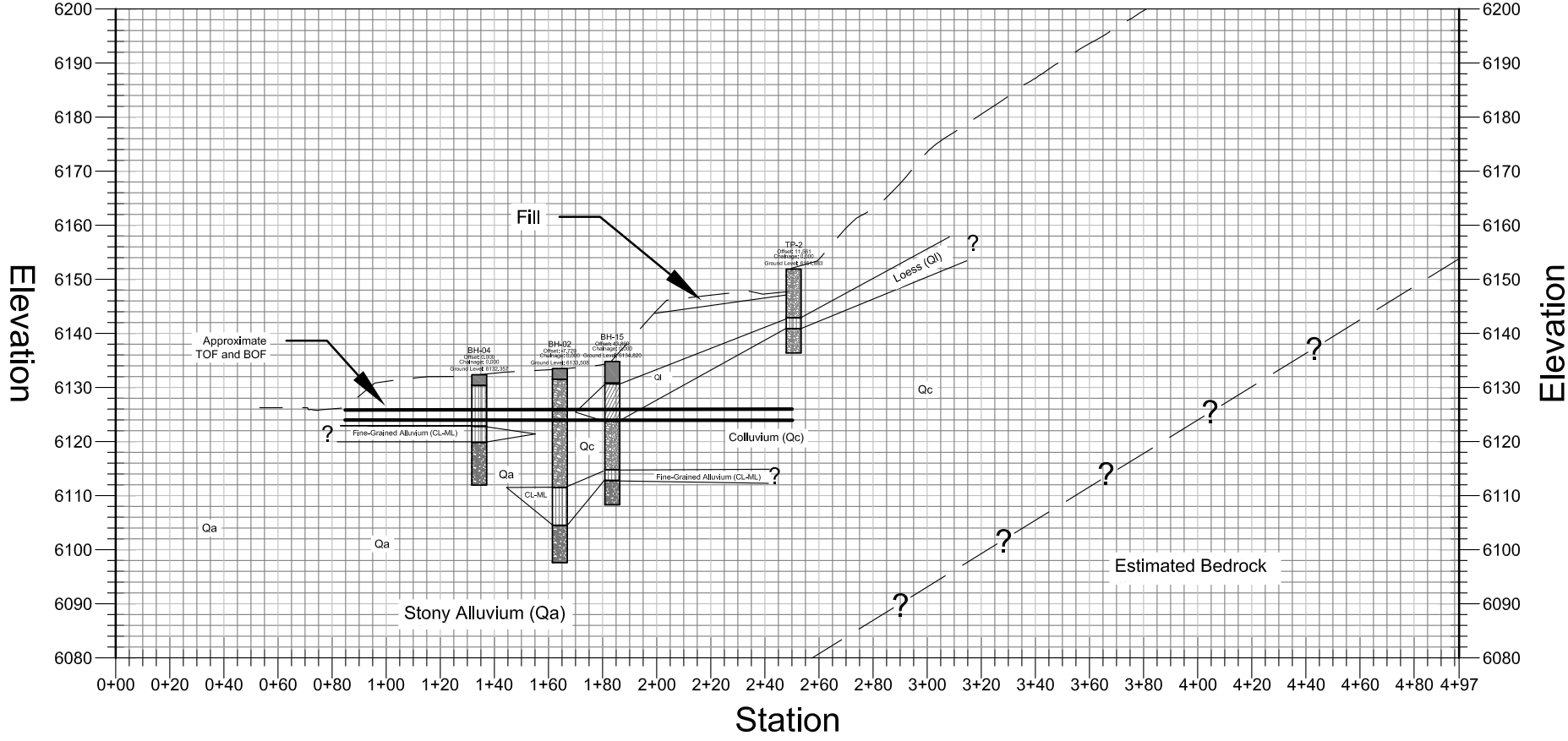
DRAFTED BY:	JBJ
REVIEWED BY:	DB
PROJECT NUMBER	22212

SHEET TITLE:
Figure C-1
Geologic Cross Section A-A'

PROJECT TITLE:
Geotechnical-Engineering Report
1400 & 1450 Hwy 89 South
Teton County, Wyoming

JORGENSEN
Geotechnical, LLC
307-733-5150 www.jorgeng.com

Cross section B-B'



SCALE
H 1:1
V 2:1

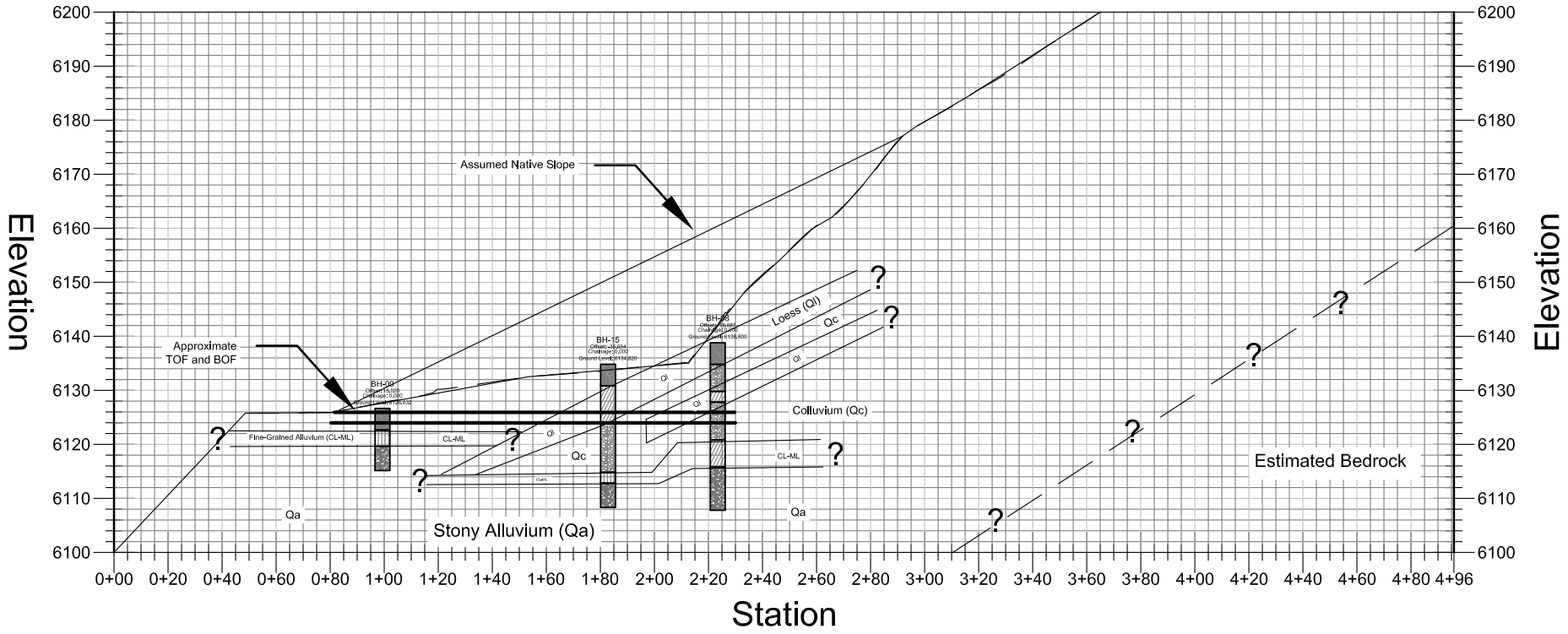
DRAFTED BY:	JBJ
REVIEWED BY:	DB
PROJECT NUMBER	22212

SHEET TITLE:
Figure C-2
Geologic Cross Section B-B'

PROJECT TITLE:
Geotechnical-Engineering Report
1400 & 1450 Hwy 89 South
Teton County, Wyoming

JORGENSEN
Geotechnical, LLC
307-733-5150 www.jorgeng.com

Cross section C-C'



SCALE
H 1:1
V 2:1

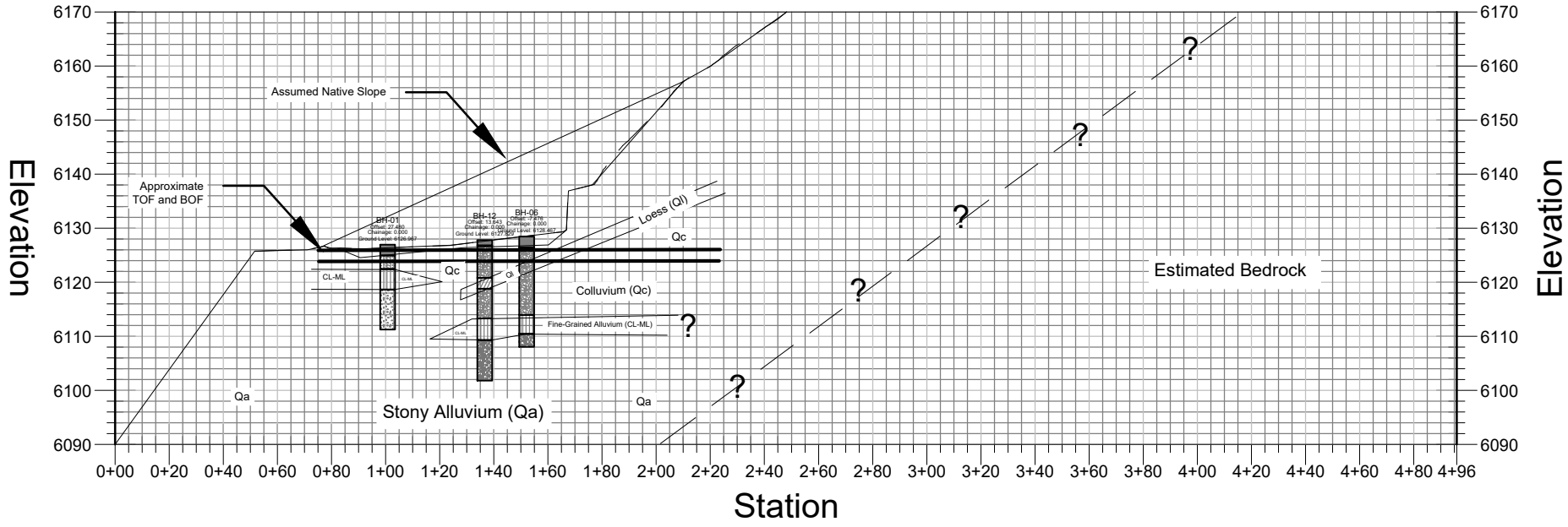
DRAFTED BY:	JBJ
REVIEWED BY:	DB
PROJECT NUMBER	22212

SHEET TITLE:
Figure C-3
Geologic Cross Section C-C'

PROJECT TITLE:
Geotechnical-Engineering Report
1400 & 1450 Hwy 89 South
Teton County, Wyoming

JORGENSEN
Geotechnical, LLC
307-733-5150 www.jorgeng.com

Cross section D-D'



SCALE
H 1:1
V 2:1

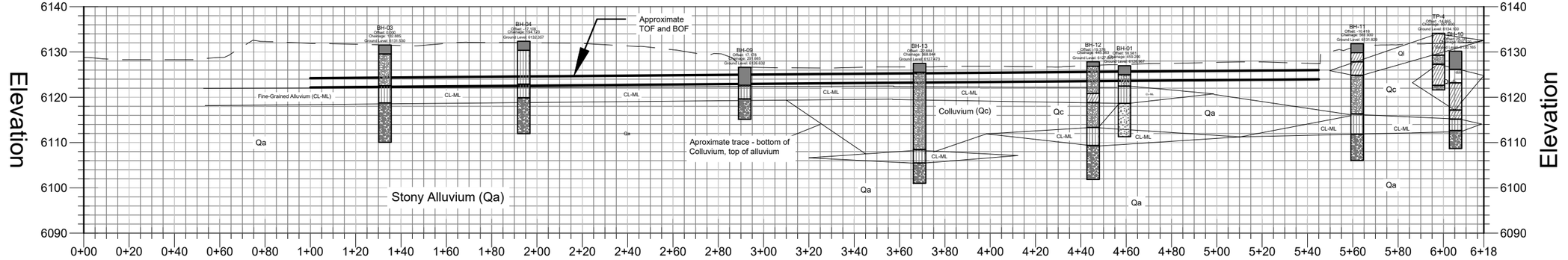
DRAFTED BY:	JBJ
REVIEWED BY:	DB
PROJECT NUMBER	22212

SHEET TITLE:
Figure C-4
Geologic Cross Section D-D'

PROJECT TITLE:
Geotechnical-Engineering Report
1400 & 1450 Hwy 89 South
Teton County, Wyoming

JORGENSEN
Geotechnical, LLC
307-733-5150 www.jorgeng.com

Cross section E-E'



SCALE
H 1:1
V 2:1

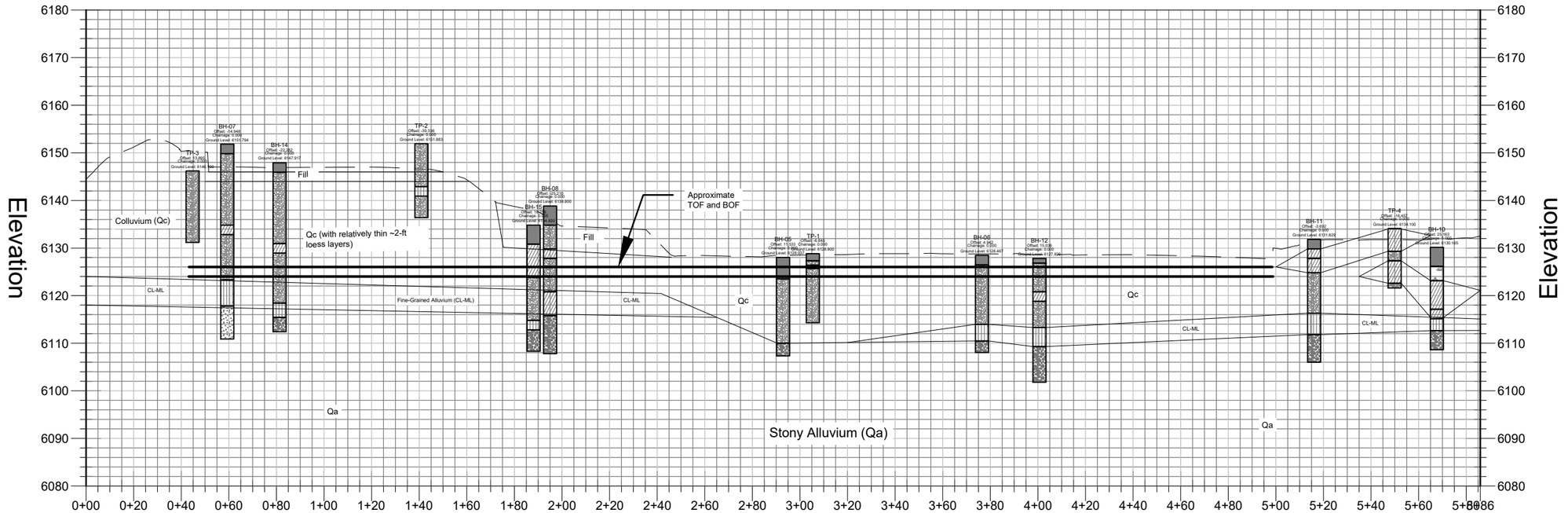
DRAFTED BY:	JBJ
REVIEWED BY:	DB
PROJECT NUMBER	22212

SHEET TITLE:
Figure C-5
Geologic Cross Section E-E'

PROJECT TITLE:
Geotechnical-Engineering Report
1400 & 1450 Hwy 89 South
Teton County, Wyoming

JORGENSEN
Geotechnical, LLC
307-733-5150 www.jorgeng.com

Cross section F-F'



SCALE
H 1:1
V 2:1

DRAFTED BY:	JBJ
REVIEWED BY:	DB
PROJECT NUMBER	22212

SHEET TITLE:
Figure C-6
Geologic Cross Section F-F'

PROJECT TITLE:
Geotechnical-Engineering Report
1400 & 1450 Hwy 89 South
Teton County, Wyoming

JORGENSEN
Geotechnical, LLC
307-733-5150 www.jorgeng.com

JORGENSEN
GEOTECHNICAL, LLC

PO Box 9550 · 1315 HWY 89 S., Suite 201
Jackson, WY 83002
PH: 307.733.5150
www.jorgeng.com

APPENDIX D

Soil-Engineering Parameters

Soil-Engineering Parameters

Engineering parameters for site soils were evaluated based on a variety of methods, including:

- direct laboratory testing (shear strength and consolidation),
- correlations with index tests,
- empirical relationships between SPT N-values and shear strength,
- visual classification and empirical estimates, and
- measurement and comparison with nearby soil slopes.

