

March 10, 2020

Land Development Consultants, Inc.  
3898 Maizeland Road  
Colorado Springs, CO 80909



**ENTECH**  
ENGINEERING, INC.

505 ELKTON DRIVE  
COLORADO SPRINGS, CO 80907  
PHONE (719) 531-5599  
FAX (719) 531-5238

Attn: Daniel Kupferer

Re: Wastewater Study  
Didleau Subdivision  
Herring Road & Forest Heights Circle  
Parcel Nos. 52090-00-050 & 52090-00-120  
El Paso County, Colorado

Dear Mr. Kupferer:

### **GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION**

The site is located in a portion of the SW¼ of Section 9, Township 12 South, Range 65 West of the 6<sup>th</sup> Principal Meridian in El Paso County, Colorado. The site is located approximately 4 miles northeast of Colorado Springs city limits, northeast of Shoup Road and Herring Road in El Paso County, Colorado. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is gradually sloping generally to the southwest with moderate slopes along the ridge that bisects the site. Burgess Creek is located in the eastern portion of the site and flows in a southwesterly direction. A minor drainage is located in the western portion of the property. Water was not observed in the drainages at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included undeveloped and a rural residential development. The site is located within the Black Forest burn scar. The site contains primarily field grasses and weeds with scattered areas of ponderosa pines in the western portion of the site and around the existing house located on Lot 2. Site photographs, taken January 30, 2020, are included in Appendix A.

Total acreage involved in the proposed subdivision is 32.25-acres. Four rural residential lots are proposed as part of the replat. The proposed lot sizes range from approximately 5-acres to 15-acres. The existing house located on Lot 2 will remain. The new lots will be serviced by individual wells and on-site wastewater treatment systems. The Site Plan with the proposed replat is presented in Figure 3.

### **SCOPE OF THE REPORT**

The scope of the report will include the following:

- A general geologic analysis utilizing published geologic data. Detailed site-specific mapping will be conducted to obtain general information in respect to major geographic and geologic features, geologic descriptions and their effects on the development of the property with regards to on-site wastewater Treatment Systems.

### **FIELD INVESTIGATION**

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS), previously the

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Soil Conservation Service (SCS) survey was also reviewed to evaluate the site. The position of mappable units within the subject property are shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements, and aerial photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Geology/Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on January 3 and 30, 2020.

Two test borings and two test pits were excavated on the site to determine general suitability for the use of on-site wastewater treatment systems and general soil characteristics. The locations of the test pits are indicated on the Site Plan/Test Pit Location Map, Figure 3. The Test Pit Logs are presented in Appendix B. Results of this testing will be discussed later in this report.

Laboratory testing was also performed on some of the soils to classify and determine the soils engineering characteristics. Laboratory tests included grain-size analysis, ASTM D-422, and Atterberg Limits, ASTM D-4318. Results of the laboratory testing are included in Appendix C. A Summary of Laboratory Test Results is presented in Table 1.

## **SOIL AND GEOLOGIC CONDITIONS**

### Soil Survey

The Natural Resource Conservation Service (NRCS) (Reference 1, Figure 4), previously the Soil Conservation Service (Reference 2) has mapped two soil types on the site. Complete descriptions of the soil types are presented in Appendix D. In general, the soils consist of sandy loam to gravelly loamy sand. The soils are described as follows:

<u>Type</u>	<u>Description</u>
26	Elbeth Sandy Loam, 8 – 15% Slopes
40	Kettle Gravelly Loamy Sand, 3 – 8% Slopes

The soils have been described to have moderate to rapid permeabilities. The soils are described as well suited for use as homesites. Possible hazards with soils erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards (Reference 2).

### Soils

The soils encountered in the test borings and test pits consisted of silty sand to very clayey sand overlying weathered to formational silty sandstone and very sandy claystone. Bedrock was encountered at depths ranging from 2 to 6 feet. The upper sands were encountered at loose to dense states and moderate moisture conditions, and the sandstone was encountered at very dense states and moderate moisture conditions. The claystone was encountered at hard consistencies and moderate moisture conditions. The samples of sand tested had approximately 12 to 38 percent of the soil size particles passing the No. 200 sieve. FHA Swell Testing on a sample of the very clayey sand resulted in an expansion pressure of 1640 psf, which indicates a moderate expansion potential. The samples of sandstone tested had 10 to 22 percent of the soil

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size particles passing the No. 200 sieve. The samples of claystone tested had 54 to 59 percent of the soil size particles passing the No. 200 sieve. FHA Swell Testing on a sample of the claystone resulted in an expansion pressure of 730 psf, which indicates a low to moderate expansion potential. Highly expansive claystone and siltstone lenses are commonly interbedded in the Dawson Formation.

### Groundwater

Groundwater or signs of seasonally occurring water were not encountered in the test borings or test pits, which were drilled to 20 feet and excavated to 6 to 7 feet. It is anticipated groundwater will not affect shallow foundations on the majority of the site. Areas of potentially seasonal shallow and seasonal shallow groundwater have been mapped in drainages on the site that are discussed in the following sections. Fluctuations in groundwater conditions may occur due to variations in rainfall or other factors not readily apparent at this time. Isolated sand layers within the soil profile can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of subsurface water features during construction.

### Geology

Approximately 12 miles west of the site is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within a large structural feature known as the Denver Basin. Bedrock in the area is typically gently dipping in a northerly direction (Reference 3). The bedrock underlying the site consists of the Dawson Formation of Cretaceous Age. The Dawson Formation typically consists of coarse-grained arkosic sandstone with interbedded layers claystone or siltstone.

The geology of the site was evaluated using the *Geologic Map of the Black Forest*, by Thorson in 2003, (Reference 4, Figure 5). The Geology Map for the site is presented in Figure 6. Four mappable units were identified on this site which is described as follows:

- Qaf      Artificial Fill of Holocene Age:** These consist of man-made fill deposits associated with a gas pipeline that bisects the site in portions of Lot 1 and Lot 2. Fill piles consisting of logs and branches are located across the site.
- Qal      Recent Alluvium of Holocene Age:** These are recent deposits that have been deposited in the drainages that exist on-site. These materials consist of silty to clayey sands. Some of these alluviums can contain highly organic soils.
- Qau      Alluvium, Undivided of Holocene and Pleistocene Age:** These are sheetwash and stream deposited alluvium that exists in the western portion of the site associated with alluvial-filled valley heads. These materials typically consist of silty to clayey sands and gravel.
- Qc/Tkd      Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:** The materials consist of colluvial or residual soils overlying the bedrock materials on-site. The colluvial soils were deposited by the action of sheetwash and gravity. The residual soils were derived from the in-situ weathering of

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the bedrock on site. These materials typically consist of silty to clayey sand with potential areas of sandy clays. The bedrock consists of the Dawson Formation. The Dawson Formation typically consists of coarse-grained, arkosic sandstone with interbedded lenses of fine-grained sandstone, siltstone and claystone.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Black Forest Quadrangle* distributed by the Colorado Geologic Survey in 2003 (Reference 4, Figure 5), The *Geologic Map of the Colorado Springs-Castle Rock Area*, distributed by the US Geological Survey in 1979 (Reference 5), and the *Geologic Map of the Pueblo 1° x 2° Quadrangle*, distributed by the US Geological Survey in 1978 (Reference 6). The test borings and test pits were used in evaluating the site and is included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

#### Drainage Areas

Minor drainages exist on-site that flow in southwesterly directions. Burgess Creek exists in the eastern portion of the site and a minor drainage exists in the western portion of the site. No water was observed flowing in these drainages at the time of the investigation. Areas of seasonal and potentially seasonal shallow groundwater have been mapped in the drainages on the site (Figure 6).

In these areas, we would anticipate the potential for periodically high subsurface moisture conditions, frost heave potential and highly organic soils. These areas lie within minor drainage areas which can be avoided by the proposed development. Due to the potential for seasonal high groundwater conditions, on-site wastewater treatment systems are not recommended in these areas. Due to lot sizes, it is anticipated these areas can be avoided by systems. The site does not lie within any floodplain zones according to the FEMA Map No. 08041CO320 dated December 7, 2018 (Figure 7, Reference 7). Exact locations of floodplain and specific drainage studies are beyond the scope of this report. Individual wastewater treatment systems must be located a minimum of 25 feet from dry gulches and 50 feet from water courses or floodplains.

