800 W. 8th Street
Pueblo, Colorado 81003
(719) 582-5588
www.jesik.us

GEOTECHNICAL ENGINEERING & SITE INVESTIGATION REPORT

FOR

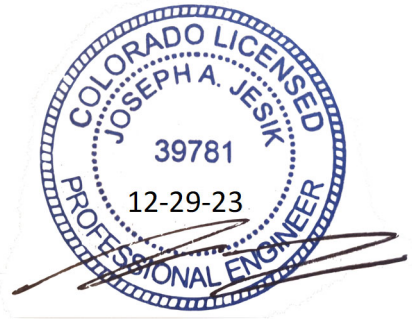
Lucy Street
Grand Lake, Colorado

PREPARED FOR:

Town of Grand Lake
PO Box 99
1026 Park Avenue
Grand Lake, Colorado 80447

PREPARED BY

Jesik Consulting
Project Number: 23-9538



Joseph A. Jesik, P.E.

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1. INTRODUCTION

Jesik Consulting has completed a site investigation and pavement design for Lucy Street at the request of Ms. Kimberly White with the Town of Grand Lake, Colorado. Site investigation results, concrete, subgrade preparation, and structural pavement recommendations are included in the report.

A new 2-lane road is being designed in a north/south direction to start at the northern end of County Road 471 and curve east to intersect Foxy Lane. The road will be named Lucy Street. Four commercial lots will eventually be developed in addition to the Town's Public Works Maintenance facility. Heavy equipment and trucks related to the maintenance facility are anticipated to use the road in addition to local traffic. Traffic loading for the road is estimated as a local road with a low volume of heavy equipment and trucks.

Alternate pavement sections presented in this report include gravel and asphalt road sections. There will be no curb and gutter and drainage ditches will be constructed parallel and at the edges of the road. Water and sewer pipelines will be constructed within the roadway. The existing soils and rock will be cut, and fills may be as deep as 15-feet.

2. GENERAL

Three (3) bores were drilled to a depth of approximately 3 to 20-feet below the existing ground surface. Bores shallower than 20-feet encountered auger refusal on igneous rock. Boring locations are shown in Appendix A.

Surficial soils consist of non-plastic, medium dense to dense, fine to coarse, silty sand. The sand was underlain by highly to moderately weathered rock. Excavation into the rock will likely require heavy excavation equipment, hydraulic hammers or drill and blast construction methods. Boring logs and laboratory test data are presented in Appendix C.

Cut slopes into the onsite soils should have a final slope of 3:1. Cuts into the highly to moderately weathered igneous rock should have a maximum finished slope of 1½:1.

3. ROAD FILL RECOMMENDATIONS

ON SITE silty SAND soils and excavated rock May be used as road fill. Fill material may also be purchased from a supplier that certifies that the material meets Class 1 Structural Fill Material or Class 6 Road Base guidelines. "Crusher Fines" are not acceptable for use as a structural fill. fill should have a maximum liquid limit (LL) of 35 and maximum plasticity index (PI) of 6. Swell should be less than 1% when wetted with a 500 pound per square foot (psf) surcharge pressure.

Fill material may be sourced from a non-certifying supplier or an alternate location; however, it must be approved by this firm prior to placement.

Testing of the fill must be performed as stated above, AND compaction testing must be performed during placement, for each lift of fill (maximum 8-inch lifts prior to compaction). If any sample of fill material does not pass compaction requirements, the entire lift must be scarified; moisture conditioned, re-compacted and evaluated for conformance. If any sample of fill does not pass tests for constituency, the failing material must be removed in its entirety.

Fill material must be properly placed. This will include the determination of its maximum dry density and optimum moisture content, with a modified proctor test (ASTM D1557) as well as its moisture and density after being placed. On-Site Fill should be compacted to a minimum of 95% of the maximum dry density, and from -2% to +2% of the optimum moisture content. The contractor may need to add water to the fill to achieve proper compaction. Water should be added at the borrow area to achieve uniform moisture conditions in the fill material if possible.

4. EXCAVATIONS

We believe the surficial materials found in our bores can be excavated using conventional excavation equipment. Excavations should be sloped or shored to meet local, state, and federal safety regulations. Based on our investigation and Occupational Safety and Health Administration (OSHA) standards, we believe the fill and natural soils classify as Type C. Type C soil requires temporary excavation side slopes no steeper than 1 ½:1, in dry conditions. Excavation slopes specified by OSHA are dependent upon soil types and ground water conditions encountered. The contractor's "competent person" should identify the soils encountered in the excavation and refer to OSHA standards to determine appropriate slopes. Stockpiles of soils and equipment should not be placed within a horizontal distance equal to one-half the excavation depth, from the edge of excavation. A professional engineer should design excavations deeper than 20 feet.

Water and sewer lines are often constructed beneath pavements. Compaction of trench backfill can have a significant effect on the life and serviceability of pavements. We recommend trench backfill be moisture conditioned and compacted to 95% of the maximum dry density (MDD) and within 2% of the optimum moisture content (OMC) as determined by the modified proctor test (ASTM D1557). Placement and compaction testing of trench backfill should be observed and evaluated by a trained soils technician.