We summarize laboratory testing and correlations with index testing in the attached Table D-1. We discuss soil parameter selection in the sections below.

Soil Unit Weight

Direct shear and consolidation testing yield unit weight values. The dry unit weight of the fine-grained alluvium was within the range of 94.6 and 106.6 pcf with an average of 102.5 pcf. The measured dry unit weight of the loess was within the range of 86.5 and 126.9 pcf with an average of 109.25 pcf. The moist unit weight of both soil units was estimated to be approximately 120 pcf based on measured water contents.

Colluvium and the stony alluvium were too stony to submit for direct shear or consolidation testing. We estimated soil unit weight based on visual classification of the soil and established empirical estimates for similar deposits (Pit Slope Manual, 1982).

Consolidation Parameters

Direct testing indicates a coefficient of consolidations, C_c, for the fine-grained alluvium of approximately 0.19 with a maximum of 0.26. The correlation suggested by Skempton (Terzaghi, 1967) underestimates the value with an average of approximately 0.14. We predict the fine-grained alluvium to be moderately compressible.

Consolidation testing of loess samples indicate a C_c of approximately 0.17 on average with a maximum of 0.23. Correlations with the Liquid Limit test of a loess sample is near the average with a value of 0.16. Although lab testing does not indicate the loess as collapsible, loess in the Jackson Hole area is typically prone to hydro-collapse up to 6-8% by volume when wetted under load. We recommend interpreting the results of the lab testing with caution and build with care on and around loess.

Strength Parameters

Final strength parameters were selected by examining several methods listed above. Direct testing of shear strength tended to indicate more conservative parameters (i.e., smaller or weaker) than empirical correlations of strength with index tests or with SPT (N1)60 values.

Laboratory Testing

From direct shear testing, the average value of peak internal friction of the alluvium is 25.2°, and the average value of the loess is approximately 27.5°. Correlations with index tests (Voight, 1973) indicate a peak friction of approximately 33 and 34 for the alluvium and the loess, respectively. The Voight correlation estimates a peak value of friction of approximately 36.5° for the colluvium.

SPT N160 Blow Counts

We correlated shear strength (ϕ') to SPT N-values using two methods: Hatanaka and Uchida (1996) and Schmertmann (1971). Hatanaka and Uchida's equation correlates the friction to the corrected blow count $(N_1)_{60}$ whereas Schmertmann's method is a graphical correlation to the corrected N_{60}. The equation used for Hatanaka's friction angle correlation is presented below.

$$\varphi = \sqrt{20 \times (N_1)_{60}} + 20$$

Equation 1: Hatanaka and Uchida's empirically correlated equation

Each SPT test was classified as loess, colluvium, fine-grained alluvium, or stony alluvium based on visual classification. We sorted the results by soil layer and calculated the maximum, minimum, average, and standard deviation for the correlated values. Gravels and cobbles can influence N-values considerably, and the range and standard deviation is greatest in the colluvium and stony alluvium. Hatanaka and Uchida generally predict lower values than Schmertmann. Average values are as follows (for Hatanaka and Uchida):

Colluvium	41.9°,
Fine-grained Alluvium	33°,
Loess	34°, and
Stony Alluvium	60.2°.

Pit Slope Manual

We reviewed values from Table 6 of chapter 9 of the Pit Slope Manual (CANMET, 1982) to estimate the effective angle of internal friction. Medium dense sand and gravel – representative of the colluvium – is estimated to have values of internal friction between 40° and 48°. Dense sand and gravel, or the stony alluvium, is listed in the range of 40° to 55°, with higher values at low confining pressures. Medium dense silt – loess – is estimated in the range of 28° to 32°.

Slope Measurements

We measured the angle of the steep, sparsely vegetated slope owned by the Teton County School District along South Park Loop Road, specifically at coordinates 43.465505° N, -110.796175° E. We observed the slopes to range from 37° to 44°, which is assumed to represent the angle of repose, or strength of purely cohesionless material. We predict these slopes to comprise similar colluvium as encountered at the subject property.

Cohesion

Cohesion was added to the material models in the slope stability model to avoid selecting slip surfaces representing the "infinite slope" solution, specifically within the colluvium and stony alluvium where a value of 500 psf was applied. Direct shear testing of the fine-grained alluvium and the loess indicates average cohesion to be 620 psf and 675 psf, respectively.

JORGENSEN GEOTECHNICAL, LLC

PO Box 9550 · 1315 HWY 89 S., Suite 201
Jackson, WY 83002
PH: 307.733.5150
www.jorgeng.com

APPENDIX E

Slope-Stability Analysis

Slope-Stability Analysis

Methodology

1. **Analyses:** Slope stability analyses were performed using the SLOPE/W stability module of GeoStudio 2023.1.2 version 23.1.2.11, produced by Bentley Systems. The Morgenstern-Price limit equilibrium method, which takes into consideration moment and force equilibrium, was used to analyze slope stability.

2. **Geometry:** Cross-sections A-A', B-B', C-C', and D-D' (Figure 2) were chosen to evaluate slope stability. We based the external geometry on topographic data collected by Jorgensen Associates, Inc., and we based the internal geometry (material boundaries within the slope) on the results of the subsurface exploration (i.e., borehole and test-pit logs), geologic conditions, and our experience in the area.

   We evaluated each cross-section for an historical, existing condition, and proposed construction condition. The level platforms historically graded on the site are assumed to have been built using a cut-and-cast approach. We estimated historical geometries from our observations of disturbed areas on the slope and historical aerial photography. Existing conditions analyses utilized the existing topography, and we prepared the proposed conditions analyses utilizing a preliminary building plan provided by the project architect.

   We observed the model to be sensitive to the loess. We modeled the loess as a continuous layer at an angle matching that of the ground surface. However, we made this assumption conservatively based on single specimens observed in the boreholes or thin layers observed in the test pits. To quantify the sensitivity of the model to the presence of the loess, we included analyses with the layer of loess removed.

3. **Materials:** We estimated the shear strength parameters for the soils identified in the subsurface exploration, and we used a Mohr-Coulomb strength model. See the discussion in Appendix D regarding development of the soil-engineering parameters. Final parameters used in the stability analysis are shown in Table 2.

   Two parameters are used to describe this strength model: cohesion (c) and friction angle (φ). Cohesion is the soil's shear strength at zero overburden stress, and the friction angle expresses the relationship between overburden stress and shear stress. Mathematically, the shear strength is defined by the equation: $\tau = c + \sigma_n \tan(\varphi)$, where τ is the shear strength and σ_n represents the overburden stress. We used effective stress parameters as the soils are anticipated to drain well. We have not observed evidence of slope instability or mapped landslides within this geological environment. As such, we relied on peak strength values, rather than residual.

Table E-1: Soil Parameters Used for Slope Stability Analysis

Layer Name	Unit Weight (pcf)	Cohesion[1] (c',psf)	Friction Angle (φ', degrees)
Lean Clay Alluvium	120	620	25.2
Colluvium	130	500	41.9
Loess	120	500	30
Stony Alluvium	135	500	42
Bedrock	Impenetrable Layer		

4. **Phreatic Surface:** Soils appeared dry to moist during the subsurface exploration during a time of year when groundwater levels are expected to be high. Groundwater is known to form springs or seeps along the flanks of Snow King Mountain further to the northeast, but evidence of such springs was not apparent at the project site. Therefore, a phreatic (i.e., static water level) surface has not been incorporated into the model.

5. **Seismicity:** Each combination of Cross-Section, Geometry, and Site Characterization (Loess/No Loess) were evaluated in both static and seismic conditions. Seismicity was incorporated into the model using a pseudo-static approach where inertial forces from seismic accelerations are applied statically to the model. Seismic loads have been applied to the critical slip surface determined by static analysis for each cross-section as it is assumed to be the most stressed region within the slope (Abramson et al., 2002). The forces from earthquake-induced ground-shaking are assumed to be proportional to the weight of the sliding mass times a horizontal seismic coefficient k_h. A seismic coefficient of k_h = 0.26g, or one half of the site-modified peak ground acceleration (½PGA_M), has been used in this assessment (Hynes-Griffin and Franklin, 1984). For those analyses with seismic FS less than 1.0, we calculated the yield acceleration, k_y, or the acceleration corresponding to a FS = 1.0.

6. **Building Loads**: Building loads of the proposed structure was incorporated into the model using an average distributed surcharge load of 900 psf for the building to account for the weight of the structure. We calculated the surcharge load using a weighted average of four 5-ft wide strip footings with a bearing pressure of 3,500 psf and applying a pressure of 450 psf across the remaining building footprint.

   We included point loads located one third of the excavation height up from the bottom of the wall to represent the resistance from the foundation wall. We calculated the magnitude of the point load as the resultant force required to hold resist at-rest lateral earth pressures for the full height of the excavation.

Results

We summarize FS results for each cross-section and analysis in Table 2 below. The figures that follow the table are the output from each analysis. The critical slip surface and factor of safety are shown. Output files, reports, convergence data, or other data from Geostudio may be made available upon request.

Table E-2: Geostudio SLOPE/W Modeling Results

Cross-Section	Geometry	Site Characterization	Analysis	FS	Ky
A-A'	Historical	Loess	Static	1.71	-
		No Loess	Static	1.71	-
	Existing Conditions	Loess	Static	1.46	-
			Seismic	0.98	0.24
		No Loess	Static	1.61	-
			Seismic	1.03	-
	Proposed	Loess	Static	1.37	-
			Seismic	0.86	0.18
		No Loess	Static	1.46	-
			Seismic	0.93	0.22
B-B'	Historical	Loess	Static	1.67	-
		No Loess	Static	1.95	-
	Existing Conditions	Loess	Static	1.34	-
			Seismic	0.85	0.16
		No Loess	Static	1.70	-
			Seismic	1.08	-
	Proposed	Loess	Static	1.35	-
			Seismic[1]	0.89	0.19
		No Loess	Static	1.43	-
			Seismic[1]	0.93	0.22
C-C'	Historical	Loess	Static	1.69	-
		No Loess	Static	1.97	-
	Existing Conditions	Loess	Static	1.18	-
			Seismic	0.79	0.10
		No Loess	Static	1.52	-
			Seismic	1.01	-
	Proposed	Loess	Static	1.21	-
			Seismic[1]	0.83	0.14
		No Loess	Static	1.33	-
			Seismic[1]	0.90	0.20
D-D'	Historical	Loess	Static	1.69	-
		No Loess	Static	1.77	-
	Existing Conditions	Loess	Static	1.33	-
			Seismic	0.85	0.16
		No Loess	Static	1.53	-
			Seismic	0.98	0.25
	Proposed	Loess	Static	1.31	-
			Seismic[1]	0.88	0.19
		No Loess	Static	1.39	-
			Seismic[1]	0.91	0.21

Notes:

1. Convergence of Factor of Safety (FS) and lambda was not found for the critical slip surface of the parent (static) analysis. The FS value in the table is the lowest value selected from the same entry-exit method as the static analysis.