#### **ON-SITE WASTEWATER TREATMENT**

The Natural Resource Conservation Service (Reference 1), previously the Soil Conservation Service (Reference 2) has been mapped with two soil descriptions. The Soil Survey Map (Reference 1) is presented in Figure 4, and the Soil Survey Descriptions (Reference 2) are presented in Appendix D. The soils are described as having moderate to rapid percolation rates. Records for the existing septic system located on Lot 2 are included in Appendix E. This system is a conventional gravel and trench system.

Soils encountered in the tactile test pits consisted of gravelly sandy loam overlying weathered to formational silty sandstone. The limiting layers encountered in the test pit is the silty sandstone, which corresponds with USDA Soil Type 3A with an LTAR value of 0.30 gallons per day per square foot. Weathered bedrock was encountered at approximately 2 to 3 feet in the test pits. Signs of seasonally occurring groundwater were not observed in the test pits. Absorption fields must be maintained a minimum of 4 feet above groundwater or bedrock, or confining layer. Should groundwater or bedrock be encountered within 6 feet of the surface, designed systems

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will be required. Designed systems are anticipated for the lots, however, areas may be encountered on the lots where conventional systems would be suitable.

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems (OWTS) and that contamination of surface and subsurface water resources should not occur provided the OWTS sites are evaluated and installed according to El Paso County and State Guidelines and properly maintained. Based on the testing performed designed systems will be required for the new lots. The Septic Suitability Map is presented in Figure 8. A possible house location, water well, and two septic sites for the new lots are indicated on Figure 8. Areas that should be avoided by septic systems are indicated on the septic suitability map.

**Individual soil testing is required for proposed construction on each lot prior to construction.** Absorption fields must be located a minimum of 100 feet from any well, including those on adjacent properties. Absorption fields must also be located a minimum of 50 feet from any drainages, floodplains or ponded areas and 25 feet from dry gulches.

## CLOSURE

This report has been prepared for Land Development Consultants, Inc., for application to the proposed project in accordance with generally accepted geologic soil and engineering practices. No other warranty expressed or implied is made.


We trust that this report has provided you with all the information that you required. Should you require additional information, please do not hesitate to contact Entech Engineering, Inc.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Reviewed by:

  
Logan L. Langford, P.G.  
Geologist

  
Joseph C. Goode  
President



LLL/III

Encl.

Entech Job No. 192115  
AAprojects/2019/192115 wws

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Parcel Nos. 52090-00-050 & 52090-00-120  
El Paso County, Colorado

## BIBLIOGRAPHY

1. Natural Resource Conservation Service, September 23, 2016. *Web Soil Survey*. United States Department Agriculture, <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.
2. United States Department of Agriculture Soil Conservation Service. June 1981. *Soil Survey of El Paso County Area, Colorado*.
3. Scott, Glen R.; Taylor Richard B.; Epis, Rudy C; and Wobus, Reinhard A. 1978. *Geologic Structure Map of the Pueblo 1° x 2° Quadrangle, South-Central Colorado*. Sheet 2. U.S. Geologic Survey. Map I-1022, Sheet 2.
4. Thorson, Jon P., 2003. *Geologic Map of the Black Forest Quadrangle, El Paso County, Colorado*. Colorado Geological Survey. Open-File Report 03-6.
5. Trimble, Donald E. and Machette, Michael N. 1979. *Geologic Map of the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado*. USGS, Map I-857-F.
6. Scott, Glen R.; Taylor Richard B.; Epis, Rudy C; and Wobus, Reinhard A. 1978. *Geologic Structure Map of the Pueblo 1° x 2° Quadrangle, South-Central Colorado*. Sheet 2. U.S. Geologic Survey. Map I-1022.
7. Federal Emergency Management Agency. December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado*. Map Number 08041CO320G

## TABLES

**TABLE 1**  
**SUMMARY OF LABORATORY TEST RESULTS**

CLIENT LDC, INC.  
 PROJECT DIDLEAU SUBDIVISION  
 JOB NO. 192115

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3			12.2						SM	SAND, SILTY
1	2	2-3			38.4				1640		SC	SAND, VERY CLAYEY
1	TP-2	2-3			14.9						SM	SAND, SILTY
2	TP-1	5-6			9.6						SM	SANDSTONE, SILTY
2	1	15			22.2						SM	SANDSTONE, SILTY
3	2	10			59.3				730		CL	CLAYSTONE, VERY SANDY
3	2	5			54.2						CL	CLAYSTONE, VERY SANDY

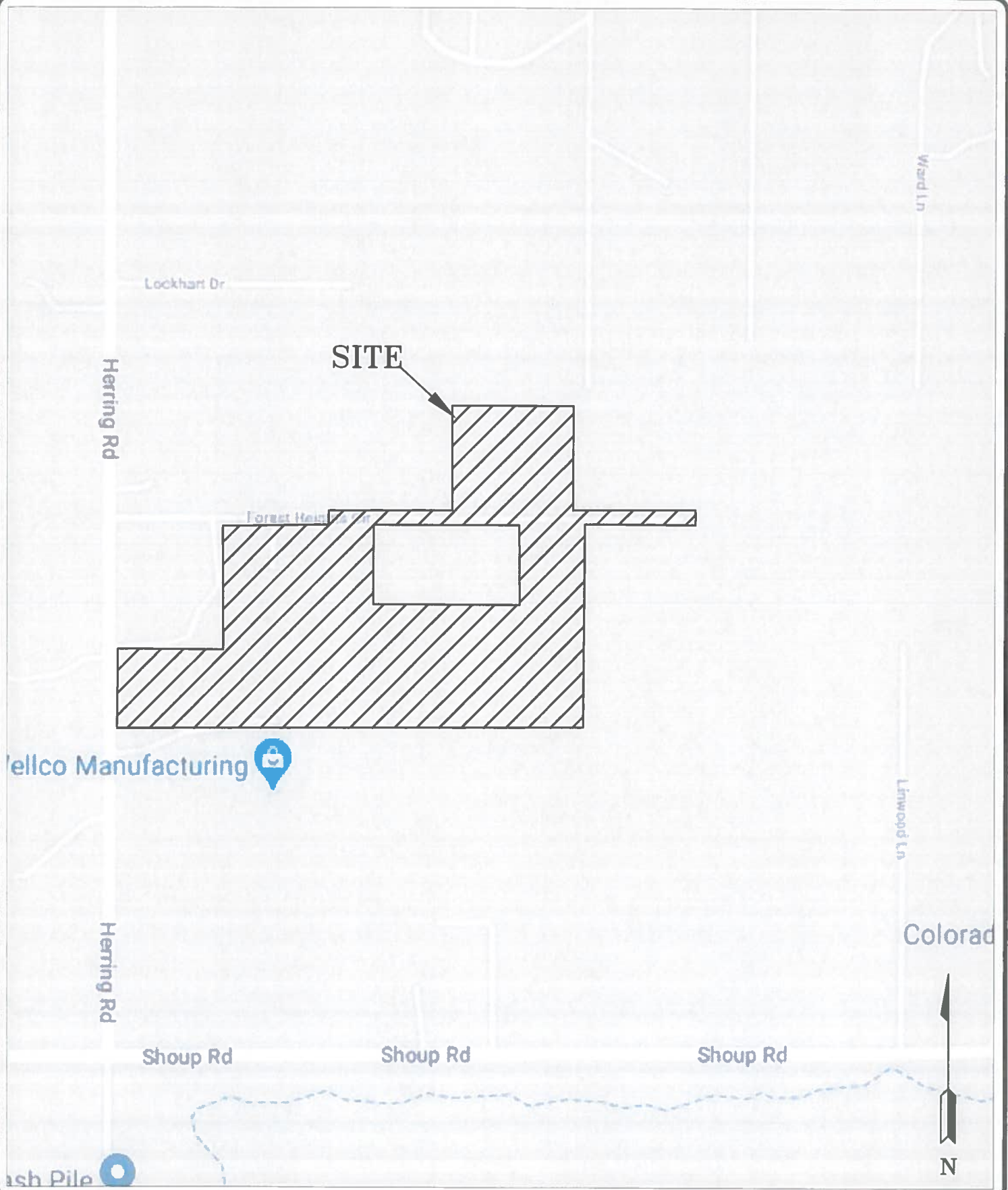


**Table 2: Summary Tactile Test Pit Results**

<b>Test Pit No.</b>	<b>USDA Soil Type</b>	<b>LTAR Value</b>	<b>Depth to Bedrock (ft.)</b>	<b>Depth to Seasonally Occurring Groundwater (ft.)</b>
1	3A*	0.30*	3*	N/A
2	3A*	0.30*	2*	N/A

\*- Conditions that will require an engineered OWTS

## FIGURES



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VICINITY MAP  
DIDLEAU SUBDIVISION  
HERRING ROAD & FOREST HEIGHTS CIRCLE  
EL PASO COUNTY, CO.  
FOR: LDC, INC.

