AGENDA
CITY OF SHERIDAN
JULY 13, 2026
STUDY SESSION COUNCIL MEETING START 5:30 P.M.

1. Discussion of PL-26-10, Resolution 14-26, First Ave East Subdivision - City Planner Kelly Schroeder

2. Discussion of PL-26-23, Ordinance 2303-26, Rezone of Cloud Peak Ranch 15-A Filing - City Planner Kelly Schroeder

3. Discussion of Bid Award to Astech Corp for the 2026 City of Sheridan Micro-Surface Project in the Amount of $313,411.44 - Project Manager David Ford

4. Discussion of the Purchase of One (1) Asphalt Recycling Trailer from Kois Brothers Equipment Company Inc. for the Amount of $95,651.00 - Fleet & Administrative Coordinator Heather Czaplinski

5. General Discussion and Potential Future Agenda Items - City Administrator Stuart J. McRae
   A. Council Request for Future Agenda Items.

CITY OF SHERIDAN, WYOMING
55 Grinnell Plaza, Sheridan, Wyoming 82801
Ph (307) 674-6483

Planning

MEMORANDUM

RE: Discussion of PL-26-10, Resolution 14-26, First Ave East Subdivision - City Planner Kelly Schroeder

From: Kelly Schroeder, Planning Director
To: City Council
Date: 07/13/2026

Background:

Randall Engineering Surveys, on behalf of the property owner, Q Construction, LLC, has submitted a final plat application for the following location:

Address: 1039 2nd Ave. East., Sheridan, WY 82801
Legal: Tract 28, Brundage Place Subdivision
PIN: 55840211100225

The applicant is proposing to divide 1 acre into 2 residential use lots with the following lot sizes:
• Lot 1: 32,324 square feet
• Lot 2: 11,212 square feet

There is an existing single-family home on proposed Lot 2 and plans for multi-family development on proposed Lot 1. The property is currently zoned B-1 Business District, which allows for a variety of uses including residential.

As both proposed lots currently have access to dedicated public streets and utility infrastructure, no new improvements are being proposed with this subdivision.

Please see the attached staff report and supporting documentation for further details.

Attachments

Staff Report
Draft Resolution
Final Plat
Aerial

CITY OF SHERIDAN, WYOMING

55 Grinnell Plaza, Sheridan Wyoming 82801
Planning Division

MEMORANDUM

From: Kelly Schroeder, City Planner
To: City of Sheridan Governing Body
Date: July 13, 2026

Re: PL-26-10, Resolution 14-26 First Avenue East Subdivision Final Plat Staff Report

Background

Randall Engineering Surveys, on behalf of the property owner, Q Construction, LLC, has submitted a final plat application for the following location:

Address: 1039 2nd Ave. East., Sheridan, WY 82801
Legal: Tract 28, Brundage Place Subdivision
PIN: 55840211100225

The applicant is proposing to divide 1 acre into 2 residential use lots with the following lot sizes:

- Lot 1: 32,324 square feet
- Lot 2: 11,212 square feet

There is an existing single-family home on proposed Lot 2 and plans for multi-family development on proposed Lot 1. The property is currently zoned B-1 Business District, which allows for a variety of uses including residential.

As both proposed lots currently have access to dedicated public streets and utility infrastructure, no new improvements are being proposed with this subdivision.

Discussion

The property was recently rezoned from R-1 Residential to B-1 in November 2025 to allow for multi-family residential use on the property. Properties to the west are also zoned B-1 Business, while properties to the east are zoned R-1 Residential. There are also M-1 Industrial, B-2 Business, and R-3 Residential properties in the area. Nearby land uses include single-family residential, multi-family residential, auto sales, restaurants, and a hotel.

The Future Land Use Map from 2017 indicates that this area is appropriate for residential use. The subdivision and proposed use of the property align with the Future Land Use Plan and creates infill development that is compatible with the surrounding properties and land uses.

Staff Review Comments
Staff comments during the internal review of this final plat application were related to minor corrections needed for the plat and information regarding requirements for future building permits on the property.

Public Notice
Staff sent notices to 22 surrounding property owners and published a legal ad in the Sheridan Press with information about the project and the public hearing schedule. A sign was also posted on the property. To date, staff have received no public comments on the final plat.

Staff Recommendation

Staff recommends that the Governing Body approve PL-26-10, Resolution 14-26 First Avenue East Subdivision Final Plat.

Planning Commission Public Hearing and Recommendation

The City of Sheridan Planning Commission will hold a public hearing on this item on Monday, July 13, 2026 at 7:00pm. This staff report will be updated following the meeting to contain any public comments and the recommendation from Planning Commission.

Anticipated Meeting Schedule

Monday, July 13, 2026, 5:30pm - City Council Study Session
Monday, July 13, 2026, 7:00pm - Planning Commission Public Hearing and Consideration
Monday, July 20, 2026, 5:30pm - City Council Public Hearing and Consideration

All meetings are held in the City Council Chambers on the 3rd Floor of City Hall. Located at 55 Grinnell Plaza, Sheridan, WY 82801.

CITY OF SHERIDAN
RESOLUTION 14-26

A RESOLUTION APPROVING PL-26-10, THE FINAL PLAT OF FIRST AVENUE EAST SUBDIVISION, DIVIDING TRACT 28 OF THE BRUNDAGE PLACE SUBDIVISION, TOTALLING 1 ACRE, INTO 2 LOTS. ZONED B-1 BUSINESS DISTRICT. LOCATED AT 1039 2ND AVENUE EAST. (PIN 55840211100225).

WHEREAS, The final plat of First Avenue East Subdivision has been reviewed for consistency with Appendix B (Subdivision Regulations) and other applicable City code; and

WHEREAS, all applicable requirements for a final plat have been met and all documents meet applicable requirements in Appendix B (Subdivision Regulations).

BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF SHERIDAN, WYOMING:

The city approves the final plat of First Avenue East Subdivision, dividing Tract 28 of the Brundage Place Subdivision, totaling 1 acre, into 2 lots.

In approving First Avenue East Subdivision, the City of Sheridan Governing Body finds the following as required by Sheridan City Code Appendix B §202A:

1. The property is already within the corporate limits of the City and requires no further action as pertains to annexation.

2. The lots as platted conform to the requirements of the City Zoning Ordinance.

3. The subdivision falls outside the Airport Influence Area.

4. As concluded by Utilities Department staff, there is adequate long-term water supply to serve this subdivision as of the time of this resolution.

PASSED, APPROVED AND ADOPTED this _____ day of _____ 2026.

City of Sheridan

_____

Richard Bridger, Mayor

ATTEST:

_____

Ashlee Foster, City Clerk

FIRST AVENUE EAST SUBDIVISION

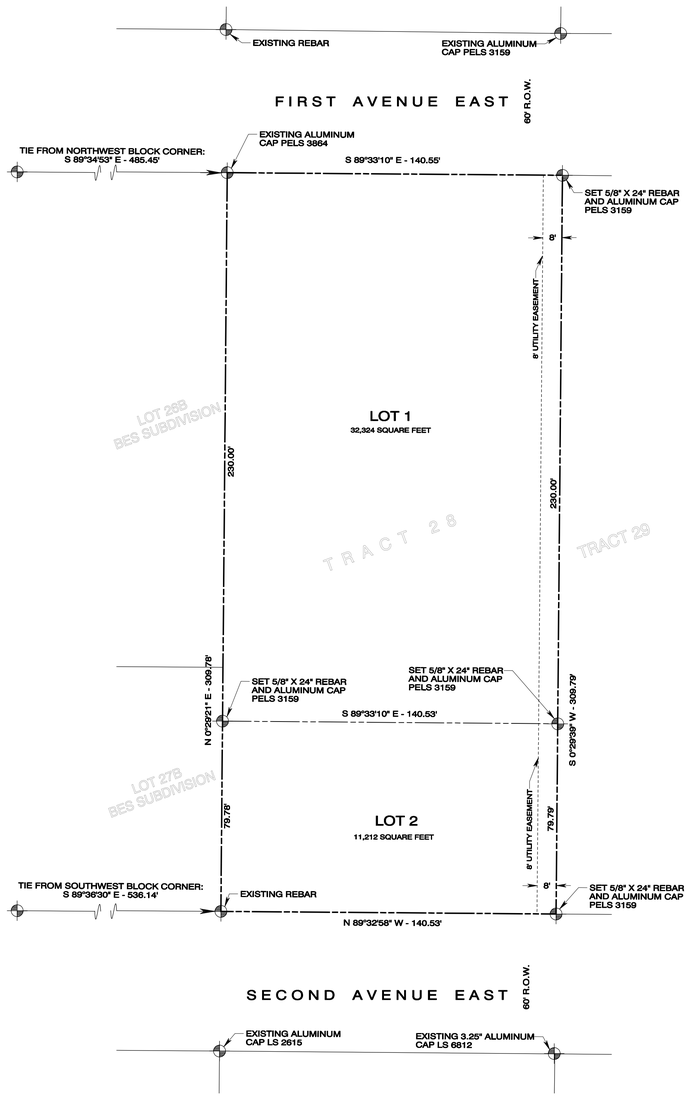
A REPLAT of TRACT 28 of the BRUNDAGE PLACE SUBDIVISION, CONSISTING of 2 LOTS and CONTAINING 1.00 ACRE

DETAIL

GRAPHIC SCALE 1"=30'

0 30 60 90

BASIS OF BEARING IS WYOMING STATE PLANE NAD 1983 (2011), (EAST CENTRAL ZONE).



CERTIFICATE of OWNER

Know all men by these presents that the undersigned, Q CONSTRUCTION LLC being the owners, proprietors or parties of interest in the land shown on this plat, do hereby certify:

That the foregoing plat designated as FIRST AVENUE EAST SUBDIVISION, being a REPLAT of Tract 28 of the Brundage Place Subdivision, City of Sheridan, Sheridan County, Wyoming.

Said tract contains 1.00 Acre.

That this subdivision, as it is described and as it appears on this plat, is made with the free consent and in accordance with the desires of the undersigned owners and proprietors; and that this is a correct plat of the area as it is divided into lots, blocks, streets and easements, and

That the undersigned owners of the land shown and described on this plat do hereby dedicate to the City of Sheridan and its licensees for public use for the indicated purposes, all streets, alleys, easements and other public lands within the boundary lines of the plat, as indicated, and not already otherwise dedicated for public use.

Utility easements, as designated on this plat, are hereby dedicated to the City of Sheridan and its licensees for public use for the purpose of installing, repairing, reinstalling, replacing and maintaining sewers, water lines gas lines, electric lines, telephone lines, cable TV lines and other froms and types of public utilities now or hereafter generally utilized by the public.

All rights under and by virtue of the homestead exemption laws of the State of Wyoming are hereby waived and released.

Executed this _____ day of _____ , 2026, by:

_____
Q CONSTRUCTION LLC

State of Wyoming }
County of Sheridan } ss

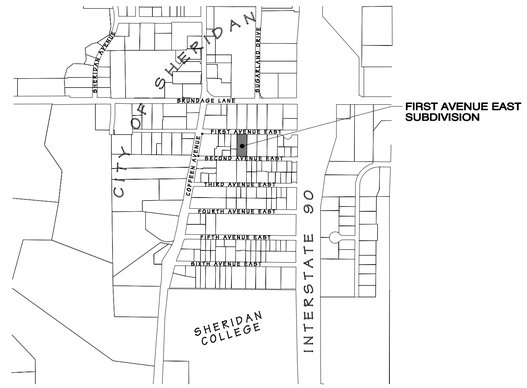
The foregoing plat was acknowledged before me this ____ day of _____ , 2026, by Q Construction LLC.

_____
Notary Public

My commission expires: _____ .

LOCATION MAP

SCALE : 1" = 1000'





CERTIFICATE of SURVEYOR

State of Wyoming }
County of Sheridan } ss

I, David L. Randall, of Sheridan, Wyoming do hereby certify that I am a duly registered Professional Engineer and Land Surveyor, licensed under the laws of the State of Wyoming, that this plat is a true, correct and complete plat of the First Avenue East Subdivision as laid out, platted, dedicated and shown hereon, that this plat was made from an accurate survey of said property conducted by me in November of 2025 through February of 2026, and correctly shows the location and dimensions of all lots, easements and streets of said subdivision in compliance with City of Sheridan regulations governing the subdivision of land.

Registration No. 3159 PE & LS

_____
CIVIL ENGINEER and LAND SURVEYOR

DECLARATION VACATING PREVIOUS PLATTING

This plat is a replat of Tract 28 of the Brundage Place Subdivision in the City of Sheridan, Sheridan County, Wyoming, as recorded in Drawer "B" of Plats, Map No. 14, of the Records of the Sheridan County Clerk. All earlier plats or portions thereof encompassed by the boundaries of this plat are hereby vacated.

CITY of SHERIDAN PLANNING COMMISSION CERTIFICATE of REVIEW

Reviewed by the City of Sheridan Planning Commission this _____ day of _____ , 2026.

_____
Attest: VICE CHAIRMAN

_____
CHAIRMAN

DIRECTOR of PUBLIC WORKS CERTIFICATE of APPROVAL

This plat has been prepared in accordance with the requirements and procedures outlined in the subdivision regulations of the City of Sheridan, Wyoming and certified this _____ day of _____ , 2026 by the Director of Public Works of Sheridan, Wyoming.

_____
DIRECTOR of PUBLIC WORKS

CITY of SHERIDAN CERTIFICATE of APPROVAL

Approved by the City Council of Sheridan, Wyoming, this _____ day of _____ , 2026.

_____
Attest: CITY CLERK

_____
MAYOR

CERTIFICATE of RECORDER

State of Wyoming }
County of Sheridan } ss

This plat was filed for record in the Office of the Clerk and Recorder at ___ O'Clock __ M., this ____ day of _____ , 2026, and is duly recorded in Book _____, Page No. ___ .
Receiving Number _____ .

_____
COUNTY CLERK

_____
DEPUTY COUNTY CLERK

PLAT

of the

FIRST AVENUE EAST SUBDIVISION

being a

REPLAT of TRACT 28

of the

BRUNDAGE PLACE SUBDIVISION

in the

CITY of SHERIDAN
SHERIDAN COUNTY, WYOMING

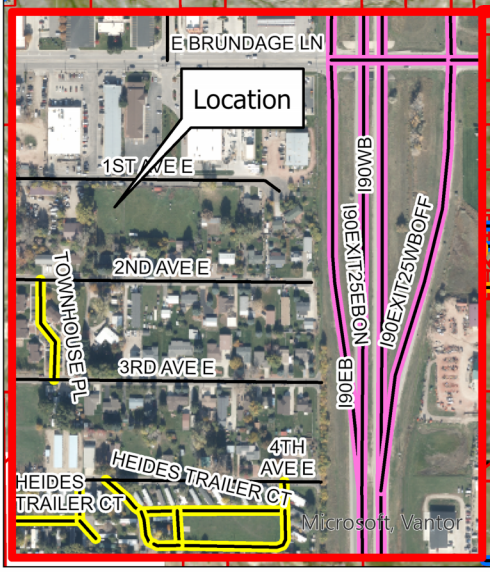
for

Q CONSTRUCTION LLC

22 TIMM PLACE
SHERIDAN, WYOMING 82801

DRAWN BY REX RANDALL - JUNE 15, 2026
RANDALL ENGINEERING SURVEYS - SHERIDAN, WYOMING

First Ave East Sub



DISCLAIMER:
The City of Sheridan GIS Division produced this map for informational purposes only. The City of Sheridan provides this map on an "as is" basis without warranties of any kind, either expressed or implied, and shall not be liable for any direct, indirect, incidental, special or consequential damages arising out of the use of such map. The user acknowledges and agrees that the use of such data is at the sole risk of the user. General questions about this map including errors, omissions, and/or updates should be directed to the City of Sheridan GIS Division.

CITY OF Sheridan WYOMING

N

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Date: 6/11/2026 11:00 AM User: sgoodman

CITY OF SHERIDAN, WYOMING
55 Grinnell Plaza, Sheridan, Wyoming 82801
Ph (307) 674-6483

Planning

MEMORANDUM

RE: Discussion of PL-26-23, Ordinance 2303-26, Rezone of Cloud Peak Ranch 15-A Filing - City Planner Kelly Schroeder

From: Kelly Schroeder, Planning Director

To: City Council

Date: 07/13/2026

Background:

Morrison-Maierle, on behalf of property owner Ranch at Twin Buttes, LLC, has submitted a rezone application for the following location:

Address: 940 Covey Run Road, Sheridan, WY 82801
Legal: Lot 1A, Outlot A, and Outlot B, Cloud Peak Ranch Fifteenth-A Filing
PIN: 56842131600125

The applicant is requesting a rezone from B-1 Business District to PUD – Planned Unit Development to allow for commercial canopy storage on the property.

Please see the attached staff report and supporting documentation for further details.

Attachments

Staff Report
Draft Ordinance
Rezone Exhibit
Rezone Petition
PUD Exhibit
PUD Design Report
Aerial

CITY OF SHERIDAN, WYOMING

55 Grinnell Plaza, Sheridan Wyoming 82801
Planning & Zoning Department

MEMORANDUM

From: Kelly Schroeder, City Planner
To: City of Sheridan Governing Body
Date: July 13, 2026

Re: PL-26-23, Ordinance 2303-26 Twin Buttes Canopy Parking Rezone Staff Report

Background

Morrison-Maierle, on behalf of property owner Ranch at Twin Buttes, LLC, has submitted a rezone application for the following location:

Address:	940 Covey Run Road, Sheridan, WY 82801
Legal:	Lot 1A, Outlot A, and Outlot B, Cloud Peak Ranch Fifteenth-A Filing
PIN:	56842131600125

The applicant is requesting a rezone from B-1 Business District to PUD – Planned Unit Development to allow for commercial canopy storage on the property.

Discussion

Location & Zoning

The subject property is currently 3.44 acres in size zoned B-1 Business district. It is located on the northwest corner of West 5th Street and Covey Run Road.

The applicant has requested a rezone of the property to PUD – Planned Unit Development. Per the PUD Design Report submitted with the application, allowed uses on the property will be outdoor storage of boats, RVs, and other vehicles, as well as future indoor storage should the demand arise. Because PUD zoning is intended to specifically describe the allowed uses and development patterns of a property, no other uses will be allowed on the property.

The PUD Design report further details the architectural theme, building setbacks, landscaping, and other site design considerations that will govern the development. It is included as an attachment for reference.

The applicant is proposing the PUD zoning designation as opposed to B-2 Business or M-1 Industrial (the only two City zone districts that would allow for indoor or outdoor storage) to intentionally limit the allowed uses on the property. Adjacent properties are zoned R-1 Residence

to the north and B-1 Business to the east and south. The adjacent property to the west is also zoned PUD and is governed by the Cloud Peak Storage Planned Unit Development. Nearby land uses include single-family residential, multi-family residential, and indoor storage.

Future Land Use

The Future Land Use Map from 2017 indicates that this area is appropriate for commercial use. The proposed rezone to PUD – Planned Unit Development with the allowed uses of indoor and outdoor storage is consistent with the future vision for this area.

Staff Review Comments

Staff comments during the internal review of this rezone application were related to a minor clarifications needed in the PUD Design Report.

Public Notice

Staff sent notices to 24 surrounding property owners and published a legal ad in the Sheridan Press with information about the project and the public hearing schedule. A sign was also posted on the property. To date, staff have received no comments, questions, or concerns from the public.

Findings of Fact

Neither state statute nor municipal code contains required findings that must be made in changing a property's zoning designation. State statute does provide some requirements for zoning regulations in general, which Planning Commission and City Council should be aware of:

W.S. 15-1-601(d) states that all regulations shall be made:

i. In accordance with a comprehensive plan and designed to:
    a. Lessen congestion in the streets;
    b. Secure safety from fire, panic, or other dangers;
    c. Promote health and general welfare;
    d. Provide adequate light and air;
    e. Prevent the overcrowding of land;
    f. Avoid undue concentration of population; and
    g. Facilitate adequate provisions for transportation, water, sewage, schools, parks, and other public requirements.

ii. With reasonable consideration, among other things, of the character of the district and its peculiar suitability for particular uses;

iii. With a view to conserving the value of buildings and encouraging the most appropriate use of land throughout the city or town; and

iv. With consideration given to the historic integrity of certain neighborhoods of districts and a view to preserving, rehabilitating and maintaining historic properties and encouraging compatible uses within the neighborhoods or districts, but no regulation made to carry out the purposes of this paragraph is valid to the extent it constitutes an unconstitutional taking without compensation.

The preamble of the City's Zoning Ordinance (Appendix A) states that the purpose of the zoning ordinance is to, "[promote] the health, safety, morals and general welfare of the inhabitants of the City of Sheridan by lessening the congestion in the streets; securing

safety from fire, panic, and other dangers; providing adequate light and air; preventing the overcrowding of land; avoiding the undue concentration of population; facilitating the adequate provision of transportation, water, sewage, schools, parks, and other public requirements; and by other means in accordance with a comprehensive plan".

Staff Recommendation

Staff recommends that the Governing Body approve PL-26-23, Ordinance 2303-26 Twin Buttes Canopy Parking Rezone from B-1 Business to PUD – Planned Unit Development.

Planning Commission Public Hearing and Recommendation

The City of Sheridan Planning Commission will hold a public hearing on this item on Monday, July 13, 2026 at 7:00pm. This staff report will be updated following the meeting to contain any public comments and the recommendation from Planning Commission.

Anticipated Meeting Schedule

Monday, July 13, 2026, 5:30pm – City Council Study Session
Monday, July 13, 2026, 7:00pm – Planning Commission Public Hearing and Consideration
Monday, July 20, 2026, 5:30pm - City Council Public Hearing and 1st Reading
Monday, August 3, 2026, 5:30pm - City Council 2nd Reading
Monday, August 17, 2026, 5:30pm - City Council 3rd Reading

All meetings are held in the City Council Chambers on the 3rd Floor of City Hall. Located at 55 Grinnell Plaza, Sheridan, WY 82801.

CITY OF SHERIDAN
ORDINANCE NO. 2303-26

AN ORDINANCE, AMENDING ORDINANCE NO. 826, THE ZONING ORDINANCE OF THE CITY OF SHERIDAN, TO ZONE THE ENTIRETY OF THE LAND MORE PARTICULARLY DESCRIBED BELOW AND SHOWN ON THE ATTACHED EXHIBIT, FROM B-1 BUSINESS DISTRICT TO PUD – PLANNED UNIT DEVELOPMENT; FOR PROPERTY LOCATED AT 940 COVEY RUN ROAD, SHERIDAN, WY.

WHEREAS, The owners of the following described lands have petitioned the City Council to rezone the same from B-1 Business District to PUD – Planned Unit Development; and

WHEREAS, a public hearing has been held thereon by the City Council.

BE IT ORDAINED BY THE GOVERNING BODY OF THE CITY OF SHERIDAN, WYOMING:

1. The following described land is hereby rezoned from B-1 Business District to PUD – Planned Unit Development:

   Lot 1A, Outlot A, and Outlot B, Cloud Peak Ranch, Fifteenth-A Filing, Sheridan County, Wyoming

2. Ordinance No. 826, the Zoning Ordinance of the City of Sheridan is hereby amended to conform herewith.

3. If any provision or portion of this ordinance is declared by any court of competent jurisdiction to be void, unconstitutional, or unenforceable, then all remaining provisions and portions of this ordinance shall remain in full force and effect.

4. This ordinance shall be in full force and effect immediately upon its passage and publication as provided by law.

PASSED, APPROVED AND ADOPTED this _____ day of _____ 2026.

City of Sheridan

_____

Richard Bridger, Mayor

ATTEST:

_____

Ashlee Foster, City Clerk

State of Wyoming)
) SS
County of Sheridan)

Signed and sworn (or affirmed) before me on this ____ day of _____ 20__

by _____

_____
Notary Public

My commission expires _____

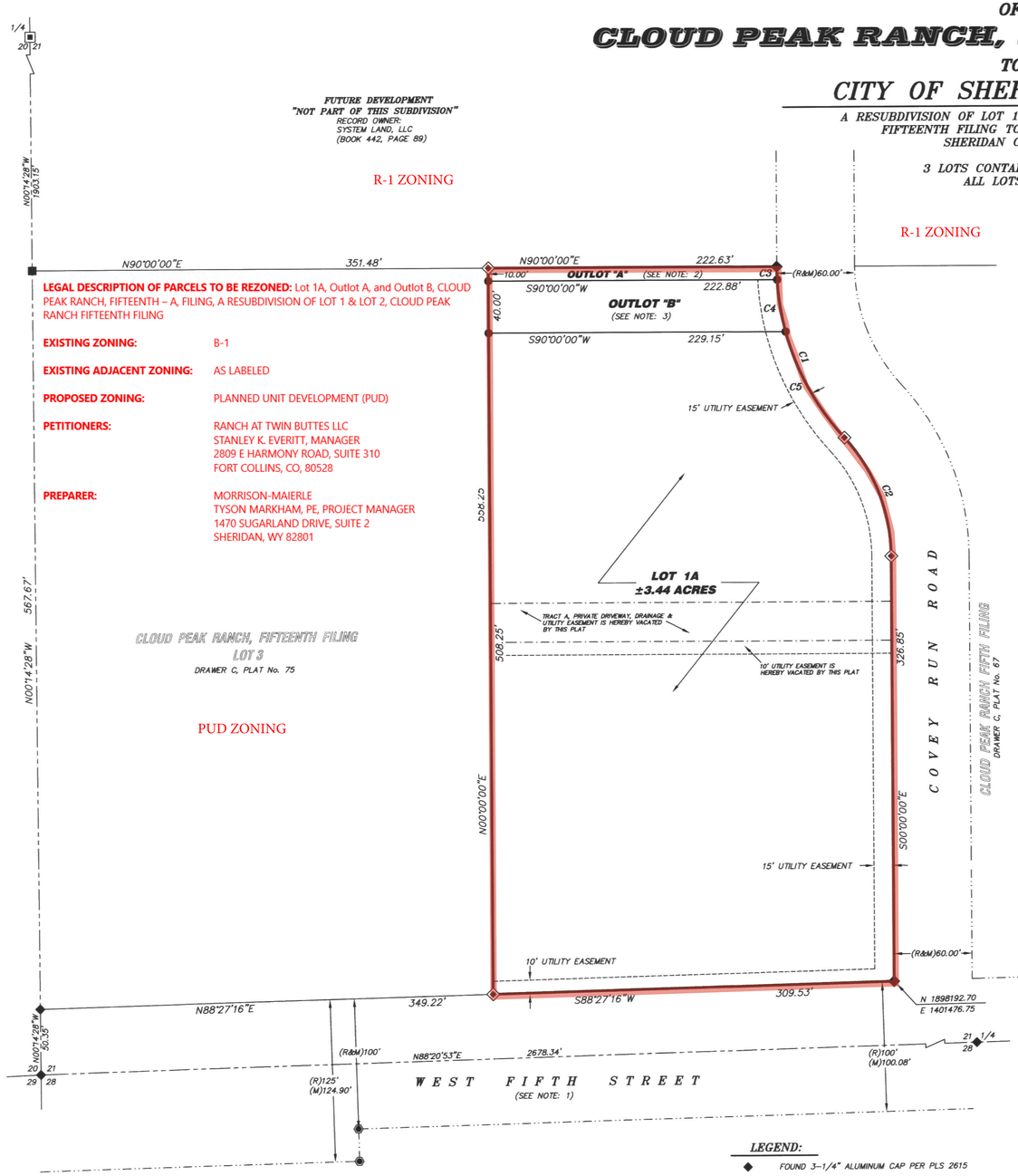
1st Reading: _____
2nd Reading: _____
3rd Reading: _____
Published: _____

EFFECTIVE DATE: This Ordinance shall be in full force and effect on __(publication date)__, after the required approval and publication, according to law

FINAL PLAT
OF THE
CLOUD PEAK RANCH, FIFTEENTH - A, FILING
TO THE
CITY OF SHERIDAN, WYOMING

A RESUBDIVISION OF LOT 1 & LOT 2, CLOUD PEAK RANCH, FIFTEENTH FILING TO THE CITY OF SHERIDAN, SHERIDAN COUNTY, WYOMING

3 LOTS CONTAINING ±3.70 ACRES
ALL LOTS ZONED B-1



LEGAL DESCRIPTION OF PARCELS TO BE REZONED: Lot 1A, Outlot A, and Outlot B, CLOUD PEAK RANCH, FIFTEENTH – A, FILING, A RESUBDIVISION OF LOT 1 & LOT 2, CLOUD PEAK RANCH FIFTEENTH FILING

EXISTING ZONING:	B-1
EXISTING ADJACENT ZONING:	AS LABELED
PROPOSED ZONING:	PLANNED UNIT DEVELOPMENT (PUD)
PETITIONERS:	RANCH AT TWIN BUTTES LLC STANLEY K. EVERITT, MANAGER 2809 E HARMONY ROAD, SUITE 310 FORT COLLINS, CO, 80528
PREPARER:	MORRISON-MAIERLE TYSON MARKHAM, PE, PROJECT MANAGER 1470 SUGARLAND DRIVE, SUITE 2 SHERIDAN, WY 82801

CURVE TABLE

CURVE No.	DELTA	RADIUS	ARC LENGTH	CHORD BEARING	CHORD LENGTH
C1	42°31'26"	195.00'	144.73'	S21°15'43"E	141.43'
C2	42°31'26"	135.00'	100.19'	S21°15'43"E	97.91'
C3	02°56'22"	195.00'	10.00'	S01°28'11"E	10.00'
C4	11°55'03"	195.00'	40.56'	S08°53'54"E	40.49'
C5	27°40'00"	195.00'	94.16'	S28°41'26"E	93.25'

LEGEND:

- ◆ FOUND 3-1/4" ALUMINUM CAP PER PLS 2615
- ● SET 2" ALUMINUM CAP PER PLS 6812
- ■ SET 3-1/4" ALUMINUM CAP PER PLS 2615
- ◈ FOUND 2" ALUMINUM CAP PER PLS 2615
- ▣ FOUND 3-1/4" ALUMINUM CAP PER PE&LS 551
- ✹ FOUND CONCRETE RIGHT-OF-WAY MONOMENT
- (R) RECORD
- (M) MEASURED
- SUBDIVISION BOUNDARY/CLOUD PEAK RANCH, FIFTEENTH – A, FILING
- LOT LINE
- SECTION LINE
- INTERIOR SECTION LINE
- UTILITY EASEMENT LINE
- RIGHT-OF-WAY LINE
- ORIGINAL TRACT LINE TO BE VACATED BY THIS PLAT

N

SCALE: 1"=50'

BEARINGS ARE BASED ON THE WYOMING COORDINATE SYSTEM NAD 1983, EAST CENTRAL ZONE
DISTANCES ARE SURFACE

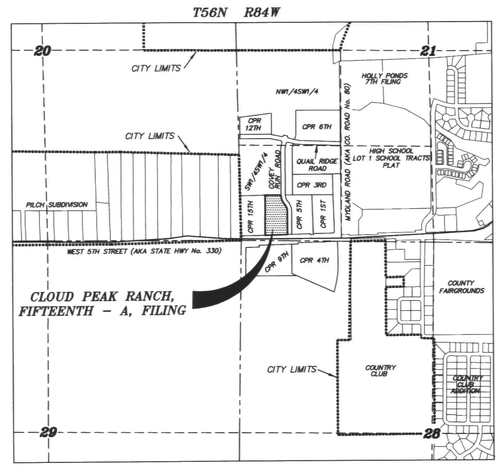
GRAPHIC SCALE

-50 0 25 50 100 200

(U.S. SURVEY FEET)
1 inch = 50 ft.

