TRANSPORTATION MEMORANDUM

For

Flying Horse North Filing 9
El Paso County, Colorado
PCD File No. PUDSP263

August 2026
Revised October 2026
Revised November 2026

Prepared for:

Flying Horse Development
2138 Flying Horse Club Drive
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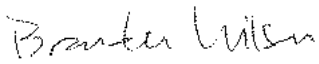


Engineer in Responsible Charge:
Brandon Wilson, PE

25-122559

Traffic Engineer's Statement

The attached traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



11/13/2026

Brandon Wilson, P.E. #68282 Date

Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

_____ _____

Drew Balsick Date
Flying Horse Development
2138 Flying Horse Club Drive
Colorado Springs, CO 80921

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I. Introduction

Project Overview

This Transportation Memorandum is provided as a planning document and addresses the capacity, geometric, and control requirements associated with the development entitled Flying Horse North Filing 9. This analysis was prepared in accordance with Appendix B of the County's Engineering Criteria Manual (ECM)[1] to support the Flying Horse North Filing No. 9 PUD & Preliminary Plan Major Amendment.

This traffic impact study has been revised to address County review comments made to the October 2026 version regarding additional discussion for right-of-way and cross-sectional criteria for Old Stagecoach Road.

This proposed development consists of 11 residential lots designated for single-family detached homes. The development is located near the southwest corner of Old Stagecoach Road and Allen Ranch Road in El Paso County, Colorado.

Study Area

The study area to be examined in this analysis encompasses all adjacent roadways, intersections ,and high-volume access drives, which includes the Allen Ranch Road intersections with Old Stagecoach Road and the proposed Ace Way.

Figure 1 illustrates location of the site and study intersections.

Site Description

The current overall 2016 Flying Horse North PUD Preliminary Plan allows for construction of 283 residential lots on approximately 1,418 acres of land (PCD File No. PUD162). A Major PUD Amendment has been approved to increase the density by 16 lots for a gross total of 299 residential lots (PCD File No. PUDSP252).

Land for the development of Filing 9 is approximately 14 acres in size, currently vacant, and surrounded by a mix of residential and recreational land uses. The previously approved Flying Horse North Updated Traffic Impact Analysis (PCD File No. PUD162) had assumed development of 10 single-family detached homes in the same development area as currently proposed with this project.

[1] El Paso County Engineering Criteria Manual, El Paso County, January 9, 2025.

It is important to note that within subsequent plans for the area, a resort hotel with supporting casitas and verandas uses had been proposed. At that time, it is understood that surrounding infrastructure had been improved to support the anticipated traffic caused by the resort hotel and its supporting casitas and verandas. These improvements include the widening of Allen Ranch Road along Filing 9's frontage to accommodate a typical modified urban residential local cross-section.

With development of Flying Horse North Filing 9, a resort hotel and its supporting uses are no longer being proposed. Instead, the development of Filing 9 is understood to entail the new construction of 11 single-family detached homes. This brings the total gross density for Flying Horse North to 310 residential lots.

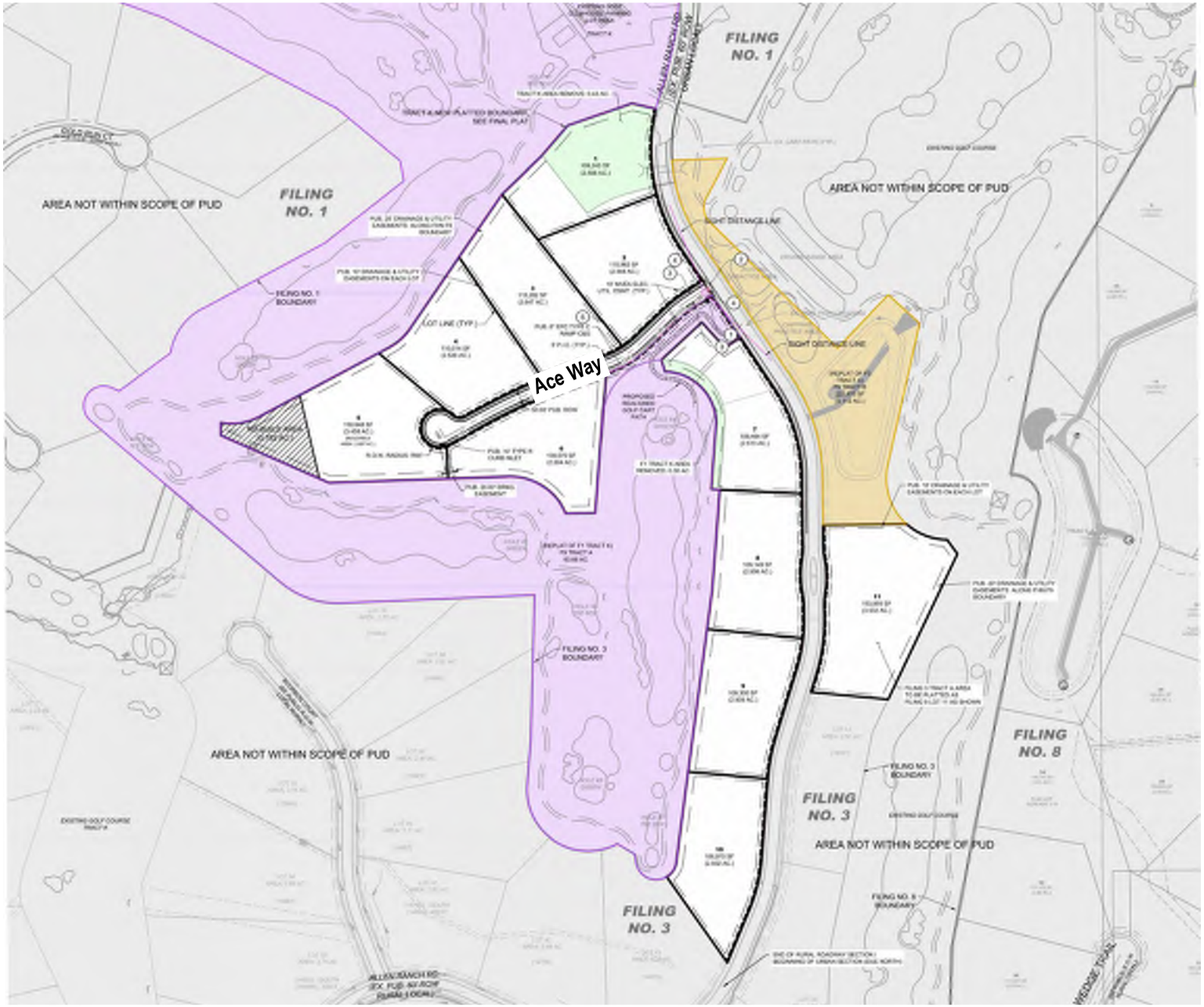
Proposed access to the development is general and provided via one full-movement access onto Old Stagecoach Road via Allen Ranch Road, and a proposed full-movement access onto Allen Ranch Road via Ace Way.

For purposes of this study, it is anticipated that development construction would be completed by end of Year 2028.

General site and access locations are shown on Figure 1.

The PUD site plan, as prepared by HR Green, is shown in Figure 2. This plan is provided for illustrative purposes only.


North
Not to Scale
Old Stagecoach Road
Development Site
Allen Ranch Road
Sandbagger Drive
Rubble Drive
Black Forest Road
Vessey Road


North
Not to Scale
FILING NO. 1
AREA NOT WITHIN SCOPE OF PUD
FILING NO. 1
AREA NOT WITHIN SCOPE OF PUD
SIGHT DISTANCE LINE
Ace Way
FILING NO. 1 BOUNDARY
LOT LINE (TYP.)
FILING NO. 3 BOUNDARY
AREA NOT WITHIN SCOPE OF PUD
FILING NO. 8
FILING NO. 3
FILING NO. 3 BOUNDARY
AREA NOT WITHIN SCOPE OF PUD
FILING NO. 3
FILING NO. 8 BOUNDARY

Existing and Committed Surface Transportation Network

Within the study area, regional access to the proposed development area is provided by way of Old Stagecoach Road while local access is provided via Allen Ranch Road. A brief description of each roadway, based on the County's Major Transportation Corridors Plan (MTCP)[2] and the ECM, is provided below:

> Old Stagecoach Road is an east-west, El Paso County-owned roadway having two through lanes (one lane in each direction) with a combination of shared and exclusive turn lanes at the intersection within the study area. The County's MTCP categorizes Old Stagecoach Road as a rural minor collector roadway and accommodates a posted speed limit of 35 MPH. Old Stagecoach Road ends at Black Forest Road, continuing east as Terra Ridge Circle, and ends at Shortwall Drive, continuing west as Stagecoach Road.
>
> Allen Ranch Road is a north-south, El Paso County-owned roadway having two through lanes (one lane in each direction) with shared turn lanes at the intersection within the study area. Allen Ranch Road is unclassified in the County's MTCP. However, per Section 2.2.4 of the County's ECM and the roadway's estimated right-of-way (ROW) width, Allen Ranch Road has an urban residential local roadway classification with a design speed limit of 25 MPH.

All study intersections operate under stop-controlled or roundabout-controlled conditions. A stop-controlled intersection is defined as a roadway intersection where vehicle rights-of-way are controlled by one or more "STOP" signs.

No regional or specific improvements for the above-described roadway are known to be planned or committed at this time. The study area roadways appear to be built to their ultimate cross-sections.

[2] El Paso County Major Transportation Corridors Plan, Felsburg Holt & Ullevig, July 2024.

II. Existing Traffic Conditions

Morning (AM) and afternoon (PM) peak hour traffic counts were collected at the intersection of Old Stagecoach Road with Allen Ranch Road. Average daily traffic (ADT) volumes were collected over a 24-hour period on Old Stagecoach Road. Counts were collected on Thursday, December 12, 2024, with AM peak hour counts being collected during the period of 7:00 a.m. to 9:00 a.m., and PM peak hour counts being collected during the period of 4:00 p.m. to 6:00 p.m., and include existing Flying Horse traffic.

These peak hour and 24-hour traffic volume counts were obtained from the previously approved Flying Horse North Major PUD Amendment Master Traffic Impact Study[3]. These referenced counts were then grown to Year 2026 at a conservative annual growth of three percent. The three percent compounded annual growth rate was determined using population growth estimates provided by the Pike's Peak Area Council of Governments' (PPACG) 2045 Long Range Transportation Plan[4], as well as traffic data provided by CDOT's Online Transportation Information System (OTIS), along the adjacent segment of State Highway 83. PPACG's 2045 Long Range Transportation Plan anticipates a 20-year growth rate between one and two percent, while CDOT's OTIS anticipates a 20-year growth rate between two and three percent.

Existing volumes and intersection geometry are shown in Figure 3.

Referenced traffic count data is included for reference in Appendix A.

[3] Flying Horse North Major PUD Amendment: Master Traffic Impact Study, SM ROCHA, LLC, January 2026.
[4] Moving Forward 2045: Pikes Peak Area Regional Transportation Plan, Pikes Peak Area Council of Governments, January 2020.

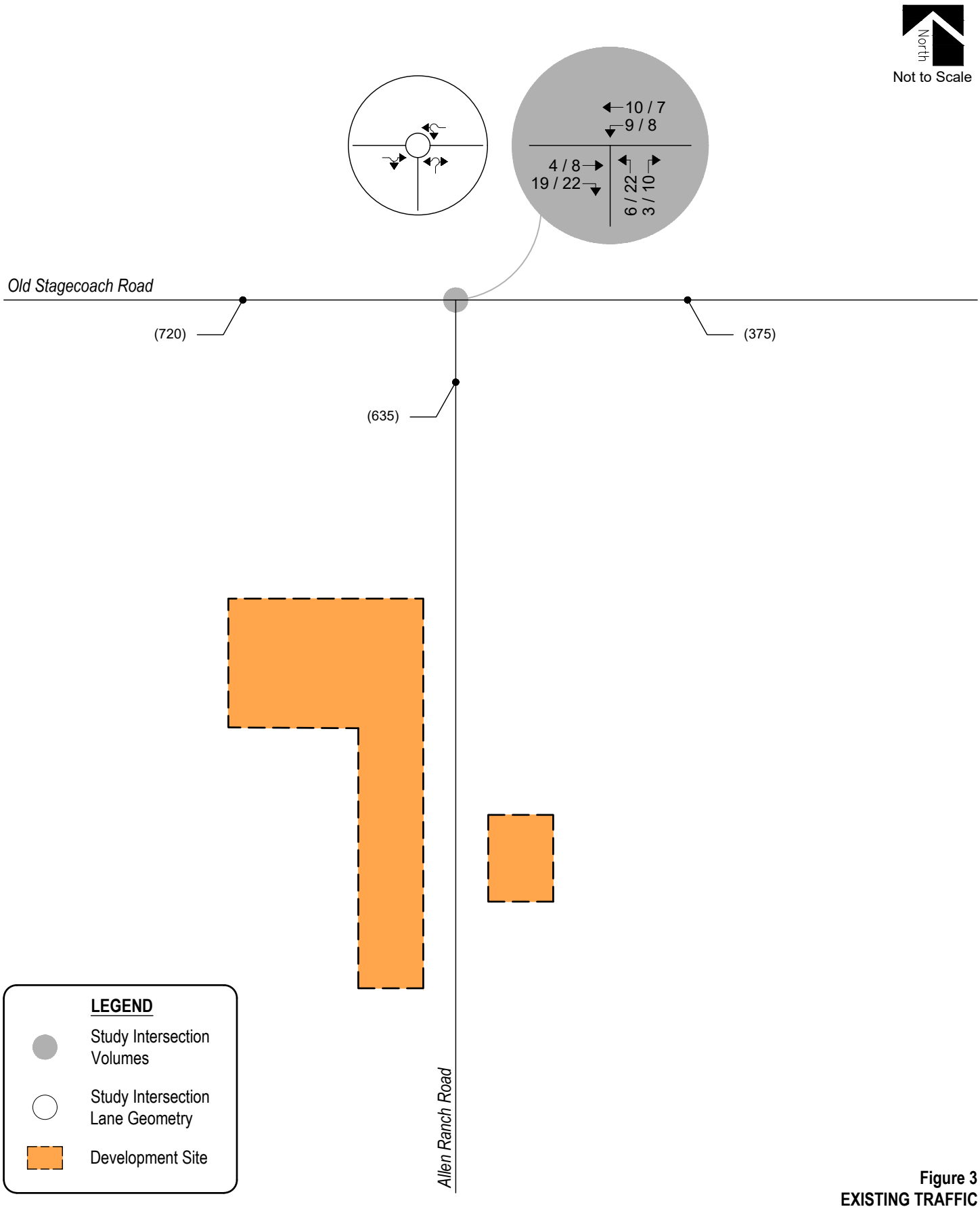


Figure 3
EXISTING TRAFFIC
Volumes & Intersection Geometry
AM / PM Peak Traffic Hour
(ADT) : Average Daily Traffic

Peak Hour Intersection Levels of Service – Existing Traffic

The Unsignalized and Roundabout Intersection Analysis techniques, as published in the Highway Capacity Manual (HCM), 7th Edition, by the Transportation Research Board and as incorporated into the SYNCHRO computer program, were used to analyze the study intersections for existing and future traffic conditions. These nationally accepted technique allows for the determination of intersection level of service (LOS) based on the congestion and delay of each traffic movement, the volume-to-capacity ratio, and control delay for each approach.

Pursuant to Section B.4.1.A of the County's ECM, the design objective for each scenario of this study shall be level of service "D". Level of service is a method of measurement used by transportation professionals to quantify a driver's perception of travel conditions that include travel time, number of stops, and total amount of stopped delay experienced on a roadway network. The HCM categorizes level of service into a range from "A" which indicates little, if any, vehicle delay, to "F" which indicates a level of operation considered unacceptable to most drivers. These levels of service grades with brief descriptions of the operating condition, for unsignalized and signalized intersections, are included for reference in Appendix B and have been used throughout this study.

The level of service analyses results for existing conditions are summarized in Table 1.

Intersection capacity worksheets developed for this study are provided in Appendix C.

Table 1 – Intersection Capacity Analysis Summary – Existing Traffic

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Old Stagecoach Road / Allen Ranch Road (Roundabout)		
Eastbound Through and Right	A	A
Westbound Left and Through	A	A
Northbound Left and Right	A	A

Key: Roundabout Intersection: Level of Service

Existing Traffic Analysis Results

Under existing conditions, operational analysis shows that the roundabout-controlled intersection of Old Stagecoach Road with Allen Ranch Road has overall operations at LOS A during the morning and afternoon peak traffic hours.

III. Future Traffic Conditions Without Proposed Development

Background traffic is the traffic projected to be on area roadways without consideration of the proposed development. Background traffic includes traffic generated by development of vacant parcels in the area.

To account for projected increases in background traffic for Year 2028, a compounded annual growth rate was determined using population growth estimates provided by PPACG's 2045 Long Range Transportation Plan, as well as traffic data provided by CDOT's OTIS, along the adjacent segment of State Highway 83. PPACG's 2045 Long Range Transportation Plan anticipates a 20-year growth rate between one and two percent, while CDOT's OTIS anticipates a 20-year growth rate between two and three percent. Therefore, in order to provide for a conservative analysis, a growth rate of three percent was applied to existing traffic volumes. This annual growth rate is also considered to be consistent with long-term regional growth projections and the level of in-fill development expected within the area.

It is important to note that ingress and egress traffic volumes along Allen Ranch Road at Old Stagecoach Road are not subject to annual growth patterns since this access drive does not provide connection to other roadways, therefore does not serve regional traffic.

To account for projected traffic from adjacent developments not yet built, trip generation estimates from traffic studies associated with adjacent future development were added to background traffic volumes. These future adjacent developments include:

- Flying Horse North Major PUD Amendment
- Flying Horse North Filing 4[5]
- Flying Horse North Filing 5[6]

Pursuant to the area roadway improvements discussed in Section I, Year 2028 background traffic conditions assume no roadway improvements to accommodate regional transportation demands. This assumption provides for a conservative analysis.

Projected background traffic volumes and intersection geometry for Year 2028 are shown in Figure 4.

[5] Flying Horse North Filing 4: Traffic Generation Analysis, SM ROCHA, LLC, February 2025.
[6] Flying Horse North Filing 5: Traffic Generation Analysis, SM ROCHA, LLC, November 2024.

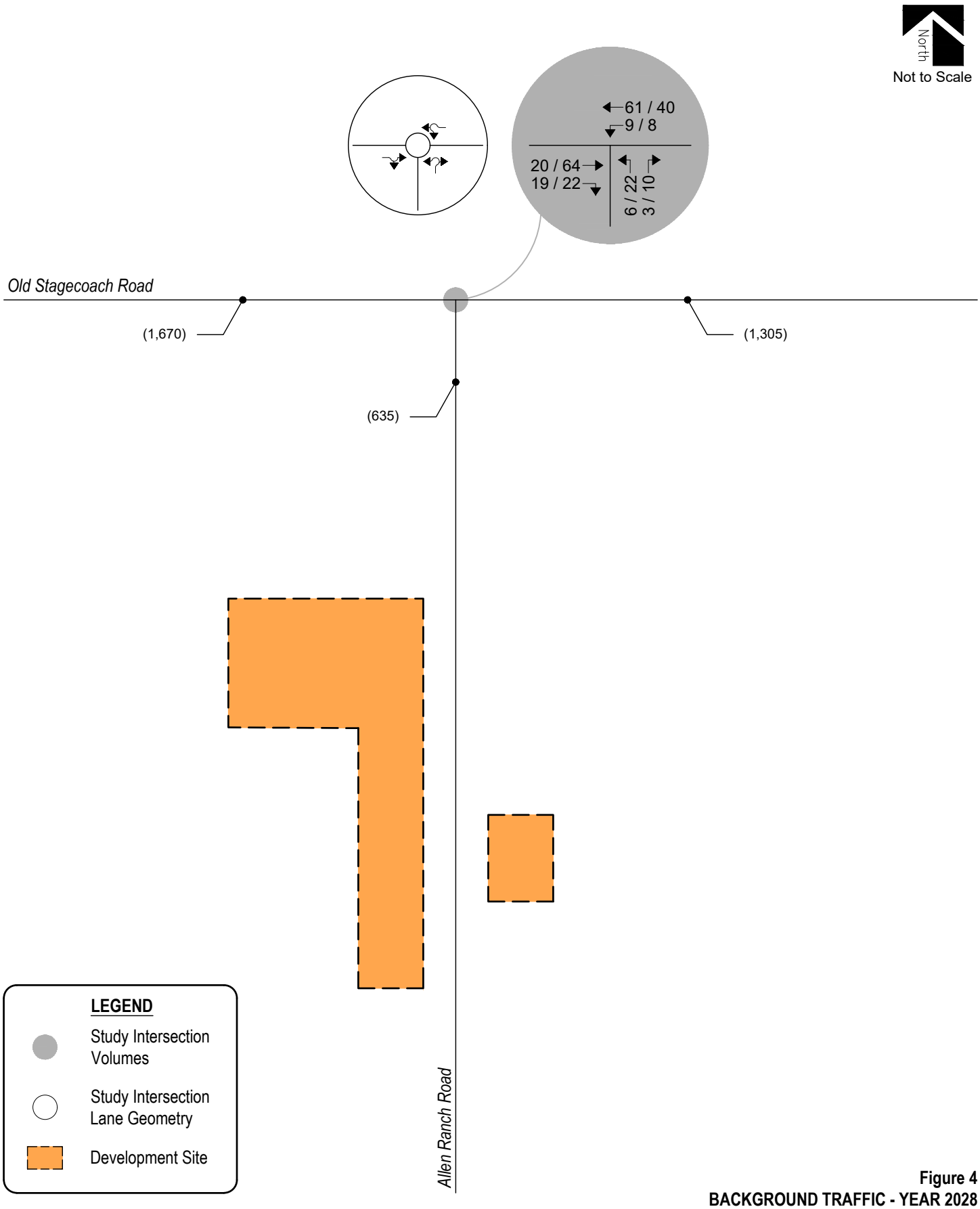


Figure 4
BACKGROUND TRAFFIC - YEAR 2028
Volumes & Intersection Geometry
AM / PM Peak Traffic Hour
(ADT) : Average Daily Traffic

Peak Hour Intersection Levels of Service – Background Traffic

As with existing traffic conditions, the operations of study intersections were analyzed under background conditions, without the proposed development, using the SYNCHRO computer program.

Background traffic level of service analysis results for Year 2028 are listed in Table 2.

Definitions of levels of service are given in Appendix B. Intersection capacity worksheets are provided in Appendix C.