DRAWN:  
LLL

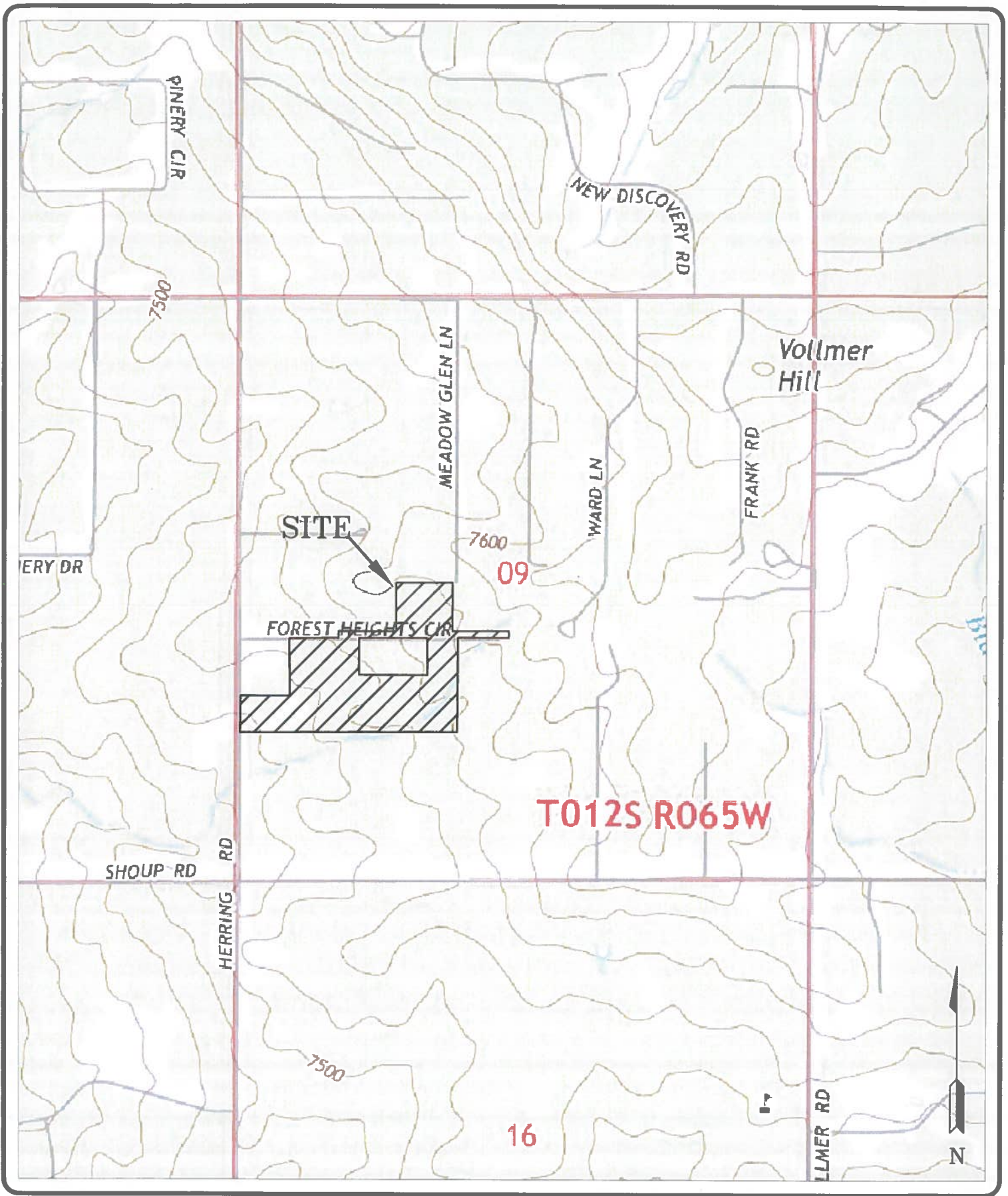
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192115

FIG NO.:  
1



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USGS MAP  
DIDLEAU SUBDIVISION  
HERRING ROAD & FOREST HEIGHTS CIRCLE  
PASO COUNTY, CO.  
FOR: LDC, INC.

DRAWN:  
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2/28/20

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JOB NO.:  
192115

FIG NO.:  
2

IN THE NORTH HALF OF THE SOUTHWEST QUARTER OF SECTION 9, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH P.M.  
COUNTY OF EL PASO, STATE OF COLORADO

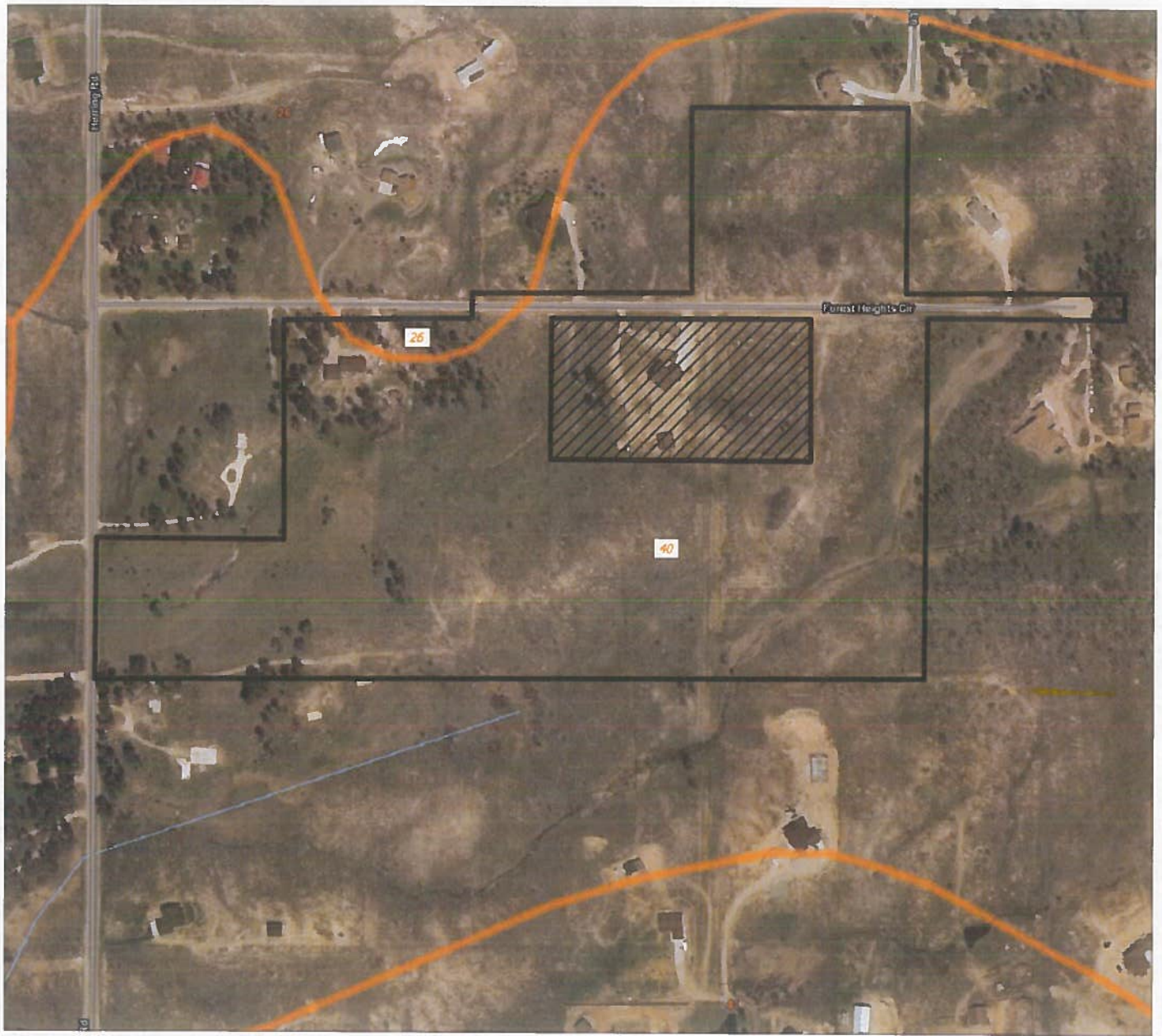
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**SITE PLAN/TESTING LOCATION MAP  
DIDLEAU SUBDIVISION  
HERRING ROAD & FOREST HEIGHTS  
CIRCLECOLORADO SPRINGS, CO.  
FOR: LDC, INC.**