DATUM:

NAD 83(1993), NAVD 88 (U.S. SURVEY FEET)
DATUM ADJUSTMENT FACTOR (DAF): 1.000235
DIVIDE SURFACE COORDINATES BY DAF TO CALCULATE THE WYOMING COORDINATE SYSTEM NAD 1983, EAST CENTRAL ZONE, COORDINATES



LOCATION MAP
NO TRUE SCALE

NOTES:

1) SEE PLAT FILED IN BOOK A, PAGE No. 325 FOR RIGHT-OF-WAY INFORMATION.
2) OUTLOT "A": UTILITY EASEMENT **(±0.05 ACRES)**
3) OUTLOT "B": PRIVATE DRIVEWAY AND CITY OF SHERIDAN SEWER, WATER, AND STORM DRAIN EASEMENT **(±0.21 ACRES)**

CERTIFICATE OF OWNERS

KNOWN ALL MEN BY THESE PRESENTS THAT THE UNDERSIGNED SYSTEM LAND, LLC BEING THE OWNER, PROPRIETOR OR PARTY OF INTEREST IN THE LAND SHOWN ON THIS PLAT, DOES HEREBY CERTIFY:

THAT THE FOREGOING PLAT DESIGNATED AS **CLOUD PEAK RANCH, FIFTEENTH – A, FILING** IS A RESUBDIVISION OF LOT 1 & LOT 2, CLOUD PEAK RANCH, FIFTEENTH FILING, TO THE CITY OF SHERIDAN, SHERIDAN COUNTY, WYOMING.

SAID SUBDIVISION CONTAINS **±3.70 ACRES** OF LAND, MORE OR LESS.

THE **CLOUD PEAK RANCH, FIFTEENTH – A, FILING** AS IT IS DESCRIBED AND AS IT APPEARS ON THIS PLAT, IS MADE WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DESIRES OF THE UNDERSIGNED OWNER AND PROPRIETOR; AND THAT THIS IS A CORRECT PLAT OF THE AREA AS IT IS DIVIDED INTO LOTS, STREETS, AND EASEMENTS.

THE UNDERSIGNED OWNER OF THE LAND SHOWN AND DESCRIBED ON THIS PLAT DOES HEREBY DEDICATE TO THE CITY OF SHERIDAN AND IT'S LICENSEES FOR PUBLIC USE OF ALL STREETS AND EASEMENTS AND OTHER PUBLIC LANDS WITHIN THE BOUNDARY LINES OF THE PLAT, AS INDICATED, AND NOT ALREADY OTHERWISE DEDICATED FOR PUBLIC USE.

UTILITY EASEMENTS "UNLESS NOTED OTHERWISE", AS DESIGNATED ON THIS PLAT ARE HEREBY DEDICATED TO THE CITY OF SHERIDAN AND IT'S LICENSEES FOR PUBLIC USE FOR THE PURPOSE OF INSTALLING, REPAIRING, REINSTALLING, REPLACING AND MAINTAINING SEWERS, WATERLINES, GAS LINES, ELECTRIC LINES, TELEPHONE LINES, CABLE TV LINES, AND OTHER FORMS AND TYPES OF PUBLIC UTILITIES NOW OR HEREAFTER GENERALLY UTILIZED BY THE PUBLIC.

DRAINAGE EASEMENTS "UNLESS NOTED OTHERWISE", AS DESIGNATED ON THIS PLAT, ARE HEREBY DEDICATED TO THE CITY OF SHERIDAN AND IT'S LICENSEES FOR PUBLIC USE, TO ACCOMMODATE THE FLOW OR STORAGE OF STORM WATERS AND SHALL BE KEPT FREE OF ALL STRUCTURES OR OTHER IMPEDIMENTS NOT RELATED TO DRAINAGE.

IN TESTIMONY WHEREOF:

ALL RIGHTS UNDER AND BY VIRTUE OF THE HOMESTEAD EXEMPTION LAWS OF THE STATE OF WYOMING ARE HEREBY WAIVED AND RELEASED.
THE UNDERSIGNED HAVE CAUSED THESE PRESENTS TO BE SIGNED THIS 12th DAY OF April, 2011.

SYSTEM LAND, LLC
BY: Vee Ann Woody
VEEANN WOODY – AGENT

STATE OF WYOMING
COUNTY OF SHERIDAN :ss

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BY VEEANN WOODY BEFORE ME THIS 12th DAY OF April, 2011.

WITNESS MY HAND AND OFFICIAL SEAL. MY COMMISSION EXPIRES July 6, 2011.

Diane T. Malkuch
NOTARY PUBLIC

DIANE T. MALKUCH - NOTARY PUBLIC
County of Sheridan State of Wyoming
My Commission Expires July 6, 2011

CERTIFICATES OF APPROVAL

THIS PLAT HAS BEEN PREPARED IN ACCORDANCE WITH THE REQUIREMENTS AND PROCEDURES OUTLINED IN THE SUBDIVISION REGULATIONS OF THE CITY OF SHERIDAN, AND CERTIFIED THIS 19th DAY OF April, 2011, BY THE DIRECTOR OF PUBLIC WORKS OF SHERIDAN, WYOMING.

Nicholas L. Baker
DIRECTOR OF PUBLIC WORKS

APPROVED BY THE CITY COUNCIL OF THE CITY OF SHERIDAN, WYOMING, THIS 19 DAY OF April, 2011.

Scott Baker
ATTEST: CITY CLERK

John Bigelow FOR
MAYOR

CERTIFICATE OF RECORDER

STATE OF WYOMING :ss
COUNTY OF SHERIDAN

THIS PLAT WAS FILED FOR RECORD IN THE OFFICE OF THE CLERK AND RECORDER AT 2:40 O'CLOCK P.M., THIS 19, DAY OF APRIL, 2011, AND IS DULY RECORDED IN DRAWER C, PLAT NO. 79
FEE $ 50.00

Erla Schunk Thompson
COUNTY CLERK

STAMP RECEIVING NUMBER 2011-697556

SURVEYOR'S CERTIFICATE

STATE OF WYOMING :ss
COUNTY OF SHERIDAN

I, THOMAS D. TUCKER DO HEREBY CERTIFY THAT I AM A REGISTERED LAND SURVEYOR, LICENSED UNDER THE LAWS OF THE STATE OF WYOMING, THAT THIS PLAT IS A TRUE, CORRECT AND COMPLETE PLAT OF **CLOUD PEAK RANCH, FIFTEENTH – A, FILING** AS LAID OUT, PLATTED, DEDICATED AND SHOWN HEREON, THAT THIS PLAT WAS MADE FROM AN ACCURATE SURVEY OF SAID PROPERTY CONDUCTED BY ME OR UNDER MY DIRECT SUPERVISION AND CORRECTLY SHOWS THE LOCATION AND DIMENSIONS OF ALL LOTS, EASEMENTS AND STREETS OF SAID SUBDIVISION IN COMPLIANCE WITH THE CITY OF SHERIDAN REGULATIONS GOVERNING THE SUBDIVISION OF LAND.

Professional Land Surveyor
THOMAS D. TUCKER
6812
Date: APRIL 6, 2011
WYOMING

"PLAT IS VALID ONLY IF PRINT HAS ORIGINAL SIGNATURE OF SURVEYOR SIGNED AND DATED"

FINAL PLAT
OF THE
CLOUD PEAK RANCH, FIFTEENTH - A, FILING
TO THE
CITY OF SHERIDAN, WYOMING

A RESUBDIVISION OF LOT 1 & LOT 2, CLOUD PEAK RANCH, FIFTEENTH FILING TO THE CITY OF SHERIDAN, SHERIDAN COUNTY, WYOMING

CLIENT: VISTA WEST ENGINEERING
P.O. BOX 785
1470 SUGARLAND DRIVE, SUITE 3
SHERIDAN, WY 82801-1039
(307)672-9310

RESTFELDT SURVEYING
PO BOX 3082
SHERIDAN, WY 82801
307-672-7415
FAX 674-5000

JN: 11004 (2011-004)
DF: 2002101_CPR 15TH A FILING
PF: T2002101_CPR 15
APRIL 06, 2011

REZONE EXHIBIT AND MAP TO ACCOMPANY REZONE PETITION

PETITION FOR REZONING

TO THE CITY COUNCIL OF THE CITY OF SHERIDAN, WYOMING:

Pursuant to the provisions of W.S. 15-1-601, 15-1-602, 15-1-603 et. seq., and other applicable statutes, and Appendix A, Sec. 16 of the Sheridan City Code, the undersigned landowner(s) respectfully petition and show the City Council as follows:

1. This is a petition for the rezoning of parcels of land within the city limits of Sheridan, Wyoming, having a legal description as follows:

   Lot 1A, Outlot A, and Outlot B of Cloud Peak Ranch, Fifteenth – A, Filing, a Resubdivision of Lot 1 and Lot 2, Cloud Peak Ranch, Fifteenth Filing to the City of Sheridan

2. Ranch at Twin Buttes LLC are the owners or authorized agents of said described land proposed to be rezoned.

3. A map of the area sought to be rezoned is attached hereto and made a part hereof.

4. Petitioners hereby request that said lands be zoned Planned Unit Development (PUD).

Therefore, Petitioners pray said parcel(s) be rezoned Planned Unit Development (PUD), pursuant to and in accordance with the applicable Wyoming Statutes and City Ordinances after proper notice and public hearing.

Dated this 28th day of May, 2026.

Signed by the Petitioners:

Ranch at Twin Buttes LLC
Stanley K. Everitt, Manager

Subscribed and Sworn before me this 28th day of May, 2026

Notary Public

SHANNON N DEDECKER
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20054033710
MY COMMISSION EXPIRES 08/26/2029

My commission expires: 08/26/2029

LEGAL DESCRIPTION

LOT 1A, OUTLOT A, AND OUTLOT B, CLOUD PEAK RANCH, FIFTEENTH-A FILING, A RESUBDIVISION OF LOT 1 & LOT 2, CLOUD PEAK RANCH FIFTEENTH FILING, TO THE CITY OF SHERIDAN, SHERIDAN COUNTY, WYOMING, CONTAINING ±3.70 ACRES.

ZONING

- EXISTING ZONING: B-1
- EXISTING ADJACENT ZONING: R-1 (NORTH), B-1 (SOUTH, EAST), PUD(WEST)
- PROPOSED ZONING: PLANNED UNIT DEVELOPMENT (PUD)
- PETITIONER: RANCH AT TWIN BUTTES, LLC

STRUCTURAL REQUIREMENT:

CANOPY PARKING ROOFS SHALL HAVE A MINIMUM 14-FT CLEARANCE ABOVE FINISHED GRADE.

OTHER NOTES:

FOOTNOTE (1) - SPACES ARE SHOWN AS DRIVE-THRU STYLE, DEPENDING ON DEMAND; QUANTITY COULD DOUBLE IF SPACES ARE USED AS DOUBLE BACK-IN STYLE

WALL LOCATION AND ORIENTATION ARE SUBJECT TO CHANGE FOLLOWING STRUCTURAL DESIGN

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THE OBJECTIVE OF THE ***TWIN BUTTES CANOPY PARKING*** FACILITY IS TO PROVIDE COVERED AND UNCOVERED BOAT AND RV STORAGE FACILITIES IN CONJUNCTION WITH THE ADJACENT STORAGE FACILITY UNDER COMMON OWNERSHIP TO THE WEST. THE DEVELOPMENT WILL PROVIDE ADDITIONAL SECURE STORAGE OPTIONS FOR SHERIDAN AREA RESIDENTS, WITH PAVED PRIMARY ACCESS FROM COVEY RUN ROAD AND A SECONDARY EMERGENCY ACCESS POINT. SITE IMPROVEMENTS INCLUDE COVERED CANOPY STRUCTURES, PERIMETER FENCING, ONSITE DETENTION, AND SNOW STORAGE PROVISIONS.

LAND USE AREA CALCULATIONS

TOTAL SITE AREA: ± 3.44 AC.

CANOPY PARKING AREA: ± 1.30 AC. (38%)

DETENTION POND: ± 0.07 AC. (2%)

OPEN SPACE: ± 0.48 AC. (14%); [LANDSCAPING AREA]

TOTAL STORAGE SPACES: 94 - 130(1)



VICINITY MAP

SCALE: 1" 300'

EXCALIBUR CONSTRUCTION INC
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SHERIDAN, WY 82801

RANCH AT TWIN BUTTES LLC
2809 E HARMONY RD STE 310
FORT COLLINS, CO 80528

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40.0' OUTLOT B
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SNOW DISPOSAL / STORAGE FROM ADJACENT STORAGE UNIT PROPERTY
24.0'
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30' DRAINAGE EASEMENT
S88°27'16"W 309.49'
10' UTIL EASEMENT
EX. 5TH STREET APPROACH TO BE REMOVED
COVEY RUN ROAD
WEST FIFTH STREET

LEGEND

- CANOPY PARKING; NO WALL (APPROX. LOCATION) WITH GRAVEL SURFACING
- NEW CONCRETE
- NEW FLOWLINE
- NEW 6' TALL SOLID FENCE
- SNOW STORAGE PATHWAY CENTERLINE
- NEW LOW-MAINTENANCE GRAVEL, MULCH, OR NATIVE SEED LANDSCAPING
- NEW GRAVEL SURFACING
- NEW DETENTION POND
- NEW STORM DRAIN CULVERT WITH FLARED ENDS
- NEW 10' TALL RETAINING WALL (APPROX. LOCATION AND LIMITS)
- CANOPY STRUCTURAL WALL (APPROX. LOCATION)
- TRAFFIC FLOW DIRECTIONS
- FINISHED GRADE SURFACE FLOW ARROW
- BENCHMARK / CONTROL POINT
- PROPERTY LINE
- PROPERTY LINE - ADJACENT PROPERTY
- EASEMENT LINE
- EXISTING FENCE
- EXISTING CONCRETE
- EXISTING EDGE OF PAVEMENT
- EXISTING CURB FLOWLINE
- EXISTING FIBER OPTIC - UNDERGROUND
- EXISTING NATURAL GAS - UNDERGROUND
- EXISTING POWER LINE - OVERHEAD
- EXISTING POWER LINE - UNDERGROUND
- EXISTING POWER BOX
- EXISTING POWER POLE
- EXISTING SANITARY SEWER CLEANOUT
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER LINE
- EXISTING STORM CULVERT
- EXISTING STORM DRAIN CURB INLET
- EXISTING STORM DRAIN LINE
- EXISTING TELEPHONE LINE - UNDERGROUND
- EXISTING TELEPHONE BOX
- EXISTING CABLE TV LINE - UNDERGROUND
- EXISTING CABLE TV BOX
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING WATER LINE
- EXISTING TREE

Professional Engineer (Civil) TYSON E. MARKHAM PE 13397 Date 05/28/2026 WYOMING

N

30 15 0 30 60

SCALE IN FEET
1' CONTOUR INTERVAL

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists
1470 Sugarland Drive, Suite 2
Sheridan, WY 82801
307.672.9310
www.m-m.net

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DRAWN BY: KRL
DSGN. BY: TEM
APPR. BY: JMF
DATE: 05/2026

TWIN BUTTES CANOPY PARKING
REZONE: 940 COVEY RUN ROAD
SHERIDAN WYOMING

PROJECT NO. 6922.003

PUD LAYOUT AND LANDSCAPING PLAN

FIGURE NUMBER 1

Plotted by tyson markham on May/28/2026

P:\6922-Ranch_Twin_Buttes_LLC\003_CPR15A Tract 1A PUD\ACAD\Civil\Exhibits\003_PUD Exhibit.dwg

PUD DESIGN REPORT

for

TWIN BUTTES CANOPY PARKING

Morrison Maierle

engineers ▪ surveyors ▪ planners ▪ scientists

PUD DESIGN REPORT

FOR

TWIN BUTTES CANOPY PARKING

PREPARED FOR:

Ranch at Twin Buttes, LLC
Sheridan, Wyoming

Morrison-Maierle, Inc.
Project No. 6922.003

CERTIFICATE OF ENGINEER

State of Wyoming)
) ss
County of Sheridan)

I, Tyson Markham, do hereby certify that this Report was prepared by me, or under my direct supervision.

Morrison Maierle
engineers • surveyors • planners • scientists

QUALITY ASSURANCE
Tyson Markham, PE
PROJECT MANAGER
Jeff Feck, PE
PEER REVIEWER
5/24/26
QA APPROVAL DATE

Prepared by:

Morrison-Maierle
1470 Sugarland Drive, Suite 2
Sheridan, Wyoming 82801

Revision 1
June 17, 2026

TABLE OF CONTENTS

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3.0	Responsibility for Construction and Maintenance	3
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LIST OF APPENDICES:

Appendix A: PUD Layout and Landscape Plan

Appendix B: Geotechnical Report

Appendix C: Storm Drainage Report

1.0 Project Location and Description

This PUD Design Report accompanies the Application for "Twin Buttes Canopy Parking", a proposed covered RV (and boats, etc.) storage facility in Sheridan, Wyoming. The applicant for this PUD is Ranch at Twin Buttes, LLC. The 3.70-acre development is located on Lot 1A and Outlots A and B of Cloud Peak Ranch – Fifteenth-A Filing in the Cloud Peak Ranch area, north of West Fifth Street and west of Covey Run Road. The property is currently zoned B-1 and is located in the SW¼ SW¼ of Section 21 of Township 56 North, Range 84 West.

Through coordination with City Planning staff, it was discussed that a PUD is the best process for this project to accommodate the proposed land use. A PUD is preferable to rezoning a single lot to R-2 or M-1 in this location, considering there are no adjacent parcels with that zoning. The proposed use is, however, a reasonable use for the property as it is consistent with the prior Cloud Peak Storage PUD located immediately to the west. The use also benefits many people on the west side of Sheridan.

The development of the property itself does not constitute a subdivision, thus there will not be a Final Plat submittal following the PUD approval by City Council. Review and approval of the site plan and permitting for the covered storage will all be accomplished through the City's building permit review and approval process.



Existing Site – Facing North

As indicated on the PUD Layout Plan, the facility will provide covered canopy parking for RV storage, including boats and other oversized items, with a maximum of approximately 100 covered spaces and the structural capacity to enclose up to 130 vehicles and equipment.

2.0 Allowed Uses and Goals of the PUD

The allowed uses within the Twin Buttes Canopy Parking include outdoor storage of boats, RVs, and other vehicles. Though not anticipated at this time, indoor storage is also proposed as an allowed use to account for future applications if storage-type demand evolves. No living quarters for an on-site manager are proposed.

The goal of the PUD is to meet a significant need for covered storage on the west side of Sheridan. There are approximately 430 single-family home lots (some of which are currently in the platting process) in the Cloud Peak Ranch area north and south of West Fifth Street. The owner of Twin Buttes Storage has noted that the ~20 spaces of covered RV storage in their current facility has the longest waiting list for any of their units.

The storage facility will be secured by solid fencing and metal-sided street-facing storage spaces. Solid fencing will be approximately 6 feet tall, and the metal siding on the street-facing storage areas will be approximately 8' to 9' tall and will match the color of the Twin Buttes Storage buildings (see below). The setbacks along West Fifth Street and Covey Run will be 30' from the property lines and will follow the existing drainage swale parallel to both streets. This enlarged setback will enhance the aesthetic character of the project.



Existing Storage Unit Facility to the West of Site

Site security will also primarily be accomplished by the rear walls of the covered storage structures acting as the fence element. These will be solid walls preventing sight or access into the complex.

Open space in its typical definition will be minimal for this PUD considering the proposed use is meant to be secure and most of the facility is located within the fenced/walled boundaries. The proposed layout of the facility will, however, provide a greater amount of space adjacent to the street right-of-way due to the proposed drainage easements that will remain outside of the secured limits.

The typical PUD open space requirements do not apply for this PUD per paragraph 4.2.3

of Article IV – Open Space, of the Universal Annexation Agreement executed between System Land LLC and the City in January 2021.

Pedestrian areas and pathways will also be minimal for the PUD, considering the necessity of maintaining a secure facility. Access into the facility will include a code or card-actuated automated gate system, thus allowing only unit owners or other authorized persons into the facility. Pedestrian connectivity will be provided along both West Fifth Street and Covey Run Road with the existing sidewalks.

3.0 Responsibility for Construction and Maintenance

Construction of the facility infrastructure and on-going maintenance will be the responsibility of the developer. Maintenance and management of the storage spaces will be managed by the manager already located at Twin Buttes Storage.

Maintenance of all site amenities and storm drainage infrastructure will also be the responsibility of the developer. This will include all sidewalks adjacent to West 5th Street and Covey Run Road, as well as pavement within the facility.

Landscaping will be minimal and is expected to include a combination of natural grass areas, gravel over weed barrier, and trees. A conceptual landscaping plan is provided per the PUD requirements and is found in Appendix A.

Water and sanitary sewer services will not be needed for the facility. Dry utilities will be limited to electrical service, which may be provided by MDU or solar panels. Lighting of the area will be mounted in strategic areas, as will security cameras. All lighting will be down-facing to reduce light pollution.

4.0 Schedule

The schedule for the development is to begin design of the facility immediately upon PUD approval. The developer plans to commence construction in 2026.

5.0 Statement of Architectural Theme

The architectural theme will be similar to the existing storage facilities adjacent to the west boundary line. On the areas that face West Fifth Street and Covey Run Road, metal panels with vertical crimps that replicate board and batten will be installed from the ground upward four feet. Above that will be metal lap siding. These walls will be the same or similar colors as the existing Twin Buttes Storage buildings. Wall heights will be 8’ to 9’ tall, depending on the depth of the spaces.



Existing Storage Unit Facility to the West of Site

Internally, treated wood or steel posts will be installed onto concrete piers, centered at 12' or 14' (or 24' and 28') as determined by the structural engineering plans. Roofing will be metal to match, installed on structural trusses. Roof pitches will be 1:12, with minimal overhangs. There will be no water service on the site, so landscaping will consist of rock beds and some areas of dry-land grasses. Drought-tolerant trees will be planted along Covey Run, but will not be permanently irrigated. Details for the proposed landscaping elements are provided on the Preliminary Landscape Plan (Appendix A).

6.0 Development Programming

A. Type and Size of Canopy Parking Spaces

The structures will be post and frame with roofs. The interior structures will have fully open sides, while exterior perimeter structures will have solid rear walls for security. The canopy parking spaces are sized as shown on the PUD Layout Plan (Appendix A), with the five canopy structures approximately sized as follows (exact dimensions to be determined by the contractor and selected materials):

- ±50' x ±300' canopy parking (two structures)
- ±30' x ±400' canopy parking
- ±25' x ±220' canopy parking
- ±35' x ±245' canopy parking

B. Land Use Area Calculations

	Area (acres)	Percent of Total
Covered storage spaces	1.30 ac	35.1%
Access drives	1.36 ac	36.8%
Stormwater detention area	0.21 ac	5.7%
Landscaped area (within W. Fifth Street and Covey Run Road ROW)	1.36 ac	N/A (not on site)

C. Parking

There will be no need for separate parking spaces within the facility.

D. Other Restrictions

i. Building setbacks

Building setbacks for the property and are shown on the PUD Layout Plan found in Appendix A. In general, the following setbacks are anticipated:

- Front: 30' (relative to Covey Run Road, includes existing drainage/utility easements)
- Rear property: 0' (rear wall of the western structure will be a combination of retaining and roof supporting wall located within 5-10' of the property line)
- Side property:
  - 90' North (Outlot A [10'] + Outlot B [40'] + Existing Drainage Easement [40'])
  - 30' South (relative to 5th St., includes existing drainage/utility easement)

ii. Structure heights

Structure heights will be no greater than 20'. The planned canopy structures are approximately 14'-6" (to accommodate 14' minimum clearance to the bottom of the structure, plus thickness of roof structure and a relatively flat 1:12 pitch).

iii. Access and grades

The grades on the facility access drives and access drives within the complex are not expected to exceed 5%. Outside of the facility's fenced/walled limits, there are grade connections to existing ground of 3H:1V or less. Thus, no steep grades are anticipated on site.