Table 2 – Intersection Capacity Analysis Summary – Background Traffic – Year 2028

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Old Stagecoach Road / Allen Ranch Road (Roundabout)		
Eastbound Through and Right	A	A
Westbound Left and Through	A	A
Northbound Left and Right	A	A

Key: Roundabout Intersection: Level of Service

Background Traffic Analysis Results – Year 2028

Year 2028 background traffic analysis indicates that the roundabout-controlled intersection of Old Stagecoach Road with Allen Ranch Road continues to offer turning movement operations at LOS A during the morning and afternoon peak traffic hours.

These intersection operations are similar to existing conditions.

IV. Proposed Project Traffic

Trip Generation

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report entitled Trip Generation Manual, 12th Edition, were applied to the proposed land use in order to estimate average daily traffic (ADT), AM Peak Hour, and PM Peak Hour vehicle trips. A vehicle trip is defined as a one-way vehicle movement from a point of origin to a point of destination.

The ITE land use code 210 (Single-Family Detached Housing) was used for estimating trip generation because of its best fit to the proposed land use description.

Trip generation rates used in this study are presented in Table 3.

Table 3 – Trip Generation Rates

ITE CODE	LAND USE	UNIT	TRIP GENERATION RATES						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	DU	9.09	0.19	0.51	0.70	0.58	0.35	0.93

Key: DU = Dwelling Units.
Note: All data and calculations above are subject to being rounded to nearest value.

Table 4 illustrates projected ADT, AM Peak Hour, and PM Peak Hour traffic volumes likely generated by the proposed development upon build-out.

Table 4 – Trip Generation Summary

ITE CODE	LAND USE	SIZE	TOTAL TRIPS GENERATED						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	11 DU	100	2	6	8	6	4	10
		Total:	*100*	*2*	*6*	*8*	*6*	*4*	*10*

Key: DU = Dwelling Units.
Note: All data and calculations above are subject to being rounded to nearest value.

Upon build-out, Table 4 illustrates that the proposed development has the potential to generate approximately 100 daily vehicle trips with 8 of those occurring during the morning peak hour and 10 during the afternoon peak hour.

Adjustments to Trip Generation Rates

A development of this type is not likely to attract trips from within area land uses nor pass-by or diverted link trips from the adjacent roadway system, therefore no trip reduction was taken in this analysis.

Trip Distribution

The overall directional distribution of site-generated traffic was determined based on the location of development site within the County, proposed and existing area land uses, allowed turning movements, available roadway network, and in reference to historical traffic count data provided by CDOT's Traffic Count Database System (TCDS)[7].

Overall trip distribution patterns for the development are shown on Figure 5.

Trip Assignment

Traffic assignment is how generated and distributed vehicle trips are expected to be loaded onto the available roadway network.

Applying trip distribution patterns to site-generated traffic provides the overall site-generated trip assignments shown on Figure 5.

[7] Transportation Data Management System, MS2, 2025.

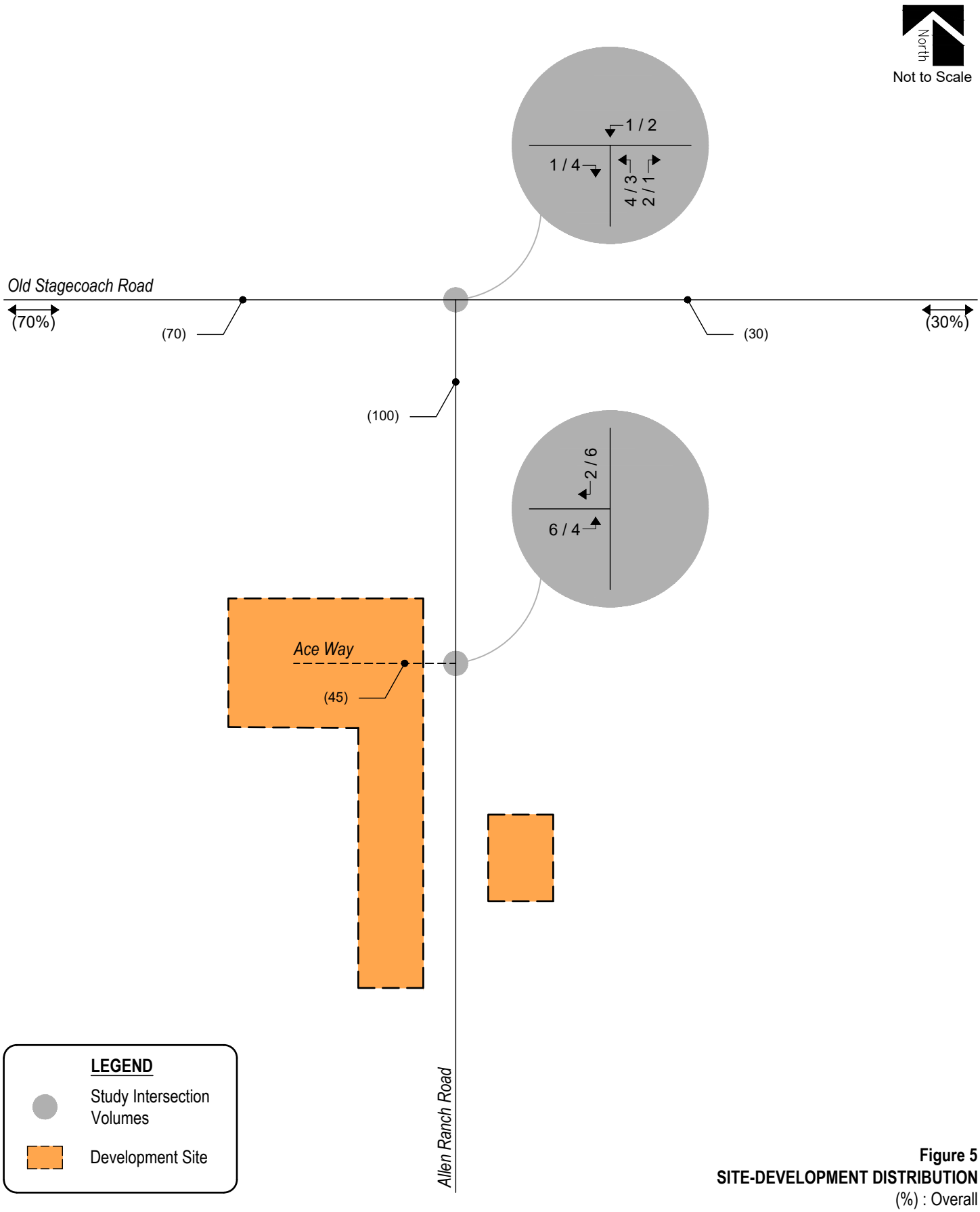


Figure 5
SITE-DEVELOPMENT DISTRIBUTION
(%) : Overall
SITE-GENERATED TRIPS
AM / PM Peak Hour
(ADT) : Average Daily Traffic

V. Future Traffic Conditions With Proposed Development

Total traffic is the traffic projected to be on area roadways with consideration of the proposed development. Total traffic includes background traffic projections for Year 2028 with consideration of site-generated traffic. For analysis purposes, it was assumed that development construction would be completed by end of Year 2028.

Pursuant to area roadway improvement discussions provided in Section III, Year 2028 total traffic conditions assume no roadway improvements to accommodate regional transportation demands. Roadway improvements associated with site development are expected to be limited to site access and frontage as required by the governing agency.

Total Traffic Auxiliary Lane Analysis

Auxiliary lanes for site development access onto Allen Ranch Road were evaluated based on the County's ECM.

Pursuant to Section 2.3.7 of the County's ECM, left and right turn deceleration lanes are required along minor arterial and lower classification roadways when the left and right turning volumes exceed 25 and 50 vehicles per hour, respectively.

Therefore, considering development build-out, an evaluation of auxiliary lane requirements reveals how exclusive left turn and right turn deceleration lanes along Allen Ranch Road are not warranted.

Projected Year 2028 total traffic volumes and intersection geometry are shown in Figure 6.

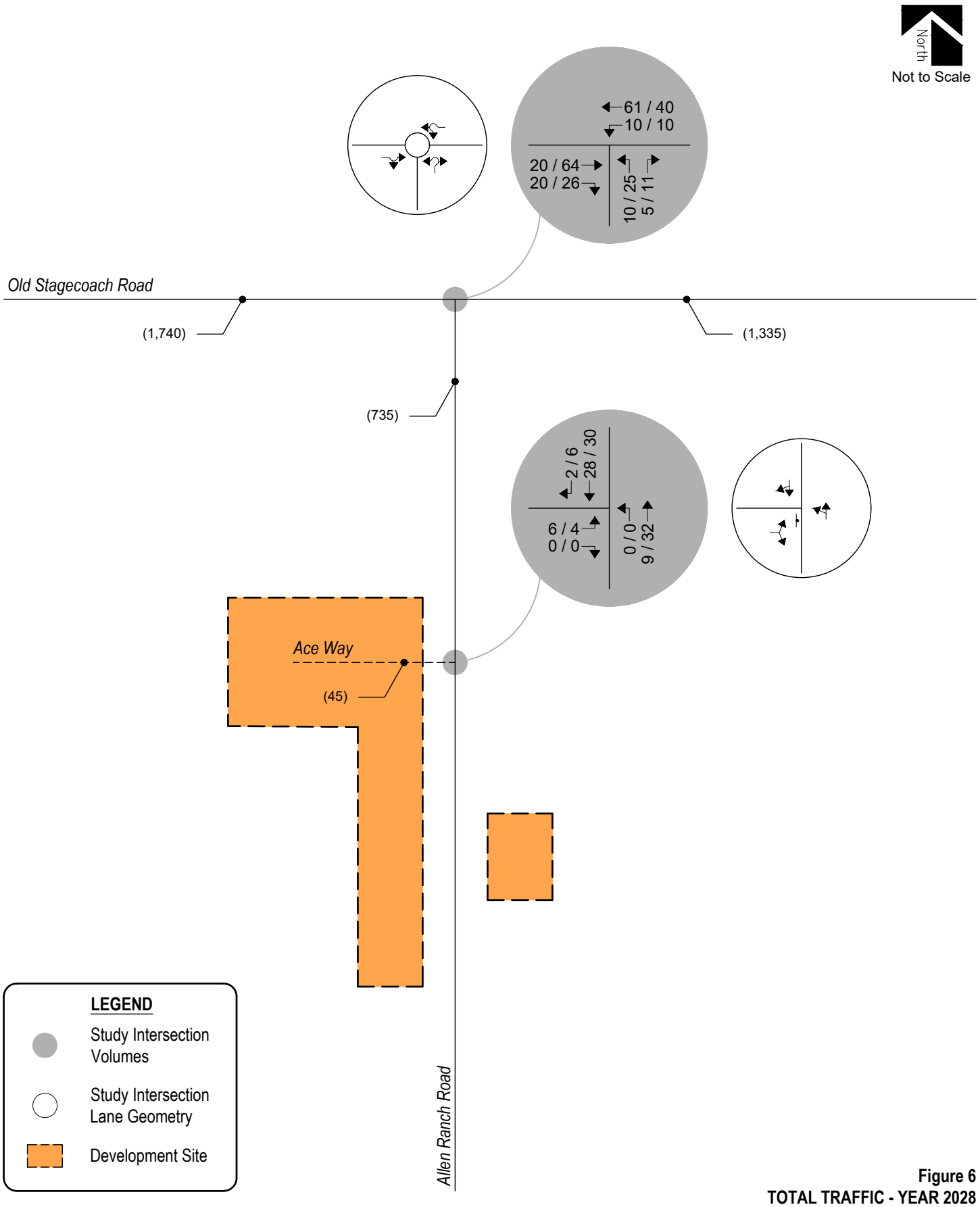


Figure 6
TOTAL TRAFFIC - YEAR 2028
Volumes & Intersection Geometry
AM / PM Peak Traffic Hour
(ADT) : Average Daily Traffic

Peak Hour Intersection Levels of Service – Total Traffic

As with background traffic, the operations of the study intersections were analyzed under projected total traffic conditions using the SYNCHRO computer program. The analyses and procedures were performed in accordance with the latest HCM and are based upon the worst-case conditions that occur during a typical weekday upon build-out of site development and analyzed land uses. Therefore, study intersections are likely to operate with traffic conditions better than those described within this study, which represent the peak hours of weekday operations only.

Total traffic level of service analysis results for Year 2028 are summarized in Table 5.

Definitions of levels of service are given in Appendix B. Intersection capacity worksheets are provided in Appendix C.

Table 5 – Intersection Capacity Analysis Summary – Total Traffic – Year 2028

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Old Stagecoach Road / Allen Ranch Road (Roundabout)		
Eastbound Through and Right	A	A
Westbound Left and Through	A	A
Northbound Left and Right	A	A
Allen Ranch Road / Ace Way (Stop-Controlled)		
Eastbound Left and Right	A	A
Northbound Left and Through	A	A

Key: Roundabout Intersection: Level of Service
Stop-Controlled Intersection: Level of Service

Total Traffic Analysis Results Upon Development Build-Out

Table 5 illustrates how, by Year 2028 and upon development build-out, the roundabout-controlled intersection of Old Stagecoach Road with Allen Ranch Road maintains LOS A operations during peak traffic periods. Compared to the background traffic analysis, the traffic generated by the proposed development is not expected to significantly change the operations of the study intersection.

The stop-controlled intersection of Allen Ranch Road with Ace Way forecasts turning movement operations at LOS A during peak traffic periods.

These intersection operations are similar to background conditions.

VI. Project Impacts

It is emphasized that the analyses and procedures described in this study were performed in accordance with the latest HCM and are based upon the worst-case conditions that occur during a typical weekday upon build-out of site development and analyzed land uses. Therefore, study intersections are likely to operate with traffic conditions better than those described within this study, which represent the peak hours of weekday operations only.

Development Impacts

Analysis of future traffic conditions indicates that the addition of site-generated traffic is expected to create no negative impact to traffic operations for the existing and surrounding roadway system upon roadway and intersection control improvements assumed within this analysis. With all conservative assumptions defined in this analysis, the study intersections are projected to operate at future levels of service comparable to background traffic conditions.

Sight Distance and Access Spacing

Pursuant to Section B.2.4.D of the County's ECM, an assessment of the appropriateness of proposed access locations was considered.

Table 2-35 of the County's ECM interprets that 390 feet of entering sight distance is required along Allen Ranch Road.

The PUD site plan further shows how approximately one-quarter-mile of spacing is being provided along Allen Ranch Road between Old Stagecoach Road and Ace Way. As a result, proposed site access drive location serving Filing 9 is believed to be appropriate.

With the understanding that this PUD site plan was prepared in accordance to Section 2.3.6 of the County's ECM and Section 9.5.3.2 of the American Association of State Highway and Transportation Officials' (AASHTO) A Policy on Geometric design of Highway and Streets (Green Book)[8], access spacing and sight distance along Allen Ranch Road is not expected to be an issue.

A conceptual sight distance exhibit illustrating approximate intersection sight distance triangles is included for reference in Appendix D.

[8] A Policy on Geometric Design of Highways and Streets (7th Edition), American Association of State Highway and Transportation Officials, 2018.

Pedestrian and Bicycle Facility Assessment

In accordance with Section B.2.4.D of the County's ECM, an assessment to adequacy of pedestrian and bicycle facilities within the study area was considered.

The study area already accommodates pedestrians and bicyclists with attached and detached sidewalks along either side of Allen Ranch Road.

The proposed development would accommodate pedestrians and bicyclists with attached sidewalks along either side of Ace Way and connecting to Allen Ranch Road, as well as preservation of the golf cart paths associated with Flying Horse North Golf Course.

Roadway Signage and Striping

An evaluation of roadway striping was assessed along the study segment of Allen Ranch Road following guidelines provided by the latest Manual on Uniform Traffic Control Devices (MUTCD)[9].

As discussed previously, Allen Ranch Road adjacent to the development site was recently improved to accommodate a typical modified urban residential local cross-section. As such, pursuant to Section 3B.02 of the MUTCD, Allen Ranch Road is not required to provide yellow center line markings due to its anticipated ADT being less than 6,000 vehicle trips per day. For these same reasons, white edge line pavement markings are not warranted pursuant to Section 3.10 of the MUTCD.

Similarly, Ace Way does not require yellow center line markings nor white edge line pavement markings due to its proposed rural local classification and projected ADT.

No other roadway markings and striping were identified to be warranted.

Recommended Improvements

Roadway and intersection improvement recommendations were assessed pursuant to roadway descriptions discussed in Section I, projected peak hour traffic volumes, level of service results, and per requirements defined within the County's ECM.

Upon development build-out of Filing 9 and considering the projected daily traffic volume along Allen Ranch Road illustrated in Figure 6 (735 vehicle trips per day), the modified urban residential local cross-section is considered to be adequate in order to accommodate future traffic demand. Therefore, no improvements to Allen Ranch Road are being recommended.

[9] Manual on Uniform Traffic Control Devices, 11th Edition, Federal Highway Administration, December 2023.

Figure 6 also illustrates projected 24-hour volumes along Old Stagecoach Road upon development build-out (1,335 to 1,740 vehicle trips per day (vpd) east and west of Allen Ranch Road, respectively). With recently completed roadway widening improvements associated with Flying Horse North Filing 1, Old Stagecoach Road currently provides a rural minor collector cross-section (design ADT of 1,500 vpd per Table 2-5 of the County's ECM). Also associated with Flying Horse North Filing 1, the El Paso County Board of County Commissioners (BoCC) approved a deviation for Stagecoach Road (between State Highway 83 and Shortwall Drive) to allow its standards for design elements to remain as a Rural Minor Collector with an ADT threshold of 2,200 vpd (PCD File No. DEV1610). As such, since this development area was included within the 2,200 vpd threshold identified within the BoCC-approved deviation, and considering how the operational analyses performed throughout this study report nothing less than exceptionally favorable results, no improvements to Stagecoach Road / Old Stagecoach Road from State Highway 83 to Allen Ranch Road are being recommended.

The reasoning behind maintaining Old Stagecoach Road's cross-section and design elements as a rural minor collector roadway is similar to that approved by BoCC, which includes but may not be limited to;

1. Limited number of lots and their access drive locations with respect to adjacent lot access drives fronting Old Stagecoach Road,
2. Old Stagecoach Road would be single-loaded with no plans to develop additional lots along the south side of the roadway,
3. A Rural Minor Collector right-of-way and cross-section could accommodate projected traffic volumes,
4. The remainder of Old Stagecoach Road east of Black Forest Road would have projected volumes below 1,500 vpd,
5. Due to the number and size of proposed residential lots, parking along Old Stagecoach Road would rarely occur,
6. Unable to obtain additional right-of-way along Old Stagecoach Road,
7. The Rural Minor Collector roadway classification and its associated design elements (right-of-way, pavement thickness, pavement width, etc.) are believed to be more appropriate for the overall development area, whereas a Rural Major Collector roadway classification increases the design speed, right-of-way width, and cross-section. The approved pavement design for Stagecoach Road is provided for reference in Appendix F.

Pursuant to Section B.8 of the County's ECM, a deviation request will be provided to maintain Old Stagecoach Road's design elements as a Rural Minor Collector between Shortwall Drive and Allen Ranch Road (approximately 3,780 feet of corridor length).

As discussed previously, the Old Stagecoach Road intersection with Allen Ranch Road is expected to maintain adequate operations during their respective peak traffic hours. As such, no improvements to the intersection's current geometric design nor control type are recommended (i.e., provision of additional approach lanes, auxiliary lanes, bypass lanes, expansion of the roundabout's inscribed circle diameter, etc.). Moreover, no additional roadway signage nor striping improvements are recommended nor identified to be needed in order to meet governing requirements.

VII. Conclusion

This Transportation Memorandum addressed the capacity, geometric, and control requirements associated with the development entitled Flying Horse North Filing 9. This analysis was prepared in accordance with Appendix B of the County's ECM to support the Flying Horse North Filing No. 9 PUD & Preliminary Plan Major Amendment. This proposed development consists of 11 residential lots designated for single-family detached homes and is located near the southwest corner of Old Stagecoach Road with Allen Ranch Road in El Paso County, Colorado.

The study area examined in this analysis encompassed all adjacent roadways, intersections, and high-volume access drives, which includes the Allen Ranch Road intersections with Old Stagecoach Road and the proposed Ace Way.

Analysis was conducted for critical AM Peak Hour and PM Peak Hour traffic operations for existing traffic conditions, Year 2028 background traffic conditions, and Year 2028 total traffic conditions.

Analysis of existing traffic conditions indicates that the roundabout-controlled intersection of Old Stagecoach Road with Allen Ranch Road operates with LOS A turning movement operations during its respective peak hour periods.

Under Year 2028 background traffic conditions and assuming development of Flying Horse North Filing 4, Filing 5, and the Major PUD Amendment (Filings 6 through 8), operational analysis shows that the study intersection of Old Stagecoach Road with Allen Ranch Road is projected to maintain LOS A turning movement operations during peak traffic periods.

Analysis of future traffic conditions indicates that the addition of site-generated traffic is expected to create no negative impact to traffic operations for the existing and surrounding roadway system upon roadway and intersection control improvements assumed within this analysis. With all conservative assumptions defined in this analysis, the study intersections are projected to operate at future levels of service comparable to Year 2028 background traffic conditions. Proposed site access has long-term operations at LOS A during peak traffic periods and upon build-out.

Based on recommended roadway and intersection improvements evaluated, no improvements to the adjacent roadway network were determined to be warranted. Therefore, no improvements associated with Flying Horse North Filing 9 are being recommended.