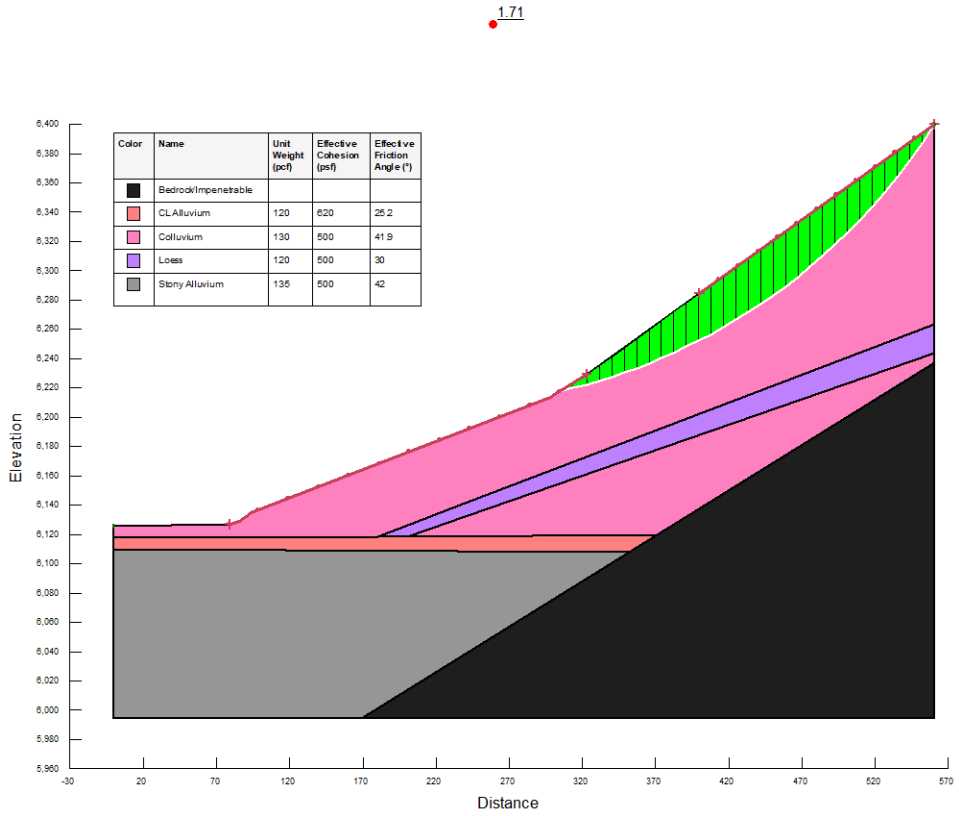


Figure E-1: Cross-Section A-A' Historical Geometry Static Analysis – With Loess

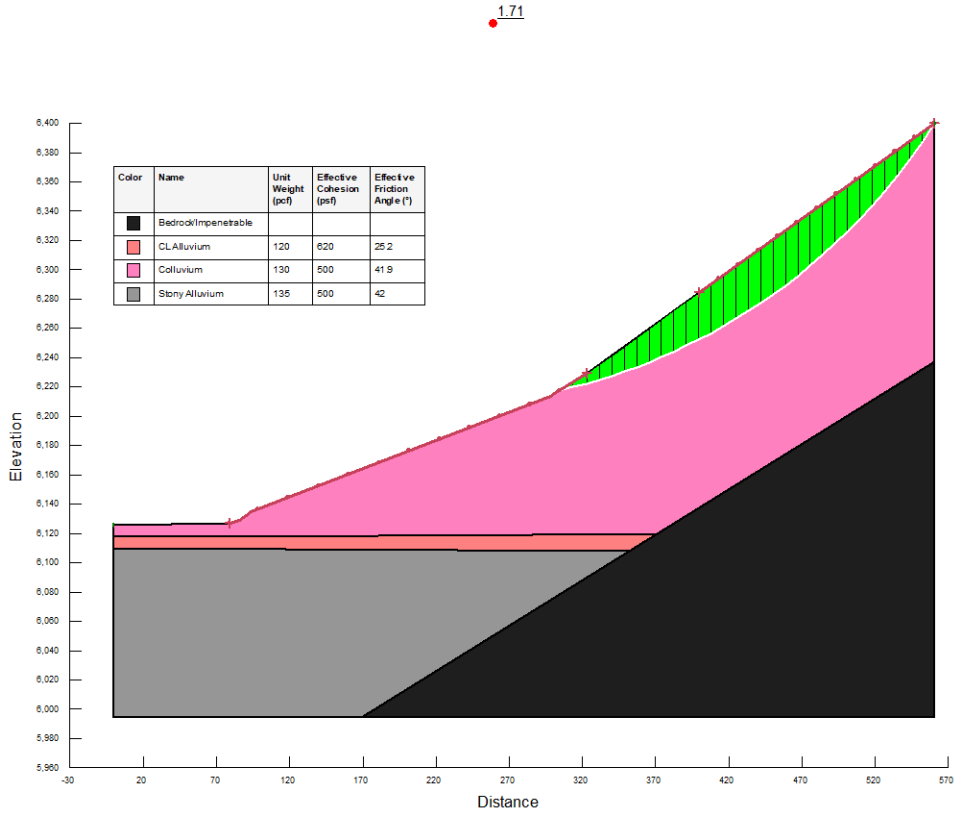


Figure E-2: Cross-Section A-A' Historical Geometry Static Analysis – No Loess

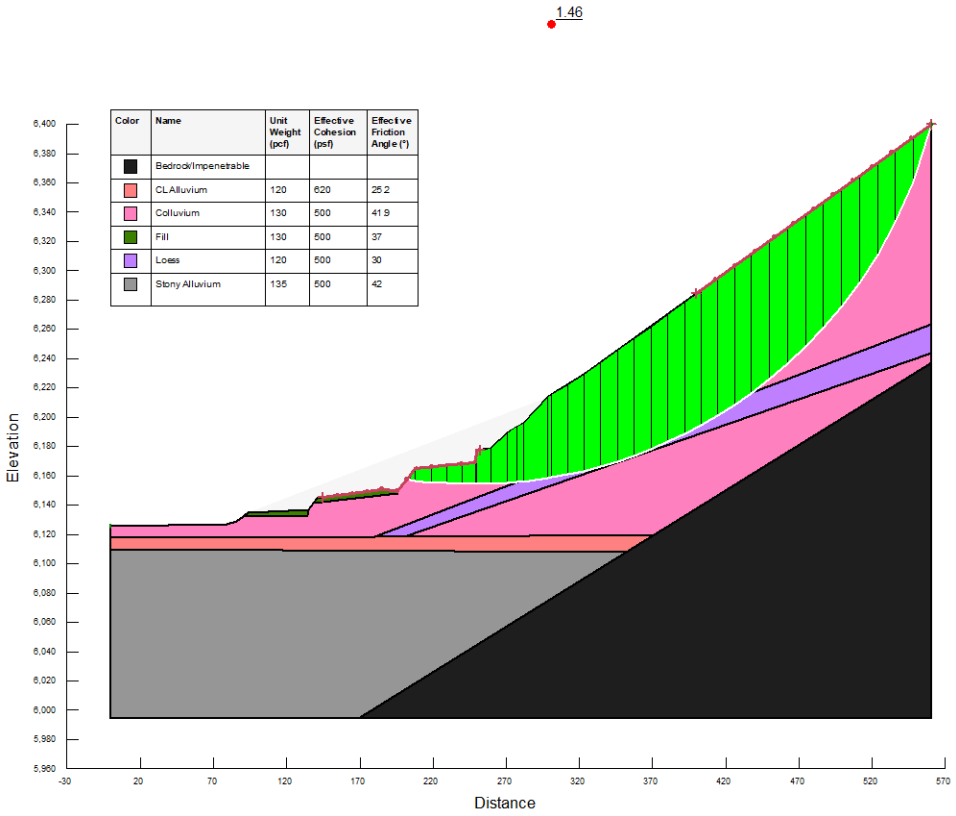


Figure E-3: Cross-Section A-A' Existing Geometry Static Analysis – With Loess

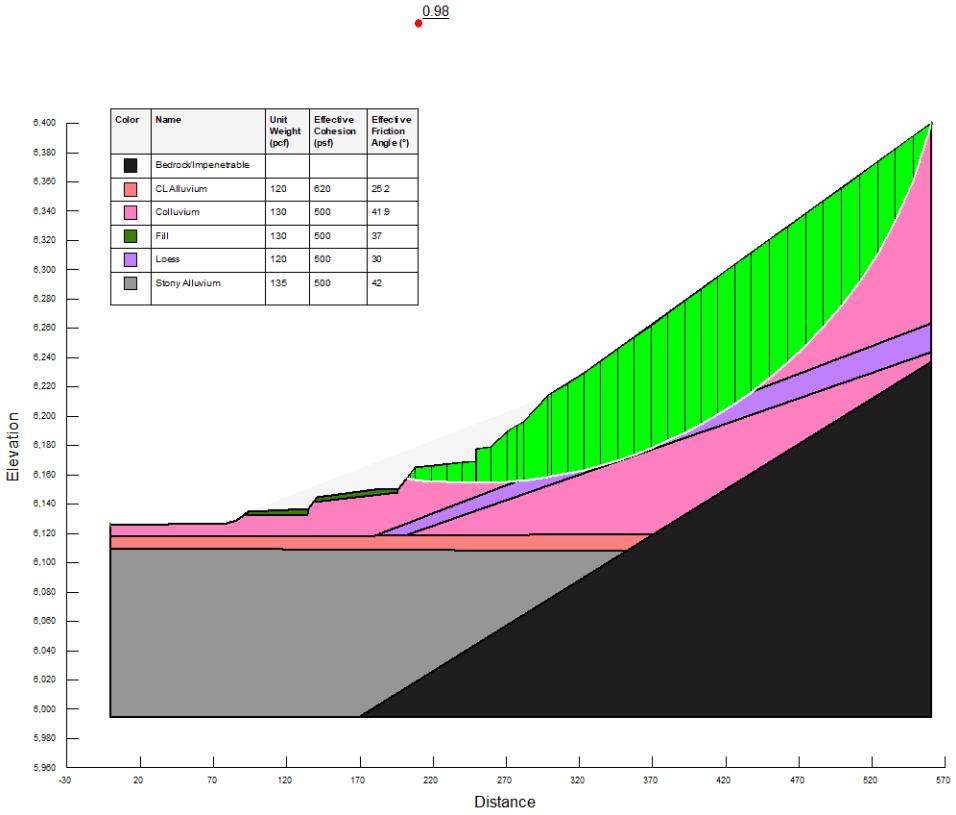


Figure E-4: Cross-Section A-A' Existing Geometry Seismic Analysis – With Loess

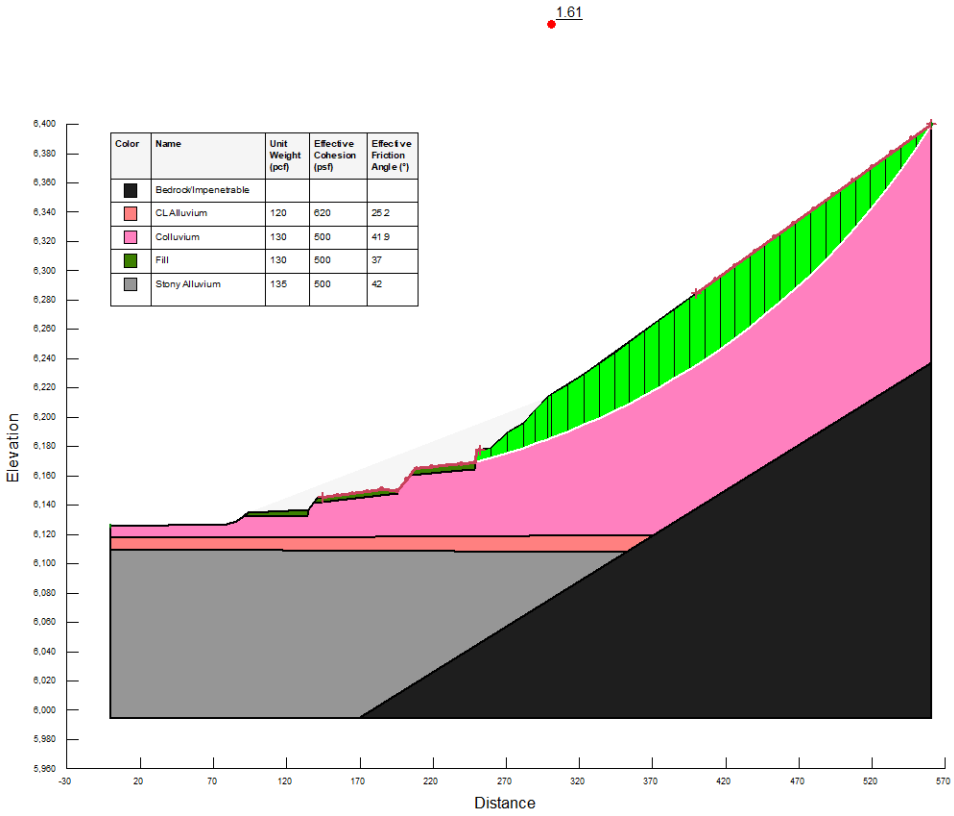


Figure E-5: Cross-Section A-A' Existing Geometry Static Analysis – No Loess

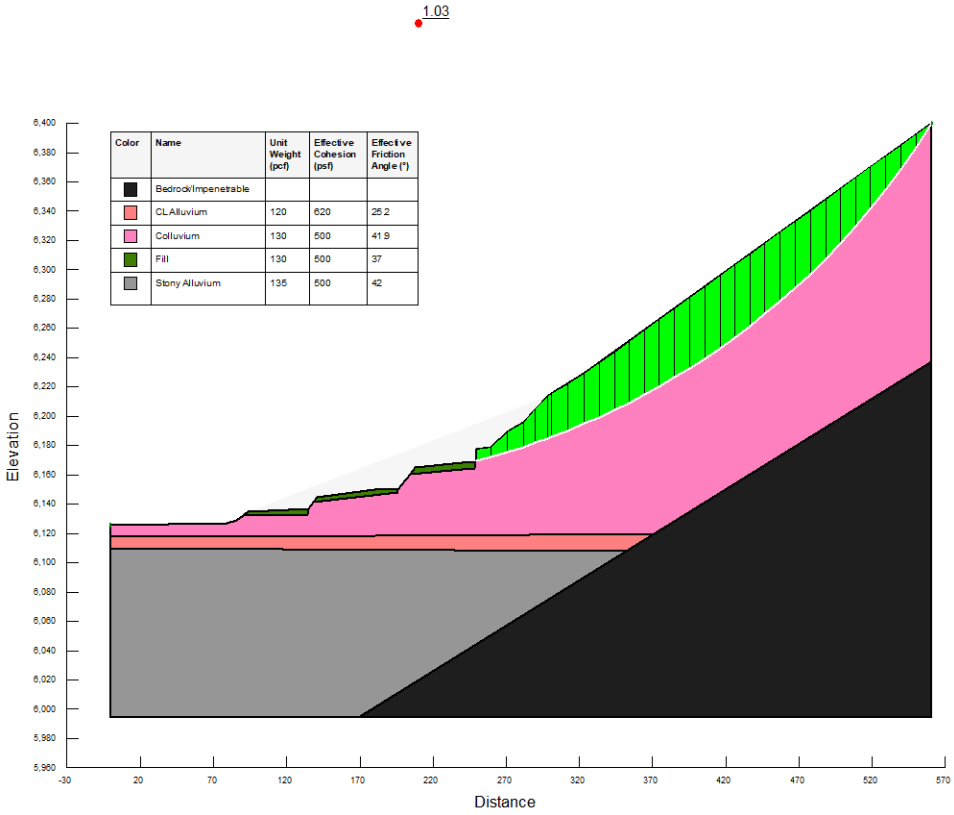


Figure E-6: Cross-Section A-A' Existing Geometry Seismic Analysis – No Loess

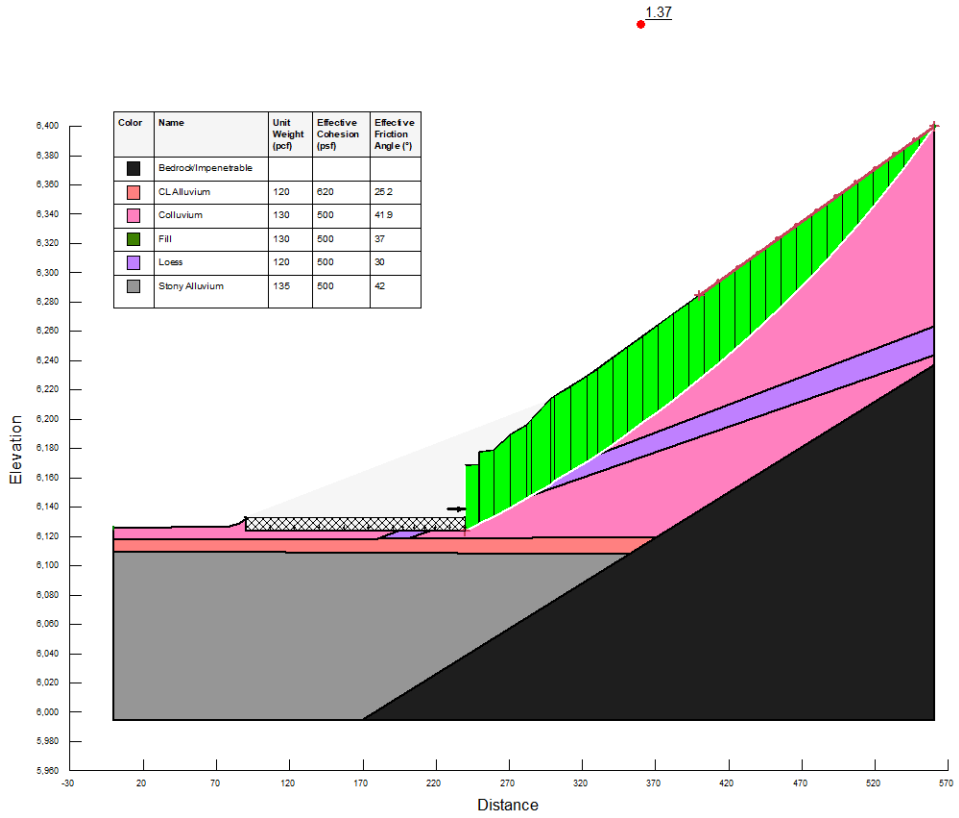


Figure E-7: Cross-Section A-A' Proposed Geometry Static Analysis – With Loess