DATE	2/28/20
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DATE	
SCALE	
AS SHOWN	
JOB NO.	192115
FIGURE NO.	3





- SEPERATE PARCEL NOT INCLUDED IN THE SUBDIVISION



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SOIL SURVEY MAP  
DIDLEAU SUBDIVISION  
HERRING ROAD & FOREST HEIGHTS CIRCLE  
EL PASO COUNTY, CO.  
FOR: LDC, INC.

DRAWN:  
LLL

DATE:  
2/28/20

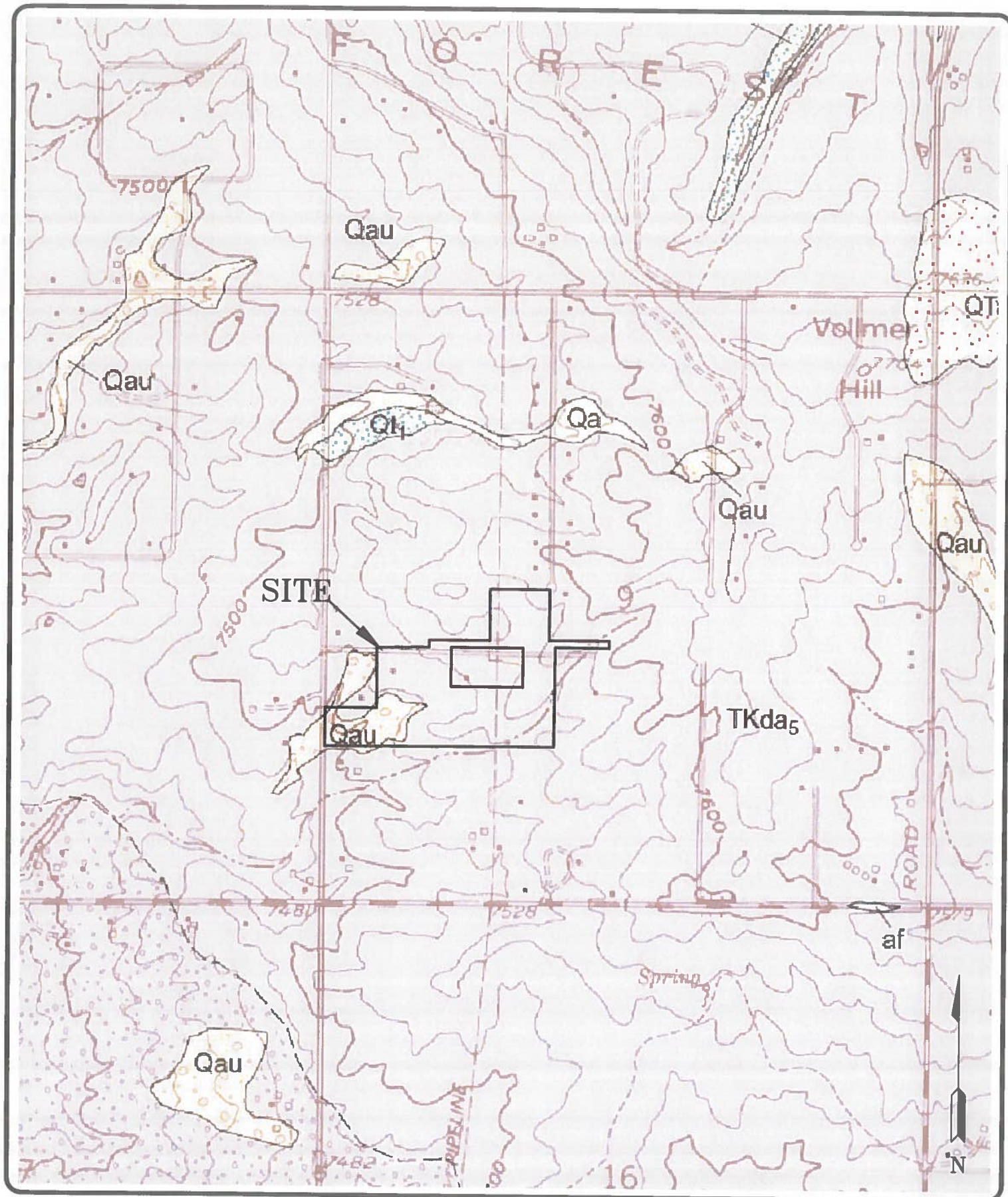
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JOB NO.:  
192115

FIG NO.:  
4





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BLACK FOREST QUADRANGLE GEOLOGIC MAP  
DIDLEAU SUBDIVISION  
HERRING ROAD & FOREST HEIGHTS CIRCLE  
EL PASO COUNTY, CO.  
FOR: LDC, INC.

DRAWN:  
LLL

DATE:  
2/28/20

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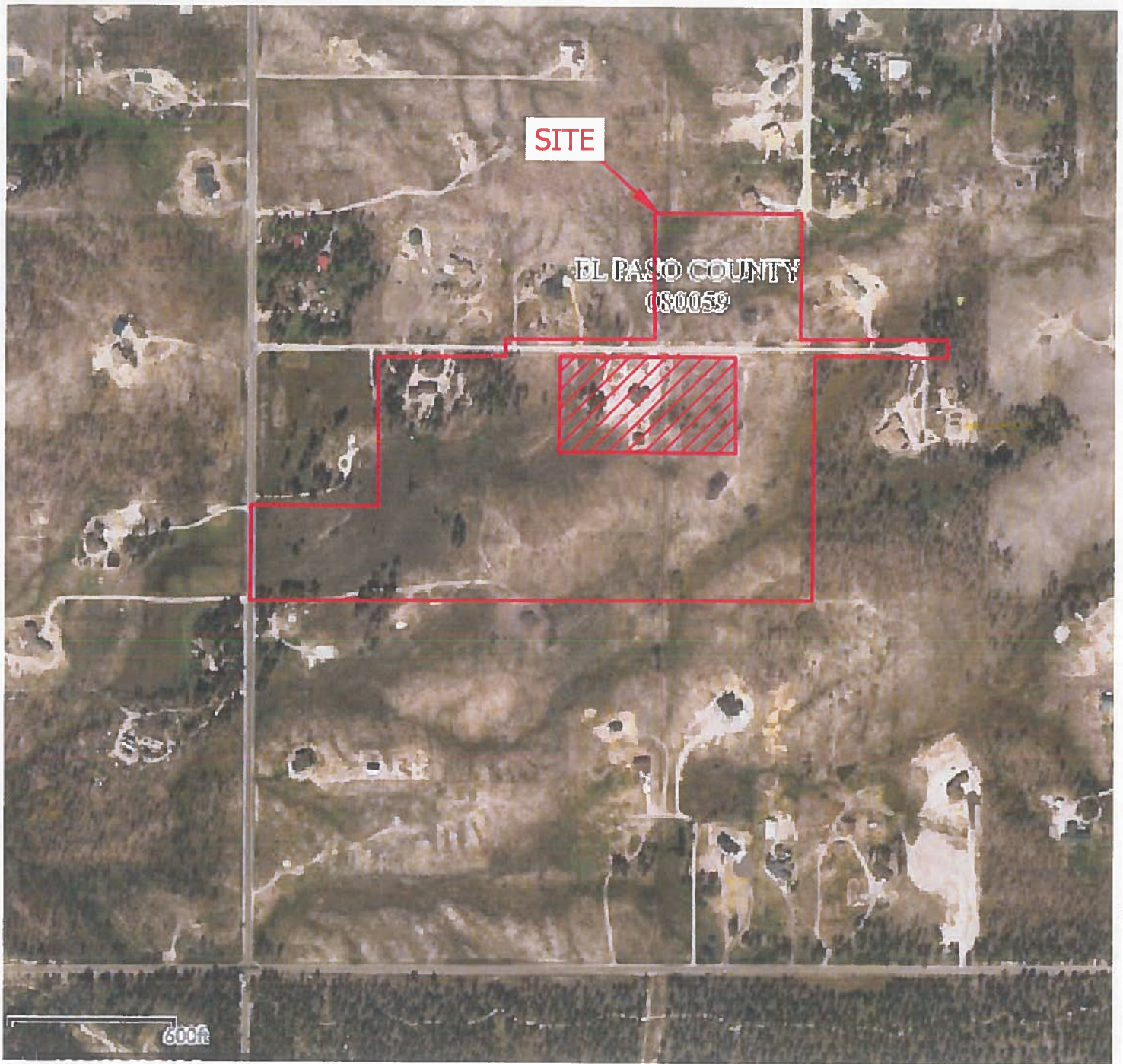
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192115