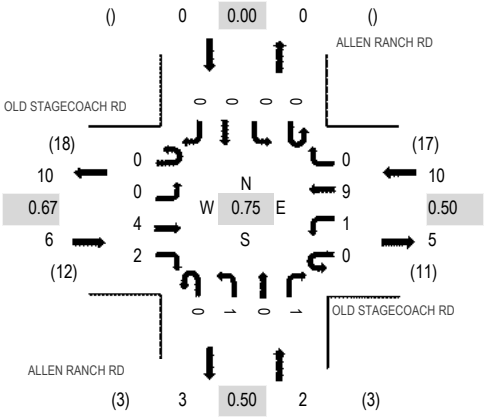
APPENDIX A

Traffic Count Data

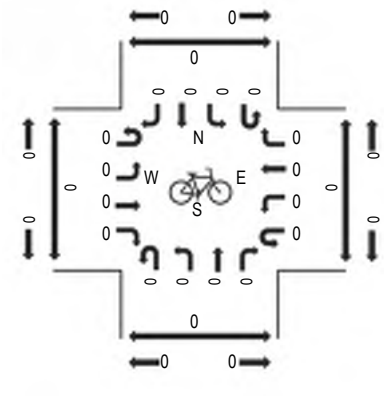
(303) 216-2439
www.alltrafficdata.net

Location: 7 ALLEN RANCH RD & OLD STAGECOACH RD AM
Date: Thursday, December 12, 2024
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

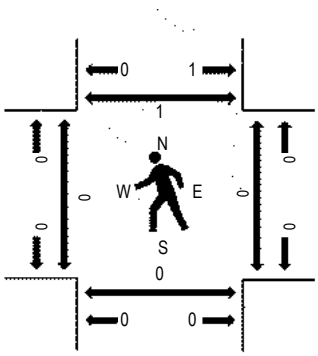
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

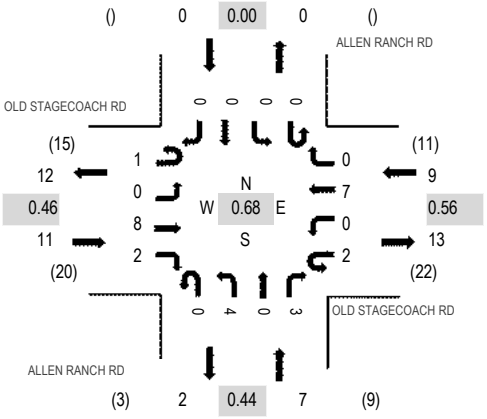
Traffic Counts - Motorized Vehicles

Interval Start Time	OLD STAGECOACH RD Eastbound				OLD STAGECOACH RD Westbound				ALLEN RANCH RD Northbound				ALLEN RANCH RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	5	17	0	0	0	0
7:15 AM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	4	16	0	0	0	0
7:30 AM	0	0	1	1	0	1	2	0	0	0	0	1	0	0	0	0	6	18	0	0	0	0
7:45 AM	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2	15	0	0	0	1
8:00 AM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	4	15	0	0	0	0
8:15 AM	0	0	0	1	0	0	5	0	0	0	0	0	0	0	0	0	6		0	0	0	0
8:30 AM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	3		0	0	0	0
8:45 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2		0	0	0	0
Count Total	0	0	10	2	0	1	16	0	0	2	0	1	0	0	0	0	32		0	0	0	1
Peak Hour	0	0	4	2	0	1	9	0	0	1	0	1	0	0	0	0	18		0	0	0	1

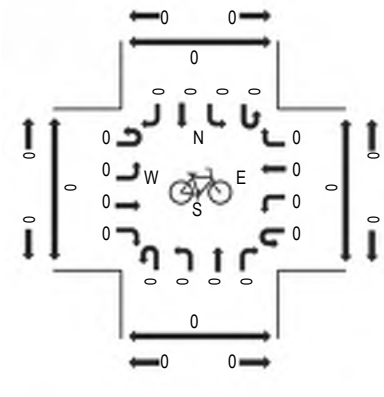
(303) 216-2439
www.alltrafficdata.net

Location: 7 ALLEN RANCH RD & OLD STAGECOACH RD PM
Date: Thursday, December 12, 2024
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:00 PM - 04:15 PM

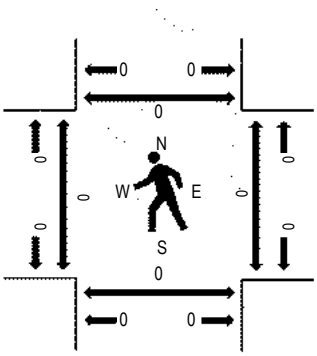
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	OLD STAGECOACH RD Eastbound				OLD STAGECOACH RD Westbound				ALLEN RANCH RD Northbound				ALLEN RANCH RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	0	4	2	0	0	2	0	0	2	0	0	0	0	0	0	10	27	0	0	0	0
4:15 PM	0	0	3	0	1	0	1	0	0	1	0	3	0	0	0	0	9	21	0	0	0	0
4:30 PM	0	0	1	0	1	0	3	0	0	0	0	0	0	0	0	0	5	14	0	0	0	0
4:45 PM	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	11	0	0	0	0
5:00 PM	0	0	2	1	0	0	0	0	0	1	0	0	0	0	0	0	4	13	0	0	0	0
5:15 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2		0	0	0	0
5:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2		0	0	0	0
5:45 PM	0	0	3	0	0	0	1	0	0	0	0	1	0	0	0	0	5		0	0	0	0
Count Total	1	0	16	3	2	0	9	0	0	5	0	4	0	0	0	0	40		0	0	0	0
Peak Hour	1	0	8	2	2	0	7	0	0	4	0	3	0	0	0	0	27		0	0	0	0

All Traffic Data Services
12200 W 52nd Ave
Wheat Ridge, CO 80033
www.alltrafficdata.net

Site Code: 17
Station ID: 17
OLD STAGECOACH RD W.O. BLACK FOREST RD

Start Time	12-Dec-24 Thu	EB	WB							Total
12:00 AM		0	0							0
01:00		0	0							0
02:00		0	0							0
03:00		0	0							0
04:00		0	0							0
05:00		0	1							1
06:00		1	4							5
07:00		**7**	8							15
08:00		5	**12**							**17**
09:00		3	3							6
10:00		4	6							10
11:00		3	4							7
12:00 PM		4	6							10
01:00		3	0							3
02:00		12	8							20
03:00		10	**10**							20
04:00		**17**	9							**26**
05:00		8	6							14
06:00		8	5							13
07:00		2	5							7
08:00		4	3							7
09:00		0	0							0
10:00		2	3							5
11:00		0	0							0
Total		93	93							186
Percent		50.0%	50.0%							
AM Peak	-	07:00	08:00	-	-	-	-	-	-	08:00
Vol.	-	7	12	-	-	-	-	-	-	17
PM Peak	-	16:00	15:00	-	-	-	-	-	-	16:00
Vol.	-	17	10	-	-	-	-	-	-	26
Grand Total		93	93							186
Percent		50.0%	50.0%							
ADT		ADT 186		AADT 186						

All Traffic Data Services
12200 W 52nd Ave
Wheat Ridge, CO 80033
www.alltrafficdata.net

Site Code: 18
Station ID: 18
OLD STAGECOACH RD E.O. SHORTWALL DR

Start Time	12-Dec-24 Thu	EB	WB							Total
12:00 AM		0	0							0
01:00		0	0							0
02:00		0	0							0
03:00		0	0							0
04:00		0	0							0
05:00		0	3							3
06:00		2	2							4
07:00		7	12							19
08:00		8	12							20
09:00		9	9							18
10:00		13	9							22
11:00		**14**	**13**							**27**
12:00 PM		4	11							15
01:00		9	5							14
02:00		16	15							31
03:00		15	9							24
04:00		**17**	**22**							**39**
05:00		14	9							23
06:00		7	9							16
07:00		3	1							4
08:00		6	2							8
09:00		3	1							4
10:00		2	1							3
11:00		0	0							0
Total		149	145							294
Percent		50.7%	49.3%							
AM Peak	-	11:00	11:00	-	-	-	-	-	-	11:00
Vol.	-	14	13	-	-	-	-	-	-	27
PM Peak	-	16:00	16:00	-	-	-	-	-	-	16:00
Vol.	-	17	22	-	-	-	-	-	-	39
Grand Total		149	145							294
Percent		50.7%	49.3%							
ADT		ADT 294		AADT 294						

APPENDIX B

Level of Service Definitions

The following information is referenced from the Highway Capacity Manual: A Guide for Multimodal Mobility Analysis, 7th Edition, Transportation Research Board, 2022: Chapter 19 – Signalized Intersections.

Motorized Vehicle Level of Service (LOS) for Signalized Intersections

Levels of service are defined to represent reasonable ranges in control delay.

LOS A Describes operations with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B Describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C Describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D Describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E Describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F Describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio[a]	
	$v/c \leq 1.0$	$v/c > 1.0$
≤ 10	A	F
> 10 – 20	B	F
> 20 – 35	C	F
> 35 – 55	D	F
> 55 – 80	E	F
> 80	F	F

Note: [a] For approach-based and intersectionwide assessments, LOS is defined solely by control delay.

The following information is referenced from the Highway Capacity Manual: A Guide for Multimodal Mobility Analysis, 7th Edition, Transportation Research Board, 2022: Chapter 20 – Two-Way Stop-Controlled Intersections, Chapter 21 – All-Way Stop-Controlled Intersections, and Chapter 22 - Roundabouts.

Motorized Vehicle Level of Service (LOS) for Unsignalized & Roundabout Intersections

LOS is a quantitative stratification of performance measure(s) representing quality of service. Quality of service describes how well a transportation facility or service operates from a traveler's perspective. LOS is measured on an A – F scale, with LOS A representing the best operating conditions from a traveler's perspective.

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio[a]	
	$v/c \leq 1.0$	$v/c > 1.0$
0 – 10	A	F
> 10 – 15	B	F
> 15 – 25	C	F
> 25 – 35	D	F
> 35 – 50	E	F
> 50	F	F

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

[a] For approaches and intersectionwide assessment, LOS is defined solely by control delay.

APPENDIX C

Capacity Worksheets

Intersection	
Intersection Delay, s/veh	2.8
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	25	21	10
Demand Flow Rate, veh/h	25	21	10
Vehicles Circulating, veh/h	10	7	4
Vehicles Exiting, veh/h	18	7	31
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.8	2.8	2.7
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	25	21	10
Cap Entry Lane, veh/h	1366	1370	1374
Entry HV Adj Factor	0.997	0.990	1.000
Flow Entry, veh/h	25	21	10
Cap Entry, veh/h	1362	1356	1374
V/C Ratio	0.018	0.015	0.007
Control Delay, s/veh	2.8	2.8	2.7
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Intersection Delay, s/veh	2.8
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	33	17	35
Demand Flow Rate, veh/h	33	17	35
Vehicles Circulating, veh/h	9	24	9
Vehicles Exiting, veh/h	32	20	33
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.8	2.8	2.8
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	33	17	35
Cap Entry Lane, veh/h	1367	1346	1367
Entry HV Adj Factor	0.995	0.991	1.000
Flow Entry, veh/h	33	17	35
Cap Entry, veh/h	1360	1334	1367
V/C Ratio	0.024	0.013	0.026
Control Delay, s/veh	2.8	2.8	2.8
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Intersection Delay, s/veh	3.0
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	43	76	10
Demand Flow Rate, veh/h	43	77	10
Vehicles Circulating, veh/h	10	7	22
Vehicles Exiting, veh/h	74	25	31
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.9	3.1	2.7
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	43	77	10
Cap Entry Lane, veh/h	1366	1370	1349
Entry HV Adj Factor	0.990	0.983	1.000
Flow Entry, veh/h	43	76	10
Cap Entry, veh/h	1352	1347	1349
V/C Ratio	0.031	0.056	0.007
Control Delay, s/veh	2.9	3.1	2.7
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	94	52	35
Demand Flow Rate, veh/h	95	53	35
Vehicles Circulating, veh/h	9	24	71
Vehicles Exiting, veh/h	68	82	33
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.2	3.0	3.0
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	95	53	35
Cap Entry Lane, veh/h	1367	1346	1283
Entry HV Adj Factor	0.985	0.984	1.000
Flow Entry, veh/h	94	52	35
Cap Entry, veh/h	1347	1325	1283
V/C Ratio	0.069	0.039	0.027
Control Delay, s/veh	3.2	3.0	3.0
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Intersection Delay, s/veh	3.0
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	44	77	16
Demand Flow Rate, veh/h	44	78	16
Vehicles Circulating, veh/h	11	11	22
Vehicles Exiting, veh/h	78	27	33
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.9	3.1	2.8
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	44	78	16
Cap Entry Lane, veh/h	1364	1364	1349
Entry HV Adj Factor	0.990	0.983	1.000
Flow Entry, veh/h	44	77	16
Cap Entry, veh/h	1351	1341	1349
V/C Ratio	0.032	0.057	0.012
Control Delay, s/veh	2.9	3.1	2.8
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	0	0	9	28	2
Future Vol, veh/h	6	0	0	9	28	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	0	0	10	30	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	41	32	33	0	-	0
Stage 1	32	-	-	-	-	-
Stage 2	10	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	970	1042	1579	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	1013	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	970	1042	1579	-	-	-
Mov Cap-2 Maneuver	970	-	-	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	1013	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	8.74	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1579	-	970	-	-
HCM Lane V/C Ratio	-	-	0.007	-	-
HCM Ctrl Dly (s/v)	0	-	8.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Intersection Delay, s/veh	3.2
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	98	54	39
Demand Flow Rate, veh/h	100	55	40
Vehicles Circulating, veh/h	11	28	71
Vehicles Exiting, veh/h	72	83	40
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.3	3.0	3.1
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	100	55	40
Cap Entry Lane, veh/h	1364	1341	1283
Entry HV Adj Factor	0.976	0.984	0.975
Flow Entry, veh/h	98	54	39
Cap Entry, veh/h	1332	1320	1251
V/C Ratio	0.073	0.041	0.031
Control Delay, s/veh	3.3	3.0	3.1
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	32	30	6
Future Vol, veh/h	4	0	0	32	30	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	0	35	33	7

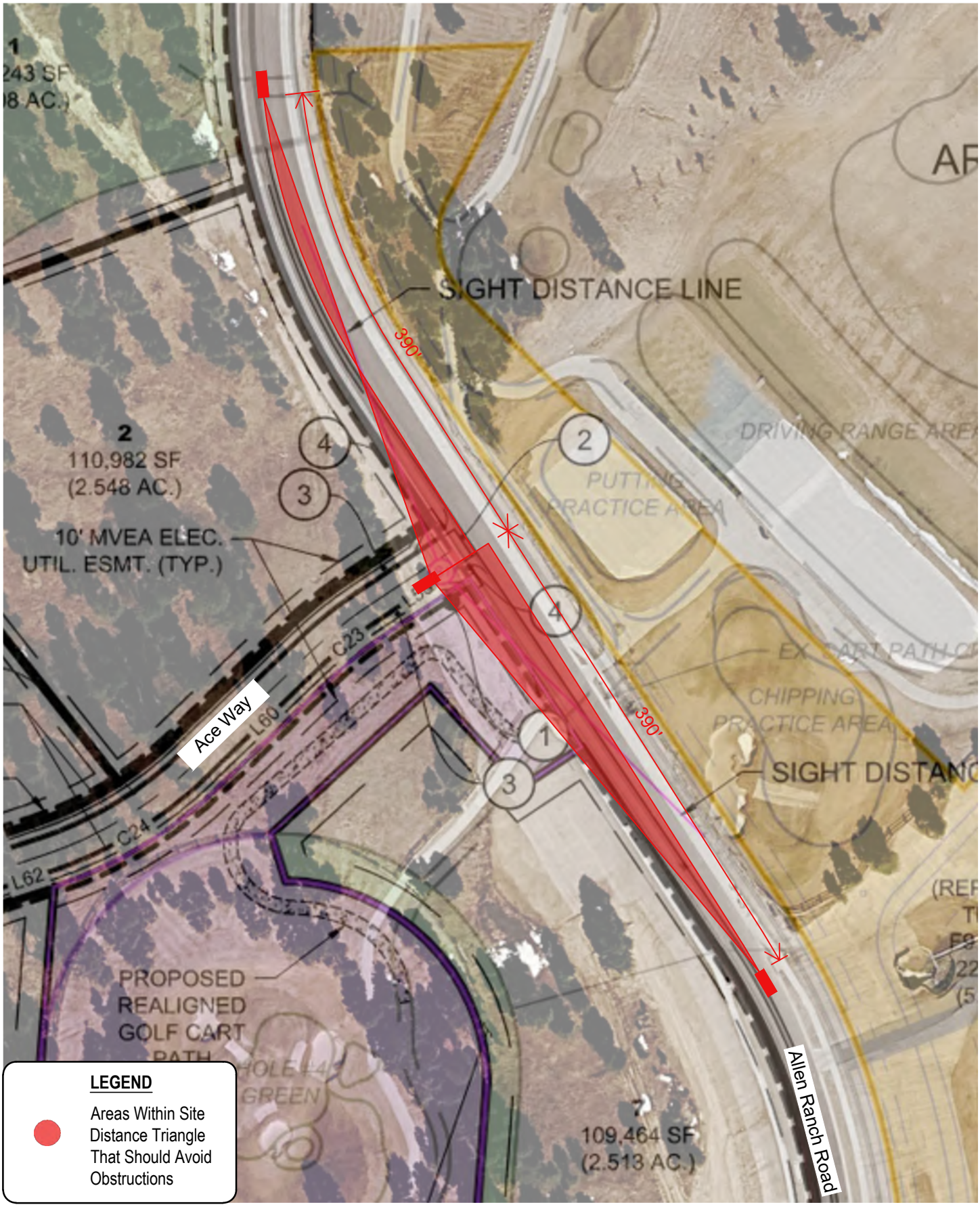
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	71	36	39	0	-	0
Stage 1	36	-	-	-	-	-
Stage 2	35	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	934	1037	1571	-	-	-
Stage 1	987	-	-	-	-	-
Stage 2	988	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	934	1037	1571	-	-	-
Mov Cap-2 Maneuver	934	-	-	-	-	-
Stage 1	987	-	-	-	-	-
Stage 2	988	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	8.87	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1571	-	934	-	-
HCM Lane V/C Ratio	-	-	0.005	-	-
HCM Ctrl Dly (s/v)	0	-	8.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

APPENDIX D

Conceptual Sight Distance Exhibit



FLYING HORSE NORTH FILING 9
Conceptual Sight Distance Exhibit

October 2026

SM ROCHA, LLC
Traffic and Transportation Engineering

0 100 North

APPENDIX E

Old Stagecoach Road – Approved Right-Of-Way Deviation

Development Services Department
2880 International Circle
Colorado Springs, Colorado 80910

Phone: 719.520.6300
Fax: 719.520.6695
Website www.elpasoco.com

DEVIATION REVIEW AND DECISION FORM

Procedure # R-FM-051-07
Issue Date: 12/31/07
Revision Issued: 00/00/00
DSD FILE NO.:

General Property Information:
Address of Subject Property (Street Number/Name): n/a
Tax Schedule ID(s) #:6100000527, 6100000526
Legal Description of Property:

TR IN SECS 34 & 35-11-66 DESC AS FOLS: BEG AT NE COR SD SEC 35, TH S 00<14'34" E 523.85 FT, TH ALG ARC OF CUR TO THE L HAVING A RAD OF 535.0 FT A C/A OF 38<24'48" WHICH CHORD BEARS S 33<01'51" W 358.69 FT, TH S 84<37'03" W 175.44, TH ALG ARC OF CUR TO THE R HAVING A RAD OF 615.0 FT A C/A OF 11<13'59"A DIST OF 120.57 FT, TH N 84<08'58" W 684.98 FT, TH ALG ARC OF CUR TO THE R HAVING A RAD OF 615.0 FT A C/A OF 25<13'51" A DIST OF 270.82 FT, N 58<55'07" W 166.51 FT, TH ALG ARC OF CUR TOTHE L HAVING A RAD OF 535.0 FT A C/A OF 31<18'40" A DIST OF 292.37 FT, S 89<45'13" W 1674.58 FT, TH ALG ARC OF CUR TO THE L HAVING A RAD OF 1960.0 FT A C/A OF 24<52'43" A DIST OF 851.06 FT, TH S 64<53'30" W 459.47 FT, TH ALG ARC OF CUR TO THE R HAVING A RAD OF 1040.0 FT A C/A OF 21<22'27" A DIST OF 387.97 FT, TH S 86<15'57" W 645.0 FT M/L, TH RUN NLY 655.0 FT M/L TO A PT ON THE NLY LN OF SEC 34, TH N 89<46'13" E 2660.56 FT, N 89<45'50" E 2048.33 FT, N 44<21'15" E 120.12 FT, N 27<42'44" E 30.37 FT, N 83<51'56" E 62.76 FT, S 79<32'21" E 69.45 FT, S 46<40'23" E 153.82 FT N 89<48'10" E 270.47 FT TO POB

TR IN NE4 SEC 34-11-66 DESC AS FOLS: BEG AT NE4 SD SEC 34, TH N 89<57'36" W 635.0 FT M/L FOR POB, TH RUN SLY 6,550 FT M/L, S 86<15'57" W 47.0 FT M/L, TH ALG ARC OF CUR TO THE L HAVING A RAD OF 535.0 FT A C/A OF 51<05'36" A DIST OF 477.09 FT, TH S 35<10'18" W 291.93 FT, TH ALG ARC OF CUR TO THE R HAVING A RAD OF 615.0 FT A C/A OF 53<07'49" A DIST OF 570.29 FT, TH S 88<18'07" W 160.75 FT TO A PT ON THE ELY R/W LN OF HWY 83, N 01<41'53: W 90.0 FT TO SWLY COR LOT 1 WESTCOTT FIRE STATION NO 3, TH N 88<18'07" E 165.75 FT, TH ALG ARC OF CUR TO THE L HAVING A RAD OF 460.0 FT A C/A OF 54<10'43" A DIST OF 434.97 FT, TH ALG ARC OF CUR TOTHE R HAVING A RAD OF 560.0 FT A C/A OF 15<19'05" A DIST OF 149.72 FT, TH N 38<00'00" W 141.67 FT, S 88<20'00" W 587.56 FT TO A PT ON ELY R/W LN SD HWY 83, N 01<41'53" W 446.49 FT, N 00<02'53" W 245.49 FT, TH ALG ARC OF CUR TO THE R HAVING A RAD OF1380.65 FT WHICH CHORD BEARS S 87<06'46" E 181.38 FT, TH N 89<54'54" E 584.61 FT, S 89<57'36" E 720.0 FT M/L TO POB

Approved for consideration by the BOCC
10/21/2016 9:19:02 AM

Public Records Pursuant to CORA, 10/4/2026

Subdivision or Project Name: Flying Horse at Shamrock Ranch

Section of ECM from Which Deviation is Sought: 2.3.2 Design Standards by Functional Classification - Table 2-5 for a Rural Major Collector Roadway: 1) Minimum Centerline Curve Radius; 2) "Access Permitted;" 3) Intersection Spacing; 2.3.4.A Vertical Curves.

Specific Criteria from Which a Deviation is Sought: The applicant requests use of Rural Minor Collector standards for the design elements of a Major Collector listed above from Table 2-5: Minimum Centerline Curve Radius, "Access Permitted," and Intersection Spacing; the applicant requests use of the Rural Minor Collector standard design speed for Vertical Curves per section 2.3.4.A.

Proposed Nature and Extent of Deviation: Given the challenging topography, the applicant requests modification to the above-listed design elements to be designed to Rural Minor Collector standards. Regarding the request for access, the length of the lot frontage through the two sections with direct lot access would be 315 feet, 305 feet, and 532 feet for the westernmost three lots proposed with direct frontage, and 921 feet, 550 feet, and 415 feet on the three lots just west of the proposed roundabout.