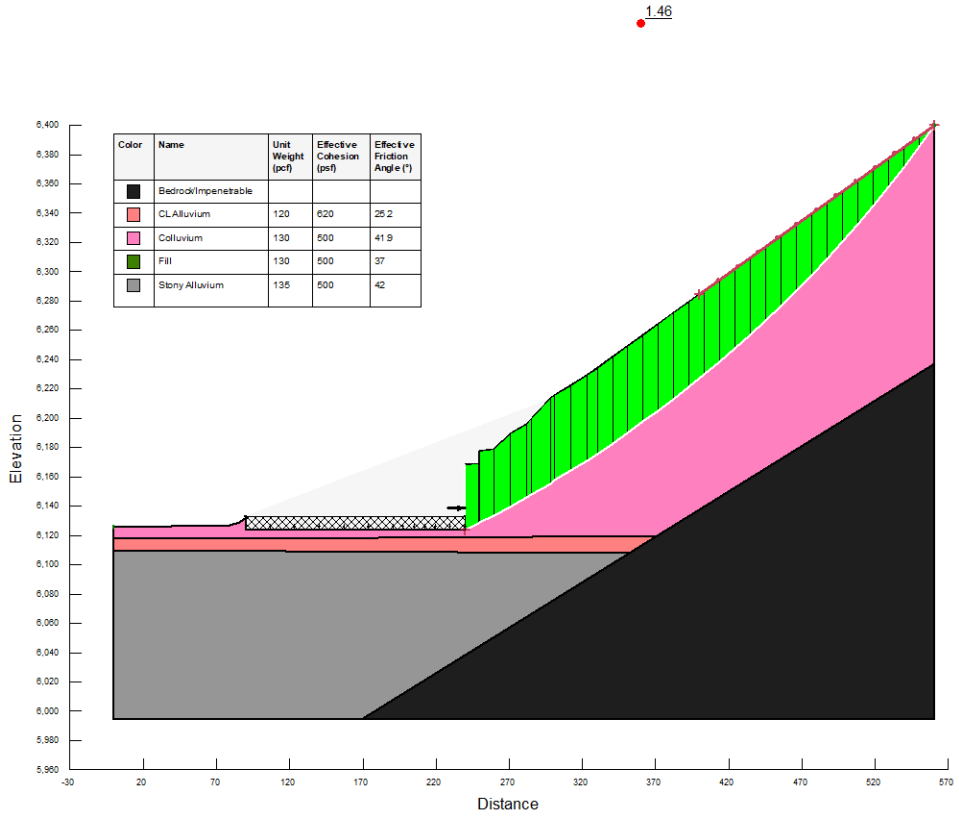


Figure E-8: Cross-Section A-A' Proposed Geometry Seismic Analysis – With Loess

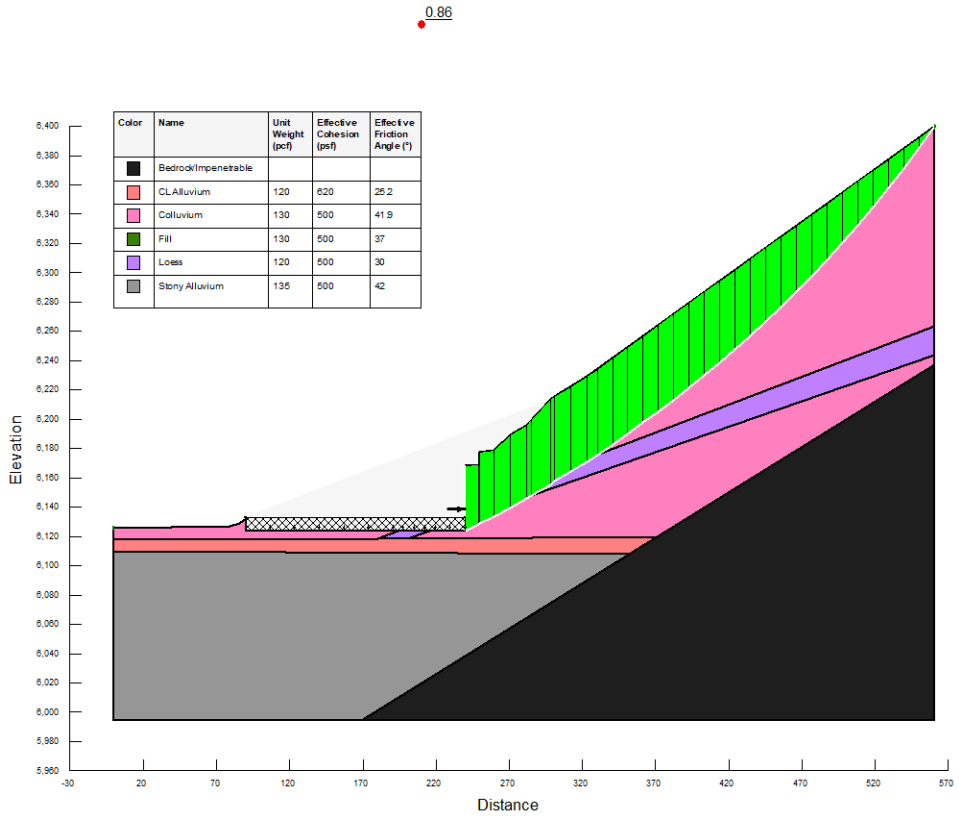


Figure E-9: Cross-Section A-A' Proposed Geometry Static Analysis – No Loess

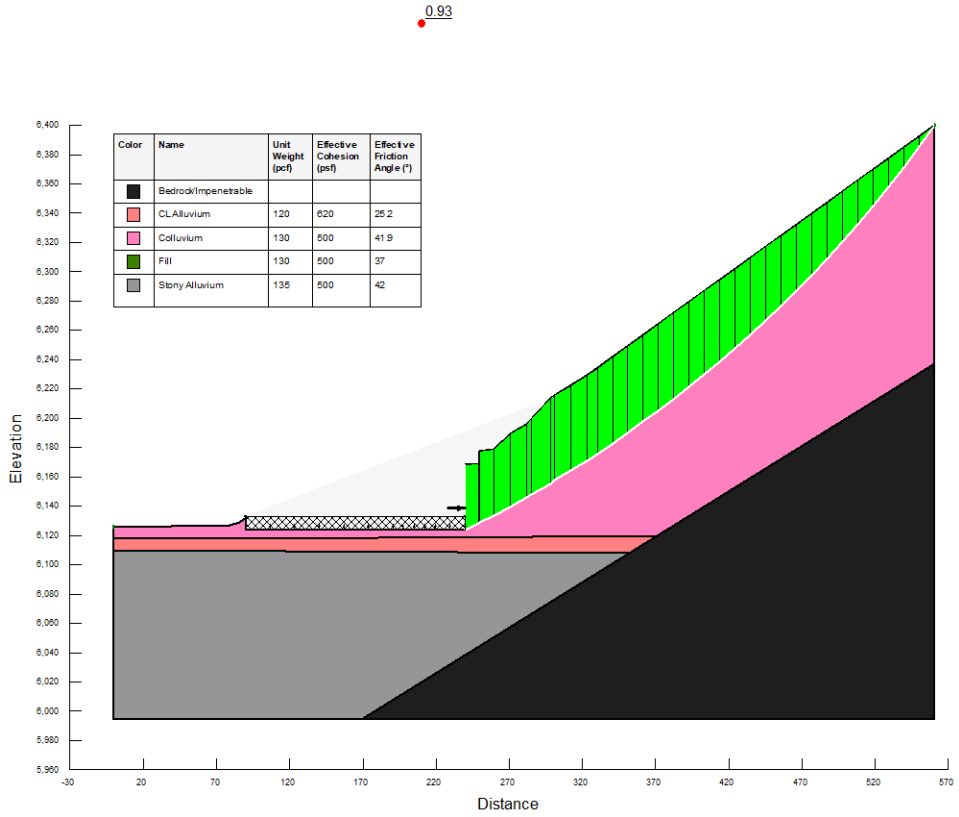


Figure E-10: Cross-Section A-A' Proposed Geometry Seismic Analysis – No Loess

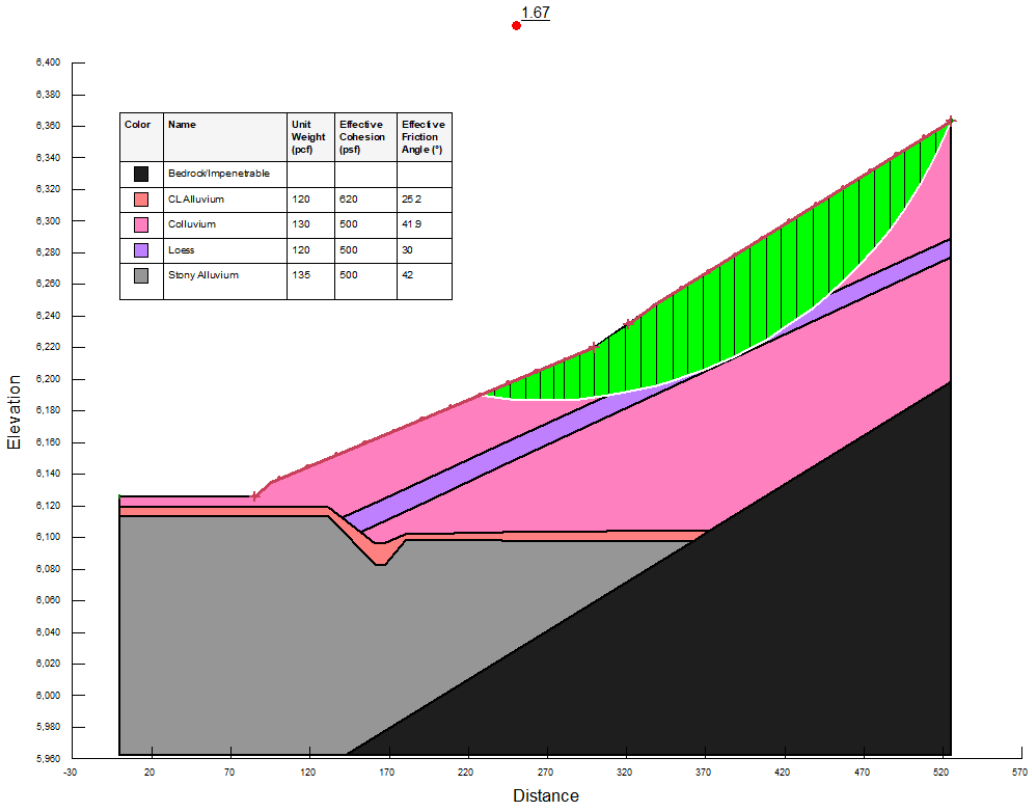


Figure E-11: Cross-Section B-B' Historical Geometry Static Analysis – With Loess

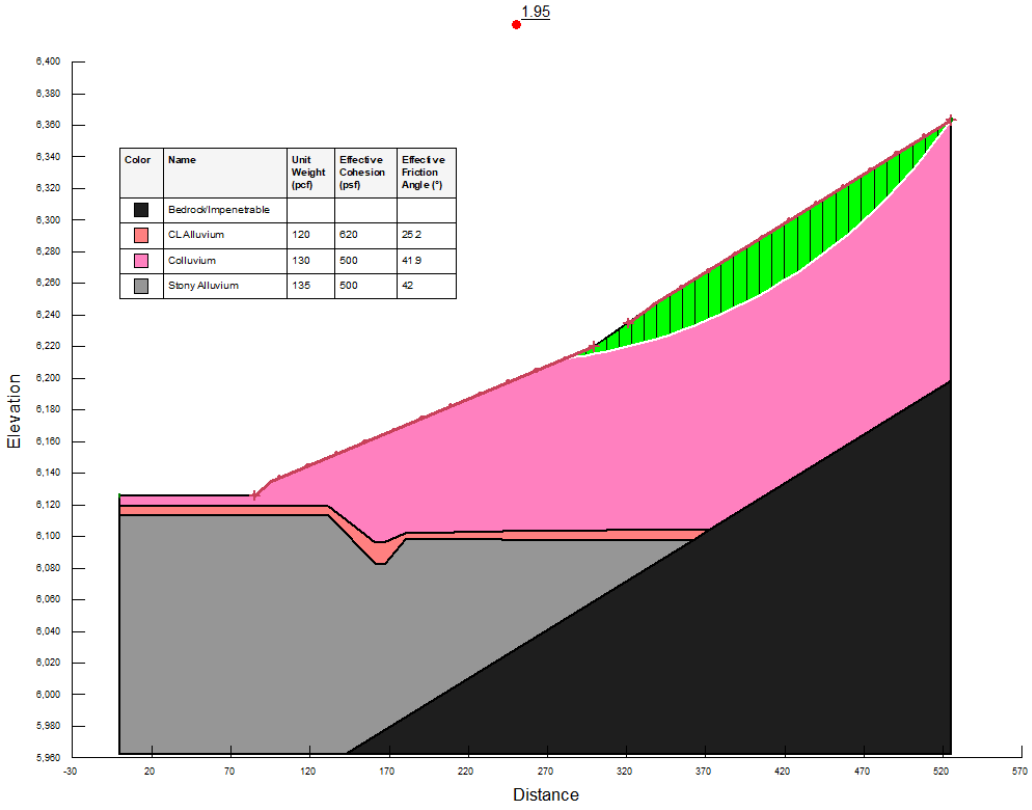


Figure E-12: Cross-Section B-B' Historical Geometry Static Analysis – No Loess

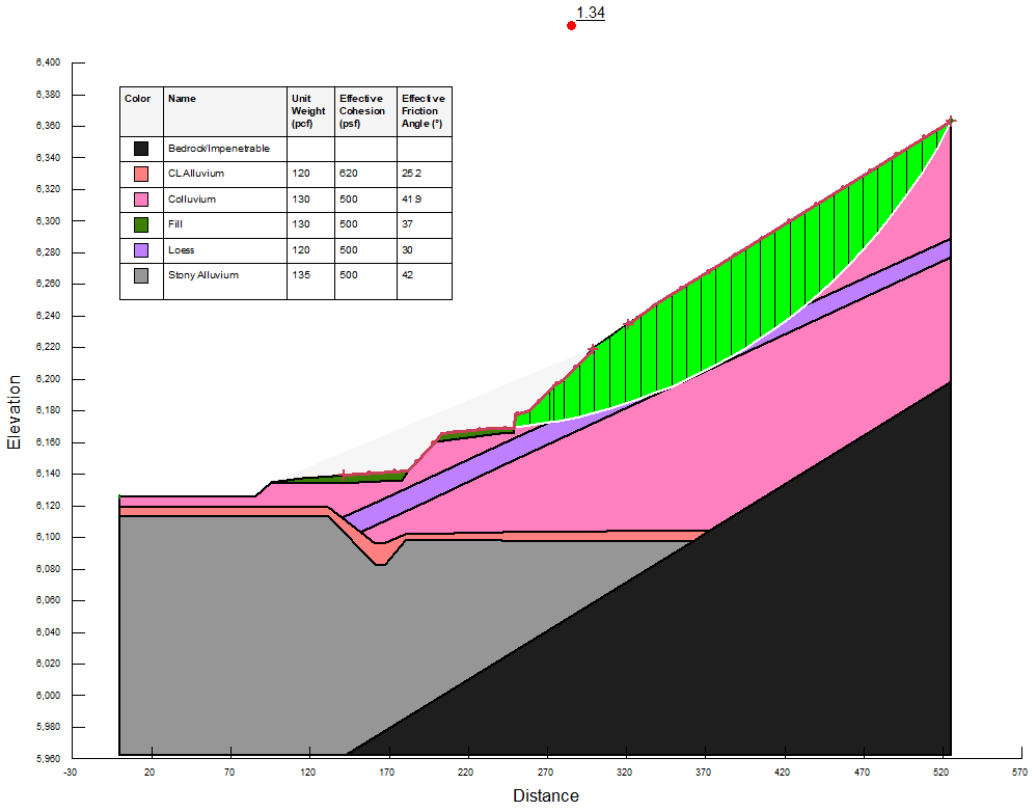


Figure E-13: Cross-Section B-B' Existing Geometry Static Analysis – With Loess

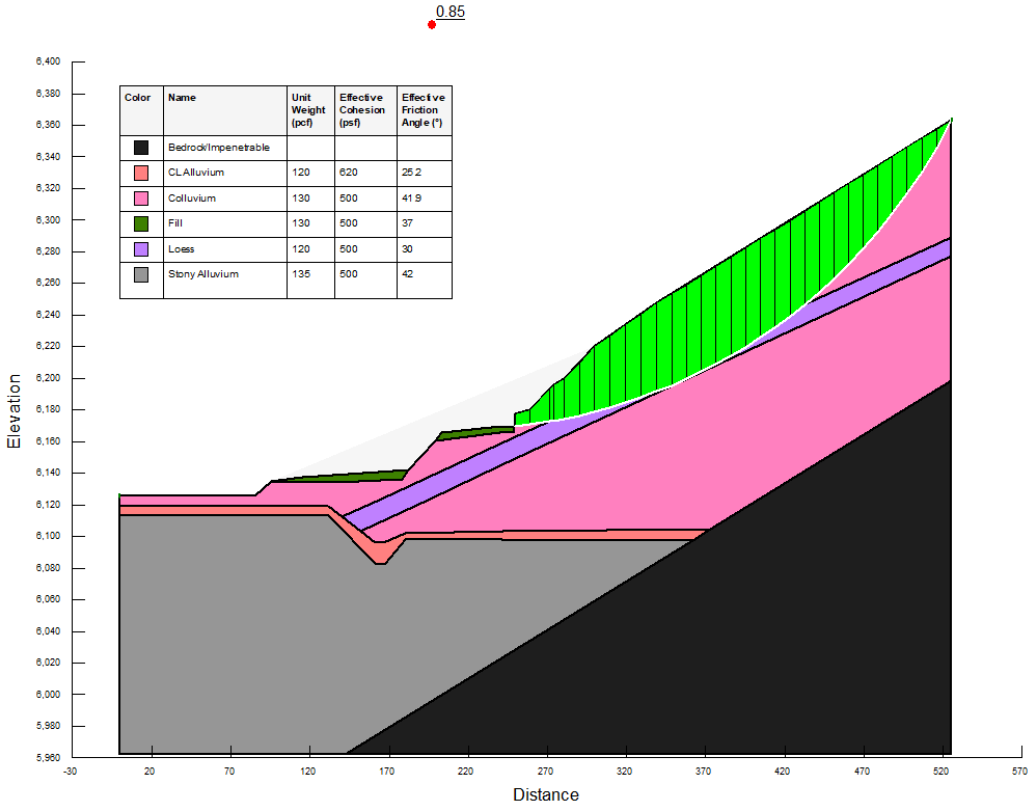


Figure E-14: Cross-Section B-B' Existing Geometry Seismic Analysis – With Loess