5. FIELD AND LABORATORY ANALYSIS

Three bores were drilled in the project area at the approximate location shown on the Site Map in Appendix A using a truck-mounted solid stem auger. Borings were

stopped at depths ranging from 3 to 20 feet below the exiting ground. Bore lengths of less than 20-feet encountered rock and the auger could not be advanced.

Soil and rock are visually logged during drilling by our personnel. Logs include soil and rock classification, density/consistency or hardness, weathering, moisture conditions, color, and other observations that may impact the design or construction. Changes in soil/rock types and properties are noted along with groundwater conditions encountered during drilling.

The driller collects soil samples from different depths to determine subsurface conditions and properties. A 2-inch O.D. brass liner is placed inside of a split-barrel sampler to retrieve the samples. The sample barrel is driven into the ground by a 140-pound hammer free falling 30 inches. Drill cuttings and bulk samples may also be collected where liner samples are not retrieved. Samples are taken to our laboratory for testing and analysis.

Laboratory testing may consist of moisture content, dry density, swell/ consolidation potential, water soluble sulfate, and particle size distribution.

Our project engineer then reviews field logs and laboratory test results. Subsurface conditions presented in the report are based upon drilling, observations, laboratory testing, and our experience in the area.

6. CONCRETE

Concrete exposed to injurious concentrations of sulfates from soil and water should be made with sulfate-resisting cement. The soils on this site are deemed to have a sulfate severity of Moderate and corresponding exposure class of S1. Concrete exposed to this type of soil should therefore incorporate sulfate resistant cementitious material. Furthermore, the concrete should have a maximum water-to-cement ratio of 0.45, a minimum compressive strength of 4000 psi and be entrained with air.

7. SITE PREPARATION

Site preparation should be performed such that standing and ponding of water around the site is minimized. Clay soils should be kept from desiccating (drying and shrinking) by sprinkling the soils. Drainage swales or channels should be created where necessary to route water away from the excavation and construction area.

Vegetation and organic material should be removed in areas to receive fill and they should be scarified to a depth of at least 12 inches, moisture conditioned to within 2 percent of optimum moisture content (OMC) and compacted to at least 95 percent of Modified Proctor maximum dry density (MDD) (ASTM D 1557).

The existing on-site soils are suitable for reuse as fill material provided vegetation; debris and other deleterious materials are substantially removed. If import material is required, we recommend importing granular non-expansive soil. Import fill should contain 100 percent passing the 2- inch sieve with less than 30 percent silt and clay-sized particles and have a liquid limit less than 25 percent and a plasticity index less than 10 percent. A sample of import material should be submitted for approval prior to stockpiling at the site.

The properties of the fill will affect the performance of the pavements. The fill should be moisture conditioned, placed in thin loose lifts (12 inches or less), and compacted to at least 95 percent of modified proctor (ASTM D1557) dry density. The granular fill should be moistened to within 2 percent of optimum moisture content. Placement and compaction of fill should be observed and tested by a qualified testing agency.

8. PAVEMENT

The design basis presented in this document is based upon the 1993 American Association of State Highway and Transportation Officials (AASHTO) Design Guide and the Colorado Asphalt Pavement Association (CAPA) Design Guides.

Subgrade Soils

The existing subgrade materials classify as A-1 soils according to the AASHTO classification system. We have assumed that the onsite silty SAND will be used for the pavement section subgrade. For design purposes, an "R" value of 24 was determined in laboratory testing to represent the subgrade strength for pavement sections.

A subgrade resilient modulus of 5,629 pounds per square inch per inch (lb./in^2) was calculated using the following formula:

$$Mr = 10^{\frac{S1+18.72}{6.24}}$$

$$S1 = \left(\frac{R-5}{11.29}\right) + 3$$

A modulus of subgrade reaction (k) of 290 lb./in^2/in was calculated from the resilient modulus with the following formula:

$$k = \frac{Mr}{19.4}$$

Traffic Estimates

We have estimated ESALs (Equivalent 18-kip Single Axle Load) of 97,000 (10 EDLA) for pavement with a 20-year design life.

8.1 Asphalt Section Design

The following parameters were used for the asphalt pavement section design.

Table 14.1.1 – Asphalt Section Design Values

Design Parameter	*Value*
Design Period	20 Years
Reliability	85%
Combined Standard Error (S_0)	0.45
Initial Serviceability Index (p_i)	4.5
Terminal Serviceability Index (p_t)	2.0
Serviceability Loss (ΔPSI)	2.5
Asphalt Strength Coefficient	0.44
Asphalt Drainage Coefficient	1.0
Aggregate Strength Coefficient	0.12
Aggregate Drainage Coefficient	1.0
Aggregate Resilient Modulus (M_r)	28,000 (lb/in^2)
Subgrade Resilient Modulus (M_r)	5,629 (lb/in^2)
Modulus of Subgrade Reaction (*k*)	290 ($lb/in^2/in$)

8.2 Recommended Asphalt Pavement Sections

Pavement sections were calculated using PaveExpress Software which is based on AASHTO 1993/1998 methodologies. The required minimum pavement thickness is shown in the table below. A composite pavement section is preferred over a full depth asphalt section.