Regarding the driveway access for the six lots planned to front this roadway, the driveways entering Stagecoach will be limited and consolidated as much as is reasonable but will be determined by natural grade, drainage, and access sight distance. The locations will be determined with the plot plans and the building pads. There are a limited number of lot driveways shown for Stagecoach, which is comparable to other roads and areas within the county. The capability for vehicles to turn around on the lots will be provided such that backing maneuvers out of the driveways would not be necessary. This would be a requirement written into the HOA covenants including the regulation of "no backing onto the public roadway."

Per the County Engineer, the modification will be to allow direct lot access only for those lots where access to Stagecoach Road is the only option. Circular/horseshoe driveways will not be allowed.

Applicant Information:
Applicant: PRI #2, LLC Email Address: DrewB@classichomes.com
Applicant is: __X__ Owner _____ Consultant _____ Contractor
Mailing Address: 6385 Corporate Drive, Colorado Springs State: CO Postal Code: 80919
Telephone Number:785-3237 Fax Number: _____

Engineer Information:
Engineer: Jeffery C. Hodsdon, P.E., P.T.O.E. Email Address: jeff@lsctrans.com
Company Name: LSC Transportation Consultants, Inc.
Mailing Address: 545 E Pikes Peak Ave, Suite 210, Colorado Springs State: CO Postal Code: 80903
Registration Number: 31684 State of Registration: Colorado
Telephone Number: (719) 633-2868 Fax Number: (719) 633-5430

Explanation of Request (Attached diagrams, figures and other documentation to clarify request):
Section of ECM from Which Deviation is Sought: 2.3.2 Design Standards by Functional Classification - Table 2-5 for a Rural Major Collector Roadway: 1) Minimum Centerline Curve Radius; 2) "Access Permitted;" 3) Intersection Spacing; 2.3.4.A Vertical Curves.

Specific Criteria from Which a Deviation is Sought: The applicant requests use of Rural Minor Collector standards for the design elements of a Major Collector listed above from Table 2-5: Minimum Centerline Curve Radius, "Access Permitted," and Intersection Spacing; the applicant requests use of the Rural Minor Collector standard design speed for Vertical Curves per section 2.3.4.A.

Proposed Nature and Extent of Deviation: Given the challenging topography, the applicant requests modification to the above-listed design elements to be designed to Rural Minor Collector Standards. Regarding the request for access, the length of the lot frontage through the two sections with direct lot access would be 315 feet, 305 feet, and

COPY Released Pursuant to CORA, May 2026

532 feet for the westernmost three lots proposed with direct frontage, and 921 feet, 550 feet, and 415 feet on the three lots just west of the proposed roundabout.

Regarding the driveway access for the six lots planned to front this roadway, the driveways entering Stagecoach will be limited and consolidated as much as is reasonable but will be determined by natural grade, drainage, and access sight distance. The locations will be determined with the plot plans and the building pads. Each driveway would be required to obtain a driveway permit, provide the required sight distance, and other requirements of section 2.4.1. There are a limited number of lot driveways shown for Stagecoach, which is comparable to other roads and areas within the county. The capability for vehicles to turn around on the lots will be provided such that backing maneuvers out of the driveways would not be necessary. This would be a requirement written into the HOA covenants including the regulation of "no backing onto the public roadway."

Per the County Engineer, the modification will be to allow direct lot access only for those lots where access to Stagecoach Road is the only option. Circular/horseshoe driveways will not be allowed.

Reason for the Requested Deviation: The modification is requested due to the challenging topography and the narrow site boundary/dimensions through this section of the site.

Comparison of Proposed Deviation to ECM Standard: For the above-referenced design element, the difference is between the Rural Minor Collector standards and the Rural Major Collector standards.

Applicable Regional or National Standards used as Basis:

Application Consideration:

CHECK IF APPLICATION MEETS CRITERIA FOR CONSIDERATION	**JUSTIFICATION**
☐ The ECM standard is inapplicable to a particular situation.	
☒ Topography, right-of-way, or other geographical conditions or impediments impose an undue hardship on the applicant, and an equivalent alternative that can accomplish the same design objective is available and does not compromise public safety or accessibility.	Given the challenging site topography, the request is to allow application of Rural Minor Collector standards for the following design elements from Table 2-5: Minimum Centerline Curve Radius, "Access Permitted," and Intersection Spacing; the applicant requests use of the Rural Minor Collector standard design speed for Vertical Curves per section 2.3.4.A. • There would be a limited number of lots proposed to front this roadway and all would be on one side (the north side) of the roadway. • The roadway would be single-loaded with no plans to develop lots along the south side of the roadway. • The six lots planned to front this roadway directly would provide the capability for vehicles to turn around on the lots such that backing maneuvers out of the driveways would not be necessary. This would be a requirement written into the HOA covenants including the regulation of "no backing onto the public roadway." - Regarding the driveway access for the six lots planned to front this roadway, the driveways entering Stagecoach will be limited and consolidated as much as is reasonable but will be determined by natural grade, drainage, and access sight distance. The locations will be determined with the plot plans and the building pads. Each driveway would be required to obtain a driveway permit, provide the required sight distance and other requirements of section 2.4.1. There are a limited number of lot driveways shown for Stagecoach, which is comparable to other roads and areas within the county. - Per the County Engineer, the modification will be to allow direct lot access only for those lots where access to Stagecoach Road is the only option. Circular/horseshoe driveways will not be allowed.

COMMS Released Pursuant to CORA, 10/9/2026

☐ A change to a standard is required to address a specific design or construction problem, and if not modified, the standard will impose an undue hardship on the applicant with little or no material benefit to the public.

If at least one of the criteria listed above is not met, this application for deviation cannot be considered.

Criteria for Approval:

PLEASE EXPLAIN HOW EACH OF THE FOLLOWING CRITERIA HAVE BEEN SATISFIED BY THIS REQUEST

The request for a deviation is not based exclusively on financial considerations.	See next paragraph.
The deviation will achieve the intended result with a comparable or superior design and quality of improvement.	The request to allow application of Rural Minor Collector standards for the specified design elements from Table 2-5 would be consistent with respect to that classification while the remainder of the roadway elements would remain as per the Rural Major Collector. Regarding the driveway access for the six lots planned to front this roadway, the driveways entering Stagecoach will be limited and consolidated as much as is reasonable but will be determined by natural grade, drainage, and access sight distance. The locations will be determined with the plot plans and the building pads. There are a limited number of lot driveways shown for Stagecoach, which is comparable to other roads and areas within the county. - Per the County Engineer, the modification will be to allow direct lot access only for those lots where access to Stagecoach Road is the only option. Circular/horseshoe driveways will not be allowed.
The deviation will not adversely affect safety or operations.	The modified design elements would be consistent with the Rural Minor Collector standards, so if the county decides to post either curve warning sign or posted speed limit consistent with the Minor Collector, all modified design elements would be appropriate for the reduced design speed. The capability for vehicles to turn around on the lots will be provided such that backing maneuvers out of the driveways would not be necessary. This would be a requirement written into the HOA covenants including the regulation of "no backing onto the public roadway." Each driveway would be required to obtain a driveway permit, provide the required sight distance and other requirements of section 2.4.1.
The deviation will not adversely affect maintenance and its associated cost.	The proposed cross section would be the same as the standard cross section.
The deviation will not adversely affect aesthetic appearance.	The requested modifications to design elements would result in improve aesthetics as they would have less impact on the existing terrain.

COMMS Release Pursuant to 10/9/2026

Owner, Applicant and Engineer Declaration:
To the best of my knowledge, the information on this application and all additional or supplemental documentation is true, factual and complete. I am fully aware that any misrepresentation of any information on this application may be grounds for denial. I have familiarized myself with the rules, regulations and procedures with respect to preparing and filing this application. I also understand that an incorrect submittal will be cause to have the project removed from the agenda of the Planning Commission, Board of County Commissioners and/or Board of Adjustment or delay review, and that any approval of this application is based on the representations made in the application and may be revoked on any breach of representation or condition(s) of approval.

Signature of owner (or authorized representative) Date 10-17-16

Signature of applicant (if different from owner) Date

Signature of Engineer Date 10/17/16

Engineer's Seal

COLORADO LICENSED
JEFFREY C. HODSDON
31684
PROFESSIONAL ENGINEER

Review and Recommendation:
APPROVED by the ECM Administrator

_____ Date_____
This request has been determined to have met the criteria for approval. A deviation from Section _____of ECM is hereby granted based on the justification provided. Comments:

____ Additional comments or information are attached.

DENIED by the ECM Administrator

_____ Date_____
This request has been determined not to have met criteria for approval. A deviation from Section _____of ECM is hereby denied. Comments:

____ Additional comments or information are attached.

COMMS Released Pursuant to CORA 10/9/2026

Development Services Department
2880 International Circle
Colorado Springs, Colorado 80910

Phone: 719.520.6300
Fax: 719.520.6695
Website www.elpasoco.com

DEVIATION REVIEW AND DECISION FORM

Procedure # R-FM-051-07
Issue Date: 12/31/07
Revision Issued: 00/00/00
DSD FILE NO.:

Approved for consideration by the BOCC
10/24/2016 1:59:52 PM

General Property Information:
Address of Subject Property (Street Number/Name):N/A
Tax Schedule ID(s):#5100000334 plus other adjacent parcels
Legal Description of Property: NW4, NW4NE4, S2NE4, NW4SW4 SEC 31-11-65
Subdivision or Project Name: Flying Horse North at Shamrock Ranch

Section of ECM from Which Deviation is Sought: 2.2.5.B.1 Rural and Urban Principal Arterial and Rural Minor Arterial Access Criteria Spacing.

Specific Criteria from Which a Deviation is Sought: Spacing of roads accessing a principal arterial or rural minor arterial that will result in a full-movement intersection shall be planned at one-half mile (one-quarter mile for rural minor arterials).

Proposed Nature and Extent of Deviation: The modification is requested to allow a proposed full-movement access to Black Forest Road (Rural Minor Arterial) 725 feet south of Black Forest Road/Terra Ridge Circle (south). This is 595 feet closer than the required one-quarter mile (1,320 feet) spacing. However, this would create two offset "T" intersections instead of one four-leg intersection, which in this situation would be preferable from a traffic operations and safety standpoint. The applicant will provide future access for parcel 5100000080 if/when the parcel is subdivided to eliminate the need for a continued access to Black Forest Road in the current driveway location.

Applicant Information:
Applicant: PRI #2, LLC Email Address: DrewB@classichomes.com
Applicant is: __X__ Owner _____ Consultant _____ Contractor
Mailing Address: 6385 Corporate Drive, Colorado Springs State: CO Postal Code: 80919
Telephone Number: (719) 785-3237 Fax Number:_____

Engineer Information:
Engineer: Jeffrey C. Hodsdon, P.E., P.T.O.E. Email Address: jeff@LSCtrans.com
Company Name: LSC Transportation Consultants, Inc.
Mailing Address: 545 E Pikes Peak Ave, Suite 210, Colorado Springs State: CO Postal Code: 80903
Registration Number: 31684 State of Registration: Colorado
Telephone Number: (719) 633-2868 Fax Number: (719) 633-5430

Explanation of Request (Attached diagrams, figures and other documentation to clarify request):
Section of ECM from Which Deviation is Sought: 2.2.5.B.1 Rural and Urban Principal Arterial and Rural Minor Arterial Access Criteria Spacing.

Specific Criteria from Which a Deviation is Sought: Spacing of roads accessing a principal arterial or rural minor arterial that will result in a full-movement intersection shall be planned at one-half mile (one-quarter mile for rural minor arterials).

Proposed Nature and Extent of Deviation: Please refer to the attached intersection/access spacing and sight distance exhibits. Proposed full-movement access to Black Forest Road (Rural Minor Arterial), 725 feet south of Black Forest Road/Terra Ridge Circle (south). This is 595 feet closer than the required one-quarter mile (1,320 feet) spacing. However, this would create two offset "T" intersections instead of one four-leg intersection, which in this situation would be preferable from a traffic operations and safety standpoint. The applicant will provide future access for parcel

COMMUNITY Released Pursuant to CORA, 10/5/2016

5100000080 if/when the parcel is subdivided to eliminate the need for a continued access to Black Forest Road in the current driveway location.

Reason for the Requested Deviation: The modification is required for the access location to be permitted at the requested location because the proposed spacing would result in less than the prescribed one-quarter mile spacing. Also, the ECM does not have a provision for use of an offset T intersection configuration instead of one four-leg intersection. Overall, the proposed offset T intersection access configuration would be preferable to a four-leg intersection at the bottom of a seven percent downgrade. The location for the access has been selected because of this and because it would result in a more than adequate intersection and stopping sight distance and shorter vehicle stopping distance when compared to the location across from Terra Ridge Circle (south) with the access proposed for the crest vertical curve instead of the bottom of the vertical curve.

Comparison of Proposed Deviation to ECM Standard: The access is proposed to be 595 feet closer than the required one-quarter mile (1,320 feet) spacing to the intersection to the north and about 430 feet closer than the quarter-mile spacing to the south.

Applicable Regional or National Standards used as Basis: NCHRP 500 Strategy 17.1 B.5.

Application Consideration:

CHECK IF APPLICATION MEETS CRITERIA FOR CONSIDERATION	**JUSTIFICATION**
☐ The ECM standard is inapplicable to a particular situation.	
☒ Topography, right-of-way, or other geographical conditions or impediments impose an undue hardship on the applicant, and an equivalent alternative that can accomplish the same design objective is available and does not compromise public safety or accessibility.	The location for the access has been selected as the preferred location for several reasons. It would result in a more than adequate intersection and stopping sight distance and shorter vehicle stopping distance when compared to the location across from Terra Ridge Circle (south) with the access proposed for the crest of the vertical curve instead of the bottom of the vertical curve. The access placement in this location would not interfere with any existing or proposed auxiliary turn lanes. The access spacing north to Terra Ridge Circle (south) and south to Country Estates Lane would be sufficient for safe operations and turning movements. This access would not require any auxiliary turn lanes. Also, a significant benefit to the request would be that the intersection would be a T intersection configuration and the existing intersection to the north would also remain a T intersection. The T intersection configurations would have fewer vehicle conflicts than a four-leg intersection at Terra Ridge Circle (south). The current left turn from existing Terra Ridge Circle (south) would have lower delay and the intersection would have significantly fewer conflict points than if a four-leg intersection were created at this location.
☐ A change to a standard is required to address a specific design or construction problem, and if not modified, the standard will impose an undue hardship on the applicant with little or no material benefit to the public.	

If at least one of the criteria listed above is not met, this application for deviation cannot be considered.

Criteria for Approval:

PLEASE EXPLAIN HOW EACH OF THE FOLLOWING CRITERIA HAVE BEEN SATISFIED BY THIS REQUEST

The request for a deviation is not based exclusively on financial considerations.	See the following paragraph.

EPC EDARP/MS Released Plan - 220 CORA, 10/9/2025

The deviation will achieve the intended result with a comparable or superior design and quality of improvement. The deviation will not adversely affect safety or operations.	Please refer to the attached intersection/access spacing and sight distance exhibits. The location for the access has been selected because it would result in a more than adequate intersection and stopping sight distances and shorter vehicle stopping distance when compared to the location across from Terra Ridge Circle (south) with the access proposed for the crest of the vertical curve instead of the bottom of the vertical curve. The access placement in this location would not interfere with any existing or proposed auxiliary turn lanes. The access spacing north to Terra Ridge Circle (south) and south to Country Estates Lane would be sufficient for safe operations and turning movements. This access would not require any auxiliary turn lanes. Also, a significant benefit to the request would be that the intersection would be a T intersection configuration and the existing intersection to the north would also remain a T intersection. The offset T intersection configurations would have far fewer vehicle conflicts than a four-leg intersection at Terra Ridge Circle (south). According to NCHRP 500 Strategy 17.1. B4, (conversion of a 4-legged intersection to two offset T intersections), collision rates at a pair of two offset T intersections have been shown to have crash rates of 37 to 43 percent of the rates at a single, four-leg intersection with four approaches. There are certain conditions when offset T intersections should not be implemented, but for intersections such as the proposed intersection with what would be very low straight through volumes on the minor street, the offset T would be a better solution. Overall, the proposed offset T intersection access configuration would be preferable to a four-leg intersection created at the bottom of a seven percent downgrade. The provision for a shorter vehicle stopping distance with an uphill grade on the approach to an intersection would be preferable. The applicant will provide future access for parcel 5100000080 if/when the parcel is subdivided to eliminate the need for a continued access to Black Forest Road in the current driveway location.
The deviation will not adversely affect maintenance and its associated cost.	N/A
The deviation will not adversely affect aesthetic appearance.	N/A

COMMS Released Public 5/6/2020

Owner, Applicant and Engineer Declaration:
To the best of my knowledge, the information on this application and all additional or supplemental documentation is true, factual and complete. I am fully aware that any misrepresentation of any information on this application may be grounds for denial. I have familiarized myself with the rules, regulations and procedures with respect to preparing and filing this application. I also understand that an incorrect submittal will be cause to have the project removed from the agenda of the Planning Commission, Board of County Commissioners and/or Board of Adjustment or delay review, and that any approval of this application is based on the representations made in the application and may be revoked on any breach of representation or condition(s) of approval.

_____ 10-24-16
Signature of owner (or authorized representative) Date

_____ _____
Signature of applicant (if different from owner) Date

_____ 10-24-16
Signature of Engineer Date

Engineer's Seal

COLORADO LICENSED
JEFFREY C. HODSDON
31684
PROFESSIONAL ENGINEER

Review and Recommendation:
APPROVED by the ECM Administrator

_____ Date_____
This request has been determined to have met the criteria for approval. A deviation from Section _____of ECM is hereby granted based on the justification provided. Comments:

____ Additional comments or information are attached.

DENIED by the ECM Administrator

_____ Date_____
This request has been determined not to have met criteria for approval. A deviation from Section _____of ECM is hereby denied. Comments:

____ Additional comments or information are attached.

COMMS Released Plan Set to CORA 10/9/2026

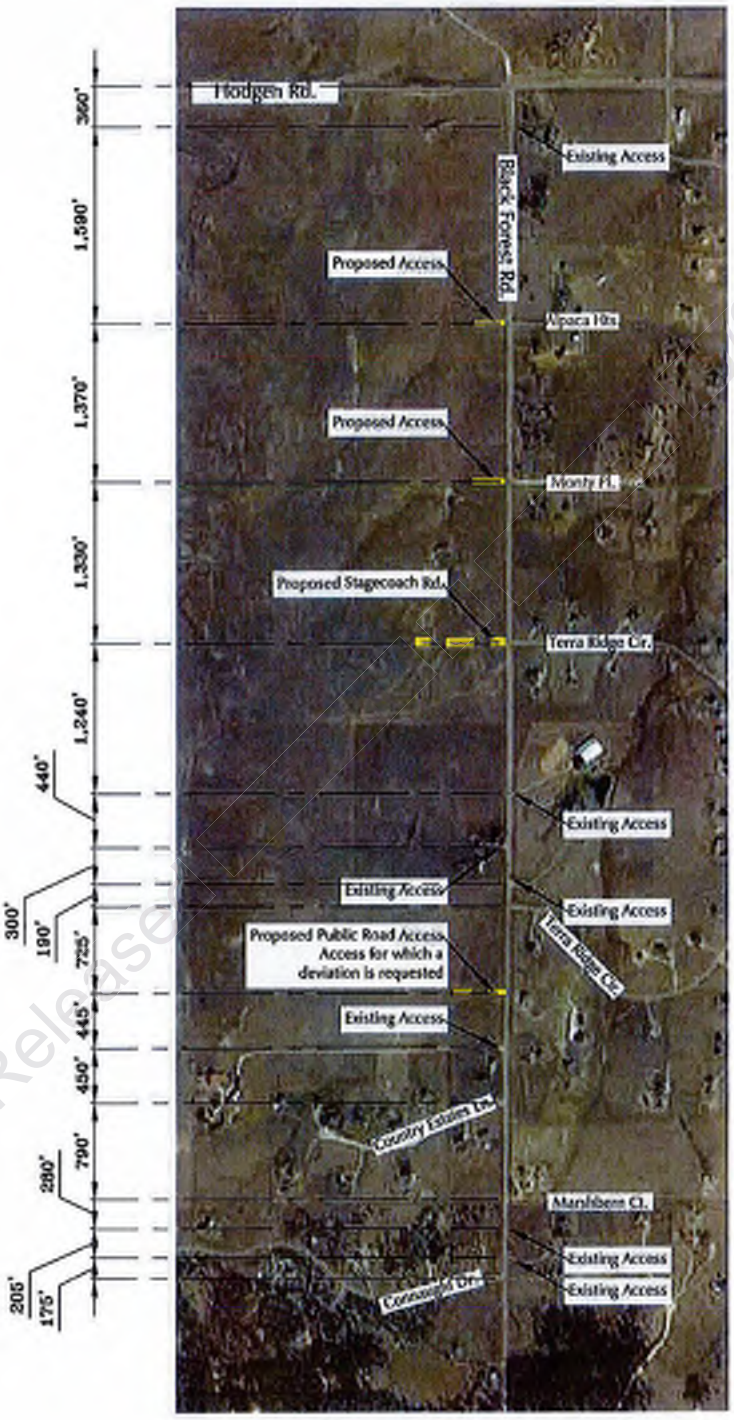


Figure 1

Black Forest Road Intersection/Access Spacing

Flying Horse North (LSC #164050)