The main access into the facility will be from Covey Run Road, with a code or card-actuated gate. An emergency-only access gate with Knox Box will be provided further south, also from Covey Run Road, to provide fire department access into

the complex. This access will be gated with solid materials. The existing fire hydrants along Covey Run Road will serve the facility, eliminating the need for additional fire hydrants inside the secure area.

An existing approach from West Fifth Street that was installed for anticipated access to this parcel will be removed, and the concrete replaced to normal curb and sidewalk conditions.

The PUD Layout Plan provided in Appendix A shows the conceptual facility layout as described.

7.0 Water and Sanitary Sewer Services

There are no water or sanitary sewer services for this facility.

8.0 Geotechnical Report

A geotechnical investigation was carried out in 2022 for the adjacent (west) project site by Rimrock Engineering of Billings, Montana. No adverse conditions have been identified. The geotechnical report is provided in Appendix B.

The developer may be obtaining additional geotechnical recommendations to support structural and retaining wall design prior to final design. This supplemental geotechnical information will be provided in accordance with building permit requirements for commercial site development.

The site will be surfaced with 4" of compacted road base under 4" of washed gravel throughout the interior drive areas. The main entry and the emergency access will be concrete-paved.

9.0 Storm Drainage

Storm drainage for the development will be controlled primarily by on-site stormwater detention, fed by surface flow and culvert pipe along the southern and eastern edge. The stormwater routing and detention pond can control on-site storm runoff to historic values below the runoff from the development area under its previous vacant condition.

For more storm drainage information, refer to the Storm Drainage Report for Twin Buttes Canopy Parking provided in Appendix C.

10.0 Traffic Trip Generation Data

Several traffic impact studies have been completed for the Cloud Peak Ranch developments, with the most recent completed in 2012 by Delich Associates of Sheridan, Colorado. That study encompassed all three annexations of Cloud Peak Ranch

(~813 acres total) and projected traffic demands and impacts for various development assumptions, with the primary goal of determining street network improvements that might be necessary as traffic increases.

In the Universal Annexation Agreement executed between the City and System Land LLC (Dec. 2020), it was agreed that updated or additional traffic studies would only be required when the proposed traffic impact from a new development may be greater than was projected in the 2012 study.

The 3.70-acre Lot 1A of Cloud Peak Ranch Fifteenth – A Filing was projected in the 2012 Delich study as Parcel D to develop with 54,000 square feet of Shopping Center (ITE Land Use #820). That land use results in projected traffic that is significantly greater than the traffic generated by the proposed RV storage facility.

Projected traffic trip generation data for projects are typically based on land use data from the *Institute of Transportation Engineers (ITE) Recommended Practice for Trip Generation Handbook*. We were unable to find that data had been collected for this specific use. Through other online research, we learned that trip rates for this use are very low, perhaps in the range of 0.84-0.97 peak hour trips per 100 RV spaces, which would be more than 4 times less than trip generation rates for mini-warehouse type storage. Though expected to be highly conservative, because of a lack of verifiable trip generation data, we chose to use mini-warehouse storage rates for this project.

We anticipate that traffic for this facility will undoubtedly be highest in the summer and negligible in the winter. In fact, the facility will remain closed, and snow will not be plowed during the winter months.

Trip generation volumes are shown in Table 1 below, including the trip generation volumes for the same parcel in the 2012 Delich Study for comparison.

Table 1. Proposed Trip Generation Volumes

Traffic Trip Generation Volumes for Twin Buttes Canopy Parking (Assumes 150 RV storage spaces [(1)])			2012 Delich Study Trip Generation for Comparison for same land parcel (pro-rated to actual parcel acreage since Lot 3 of CPR 15th Filing is not included)
Average Daily Traffic (ADT)	38	50% entering/ 50% exiting	1,043
AM Peak Hour	5	60% entering/ 40% exiting	25
PM Peak Hour	5	47% entering/ 53% exiting	92
Saturday	33	50% entering/ 50% exiting	n/a
Saturday Peak Hour	6	55% entering/ 45% exiting	n/a
Sunday	23	50% entering/ 50% exiting	n/a
Sunday Peak Hour	5	Data not available	n/a
(1) ITE Trip Generation Land Use #151 (Mini-Warehouse); 9th Edition, Vol. 2 of 3			

As indicated in the table above, the trip generation data included in the 2012 Delich study is significantly greater than the traffic that will be generated by a 130-space RV storage facility. No recognizable impacts to area roadways are expected, nor additional controls at existing intersections determined to be necessary.

APPENDIX A

PUD LAYOUT AND LANDSCAPE PLAN

LEGAL DESCRIPTION

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- NEW GRAVEL SURFACING
- NEW DETENTION POND
- NEW STORM DRAIN CULVERT WITH FLARED ENDS
- NEW 10' TALL RETAINING WALL (APPROX. LOCATION AND LIMITS)
- CANOPY STRUCTURAL WALL (APPROX. LOCATION)
- TRAFFIC FLOW DIRECTIONS
- FINISHED GRADE SURFACE FLOW ARROW
- BENCHMARK / CONTROL POINT
- PROPERTY LINE
- PROPERTY LINE - ADJACENT PROPERTY
- EASEMENT LINE
- EXISTING FENCE
- EXISTING CONCRETE
- EXISTING EDGE OF PAVEMENT
- EXISTING CURB FLOWLINE
- EXISTING FIBER OPTIC - UNDERGROUND
- EXISTING NATURAL GAS - UNDERGROUND
- EXISTING POWER LINE - OVERHEAD
- EXISTING POWER LINE - UNDERGROUND
- EXISTING POWER BOX
- EXISTING POWER POLE
- EXISTING SANITARY SEWER CLEANOUT
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER LINE
- EXISTING STORM CULVERT
- EXISTING STORM DRAIN CURB INLET
- EXISTING STORM DRAIN LINE
- EXISTING TELEPHONE LINE - UNDERGROUND
- EXISTING TELEPHONE BOX
- EXISTING CABLE TV LINE - UNDERGROUND
- EXISTING CABLE TV BOX
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING WATER LINE
- EXISTING TREE

Professional Engineer (Civil) TYSON E. MARKHAM PE-13357 Date 6-17-26 WYOMING

N

30 15 0 30 60

SCALE IN FEET
1' CONTOUR INTERVAL

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists
1470 Sugarland Drive, Suite 2
Sheridan, WY 82801
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DRAWN BY: KRL
DSGN. BY: TEM
APPR. BY: JMF
DATE: 05/2026

TWIN BUTTES CANOPY PARKING
REZONE: 940 COVEY RUN ROAD
SHERIDAN WYOMING

PROJECT NO. 6922.003

PUD LAYOUT AND LANDSCAPING PLAN

FIGURE NUMBER 1-R1

P:\6922-Ranch_Twin_Buttes_LLC\003_CPR15A Tract 1A PUD\ACAD\Civil\Exhibits\003_PUD Exhibit.dwg

Plotted by tyson markham on Jun/17/2026

APPENDIX B

GEOTECHNICAL REPORT

RIMROCK
ENGINEERING, INC.

GEOTECHNICAL ENGINEERING REPORT

Cloud Peak Storage
West 5th Street
Sheridan, Wyoming

July 20, 2022
Project No. G22113

Prepared for:

Morton Buildings
727 E. Brundage Lane, Suite G
Sheridan, Wyoming 82801

Prepared by:

Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, Montana 59101

RIMROCK ENGINEERING, INC.

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July 20, 2022

Mr. Nik Zuhlsdorf
Morton Buildings
727 E. Brundage Lane, Suite G
Sheridan, Wyoming 82801

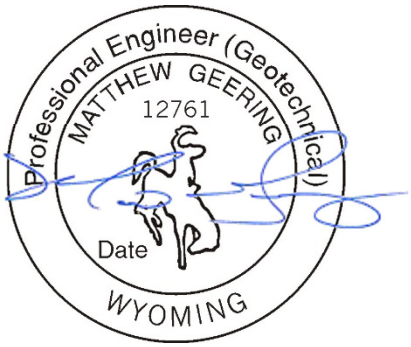
Re: Geotechnical Engineering Report
Cloud Peak Storage
West 5th Street
Sheridan, Wyoming

Dear Nik:

Rimrock Engineering, Inc. has completed the geotechnical engineering services for the referenced project. The attached report presents the results of our findings. Our work consisted of subsurface exploration, laboratory testing, engineering analyses, and preparation of this report.

We appreciate this opportunity to be of service to you and are prepared to provide construction materials testing services during the construction phase of the project. If you have any questions regarding this report or need additional information or services, please contact us.

Sincerely,
RIMROCK ENGINEERING, INC.



Matt Geering, P.E.
Principal/Vice President

Wade Reynolds
Principal/President

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APPENDICES

Appendix A Vicinity/Site Map, Logs, USCS Description/Log Key
Appendix B Laboratory Test Results

EXECUTIVE SUMMARY

Rimrock Engineering has completed the geotechnical engineering services for the Cloud Peak Storage project to be located along West 5th Street in Sheridan, Wyoming. Based on the results of our geotechnical investigation, the site can be developed for the proposed project consistent with the recommendations provided in this report. The following geotechnical conditions and considerations were identified:

- The subsurface profile consists of varying depths of clayey sand with gravel, silty sand with gravel, and sandy lean clay soils overlying highly weathered shale bedrock. Apparent fill soils are present across the site as well. Groundwater was encountered at about 10 feet while drilling or for the short duration the borings were allowed to remain open.

- The site soils are somewhat variable across the site consisting of silty sand, clayey sand, and sandy lean clay. These soils are underlain by highly weathered, soft to moderately hard shale. In addition, apparent fill soils were observed at the site as well. The site soils are expected to be compressible.

- We understand there will be a retaining wall/structure supported by shallow footings along the north portion of the lot and the remaining building elements will be supported on columns. In our opinion, the retaining wall/structure can be supported using a shallow spread footing foundation system bearing on a zone of geotextile-reinforced structural fill. Performance of this system is directly related to the proper treatment and re-compaction of the native soils, placement and control of geotextiles and structural fill, and good positive drainage for the life of the structure.

- To reduce the potential for movement related distress to concrete slabs, we recommend slabs bear on the site sand and gravel soils or on a minimum of 10 inches of structural fill.

It should be noted that specific project details were not fully developed or included in this section. The information provided in this executive summary should be used in conjunction with the entire report for design purposes.

GEOTECHNICAL ENGINEERING REPORT

Cloud Peak Storage
West 5th Street
Sheridan, Wyoming

1.0 INTRODUCTION AND SCOPE

1.1 Project Description

The project consists of the new Cloud Peak Storage P.U.D. to be located along West 5th Street in Sheridan, Wyoming. The project will include 10 storage buildings and site paving.

1.2 Purpose and Scope of Work

The purpose of this study is to evaluate the feasibility of the proposed development with respect to the observed subsurface conditions and to provide information, opinions, and geotechnical engineering recommendations relative to:

- General site, soil and groundwater conditions
- Site and subgrade preparation
- Recommended foundation type(s) and design parameters
- Estimated settlement of foundations
- Corrosivity and cement type
- Pavement thickness design
- General earthwork and site drainage

Our scope of services consisted of background review, site reconnaissance, field exploration, laboratory testing, engineering analyses, and preparation of this report.

2.0 INVESTIGATION

2.1 Field Exploration

The subsurface exploration consisted of drilling seven (7) borings on June 29, 2022 to approximately 16 feet below existing grades. The borings were drilled using our truck mounted drill rig equipped with solid flight augers. Groundwater levels were measured during drilling operations, if encountered. Upon completion of drilling and/or groundwater measurements, the borings were backfilled with drill cuttings and compacted with the equipment at hand.

Logs of the borings along with a Vicinity/Site Map are included in Appendix A. The borings were located in the field by Rimrock Engineering based on the site plan provided. Estimated ground surface elevations were set at 100 for purposes of this investigation. The locations and elevations

of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

Rimrock Engineering personnel logged the soil conditions encountered in the borings. At selected intervals, samples of the subsurface materials were taken by driving split-spoon samplers, pushing Shelby tube samplers, and collecting auger cuttings. Penetration resistance measurements were obtained by driving the samplers into the subsurface materials with a 140-pound automatic hammer falling 30 inches. The penetration resistance value is a useful index in estimating the relative density, or consistency, of the materials encountered. The sample was tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification.

2.2 Laboratory Testing

The purpose of the laboratory testing is to assess the physical and engineering properties of the soil samples collected in the field to be used in our geotechnical evaluations and analyses. Laboratory testing was performed on selected soil samples to assess the following:

- Visual classification (USCS)
- Moisture content
- Sieve analysis
- Moisture density relationship
- Atterberg limits
- Consolidation/swell
- Water soluble sulfate, pH & resistivity
- California Bearing Ratio (CBR)

The soil descriptions presented on the boring logs are in accordance with the Unified Soil Classification System (USCS). Individual laboratory test results can be found in Appendix B at the end of this report.

3.0 SITE & SUBSURFACE CONDITIONS

3.1 Site Conditions

The project site is located along West 5th Street in Sheridan, Wyoming. The site consists of undeveloped property with areas of fill present. The site generally slopes to the east. The surrounding area consists of residential and commercial developments.

3.2 Subsurface Soil Conditions

Based on the materials encountered in our borings, the subsurface profile consists of varying depths of clayey sand with gravel, silty sand with gravel, and sandy lean clay soils overlying highly weathered shale bedrock. Apparent fill soils are present across the site as well.

The subsurface sand and gravel soil had Standard Penetration Test (SPT) N-values in the range of 14 to 26 which indicates the granular soils to be medium dense in relative density with low to moderate compressibility. SPT N-values in the clay soils ranged from 8 to 20 bpf indicating the

soils are stiff in consistency, compressible, and low in shear strength. The shale is highly weathered, soft to moderately hard, and generally becomes more competent with depth. For a more detailed description of the subsurface conditions, please refer to the individual boring logs provided in Appendix A.

3.3 Groundwater Conditions

The borings were observed while drilling and after completion for the presence and level of groundwater. Groundwater was encountered at about 10 feet while drilling or for the short duration the borings were allowed to remain open. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Groundwater can be expected to fluctuate with varying seasonal and weather conditions and other factors not evident at the time of the investigation. Evaluation of the factors that affect groundwater fluctuations is beyond the scope of this report.

3.4 Laboratory Test Results

The site soils were tested for grain size distribution (sieve analysis) and Atterberg Limits. Atterberg limits are a basic measure of the critical water contents of a fine-grained soils. The site clayey soils encountered in the borings generally have medium to high plasticity. Results are summarized below:

Location	Depth (ft)	USCS	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Gravel (%)	Sand (%)	Clay/Silt (%)
B-1	2.5	SC	30	17	13	33.5	38.6	27.9
B-2	4.5	SM	NP	NP	NP	37.7	47.2	15.0
B-2	7.5	CL	35	18	17	0.9	3.8	95.3
B-4	8.0	CL	41	18	23	5.4	11.9	82.7

A sample of the lean clay/shale was tested for consolidation/swell potential. The sample was allowed to consolidate under a confining pressure of 1,000 pounds per square foot (psf). Once consolidation under the surcharge load was complete, the sample was inundated with water and allowed to swell/collapse. After movement from the addition of water ceased, incremental loads were then applied to further consolidate the sample.

Consolidation/swell test results indicate that the fine-grained soils exhibit moderate to high compressibility and slight collapse potential with increased moisture (See Consolidation Tests in Appendix B). Results are summarized below:

Location	Depth (ft)	Material	Dry Unit Weight (pcf)	Strain @ 2,000 psf (%)	Collapse(-)/Swell(+) (%)
B-4	8.0	CL	108	1.2	-0.1

A representative sample of the near surface fine grained soils was collected for Moisture-Density Relationship (M/D) and California Bearing Ratio (CBR) testing. The results are summarized in the following table:

Location	Depth, (ft)	Material	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR
B-6	1-3	CL	112.4	13.8	4.9

4.0 RECOMMENDATIONS

4.1 Geotechnical Concerns/Considerations

The site soils are somewhat variable across the site consisting of silty sand, clayey sand, and sandy lean clay. These soils are underlain by highly weathered, soft to moderately hard shale. In addition, apparent fill soils were observed at the site as well. The site soils are expected to be compressible.

We understand there will be a retaining wall/structure supported by shallow footings along the north portion of the lot and the remaining building elements will be supported on columns. In our opinion, the retaining wall/structure can be supported using a shallow spread footing foundation system bearing on a zone of geotextile-reinforced structural fill. Performance of this system is directly related to the proper treatment and re-compaction of the native soils, placement and control of geotextiles and structural fill, and good positive drainage for the life of the structure.

4.2 Earthwork

The following sections present recommendations for site and subgrade preparation and placement of fill materials on the project. Earthwork on the project should be observed and tested by Rimrock Engineering.

4.2.1 Site and Subgrade Preparation

Vegetation, topsoil, existing utilities (if present), and other unsuitable materials (e.g. debris, desiccated soil, frozen soil, etc.) should be removed from the proposed construction area. It is anticipated that general excavations for the proposed construction can be accomplished with conventional earthmoving equipment such as tractor mounted backhoes and tracked excavators.

Excavations for the shallow spread footings should allow for the placement of at least 1.5 feet of geotextile-reinforced structural fill and 10 inches of aggregate base beneath floor slabs. Excavation for structural fill placement should extend laterally beyond all edges of the foundation at least 12 inches per foot of over-excavation depth.

The excavated site soils, cleaned of all organic/deleterious material, construction debris, and rock greater than 3 inches in nominal size (if encountered), may be stockpiled on-site and used as wall/trench backfill, and landscaping materials.

In order to mitigate construction disturbance and improve uniformity of subgrade support, prior to placement of fill and/or slabs, subgrade should be scarified a minimum of 12 inches, moisture conditioned to near optimum, and compacted to 95 percent of the maximum dry density (ASTM D698). Rimrock Engineering should be contacted to observe the subgrade surface to ascertain integrity consistent with the design assumptions.

Within the proposed areas to receive pavement and fill materials, scarification, re-compaction and proof-rolling of the subgrade soils is recommended. Subgrade soils beneath pavement and fill areas should be scarified to a depth of at least 12 inches, moisture conditioned to within 3 percent of optimum and compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D698. The moisture content and compaction of subgrade soils should be maintained until pavement construction. The prepared subgrade in areas to receive pavement should be proof-rolled by a tandem axle dump truck loaded to its capacity. The proof-rolling should be observed by Rimrock Engineering to identify areas of soft subgrade. Any areas that become unstable or “pump” under the loaded dump truck should be excavated to a depth to be determined by Rimrock Engineering and replaced with a dense graded gravel/sand mixture to stabilize the subgrade. Once the subgrade has been proof-rolled and approved by the geotechnical engineer, base course may be placed. Additionally, a geogrid or geotextile separation/stabilization fabric may be required to stabilize soft subgrade soils.

4.2.2 Material Requirements

It is anticipated that excavated materials will be used to the extent practical as site, wall, and trench backfill. The material suitability should be evaluated by the geotechnical engineer prior to use. Moisture conditioning and processing of on-site soils will likely be required. Structural fill, if required, should be a crushed aggregate and meet the criteria outlined below:

Gradation	Percent finer by weight (ASTM C136)
3"	100
No. 4 Sieve	30-75
No. 200 Sieve	15 (max)
Liquid Limit	25 (max)
Plasticity Index	6 (max)

4.2.3 Compaction Requirements

Fill materials should be placed and compacted in loose lift thicknesses of 8 inches or less when heavy, self-propelled compaction equipment is used. When hand-guided equipment such as

jumping jack or plate compactor is used, loose lift thicknesses should be on the order of 4 to 6 inches.

The following table lists the compaction requirements for the different types of fill recommended in this report.

Item	Description
Compaction Requirement (ASTM D698)	**Scarified Subgrade Soils:** 95% **Structural Fill:** 98% **Wall/Trench Backfill:** 95%
Moisture Content (ASTM D698)	±3 % of optimum

4.2.4 Utility Trench Backfill

All trench excavations should be made with sufficient working space to permit construction including backfill placement and compaction. Utility trenches are a common source of water infiltration and migration. All utility trenches that penetrate beneath the structure should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate beneath the structure. We recommend constructing an effective clay “trench plug” that extends at least 5 feet out from the structure. The plug material should consist of clay compacted at a water content at or above the optimum water content. The clay fill should be placed to completely surround the utility line above the bedding zone and be compacted in accordance with recommendations in this report.

4.2.5 Site Drainage

Positive drainage should be provided during construction and maintained throughout the life of the proposed project. Infiltration of water into utility or foundation excavations must be prevented during construction. All grades must provide effective drainage away from the structure during and after construction. Water permitted to pond next to the structure can result in greater soil movements than those discussed in this report. Estimated movements described in this report are based on effective drainage for the life of the structure and cannot be relied upon if effective drainage is not maintained.

In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 10 percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

Downspouts, roof drains or scuppers should be extended and discharged beyond the backfill zone when the ground surface beneath such features is not protected by exterior slabs or paving.

Landscaped irrigation adjacent to the foundation system should be minimized, eliminated, or strictly regulated.

4.2.6 Construction Considerations

Although the exposed subgrade is anticipated to be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. The use of light, rubber-tracked construction equipment would aid in reducing subgrade disturbance. Should unstable subgrade conditions develop, our geotechnical engineer should review conditions and provide recommendations for stabilization.

The site should be graded to prevent ponding of surface water on, or direction of runoff toward, the prepared subgrades or excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed.

As a minimum, all temporary excavations should be sloped or braced as required by Occupational Health and Safety Administration (OSHA) regulations to provide stability and safe working conditions. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations, as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

Rimrock Engineering should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during foundation preparation and installation, compaction of backfill, and final preparation for construction of the structure.

4.3 Drilled Piers

This section provides design parameters and construction considerations for the foundation support using concrete drilled piers.

The geotechnical resistance for drilled piers within the depths explored for this investigation can be estimated using the following ultimate values:

Material	Ultimate Skin Friction (psf)	Ultimate End Bearing (psf)
Clayey/Silty Sand & Clay	500	-
Shale	1,000	18,000

Piers should be sized for axial compressive loading using a Factor of Safety (FS=3) applied to the ultimate parameters provided. All piers should be reinforced full-depth for the applied axial, lateral, and uplift stresses imposed.

A minimum pier diameter of 24 inches is recommended to facilitate proper cleaning and observation of the pier hole. A minimum practical horizontal spacing between piers of at least three diameters should be maintained, and adjacent piers should bear at the same elevation. Should closer pier spacing be required, group effects on total axial (and lateral) capacity should be evaluated by further interaction with our geotechnical engineer and the structural engineer as design proceeds. Foundation elements such as pier caps should extend at least 3.5 feet below final grade for frost protection.

Provided the piers are properly designed and constructed, the total movement is estimated to be on the order of 1 inch or less. Additional foundation movements could occur if excessive water from any source infiltrates the foundation materials causing moisture increases to depths greater than the design assumption. Therefore, proper drainage should be provided in the final design, during construction and for the life of the project.

Single pile lateral load capacity can be estimated using the following design parameters for the soil profile in a p-y analysis such as conducted using the computer program LPile:

Material	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)	K_h (pci)	ε_{50}
SC/SM/CL	115	500	25	100	-
Shale	125	1,000	-	1,000	0.005

Soil modulus parameters in the table should be reduced by 50% for seismic analysis. Lateral load capacity will also be diminished in pile groups depending on pile spacing. Rimrock Engineering should be contacted to provide further design assistance in this regard once pile load/type and configuration are known.

Based on available information, drilling to design depths should be possible with conventional drilled shaft/pier auger equipment. A contingency should be provided in the construction budget/planning to allow for drill hole stabilization. This may include, but not be limited to, such means as casing, drilling mud, and tremie placement of concrete if required.

Depending on design pier depths, subsurface conditions indicate that temporary steel casing may be required on this project. The bottom of the pier excavations should be substantially free of loose material and water to affect placement of concrete in the “dry”. Pier concrete should be placed immediately after completion of drilling and cleaning. If pier concrete cannot be placed in dry conditions, or if groundwater and sloughing soils present difficulties that casing cannot adequately support, mud slurry and tremie methods may be required for concrete placement.

Temporary casing, if needed for pier construction, should be withdrawn in a slow continuous manner maintaining a sufficient head of concrete to prevent infiltration of water or the creation of voids in pier concrete. Pier concrete should have a relatively high fluidity when placed in cased pier holes or through a tremie. Pier concrete with slump in the range of 6 to 8 inches is recommended.

The pier foundation excavations and construction should be observed on a full-time basis by Rimrock Engineering. If the ground conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

Drilled shaft construction should be constructed in accordance with applicable portions of ACI 336.3R-93 or other similar, approved specification. Concrete mix should be designed utilizing Type I-II or Type V cement to have a minimum 28-day compressive strength of 4,000 psi and a maximum water cement ratio of 0.45. A superplasticizer may be necessary to increase concrete slump/flow temporarily for drilled shaft placement.

4.4 Shallow Foundation System

If deep foundations are not desired, the proposed structures can be supported by a shallow spread footing foundation system or thickened edge monolithic slab bearing on a minimum of 1.5 feet of geotextile-reinforced structural fill. The spread footing foundation system constructed on structural fill as described above, may be designed for a maximum allowable bearing pressure of 2,500 pounds per square foot (psf). The design bearing pressure applies to dead load plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions. A coefficient of friction value of 0.5 can be used for footings bearing on structural fill.

It should be noted that because the monolithic slab is not allowed to ‘float’ independent of the foundation, differential movement and cracking between the slab and the thickened edge foundation may occur. If used, the monolithic slab should be designed by a structural engineer to take this into account as well as the anticipated wall and point loads.

Rigid insulation panels should be placed along the exterior of the thickened edge for frost protection. These panels should extend outward approximately 4 feet and be sloped away from the structure to promote drainage of infiltration away from the structure.

Provided the structure is properly constructed, the total and differential movement resulting from the structural loads is estimated to be on the order of 1 inch and ¾ inch respectively. However, greater movements are possible given the site soil conditions. Foundation movement will depend upon the variation within the subsurface soil profile, structural loading conditions, embedment depth of footings, thickness of compacted fill, and quality of earthwork operations. Additional foundation movements could occur if water from any source infiltrates the foundation soils; therefore, proper drainage is critical and should be provided in the final design, during construction and for the life of the project.

If conventional shallow spread footing and stem walls are used, exterior foundations should be embedded a minimum of 3.5 feet below lowest adjacent exterior finish grade for frost protection and confinement. Interior footings should be bottomed at least 18 inches below lowest adjacent finish grade for confinement. Wall foundation dimensions should satisfy the requirements listed in

the latest edition of the International Building Code. Reinforcing steel requirements for foundations should be provided by the design engineer.

The base of all foundation excavations should be free of water and loose material prior to placing structural fill. Concrete should be placed soon after structural fill placement to reduce the potential for bearing surface disturbance. If the soil bearing levels become excessively dry, disturbed, saturated, or frozen, the affected material should be removed and replaced with suitable material prior to placing concrete. It is recommended that Rimrock Engineering be retained to observe and approve the foundation materials and their preparation for compliance with our recommendations and design assumptions.

4.5 Concrete Slabs

We recommend slabs bear on the site sand and gravel soils or on a minimum of 10 inches of structural fill. A leveling course, typically 4 to 6 inches of sand/gravel, should also be provided below the concrete slabs.