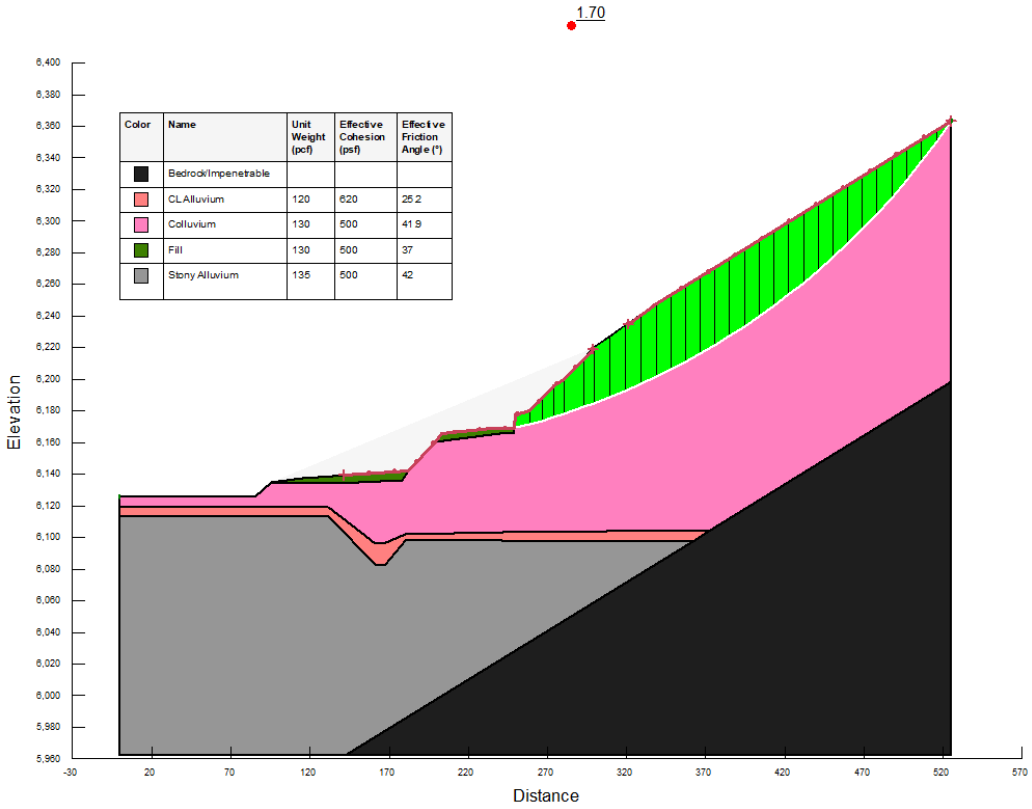


Figure E-15: Cross-Section B-B' Existing Geometry Static Analysis – No Loess

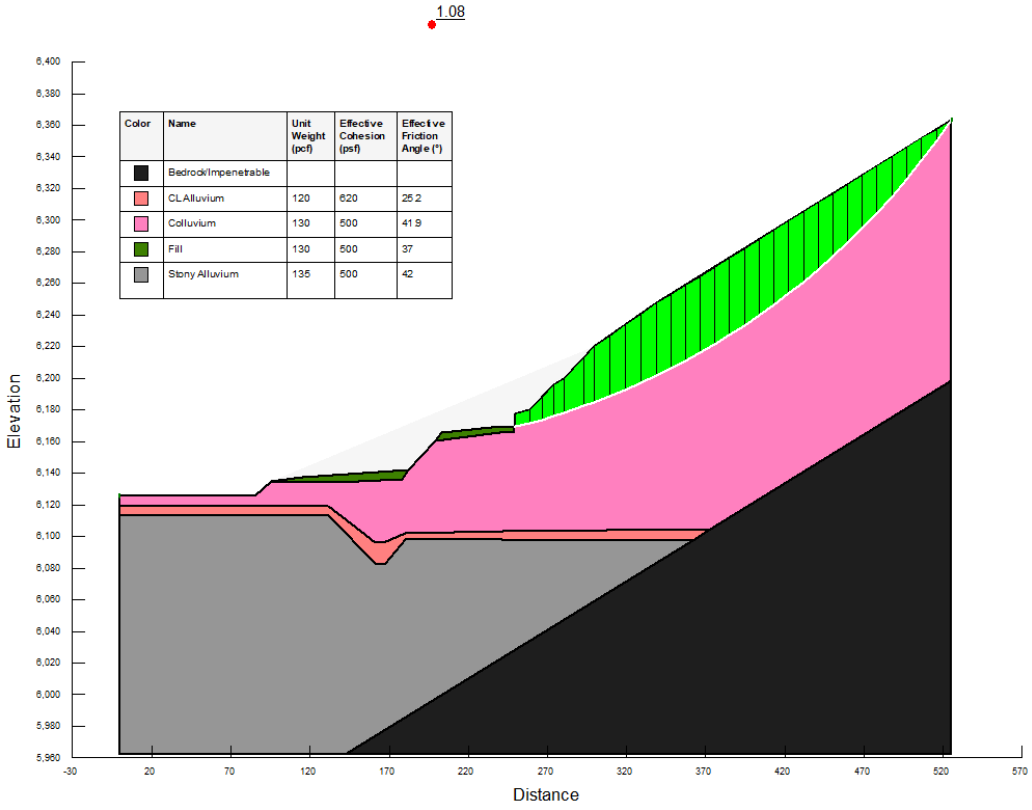


Figure E-16: Cross-Section B-B' Existing Geometry Seismic Analysis – No Loess

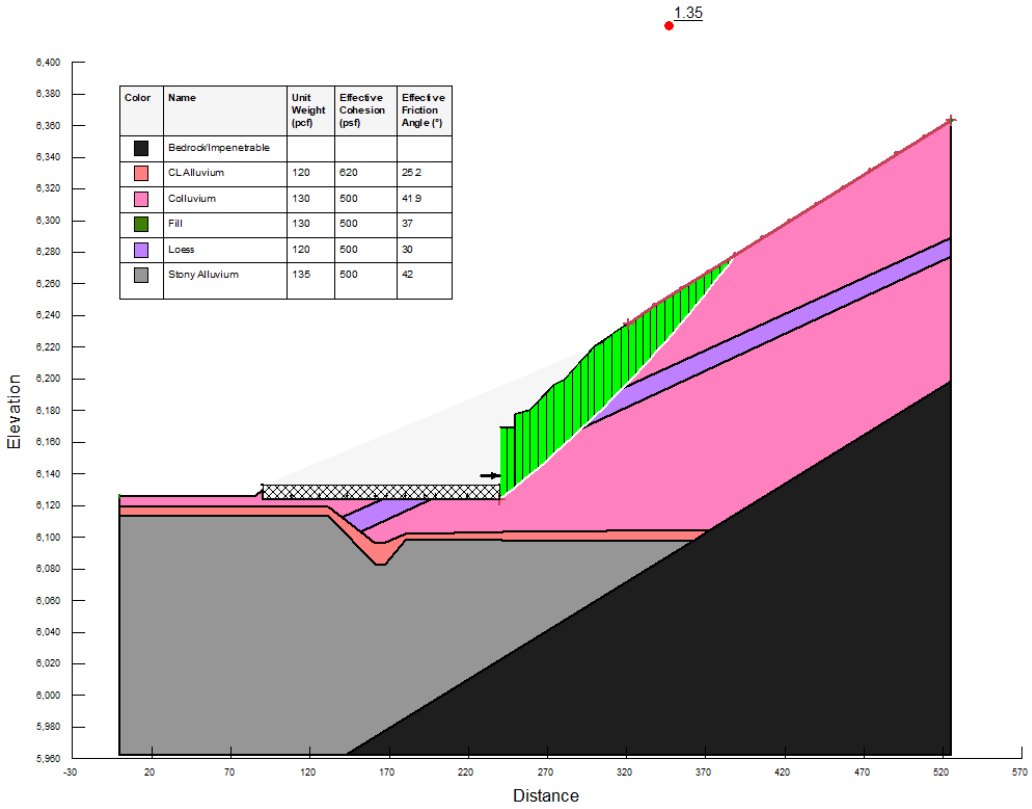


Figure E-17: Cross-Section B-B' Proposed Geometry Static Analysis – With Loess

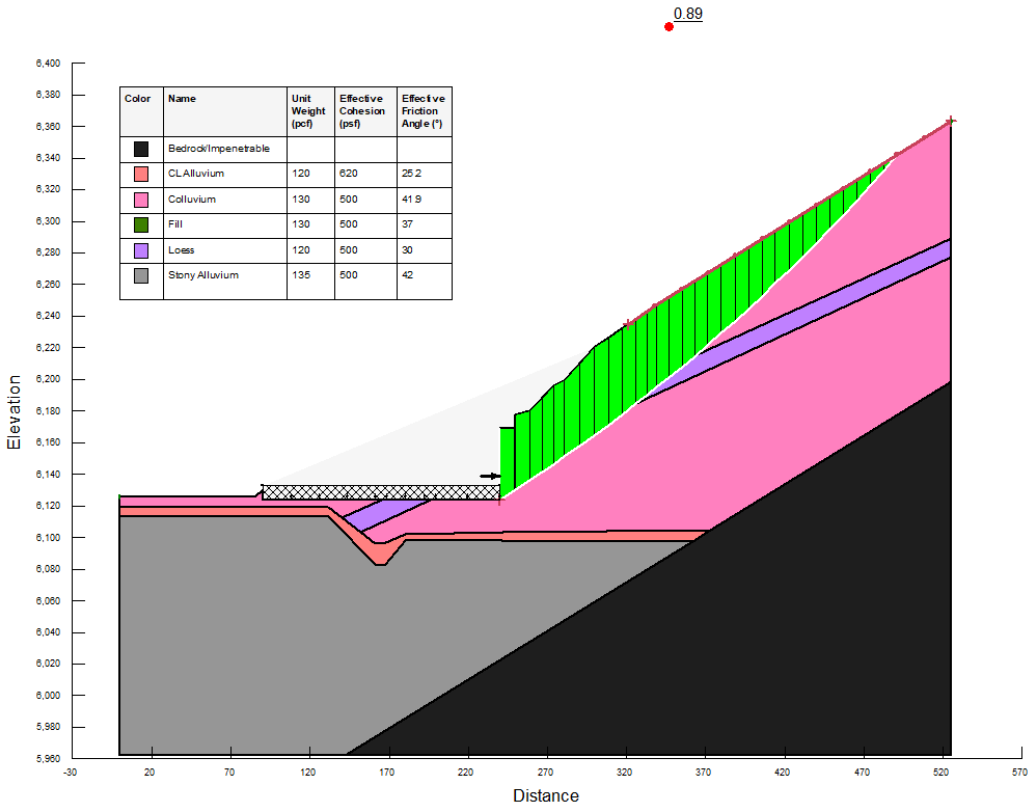


Figure E-18: Cross-Section B-B' Proposed Geometry Seismic Analysis – With Loess

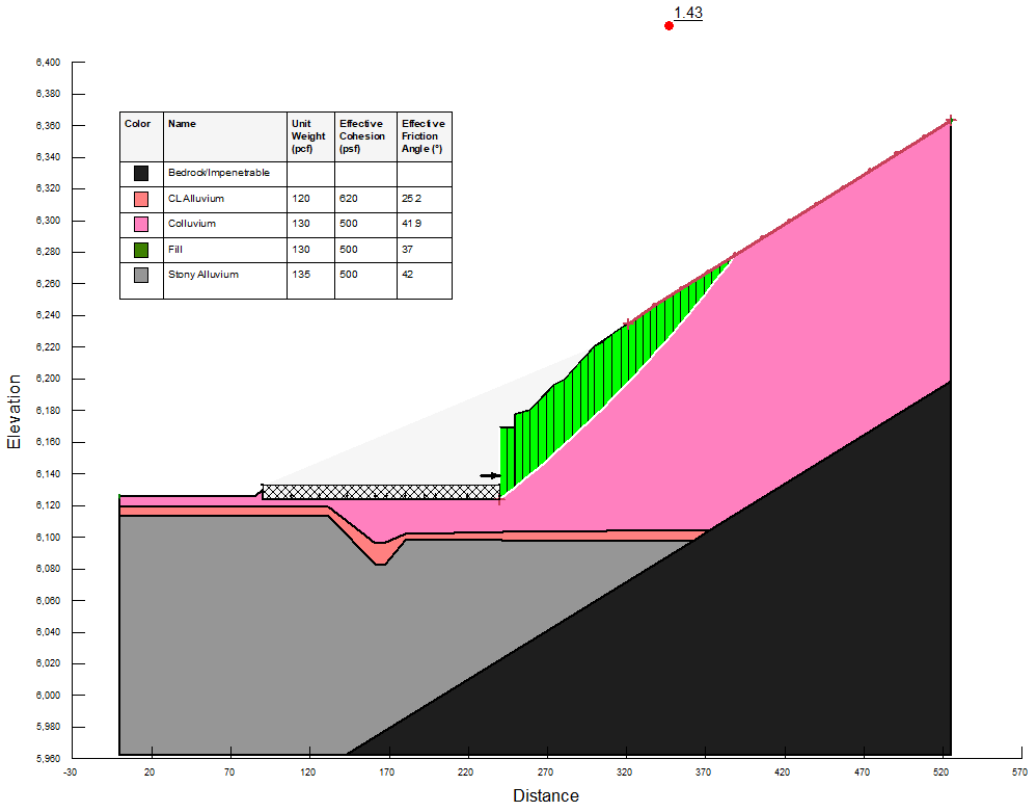


Figure E-19: Cross-Section B-B' Proposed Geometry Static Analysis – No Loess

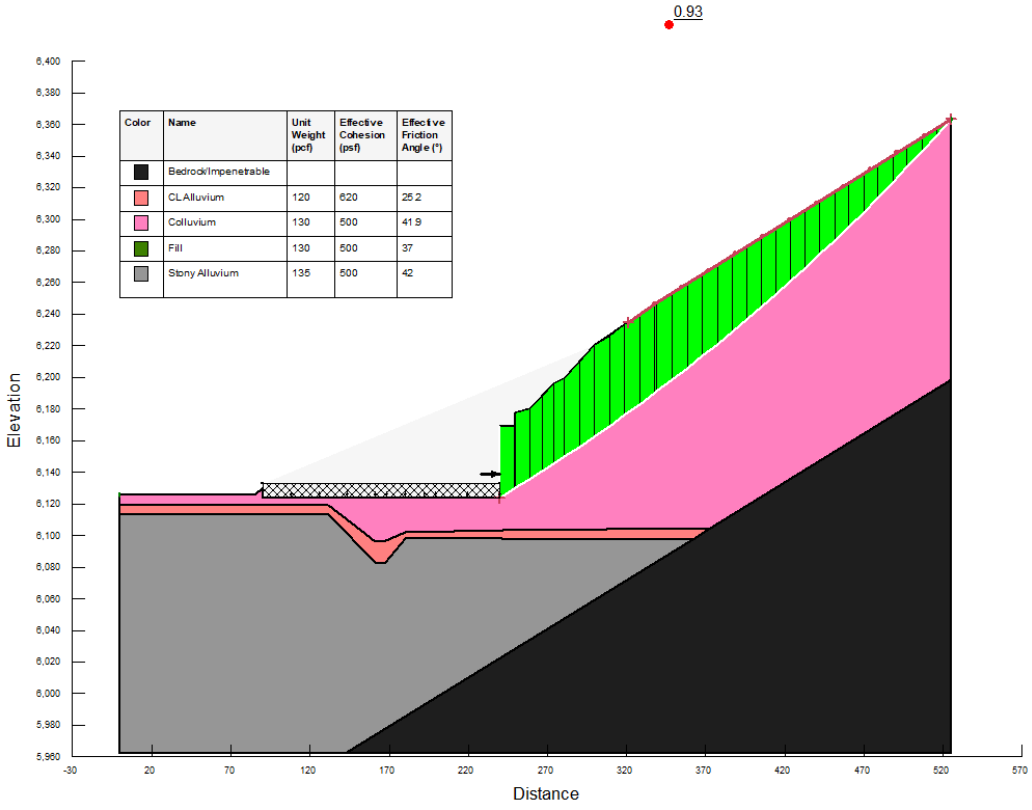


Figure E-20: Cross-Section B-B' Proposed Geometry Seismic Analysis – No Loess

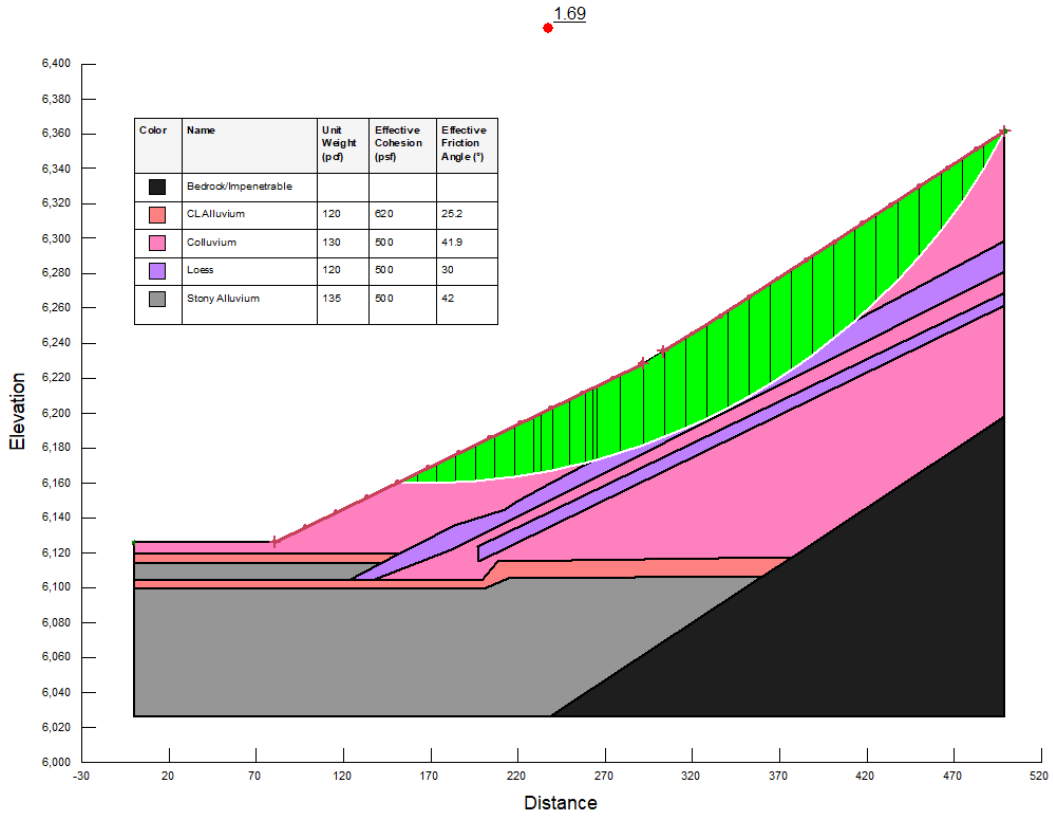


Figure E-21: Cross-Section C-C' Historical Geometry Static Analysis – With Loess