COMMS Released 7/9/2026

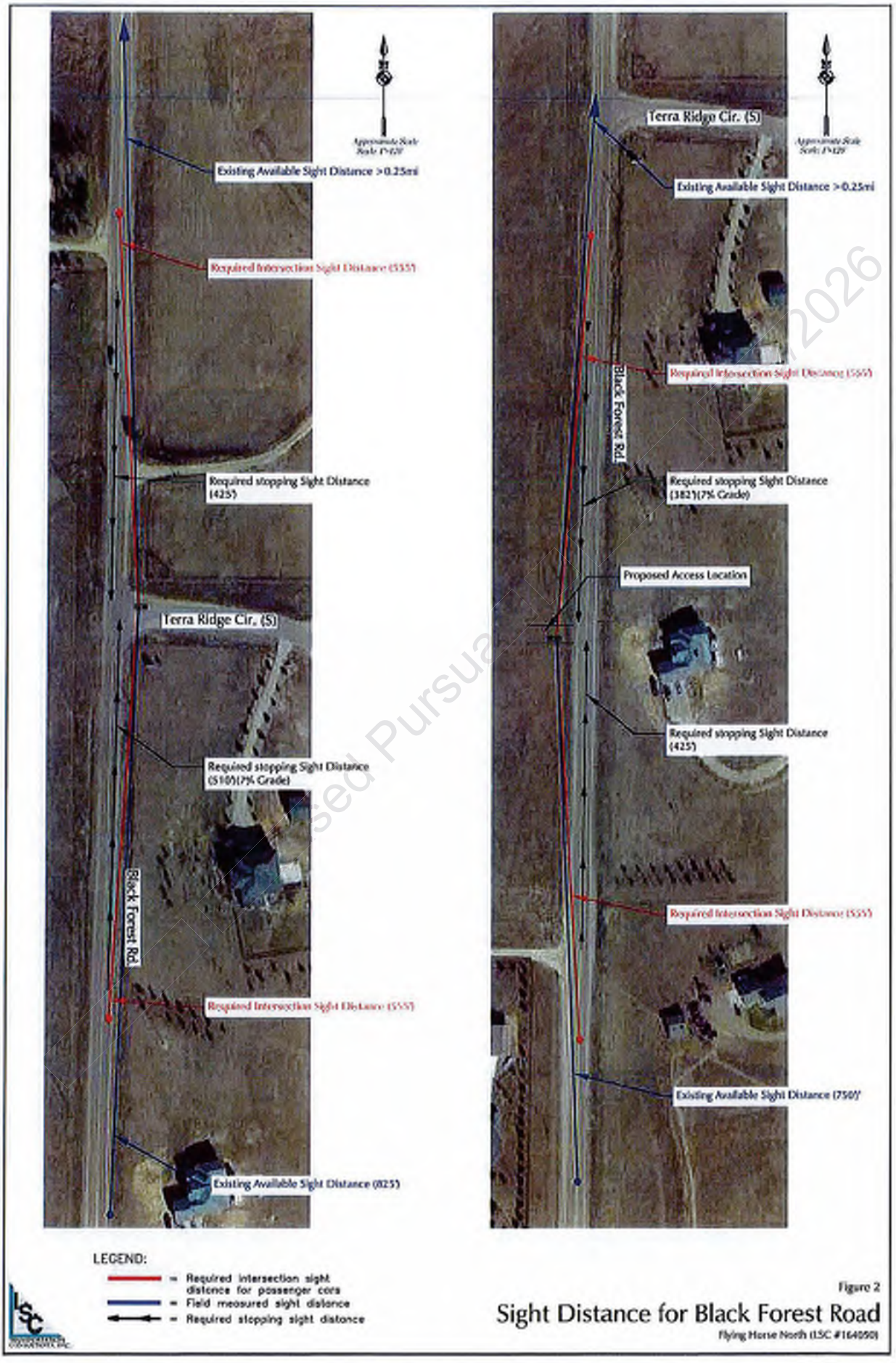


Figure 2

Sight Distance for Black Forest Road

Flying Horse North (LSC #164050)

Reviewed Pursuant to C.R.S. 30-28-136 2026

APPENDIX F

Old Stagecoach Road – Approved Paving Design

April 2, 2018
Revised September 12, 2018

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

Approved, EN
09/26/2018 10:27:33 AM

Pulpit Rock, LLC
6385 Corporate Drive, Suite 200
Colorado Springs, CO 80919

Attn: Drew Balsick

Re: Pavement Recommendations
Flying Horse North, Filing No. 1
El Paso County, Colorado

Dear Mr. Balsick:

As requested, Entech Engineering, Inc. has obtained samples of the pavement subgrade soils for Stagecoach Road, Husted Court, Talbert Court, and Short Wall Court located within Flying Horse North, Filing No. 1 in northern El Paso County, Colorado. Stagecoach Road is proposed to extend from Black Forest Road to Colorado State Highway 83. This section of roadway is estimated at 20,000 feet in length. This letter presents the results of the laboratory testing and pavement recommendations for the roadway sections.

Project Description

The roadways for this project consists of a 20,000-foot section of Stagecoach Road extending from Black Forest Road to Colorado State Highway 83 and two short residential cul-de-sacs that extend north off Stagecoach Road; Husted Court and Short Wall Court. Subsurface Soil Investigation and laboratory testing was performed in order to determine the pavement support characteristics of the soils. The approximate locations of the test borings are presented in the Test Boring Location Map, Figure 1.

Subgrade Conditions

Forty-Two test borings were drilled along the above referenced roadway to depths of approximately 5 and 10 feet below the existing subgrade surface. Test borings 5 through 13 were drilled in the Phase 1 section. Test Borings 1 through 4 will be addressed in a second report for Phase 2. The Test Boring Logs are presented in Appendix A. Sieve Analyses and Atterberg Limit testing were performed on the soil samples obtained from the test borings for the purpose of classification. The subgrade soils percent passing the No. 200 sieve ranged from approximately 9 to 82 percent. Three subgrade soil types were determined through laboratory testing. The Type 1 Soils classify as A-1-b and A-2-4 soils, the Type 2 Soils classify A-2-6 soils, and the Type 3 Soils classify as A-4, A-5, and A-6 soils, using AASHTO Classification System. Soil Type 1 is described as slightly silty to silty sand fill, silty sand, clayey sand fill, clayey sand, and silty clayey sand (SM-SW, SM, SC, SC-SM) with gradations between approximately 9 and 33 percent. Soil Type 2 is described as clayey sand fill and clayey sand (SC) with gradations between approximately 15 and 35 percent. Soil Type 3 is described as a sandy to very sandy clay, clayey to very clayey sand, silty clayey sand and very sandy clay-silt with gradations between approximately 36 and 82 percent. Soil Types 1 and 2 typically provide good pavement support characteristics; whereas, Soil Type 3 typically provide fair to poor pavement support characteristics. Groundwater was not encountered in the test borings. Water-soluble sulfate tests results indicated that the subgrade soils exhibit a negligible potential for sulfate attack.

Swell/Consolidation Tests performed on the A-2-6 soil samples resulted in volume changes ranging between 0.4 to 1.9 percent, indicating low swell potentials. Swell/Consolidation Tests performed on the A-4, A-5, and A-6 soil samples resulted in volume changes of ranging between 0.1 to 1.9 percent, indicating low swell potentials. The samples tested did not exceeded the allowable swell values. These Swell Test results indicate mitigation of the expansive potential of the subgrade soils will not be required. Due to the varied soil types and their expected pavement support characteristics, other areas may exist in the roadways in which overexcavation may be required and should be field determined. Mitigation requirements, if required, are discussed later in this report. Laboratory test results are presented in Appendix B and are summarized on Table 1. Based on the testing, the subgrade soils for these roadways exhibit poor to good subgrade support characteristics.

California Bearing Ratio (CBR) testing was performed on the three soil types previously described that were encountered in the proposed roadway subgrades. The results of the CBR testing, classification testing, and Swell/Consolidation tests are presented in Appendix B and summarized as follows:

CBR No. 1

Soil Type 1 – Silty Sand Fill

R @ 90% = 12.0
R @ 95% = 30.0
Use R = 20.0 for design

Classification Testing

Liquid Limit	NV
Plasticity Index	NP
Percent Passing 200	26.5
AASHTO Classification	A-1-b
Group Index	0
Unified Soils Classification	SM

CBR No. 2

Soil Type 2 – Clayey Sand

R @ 90% = 26.0
R @ 95% = 50.0
Use R = 38.0 for design

Classification Testing

Liquid Limit	25
Plasticity Index	14
Percent Passing 200	31.6
AASHTO Classification	A-2-6
Group Index	1
Unified Soils Classification	SC

CBR No. 3

Soil Type 3 – Very Clayey Sand

R @ 90% = 1.0
R @ 95% = 6.0
Use R = 6.0 for design

Classification Testing

Liquid Limit	29
Plasticity Index	17
Percent Passing 200	37.5
AASHTO Classification	A-6
Group Index	2
Unified Soils Classification	SC

Pulpit Rock, LLC
Pavement Recommendations
Flying Horse North, Filing No. 1
El Paso County, Colorado

Pavement Design

CBR testing was used to determine pavement sections for the roadway. Pavement sections were determined utilizing the Pavement Design Criteria and Report for El Paso County. A Traffic Impact Analysis report was prepared for this filing by LSC Transportation Consultants, Inc. dated July 21, 2016, LSC Job No. 164050. This report was used in determining the roadway classifications. The report section indicating Recommended Street Classifications is included in Appendix D. Stagecoach Road is categorized as a rural minor collector east of the intersection of Shortwall Drive which uses an 18K ESAL value of 109,500, and categorized as a rural major collector west of the intersection of Shortwall Drive which uses an 18K ESAL value of 273,750 for design purposes. Husted Court, Talbert Court, and Short Wall Court are categorized as rural local roadways which use an 18K ESAL value of 36,500 for design purposes. Pavement alternatives for asphalt over aggregate base course and cement stabilized subgrade sections are provided.

Design parameters used in the pavement analysis for the roadway section are as follows:

Reliability (Rural Local)	75%
Reliability (Rural Collector)	80%
Serviceability Index	
Rural Local	2.0
Rural Collector	2.5
Standard Deviation	0.45
Resilient Modulus – Soil Type 1	4,940 psi
Resilient Modulus – Soil Type 2	8,896 psi
Resilient Modulus – Soil Type 3	3,126 psi
"R" Value Subgrade – Soil Type 1	20.0
"R" Value Subgrade – Soil Type 2	38.0
"R" Value Subgrade – Soil Type 3	6.0
Hot Bituminous Pavement	0.44
Base Course	0.11
Cement Stabilized Subgrade	0.12

The pavement design nomographs and calculations are presented in Appendix C. Pavement section alternatives for the roadway sections are presented below. Any additional grading may result in subgrade soils with different support characteristics. The following pavement sections should be re-evaluated if additional grading is performed.

Rural Local Roads

Pavement Sections – Rural Local Road
Soil Type 1 – R=20.0

Alternative	Asphalt (in)	Base Course (in)
1. Asphalt Over Base Course	3.5	6.0
2. Asphalt Over Base Course	-	-
3. Asphalt Over Stabilized Subgrade	4.0*	10.0*

Pavement Sections – Rural Local Road
Soil Type 2 – R=38.0

Alternative	Asphalt (in)	Base Course (in)
1. Asphalt Over Base Course	3.0*	4.0*
2. Asphalt Over Base Course	-	-
3. Asphalt Over Stabilized Subgrade	4.0*	10.0*

Pavement Sections – Rural Local Road
Soil Type 3 – R=6.0

Alternative	Asphalt (in)	Base Course (in)
1. Asphalt Over Base Course	4.0	7.0
2. Asphalt Over Base Course	-	-
3. Asphalt Over Stabilized Subgrade	4.0*	10.0*

Stagecoach Road – Minor Collector

Pavement Sections – Rural Minor Collector
Soil Type 1 – R=20.0

Alternative	Asphalt (in)	Base Course (in)
1. Asphalt Over Base Course	4.0	7.0
2. Asphalt Over Base Course	4.5	6.0*
3. Asphalt Over Stabilized Subgrade	4.0*	10.0*

Pulpit Rock, LLC
Pavement Recommendations
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Pavement Sections – Rural Minor Collector
Soil Type 2 – R=38.0

Alternative	Asphalt (in)	Base Course (in)
1. Asphalt Over Base Course	3.0*	7.0
2. Asphalt Over Base Course	3.5	6.0*
3. Asphalt Over Stabilized Subgrade	4.0*	10.0*

Pavement Sections – Rural Minor Collector
Soil Type 3 – R=6.0

Alternative	Asphalt (in)	Base Course (in)
1. Asphalt Over Base Course	4.5	9.0
2. Asphalt Over Base Course	5.0	7.0
3. Asphalt Over Stabilized Subgrade	4.0*	10.0*

Stagecoach Road – Major Collector

Pavement Sections – Rural Major Collector
Soil Type 1 – R=20.0

Alternative	Asphalt (in)	Base Course (in)
1. Asphalt Over Base Course	4.5	8.5
2. Asphalt Over Stabilized Subgrade	4.0*	10.0*

Pavement Sections – Rural Major Collector
Soil Type 2 – R=38.0

Alternative	Asphalt (in)	Base Course (in)
1. Asphalt Over Base Course	3.5	8.0
2. Asphalt Over Stabilized Subgrade	4.0*	10.0*

Pulpit Rock, LLC
Pavement Recommendations
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Pavement Sections – Rural Major Collector
Soil Type 3 – R=6.0

Alternative	Asphalt (in)	Base Course (in)
1. Asphalt Over Base Course	5.0	11.0
2. Asphalt Over Base Course	5.5	9.0
3. Asphalt Over Stabilized Subgrade	5.0	10.0*

*Minimum sections required per the El Paso County Pavement Design Criteria and Report.

In summary, if the cement treated subgrade is used a section of 4-inches asphalt on 10-inches of treated subgrade is recommended on all of the roads with the exception of the rural major collector roads with underlying Soil Type 3 subgrade which will use a section of 5-inches asphalt on 10-inches of treated subgrade.

Mitigation

The El Paso County Pavement Design Criteria and Report requires mitigation of expansive soils for roadway subgrades that have swells of 2 percent or greater with a 150 pound per square foot surcharge. No samples at subgrade depth resulted in volume changes exceeding 2.0 percent. Based on the results of the laboratory testing, mitigation for expansive soils is not expected. If subgrade soils differ from those described in this report and the soils are expansive, then the extents of and depths of overexcavation should be field determined. Personnel of Entech Engineering, Inc. should be on-site to verify the locations and approximate depths of overexcavation during the subgrade preparation. Density testing should be performed on the fill material.

Roadway Construction - Full Depth Asphalt and Asphalt on Aggregate Base Course Alternatives

Prior to placement of the asphalt, the cohesionless subgrade soils should be proofrolled, scarified, moisture conditioned and compacted to a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557 at ±2 percent of optimum moisture, and the cohesive subgrade soils should be proofrolled, scarified, moisture conditioned and compacted to a minimum of 95 percent of its maximum Standard Proctor Dry Density, ASTM D-698 at 0 to 3 percent of optimum moisture. Any loose or soft areas should be removed and replaced with suitable materials. Base course materials should be compacted to a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557 at ± 2 percent of optimum moisture content. Special attention should be given to areas adjacent to manholes, inlet structures and valves.

Roadway Construction – Cement Stabilized Subgrade Alternative

Prior to placement of the asphalt, the subgrade shall be stabilized by addition of cement to a depth of at least 10 inches. The depth of the required cement stabilized subgrade is shown in the previous table. The amount of cement applied shall be 2.0 percent (by weight) of the subgrade's maximum dry density as determined by the Modified Proctor Test (ASTM D-1557) based on laboratory cement stabilization testing. The cement should be spread evenly on the subgrade surface and be thoroughly mixed into the subgrade over a 10-inch depth such that a uniform blend of soil and cement is achieved. Prior to application or mixing of the cement, the upper 10 inches of subgrade should be thoroughly moisture conditioned to the soil's optimum

water content or as much as 2 percent more than the optimum water content as necessary to provide a compactable soil condition. Densification of the cement-stabilized subgrade should be completed to obtain a compaction of at least 95 percent of the subgrade maximum dry density as determined by the Modified Proctor Test (ASTM D-1557). Satisfactory compaction of the subgrade shall occur within 90 minutes from the time of mixing the cement into the subgrade.

The following conditions shall be observed as part of the subgrade stabilization:

- Type I/II cement as supplied, a local supplier shall be used. All cement used for stabilization should come from the same source. If cement sources are changed a new laboratory mix design should be completed.

- Moisture conditioning of the subgrade and/or mixing of the cement into the subgrade shall not occur when soil temperatures are below 40° F. Cement treated subgrades should be maintained at a temperature of 40° F or greater until the subgrade has been compacted as required.

- Cement placement, cement mixing and compaction of the cement treated subgrade should be observed by a Soils Engineer. The Soils Engineer should complete in situ compaction tests and construct representative compacted specimens of the treated subgrade material for subsequent laboratory quality assurance testing.

If significant grading is performed, the soils at subgrade may change. Modification to the pavement sections should be evaluated after site grading is completed.

In addition to the above guidance the asphalt, subgrade conditions, compaction of materials and roadway construction methods shall meet the El Paso County specifications.

Pulpit Rock, LLC
Pavement Recommendations
Flying Horse North, Filing No. 1
El Paso County, Colorado

We trust that this report contains the information you require. If you have questions or need additional information, please contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Reviewed by:



Stan C. Culp, P.E.
Senior Engineer

Joseph C. Goode, Jr., P.E.
President

SCC/sc
Encl.
Entech Job No. 171671
AAprojects/2017/171671/171671 pr_r

TABLE

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1
JOB NO. 171671

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	AASHTO CLASS.	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1, CBR #1	4	0-3			26.5	NV	NP		A-1-b		SM	FILL, SAND, SILTY
1	2	1-2			11.8	NV	NP		A-1-b		SM-SW	FILL, SAND, SLIGHTLY SILTY
1	4	1-2			8.5	NV	NP		A-1-b		SM-SW	FILL, SAND, SLIGHTLY SILTY
1	5	1-2			13.1	NV	NP		A-1-b		SM	FILL, SAND, SILTY
1	6	1-2			15.3	NV	NP		A-1-b		SM	FILL, SAND, SILTY
1	13	1-2			24.8	21	5		A-2-4		SC-SM	SAND, CLAYEY, SILTY
1	14	1-2			29.6	25	10		A-2-4		SC	FILL, SAND, CLAYEY
1	16	1-2			16.7	26	10		A-2-4		SC	FILL, SAND, CLAYEY
1	17	1-2			29.7	28	10	<0.01	A-2-4		SC	SAND, CLAYEY
1	19	1-2			22.7	27	10	0.01	A-2-4		SC	SAND, CLAYEY
1	20	1-2			17.9	NV	NP		A-1-b		SM	SAND, SILTY
1	21	1-2			16.1	NV	NP		A-1-b		SM	FILL, SAND, SILTY
1	9	1-2			15.7	25	8		A-2-4		SC	SAND, CLAYEY
1	31	1-2			18.5	NV	NP		A-1-b		SM	SAND, SILTY
1	35	1-2			33.0	25	8		A-2-4		SC	FILL, SAND, CLAYEY
1	5	5			13.2	NV	NP		A-1-b		SM	SAND, SILTY
1	6	10			20.1						SM	SAND, SILTY
1	8	5			15.2	NV	NP		A-1-b		SM	SAND, SILTY
1	35	5			37.7	27	10		A-2-4		SC	SAND, CLAYEY
1	20	0-3			31.9						SC	SAND, CLAYEY
2, CBR #2	10	0-3	16.9	108.3	31.6	25	14		A-2-6	0.4	SC	SAND, CLAYEY
2	1	1-2	15.5	110.9	21.0	29	13		A-2-6	1.9	SC	FILL, SAND, CLAYEY
2	3	1-2	12.7	115.6	19.1	26	12	<0.01	A-2-6	1.2	SC	FILL, SAND, CLAYEY
2	11	1-2	15.9	101.1	14.8	26	12	0.01	A-2-6	1.6	SC	FILL, SAND, CLAYEY
2	12	1-2	14.6	106.1	27.3	26	11		A-2-6	1.0	SC	FILL, SAND, CLAYEY
2	7	1-2	12.2	116.9	20.6	30	16	<0.01	A-2-6	1.9	SC	SAND, CLAYEY
2	8	1-2	17.9	103.0	20.2	27	18		A-2-6	1.0	SC	SAND, CLAYEY
2	18	1-2	12.1	105.2	34.5	24	11		A-2-6	0.4	SC	SAND, CLAYEY
2	23	1-2	15.4	110.7	32.6	30	12		A-2-6	1.1	SC	SAND, CLAYEY
2	24	1-2	14.7	114.7	20.2	26	12		A-2-6	1.7	SC	SAND, CLAYEY
2	36	1-2	5.7	120.7	20.1	30	11		A-2-6	0.9	SC	SAND, CLAYEY
2	7	0-3			28.6						SC	SAND, CLAYEY
3, CBR #2	15	0-3	15.3	114.9	37.5	29	17		A-6	1.6	SC	SAND, VERY CLAYEY
3	10	1-2	16.9	110.6	52.4	28	13		A-6	1.1	CL	CLAY, VERY SANDY
3	22	1-2	10.8	107.2	42.3	27	12	<0.01	A-6	0.3	SC	SAND, VERY CLAYEY
3	25	1-2	8.1	140.3	66.0	26	11		A-6	1.9	CL	CLAY, SANDY

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	AASHTO CLASS.	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
3	26	1-2	11.8	113.3	55.6	25	10	<0.01	A-4	1.8	CL	CLAY, VERY SANDY
3	27	1-2	9.3	108.2	47.2	28	12		A-6	0.9	SC	SAND, VERY CLAYEY
3	28	1-2	8.7	118.0	36.9	21	5		A-4	0.6	SC-SM	SAND, CLAYEY, SILTY
3	29	1-2	11.2	119.3	35.6	26	11		A-6	0.1	SC	SAND, CLAYEY
3	30	1-2	7.5	114.3	72.4	30	15		A-6	0.1	CL	CLAY, SANDY
3	32	1-2	10.7	111.9	55.7	28	16		A-6	0.3	CL	CLAY, VERY SANDY
3	33	1-2	14.4	104.8	56.3	21	7		A-4	0.8	CL	CLAY, VERY SANDY
3	34	1-2	7.6	114.0	43.5	27	11		A-6	0.4	SC	SAND, VERY CLAYEY
3	37	1-2	16.3	107.8	71.8	28	11		A-6	1.6	CL	CLAY, SANDY
3	38	1-2	11.3	118.3	78.4	30	10		A-5	0.5	CL	CLAY, SANDY
3	39	1-2	7.4	115.9	59.0	31	16		A-6	0.0	CL	CLAY, VERY SANDY
3	40	1-2	7.5	121.1	76.1	32	14		A-6	0.3	CL	CLAY, SANDY
3	41	1-2	16.3	114.0	58.7	28	6	<0.01	A-4	0.8	CL-ML	CLAY-SILT, VERY SANDY
3	42	1-2	10.8	115.1	81.6	25	8		A-4	0.1	CL	CLAY, SANDY
3	28	5	8.8	116.8	55.0	31	17		A-6	-0.1	CL	CLAY, VERY SANDY
3	29	5	17.2	109.7	73.1	28	11		A-6	1.7	CL	CLAY, SANDY
3	26	10	13.4	112.4	49.4	39	25		A-6	0.3	SC	SAND, VERY CLAYEY
4	1	5			13.8	NV	NP		A-1-b		SM	SANDSTONE, SILTY
4	9	5			12.6	NV	NP		A-1-b		SM	SANDSTONE, SILTY
4	15	1-2	7.6	110.3	17.9	39	18	<0.01	A-2-6	0.1	SC	SANDSTONE, CLAYEY
4	23	10	12.9	112.7	22.6	38	17	<0.01	A-2-6	-0.4	SC	SANDSTONE, CLAYEY
4	31	10			20.6	NV	NP		A-1-b		SM	WEATHERED SANDSTONE, SILTY
4	36	10	12.3	113.6	25.0	34	18	0.01	A-2-6	-0.1	SM	SANDSTONE, SILTY
4	40	10			21.5	NV	NP		A-2-4		SM	WEATHERED SANDSTONE, SILTY

FIGURE

REVISIONS	BY:
09-12-18	SC

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

TEST BORING LOCATION MAP
FLYING HORSE NORTH, FILING 1
EL PASO COUNTY, CO
FOR: PULPIT ROCK, LLC

LEGEND:

- SOIL TYPE 1
- SOIL TYPE 2
- SOIL TYPE 3
- TB-2- APPROXIMATE TEST BORING LOCATION AND NUMBER

TB-1 TB-2 TB-3 TB-4 TB-5 TB-6 TB-7 TB-8 TB-9 TB-10 TB-11 TB-12 TB-13 TB-14 TB-15 TB-16 TB-17 TB-18 TB-19 TB-20 TB-21 TB-22 TB-23 TB-24 TB-25 TB-26 TB-27 TB-28 TB-29 TB-30 TB-31 TB-32 TB-33 TB-34 TB-35 TB-36 TB-37 TB-38 TB-39 TB-40 TB-41 TB-42 TB-44 TB-45 TB-47 TB-49

SHEET 3. SHEET 4. SHEET 4. SHEET 5 SHEET 5 SHEET 6. SHEET 11. SHEET 12. SHEET 13. SHEET 13.