Table 8.2.1 – Minimum Pavement Thickness (Inches)

Classification	*HMA+ABC*	*HMA*	*Gravel Base Course*
Local Road w/ Trucks & Equipment	4” + 6.5”	6”	10”

Abbreviations: HMA = Hot Mix Asphalt
ABC = Aggregate Base Course (CDOT Class 6 or approved equal)
NR = Not Recommended

8.3 Pavement Construction Recommendations

Asphalt should consist of a mixture of aggregate, filler, and asphalt cement determined by a qualified engineer.

8.3.1 Subgrade Preparation

After clearing and grubbing and rough grading, the exposed subgrade should be scarified to a depth of twelve (12) inches and moisture conditioned to within 3 percent of the optimum moisture content for the onsite sandy clay and compacted to a minimum of 95 percent of the maximum dry density based on the modified proctor test (ASTM D1557).

8.3.2 Proofroll

Before paving, the subgrade should be proof rolled with a heavily loaded pneumatic-tired vehicle. This vehicle should have a gross vehicle weight of at least 50,000 pounds with a loaded single axle weight of 18,000 pounds and a tire pressure of at least 100 psi. Areas that deform excessively under heavy wheel loads are not stable and should be removed and replaced to achieve a stable subgrade prior to paving or placement of subgrade.

8.3.3 Drainage

The collection and diversion of surface water away from paved areas is extremely important for the satisfactory performance of pavement. Drainage design should provide for the removal of water from paved areas and prevent wetting of subgrade soils.

8.3.4 Maintenance

Periodic maintenance of paved areas is critical to achieve the design pavement life. Crack sealing should be performed annually as new cracks appear. Joint seals in concrete should be performed annually as new cracks appear. Joint seals in concrete should be replaced as they deteriorate. Chip seals, fog seals, or slurry seals applied at approximate intervals of 3 to 5 years are usually necessary for asphalt. As conditions warrant, it may be necessary to perform patching and structural overlays at approximate 10-year intervals.