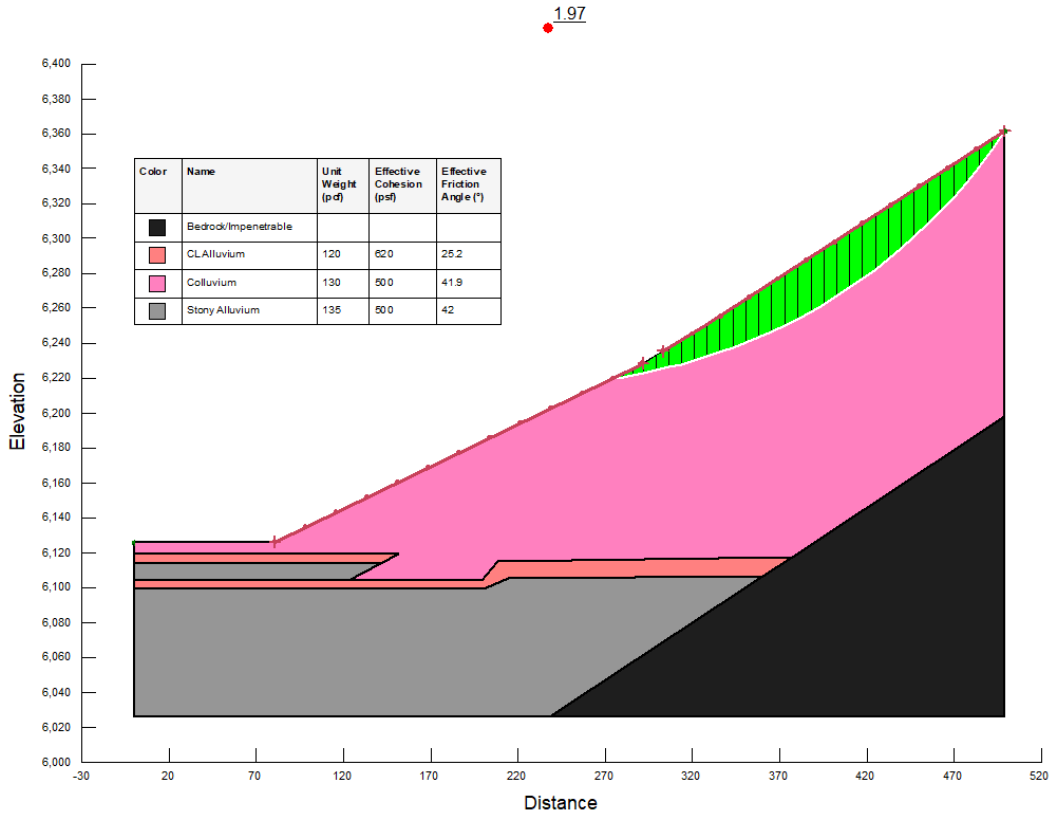


Figure E-22: Cross-Section C-C' Historical Geometry Static Analysis – No Loess

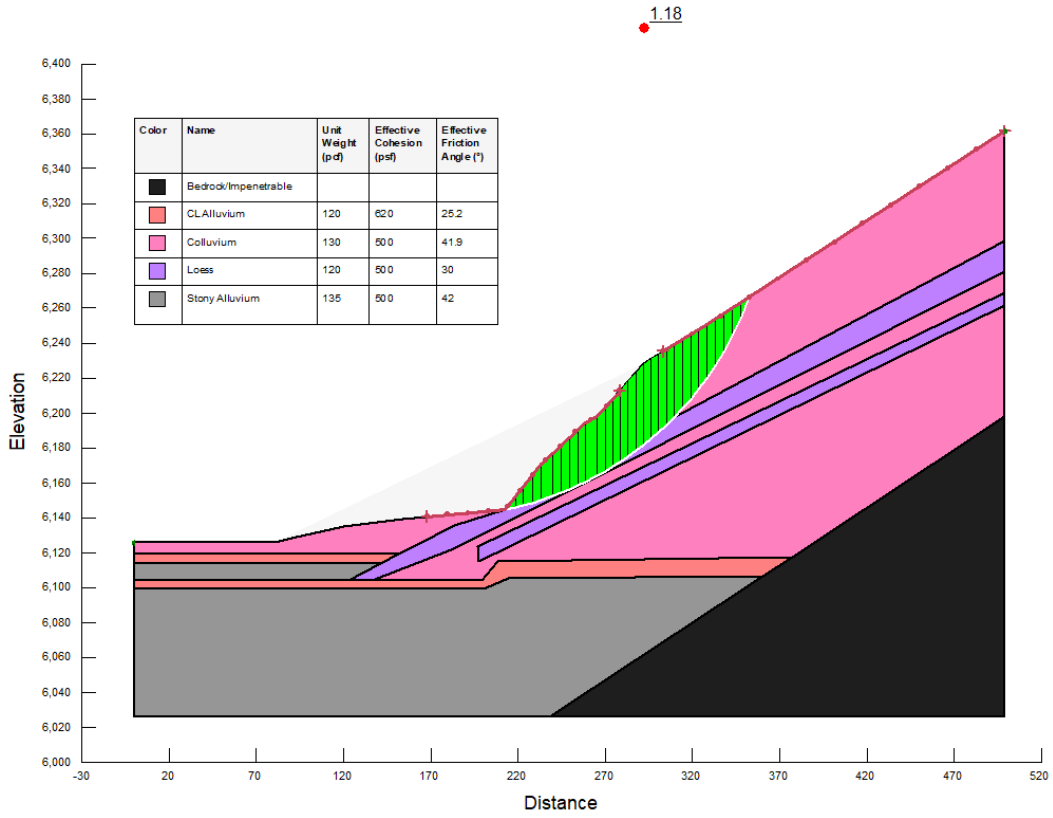


Figure E-23: Cross-Section C-C' Existing Geometry Static Analysis – With Loess

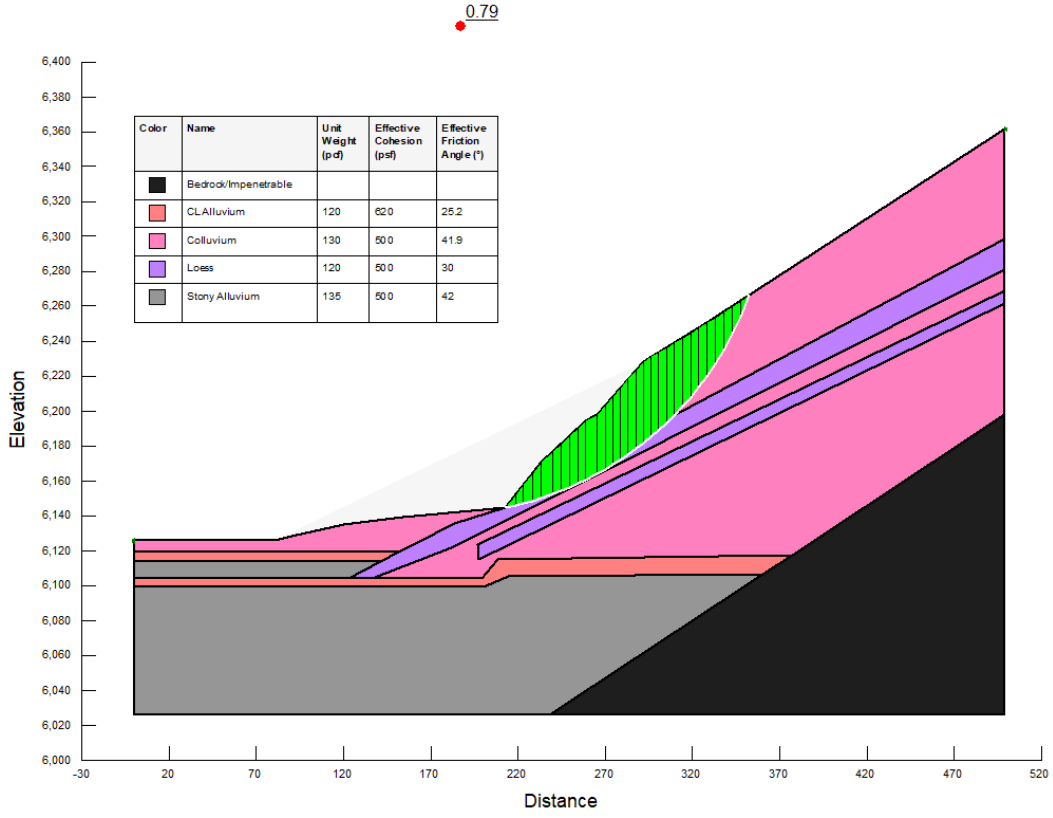


Figure E-24: Cross-Section C-C' Existing Geometry Seismic Analysis – With Loess

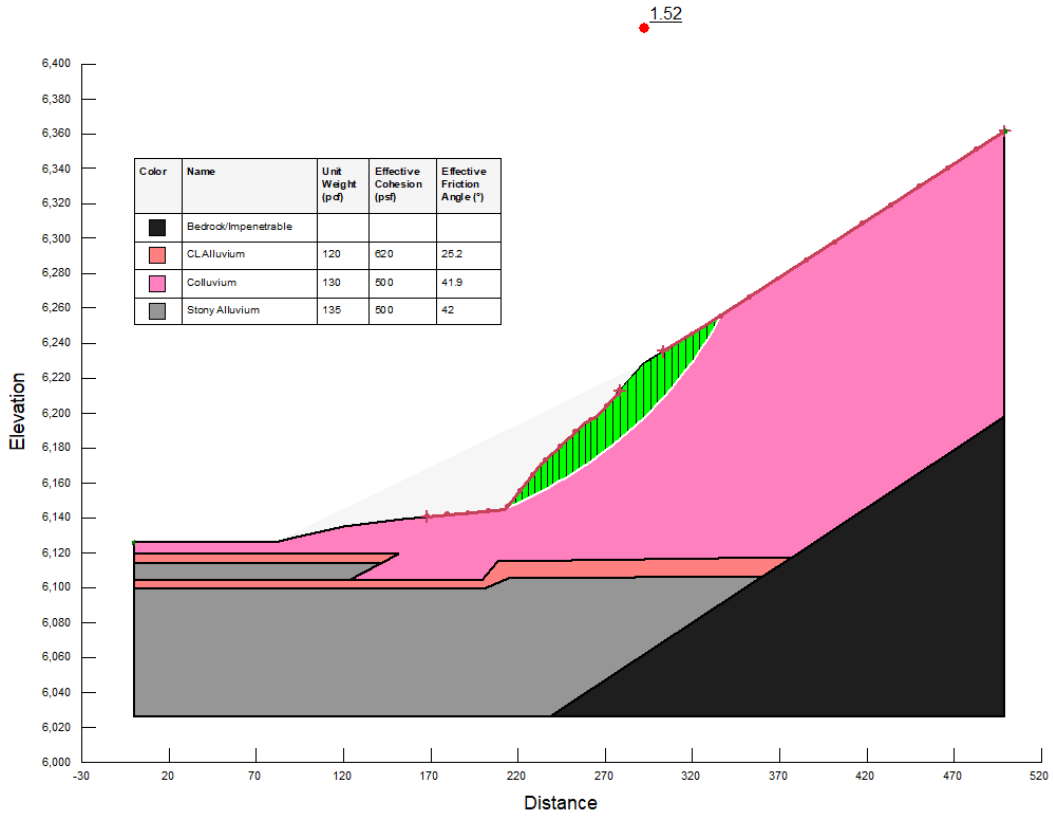


Figure E-25: Cross-Section C-C' Existing Geometry Static Analysis – No Loess

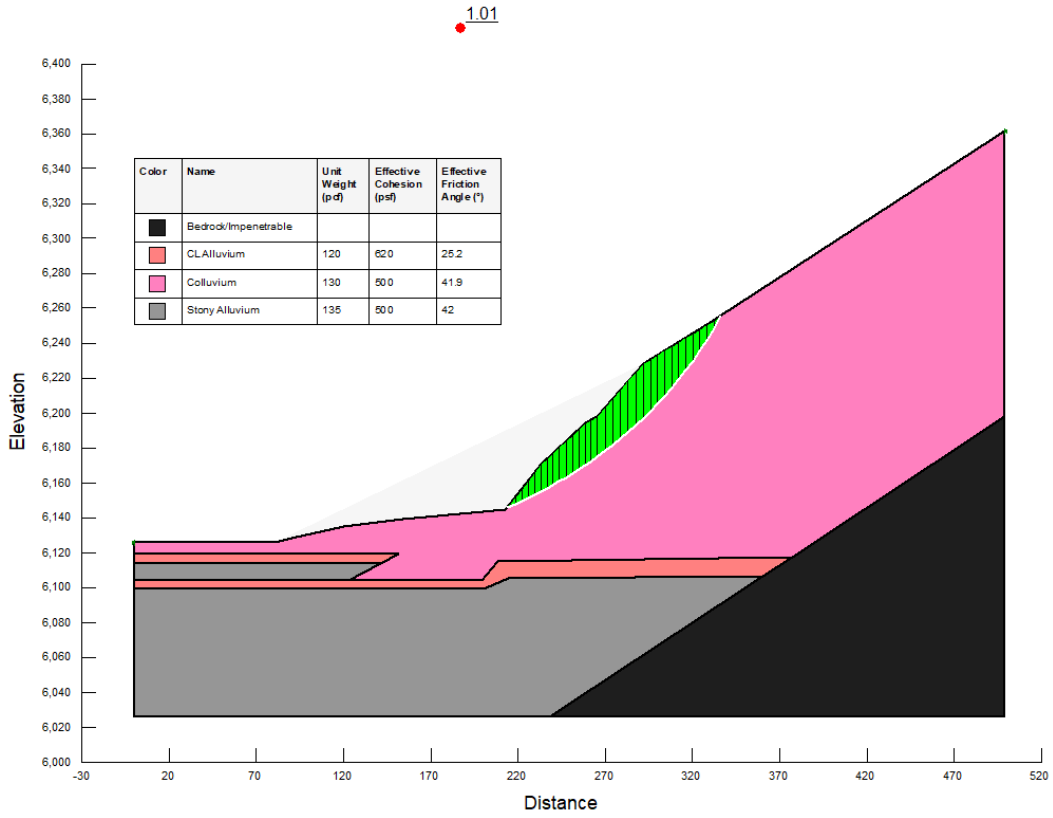


Figure E-26: Cross-Section C-C' Existing Geometry Seismic Analysis – No Loess

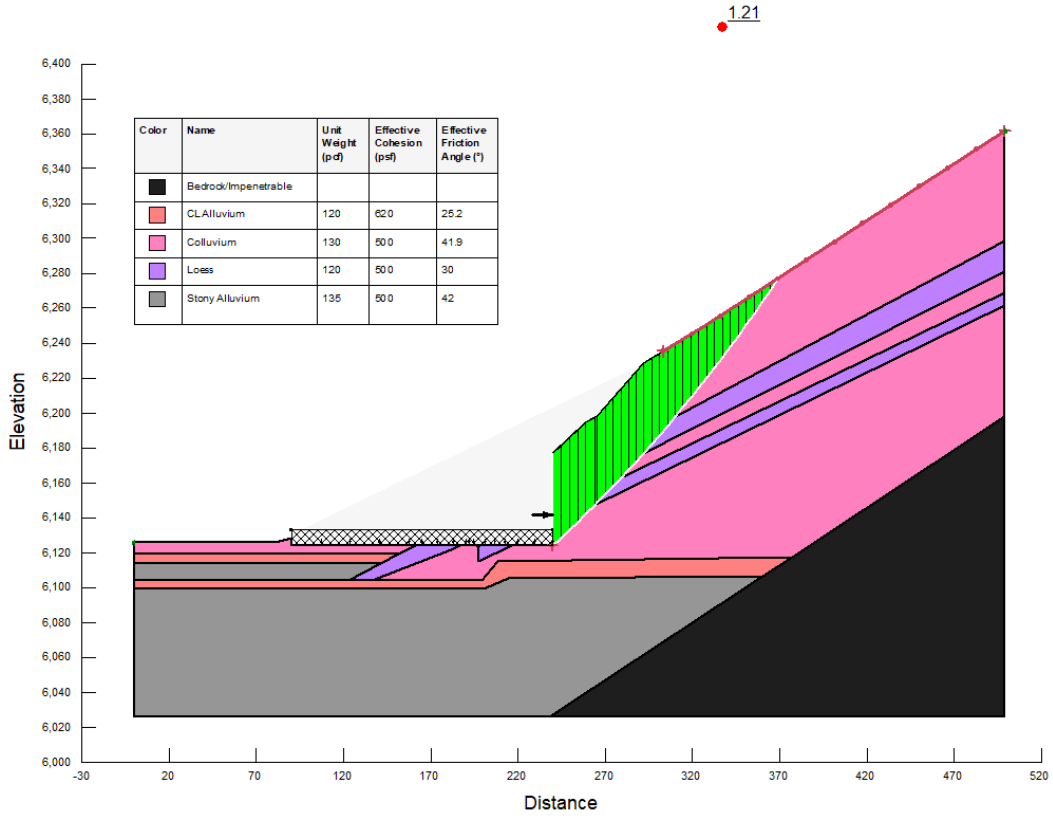


Figure E-27: Cross-Section C-C' Proposed Geometry Static Analysis – With Loess

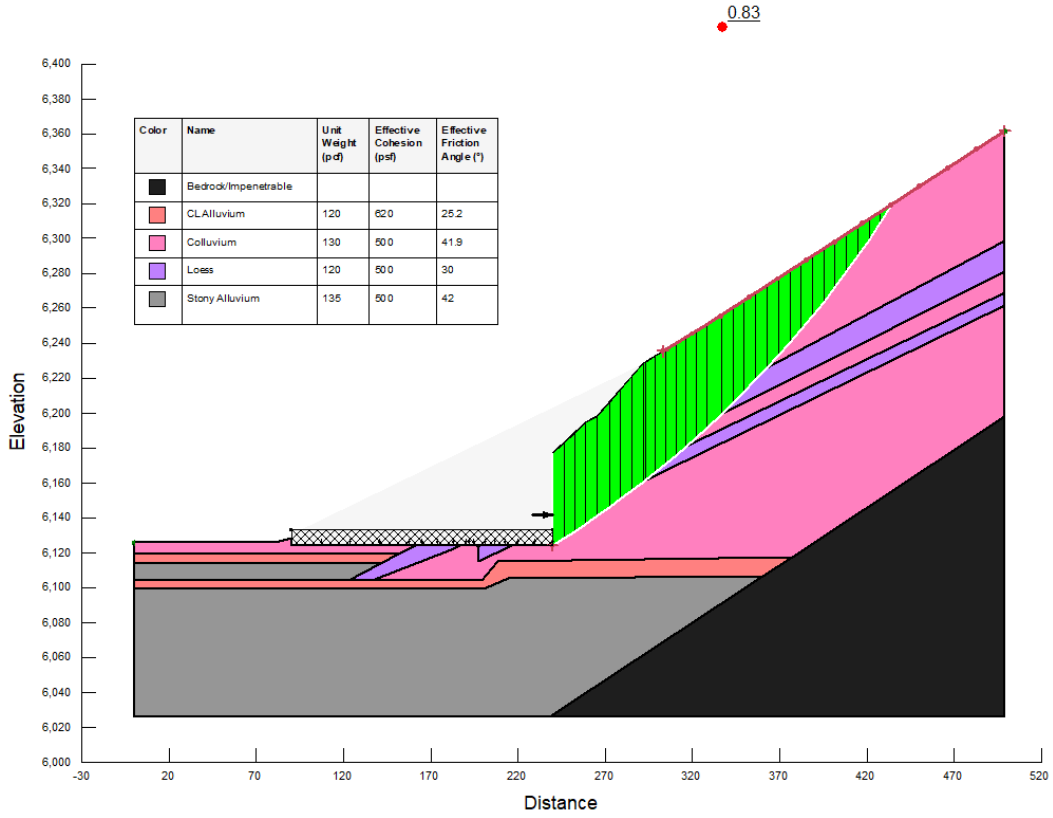


Figure E-28: Cross-Section C-C' Proposed Geometry Seismic Analysis – With Loess