COLORADO STATE HIGHWAY 83 · CRESTED COCK COURT · TALBERT COURT · SHORT WALL COURT · STAGECOACH ROAD · SHORTHILL DRIVE · GOLD RUN COURT · RUBBLE DRIVE · BLACK FOREST ROAD · TRACT · PARK/OPEN SPACE · GOLF CLUBHOUSE AREA

DRAWN BY:	S. CULP
DESIGNED BY:	S. CULP
CHECKED BY:	
DATE:	02/14/18
SCALE:	AS SHOWN
JOB NO.:	171671
FIGURE NO.:	1

APPENDIX A: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 10/13/2017
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 10/13/17						
FILL 0-3', SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST				33	8.7	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, LIGHT RED BROWN, VERY DENSE, MOIST	5			50/7"	9.7	4
	10					
	15					
	20					

TEST BORING NO. 2
DATE DRILLED 10/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 10/13/17						
FILL 0-5', SAND, SLIGHTLY SILTY TO CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				20	6.1	1
	5			13	13.3	1
	10					
	15					
	20					

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: A- 1

TEST BORING NO. 3
DATE DRILLED 10/13/2017
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 10', 10/13/17						
FILL 0-9', SAND, CLAYEY TO SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				29	8.5	1
	5			16	6.9	1
SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY	10			18	1.7	2
	15					
	20					

TEST BORING NO. 4
DATE DRILLED 10/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 10/13/17						
FILL 0-4', SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, LOOSE, MOIST				9	3.5	1
SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST	5			17	4.1	2
	10					
	15					
	20					

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: A-2

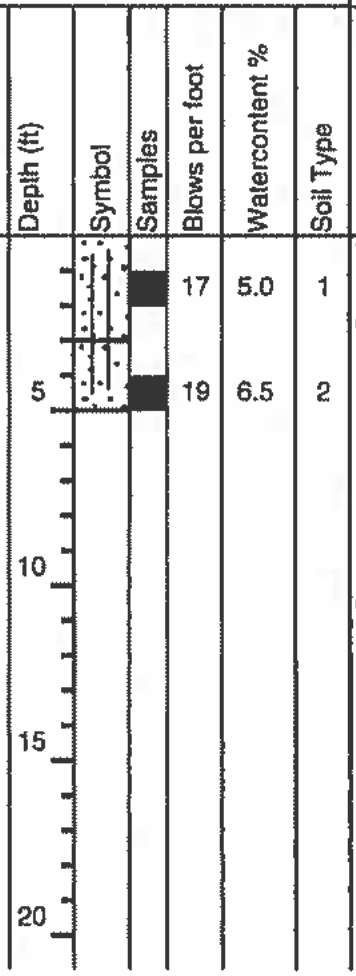
TEST BORING NO. 5
DATE DRILLED 10/13/2017
Job # 171671

REMARKS

DRY TO 5', 10/13/17

FILL 0-3', SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST

SAND, SILTY, FINE TO COARSE GRAINED, RED BROWN, MEDIUM DENSE, MOIST



Samples	Blows per foot	Watercontent %	Soil Type
	17	5.0	1
	19	6.5	2

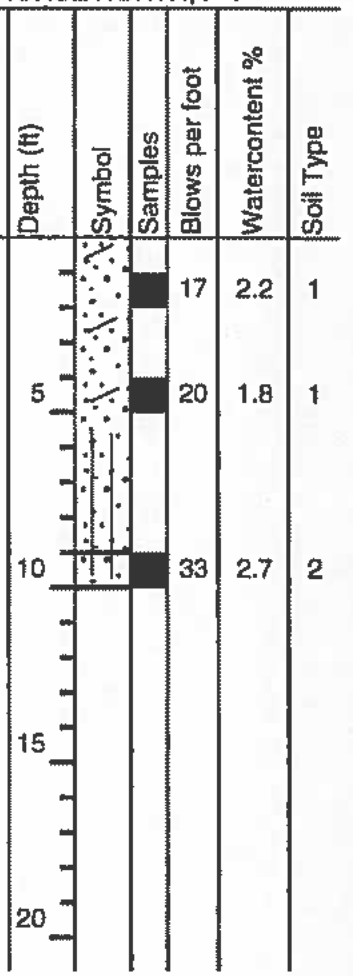
TEST BORING NO. 6
DATE DRILLED 10/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS

DRY TO 10', 10/13/17

FILL 0-9', SAND, CLAYEY TO SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST TO DRY

SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST



Samples	Blows per foot	Watercontent %	Soil Type
	17	2.2	1
	20	1.8	1
	33	2.7	2

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO.: 171671
FIG NO.: A-3

TEST BORING NO. 7
DATE DRILLED 10/13/2017
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 10/13/17						
SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST				22	8.7	2
	5			30	9.1	2
	10					
	15					
	20					

TEST BORING NO. 8
DATE DRILLED 10/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 10', 10/13/17						
FILL 0-4', SAND, CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST				21	8.2	1
SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST	5			34	3.2	2
SANDSTONE, SILTY, FINE TO COARSE GRAINED, RED BROWN, VERY DENSE, MOIST	10			50/7"	7.0	4
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: A- 4

TEST BORING NO. 9
DATE DRILLED 10/13/2017
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 10/13/17						
SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST				43	9.0	2
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BUFF, VERY DENSE, MOIST	5			50/10"	6.8	4
	10					
	15					
	20					

TEST BORING NO. 10
DATE DRILLED 10/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 10/13/17						
CLAY, SANDY, BROWN, STIFF, MOIST				26	7.6	3
SAND, CLAYEY TO SILTY, FINE TO COARSE GRAINED, BUFF, MEDIUM DENSE, MOIST	5			12	5.4	2
	10					
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SLC	2/19/18

JOB NO.: 171671
FIG NO.: A- 5

TEST BORING NO. 11
DATE DRILLED 10/13/2017
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 10', 10/13/17						
POSS. FILL 0-9', SAND, CLAYEY, FINE TO COARSE GRAINED, TAN TO BROWN, MEDIUM DENSE, MOIST				21	6.5	2
	5			12	20.3	2
SAND, SILTY, FINE TO COARSE GRAINED, RED BROWN, MEDIUM DENSE, MOIST	10			14	5.4	1
	15					
	20					

TEST BORING NO. 12
DATE DRILLED 10/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 10/13/17						
POSS. FILL 0-2', SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				21	8.9	2
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST	5			30	3.9	4
	10					
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: A- 6

TEST BORING NO. 13
DATE DRILLED 11/13/2017
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 11/13/17						
FILL 0-4, SAND, CLAYEY, SILTY, FINE TO COARSE GRAINED, BUFF, MEDIUM DENSE, MOIST				13	8.3	1
SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST	5			20	7.8	1
	10					
	15					
	20					

TEST BORING NO. 14
DATE DRILLED 11/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 10', 11/13/17						
FILL 0-6', SAND, CLAYEY, FINE TO COARSE GRAINED, BUFF, MEDIUM DENSE, MOIST				19	8.0	1
	5			15	11.2	1
SAND, CLAYEY, FINE TO COARSE GRAINED, BUFF, DENSE, MOIST						
	10			38	11.9	1
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: SCC	DATE: 7/19/18

JOB NO.: 171671
FIG NO.: A- 7

TEST BORING NO. 15
DATE DRILLED 11/13/2017
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 11/13/17						
SAND, SILTY, TAN*						1
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST				50 10"	8.6	4
	5			50 7"	11.0	4
* - 0-3' SAMPLE CLASSIFIED AS A SOIL TYPE #3	10					
	15					
	20					

TEST BORING NO. 16
DATE DRILLED 11/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 11/13/17						
FILL 0-2.5', SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				28	7.3	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, RED BROWN, VERY DENSE, MOIST	5			50 10"	10.3	4
	10					
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO.: 171671
FIG NO.: A- 8

TEST BORING NO. 17
DATE DRILLED 11/13/2017
Job # 171671

REMARKS

DRY TO 10', 11/13/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			50 9"	8.2	4
5			50 6"	10.6	4
10			50 4"	8.3	4
15					
20					

SAND, SILTY, TAN
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BUFF, VERY DENSE, MOIST

TEST BORING NO. 18
DATE DRILLED 11/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS

DRY TO 5', 11/13/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			23	6.3	2
5			19	9.3	2
10					
15					
20					

FILL 0-5', SAND, CLAYEY, FINE TO COARSE GRAINED, BUFF TO TAN, MEDIUM DENSE, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: A- 9

TEST BORING NO. 19
DATE DRILLED 11/13/2017
Job # 171671

REMARKS

DRY TO 5', 11/13/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			19	7.3	1	SAND, CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST
5			23	6.0	1	
10						
15						
20						

TEST BORING NO. 20
DATE DRILLED 11/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS

DRY TO 10', 11/13/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			31	6.4	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN, DENSE TO LOOSE, MOIST
5			8	5.9	1	
10			40	8.5	4	WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, DENSE, RED BROWN, MOIST
15						
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLC	2/19/18

JOB NO.: 171671
FIG NO.: A- 10

TEST BORING NO. 21
DATE DRILLED 11/13/2017
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 11/13/17						
FILL 0-5', SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO LOOSE, MOIST				13	4.1	1
	5			6	10.3	1
	10					
	15					
	20					

TEST BORING NO. 22
DATE DRILLED 12/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 12/13/17						
SAND, VERY CLAYEY, FINE TO COARSE GRAINED, BUFF TO TAN, DENSE TO MEDIUM DENSE, MOIST				42	10.0	3
	5			24	9.8	3
	10					
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO.: 171671
FIG NO.: A- 11

TEST BORING NO. 23
DATE DRILLED 12/13/2017
Job # 171671

REMARKS

DRY TO 10', 12/13/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, CLAYEY, FINE TO COARSE GRAINED, BUFF, DENSE, MOIST			38	11.7	2
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, RED BROWN, VERY DENSE, MOIST			50	12.9	4
5					
10			50 9"	12.9	4
15					
20					

TEST BORING NO. 24
DATE DRILLED 12/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS

DRY TO 5', 12/13/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST			19	2.5	2
5			15	10.2	2
10					
15					
20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: A- 12

TEST BORING NO. 25
DATE DRILLED 12/13/2017
Job # 171671

REMARKS

DRY TO 5', 12/13/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			36	7.0	3	CLAY, SANDY, TAN, VERY STIFF TO FIRM, MOIST
5			13	7.8	3	
10						
15						
20						

TEST BORING NO. 26
DATE DRILLED 12/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS

DRY TO 10', 12/13/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			15	10.0	3	CLAY, VERY SANDY, RED BROWN, STIFF TO FIRM, MOIST
5			14	7.4	3	
10			17	12.1	3	
15						
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/9/18

JOB NO: 171671
FIG NO: A- 13

TEST BORING NO. 27
DATE DRILLED 12/13/2017
Job # 171671

REMARKS

DRY TO 5', 12/13/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, VERY CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST			19	8.8	3
5			33	8.9	3
10					
15					
20					

TEST BORING NO. 28
DATE DRILLED 12/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS

DRY TO 5', 12/13/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, CLAYEY, SILTY, FINE TO COARSE GRAINED, BUFF TO BROWN, DENSE, MOIST			30	8.0	3
5			38	10.3	3
10					
15					
20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: SCC	DATE: 3/19/18

JOB NO: 171671
FIG NO.: A- 14

TEST BORING NO. 29
DATE DRILLED 12/13/2017
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 10', 12/13/17						
SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				16	6.7	3
CLAY, SANDY, BROWN, STIFF, MOIST	5			25	14.1	3
SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST	10			11	10.7	2
	15					
	20					

TEST BORING NO. 30
DATE DRILLED 12/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 12/13/17						
CLAY, SANDY, BROWN, STIFF, MOIST				25	9.2	3
	5			25	6.3	3
	10					
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SLC	4/19/18

JOB NO: 171671
FIG NO: A- 15

TEST BORING NO. 31
DATE DRILLED 1/25/2018
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 10', 1/25/18						
SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				12	4.8	1
SAND, CLAYEY, FINE TO COARSE GRAINED, RED BROWN, MEDIUM DENSE, MOIST	5			12	9.7	2
WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, DENSE, MOIST	10			34	12.5	4
	15					
	20					

TEST BORING NO. 32
DATE DRILLED 12/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 10', 12/13/17						
CLAY, VERY SANDY, BROWN, MEDIUM DENSE, MOIST				22	8.6	3
SAND, CLAYEY, FINE TO COARSE GRAINED, BUFF, DENSE, MOIST	5			32	5.2	2
	10			33	7.1	2
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SLC	2/19/18

JOB NO: 171671
FIG NO: A- 16

TEST BORING NO. 33
DATE DRILLED 12/13/2017
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 12/13/17						
CLAY, VERY SANDY, RED SOFT TO FIRM, MOIST				6	18.5	3
	5			8	15.9	3
	10					
	15					
	20					

TEST BORING NO. 34
DATE DRILLED 12/13/2017
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 12/13/17						
SAND, VERY CLAYEY, FINE TO COARSE GRAINED, TAN TO BUFF, MEDIUM DENSE, MOIST				25	7.3	3
	5			29	7.1	3
	10					
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: A- 17

TEST BORING NO. 35
DATE DRILLED 1/25/2018
Job # 171671

REMARKS

DRY TO 5', 1/25/18

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			21	7.5	1	FILL 0-3', SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
5			19	8.5	2	SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
10						
15						
20						

TEST BORING NO. 36
DATE DRILLED 1/25/2018
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS

DRY TO 10', 1/25/18

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			24	7.9	2	SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
5			20	8.4	2	
10			50	11.6	4	SANDSTONE, SILTY, FINE TO COARSE GRAINED, RED BROWN, VERY DENSE, MOIST
15						
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO: 171671
FIG NO.: A- 18

TEST BORING NO. 37
DATE DRILLED 1/25/2018
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 1/25/18						
CLAY, SANDY, BROWN TO TAN, FIRM, MOIST				12	12.9	3
	5			14	8.7	3
	10					
	15					
	20					

TEST BORING NO. 38
DATE DRILLED 1/25/2018
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 1/25/18						
CLAY, SANDY, TAN, STIFF, MOIST				22	7.3	3
	5			22	8.7	3
	10					
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SEC	2/19/18

JOB NO.: 171671
FIG NO.: A- 19

TEST BORING NO. 39
DATE DRILLED 1/25/2018
Job # 171671

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 1/25/18						
CLAY, VERY SANDY, BROWN, FIRM, MOIST				14	10.8	3
	5			13	17.9	3
	10					
	15					
	20					

TEST BORING NO. 40
DATE DRILLED 1/25/2018
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 5', 1/25/18						
CLAY, SANDY, BROWN, STIFF, MOIST				16	12.5	3
SAND, CLAYEY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST	5			13	5.3	2
WEATHERED SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST	10			35	4.2	4
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		SCE	3/19/18

JOB NO.: 171671
FIG NO.: A- 20

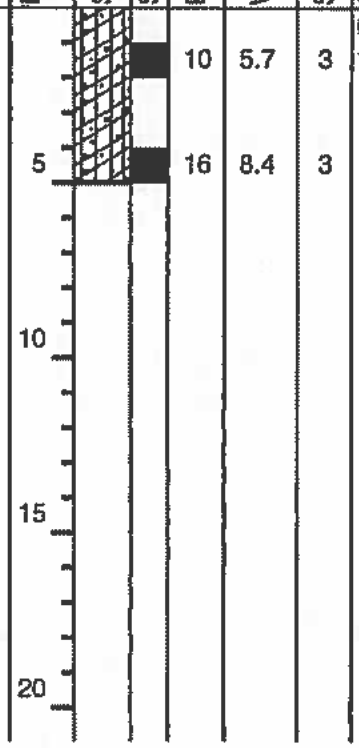
TEST BORING NO. 41
DATE DRILLED 1/25/2018
Job # 171671

REMARKS

DRY TO 5', 1/25/18

CLAY-SILT, VERY SANDY, BROWN TO TAN, FIRM TO STIFF, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			10	5.7	3
5			16	8.4	3



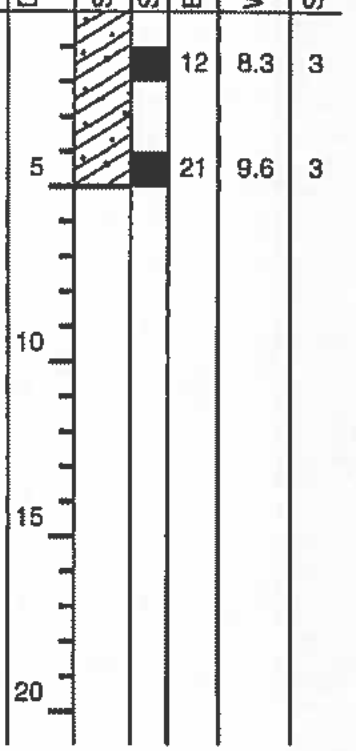
TEST BORING NO. 42
DATE DRILLED 1/25/2018
CLIENT PULPIT ROCK, LLC
LOCATION FLYING HORSE NORTH, F-1

REMARKS

DRY TO 5', 1/25/18

CLAY, SANDY, TAN, FIRM TO STIFF, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			12	8.3	3
5			21	9.6	3



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TEST BORING LOG

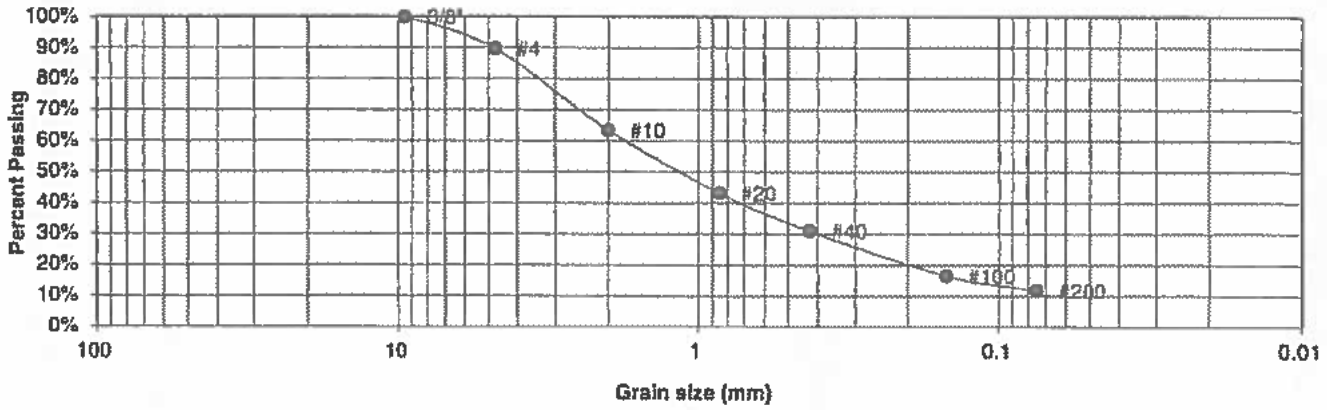
DRAWN:	DATE:	CHECKED: SCC	DATE: 3/19/18

JOB NO: 171671
FIG NO: A- 21

APPENDIX B: Laboratory Test Results

UNIFIED CLASSIFICATION	SM-SW	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	2	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	89.7%
10	63.4%
20	43.2%
40	31.0%
100	16.6%
200	11.8%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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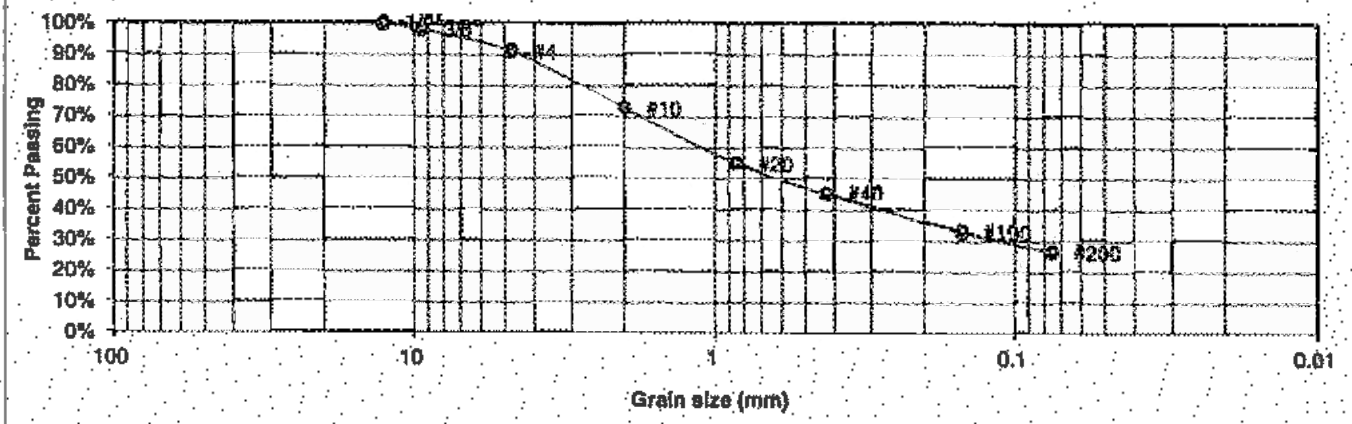
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: B-1