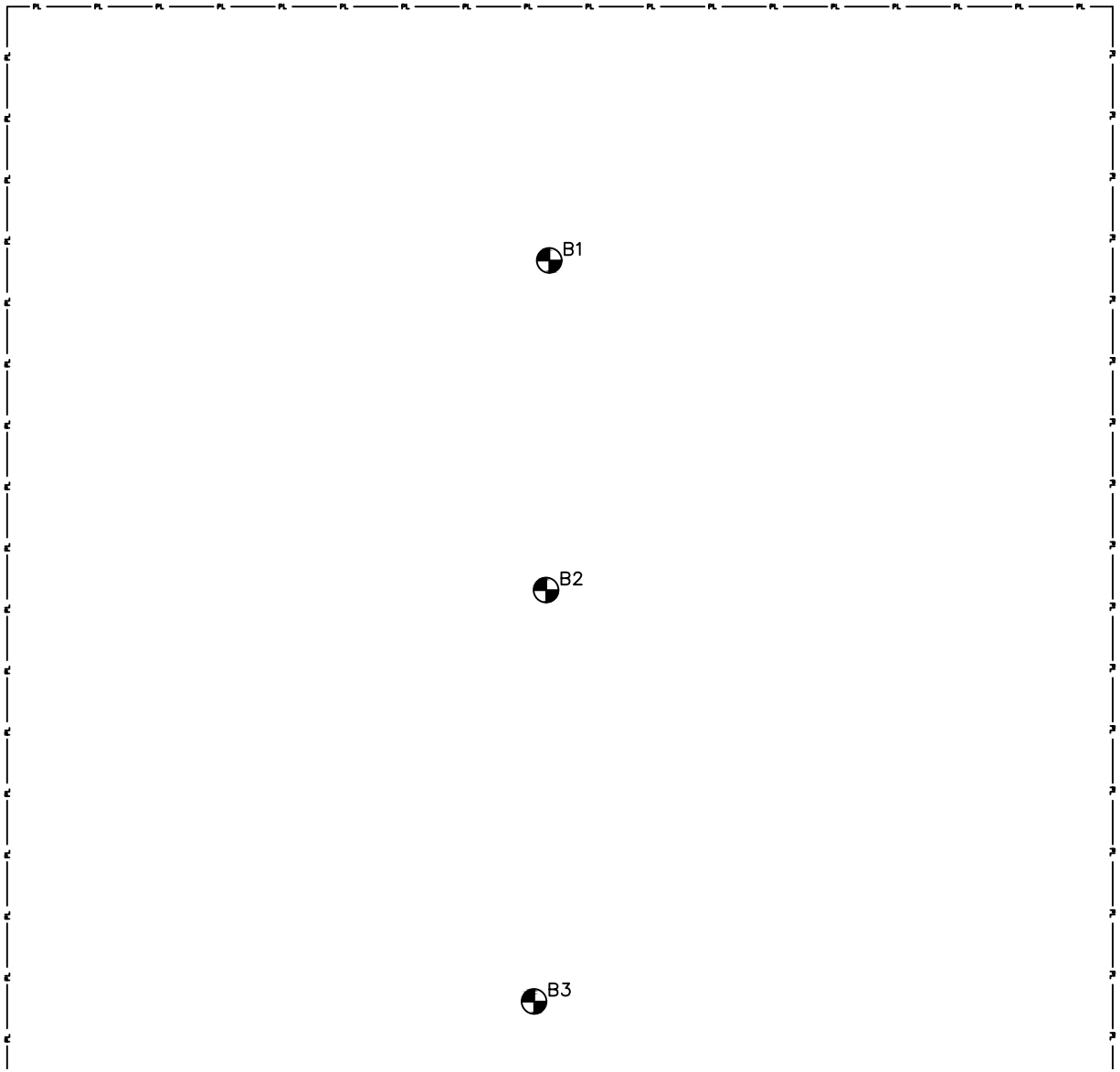
9. LIMITATIONS

In any subsurface investigation, limited data is available from which to formulate soil descriptions and generate recommendations for foundations and related construction components. The samples taken are indicative of the subsurface materials at the time and at the location the samples were taken. Precipitation, seasonal changes, and excavating are just a few factors that may create changes in the subsurface conditions of the site. If conditions are encountered which vary significantly different from those described in this report, contact this office before proceeding.

By acceptance of this report all parties agree that the purpose of this report is to provide geotechnical data and foundation recommendations only and does not address nor was intended to address any environmental issues, hazardous materials, mold issues, toxic waste issues or other subsurface situations or conditions other than those described within this report. This report is intended for the sole use of the above-named client and their approved agents. This office cannot be responsible for any conclusions or recommendations made by other parties based upon the data contained herein.

No warranty, expressed or implied, is made.

APPENDIX A: MAP



GENERAL NOTES

BORINGS DRILLED AUGUST 30, 2023
ALL MEASUREMENTS ARE APPROXIMATE

N

0 20 50 100
1" = 100'

No.	Revision/Issue	Date
JJ	Rev	

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SITE INVESTIGATION PLAN FOR:

WHITE

LUCY ST
GRAND LAKES
GRAND COUNTY, COLORADO

PROJECT NUMBER: 23-9538

DATE: 12/22/2023

SCALE: 1" = 100'

SHEET: SP-1

APPENDIX B: BORING LOGS

Project: **Lucy Street** Project Location: **Grand Lake, CO** Project Number: **23-9538**	**Jesik Consulting** 800 W. 8th Street Pueblo, CO 81003 (719) 582-5588	Log of Boring B1 **Sheet 1 of 1**

Date(s) Drilled **08/30/2023**	Logged By **Caleb Lewis**	Checked By **AJ**
Drilling Method **Solid stem auger**	Drill Bit Size/Type **4" Carbide**	Total Depth of Borehole **20 feet bgs**
Drill Rig Type **Giddings**	Drilling Contractor **Jesik**	Approximate Surface Elevation **----**
Groundwater Level and Date Measured **NE**	Sampling Method(s) **Modified California**	Hammer Data **SPT 140 lbs/30"**
Borehole Backfill **None**	Location **40.25462°, -105.84593**	

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Percent Fines	Uniformity Coefficient	LL, %	PI, %	Swell/Consolidation, %	Comments
0			SM		SAND, some silt, medium dense to dense, moist to dry, brownish yellow to brown								
		6-10								NL	NP		
5		4-12				11.6		21					
		10-20				4.4		24					
10													
		13-30				3.7		20					
15													
		50/11											
20					TDD								
25													
30													

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Figure B-1

Project: **Lucy Street** Project Location: **Grand Lake, CO** Project Number: **23-9538**	**Jesik Consulting** 800 W. 8th Street Pueblo, CO 81003 (719) 582-5588	Log of Boring B2 **Sheet 1 of 1**

Date(s) Drilled **08/30/2023**	Logged By **Caleb Lewis**	Checked By **AJ**
Drilling Method **Solid stem auger**	Drill Bit Size/Type **4" Carbide**	Total Depth of Borehole **5 feet bgs**
Drill Rig Type **Giddings**	Drilling Contractor **Jesik**	Approximate Surface Elevation **----**
Groundwater Level and Date Measured **NE**	Sampling Method(s) **Bulk, Modified California**	Hammer Data **SPT 140 lbs/30"**
Borehole Backfill **None**	Location **40.25404°, -105.84592**	

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Percent Fines	Uniformity Coefficient	LL, %	PI, %	Swell/Consolidation, %	Comments
0			SM		SAND, some silt, trace gravel, medium dense, dry, brown								
		7-20								NL	NP		
						6.1		25					
5					TDD - auger refusal on granite								
10													
15													
20													
25													
30													

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Figure B-2

Project: **Lucy Street** Project Location: **Grand Lake, CO** Project Number: **23-9538**	**Jesik Consulting** 800 W. 8th Street Pueblo, CO 81003 (719) 582-5588	Log of Boring B3 **Sheet 1 of 1**