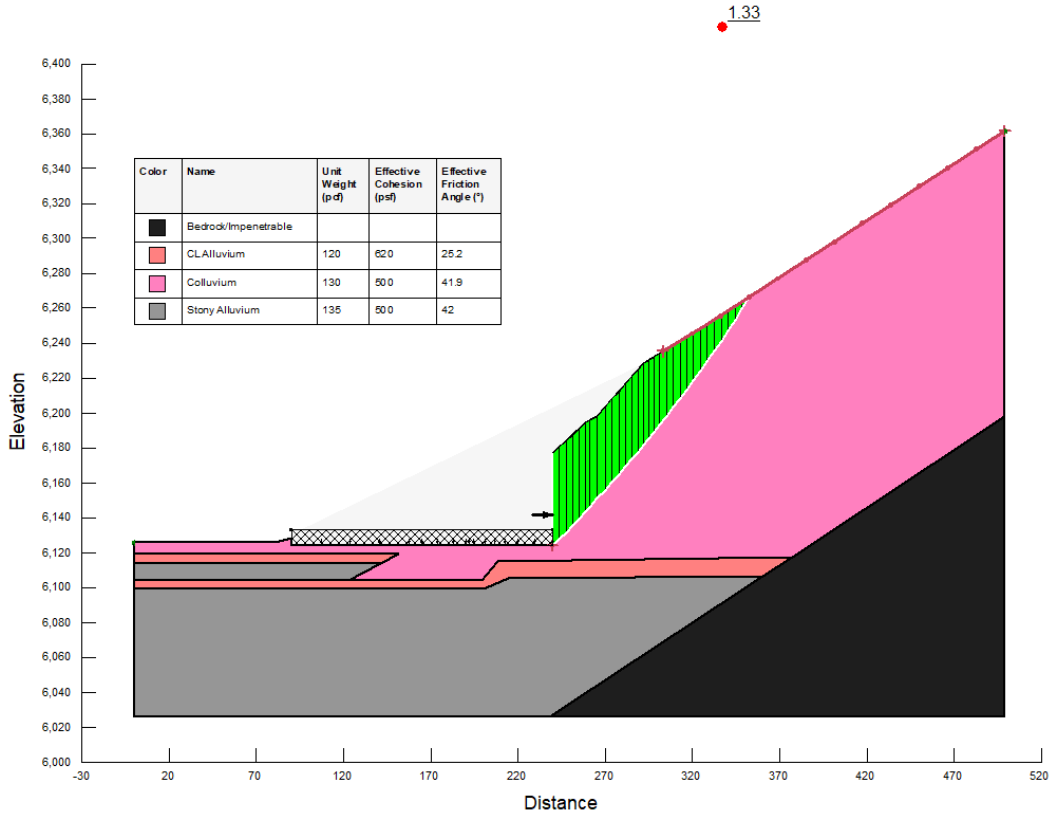


Figure E-29: Cross-Section C-C' Proposed Geometry Static Analysis – No Loess

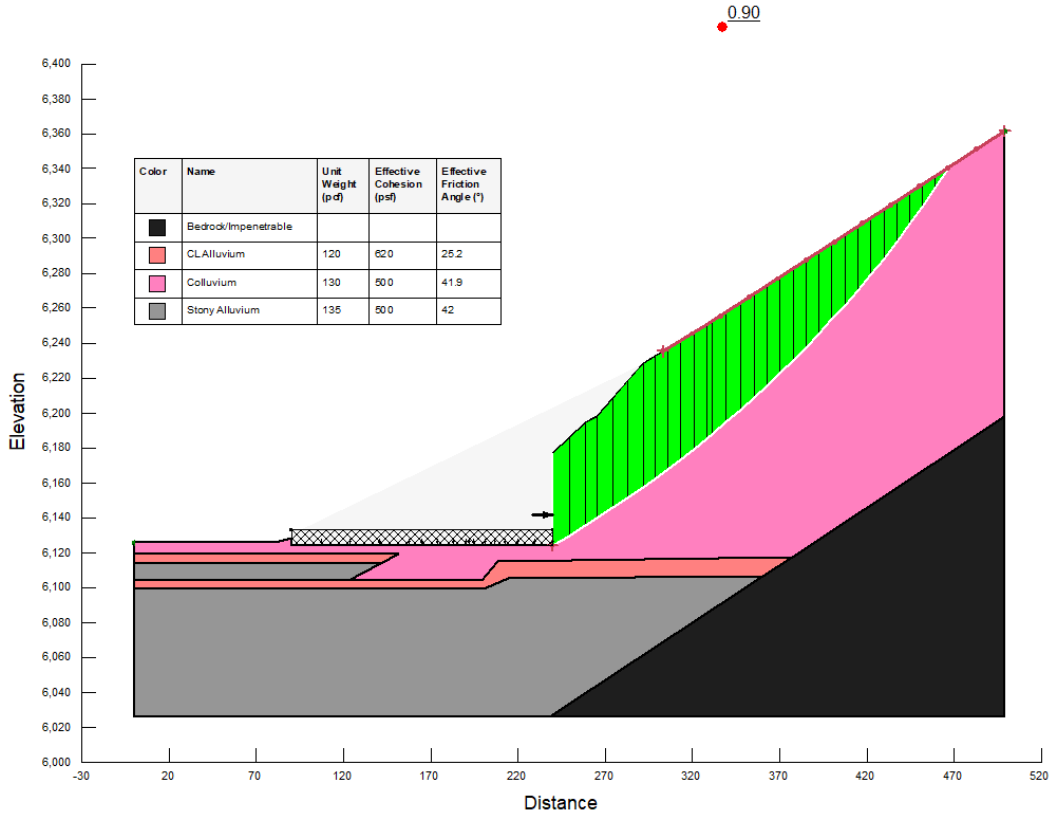


Figure E-30: Cross-Section C-C' Proposed Geometry Seismic Analysis – No Loess

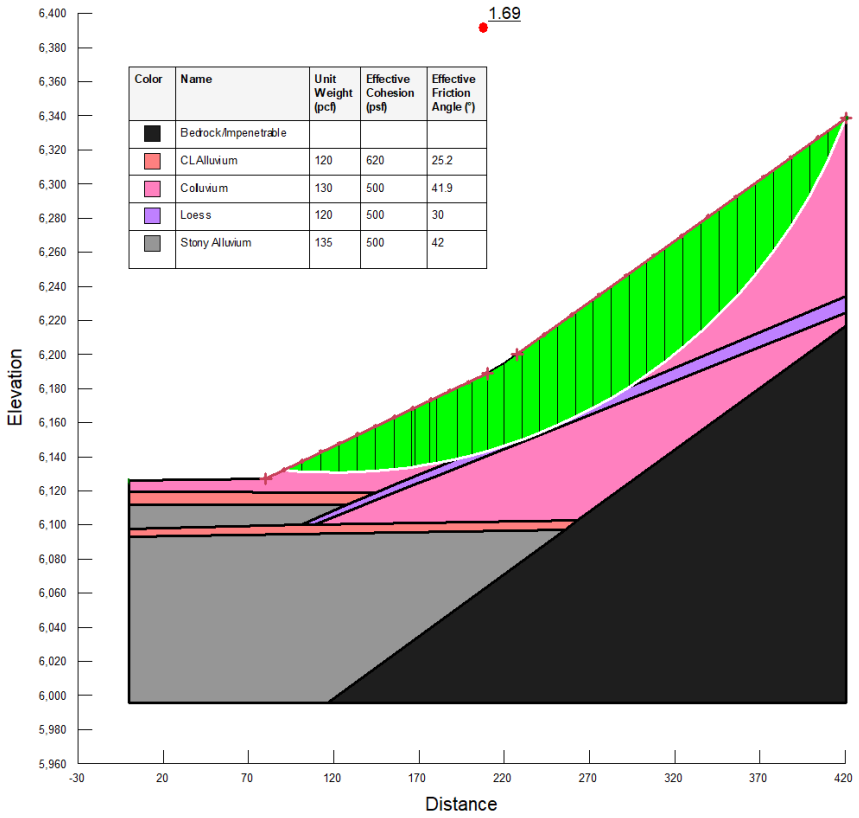


Figure E-31: Cross-Section D-D' Historical Geometry Static Analysis – With Loess

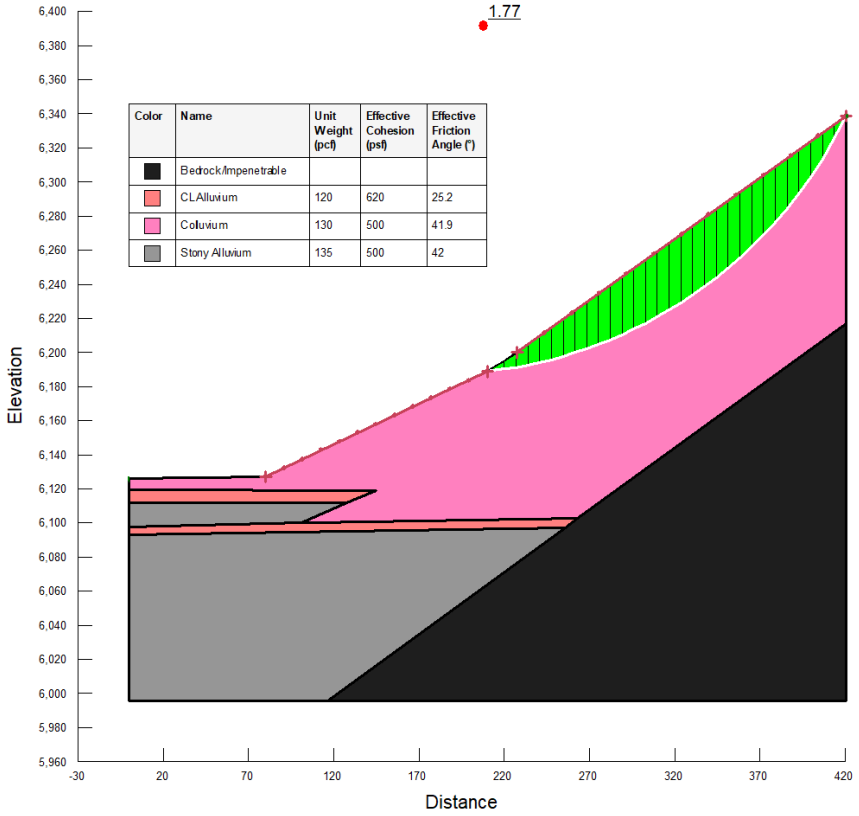


Figure E-32: Cross-Section D-D' Historical Geometry Static Analysis – No Loess

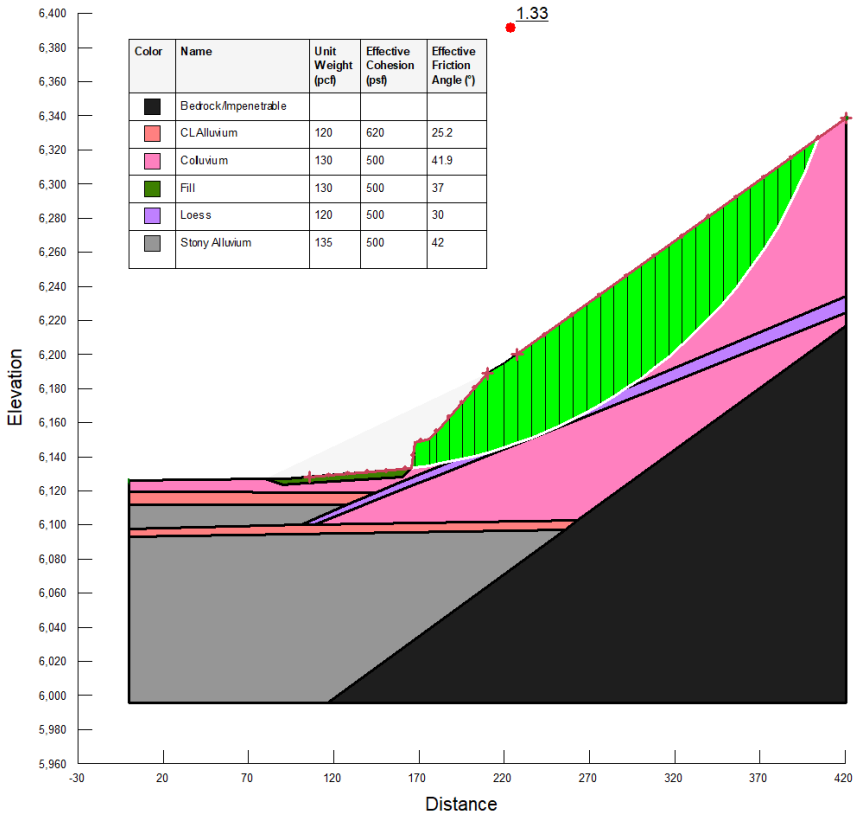


Figure E-33: Cross-Section D-D' Existing Geometry Static Analysis – With Loess

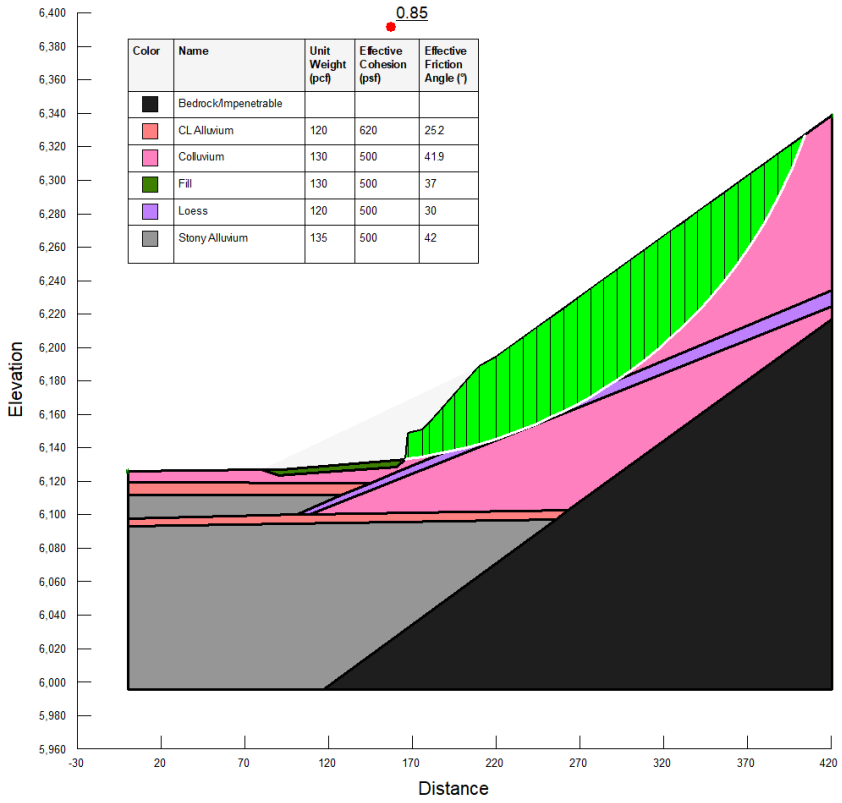


Figure E-34: Cross-Section D-D' Existing Geometry Seismic Analysis – With Loess

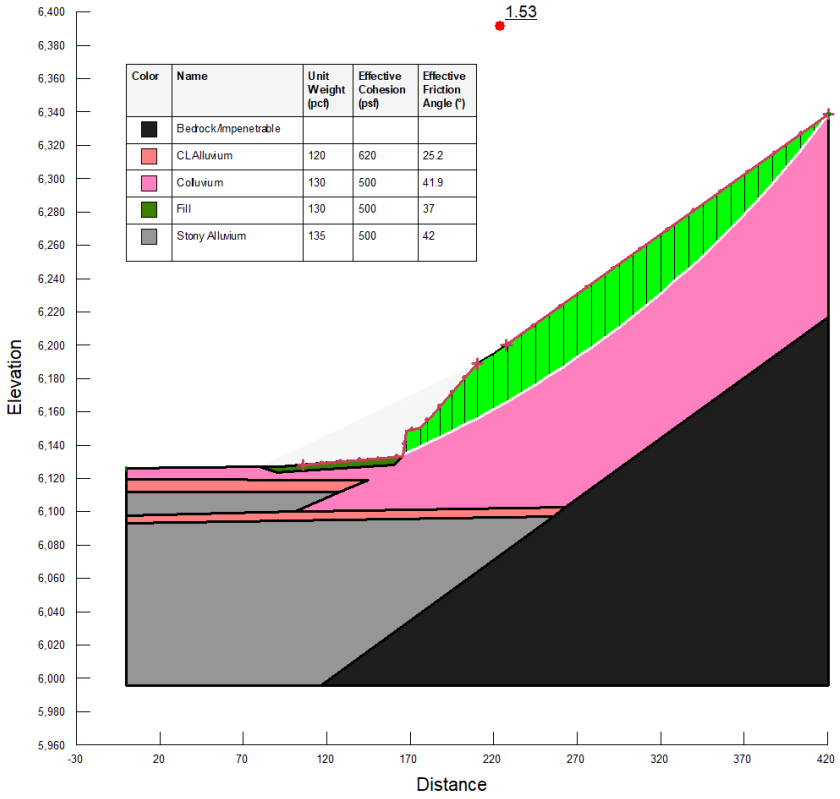


Figure E-35: Cross-Section D-D' Existing Geometry Static Analysis – No Loess