Additional floor slab design and construction recommendations for are as follows:

- Positive separations and/or isolation joints should be provided between slabs and all foundations, columns or utility lines to allow independent movement
- Contraction joints should be provided in slabs to control the location and extent of cracking
- Floor slabs should be structurally independent of any building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between slab and foundation
- The use of a vapor retarder should be considered beneath concrete slabs-on-grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer and slab contractor should refer to ACI 302 for procedures and cautions regarding the use and placement of a vapor retarder
- Floor slabs should not be constructed on frozen subgrade
- Other design and construction considerations, as outlined in Section 302.1R of the ACI Design Manual, are recommended.

Exterior slabs-on-grade founded on the site soils may experience some movement due to the volume change of the near surface materials through moisture variation or freeze-thaw cycles. This movement may lead to loss of positive drainage away from the building and could present a tripping hazard where slab sections move independently. Potential movement could be reduced by:

- Performing regular joint-sealing maintenance
- Minimizing moisture variations in the subgrade
- Minimizing moisture introduction to slab surfaces
- Controlling moisture-density during placement

- Placing effective control joints on relatively close centers
- Using designs which allow vertical movement between the exterior features and adjoining structural elements

4.6 Corrosion Protection

A soil sample was submitted for water soluble sulfate testing. The results are summarized in the following table:

Location	Depth (ft)	Material	Soluble Sulfate Content (%)	Resistivity (ohm-cm)	pH
B-2	2.5	SC	0.05	500	7.8

Water soluble sulfate values less than 0.10 are considered to have negligible attack potential on normal strength concrete. As a result, Type I-II Portland cement can be specified for all project concrete. However, if additional protection in this regard is desired, Type V cement should be specified.

Resistivity values less than 1,000 are considered to be very strongly aggressive with regard to corrosion of buried metals. If corrosion of buried metal is critical, it should be protected using a non-corrosive backfill, wrapping, coating, sacrificial anodes, or a combination of these methods, as designed by a qualified corrosion engineer.

4.7 Pavements

Pavement section alternatives for this project were designed based on the procedures outlined in the 1993 Guideline for Design of Pavement Structures by the American Association of State Highway and Transportation Officials (AASHTO). Input variables used in the calculations are presented in the following table:

Parameter	Value	Parameter	Value
CBR Value	4.9	Reliability (%)	85
Subgrade Drainage Coefficient	0.9	Standard Deviation	0.45
Initial Serviceability Index	4.2	Terminal Serviceability Index	2.0

It is anticipated that pavement subgrade soils will consist of clay and silt materials which are typically considered poor materials for pavement support. Please note that this CBR value and the pavement section alternatives provided assume that the site soils will be re-compacted and left in-place within the pavement areas. If this is not the case, Rimrock Engineering should be notified to provide additional pavement design recommendations based on the subgrade soils which will be present below the pavement sections.

Specific traffic data was not provided for this project. Therefore, we have assumed an equivalent 18-kip single axle load (ESAL) of 100,000 to represent the design traffic intensity for the proposed interior roads over a 20-year design period. Please notify us if any of the parameters used in the pavement design do not adequately define the anticipated conditions. Select from the following pavement alternative, or an approved equivalent.

The following table presents the recommended pavement section alternatives based on the above parameters.

Traffic Area	Asphalt Concrete	Portland Cement Concrete	Base Course	Total
Parking & Access	3	-	10	13
	-	6	4	10
Dumpster Locations	-	7	4	11

Asphalt concrete should be composed of a mixture of aggregate, filler and additives (if required), and approved bituminous material. The asphalt concrete should conform to approved mix designs which include volumetrics, Marshall properties, optimum asphalt cement content, job mix formula, and recommended mixing and placing temperatures. The asphalt concrete should be consistent with an approved mix design conforming to Wyoming DOT or City of Sheridan specifications. Mix designs should be submitted prior to construction to verify their adequacy. Aggregate used in the asphalt should meet MPW specifications for quality and gradation.

Asphalt material should be placed in maximum 3-inch lifts (compacted thickness) and should be compacted to the minimum standards outlined in the Wyoming DOT or City of Sheridan specifications. Aggregate base course should consist of a blend of sand and gravel which meets Wyoming DOT or City of Sheridan specifications for quality and gradation. Aggregate base course should be compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D 698.

Where rigid pavements are used, the concrete should be obtained from an approved mix design conforming to the MPW specifications, including the following minimum properties:

- Compressive Strength @ 28 days: 4,500 psi minimum
- Entrained Air Content: 4% to 7%

Each pavement alternative should be evaluated with respect to current material availability and economic conditions. The pavement sections presented herein are based on design parameters selected by Rimrock Engineering based on experience with similar projects and soil conditions. Design parameters may vary with the specific project and material source. Variation of these parameters may change the thickness of the pavement sections presented. Rimrock Engineering is prepared to discuss the details of these parameters and their effects on pavement design and reevaluate pavement design as appropriate.

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. If heavy construction traffic is allowed on unfinished pavement sections or sections not designed for such traffic, premature rutting and/or failure may occur.

The pavement sections provided in this report represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Preventive maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Preventive maintenance consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance program, additional engineering input is recommended to determine the type and extent of preventive maintenance appropriate. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

5.0 ADDITIONAL SERVICES

The recommendations made in this report assume that an adequate program of tests and observations will be made during construction to verify compliance with these recommendations. The review of plans and specifications and the field observation and testing by Rimrock Engineering are an integral part of the conclusions and recommendations made in this report. If we are not retained for these services, the Client agrees to assume Rimrock Engineering's responsibility for any potential claims that may arise during construction.

6.0 LIMITATIONS

Recommendations contained in this report are based on our field explorations, laboratory tests, and our understanding of the proposed construction. The study was performed using a mutually agreed upon scope of work. It is our opinion that this study was a cost-effective method to evaluate the subject site and evaluate some of the potential geotechnical concerns. More detailed, focused, and/or thorough investigations can be conducted. Further studies will tend to increase the level of assurance; however, such efforts will result in increased costs. If the Client wishes to reduce the uncertainties beyond the level associated with this study, Rimrock Engineering should be contacted for additional consultation.

The soils data used in the preparation of this report were obtained from borings made for this investigation. It is possible that variations in soils exist between the points explored. The nature and extent of soil variations may not be evident until construction occurs. If any soil conditions are encountered at this site which is different from those described in this report, our firm should be

immediately notified so that we may make any necessary revisions to our recommendations. In addition, if the scope of the proposed project changes, our firm should be notified. This report has been prepared for design purposes for specific application to this project in accordance with the generally accepted standards of practice at the time the report was written. No warranty, express or implied, is made.

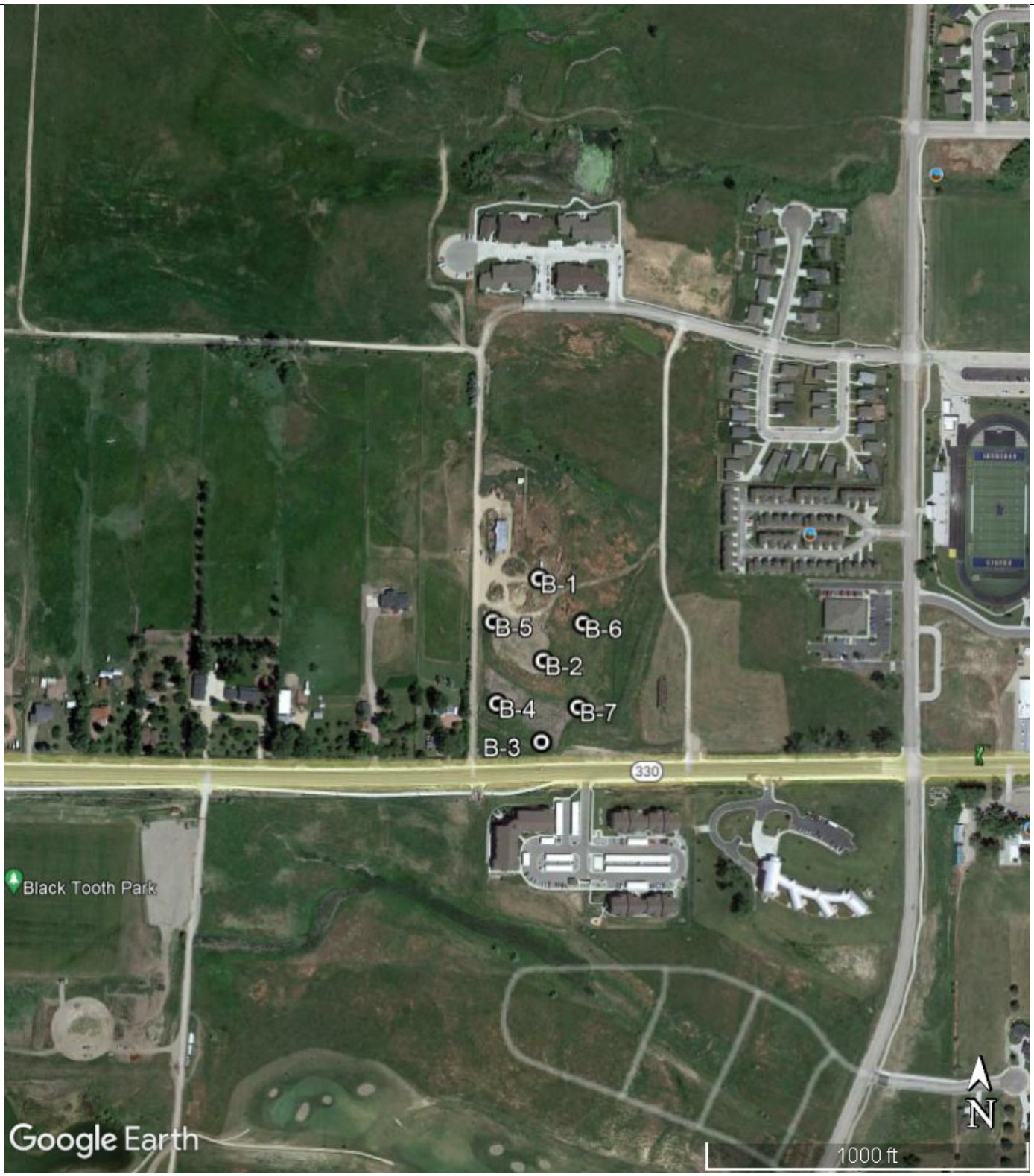
Other standards or documents referenced in any given standard cited in this report, or otherwise relied upon by the authors of this report, are only mentioned in the given standard; they are not incorporated into it or “included by reference,” as that latter term is used relative to contracts or other matters of law.

This report may be used only by the Client and for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on- and off-site), or other factors including advances in man’s understanding of applied science may change over time and could materially affect our findings. Therefore, this report should not be relied upon after 36 months from its issue. Rimrock Engineering should be notified if the project is delayed by more than 24 months from the date of this report so that a review of site conditions can be made, and recommendations revised if appropriate.

It is the Client’s responsibility to see that all parties to the project including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor’s option and risk. Any party other than the Client who wishes to use this report shall notify Rimrock Engineering of such intended use. Based on the intended use of the report, Rimrock Engineering may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the Client or anyone else will release Rimrock Engineering from any liability resulting from the use of this report by any unauthorized party.

APPENDIX A

Field Exploration



Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, MT 59101 Tel. (406) 294-8400

PROJECT NO. G22113

VICINITY/SITE MAP

CLOUD PEAK STORAGE
W. 5th Street
Sheridan, WY

N

BORING NUMBER B-1

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 10.00 ft / Elev 90.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		GRAVEL FILL										
		(SC) CLAYEY SAND with GRAVEL Light brown/brown, medium dense, medium plasticity, silty sand and sandy lean clay lenses.	SPT	100	12-13-13 (26)			11	30	17	13	28
5		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.	SPT	100	6-7-8 (15)			15				
10	▽		SPT	100	6-50			21				
15			SPT	100	14-11-3 (14)			27				

Bottom of borehole at 16.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 7/19/22 15:48 - G:\PROJECTS\2022\G22113.GPJ

BORING NUMBER B-2

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 11.00 ft / Elev 89.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL										
		(SC) CLAYEY SAND with GRAVEL Light brown/brown, medium dense, medium plasticity, silty sand and sandy lean clay lenses.	AU	100				14				
5		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.	SPT	100	14-11-3 (14)			13	NP	NP	NP	15
		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.	SPT	100	3-4-6 (10)			21	35	18	17	95
10		▽	SPT	100	50/5"			21				
15			SPT	100	5-7-10 (17)			32				

Bottom of borehole at 16.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 7/19/22 15:48 - G:\PROJECTS\2022\G22113.GPJ

BORING NUMBER B-3

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 12.00 ft / Elev 88.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		GRAVEL FILL										
		(CL) SANDY LEAN CLAY brown, stiff, medium plasticity, clayey sand and silty sand lenses, some intermixed gravels.	SPT	100	6-10-10 (20)			15				
5			SPT	100	3-4-4 (8)			17				
		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.										
		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.	SPT	100	3-4-5 (9)			19				
10			SPT	100	5-10-15 (25)			20				
		▽										
15			SPT	100	6-11-16 (27)			34				

Bottom of borehole at 16.0 feet.

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BORING NUMBER B-4

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 12.00 ft / Elev 88.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		GRAVEL FILL										
		(CL) SANDY LEAN CLAY brown, stiff, medium plasticity, clayey sand and silty sand lenses, some intermixed gravels.										
5		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.										
		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.	ST	100		2.0	108	19	41	18	23	83
10			SPT	100	5-6-12 (18)			18				
		▽										
15												

Bottom of borehole at 16.0 feet.

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BORING NUMBER B-5

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 11.00 ft / Elev 89.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL										
		(SC) CLAYEY SAND with GRAVEL Light brown/brown, medium dense, medium plasticity, silty sand and sandy lean clay lenses.										
5		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.										
10		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.										
		▽										
15												

Bottom of borehole at 16.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 7/19/22 15:48 - G:\PROJECTS\2022\G22113.GPJ

BORING NUMBER B-6

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 11.00 ft / Elev 89.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL										
		(CL) SANDY LEAN CLAY brown, stiff, medium plasticity, clayey sand and silty sand lenses, some intermixed gravels.										
5		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.										
		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.										
10		▽										
15												

Bottom of borehole at 16.0 feet.

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BORING NUMBER B-7

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 11.00 ft / Elev 89.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		GRAVEL FILL										
		(CL) SANDY LEAN CLAY brown, stiff, medium plasticity, clayey sand and silty sand lenses, some intermixed gravels.										
5		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.										
		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.										
10	▽											
15												

Bottom of borehole at 16.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 7/19/22 15:48 - G:\PROJECTS\2022\G22113.GPJ

KEY TO SYMBOLS

Rimrock Engineering, Inc.

CLIENT Morton Buildings **PROJECT NAME** Cloud Peak Storage

PROJECT NUMBER G22113 **PROJECT LOCATION** Sheridan, WY

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

- CLS: USCS Low Plasticity Sandy Clay
- FILL: Fill (made ground)
- SC: USCS Clayey Sand
- SHALE: Shale
- SM: USCS Silty Sand
- TOPSOIL: Topsoil

SAMPLER SYMBOLS

- Auger Cuttings
- Standard Penetration Test
- Shelby Tube

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION

▽ Water Level at Time Drilling, or as Shown

▼ Water Level at End of Drilling, or as Shown

▼ Water Level After 24 Hours, or as Shown

KEY TO SYMBOLS - GINT STD US LAB.GDT - 7/19/22 15:48 - G:\PROJECTS\2022\G22113.GPJ

APPENDIX B

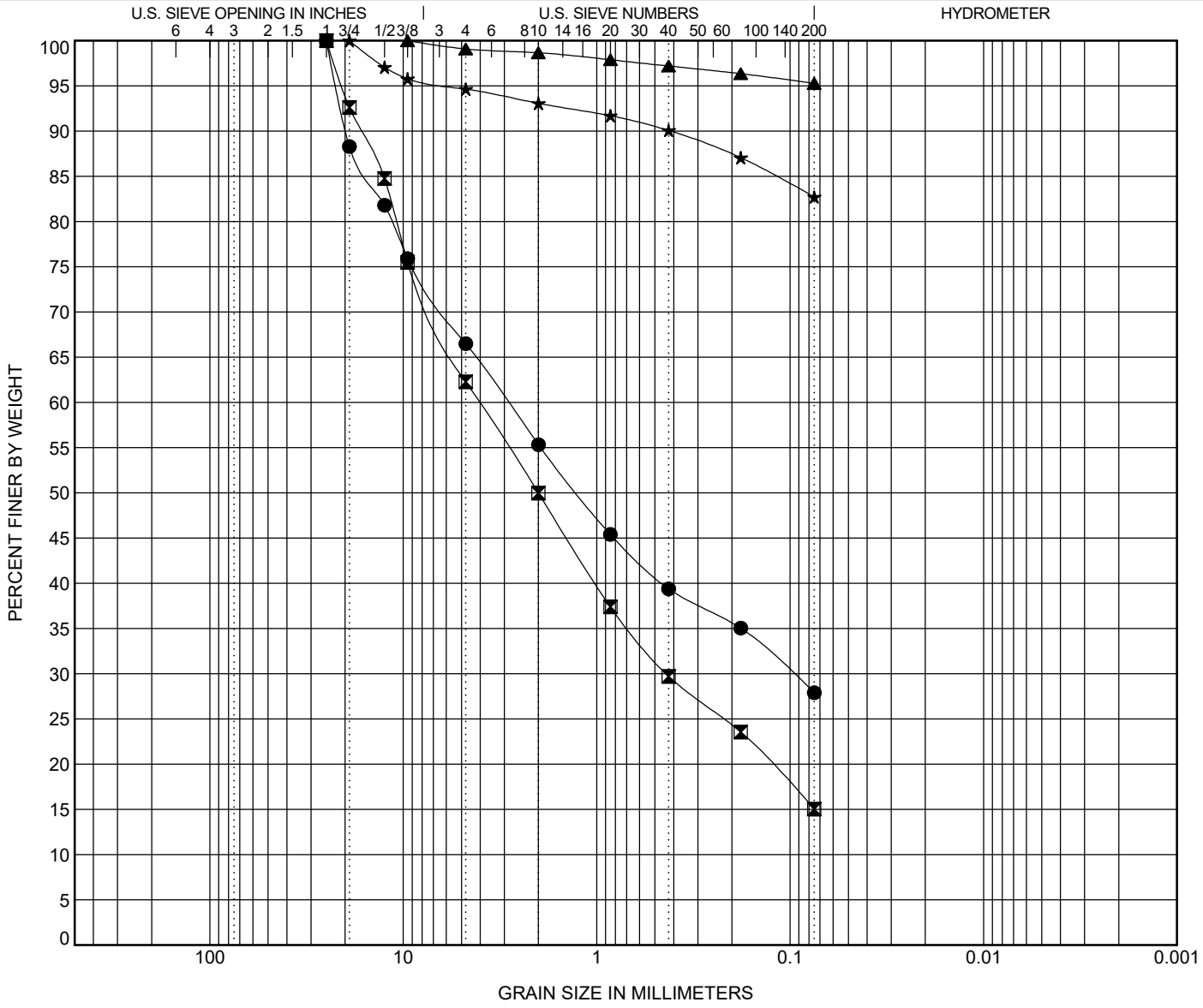
Laboratory Test Results

GRAIN SIZE DISTRIBUTION

Rimrock Engineering, Inc.

CLIENT Morton Buildings **PROJECT NAME** Cloud Peak Storage

PROJECT NUMBER G22113 **PROJECT LOCATION** Sheridan, WY



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-1**	**2.5**	**CLAYEY SAND with GRAVEL(SC)**	**30**	**17**	**13**		
⊠	**B-2**	**4.5**	**SILTY SAND with GRAVEL(SM)**	**NP**	**NP**	**NP**		
▲	**B-2**	**7.5**	**LEAN CLAY(CL)**	**35**	**18**	**17**		
★	**B-4**	**8.0**	**LEAN CLAY with SAND(CL)**	**41**	**18**	**23**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1**	**2.5**	**25**	**2.873**	**0.097**		**33.5**	**38.6**	**27.9**	
⊠	**B-2**	**4.5**	**25**	**4.05**	**0.437**		**37.7**	**47.2**	**15.0**	
▲	**B-2**	**7.5**	**9.5**				**0.9**	**3.8**	**95.3**	
★	**B-4**	**8.0**	**19**				**5.4**	**11.9**	**82.7**	

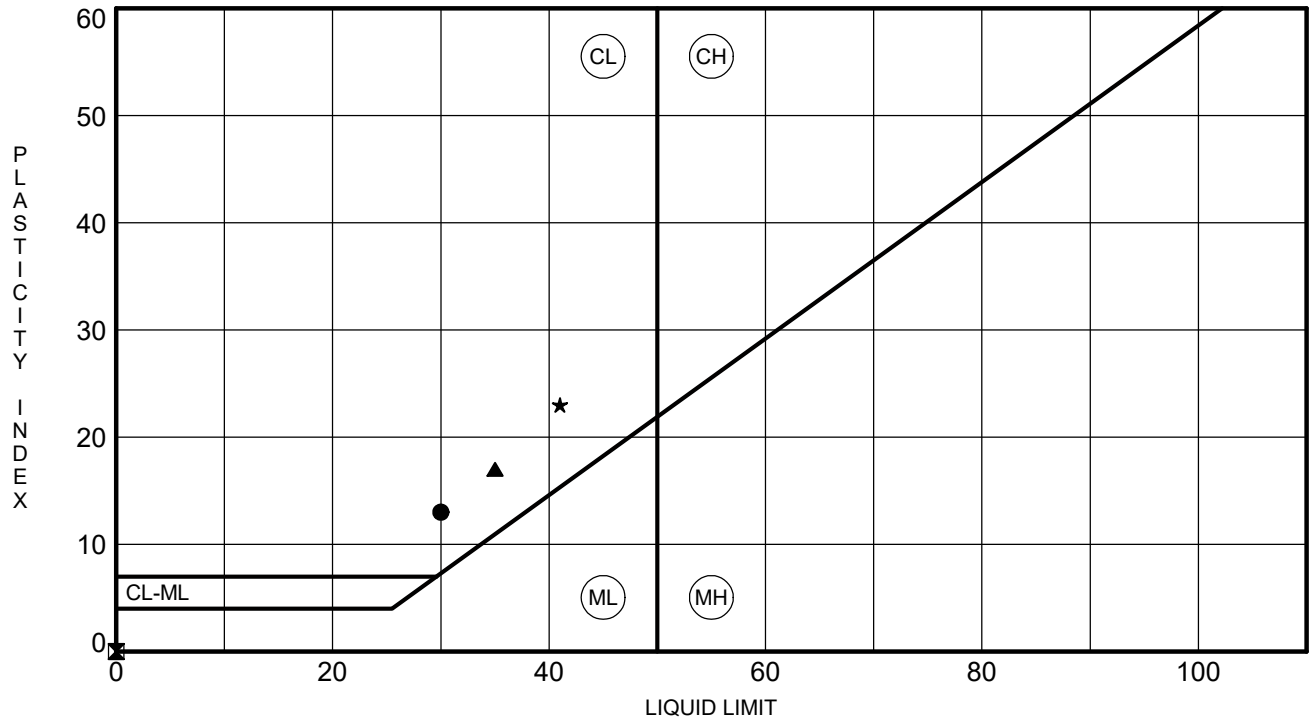
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ATTERBERG LIMITS' RESULTS

Rimrock Engineering, Inc.

CLIENT Morton Buildings **PROJECT NAME** Cloud Peak Storage

PROJECT NUMBER G22113 **PROJECT LOCATION** Sheridan, WY



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-1**	**2.5**	**30**	**17**	**13**	**28**	**CLAYEY SAND with GRAVEL(SC)**
⧓	**B-2**	**4.5**	**NP**	**NP**	**NP**	**15**	**SILTY SAND with GRAVEL(SM)**
▲	**B-2**	**7.5**	**35**	**18**	**17**	**95**	**LEAN CLAY(CL)**
★	**B-4**	**8.0**	**41**	**18**	**23**	**83**	**LEAN CLAY with SAND(CL)**

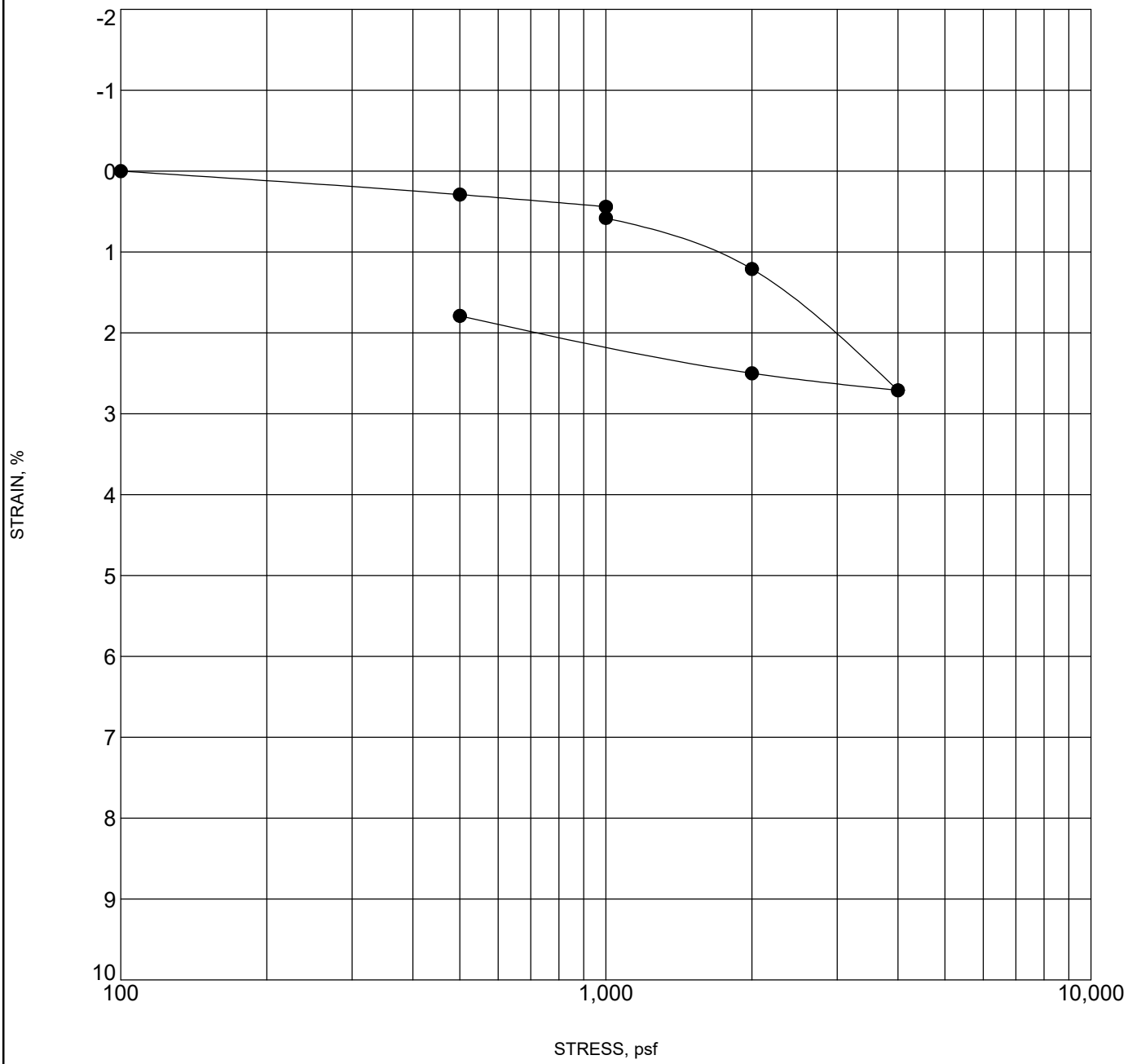
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CONSOLIDATION TEST

Rimrock Engineering, Inc.