Date(s) Drilled **08/30/2023**	Logged By **Caleb Lewis**	Checked By **AJ**
Drilling Method **Solid stem auger**	Drill Bit Size/Type **4" Carbide**	Total Depth of Borehole **3 feet bgs**
Drill Rig Type **Giddings**	Drilling Contractor **Jesik**	Approximate Surface Elevation **----**
Groundwater Level and Date Measured **NE**	Sampling Method(s) **Modified California**	Hammer Data **SPT 140 lbs/30"**
Borehole Backfill **None**	Location **40.25379°, -105.84588**	

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Percent Fines	Uniformity Coefficient	LL, %	PI, %	Swell/Consolidation, %	Comments
0			SM		SAND, some silt, some gravel, medium dense, non plastic, moist, brown								
		7-12								NL	NP		
					TDD - auger refusal on granite								
5													
10													
15													
20													
25													
30													

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Figure B-3

Project: **Lucy Street** Project Location: **Grand Lake, CO** Project Number: **23-9538**	**Jesik Consulting** 800 W. 8th Street Pueblo, CO 81003 (719) 582-5588	Boring Log Key

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Percent Fines	Uniformity Coefficient	LL, %	PI, %	Swell/Consolidation, %	Comments
1	2	3	4	5	6	7	8	9	10	11	12	13	14

COLUMN DESCRIPTIONS

1. Depth (feet): Depth in feet below the ground surface.
2. Sample Type: Type of soil sample collected at the depth interval shown.
3. Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
4. Material Type: Type of material encountered.
5. Graphic Log: Graphic depiction of the subsurface material encountered.
6. MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
7. Water Content, %: Water content of the soil sample, expressed as percentage of dry weight of sample.
8. Dry Unit Weight, pcf: Dry weight per unit volume of soil sample measured in laboratory, in pounds per cubic foot.
9. Percent Fines: The percent fines (soil passing the No. 200 Sieve) in the sample. WA indicates a Wash Sieve, SA indicates a Sieve Analysis.
10. Uniformity Coefficient: Sieve Uc
11. LL, %: Liquid Limit, expressed as a water content.
12. PI, %: Plasticity Index, expressed as a water content.
13. Swell/Consolidation, %: Swell/Consolidation
14. Comments: Comments and observations regarding drilling or sampling made by driller or field personnel.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

MATERIAL GRAPHIC SYMBOLS


Silty SAND (SM)

TYPICAL SAMPLER GRAPHIC SYMBOLS


Bulk Sample


2.5-inch-OD Modified California w/ brass liners

OTHER GRAPHIC SYMBOLS


Water level (at time of drilling, ATD)


Water level (after waiting, AW)


Minor change in material properties within a stratum

Inferred/gradational contact between strata

Queried contact between strata

GENERAL NOTES

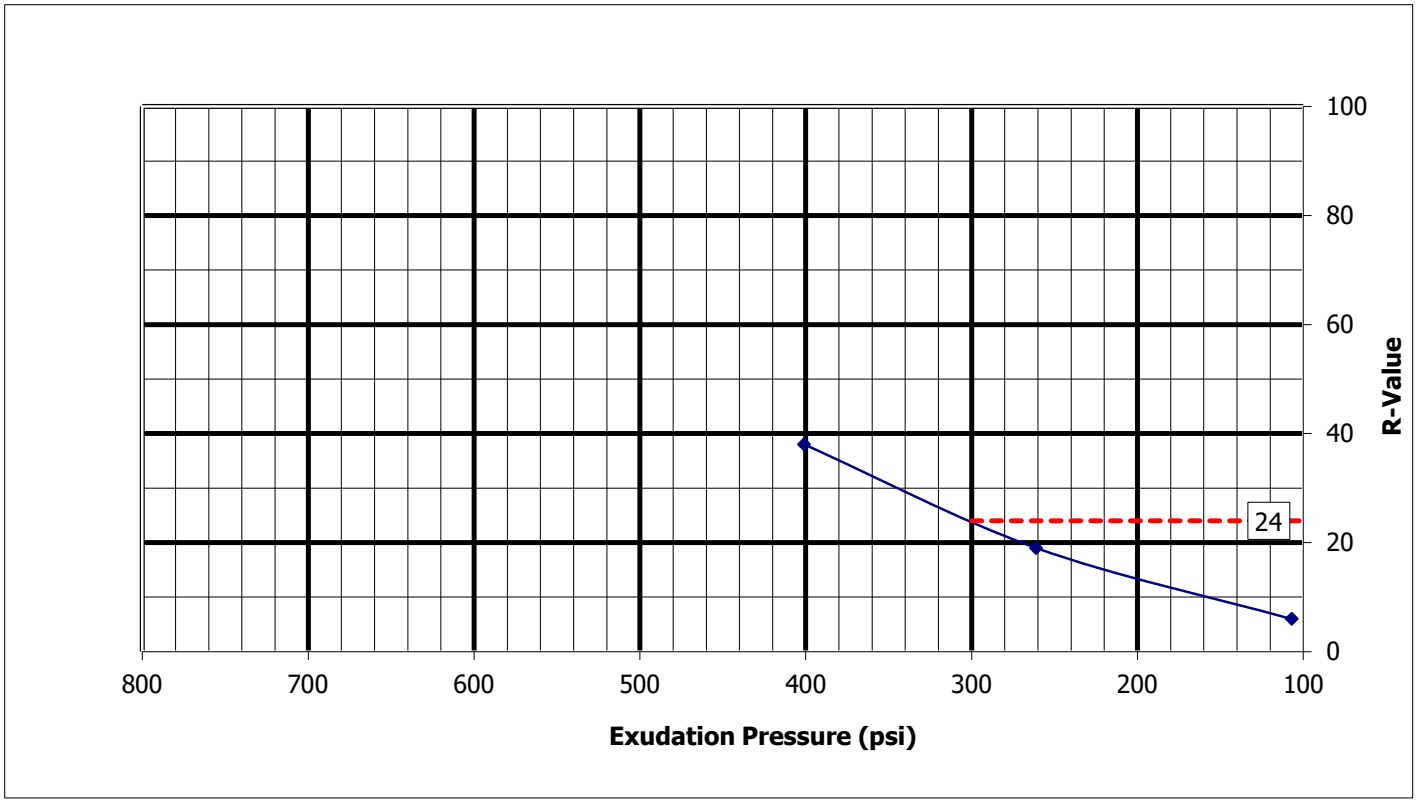
1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.
3: Blow counts of 6-12 indicate that it took 6 blows to drive the sampler the first 6 inches into the ground and 12 blows to drive the sampler the second 6 inches into the ground for a total of 12 inches.
4: Blow counts of 50/8 indicate that it took 50 blows to drive the sampler into the ground a total of 8 inches.