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1, CBR #1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	4	JOB NO.	171671
DEPTH (FT)	0-3	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.1%
4	91.1%
10	72.8%
20	54.9%
40	45.3%
100	32.8%
200	26.5%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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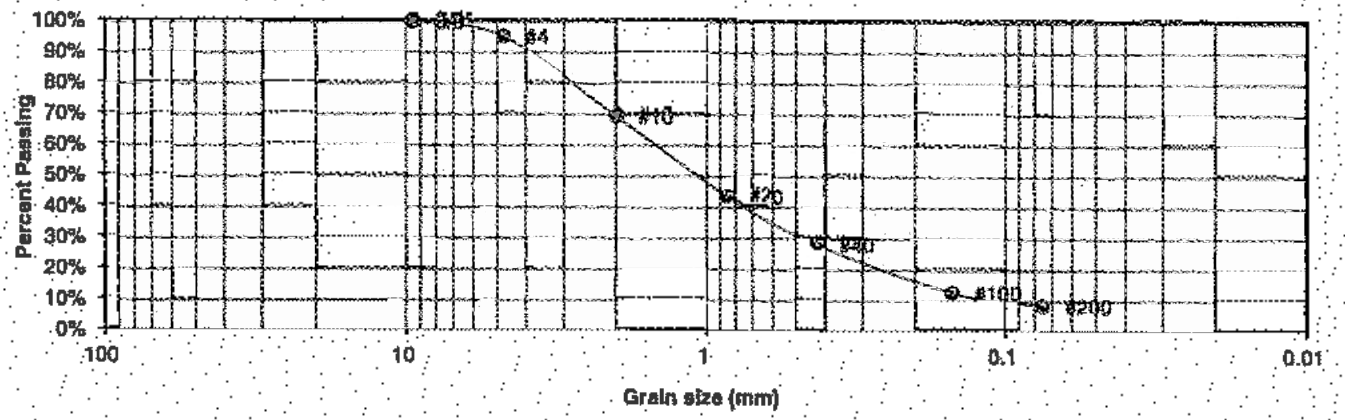
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 3/19/18

JOB NO. 171671
FIG NO.: B-2

UNIFIED CLASSIFICATION	SM-SW	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	4	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.1%
10	69.5%
20	43.6%
40	28.2%
100	12.7%
200	8.5%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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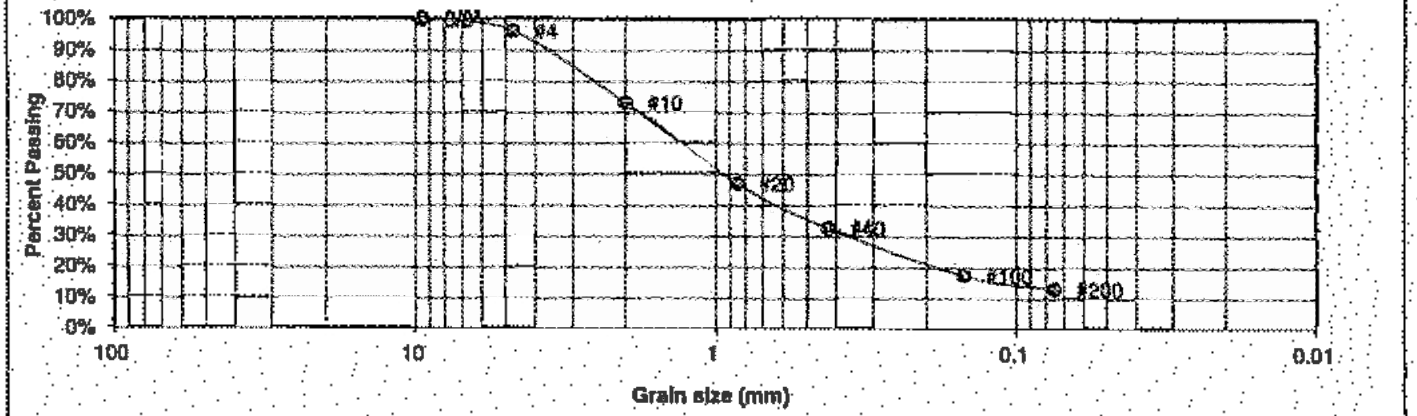
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: BCC	DATE: 2/19/18

JOB NO.: 171671
FIG NO.: B-3

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	5	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.4%
10	73.1%
20	47.1%
40	32.7%
100	17.5%
200	13.1%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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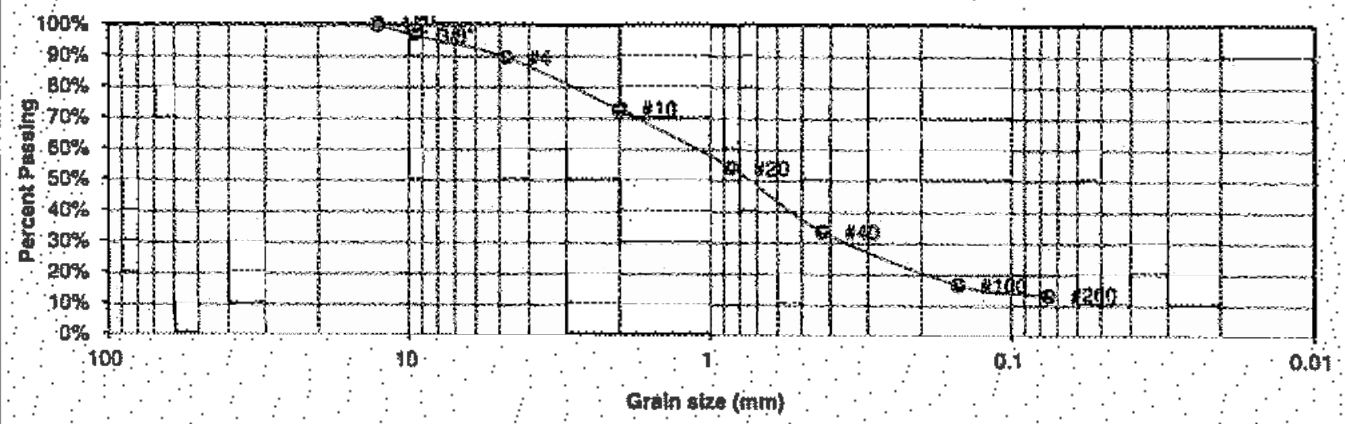
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO: 171671
FIG NO: B-4

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	5	JOB NO.	171671
DEPTH (FT)	5	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.7%
4	89.6%
10	72.9%
20	54.2%
40	33.7%
100	16.7%
200	13.2%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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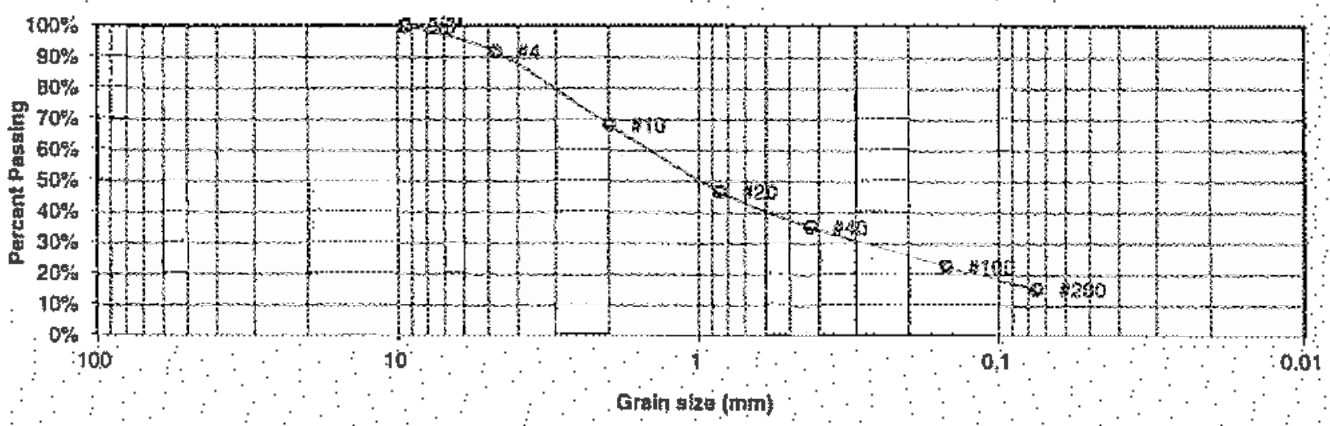
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO.: 171671
FIG NO.: B-5

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	6	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	91.9%
10	68.4%
20	46.9%
40	35.4%
100	22.6%
200	15.3%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

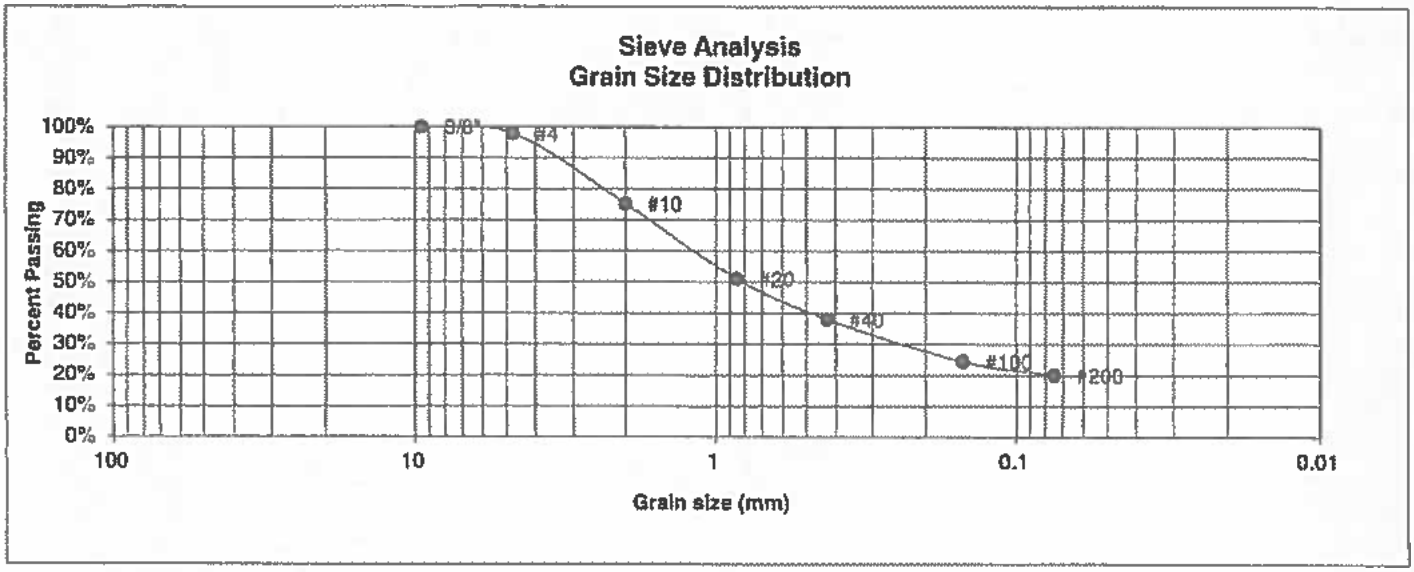
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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO: 171671
FIG NO: B-6

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	6	JOB NO.	171671
DEPTH (FT)	10	TEST BY	BL
AASHTO CLASSIFICATION		GROUP INDEX	



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.9%
10	75.2%
20	51.0%
40	38.0%
100	24.4%
200	20.1%

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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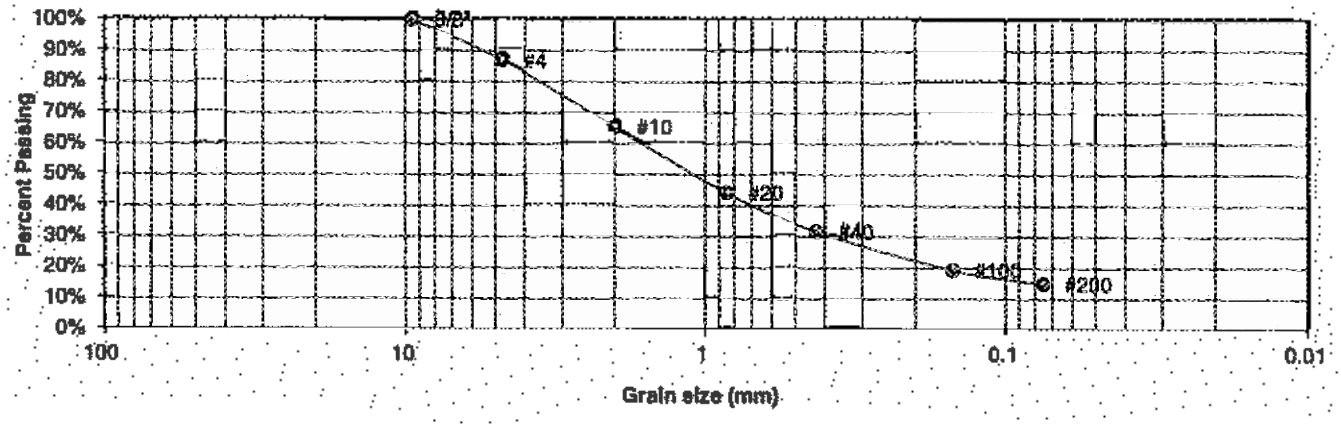
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO.: 171671
FIG NO.: B-7

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	7	JOB NO.	171671
DEPTH (FT)	5	TEST BY	BL
AASHTO CLASSIFICATION		GROUP INDEX	

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	87.0%
10	65.3%
20	44.3%
40	31.7%
100	19.3%
200	14.8%

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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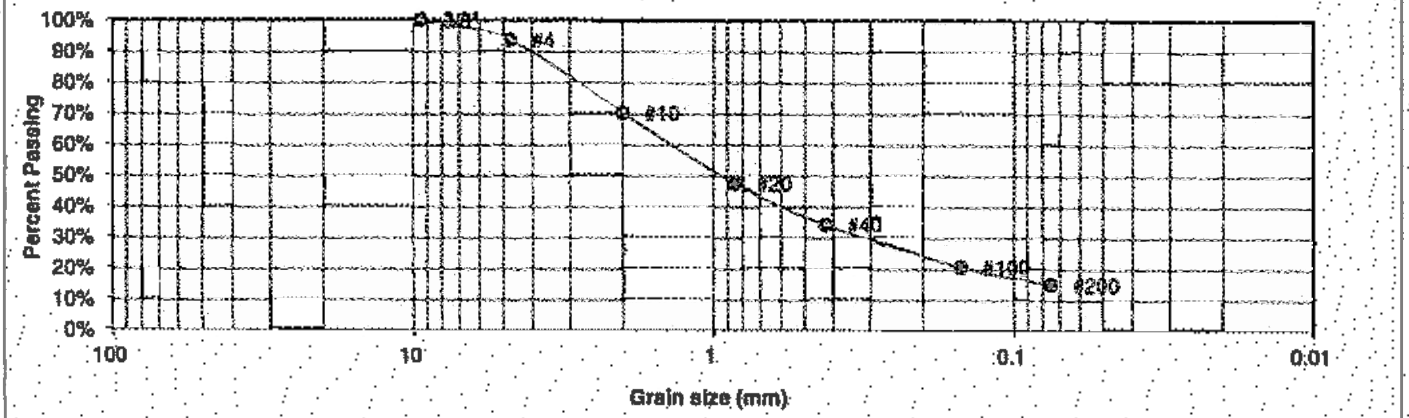
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	5/19/18

JOB NO: 171671
FIG NO: B-8

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	8	JOB NO.	171671
DEPTH (FT)	5	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.9%
10	70.3%
20	47.6%
40	34.4%
100	20.8%
200	15.2%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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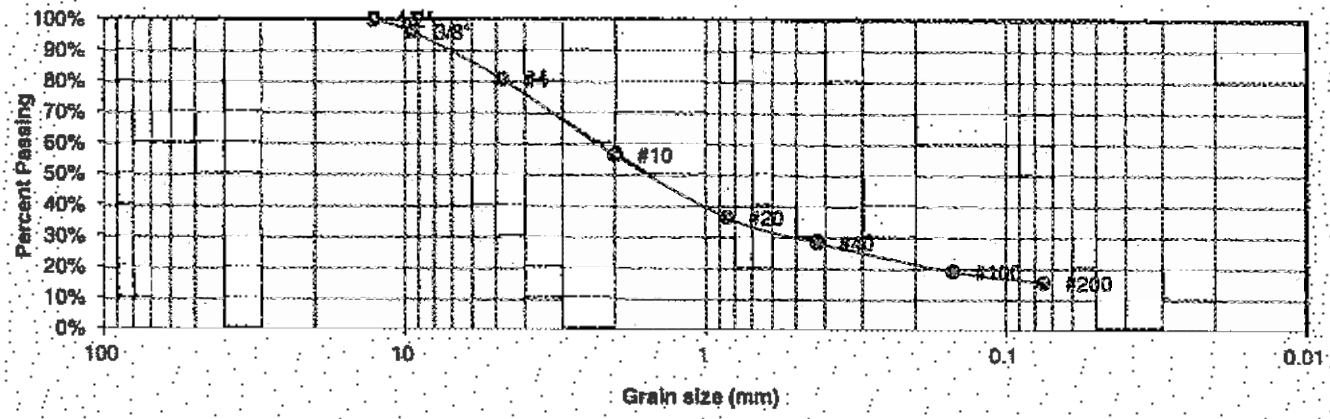
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-9

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	9	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.2%
4	80.9%
10	56.5%
20	36.6%
40	28.4%
100	19.2%
200	15.7%

Atterberg Limits	
Plastic Limit	17
Liquid Limit	25
Plastic Index	8

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

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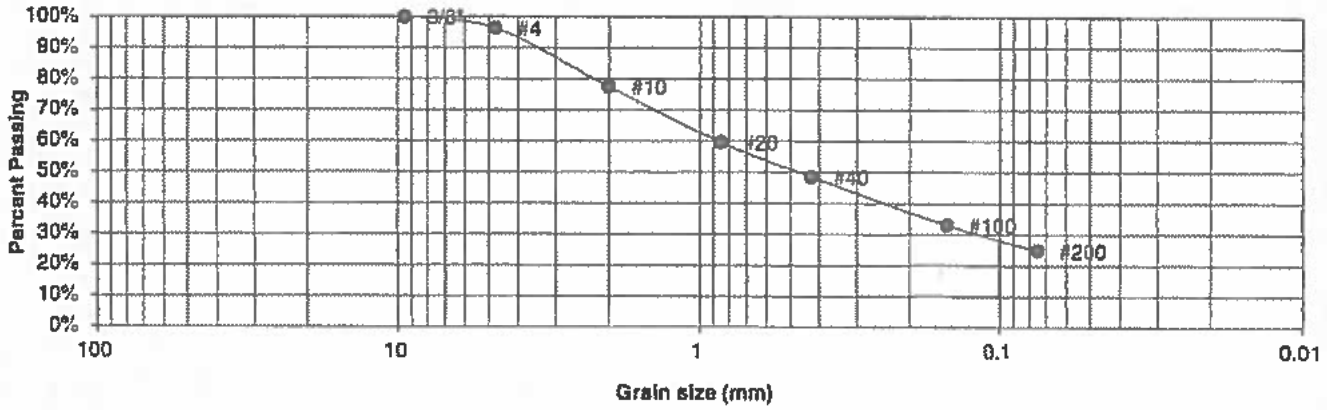
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-10

UNIFIED CLASSIFICATION	SC-SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	13	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.3%
10	77.5%
20	59.6%
40	48.5%
100	33.0%
200	24.8%

Atterberg Limits	
Plastic Limit	15
Liquid Limit	21
Plastic Index	5

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

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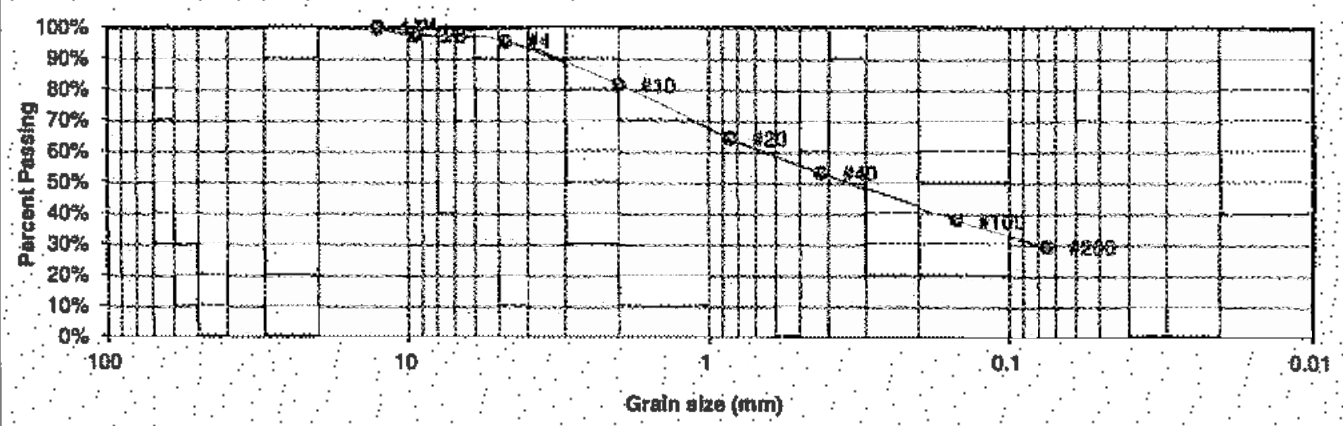
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-11

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	14	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.8%
4	95.8%
10	81.7%
20	64.6%
40	53.4%
100	37.9%
200	29.6%