CLIENT Morton Buildings **PROJECT NAME** Cloud Peak Storage

PROJECT NUMBER G22113 **PROJECT LOCATION** Sheridan, WY



BOREHOLE	DEPTH	Classification	γ_d	MC%
● **B-4**	**8.0**	**LEAN CLAY with SAND(CL)**	**108**	**19**

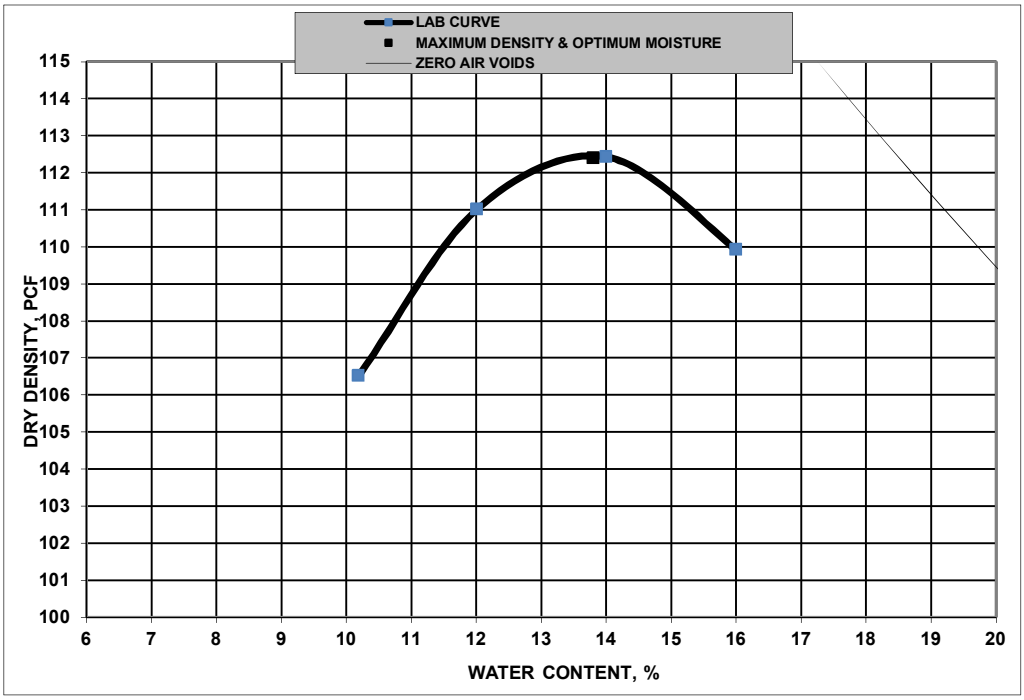
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RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Morton	**Project No:**	G22113
		Date of Report:	7/20/2022
Project Name:	Cloud Peak Storage	**Sample Location:**	B-6
Project Location:	Sheridan, WY	**Sample Depth:**	1'-3'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	Sandy Lean Clay (CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	6/29/2022

MOISTURE-DENSITY RELATIONSHIP



Maximum Density, PCF:	112.4
Optimum Moisture, %:	13.8
Test Method:	ASTM D698
Visual Classification:	Sandy Lean Clay (CL)

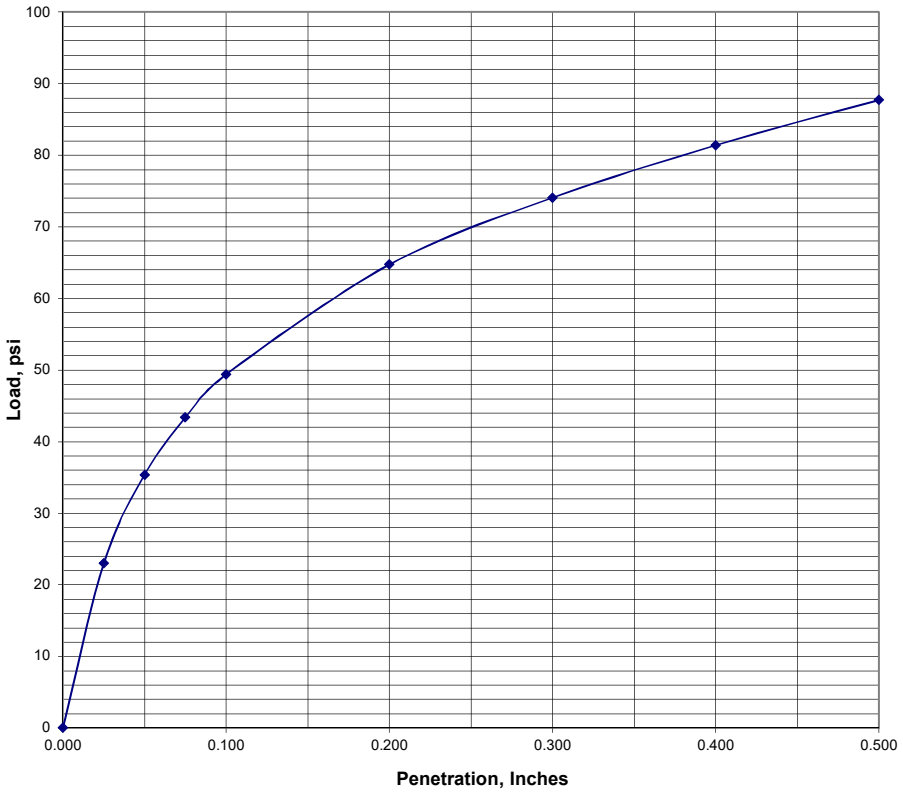
RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Morton	**Project No:**	G22113
		Date of Report:	7/20/2022
Project Name:	Cloud Peak Storage	**Sample Location:**	B-6
Project Location:	Sheridan, WY	**Sample Depth:**	1'-3'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	Sandy Lean Clay (CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	6/29/2022

CALIFORNIA BEARING RATIO

LABORATORY BEARING RATIO (CBR)



% CBR @ 0.1" **4.9**

APPENDIX C

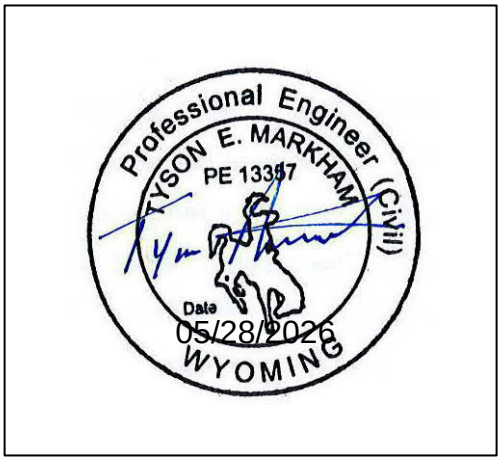
STORM DRAINAGE REPORT

TWIN BUTTES CANOPY PARKING
SITE DEVELOPMENT
DRAINAGE REPORT

SHERIDAN, WYOMING

CERTIFICATION

I hereby state that this Drainage Report has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community of professional engineers. The analysis has been prepared utilizing procedures and practices specified by the City of Sheridan and within the standard accepted practices.



PE or PG STAMP OR SEAL

Tyson Markham, P.E.

05/28/2026

Date

DRAINAGE REPORT

for

TWIN BUTTES CANOPY PARKING
SITE DEVELOPMENT

Morrison Maierle

engineers ▪ surveyors ▪ planners ▪ scientists

DRAINAGE REPORT
TO ACCOMPANY
TWIN BUTTES CANOPY PARKING

MORRISON-MAIERLE, INC.
PROJECT NO. 6922.003

Sheridan, Wyoming

Prepared for:

Ranch at Twin Buttes, LLC

Morrison Maierle engineers • surveyors • planners • scientists
QUALITY ASSURANCE
Tyson Markham, PE
PROJECT MANAGER
Jeff Feck, PE
PEER REVIEWER
5/28/26
QA APPROVAL DATE

CERTIFICATE OF ENGINEER

State of Wyoming)
) ss
County of Sheridan)

I, Tyson E. Markham, do hereby certify that this Report was prepared by me, or under my direct supervision.



Morrison-Maierle
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May 28, 2026

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1.0 INTRODUCTION

This Drainage Report accompanies building permit submittals for the Twin Buttes Canopy Parking site development. The report documents the hydrologic and hydraulic analysis for a proposed covered RV (and boats, etc.) storage facility in Sheridan, Wyoming.

The 3.70-acre site development is located on Lot 1A and Outlots A and B of Cloud Peak Ranch – Fifteenth-A Filing in the Cloud Peak Ranch area, north of West Fifth Street and west of Covey Run Road. The property is currently zoned B-1 (with the intent to rezone to PUD) and is in the SW¼ SW¼ of Section 21 of Township 56 North, Range 84 West. A site plan, along with Pre- and Post-Development Basin maps, are provided as Figures 1, 2, and 3 respectively.

1.1 Description of Property and Existing Conditions

The site is located at 940 Covey Run Road in Sheridan, Wyoming. The existing parcel is predominately native grass with overland flow grades from west to east (approximately 4–6% slope). The existing storage unit facility to the west discharges south of the site into a shallow swale, then north along the east edge, as shown on Figure 1. Both the swale, as well as on-site flow are directed to a 13”x22” arch culvert pipe crossing Covey Run Road.

1.2 Proposed Project Description

The proposed development includes canopy parking structures, internal drives, and minimal landscaped areas along roadway frontage. On-site runoff will be directed to a site detention pond, then to the existing culvert crossing Covey Run Road (noted as ‘Outfall A’).

1.3 Drainage Criteria

1.3.1 Applicable Standards or Exceptions

Design follows the *City of Sheridan Storm Drainage Design Criteria (August 2016).*

1.3.2 Minor and Major Storm Analysis

The project falls into the classification of “Commercial Development” as defined in the 2016 Storm Drainage Design Criteria. Rational/Modified Rational modeling was performed for the 2-year, 10-year, and 100-year

design storms. Pipes are checked against the 25-year design storm per City criteria; detention compliance is demonstrated at historic outfalls.

1.3.3 Geotechnical/Hydrogeological Analysis

A geotechnical engineering report was prepared in July 2022 for the site to the west by Rimrock Engineering of Billings, Montana by the same developer. Seven borings within the site were completed in June 2022. The complete report is provided in Appendix A. If needed, additional geotechnical analysis may be performed to support the structural design.

No hydrogeological analysis was prepared or deemed necessary for this project. The geotechnical report indicates groundwater evidence at a depth of 10- to 12-feet below existing ground surface. The site grading as proposed is not anticipated to impact groundwater during earthwork activities. Though not anticipated, some dewatering may be required during trenching for retaining wall foundation and structure installation, along with means of draining groundwater around the wall foundation.

1.3.4 Hydrologic Methods

Stormwater runoff values for this report were calculated using Autodesk Storm and Sanitary Analysis (SSA) software, utilizing the Modified Rational Method in accordance with Table 5.1 of the Drainage Design Manual (developments of 5 acres or less). See Appendix B for hydrologic and detention pond routing computations. The following data supported the calculations:

- Rainfall depths from the City of Sheridan Storm Drainage Design Criteria, 2016 Edition.
- Hydrologic soil group information from the NRCS Web Soil Survey (http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx). Refer to the NRCS soil report provided in Appendix C.

1.3.5 Hydraulic Methods

The Modified Rational Method using SSA software estimated flow rates for the three storm events. These flow rates were then used to verify detention size, pipe, and orifice (reducer) sizes. The analysis and capacity of the system is described further in Section 3 of this report.

1.3.6 State or Federal Regulations

No State or Federal stormwater-specific regulations apply beyond local criteria.

2.0 HISTORIC DRAINAGE SYSTEM

2.1 Major Basin Description

2.1.1 Major Drainage Description

Historically, the entire site drained to the east side low point and discharged to Outfall A.

2.1.2 Basin Characteristics

In general, the existing site area falls within one overall drainage basin. The extents of this basin (Basin 1) are shown on the Pre-Development Drainage Basin Delineation Map (Figure 2) of this report.

Basin A includes ±3.86 acres of primarily vacant land. Storm runoff from this basin starts in the west edge of the basin (the highest point) and travels via overland flow eastward across the basin.

2.2 Sub-Basin Descriptions

2.2.1 Historic Drainage Patterns

There are no other significant drainage patterns beyond those discussed in Section 2.1 above.

2.2.2 Off-Site Drainage Flows

The storage facility site to the west includes drainage control detention and outfalls around the site to the south and east within a shallow swale within a drainage easement, and ultimately to Outfall A. This does not have an impact on the existing site either pre- or post-development. There are no other significant off-site contributing drainage flows beyond those discussed in Section 2.1 above.

2.2.3 Off-Site and On-Site Basin Characteristics and Runoff Rates

Existing basins and flow characteristics are shown in the pre-development basin map (Figure 2). Table 1 below provides peak flow rates during the existing (pre-development) scenario.

TABLE 1 - PRE-DEVELOPMENT BASIN PHYSICAL PROPERTIES AND FLOW RATES									
				Rainfall Intensity (in/hr)			Flow Rate (cfs)		
Basin	Weighted Runoff Coefficient	Area (acres)	Time of Concentration (min)	2-year	10-year	100-year	2-year	10-year	100-year
A	0.17	3.86	22.4	1.15	1.77	2.67	0.76	1.16	1.75

3.0 PROPOSED DRAINAGE SYSTEM

3.1 Design Concepts

The proposed storm drainage improvements for the development consist of maintaining overland flow directions and directing onsite flow to a valley gutter for collection at the east side of the complex and routes to the main detention pond, the pond outlet includes a 12" discharge pipe with 6" reducer that outlets to Outfall A. This configuration maintains site related discharge to at or below pre-development conditions. Additionally, a 12" culvert will be installed at the southern emergency entrance to maintain ditch flow.

3.1.1 Minor and Major Drainage Patterns

The downstream drainage patterns are described in Section 2.1.2.

3.1.2 Compliance with Off-Site Runoff

Off-site runoff is managed within the southern and eastern drainage easements with similar routing to existing. It should be noted that the northern region of the site is being allocated for snow storage from the adjacent west property. Though snowmelt is not anticipated to affect stormwater discharge quantities significantly.

3.1.3 Proposed Drainage Patterns and Improvements

The drainage pattern remains similar to pre-development conditions, with a more well-defined drainage pattern than the current overland flow.

3.2 Design Details

The proposed surface drainage routing and the post-development basin map is shown on Figure 3.

3.2.1 Drainage Problems and Solutions

There are no apparent problems with the drainage patterns of the existing site.

3.2.2 Detention Storage and Outlet Design

Detention storage is provided at the east area of the site (Figure 3). The grading is such that the detention is approximately 3.6 feet deep, with a capacity of 48,000 gallons. A 12-inch outlet pipe leads from the pond to Outfall A, fitted with a 6-inch concentric reducer on the pipe end to sustain peak flow below pre-development rates (for large events, i.e. 100-yr and greater).

3.2.3 Storm Drain

Other than the culvert pipes shown, no new storm drain piping is planned for this site. The culvert pipe and downstream Outfall A pipe were analyzed to verify capacity.

3.2.4 Maintenance and Access

The proposed site piping and detention will be owned and maintained by the developer or current property owner.

3.2.5 Flow Concentrating Impacts on Downstream Properties

The flow direction to the east is consistent with exiting flow patterns. Site post-development peak flow rates are less than pre-development conditions. Flow is routed eastward to other downstream properties; however, their on-site flow is collected separately and not within in this outfall line. They do, still, converge downstream within a vacant lot that will require stormwater management during its development.

3.2.6 Summary of Basin Characteristics and Runoff Rates

Table 2 identifies the properties of the post-development basins for the 2-year, 10-year, and 100-year events.

TABLE 2 - POST-DEVELOPMENT BASIN PHYSICAL PROPERTIES AND FLOW RATES												
				Rainfall Intensity (in/hr)			Peak Flow Rate at Outfall* (cfs)			Detention Pond Depth (ft)		
Basin	Weighted Runoff Coeff.	Area (ac.)	Tc (min)	2-year	10-year	100-year	2-year	10-year	100-year	2-year	10-year	100-year
OUTFALL A												
1	0.72	3.86	17.74	1.69	2.00	3.03	1.20	1.49	1.75	1.8	2.6	3.5

* - Indicates runoff at outfall following detention; with 6" dia. reducer installed at the downstream end of 12" outlet pipe

3.2.7 Geotechnical and Hydrogeological Impacts

Not applicable to this project. There are no anticipated geotechnical or hydrogeological impacts.

3.2.8 Flooding Hazards and Minimum Building Elevations

There are no known flooding hazards in the project area. Building elevations lie above the surrounding area.

4.0 SUMMARY

4.1 Connection to Off-Site Drainage Features

Off-site drainage is being controlled on the project via the existing surface swale routing around the site.

4.2 Proposed Improvements

Site drainage will be routed via surface and piped drainage to Outfall A.

4.2.1 Storm Drain

Proposed storm drain is shown on Figure 3 and includes 12" pipe with 6" orifice from the detention pond routed to existing storm infrastructure in Covey Run Road (Outfall A).

4.2.2 Culverts

One 12” culvert is proposed and is sized to accommodate the off-site flow routed beneath the southern approach into the facility on the east end of the site.

4.2.3 Open Channels

Small swales will be maintained/graded around the site to provide directional flow control as needed to reach the desired outfall.

4.2.4 Detention Storage

One stormwater detention/retention area is proposed on-site as discussed in Section 3.2.4.

4.2.5 Geotechnical and Hydrogeological Impacts

Not applicable to this project. There are no anticipated geotechnical or hydrogeological impacts.

4.2.6 On-Site and Off-Site Impacts and Mitigation Measures

Not applicable to this project. There are no wetland impacts nor mitigation measures.

4.3 Floodplain Impacts

The site is located entirely within floodplain Zone X, according to the 2014 Flood Insurance Rate Map (FIRM) for the City of Sheridan (Panel#: 56033C0761E). The FEMA FIRMette map excerpt of the location is in Appendix D of this report.

4.4 State or Federal Regulations

There are no known State or Federal Regulations that apply to storm drainage for this project.

4.5 Compliance with Regulations and Standards

The storm drainage improvements for this project were designed in general accordance with the City of Sheridan Storm Drainage Design Criteria, August 2016 edition.

5.0 REFERENCES

Storm Drainage Design Criteria, City of Sheridan, adopted August 2016.

EXCALIBUR CONSTRUCTION INC
2275 DRY RANCH RD
SHERIDAN, WY 82801

RANCH AT TWIN BUTTES LLC
2809 E HARMONY RD STE 310
FORT COLLINS, CO 80528

10.0'
OUTLOT A

40.0'
OUTLOT B

NEW 6' TALL SOLID FENCE

SNOW DISPOSAL / STORAGE
FROM ADJACENT STORAGE
UNIT PROPERTY

24.0'

40' DRAINAGE
EASEMENT

TAPER WALL
HEIGHT TO 2'-4'

NEW
ENTRY GATE

NEW 36' WIDE
PRIMARY
ACCESS

NEW 6' TALL SOLID FENCE

12'
MIN.
TYP.

13'
TYP.

40.0'

DETENTION
POND

15.0' UTIL
EASEMENT

CONC. VALLEY GUTTER

30' DRAINAGE
EASEMENT

COVEY RUN ROAD

12'
TYP.

50.0'

20' WIDE GATE
(DOUBLE SWING)

NEW 20'
EMERGENCY
ACCESS

12'
TYP.

30' DRAINAGE
EASEMENT

10' UTIL
EASEMENT

EX. 5TH STREET APPROACH
TO BE REMOVED

WEST FIFTH STREET

N

0 25 50
SCALE IN FEET

Morrison Maierle
engineers ▪ surveyors ▪ planners ▪ scientists

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DATE: 5/2026

TWIN BUTTES CANOPY STORAGE
SHERIDAN WYOMING

SITE PLAN

PROJECT NO.
6922.003

FIGURE NUMBER
1

Plotted by tyson markham on May/27/2026

P:\6922-Ranch_Twin_Buttes_LLC\003_CPR15A Tract 1A PUD\ACAD\Civil\Exhibits\Drainage Report\003_Site Plan.dwg

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SHERIDAN, WY 82801

RANCH AT TWIN BUTTES LLC
2809 E HARMONY RD STE 310
FORT COLLINS, CO 80528

BASIN 1
3.86 AC

OUTFALL A
EX. 13"x22" CULVERT

30' DRAINAGE EASEMENT

EX. DETENTION POND AND OUTFALL STRUCTURE

12" PVC OUTLET PIPE

10' UTIL EASEMENT

30' DRAINAGE EASEMENT

WEST FIFTH STREET

COVEY RUN ROAD

0 25 50
SCALE IN FEET

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TWIN BUTTES CANOPY STORAGE
SHERIDAN WYOMING

PRE-DEVELOPMENT
DRAINAGE BASIN AREA MAP

PROJECT NO.
6922.003

FIGURE NUMBER
2

EXCALIBUR CONSTRUCTION INC
2275 DRY RANCH RD
SHERIDAN, WY 82801

RANCH AT TWIN BUTTES LLC
2809 E HARMONY RD STE 310
FORT COLLINS, CO 80528

DETENTION POND

OUTFALL A
EX. 13"x22" CULVERT

BASIN A
3.86 AC

CONC VALLEY
GUTTER

30' DRAINAGE
EASEMENT

EX. DETENTION
POND AND
OUTFALL
STRUCTURE

10' UTIL
EASEMENT

30' DRAINAGE
EASEMENT

12" PVC OUTLET PIPE
(100-YR OUTFLOW= 3.60 CFS)

COVEY RUN ROAD

WEST FIFTH STREET

N

0 25 50
SCALE IN FEET

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TWIN BUTTES CANOPY STORAGE
SHERIDAN WYOMING

POST-DEVELOPMENT
DRAINAGE BASIN AREA MAP

PROJECT NO.
6922.003

FIGURE NUMBER
3

Plotted by tyson markham on May/28/2026

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Appendix A

Geotechnical Engineering Report

RIMROCK
ENGINEERING, INC.

GEOTECHNICAL ENGINEERING REPORT

Cloud Peak Storage
West 5th Street
Sheridan, Wyoming

July 20, 2022
Project No. G22113

Prepared for:

Morton Buildings
727 E. Brundage Lane, Suite G
Sheridan, Wyoming 82801

Prepared by:

Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, Montana 59101

RIMROCK ENGINEERING, INC.

5440 Holiday Avenue · Billings, Montana 59101: · Phone: 406.294.8400 · www.rimrock.biz

July 20, 2022

Mr. Nik Zuhlsdorf
Morton Buildings
727 E. Brundage Lane, Suite G
Sheridan, Wyoming 82801

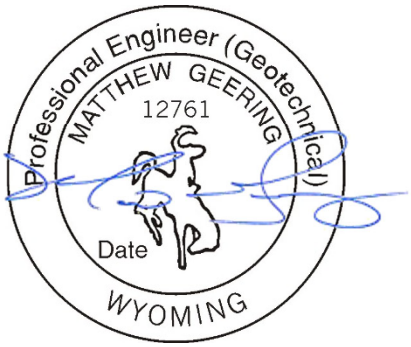
Re: Geotechnical Engineering Report
Cloud Peak Storage
West 5th Street
Sheridan, Wyoming

Dear Nik:

Rimrock Engineering, Inc. has completed the geotechnical engineering services for the referenced project. The attached report presents the results of our findings. Our work consisted of subsurface exploration, laboratory testing, engineering analyses, and preparation of this report.

We appreciate this opportunity to be of service to you and are prepared to provide construction materials testing services during the construction phase of the project. If you have any questions regarding this report or need additional information or services, please contact us.

Sincerely,
RIMROCK ENGINEERING, INC.



Matt Geering, P.E.
Principal/Vice President

Wade Reynolds
Principal/President

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APPENDICES

Appendix A Vicinity/Site Map, Logs, USCS Description/Log Key
Appendix B Laboratory Test Results

EXECUTIVE SUMMARY

Rimrock Engineering has completed the geotechnical engineering services for the Cloud Peak Storage project to be located along West 5th Street in Sheridan, Wyoming. Based on the results of our geotechnical investigation, the site can be developed for the proposed project consistent with the recommendations provided in this report. The following geotechnical conditions and considerations were identified:

- The subsurface profile consists of varying depths of clayey sand with gravel, silty sand with gravel, and sandy lean clay soils overlying highly weathered shale bedrock. Apparent fill soils are present across the site as well. Groundwater was encountered at about 10 feet while drilling or for the short duration the borings were allowed to remain open.

- The site soils are somewhat variable across the site consisting of silty sand, clayey sand, and sandy lean clay. These soils are underlain by highly weathered, soft to moderately hard shale. In addition, apparent fill soils were observed at the site as well. The site soils are expected to be compressible.

- We understand there will be a retaining wall/structure supported by shallow footings along the north portion of the lot and the remaining building elements will be supported on columns. In our opinion, the retaining wall/structure can be supported using a shallow spread footing foundation system bearing on a zone of geotextile-reinforced structural fill. Performance of this system is directly related to the proper treatment and re-compaction of the native soils, placement and control of geotextiles and structural fill, and good positive drainage for the life of the structure.

- To reduce the potential for movement related distress to concrete slabs, we recommend slabs bear on the site sand and gravel soils or on a minimum of 10 inches of structural fill.

It should be noted that specific project details were not fully developed or included in this section. The information provided in this executive summary should be used in conjunction with the entire report for design purposes.

GEOTECHNICAL ENGINEERING REPORT

Cloud Peak Storage
West 5th Street
Sheridan, Wyoming

1.0 INTRODUCTION AND SCOPE

1.1 Project Description

The project consists of the new Cloud Peak Storage P.U.D. to be located along West 5th Street in Sheridan, Wyoming. The project will include 10 storage buildings and site paving.

1.2 Purpose and Scope of Work

The purpose of this study is to evaluate the feasibility of the proposed development with respect to the observed subsurface conditions and to provide information, opinions, and geotechnical engineering recommendations relative to:

- General site, soil and groundwater conditions
- Site and subgrade preparation
- Recommended foundation type(s) and design parameters
- Estimated settlement of foundations
- Corrosivity and cement type
- Pavement thickness design
- General earthwork and site drainage

Our scope of services consisted of background review, site reconnaissance, field exploration, laboratory testing, engineering analyses, and preparation of this report.

2.0 INVESTIGATION

2.1 Field Exploration

The subsurface exploration consisted of drilling seven (7) borings on June 29, 2022 to approximately 16 feet below existing grades. The borings were drilled using our truck mounted drill rig equipped with solid flight augers. Groundwater levels were measured during drilling operations, if encountered. Upon completion of drilling and/or groundwater measurements, the borings were backfilled with drill cuttings and compacted with the equipment at hand.

Logs of the borings along with a Vicinity/Site Map are included in Appendix A. The borings were located in the field by Rimrock Engineering based on the site plan provided. Estimated ground surface elevations were set at 100 for purposes of this investigation. The locations and elevations

of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

Rimrock Engineering personnel logged the soil conditions encountered in the borings. At selected intervals, samples of the subsurface materials were taken by driving split-spoon samplers, pushing Shelby tube samplers, and collecting auger cuttings. Penetration resistance measurements were obtained by driving the samplers into the subsurface materials with a 140-pound automatic hammer falling 30 inches. The penetration resistance value is a useful index in estimating the relative density, or consistency, of the materials encountered. The sample was tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification.

2.2 Laboratory Testing

The purpose of the laboratory testing is to assess the physical and engineering properties of the soil samples collected in the field to be used in our geotechnical evaluations and analyses. Laboratory testing was performed on selected soil samples to assess the following:

- Visual classification (USCS)
- Moisture content
- Sieve analysis
- Moisture density relationship
- Atterberg limits
- Consolidation/swell
- Water soluble sulfate, pH & resistivity
- California Bearing Ratio (CBR)

The soil descriptions presented on the boring logs are in accordance with the Unified Soil Classification System (USCS). Individual laboratory test results can be found in Appendix B at the end of this report.