Figure B-3

APPENDIX C: LABORATORY TEST RESULTS

R-VALUE TEST GRAPH (ASTM D2844)

Project Number:	23.032, Jesik Consulting	Date:	09/27/23
Project Name:	General Lab Testing 2023 (Jesik Project No. 23-9538)	Technician:	J. De Los Santos
Lab ID Number:	232840	Reviewer:	G. Hoyos
Sample Location:	Grand Lakes, CO (Sample Reference No. 2659)		
Visual Description:	SAND, silty, with gravel, brown		



R-Value @ Exudation Pressure 300 psi: 24

Specification:

CDOT Pavement Design Manual, 2011.
Eq. 2.1 & 2.2, page 2-3.

$S_1 = [(R-5)/11.29]+3$ **S_1= 4.68**

$M_R = 10^{[(S_1+18.72)/6.24]}$ **M_R= 5,629**

M_R = Resilient Modulus, psi

S_1 = the Soil Support Value

R = the R-Value obtained

Test Specimen:	1	2	3
Moisture Content, %:	9.9	10.8	13.1
Expansion Pressure, psi:	0.18	-0.05	-0.10
Dry Density, pcf:	129.1	125.9	121.9
R-Value:	38	19	6
Exudation Pressure, psi:	401	261	107

Note: The R-Value is measured; the M_R is an approximation from correlation formulas.

Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4318

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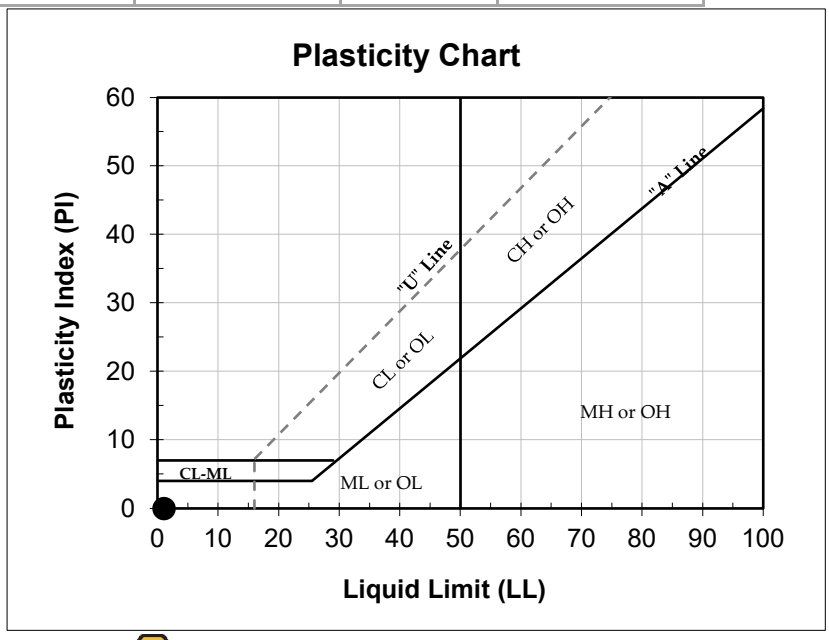
Project Name:	Lucy Street	Tested By:	CL	Date:	9/7/2023
Source/Boring:	B1	Checked By:	AJ	Date:	9/19/2023
Depth/Sample No:	2	Test Number:	1	Project No:	23-9538
Sample Time:	-	Delivery Date:	8/30/2023	Sample Date:	8/30/2023