FIG NO.:  
5









SEPERATE PARCEL NOT INCLUDED IN THE SUBDIVISION



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FEMA FLOODPLAIN MAP  
DIDLEAU SUBDIVISION  
HERRING ROAD & FOREST HEIGHTS CIRCLE  
EL PASO COUNTY, CO.  
FOR: LDC, INC.

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2/28/20

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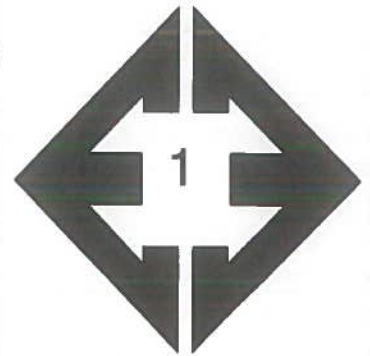
FIG NO.:  
7







## **APPENDIX A: Photographs**



**Looking north towards  
Lot 1 in the eastern  
portion of the site.**

January 30, 2020



**Looking north from the  
central portion of Lot  
2.**

January 30, 2020





**Looking south from  
the northern portion of  
Lot 4.**

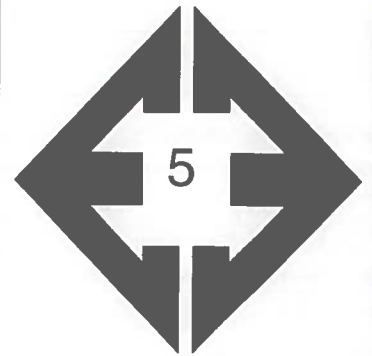
January 30, 2020



**Looking south towards  
one of the stockpiles  
of cut trees.**

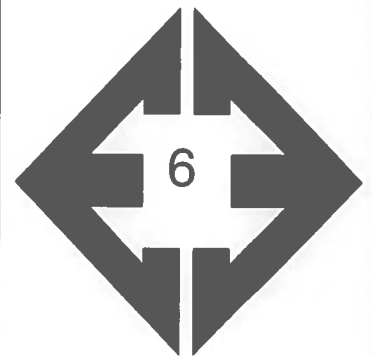
January 30, 2020





**Looking northeast  
towards stockpile of  
trees on Lot 3.**

January 30, 2020



**Looking north from the  
eastern portion of Lot  
3.**

January 30, 2020

## **APPENDIX B: Test Boring and Test Pit Logs**

TEST BORING NO. 1  
 DATE DRILLED 1/3/2020  
 Job # 192115

TEST BORING NO. 2  
 DATE DRILLED 1/3/2020  
 CLIENT LDC, INC.  
 LOCATION DIDLEAU SUBDIVISION

REMARKS

DRY TO 17.5', 1/6/20

SAND, SILTY, FINE TO COARSE  
 GRAINED, BROWN, VERY DENSE  
 TO DENSE, MOIST

SANDSTONE, SILTY, FINE TO  
 COARSE GRAINED, BROWN,  
 VERY DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50	5.6	1
			42	10.8	1
10			50 10"	12.5	2
15			50 9"	11.7	2
20			50 7"	11.5	2

REMARKS

DRY TO 18.5', 1/6/20

SAND, VERY CLAYEY, FINE TO  
 MEDIUM GRAINED, BROWN,  
 LOOSE, MOIST

CLAYSTONE, VERY SANDY,  
 BROWN, HARD, MOIST

SANDSTONE, SILTY, FINE TO  
 COARSE GRAINED, BROWN,  
 VERY DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			7	23.1	1
			50 11"	12.7	1 3
10			50 6"	15.2	3
15			50 5"	6.9	2
20			50 6"	15.8	2



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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:

DATE

CHECKED: *h*

DATE: 1/17/20

JOB NO.  
 192115

FIG NO  
 B-1



TEST PIT NO. 1  
 DATE EXCAVATED 4/23/2019  
 Job # 192115

TEST PIT NO. 2  
 DATE EXCAVATED 4/23/2019  
 CLIENT LDC, INC.  
 LOCATION DIDLEAU SUBDIVISION

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1						topsoil sandy loam, brown	1					
gravelly sandy loam, fine to coarse grained, light brown	2			gr	m	2	gravelly sandy loam, fine to coarse grained, light brown	2			gr	m	2
weathered to formational silty sandstone, fine to coarse grained, tan	3			ma		3A	weathered to formational silty sandstone, fine to coarse grained, tan	3			ma		3A
	4							4					
	5							5					
	6							6					
	7							7					
	8							8					
	9							9					
	10							10					

Soil Structure Shape

granular - gr  
 platy - pl  
 blocky - bl  
 prismatic - pr  
 single grain - sg  
 massive - ma

Soil Structure Grade

weak - w  
 moderate - m  
 strong - s  
 loose - l



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 COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

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2/25/20

JOB NO.:

192115

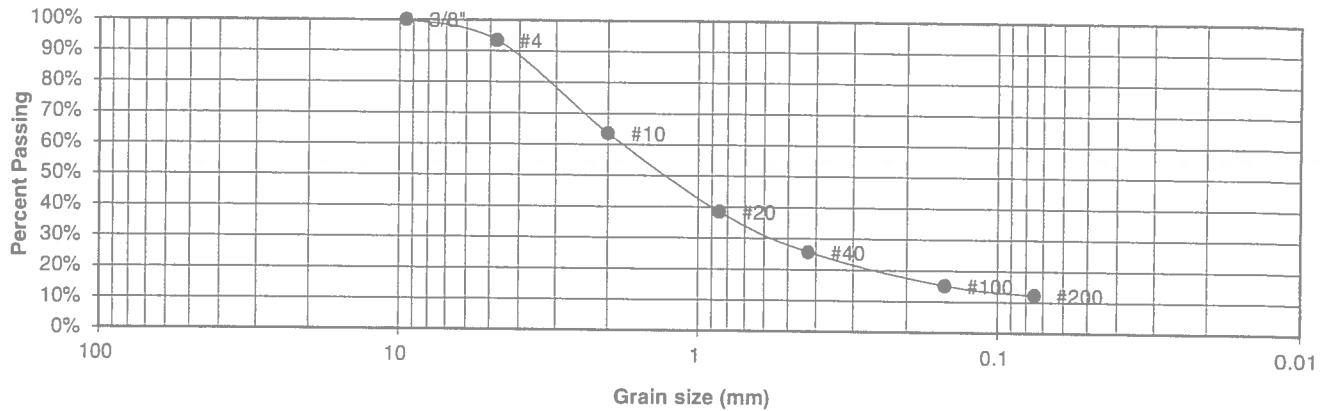
FIG NO.:

B-2

## **APPENDIX C: Laboratory Test Results**

UNIFIED CLASSIFICATION	SM	CLIENT	LDC, INC.
SOIL TYPE #	1	PROJECT	DIDLEAU SUBDIVISION
TEST BORING #	1	JOB NO.	192115
DEPTH (FT)	2-3	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.4%
10	63.6%
20	38.4%
40	25.6%
100	15.1%
200	12.2%

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

Swell  
Moisture at start  
Moisture at finish  
Moisture increase  
Initial dry density (pcf)  
Swell (psf)



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COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

DRAWN:

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DATE:  
1/17/20

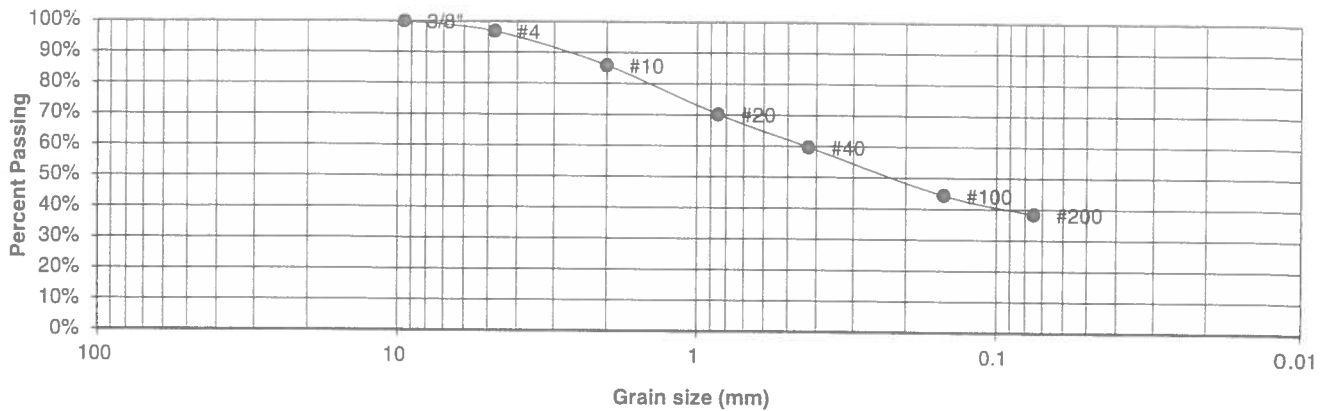
JOB NO  
192115

FIG NO  
C-1

UNIFIED CLASSIFICATION	SC
SOIL TYPE #	1
TEST BORING #	2
DEPTH (FT)	2-3

CLIENT	LDC, INC.
PROJECT	DIDLEAU SUBDIVISION
JOB NO.	192115
TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.8%
10	85.8%
20	70.2%
40	59.7%
100	44.3%
200	38.4%

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

<u>Swell</u>	
Moisture at start	13.8%
Moisture at finish	25.6%
Moisture increase	11.8%
Initial dry density (pcf)	95
Swell (psf)	1640



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### LABORATORY TEST RESULTS

DRAWN

DATE

CHECKED

DATE

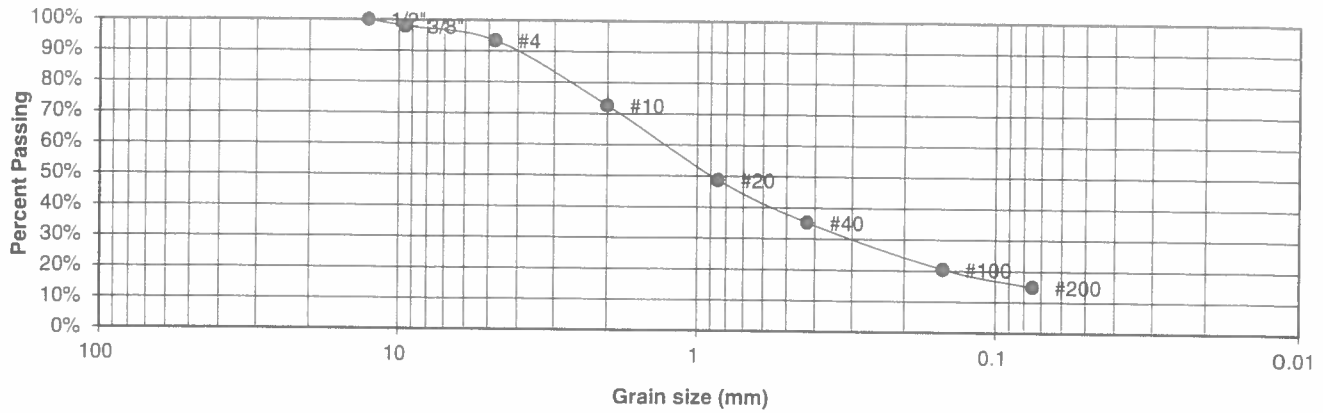
*h* 1/17/20

JOB NO:  
192115

FIG NO  
L-2

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	LDC, INC.
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	DIDLEAU SUBDIVISION
<u>TEST BORING #</u>	TP-2	<u>JOB NO.</u>	192115
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL

### Sieve Analysis Grain Size Distribution



U.S.  
Sieve #

Percent  
Finer

3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.9%
4	93.3%
10	72.7%
20	48.7%
40	35.2%
100	20.5%
200	14.9%

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

Swell  
Moisture at start  
Moisture at finish  
Moisture increase  
Initial dry density (pcf)  
Swell (psf)



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

LL

1/17/20

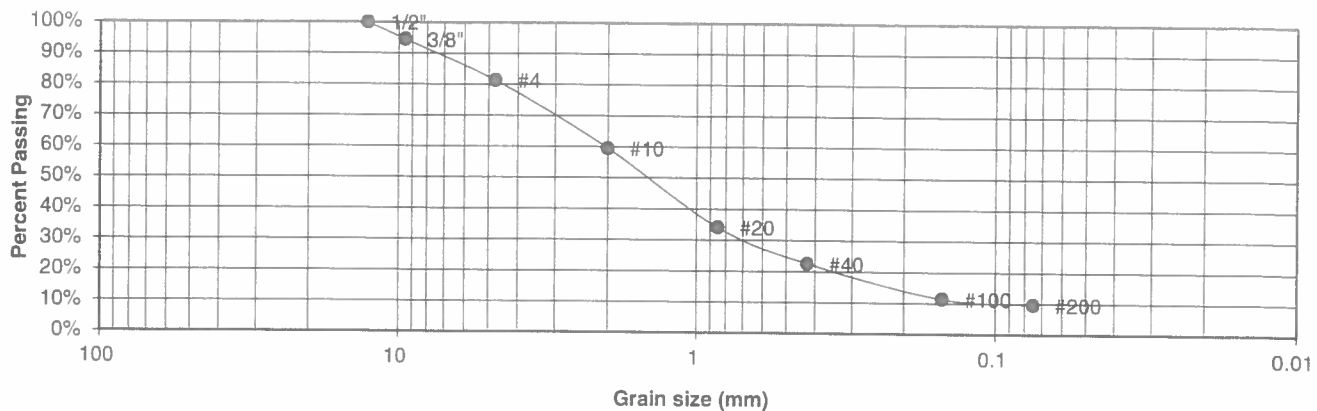
JOB NO  
192115

FIG NO

C-3

UNIFIED CLASSIFICATION	SM	CLIENT	LDC, INC.
SOIL TYPE #	2	PROJECT	DIDLEAU SUBDIVISION
TEST BORING #	TP-1	JOB NO.	192115
DEPTH (FT)	5-6	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S.  
Sieve #

Percent  
Finer

3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	94.5%
4	81.3%
10	59.5%
20	34.1%
40	22.5%
100	11.4%
200	9.6%

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

Swell  
Moisture at start  
Moisture at finish  
Moisture increase  
Initial dry density (pcf)  
Swell (psf)