3.0 SITE & SUBSURFACE CONDITIONS

3.1 Site Conditions

The project site is located along West 5th Street in Sheridan, Wyoming. The site consists of undeveloped property with areas of fill present. The site generally slopes to the east. The surrounding area consists of residential and commercial developments.

3.2 Subsurface Soil Conditions

Based on the materials encountered in our borings, the subsurface profile consists of varying depths of clayey sand with gravel, silty sand with gravel, and sandy lean clay soils overlying highly weathered shale bedrock. Apparent fill soils are present across the site as well.

The subsurface sand and gravel soil had Standard Penetration Test (SPT) N-values in the range of 14 to 26 which indicates the granular soils to be medium dense in relative density with low to moderate compressibility. SPT N-values in the clay soils ranged from 8 to 20 bpf indicating the

soils are stiff in consistency, compressible, and low in shear strength. The shale is highly weathered, soft to moderately hard, and generally becomes more competent with depth. For a more detailed description of the subsurface conditions, please refer to the individual boring logs provided in Appendix A.

3.3 Groundwater Conditions

The borings were observed while drilling and after completion for the presence and level of groundwater. Groundwater was encountered at about 10 feet while drilling or for the short duration the borings were allowed to remain open. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Groundwater can be expected to fluctuate with varying seasonal and weather conditions and other factors not evident at the time of the investigation. Evaluation of the factors that affect groundwater fluctuations is beyond the scope of this report.

3.4 Laboratory Test Results

The site soils were tested for grain size distribution (sieve analysis) and Atterberg Limits. Atterberg limits are a basic measure of the critical water contents of a fine-grained soils. The site clayey soils encountered in the borings generally have medium to high plasticity. Results are summarized below:

Location	Depth (ft)	USCS	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Gravel (%)	Sand (%)	Clay/Silt (%)
B-1	2.5	SC	30	17	13	33.5	38.6	27.9
B-2	4.5	SM	NP	NP	NP	37.7	47.2	15.0
B-2	7.5	CL	35	18	17	0.9	3.8	95.3
B-4	8.0	CL	41	18	23	5.4	11.9	82.7

A sample of the lean clay/shale was tested for consolidation/swell potential. The sample was allowed to consolidate under a confining pressure of 1,000 pounds per square foot (psf). Once consolidation under the surcharge load was complete, the sample was inundated with water and allowed to swell/collapse. After movement from the addition of water ceased, incremental loads were then applied to further consolidate the sample.

Consolidation/swell test results indicate that the fine-grained soils exhibit moderate to high compressibility and slight collapse potential with increased moisture (See Consolidation Tests in Appendix B). Results are summarized below:

Location	Depth (ft)	Material	Dry Unit Weight (pcf)	Strain @ 2,000 psf (%)	Collapse(-)/Swell(+) (%)
B-4	8.0	CL	108	1.2	-0.1

A representative sample of the near surface fine grained soils was collected for Moisture-Density Relationship (M/D) and California Bearing Ratio (CBR) testing. The results are summarized in the following table:

Location	Depth, (ft)	Material	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR
B-6	1-3	CL	112.4	13.8	4.9

4.0 RECOMMENDATIONS

4.1 Geotechnical Concerns/Considerations

The site soils are somewhat variable across the site consisting of silty sand, clayey sand, and sandy lean clay. These soils are underlain by highly weathered, soft to moderately hard shale. In addition, apparent fill soils were observed at the site as well. The site soils are expected to be compressible.

We understand there will be a retaining wall/structure supported by shallow footings along the north portion of the lot and the remaining building elements will be supported on columns. In our opinion, the retaining wall/structure can be supported using a shallow spread footing foundation system bearing on a zone of geotextile-reinforced structural fill. Performance of this system is directly related to the proper treatment and re-compaction of the native soils, placement and control of geotextiles and structural fill, and good positive drainage for the life of the structure.

4.2 Earthwork

The following sections present recommendations for site and subgrade preparation and placement of fill materials on the project. Earthwork on the project should be observed and tested by Rimrock Engineering.

4.2.1 Site and Subgrade Preparation

Vegetation, topsoil, existing utilities (if present), and other unsuitable materials (e.g. debris, desiccated soil, frozen soil, etc.) should be removed from the proposed construction area. It is anticipated that general excavations for the proposed construction can be accomplished with conventional earthmoving equipment such as tractor mounted backhoes and tracked excavators.

Excavations for the shallow spread footings should allow for the placement of at least 1.5 feet of geotextile-reinforced structural fill and 10 inches of aggregate base beneath floor slabs. Excavation for structural fill placement should extend laterally beyond all edges of the foundation at least 12 inches per foot of over-excavation depth.

The excavated site soils, cleaned of all organic/deleterious material, construction debris, and rock greater than 3 inches in nominal size (if encountered), may be stockpiled on-site and used as wall/trench backfill, and landscaping materials.

In order to mitigate construction disturbance and improve uniformity of subgrade support, prior to placement of fill and/or slabs, subgrade should be scarified a minimum of 12 inches, moisture conditioned to near optimum, and compacted to 95 percent of the maximum dry density (ASTM D698). Rimrock Engineering should be contacted to observe the subgrade surface to ascertain integrity consistent with the design assumptions.

Within the proposed areas to receive pavement and fill materials, scarification, re-compaction and proof-rolling of the subgrade soils is recommended. Subgrade soils beneath pavement and fill areas should be scarified to a depth of at least 12 inches, moisture conditioned to within 3 percent of optimum and compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D698. The moisture content and compaction of subgrade soils should be maintained until pavement construction. The prepared subgrade in areas to receive pavement should be proof-rolled by a tandem axle dump truck loaded to its capacity. The proof-rolling should be observed by Rimrock Engineering to identify areas of soft subgrade. Any areas that become unstable or “pump” under the loaded dump truck should be excavated to a depth to be determined by Rimrock Engineering and replaced with a dense graded gravel/sand mixture to stabilize the subgrade. Once the subgrade has been proof-rolled and approved by the geotechnical engineer, base course may be placed. Additionally, a geogrid or geotextile separation/stabilization fabric may be required to stabilize soft subgrade soils.

4.2.2 Material Requirements

It is anticipated that excavated materials will be used to the extent practical as site, wall, and trench backfill. The material suitability should be evaluated by the geotechnical engineer prior to use. Moisture conditioning and processing of on-site soils will likely be required. Structural fill, if required, should be a crushed aggregate and meet the criteria outlined below:

Gradation	Percent finer by weight (ASTM C136)
3"	100
No. 4 Sieve	30-75
No. 200 Sieve	15 (max)
Liquid Limit	25 (max)
Plasticity Index	6 (max)

4.2.3 Compaction Requirements

Fill materials should be placed and compacted in loose lift thicknesses of 8 inches or less when heavy, self-propelled compaction equipment is used. When hand-guided equipment such as

jumping jack or plate compactor is used, loose lift thicknesses should be on the order of 4 to 6 inches.

The following table lists the compaction requirements for the different types of fill recommended in this report.

Item	Description
Compaction Requirement (ASTM D698)	**Scarified Subgrade Soils:** 95% **Structural Fill:** 98% **Wall/Trench Backfill:** 95%
Moisture Content (ASTM D698)	±3 % of optimum

4.2.4 Utility Trench Backfill

All trench excavations should be made with sufficient working space to permit construction including backfill placement and compaction. Utility trenches are a common source of water infiltration and migration. All utility trenches that penetrate beneath the structure should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate beneath the structure. We recommend constructing an effective clay “trench plug” that extends at least 5 feet out from the structure. The plug material should consist of clay compacted at a water content at or above the optimum water content. The clay fill should be placed to completely surround the utility line above the bedding zone and be compacted in accordance with recommendations in this report.

4.2.5 Site Drainage

Positive drainage should be provided during construction and maintained throughout the life of the proposed project. Infiltration of water into utility or foundation excavations must be prevented during construction. All grades must provide effective drainage away from the structure during and after construction. Water permitted to pond next to the structure can result in greater soil movements than those discussed in this report. Estimated movements described in this report are based on effective drainage for the life of the structure and cannot be relied upon if effective drainage is not maintained.

In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 10 percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

Downspouts, roof drains or scuppers should be extended and discharged beyond the backfill zone when the ground surface beneath such features is not protected by exterior slabs or paving.

Landscaped irrigation adjacent to the foundation system should be minimized, eliminated, or strictly regulated.

4.2.6 Construction Considerations

Although the exposed subgrade is anticipated to be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. The use of light, rubber-tracked construction equipment would aid in reducing subgrade disturbance. Should unstable subgrade conditions develop, our geotechnical engineer should review conditions and provide recommendations for stabilization.

The site should be graded to prevent ponding of surface water on, or direction of runoff toward, the prepared subgrades or excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed.

As a minimum, all temporary excavations should be sloped or braced as required by Occupational Health and Safety Administration (OSHA) regulations to provide stability and safe working conditions. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations, as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

Rimrock Engineering should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during foundation preparation and installation, compaction of backfill, and final preparation for construction of the structure.

4.3 Drilled Piers

This section provides design parameters and construction considerations for the foundation support using concrete drilled piers.

The geotechnical resistance for drilled piers within the depths explored for this investigation can be estimated using the following ultimate values:

Material	Ultimate Skin Friction (psf)	Ultimate End Bearing (psf)
Clayey/Silty Sand & Clay	500	-
Shale	1,000	18,000

Piers should be sized for axial compressive loading using a Factor of Safety (FS=3) applied to the ultimate parameters provided. All piers should be reinforced full-depth for the applied axial, lateral, and uplift stresses imposed.

A minimum pier diameter of 24 inches is recommended to facilitate proper cleaning and observation of the pier hole. A minimum practical horizontal spacing between piers of at least three diameters should be maintained, and adjacent piers should bear at the same elevation. Should closer pier spacing be required, group effects on total axial (and lateral) capacity should be evaluated by further interaction with our geotechnical engineer and the structural engineer as design proceeds. Foundation elements such as pier caps should extend at least 3.5 feet below final grade for frost protection.

Provided the piers are properly designed and constructed, the total movement is estimated to be on the order of 1 inch or less. Additional foundation movements could occur if excessive water from any source infiltrates the foundation materials causing moisture increases to depths greater than the design assumption. Therefore, proper drainage should be provided in the final design, during construction and for the life of the project.

Single pile lateral load capacity can be estimated using the following design parameters for the soil profile in a p-y analysis such as conducted using the computer program LPile:

Material	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)	K_h (pci)	ε_{50}
SC/SM/CL	115	500	25	100	-
Shale	125	1,000	-	1,000	0.005

Soil modulus parameters in the table should be reduced by 50% for seismic analysis. Lateral load capacity will also be diminished in pile groups depending on pile spacing. Rimrock Engineering should be contacted to provide further design assistance in this regard once pile load/type and configuration are known.

Based on available information, drilling to design depths should be possible with conventional drilled shaft/pier auger equipment. A contingency should be provided in the construction budget/planning to allow for drill hole stabilization. This may include, but not be limited to, such means as casing, drilling mud, and tremie placement of concrete if required.

Depending on design pier depths, subsurface conditions indicate that temporary steel casing may be required on this project. The bottom of the pier excavations should be substantially free of loose material and water to affect placement of concrete in the “dry”. Pier concrete should be placed immediately after completion of drilling and cleaning. If pier concrete cannot be placed in dry conditions, or if groundwater and sloughing soils present difficulties that casing cannot adequately support, mud slurry and tremie methods may be required for concrete placement.

Temporary casing, if needed for pier construction, should be withdrawn in a slow continuous manner maintaining a sufficient head of concrete to prevent infiltration of water or the creation of voids in pier concrete. Pier concrete should have a relatively high fluidity when placed in cased pier holes or through a tremie. Pier concrete with slump in the range of 6 to 8 inches is recommended.

The pier foundation excavations and construction should be observed on a full-time basis by Rimrock Engineering. If the ground conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

Drilled shaft construction should be constructed in accordance with applicable portions of ACI 336.3R-93 or other similar, approved specification. Concrete mix should be designed utilizing Type I-II or Type V cement to have a minimum 28-day compressive strength of 4,000 psi and a maximum water cement ratio of 0.45. A superplasticizer may be necessary to increase concrete slump/flow temporarily for drilled shaft placement.

4.4 Shallow Foundation System

If deep foundations are not desired, the proposed structures can be supported by a shallow spread footing foundation system or thickened edge monolithic slab bearing on a minimum of 1.5 feet of geotextile-reinforced structural fill. The spread footing foundation system constructed on structural fill as described above, may be designed for a maximum allowable bearing pressure of 2,500 pounds per square foot (psf). The design bearing pressure applies to dead load plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions. A coefficient of friction value of 0.5 can be used for footings bearing on structural fill.

It should be noted that because the monolithic slab is not allowed to ‘float’ independent of the foundation, differential movement and cracking between the slab and the thickened edge foundation may occur. If used, the monolithic slab should be designed by a structural engineer to take this into account as well as the anticipated wall and point loads.

Rigid insulation panels should be placed along the exterior of the thickened edge for frost protection. These panels should extend outward approximately 4 feet and be sloped away from the structure to promote drainage of infiltration away from the structure.

Provided the structure is properly constructed, the total and differential movement resulting from the structural loads is estimated to be on the order of 1 inch and ¾ inch respectively. However, greater movements are possible given the site soil conditions. Foundation movement will depend upon the variation within the subsurface soil profile, structural loading conditions, embedment depth of footings, thickness of compacted fill, and quality of earthwork operations. Additional foundation movements could occur if water from any source infiltrates the foundation soils; therefore, proper drainage is critical and should be provided in the final design, during construction and for the life of the project.

If conventional shallow spread footing and stem walls are used, exterior foundations should be embedded a minimum of 3.5 feet below lowest adjacent exterior finish grade for frost protection and confinement. Interior footings should be bottomed at least 18 inches below lowest adjacent finish grade for confinement. Wall foundation dimensions should satisfy the requirements listed in

the latest edition of the International Building Code. Reinforcing steel requirements for foundations should be provided by the design engineer.

The base of all foundation excavations should be free of water and loose material prior to placing structural fill. Concrete should be placed soon after structural fill placement to reduce the potential for bearing surface disturbance. If the soil bearing levels become excessively dry, disturbed, saturated, or frozen, the affected material should be removed and replaced with suitable material prior to placing concrete. It is recommended that Rimrock Engineering be retained to observe and approve the foundation materials and their preparation for compliance with our recommendations and design assumptions.

4.5 Concrete Slabs

We recommend slabs bear on the site sand and gravel soils or on a minimum of 10 inches of structural fill. A leveling course, typically 4 to 6 inches of sand/gravel, should also be provided below the concrete slabs.

Additional floor slab design and construction recommendations for are as follows:

- Positive separations and/or isolation joints should be provided between slabs and all foundations, columns or utility lines to allow independent movement
- Contraction joints should be provided in slabs to control the location and extent of cracking
- Floor slabs should be structurally independent of any building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between slab and foundation
- The use of a vapor retarder should be considered beneath concrete slabs-on-grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer and slab contractor should refer to ACI 302 for procedures and cautions regarding the use and placement of a vapor retarder
- Floor slabs should not be constructed on frozen subgrade
- Other design and construction considerations, as outlined in Section 302.1R of the ACI Design Manual, are recommended.

Exterior slabs-on-grade founded on the site soils may experience some movement due to the volume change of the near surface materials through moisture variation or freeze-thaw cycles. This movement may lead to loss of positive drainage away from the building and could present a tripping hazard where slab sections move independently. Potential movement could be reduced by:

- Performing regular joint-sealing maintenance
- Minimizing moisture variations in the subgrade
- Minimizing moisture introduction to slab surfaces
- Controlling moisture-density during placement

- Placing effective control joints on relatively close centers
- Using designs which allow vertical movement between the exterior features and adjoining structural elements

4.6 Corrosion Protection

A soil sample was submitted for water soluble sulfate testing. The results are summarized in the following table:

Location	Depth (ft)	Material	Soluble Sulfate Content (%)	Resistivity (ohm-cm)	pH
B-2	2.5	SC	0.05	500	7.8

Water soluble sulfate values less than 0.10 are considered to have negligible attack potential on normal strength concrete. As a result, Type I-II Portland cement can be specified for all project concrete. However, if additional protection in this regard is desired, Type V cement should be specified.

Resistivity values less than 1,000 are considered to be very strongly aggressive with regard to corrosion of buried metals. If corrosion of buried metal is critical, it should be protected using a non-corrosive backfill, wrapping, coating, sacrificial anodes, or a combination of these methods, as designed by a qualified corrosion engineer.

4.7 Pavements

Pavement section alternatives for this project were designed based on the procedures outlined in the 1993 Guideline for Design of Pavement Structures by the American Association of State Highway and Transportation Officials (AASHTO). Input variables used in the calculations are presented in the following table:

Parameter	Value	Parameter	Value
CBR Value	4.9	Reliability (%)	85
Subgrade Drainage Coefficient	0.9	Standard Deviation	0.45
Initial Serviceability Index	4.2	Terminal Serviceability Index	2.0

It is anticipated that pavement subgrade soils will consist of clay and silt materials which are typically considered poor materials for pavement support. Please note that this CBR value and the pavement section alternatives provided assume that the site soils will be re-compacted and left in-place within the pavement areas. If this is not the case, Rimrock Engineering should be notified to provide additional pavement design recommendations based on the subgrade soils which will be present below the pavement sections.

Specific traffic data was not provided for this project. Therefore, we have assumed an equivalent 18-kip single axle load (ESAL) of 100,000 to represent the design traffic intensity for the proposed interior roads over a 20-year design period. Please notify us if any of the parameters used in the pavement design do not adequately define the anticipated conditions. Select from the following pavement alternative, or an approved equivalent.

The following table presents the recommended pavement section alternatives based on the above parameters.

Traffic Area	Asphalt Concrete	Portland Cement Concrete	Base Course	Total
Parking & Access	3	-	10	13
	-	6	4	10
Dumpster Locations	-	7	4	11

Asphalt concrete should be composed of a mixture of aggregate, filler and additives (if required), and approved bituminous material. The asphalt concrete should conform to approved mix designs which include volumetrics, Marshall properties, optimum asphalt cement content, job mix formula, and recommended mixing and placing temperatures. The asphalt concrete should be consistent with an approved mix design conforming to Wyoming DOT or City of Sheridan specifications. Mix designs should be submitted prior to construction to verify their adequacy. Aggregate used in the asphalt should meet MPW specifications for quality and gradation.

Asphalt material should be placed in maximum 3-inch lifts (compacted thickness) and should be compacted to the minimum standards outlined in the Wyoming DOT or City of Sheridan specifications. Aggregate base course should consist of a blend of sand and gravel which meets Wyoming DOT or City of Sheridan specifications for quality and gradation. Aggregate base course should be compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D 698.

Where rigid pavements are used, the concrete should be obtained from an approved mix design conforming to the MPW specifications, including the following minimum properties:

- Compressive Strength @ 28 days: 4,500 psi minimum
- Entrained Air Content: 4% to 7%

Each pavement alternative should be evaluated with respect to current material availability and economic conditions. The pavement sections presented herein are based on design parameters selected by Rimrock Engineering based on experience with similar projects and soil conditions. Design parameters may vary with the specific project and material source. Variation of these parameters may change the thickness of the pavement sections presented. Rimrock Engineering is prepared to discuss the details of these parameters and their effects on pavement design and reevaluate pavement design as appropriate.

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. If heavy construction traffic is allowed on unfinished pavement sections or sections not designed for such traffic, premature rutting and/or failure may occur.

The pavement sections provided in this report represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Preventive maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Preventive maintenance consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance program, additional engineering input is recommended to determine the type and extent of preventive maintenance appropriate. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

5.0 ADDITIONAL SERVICES

The recommendations made in this report assume that an adequate program of tests and observations will be made during construction to verify compliance with these recommendations. The review of plans and specifications and the field observation and testing by Rimrock Engineering are an integral part of the conclusions and recommendations made in this report. If we are not retained for these services, the Client agrees to assume Rimrock Engineering's responsibility for any potential claims that may arise during construction.

6.0 LIMITATIONS

Recommendations contained in this report are based on our field explorations, laboratory tests, and our understanding of the proposed construction. The study was performed using a mutually agreed upon scope of work. It is our opinion that this study was a cost-effective method to evaluate the subject site and evaluate some of the potential geotechnical concerns. More detailed, focused, and/or thorough investigations can be conducted. Further studies will tend to increase the level of assurance; however, such efforts will result in increased costs. If the Client wishes to reduce the uncertainties beyond the level associated with this study, Rimrock Engineering should be contacted for additional consultation.

The soils data used in the preparation of this report were obtained from borings made for this investigation. It is possible that variations in soils exist between the points explored. The nature and extent of soil variations may not be evident until construction occurs. If any soil conditions are encountered at this site which is different from those described in this report, our firm should be

immediately notified so that we may make any necessary revisions to our recommendations. In addition, if the scope of the proposed project changes, our firm should be notified. This report has been prepared for design purposes for specific application to this project in accordance with the generally accepted standards of practice at the time the report was written. No warranty, express or implied, is made.

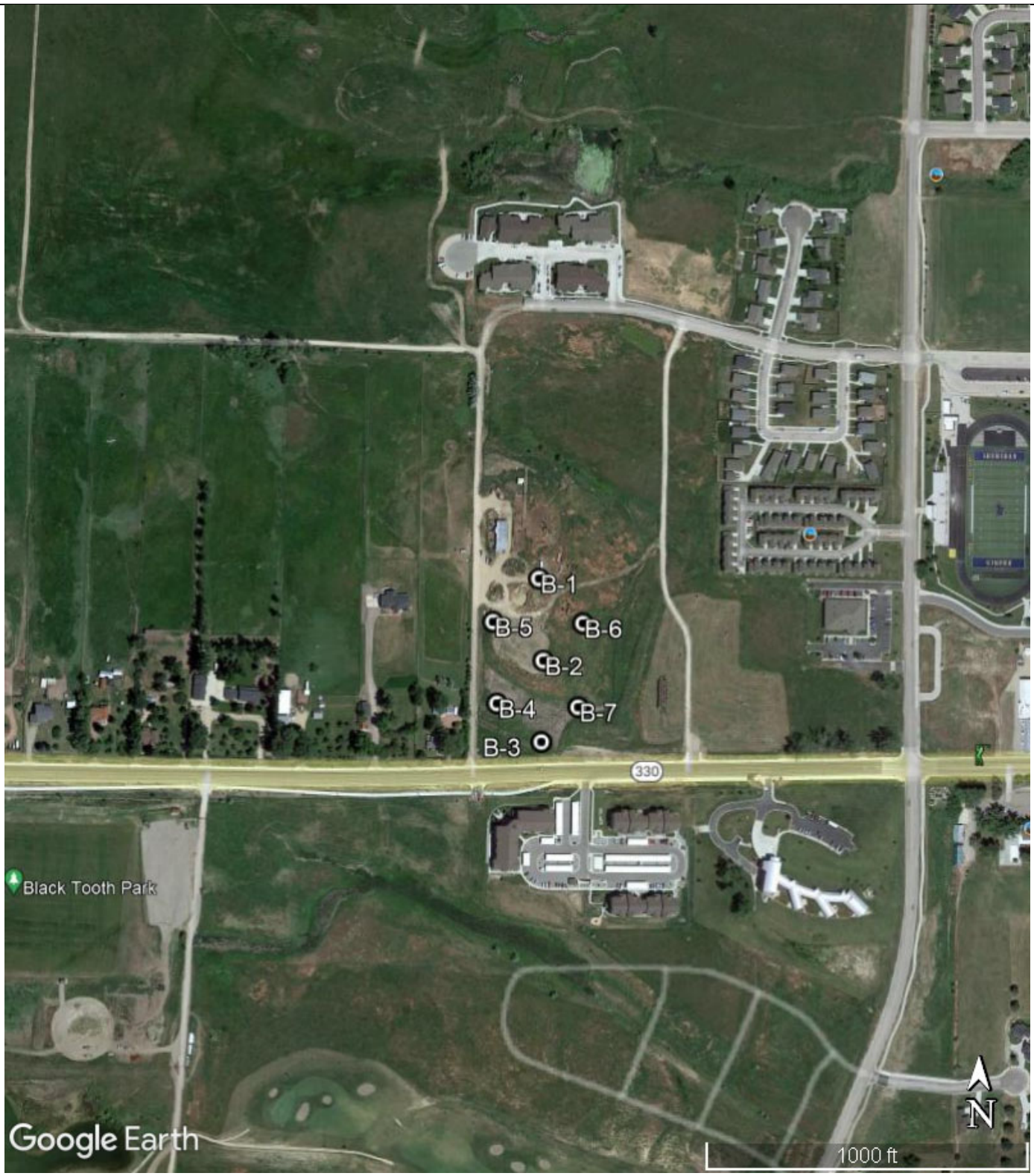
Other standards or documents referenced in any given standard cited in this report, or otherwise relied upon by the authors of this report, are only mentioned in the given standard; they are not incorporated into it or “included by reference,” as that latter term is used relative to contracts or other matters of law.

This report may be used only by the Client and for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on- and off-site), or other factors including advances in man’s understanding of applied science may change over time and could materially affect our findings. Therefore, this report should not be relied upon after 36 months from its issue. Rimrock Engineering should be notified if the project is delayed by more than 24 months from the date of this report so that a review of site conditions can be made, and recommendations revised if appropriate.

It is the Client’s responsibility to see that all parties to the project including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor’s option and risk. Any party other than the Client who wishes to use this report shall notify Rimrock Engineering of such intended use. Based on the intended use of the report, Rimrock Engineering may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the Client or anyone else will release Rimrock Engineering from any liability resulting from the use of this report by any unauthorized party.

APPENDIX A

Field Exploration



Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, MT 59101 Tel. (406) 294-8400

PROJECT NO. G22113

VICINITY/SITE MAP

CLOUD PEAK STORAGE
W. 5th Street
Sheridan, WY

N

BORING NUMBER B-1

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 10.00 ft / Elev 90.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		GRAVEL FILL										
		(SC) CLAYEY SAND with GRAVEL Light brown/brown, medium dense, medium plasticity, silty sand and sandy lean clay lenses.	SPT	100	12-13-13 (26)			11	30	17	13	28
5		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.	SPT	100	6-7-8 (15)			15				
10	▽		SPT	100	6-50			21				
15			SPT	100	14-11-3 (14)			27				

Bottom of borehole at 16.0 feet.

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BORING NUMBER B-2

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 11.00 ft / Elev 89.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL										
		(SC) CLAYEY SAND with GRAVEL Light brown/brown, medium dense, medium plasticity, silty sand and sandy lean clay lenses.	AU	100				14				
5		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.	SPT	100	14-11-3 (14)			13	NP	NP	NP	15
		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.	SPT	100	3-4-6 (10)			21	35	18	17	95
10		▽	SPT	100	50/5"			21				
15			SPT	100	5-7-10 (17)			32				

Bottom of borehole at 16.0 feet.

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BORING NUMBER B-3

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 12.00 ft / Elev 88.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		GRAVEL FILL										
		(CL) SANDY LEAN CLAY brown, stiff, medium plasticity, clayey sand and silty sand lenses, some intermixed gravels.	SPT	100	6-10-10 (20)			15				
5			SPT	100	3-4-4 (8)			17				
		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.										
		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.	SPT	100	3-4-5 (9)			19				
10			SPT	100	5-10-15 (25)			20				
		▽										
15			SPT	100	6-11-16 (27)			34				

Bottom of borehole at 16.0 feet.