LIQUID LIMIT

Container No.:					
Container mass (g):	-				
Wet soil + can mass (g):	-				
Dry soil + can mass (g):	-				
Blow count, N:	-				
Dry soil mass (g):					
Water mass (g):					
Water content:					
PLASTIC LIMIT					
Container No.:					
Container mass (g):	-				
Wet soil + container mass (g):	-				
Dry soil + container mass (g):	-				
Dry soil mass (g):					
Mass of moisture (g):					
Water content:					

LIQUID LIMIT. LL = NL
PLASTIC LIMIT, PL = NP
PLASTICITY INDEX, PI = NP

SAMPLE DESCRIPTION:



Rolling Device: Hand
Liquid Limit Device: Manual
Grooving Tool: Plastic

Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4318

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Project Name:	Lucy Street	Tested By:	CL	Date:	9/7/2023
Source/Boring:	B2	Checked By:	AJ	Date:	9/19/2023
Depth/Sample No:	2	Test Number:	2	Project No:	23-9538
Sample Time:	-	Delivery Date:	8/30/2023	Sample Date:	8/30/2023

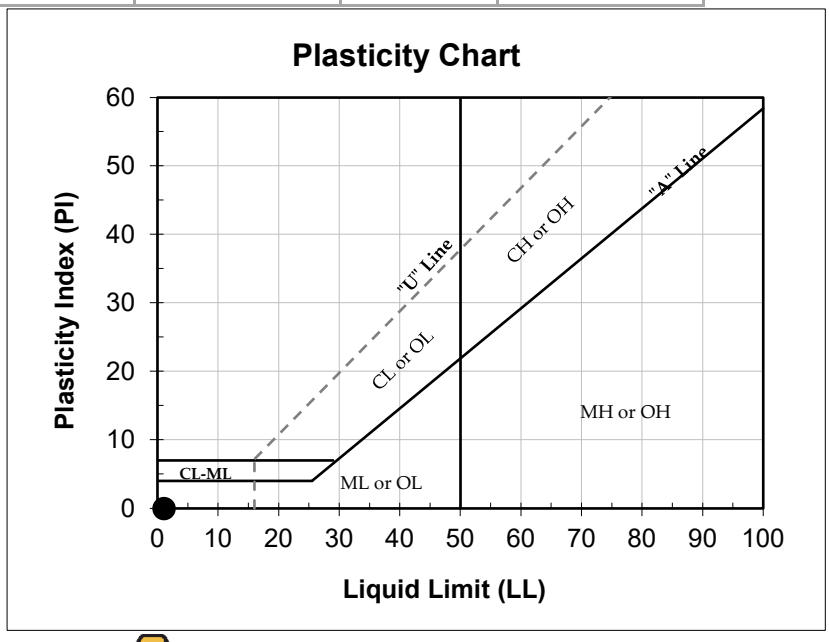
LIQUID LIMIT

Container No.:					
Container mass (g):	-				
Wet soil + can mass (g):	-				
Dry soil + can mass (g):	-				
Blow count, N:	-				
Dry soil mass (g):					
Water mass (g):					
Water content:					
PLASTIC LIMIT					
Container No.:					
Container mass (g):	-				
Wet soil + container mass (g):	-				
Dry soil + container mass (g):	-				
Dry soil mass (g):					
Mass of moisture (g):					
Water content:					

LIQUID LIMIT. LL = NL
PLASTIC LIMIT, PL = NP
PLASTICITY INDEX, PI = NP

SAMPLE DESCRIPTION:

Rolling Device: Hand
Liquid Limit Device: Manual
Grooving Tool: Plastic



Form Revision March 2021

AASHTO ACCREDITED

Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4318

Jesik
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Pueblo, Colorado 81003
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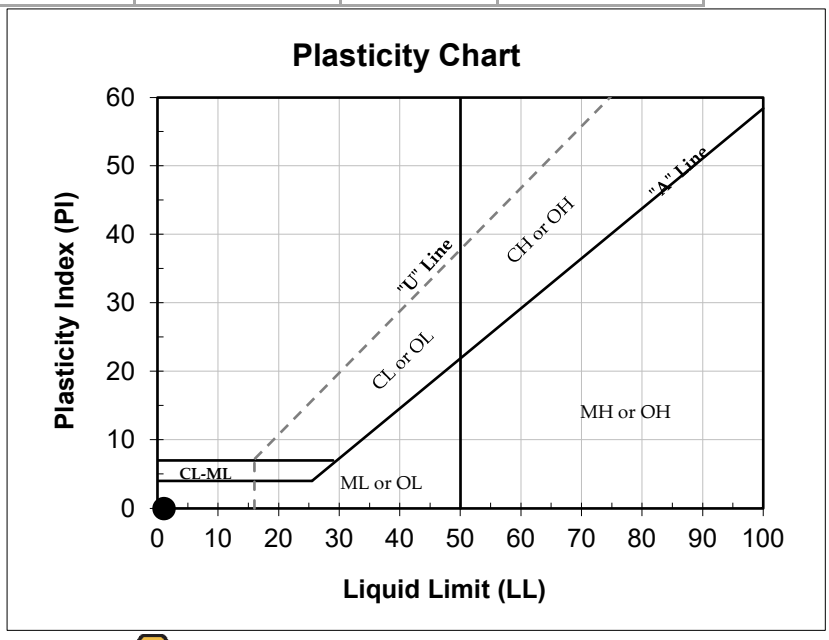
Project Name:	Lucy Street	Tested By:	CL	Date:	9/7/2023
Source/Boring:	B3	Checked By:	AJ	Date:	9/19/2023
Depth/Sample No:	2	Test Number:	3	Project No:	23-9538
Sample Time:	-	Delivery Date:	8/30/2023	Sample Date:	8/30/2023