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

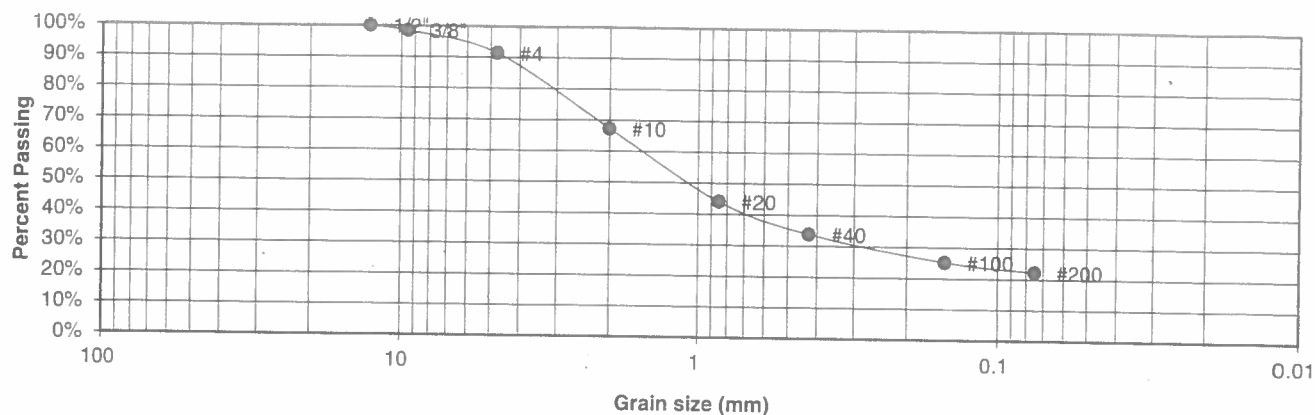
DRAWN:	DATE:	CHECKED: LLL	DATE: 1/17/20
--------	-------	-----------------	------------------

JOB NO:  
192115

FIG NO  
C-4

UNIFIED CLASSIFICATION	SM	CLIENT	LDC, INC.
SOIL TYPE #	2	PROJECT	DIDLEAU SUBDIVISION
TEST BORING #	1	JOB NO.	192115
DEPTH (FT)	15	TEST BY	BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.4%
#4	91.4%
#10	67.2%
#20	44.1%
#40	33.8%
#100	25.2%
#200	22.2%

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

Swell  
Moisture at start  
Moisture at finish  
Moisture increase  
Initial dry density (pcf)  
Swell (psf)



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:

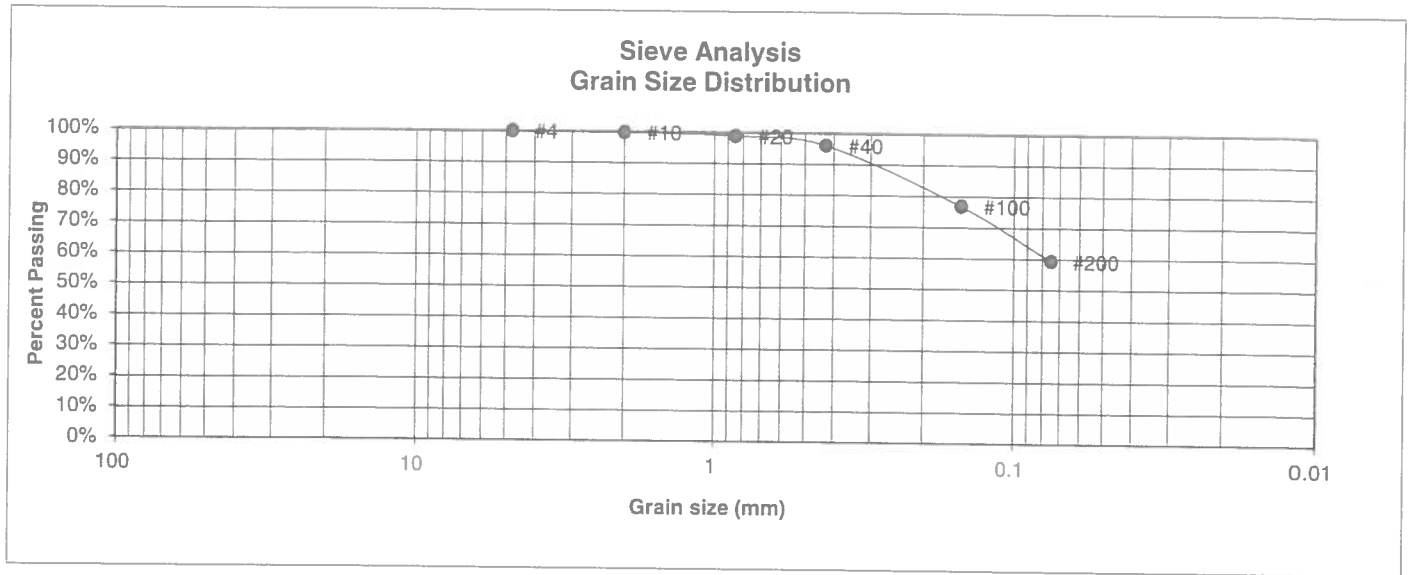
DATE  
1/17/20

JOB NO  
192115

FIG NO.:

C-5

UNIFIED CLASSIFICATION	CL	CLIENT	LDC, INC.
SOIL TYPE #	3	PROJECT	DIDLEAU SUBDIVISION
TEST BORING #	2	JOB NO.	192115
DEPTH (FT)	10	TEST BY	BL



U.S.  
Sieve #

Percent  
Finer

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

3"  
1 1/2"  
3/4"  
1/2"  
3/8"

4	100.0%
10	99.8%
20	98.9%
40	96.1%
100	76.9%
200	59.3%

<u>Swell</u>	
Moisture at start	16.1%
Moisture at finish	20.4%
Moisture increase	4.3%
Initial dry density (pcf)	104
Swell (psf)	730



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ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

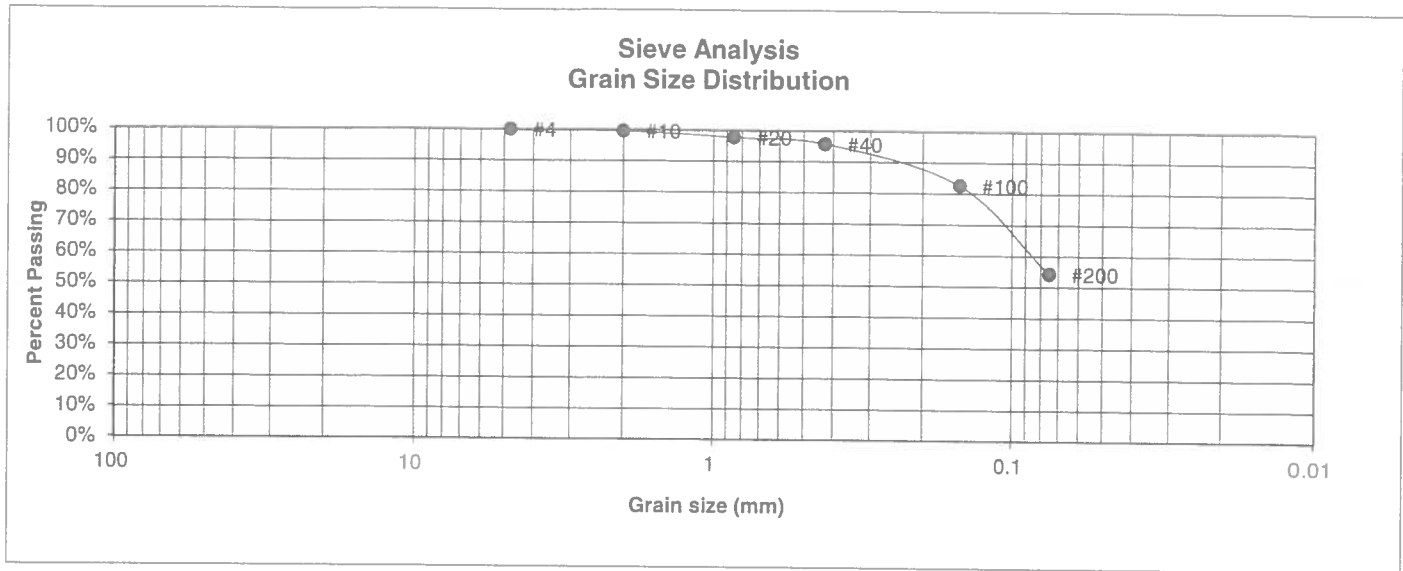
*A* 1/17/20

JOB NO.  
192115

FIG NO  
C-6



UNIFIED CLASSIFICATION	CL	CLIENT	LDC, INC.
SOIL TYPE #	3	PROJECT	DIDLEAU SUBDIVISION
TEST BORING #	2	JOB NO.	192115
DEPTH (FT)	5	TEST BY	BL