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BORING NUMBER B-4

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 12.00 ft / Elev 88.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		GRAVEL FILL										
		(CL) SANDY LEAN CLAY brown, stiff, medium plasticity, clayey sand and silty sand lenses, some intermixed gravels.										
5		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.										
		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.	ST	100		2.0	108	19	41	18	23	83
10			SPT	100	5-6-12 (18)			18				
		▽										
15												

Bottom of borehole at 16.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 7/19/22 15:48 - G:\PROJECTS\2022\G22113.GPJ

BORING NUMBER B-5

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 11.00 ft / Elev 89.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL										
		(SC) CLAYEY SAND with GRAVEL Light brown/brown, medium dense, medium plasticity, silty sand and sandy lean clay lenses.										
5		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.										
10		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.										
		▽										
15												

Bottom of borehole at 16.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 7/19/22 15:48 - G:\PROJECTS\2022\G22113.GPJ

BORING NUMBER B-6

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 11.00 ft / Elev 89.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL										
		(CL) SANDY LEAN CLAY brown, stiff, medium plasticity, clayey sand and silty sand lenses, some intermixed gravels.										
5		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.										
		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.										
10		▽										
15												

Bottom of borehole at 16.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 7/19/22 15:48 - G:\PROJECTS\2022\G22113.GPJ

BORING NUMBER B-7

Rimrock Engineering, Inc.

CLIENT Morton Buildings
PROJECT NAME Cloud Peak Storage
PROJECT NUMBER G22113
PROJECT LOCATION Sheridan, WY
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 11.00 ft / Elev 89.00 ft
LOGGED BY C.B. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		GRAVEL FILL										
		(CL) SANDY LEAN CLAY brown, stiff, medium plasticity, clayey sand and silty sand lenses, some intermixed gravels.										
5		(SM) SILTY SAND with GRAVEL Light brown/brown, medium dense, clayey sand and sandy lean clay lenses.										
		SHALE Gray/brown/yellowish-red, highly weathered, soft to moderately hard, medium to high plasticity, almost completely weathered, some sandstone lenses.										
10	▽											
15												

Bottom of borehole at 16.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 7/19/22 15:48 - G:\PROJECTS\2022\G22113.GPJ

KEY TO SYMBOLS

Rimrock Engineering, Inc.

CLIENT Morton Buildings **PROJECT NAME** Cloud Peak Storage

PROJECT NUMBER G22113 **PROJECT LOCATION** Sheridan, WY

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

- CLS: USCS Low Plasticity Sandy Clay
- FILL: Fill (made ground)
- SC: USCS Clayey Sand
- SHALE: Shale
- SM: USCS Silty Sand
- TOPSOIL: Topsoil

SAMPLER SYMBOLS

- Auger Cuttings
- Standard Penetration Test
- Shelby Tube

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION

▽ Water Level at Time Drilling, or as Shown

▼ Water Level at End of Drilling, or as Shown

▼ Water Level After 24 Hours, or as Shown

KEY TO SYMBOLS - GINT STD US LAB.GDT - 7/19/22 15:48 - G:\PROJECTS\2022\G22113.GPJ

APPENDIX B

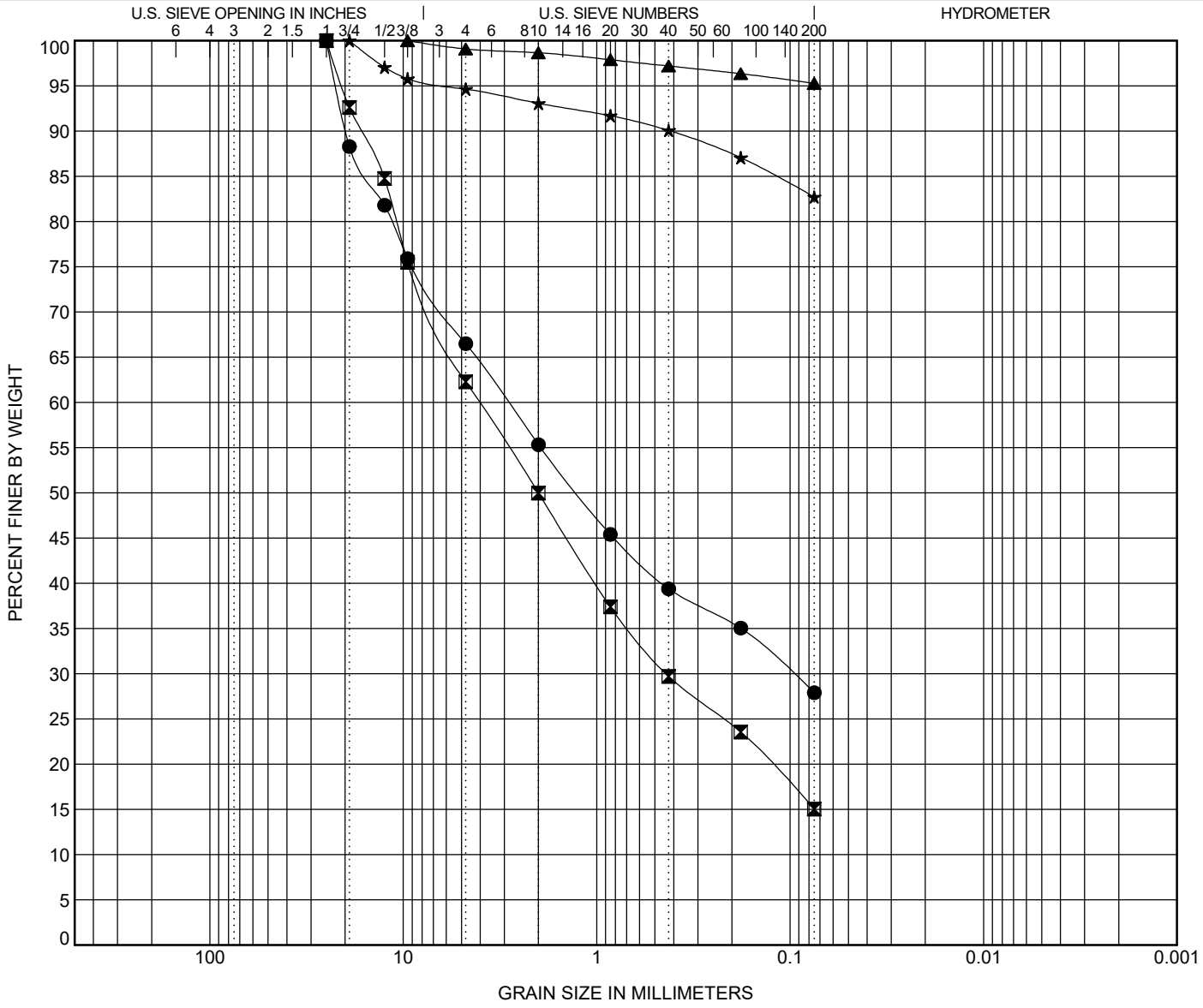
Laboratory Test Results

GRAIN SIZE DISTRIBUTION

Rimrock Engineering, Inc.

CLIENT Morton Buildings **PROJECT NAME** Cloud Peak Storage

PROJECT NUMBER G22113 **PROJECT LOCATION** Sheridan, WY



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-1**	**2.5**	**CLAYEY SAND with GRAVEL(SC)**	**30**	**17**	**13**		
⊠	**B-2**	**4.5**	**SILTY SAND with GRAVEL(SM)**	**NP**	**NP**	**NP**		
▲	**B-2**	**7.5**	**LEAN CLAY(CL)**	**35**	**18**	**17**		
★	**B-4**	**8.0**	**LEAN CLAY with SAND(CL)**	**41**	**18**	**23**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1**	**2.5**	**25**	**2.873**	**0.097**		**33.5**	**38.6**	**27.9**	
⊠	**B-2**	**4.5**	**25**	**4.05**	**0.437**		**37.7**	**47.2**	**15.0**	
▲	**B-2**	**7.5**	**9.5**				**0.9**	**3.8**	**95.3**	
★	**B-4**	**8.0**	**19**				**5.4**	**11.9**	**82.7**	

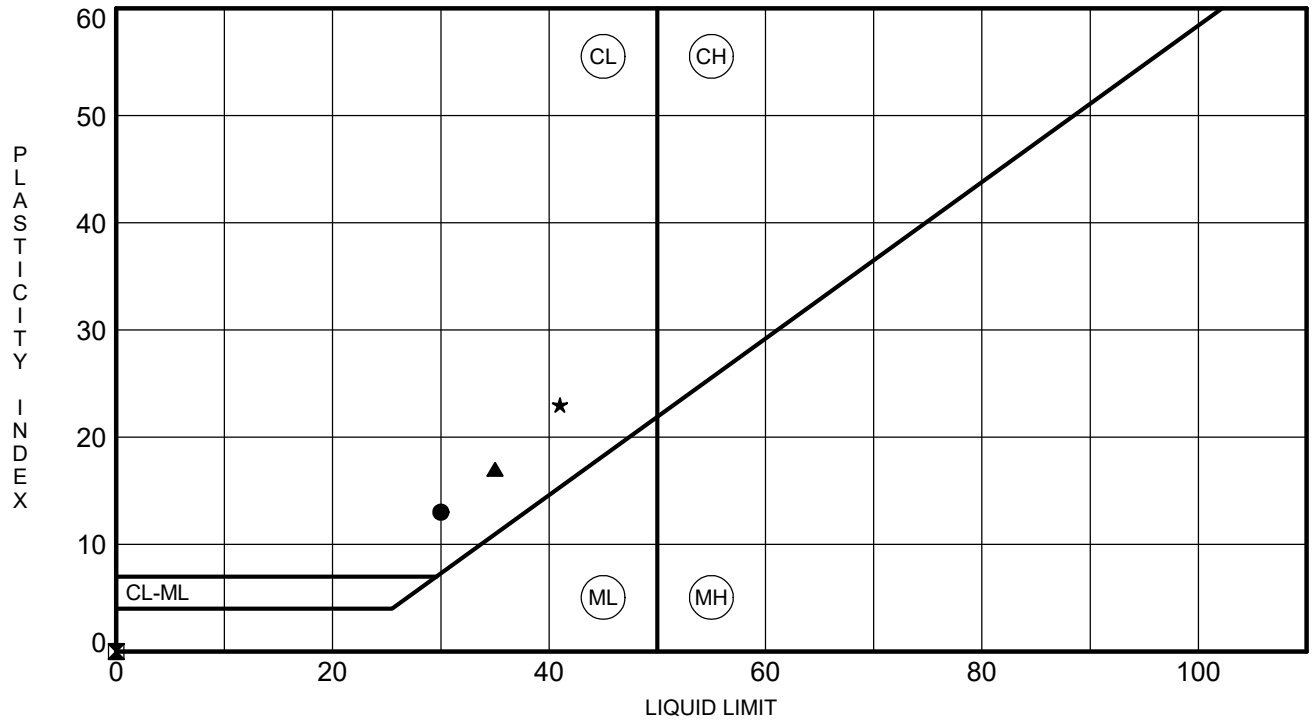
GRAIN SIZE - GINT STD US LAB.GDT - 7/19/22 14:44 - G:\PROJECTS\2022\G22113.GPJ

ATTERBERG LIMITS' RESULTS

Rimrock Engineering, Inc.

CLIENT Morton Buildings **PROJECT NAME** Cloud Peak Storage

PROJECT NUMBER G22113 **PROJECT LOCATION** Sheridan, WY



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-1**	**2.5**	**30**	**17**	**13**	**28**	**CLAYEY SAND with GRAVEL(SC)**
⧓	**B-2**	**4.5**	**NP**	**NP**	**NP**	**15**	**SILTY SAND with GRAVEL(SM)**
▲	**B-2**	**7.5**	**35**	**18**	**17**	**95**	**LEAN CLAY(CL)**
★	**B-4**	**8.0**	**41**	**18**	**23**	**83**	**LEAN CLAY with SAND(CL)**

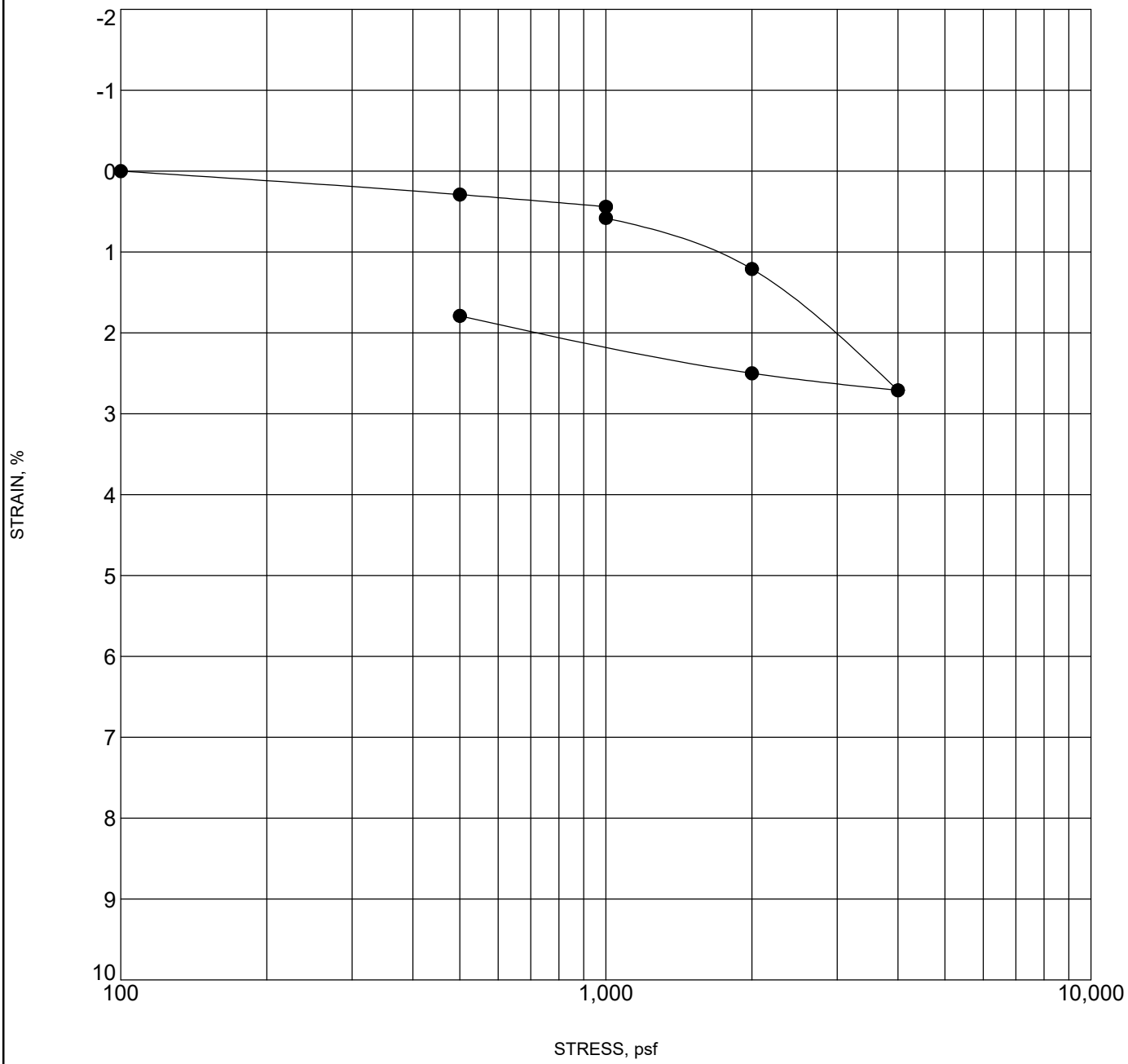
ATTERBERG LIMITS - GINT STD US LAB.GDT - 7/19/22 14:45 - G:\PROJECTS\2022\G22113.GPJ

CONSOLIDATION TEST

Rimrock Engineering, Inc.

CLIENT Morton Buildings **PROJECT NAME** Cloud Peak Storage

PROJECT NUMBER G22113 **PROJECT LOCATION** Sheridan, WY



BOREHOLE	DEPTH	Classification	γ_d	MC%
● **B-4**	**8.0**	**LEAN CLAY with SAND(CL)**	**108**	**19**

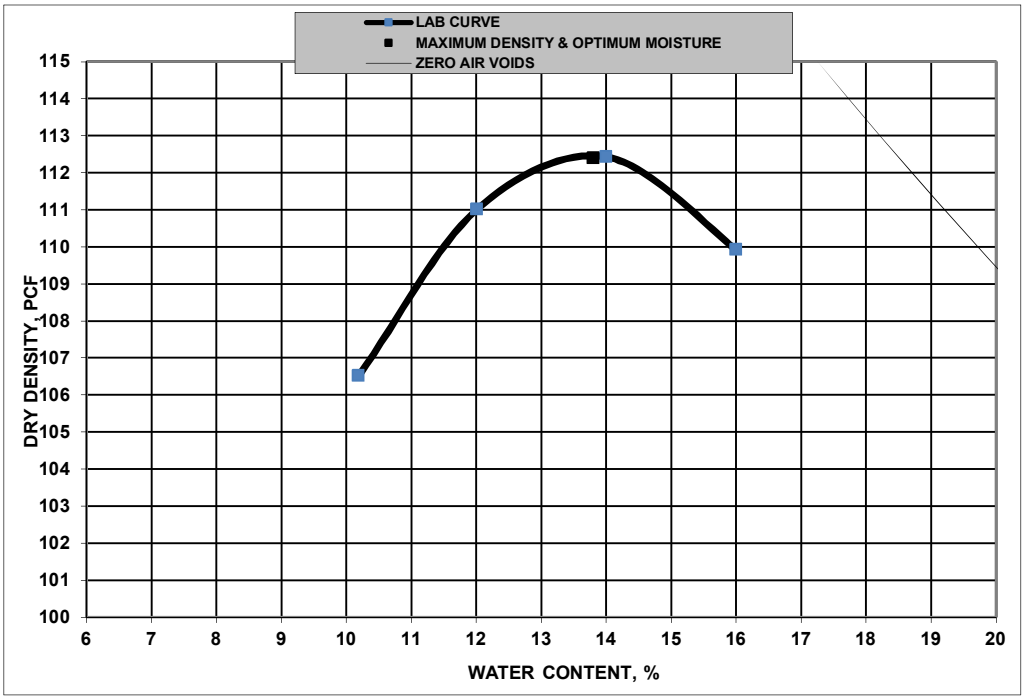
CONSOL STRAIN - GINT STD US LAB.GDT - 7/19/22 14:45 - G:\PROJECTS\2022\G22113.GPJ

RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Morton	**Project No:**	G22113
		Date of Report:	7/20/2022
Project Name:	Cloud Peak Storage	**Sample Location:**	B-6
Project Location:	Sheridan, WY	**Sample Depth:**	1'-3'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	Sandy Lean Clay (CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	6/29/2022

MOISTURE-DENSITY RELATIONSHIP



Maximum Density, PCF:	112.4
Optimum Moisture, %:	13.8
Test Method:	ASTM D698
Visual Classification:	Sandy Lean Clay (CL)

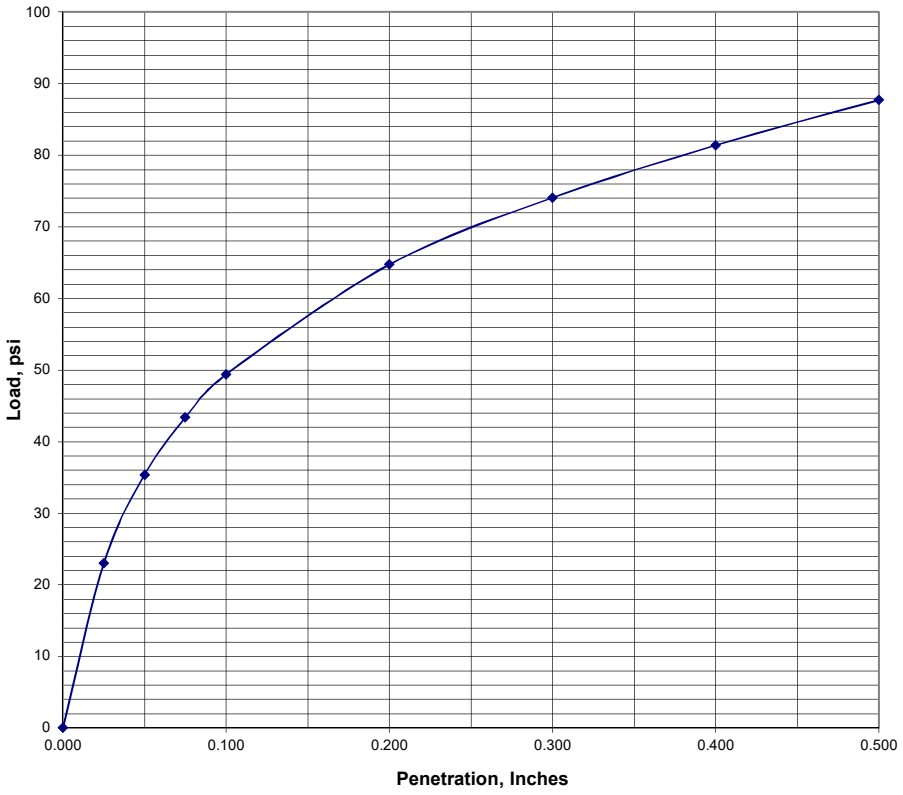
RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Morton	**Project No:**	G22113
		Date of Report:	7/20/2022
Project Name:	Cloud Peak Storage	**Sample Location:**	B-6
Project Location:	Sheridan, WY	**Sample Depth:**	1'-3'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	Sandy Lean Clay (CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	6/29/2022

CALIFORNIA BEARING RATIO

LABORATORY BEARING RATIO (CBR)



% CBR @ 0.1" **4.9**

Appendix B

Autodesk Storm Model Output and Culvert Calculations
(Hydrologic and Hydraulic Computations)

Arch Pipe @ Covey Run Road

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013
Channel Slope	0.027 ft/ft
Rise	1.1 ft
Span	1.8 ft

Results

Discharge	13.77 cfs	FULL FLOW CAPACITY = 13.77 cfs 100 yr event = 5.35 cfs; 3.6 cfs (off site) + 1.75 cfs (on-site)
Normal Depth	13.0 in	
Flow Area	1.5 ft²	
Wetted Perimeter	4.6 ft	
Hydraulic Radius	4.0 in	
Top Width	0.00 ft	
Critical Depth	12.6 in	
Percent Full	100.0 %	
Critical Slope	0.023 ft/ft	
Velocity	9.02 ft/s	
Velocity Head	1.26 ft	
Specific Energy	28.12 in	
Froude Number	(N/A)	
Maximum Discharge	14.74 cfs	
Discharge Full	13.76 cfs	
Slope Full	0.027 ft/ft	
Flow Type	Undefined	

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	13.0 in
Critical Depth	12.6 in
Channel Slope	0.027 ft/ft
Critical Slope	0.023 ft/ft

Culvert @ Emer Entrance

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010
Channel Slope	0.032 ft/ft
Diameter	12.0 in
Discharge	3.60 cfs

Results

Normal Depth	5.5 in
Flow Area	0.4 ft²
Wetted Perimeter	1.5 ft
Hydraulic Radius	2.8 in
Top Width	1.00 ft
Critical Depth	9.7 in
Percent Full	46.1 %
Critical Slope	0.006 ft/ft
Velocity	10.18 ft/s
Velocity Head	1.61 ft
Specific Energy	2.07 ft
Froude Number	3.015
Maximum Discharge	8.91 cfs
Discharge Full	8.28 cfs
Slope Full	0.006 ft/ft
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	46.1 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.5 in
Critical Depth	9.7 in
Channel Slope	0.032 ft/ft
Critical Slope	0.006 ft/ft

Autodesk® Storm and Sanitary Analysis 2024 - Version 13.6.323 (Build 0)

****
Project Description
****
File Name ..... Pre-drainage.SPF

****
Analysis Options
****
Flow Units ..... cfs
Subbasin Hydrograph Method. Rational
Time of Concentration..... SCS TR-55
Return Period..... 2 years
Storage Node Exfiltration.. None
Starting Date APR-15-2026 00:00:00
Ending Date APR-16-2026 00:00:00
Report Time Step 00:00:10

****
Element Count
****
Number of subbasins 1
Number of nodes 1
Number of links 0

****
Subbasin Summary
****

Subbasin ID	Total Area acres
Sub-01	3.86

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow
Out-01	OUTFALL	3929.00	3929.00	0.00	

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	0.139	0.433
Continuity Error (%)	0.831	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	0.023	0.008
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Sub-01

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Open Space, less than 25 years	3.86	C (2-6%)	0.17
Composite Area & Weighted Runoff Coeff.	3.86		0.17

****
SCS TR-55 Time of Concentration Computations Report
****

Sheet Flow Equation

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where:

Tc = Time of Concentration (hrs)
n = Manning's Roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)

V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's Roughness

Subbasin Sub-01

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.15	0.00	0.00
Flow Length (ft):	300.00	0.00	0.00
Slope (%):	5.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.70	1.70	1.70
Velocity (ft/sec):	0.22	0.00	0.00
Computed Flow Time (minutes):	22.44	0.00	0.00
Total TOC (minutes):	22.44		

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip in	Rainfall Intensity in/hr	Total Runoff in	Peak Runoff cfs	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Sub-01	0.43	1.15	0.07	0.76	0.170	0	00:22:26

Analysis began on: Tue May 26 16:33:48 2026
Analysis ended on: Tue May 26 16:33:51 2026
Total elapsed time: 00:00:03

Autodesk® Storm and Sanitary Analysis 2024 - Version 13.6.323 (Build 0)

****
Project Description
****
File Name ..... Pre-drainage.SPF

****
Analysis Options
****
Flow Units ..... cfs
Subbasin Hydrograph Method. Rational
Time of Concentration..... SCS TR-55
Return Period..... 10 years
Storage Node Exfiltration.. None
Starting Date APR-15-2026 00:00:00
Ending Date APR-16-2026 00:00:00
Report Time Step 00:00:10

****
Element Count
****
Number of subbasins 1
Number of nodes 1
Number of links 0

****
Subbasin Summary
****

Subbasin ID	Total Area acres
Sub-01	3.86

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow
Out-01	OUTFALL	3929.00	3929.00	0.00	

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	0.214	0.664
Continuity Error (%)	0.831	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	0.036	0.012
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Sub-01

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Open Space, less than 25 years	3.86	C (2-6%)	0.17

```
        V  = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
        V  = 9.0 * (Sf^0.5) (cultivated straight rows surface)
        V  = 7.0 * (Sf^0.5) (short grass pasture surface)
        V  = 5.0 * (Sf^0.5) (woodland surface)
        V  = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
        Tc = (Lf / V) / (3600 sec/hr)

        Where:

        Tc = Time of Concentration (hrs)
        Lf = Flow Length (ft)
        V  = Velocity (ft/sec)
        Sf = Slope (ft/ft)

Channel Flow Equation
---------------------

        V  = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
        R  = Aq / Wp
        Tc = (Lf / V) / (3600 sec/hr)

        Where:

        Tc = Time of Concentration (hrs)
        Lf = Flow Length (ft)
        R  = Hydraulic Radius (ft)
        Aq = Flow Area (ft²)
        Wp = Wetted Perimeter (ft)
        V  = Velocity (ft/sec)
        Sf = Slope (ft/ft)
        n  = Manning's Roughness

------------------
Subbasin Sub-01
------------------

Sheet Flow Computations
-----------------------
                                          Subarea A           Subarea B           Subarea C
        Manning's Roughness:                   0.15                0.00                0.00
        Flow Length (ft):                    300.00                0.00                0.00
        Slope (%):                             5.00                0.00                0.00
        2 yr, 24 hr Rainfall (in):             1.70                1.70                1.70
        Velocity (ft/sec):                     0.22                0.00                0.00
        Computed Flow Time (minutes):         22.44                0.00                0.00
=============================================================================================
        Total TOC (minutes):                  22.44
=============================================================================================


**********************
Subbasin Runoff Summary
**********************

-------------------------------------------------------------------------------------
Subbasin       Accumulated     Rainfall     Total      Peak  Weighted           Time of
ID                  Precip    Intensity    Runoff    Runoff    Runoff     Concentration
                        in        in/hr        in       cfs     Coeff    days  hh:mm:ss
-------------------------------------------------------------------------------------
Sub-01                0.66         1.77      0.11      1.16     0.170       0  00:22:26
-------------------------------------------------------------------------------------


Analysis began on:  Tue May 26 14:13:13 2026
Analysis ended on:  Tue May 26 14:13:16 2026
Total elapsed time: 00:00:03
```