LIQUID LIMIT

Container No.:					
Container mass (g):	-				
Wet soil + can mass (g):	-				
Dry soil + can mass (g):	-				
Blow count, N:	-				
Dry soil mass (g):					
Water mass (g):					
Water content:					
PLASTIC LIMIT					
Container No.:					
Container mass (g):	-				
Wet soil + container mass (g):	-				
Dry soil + container mass (g):	-				
Dry soil mass (g):					
Mass of moisture (g):					
Water content:					

LIQUID LIMIT. LL = NL
PLASTIC LIMIT, PL = NP
PLASTICITY INDEX, PI = NP

SAMPLE DESCRIPTION:



Rolling Device: Hand
Liquid Limit Device: Manual
Grooving Tool: Plastic

Particle Size Distribution of Soils
ASTM D6913

800 W. 8th Street
Pueblo, Colorado 81003
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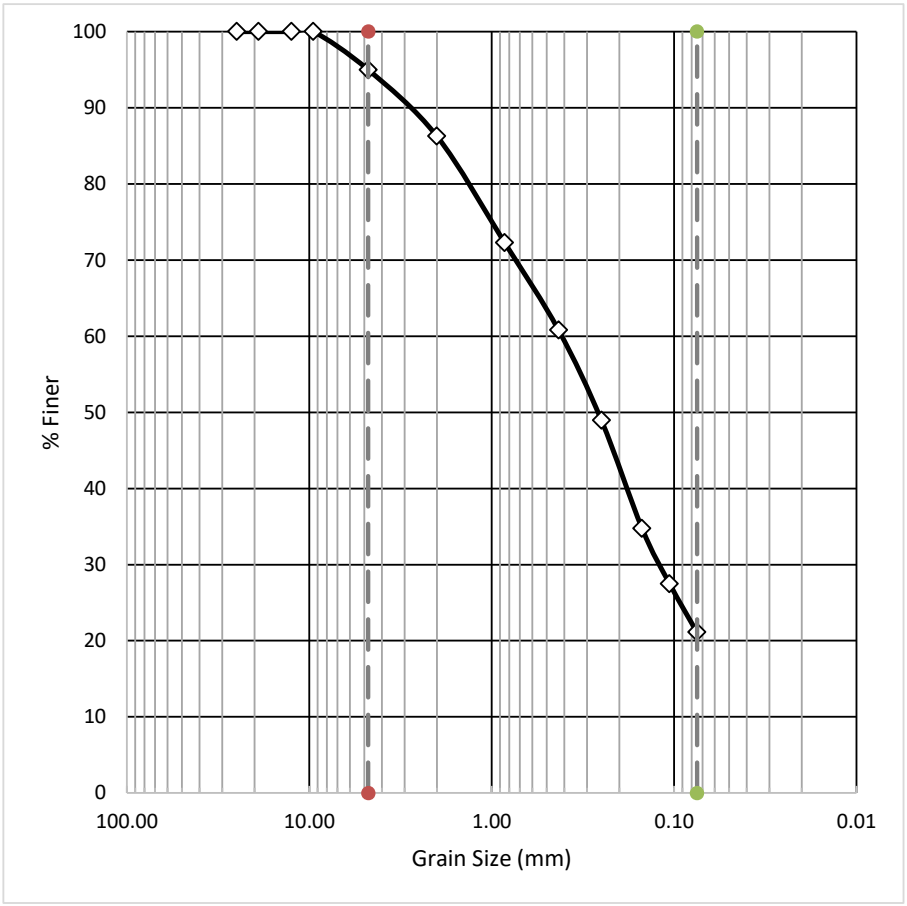
Project Name:	Lucy Street	Tested By:	CL	Date:	9/7/2023
Source/Boring:	B1	Checked By:	AJ	Date:	9/19/2023
Depth/Sample No:	4	Test Number:	1	Project No:	23-9538
Sample Time:	-	Delivery Date:	8/30/2023	Sample Date:	8/30/2023

Sieve No.	Dia (mm)	% Passing
1"	25.00	100%
3/4"	19.00	100%
1/2"	12.50	100%
3/8"	9.50	100%
#4	4.75	95%
#10	2.00	86%
#20	0.85	72%
#40	0.43	61%
#60	0.25	49%
#100	0.15	35%
#140	0.11	27%
#200	0.075	21.1%

% Gravel:	5%
% Sand:	74%
% Clay/Silt:	21.1%



D_{10}: -
D_{30}: .13
D_{50}: .28
D_{60}: .41

C_u: -
C_c: -

Natural Moisture Content (%): 11.6%