U.S.  
Sieve #

Percent  
Finer

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

3"  
1 1/2"  
3/4"  
1/2"  
3/8"

4	100.0%
10	99.6%
20	97.7%
40	95.7%
100	82.6%
200	54.2%

Swell  
Moisture at start  
Moisture at finish  
Moisture increase  
Initial dry density (pcf)  
Swell (psf)



**ENTECH  
ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE

1/17/20

JOB NO.:  
192115

FIG NO.:

C-7

## **APPENDIX D: Soil Survey Descriptions**

## El Paso County Area, Colorado

### 26—Elbeth sandy loam, 8 to 15 percent slopes

#### Map Unit Setting

*National map unit symbol:* 367y

*Elevation:* 7,300 to 7,600 feet

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Elbeth and similar soils:* 85 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Elbeth

##### Setting

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium derived from arkose

##### Typical profile

*A - 0 to 3 inches:* sandy loam

*E - 3 to 23 inches:* loamy sand

*Bt - 23 to 68 inches:* sandy clay loam

*C - 68 to 74 inches:* sandy clay loam

##### Properties and qualities

*Slope:* 8 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Natural 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

*Available water storage in profile:* Moderate (about 7.1 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

#### Minor Components

##### Other soils

*Percent of map unit:*

*Hydric soil rating:* No

**Pleasant**

*Percent of map unit:*

*Landform:* Depressions

*Hydric soil rating:* Yes

**Data Source Information**

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 17, Sep 13, 2019

## El Paso County Area, Colorado

### 40—Kettle gravelly loamy sand, 3 to 8 percent slopes

#### Map Unit Setting

*National map unit symbol:* 368g

*Elevation:* 7,000 to 7,700 feet

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Kettle and similar soils:* 85 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Kettle

##### Setting

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Sandy alluvium derived from arkose

##### Typical profile

*E - 0 to 16 inches:* gravelly loamy sand

*Bt - 16 to 40 inches:* gravelly sandy loam

*C - 40 to 60 inches:* extremely gravelly loamy sand

##### Properties and qualities

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Somewhat excessively drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High  
(2.00 to 6.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Low (about 3.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

#### Minor Components

##### Pleasant

*Percent of map unit:*

*Landform:* Depressions

*Hydric soil rating:* Yes

**Other soils**

*Percent of map unit:*

*Hydric soil rating:* No

**Data Source Information**

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 17, Sep 13, 2019

## **APPENDIX E: El Paso County Health Department Septic Records**



El Paso County, CO

Public Health

Needs Eval... Will Send In.

Prevent • Promote • Protect

Environmental Health Division

1675 W. Garden of the Gods Rd., Suite 2044  
Colorado Springs, CO 80907  
(719) 578-3199 phone  
(719) 578-3188 fax  
www.elpasocountyhealth.org

9/14/2013

**APPLICATION FOR AN ON-SITE WASTEWATER TREATMENT SYSTEM PERMIT**

☐ NEW PERMIT ☐ MAJOR REPAIR PERMIT ☒ MINOR REPAIR PERMIT

Owner Jon Didlo Daytime Phone 495-3204  
System Installer M&M Construction Daytime Phone 719-334-7726  
Property Address 7935 Forest Heights Cir City and Zip Black Forest 80908  
Owners Mailing Address 7935 Forest Heights Cir  
Email Address WlandM Construction Inc. com Fax # 683-2337  
Tax Schedule # 5209000050 Lot Size 2.5 acrs.  
Site Located Inside City Limits ☐ Yes ☒ No Primary Contact ☐ Owner ☒ Contractor  
Proposed Use: ☒ Single Family ☐ Multi-Family ☐ Commercial  
Water Supply: ☒ Well ☐ Cistern ☐ Municipal Number of Bedrooms 3  
☐ Pickup: ☐ Fax: ☒ Email:

**CURRENT FEES AS APPROVED BY THE EL PASO COUNTY BOARD OF HEALTH**

**New Permit:** \$440.00 (EPCPH Charge) + \$147.00 (EPC Planning Dept. Surcharge) + \$23.00 (CDPHE Surcharge) = \$610.00

**Major Repair Permit:** \$494.00 (EPCPH Charge) + \$23.00 (CDPHE Surcharge) = \$517.00

**Minor Repair Permit:** \$188.00 (EPCPH Charge) + \$23.00 (CDPHE Surcharge) = \$211.00

- All Payments are due at the time of application submittal; by cash, check or major credit card (Visa / MC)
- This permit will expire one year from the date of issuance.

I certify that the information provided on this application is in compliance with Section 8.3, Chapter 8 of the Onsite Wastewater System (OWS) Regulations of the El Paso County Board of Health. I also authorize the assigned representative of El Paso County Public Health to enter onto this property in order to obtain information necessary for the issuance of a permit.

Applicants Signature: Monty Don Lyke Date: 9/16/2013

Site Insp. Date: \_\_\_\_\_ Perc. Rate: \_\_\_\_\_ Permit # 0N0033102

E.H.S. Review Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date to: E.P.C. Development Services \_\_\_\_\_ Flood Plain and Enumerations \_\_\_\_\_

Permit Requirements: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Min. Septic Tank Capacity \_\_\_\_\_

Min. Absorption Area \_\_\_\_\_

E.H. Specialist \_\_\_\_\_ Date \_\_\_\_\_ ☐ Approved ☐ Denied

Reviewed 03/22/2013

Chad



- 1) We require an original copy of your PERCOLATION TEST with a licensed engineer's (P.E.) stamp and signature as well as a plot plan of the test hole locations with measurements from a fixed reference point.
- 2) Property address or lot number must be posted and clearly visible from the road. The percolation holes must be clearly marked or an additional charge for a return trip to the site may be assessed.
- 3) A plot plan must be drawn on an 8 1/2" x 11" sheet of paper and shall include the following items:

a) North Arrow	e) Proposed Septic System Site	h) Distance of Percolation
b) Property Lines	f) Alternate Septic System Site	Test to Two Property
c) Property Dimensions	g) Driveway & Name of Adjoining	Lines.
d) All Existing and Proposed Buildings	Street	
- 4) Additional items that shall be included on the plot plan if they apply to your site:

a) Proposed &/or Existing Wells	e) Drainage Ways; Existing or Proposed
b) Wells on Adjacent Properties	(ie: Streams, Dry Gulch, etc...)
c) Water Lines	f) Subsoil Drains
d) Bodies of water (ie: Lake, Pond)	
- 5) Please provide below complete and accurate directions to the property from a main highway.

EL PASO COUNTY HEALTH DEPARTMENT  
INDIVIDUAL SEWAGE DISPOSAL INSPECTION FORM

0N0033102

Permit # 2752

Date 8/26/91 P

Tax# 5209000050

APPROVED YES ☒ NO ☐

ENVIRONMENTALIST Krueger

Address 79.35 FOREST HEIGHTS

Owner DIDLO

Legal Description SAME

Residence ☒ Commercial ☐ # of Bedrooms 3 System Installer MOSE

SEPTIC TANK

Commercial ☒ Noncommercial ☐ Measurements: L        W        D       

Construction Material CONCRETE Liq. Cap. 1250

DISPOSAL FIELD

Exc. Depth 24-36" Width 36" Total Length 194' Sq. Ft. 582

Rock RIVER Depth 12" Under 6" Over 2"

Rockless System: Diameter of Pipe       

Seepage Pits: Number of rings        Lining Material        Sq. Ft.       

Working Depth        Width       

Engineer Design Yes ☐ Type        Engineer Approval Letter Yes ☐

Well 50 feet from Tank yes 100 feet from leach field yes

Well Installed at Time of Septic System Inspection Yes ☒ No ☐ Public Water       

\* APPROVED BY FIELD VERIFICATION ON AUG 26, 1991 - PIPE, ROCK AS FIELD VISUAL  
ATTACHED MAP - BY INSTALLER - APPEARS ONLY 2 LINES OF APP. 100' EACH -