Autodesk® Storm and Sanitary Analysis 2024 - Version 13.6.323 (Build 0)

****
Project Description
****
File Name ..... Pre-drainage.SPF

****
Analysis Options
****
Flow Units ..... cfs
Subbasin Hydrograph Method. Rational
Time of Concentration..... SCS TR-55
Return Period..... 100 years
Storage Node Exfiltration.. None
Starting Date APR-15-2026 00:00:00
Ending Date APR-16-2026 00:00:00
Report Time Step 00:00:10

****
Element Count
****
Number of subbasins 1
Number of nodes 1
Number of links 0

****
Subbasin Summary
****

Subbasin ID	Total Area acres
Sub-01	3.86

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow
Out-01	OUTFALL	3929.00	3929.00	0.00	

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	0.322	1.002
Continuity Error (%)	0.831	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	0.054	0.018
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Sub-01

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Open Space, less than 25 years	3.86	C (2-6%)	0.17

V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's Roughness

Subbasin Sub-01

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.15	0.00	0.00
Flow Length (ft):	300.00	0.00	0.00
Slope (%):	5.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.70	1.70	1.70
Velocity (ft/sec):	0.22	0.00	0.00
Computed Flow Time (minutes):	22.44	0.00	0.00
Total TOC (minutes):	22.44		

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip in	Rainfall Intensity in/hr	Total Runoff in	Peak Runoff cfs	Weighted Runoff Coeff	Time of Concentration days	hh:mm:ss
Sub-01	1.00	2.67	0.17	1.75	0.170	0	00:22:26

Analysis began on: Tue May 26 14:14:36 2026
Analysis ended on: Tue May 26 14:14:39 2026
Total elapsed time: 00:00:03

Autodesk® Storm and Sanitary Analysis 2024 - Version 13.6.323 (Build 0)

****
Project Description
****
File Name ..... Post Drainage.SPF

****
Analysis Options
****
Flow Units ..... cfs
Subbasin Hydrograph Method. Rational
Time of Concentration..... SCS TR-55
Return Period..... 2 years
Link Routing Method ..... Kinematic Wave
Storage Node Exfiltration.. None
Starting Date APR-15-2026 00:00:00
Ending Date APR-16-2026 00:00:00
Report Time Step 00:00:10

****
Element Count
****
Number of subbasins 1
Number of nodes 2
Number of links 1

****
Subbasin Summary
****

Subbasin ID	Total Area acres
Sub-01	3.86

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow
Out-01	OUTFALL	3929.00	3929.50	0.00	
Stor-01	STORAGE	3929.40	3933.00	0.00	

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
Orifice-03	Stor-01	Out-01	ORIFICE			

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	0.124	0.385
Continuity Error (%)	0.286	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	0.088	0.029
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Sub-01

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Commercial, less than 25 years	3.86	C (2-6%)	0.72
Composite Area & Weighted Runoff Coeff.	3.86		0.72

****
SCS TR-55 Time of Concentration Computations Report
****

Sheet Flow Equation

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where:

Tc = Time of Concentration (hrs)
n = Manning's Roughness

Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's Roughness

Subbasin Sub-01

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.10	0.00	0.00
Flow Length (ft):	300.00	0.00	0.00
Slope (%):	4.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.70	1.70	1.70
Velocity (ft/sec):	0.28	0.00	0.00
Computed Flow Time (minutes):	17.74	0.00	0.00
Total TOC (minutes):	17.74		

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip in	Rainfall Intensity in/hr	Total Runoff in	Peak Runoff cfs	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Sub-01	0.39	1.31	0.28	3.64	0.720	0	00:17:44

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Flooded Time minutes	Retention Time hh:mm:ss
Out-01	0.00	0.00	3929.00	0	00:00	0	0	0:00:00
Stor-01	0.06	1.92	3931.32	0	00:29	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
Out-01	OUTFALL	0.00	1.25	0	00:29	0.00		
Stor-01	STORAGE	3.64	3.64	0	00:17	0.00		

****
Storage Node Summary
****

Storage Node ID	Maximum Ponded Volume 1000 ft³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days hh:mm	Average Ponded Volume 1000 ft³	Average Ponded Volume (%)	Maximum Storage Node Outflow cfs	Maximum Exfiltration Rate cfm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 ft³
Stor-01	2.150	33	0 00:29	0.050	1	1.25	0.00	0:00:00	0.000

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
Out-01	5.78	0.77	1.25
System	5.78	0.77	1.25

****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
Orifice-03	ORIFICE	0 00:29			1.25			0.00		

****
Highest Flow Instability Indexes
****
All links are stable.

WARNING 118 : Orifice crest elevation defined for Orifice Orifice-03 is below upstream node invert elevation.
Assumed orifice crest elevation equal to upstream node invert elevation.

Analysis began on: Tue May 26 16:35:48 2026
Analysis ended on: Tue May 26 16:35:51 2026
Total elapsed time: 00:00:03

Autodesk® Storm and Sanitary Analysis 2024 - Version 13.6.323 (Build 0)

****
Project Description
****
File Name ..... Post Drainage.SPF

****
Analysis Options
****
Flow Units ..... cfs
Subbasin Hydrograph Method. Rational
Time of Concentration..... SCS TR-55
Return Period..... 10 years
Link Routing Method ..... Kinematic Wave
Storage Node Exfiltration.. None
Starting Date APR-15-2026 00:00:00
Ending Date APR-16-2026 00:00:00
Report Time Step 00:00:10

****
Element Count
****
Number of subbasins 1
Number of nodes 2
Number of links 1

****
Subbasin Summary
****

Subbasin ID	Total Area acres
Sub-01	3.86

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow
Out-01	OUTFALL	3929.00	3929.50	0.00	
Stor-01	STORAGE	3929.40	3933.00	0.00	

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
Orifice-03	Stor-01	Out-01	ORIFICE			

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	0.190	0.590
Continuity Error (%)	0.286	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	0.136	0.044
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Sub-01

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Commercial, less than 25 years	3.86	C (2-6%)	0.72
Composite Area & Weighted Runoff Coeff.	3.86		0.72

****
SCS TR-55 Time of Concentration Computations Report
****

Sheet Flow Equation

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where:

Tc = Time of Concentration (hrs)
n = Manning's Roughness

Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's Roughness

Subbasin Sub-01

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.10	0.00	0.00
Flow Length (ft):	300.00	0.00	0.00
Slope (%):	4.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.70	1.70	1.70
Velocity (ft/sec):	0.28	0.00	0.00
Computed Flow Time (minutes):	17.74	0.00	0.00
Total TOC (minutes):	17.74		

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip in	Rainfall Intensity in/hr	Total Runoff in	Peak Runoff cfs	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Sub-01	0.59	2.00	0.43	5.57	0.720	0	00:17:44

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Flooded Time minutes	Retention Time hh:mm:ss
Out-01	0.00	0.00	3929.00	0	00:00	0	0	0:00:00
Stor-01	0.10	2.63	3932.03	0	00:30	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
Out-01	OUTFALL	0.00	1.49	0	00:30	0.00		
Stor-01	STORAGE	5.57	5.57	0	00:17	0.00		

****
Storage Node Summary
****

Storage Node ID	Maximum Ponded Volume 1000 ft³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days hh:mm	Average Ponded Volume 1000 ft³	Average Ponded Volume (%)	Maximum Storage Node Outflow cfs	Maximum Exfiltration Rate cfm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 ft³
Stor-01	3.816	59	0 00:30	0.111	2	1.49	0.00	0:00:00	0.000

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
Out-01	7.23	0.95	1.49
System	7.23	0.95	1.49

****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
Orifice-03	ORIFICE	0 00:30			1.49			0.00		

****
Highest Flow Instability Indexes
****
All links are stable.

WARNING 118 : Orifice crest elevation defined for Orifice Orifice-03 is below upstream node invert elevation.
Assumed orifice crest elevation equal to upstream node invert elevation.

Analysis began on: Tue May 26 16:36:30 2026
Analysis ended on: Tue May 26 16:36:34 2026
Total elapsed time: 00:00:04

Autodesk® Storm and Sanitary Analysis 2024 - Version 13.6.323 (Build 0)

****
Project Description
****
File Name ..... Post Drainage.SPF

****
Analysis Options
****
Flow Units ..... cfs
Subbasin Hydrograph Method. Rational
Time of Concentration..... SCS TR-55
Return Period..... 100 years
Link Routing Method ..... Kinematic Wave
Storage Node Exfiltration.. None
Starting Date APR-15-2026 00:00:00
Ending Date APR-16-2026 00:00:00
Report Time Step 00:00:10

****
Element Count
****
Number of subbasins 1
Number of nodes 2
Number of links 1

****
Subbasin Summary
****

Subbasin ID	Total Area acres
Sub-01	3.86

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow
Out-01	OUTFALL	3929.00	3929.50	0.00	
Stor-01	STORAGE	3929.40	3933.00	0.00	

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
Orifice-03	Stor-01	Out-01	ORIFICE			

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	0.287	0.891
Continuity Error (%)	0.286	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	0.205	0.067
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Sub-01

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
Commercial, less than 25 years	3.86	C (2-6%)	0.72
Composite Area & Weighted Runoff Coeff.	3.86		0.72

****
SCS TR-55 Time of Concentration Computations Report
****

Sheet Flow Equation

$$Tc = (0.007 * ((n * Lf)^{0.8})) / ((P^{0.5}) * (Sf^{0.4}))$$

Where:

Tc = Time of Concentration (hrs)
n = Manning's Roughness

Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hrs)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft²)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's Roughness

Subbasin Sub-01

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.10	0.00	0.00
Flow Length (ft):	300.00	0.00	0.00
Slope (%):	4.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.70	1.70	1.70
Velocity (ft/sec):	0.28	0.00	0.00
Computed Flow Time (minutes):	17.74	0.00	0.00
Total TOC (minutes):	17.74		

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip in	Rainfall Intensity in/hr	Total Runoff in	Peak Runoff cfs	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Sub-01	0.89	3.03	0.64	8.41	0.720	0	00:17:44

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Flooded Time minutes	Retention Time hh:mm:ss
Out-01	0.00	0.00	3929.00	0	00:00	0	0	0:00:00
Stor-01	0.29	3.58	3932.98	0	00:31	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
Out-01	OUTFALL	0.00	1.77	0	00:31	0.00		
Stor-01	STORAGE	8.41	8.41	0	00:17	0.00		

****
Storage Node Summary
****

Storage Node ID	Maximum Ponded Volume 1000 ft³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days hh:mm	Average Ponded Volume 1000 ft³	Average Ponded Volume (%)	Maximum Storage Node Outflow cfs	Maximum Exfiltration Rate cfm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 ft³
Stor-01	6.408	99	0 00:31	0.390	6	1.77	0.00	0:00:00	0.000

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
Out-01	15.08	1.13	1.77
System	15.08	1.13	1.77

****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
Orifice-03	ORIFICE	0 00:31			1.77			0.00		

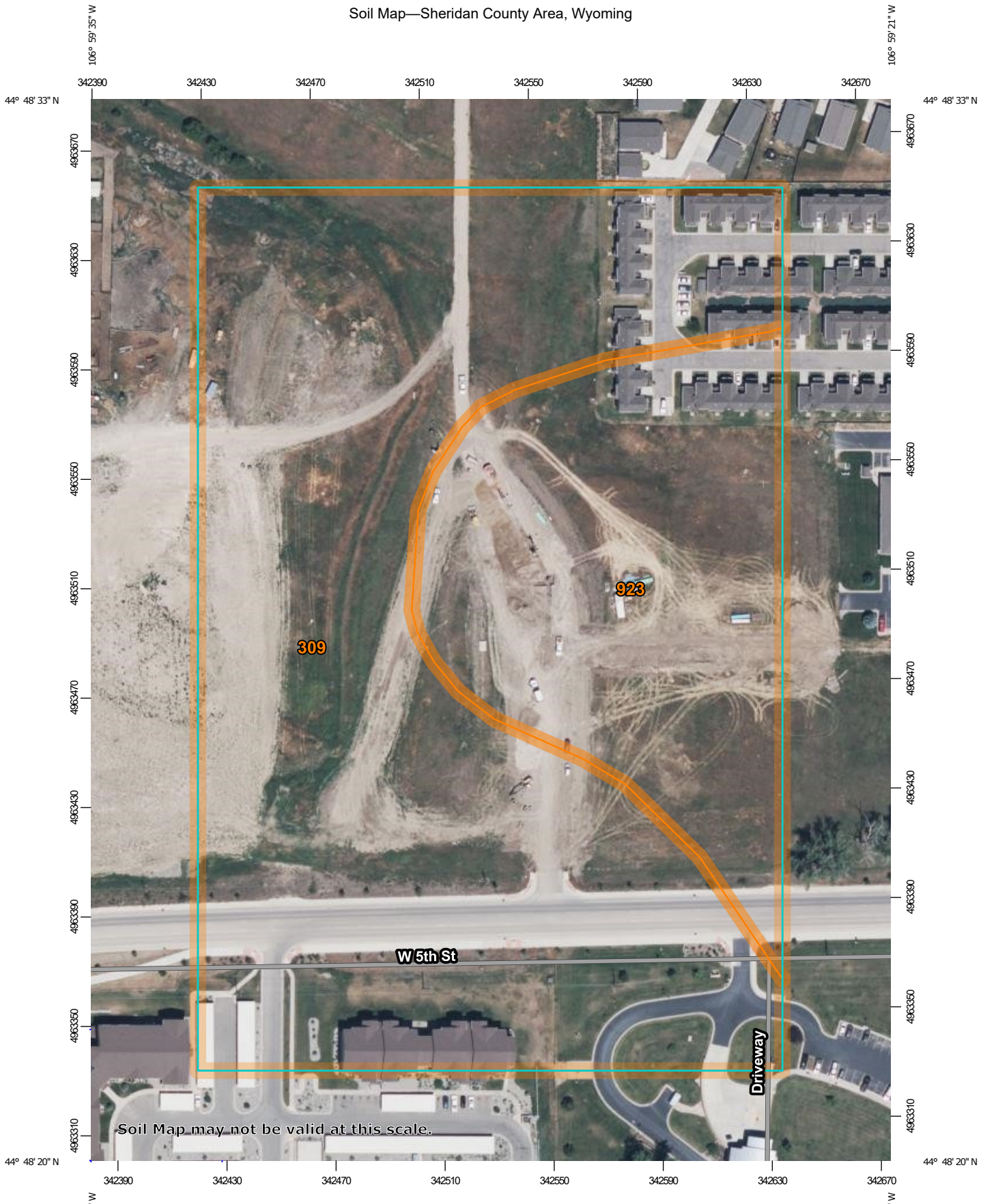
****
Highest Flow Instability Indexes
****
All links are stable.

WARNING 118 : Orifice crest elevation defined for Orifice Orifice-03 is below upstream node invert elevation.
Assumed orifice crest elevation equal to upstream node invert elevation.

Analysis began on: Tue May 26 16:37:14 2026
Analysis ended on: Tue May 26 16:37:16 2026
Total elapsed time: 00:00:02

Appendix C

Hydrologic Soil Group Information



Map Scale: 1:1,890 if printed on A portrait (8.5" x 11") sheet.

N

0 25 50 100 150 Meters

0 50 100 200 300 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sheridan County Area, Wyoming
Survey Area Data: Version 26, Sep 4, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 22, 2021—Jun 30, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
309	Wyarno clay loam, 0 to 3 percent slopes	12.2	70.8%
923	Recluse loam, 0 to 3 percent slopes	5.0	29.2%
Totals for Area of Interest		**17.2**	**100.0%**

Sheridan County Area, Wyoming

309—Wyarno clay loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1t4p1
Landscape: Sedimentary plains
Elevation: 3,500 to 4,500 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 105 to 130 days
Farmland classification: Farmland of statewide importance, if irrigated

Map Unit Composition

Wyarno and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wyarno

Setting

Landscape: Sedimentary plains
Landform: Alluvial fans, Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from shale

Typical profile

A - 0 to 5 inches: clay loam
Bt - 5 to 12 inches: silty clay loam
Bk - 12 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R058BY104WY - Clayey (Cy) 10-14" PZ
Hydric soil rating: No

Minor Components

Kishona

Percent of map unit: 15 percent
Landscape: Sedimentary plains
Landform: Fan remnants, Alluvial fans
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R058BY122WY - Loamy (Ly) 10-14" PZ
Hydric soil rating: No

Data Source Information

Soil Survey Area: Sheridan County Area, Wyoming
Survey Area Data: Version 26, Sep 4, 2025

Sheridan County Area, Wyoming

923—Recluse loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1hjvb
Landscape: Sedimentary plains
Elevation: 3,500 to 4,500 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 105 to 130 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Recluse and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Recluse

Setting

Landscape: Sedimentary plains
Landform: Alluvial fans, Hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits derived from sandstone and shale

Typical profile

A - 0 to 9 inches: loam
Bt - 9 to 19 inches: clay loam
Bk - 19 to 60 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R043BY422WY - Loamy (Ly) 15-19" Northern Plains Precipitation Zone
Hydric soil rating: No

Minor Components

Moskee

Percent of map unit: 8 percent
Landscape: Sedimentary plains
Landform: Fan remnants, Alluvial fans
Landform position (two-dimensional): Footslope, toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R043BY450WY - Sandy (Sy) 15-19" Northern Plains Precipitation Zone
Hydric soil rating: No

Nuncho

Percent of map unit: 8 percent
Landscape: Sedimentary plains
Landform: Fan remnants, Alluvial fans
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R043BY404WY - Clayey (Cy) 15-19" Northern Plains Precipitation Zone
Hydric soil rating: No

Wetterdon

Percent of map unit: 7 percent
Landscape: Sedimentary plains
Landform: Alluvial fans, Hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R043BY422WY - Loamy (Ly) 15-19" Northern Plains Precipitation Zone
Hydric soil rating: No

Wolf

Percent of map unit: 7 percent
Landscape: Sedimentary plains
Landform: Alluvial fans, Fan remnants
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R043BY422WY - Loamy (Ly) 15-19" Northern Plains Precipitation Zone

Hydric soil rating: No

Data Source Information

Soil Survey Area: Sheridan County Area, Wyoming
Survey Area Data: Version 26, Sep 4, 2025

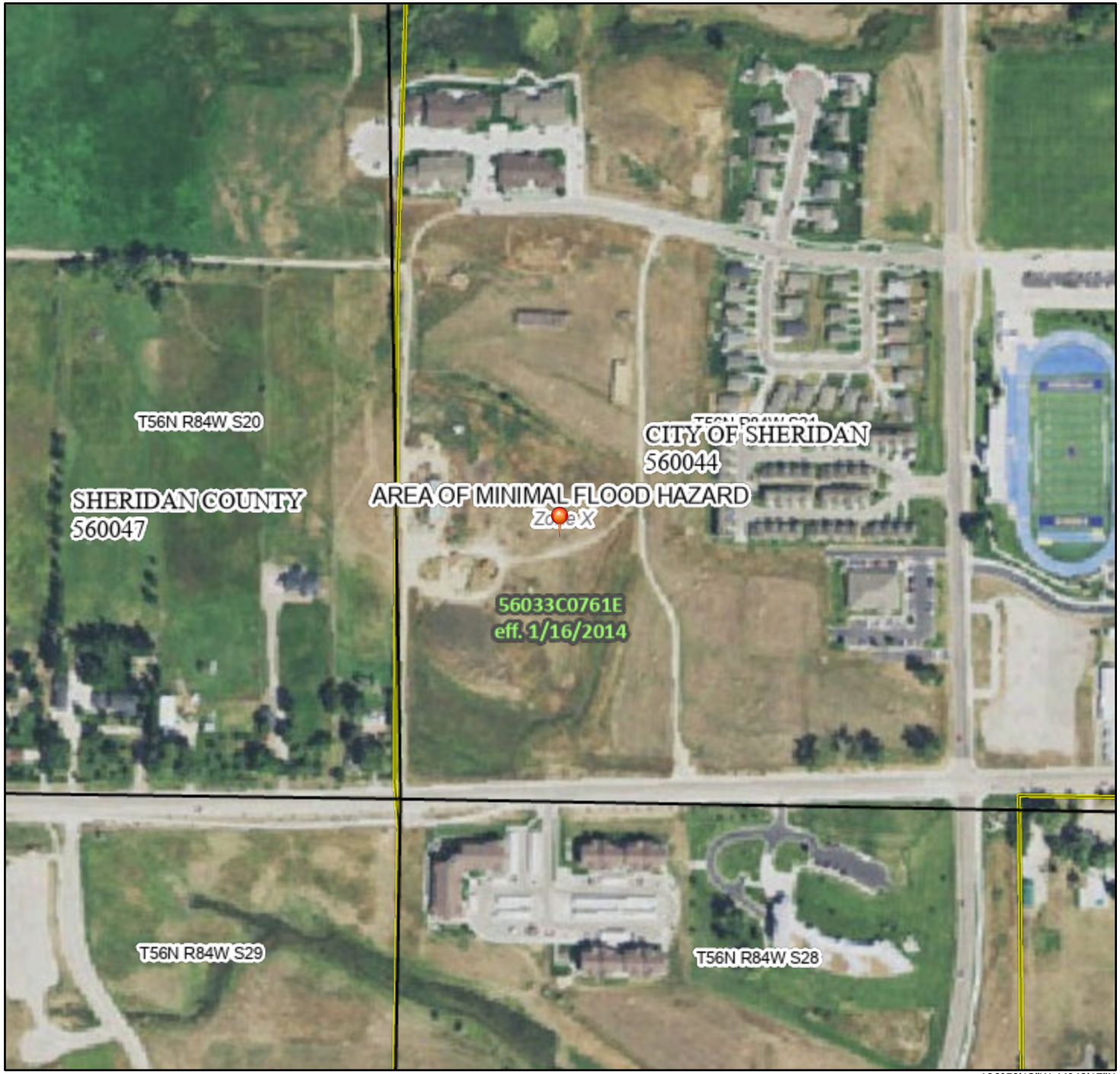
Appendix D

Floodplain Map

National Flood Hazard Layer FIRMette

FEMA

106°59'51"W 44°48'42"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

106°59'13"W 44°48'17"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/26/2026 at 8:52 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Cloud Peak 15 Rezone



PUD

DISCLAIMER:
The City of Sheridan GIS Division produced this map for informational purposes only. The City of Sheridan provides this map on an "as is" basis without warranties of any kind, either expressed or implied, and shall not be liable for any direct, indirect, incidental, special or consequential damages arising out of the use of such map. The user acknowledges and agrees that the use of such data is at the sole risk of the user. General questions about this map including errors, omissions, and/or updates should be directed to the City of Sheridan GIS Division.

CITY OF Sheridan WYOMING

N

Miles 0 0.45 0.9

Date: 6/17/2026 9:04 AM User: sgoodman

CITY OF SHERIDAN, WYOMING
55 Grinnell Plaza, Sheridan, Wyoming 82801
Ph (307) 674-6483

Public Works

MEMORANDUM

RE: Discussion of Bid Award to Astech Corp for the 2026 City of Sheridan Micro-Surface Project in the Amount of $313,411.44 - Project Manager David Ford

From: David Ford, Project Engineer

To: City Council

Date: 07/13/2026

Recommendation:

Staff recommends that the Mayor and City Council award the 2026 City of Sheridan Micro-Surface Project to Astech Corp, the lowest qualified bid, in the amount of $313,411.44.

Staff requests that for the 2026 City of Sheridan Micro-Surface Project, the Mayor and City Council authorize the Public Works Director, Hanns Mercer, to act on behalf of the Council and Mayor on all matters related to this project.

Background:

The project base bid includes micro-surfacing approximately 61,924 SQYDs of City of Sheridan streets in the area south of 11th Street between Highland Ave. and Ridgeway Ave. APWA Micro-Surface Seal Section 32 01 13.69 spec Type 2 rock will be required for this project.

This project was advertised on June 17th and 27th with pre-bid conference on June 24, and a bid opening on June 30. The City received two bids.

Bids Received:

- **Astech Corp** **$313,411,44**
- Intermountain Slurry Seal $388,061.80

Engineer's Estimate ***$327,696.00***

Funding:

This project is funded by CAP Tax and GPET.

Attachments

Map



CITY OF Sheridan WYOMING

2026 Micro-Surface Project

OPTIONAL SALES TAX one cent GENERAL PURPOSE EXCISE TAX

- Project Area

CITY OF SHERIDAN, WYOMING
55 Grinnell Plaza, Sheridan, Wyoming 82801
Ph (307) 674-6483

Public Works

MEMORANDUM

RE: Discussion of the Purchase of One (1) Asphalt Recycling Trailer from Kois Brothers Equipment Company Inc. for the Amount of $95,651.00 - Fleet & Administrative Coordinator Heather Czaplinski

From: Heather Czaplinski, PW Administrative Coordinator

To: City Council

Date: 07/13/2026

Recommendation:

Staff recommends that the Mayor and City Council approve the purchase of one (1) STEPP MFG Asphalt Recycling Trailer from Kois Brothers Equipment Company Inc. for the amount of $95,651.00 for the Street Department.

Staff recommends that, for the purchase of the asphalt recycling trailer, the Mayor and City Council authorize the Fleet Coordinator, Heather Czaplinski, to act on behalf of the Council and Mayor on all matters related to the procurement process.

Background:

The purchase of the asphalt recycling trailer was approved in the current FY27 budget for the Street Department. A request for quotes, utilizing the Sourcewell Cooperative Purchasing process, was initiated by the Street Maintenance Supervisor.

The following 3 quotes were obtained:

- Kois Brothers Equipment Company Inc. $95,651.00 (includes freight)
- Asphalt Sealcoating Direct $96,500.00 (+freight)
- K M International $108,980.00 (includes freight)

Discussion:

The asphalt recycling trailer will be a valuable addition to the City's fleet and street maintenance operations. The equipment will allow crews to recycle leftover asphalt into usable material directly on site, eliminating the need to fire up the asphalt plant for small batches used in pothole repairs and utility cuts, even during the colder months when the plant is shut down. This will result in significant time and cost savings related to asphalt production. In addition, the trailer will use reclaimed asphalt generated from projects such as rotomill and overlay, converting the material into a quality asphalt mix suitable for those smaller maintenance projects. The trailer-mounted design provides versatility and mobility, allowing crews to deploy the equipment quickly and efficiently wherever it is needed. Crews have had the opportunity to demo this equipment before, making familiarity and ease of use beneficial.

Currently, the City's hotbox equipment is limited to reheating new asphalt for temporary cold mix applications or maintaining the temperature of fresh asphalt. Crews must still produce small asphalt batches separately for minor repair work. The asphalt recycling trailer will improve this process by providing a more efficient and sustainable solution for small-scale asphalt production. Overall, the addition of the asphalt recycling trailer will reduce wear

and tear on the asphalt plant, improve operational efficiency, and enhance the City's ability to perform timely and effective street repairs.

Funding:

The Service Center Capital Outlay-Equipment/Machinery/Vehicles Budget for the Street Department Division (12731-7600-0190D) is the fund covering the purchase.