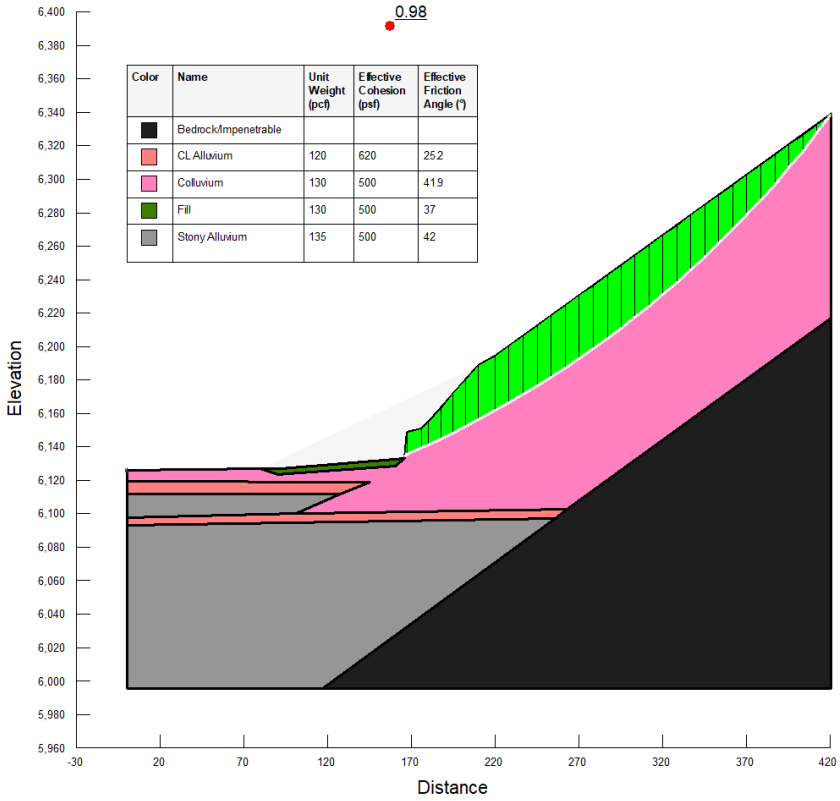


Figure E-36: Cross-Section D-D' Existing Geometry Seismic Analysis – No Loess

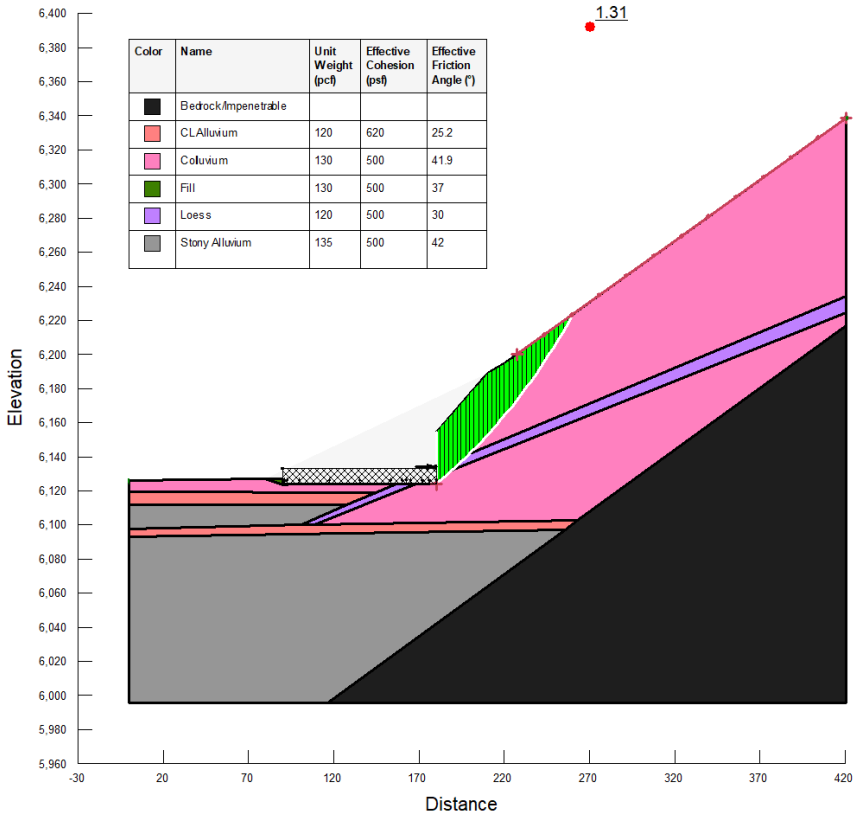


Figure E-37: Cross-Section D-D' Proposed Geometry Static Analysis – With Loess

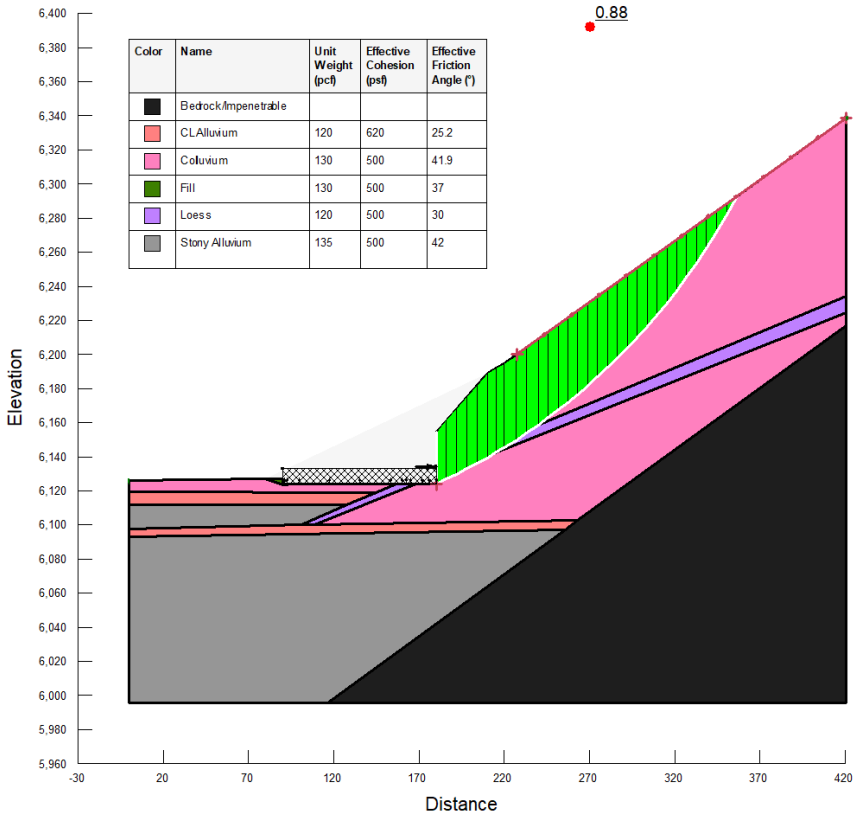


Figure E-38: Cross-Section D-D' Proposed Geometry Seismic Analysis – With Loess

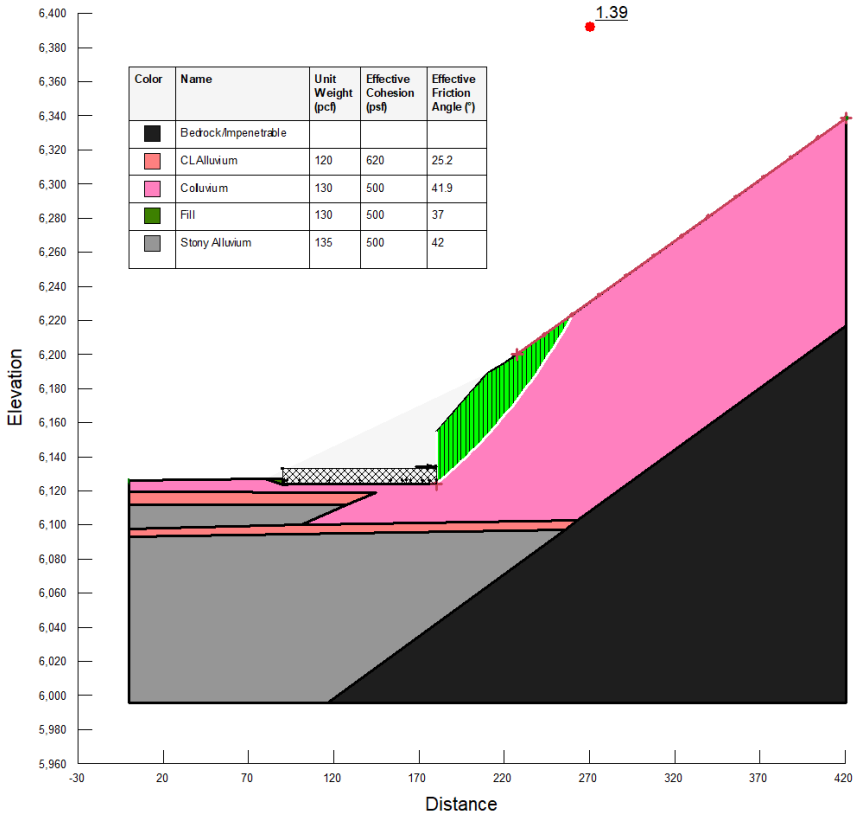


Figure E-39: Cross-Section D-D' Proposed Geometry Static Analysis – No Loess

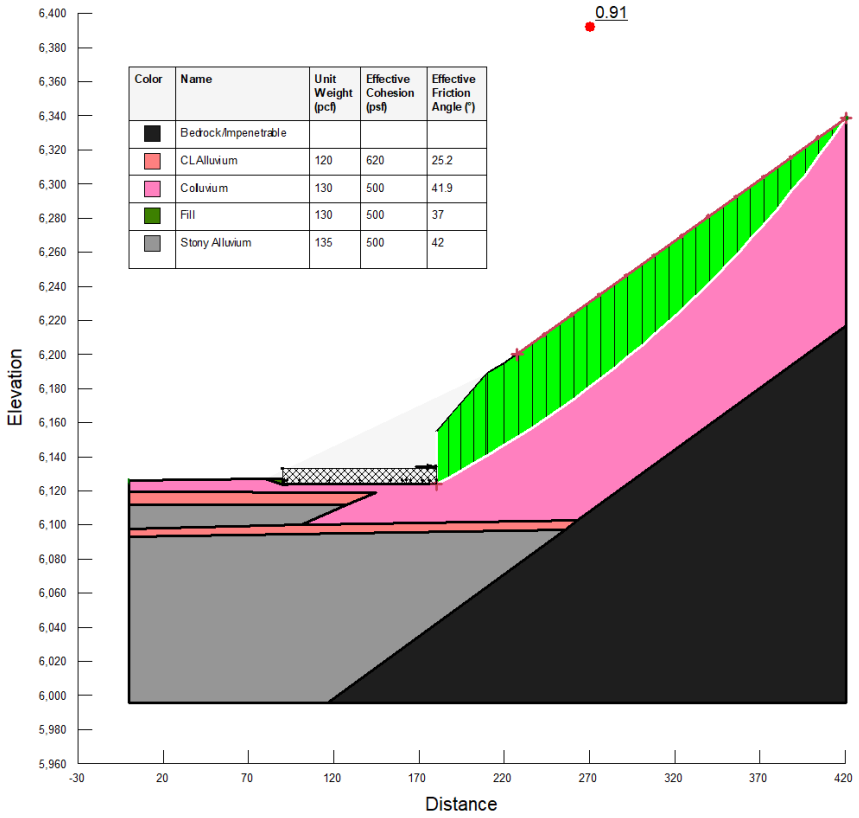


Figure E-40: Cross-Section D-D' Proposed Geometry Seismic Analysis – No Loess

JORGENSEN
GEOTECHNICAL, LLC

PO Box 9550 · 1315 HWY 89 S., Suite 201
Jackson, WY 83002
PH: 307.733.5150
www.jorgeng.com

APPENDIX F

Important Information about your Geotechnical Engineering Report

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org