Atterberg Limits

Plastic Limit	16
Liquid Limit	25
Plastic Index	10

Swell

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

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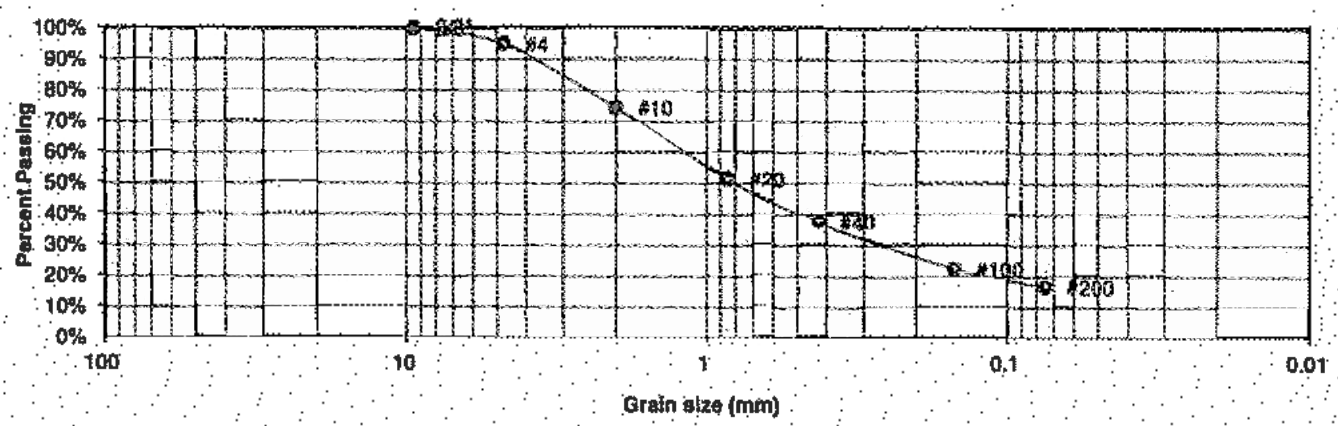
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-12

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	16	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.9%
10	74.5%
20	51.3%
40	37.5%
100	22.6%
200	16.7%

Atterberg Limits

Plastic Limit	16
Liquid Limit	26
Plastic Index	10

Swell

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

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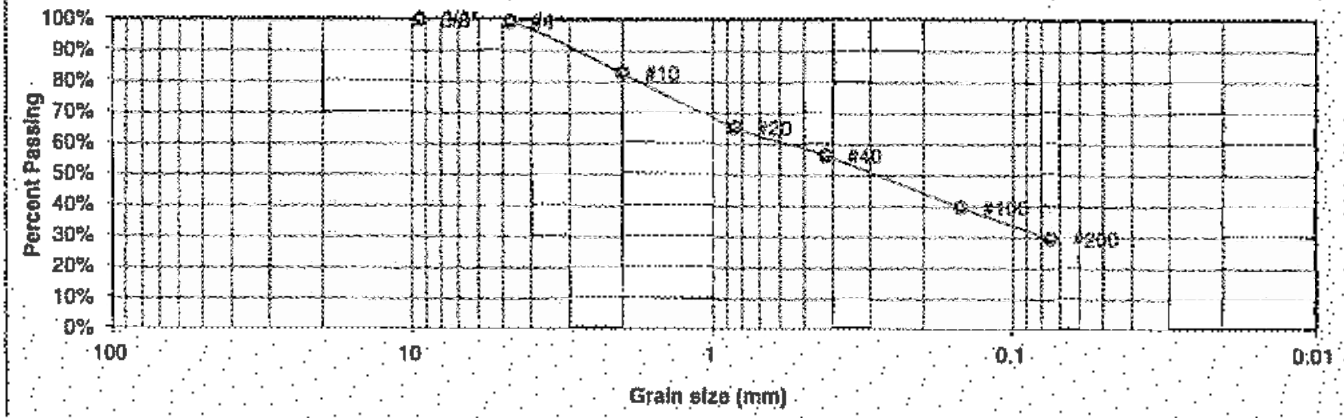
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-13

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	17	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.4%
10	82.9%
20	65.4%
40	56.5%
100	39.7%
200	29.7%

Atterberg Limits

Plastic Limit	18
Liquid Limit	28
Plastic Index	10

Swell

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

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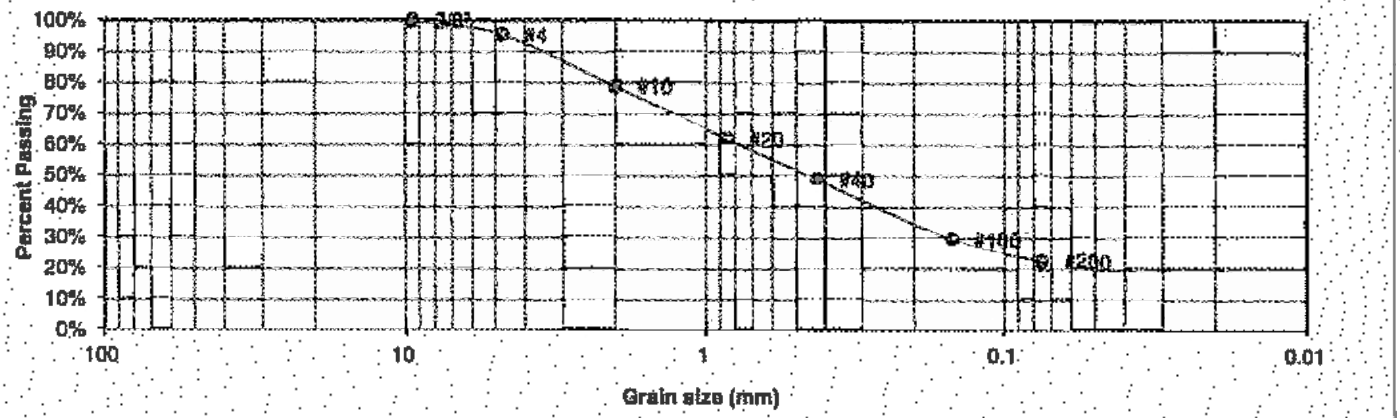
LABORATORY TEST RESULTS

DRAWN	DATE	CHECKED:	DATE:
		SCC	2/19/18

JOB NO: 171671
FIG NO: B-14

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	19	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.6%
10	79.0%
20	62.0%
40	48.9%
100	29.6%
200	22.7%

Atterberg Limits

Plastic Limit	17
Liquid Limit	27
Plastic Index	10

Swell

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

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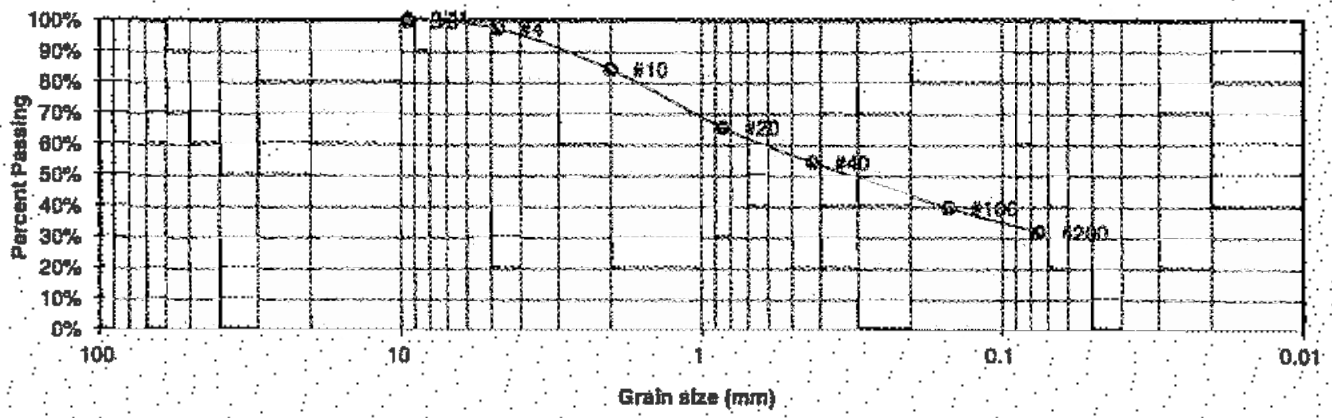
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO.: 171671
FIG NO.: B-15

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	20	JOB NO.	171671
DEPTH (FT)	0-3	TEST BY	BL
AASHTO CLASSIFICATION		GROUP INDEX	

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.6%
10	84.3%
20	65.7%
40	54.5%
100	39.8%
200	31.9%

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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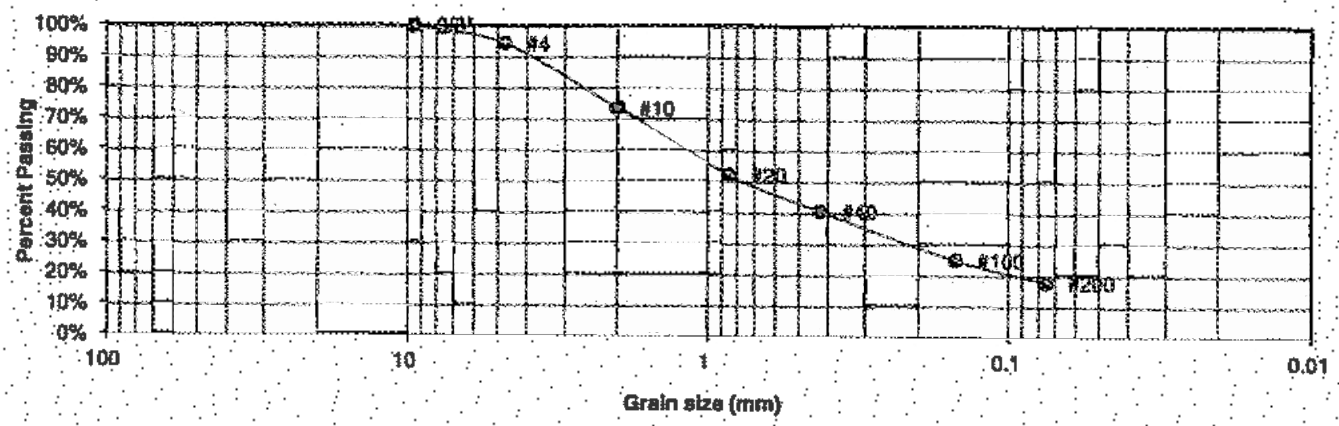
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO.: 171671
FIG NO.: B-16

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	20	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.5%
10	73.8%
20	52.4%
40	40.7%
100	25.1%
200	17.9%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

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

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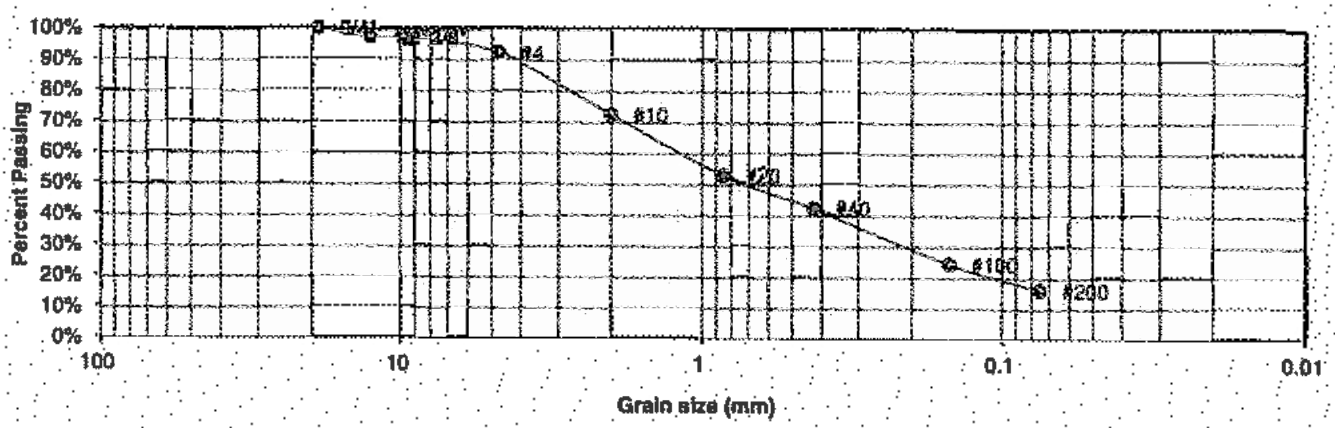
LABORATORY TEST RESULTS

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		SCC	3/19/18

JOB NO: 171671
FIG NO: B-17

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	21	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	100.0%
1/2"	97.2%
3/8"	97.2%
4	92.4%
10	72.5%
20	53.0%
40	42.4%
100	24.5%
200	16.1%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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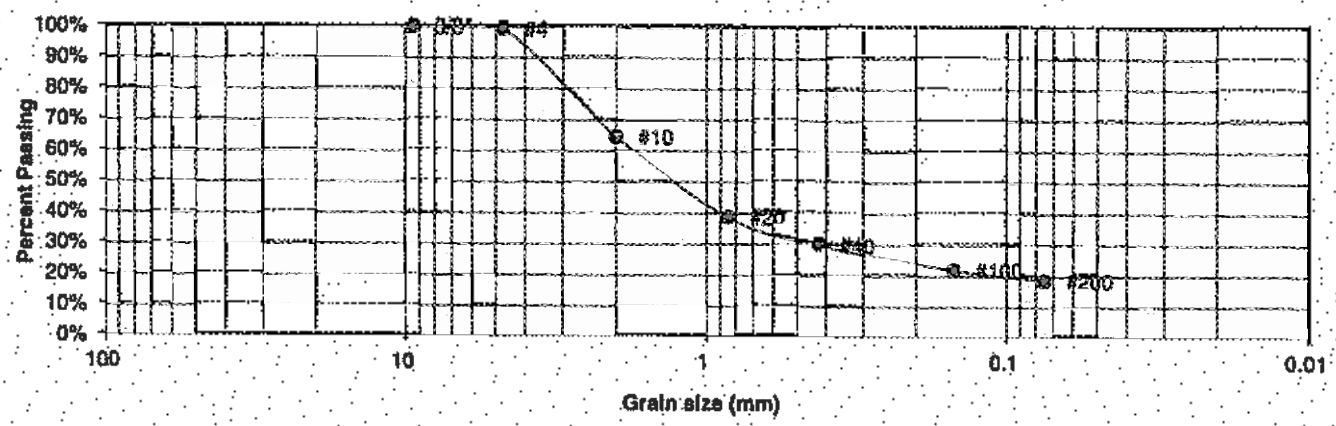
LABORATORY TEST RESULTS

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JOB NO: 171671
FIG NO: B-18

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	31	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.2%
10	64.6%
20	38.8%
40	29.8%
100	21.9%
200	18.5%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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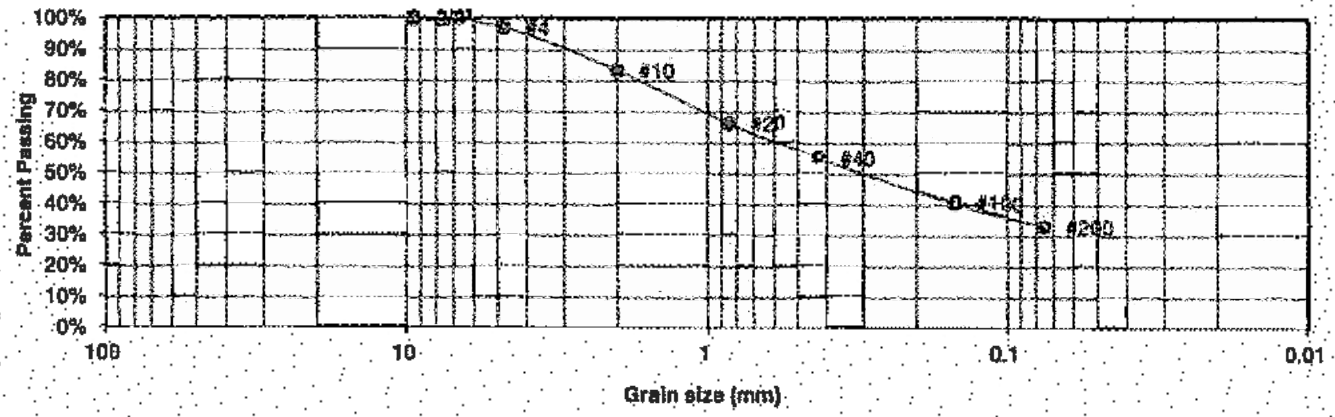
LABORATORY TEST RESULTS

DRAWN	DATE	CHECKED	DATE
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-19

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	35	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.2%
10	83.4%
20	66.3%
40	55.2%
100	40.4%
200	33.0%

Atterberg Limits

Plastic Limit	17
Liquid Limit	25
Plastic Index	8

Swell

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

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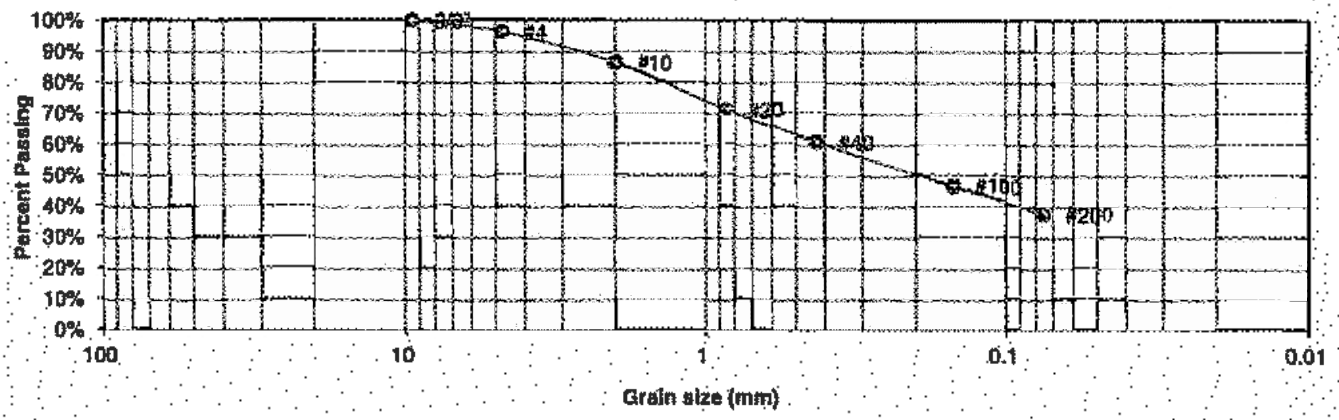
LABORATORY TEST RESULTS

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JOB NO.: 171671
FIG NO.: B-20

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	1	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	35	JOB NO.	171671
DEPTH (FT)	5	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.5%
10	86.6%
20	71.4%
40	60.9%
100	46.7%
200	37.7%

Atterberg Limits	
Plastic Limit	17
Liquid Limit	27
Plastic Index	10

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

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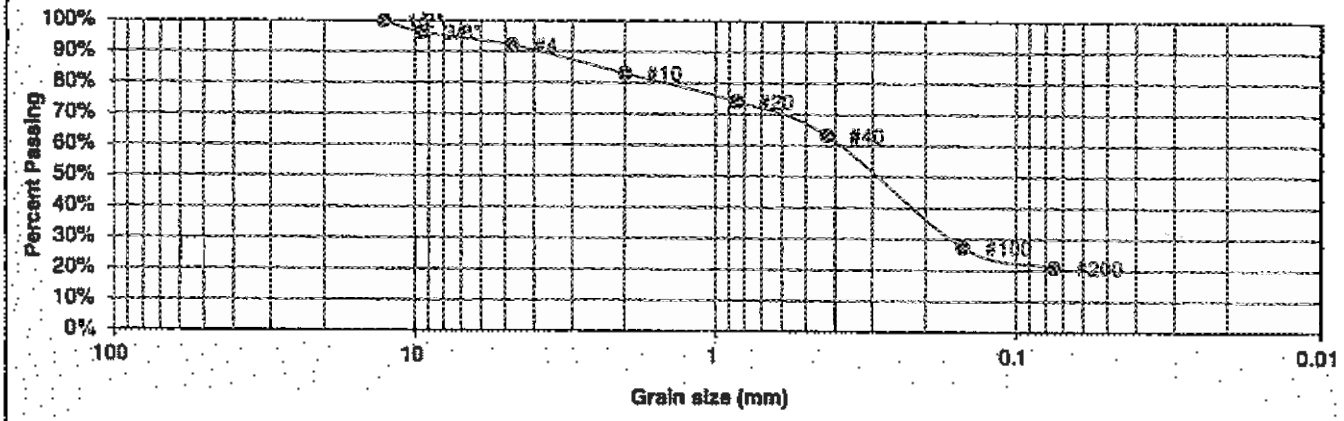
LABORATORY TEST RESULTS

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		SCC	3/19/18

JOB NO. 171671
FIG NO. B-21

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	1	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.2%
4	92.1%
10	83.1%
20	74.1%
40	63.2%
100	27.4%
200	21.0%

Atterberg Limits	
Plastic Limit	16
Liquid Limit	29
Plastic Index	13

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

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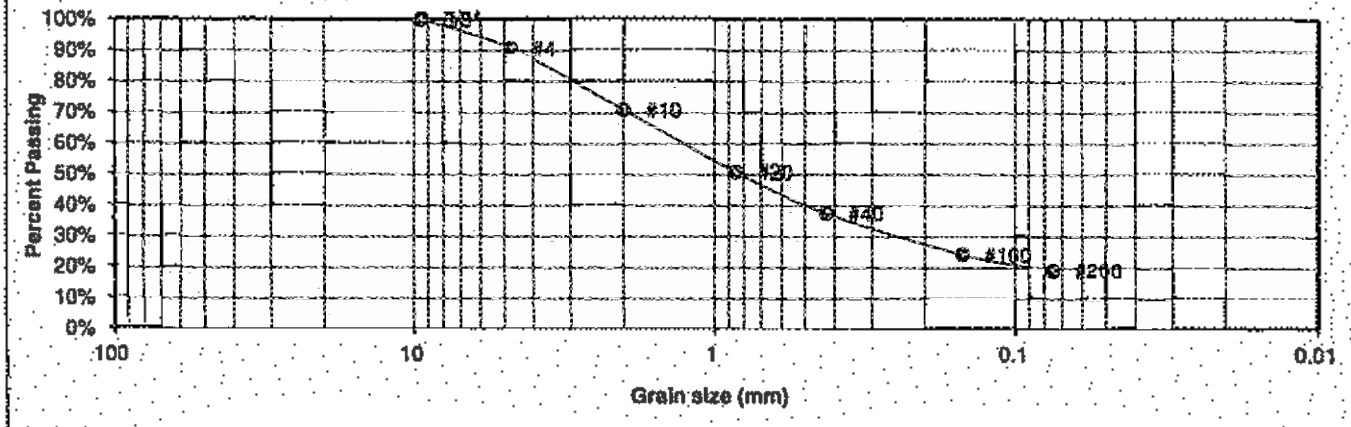
LABORATORY TEST RESULTS

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		JCE	2/19/18

JOB NO.: 171671
FIG NO.: B-22

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	3	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	90.8%
10	70.9%
20	50.9%
40	37.5%
100	24.3%
200	19.1%

Atterberg Limits

Plastic Limit	14
Liquid Limit	26
Plastic Index	12

Swell

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

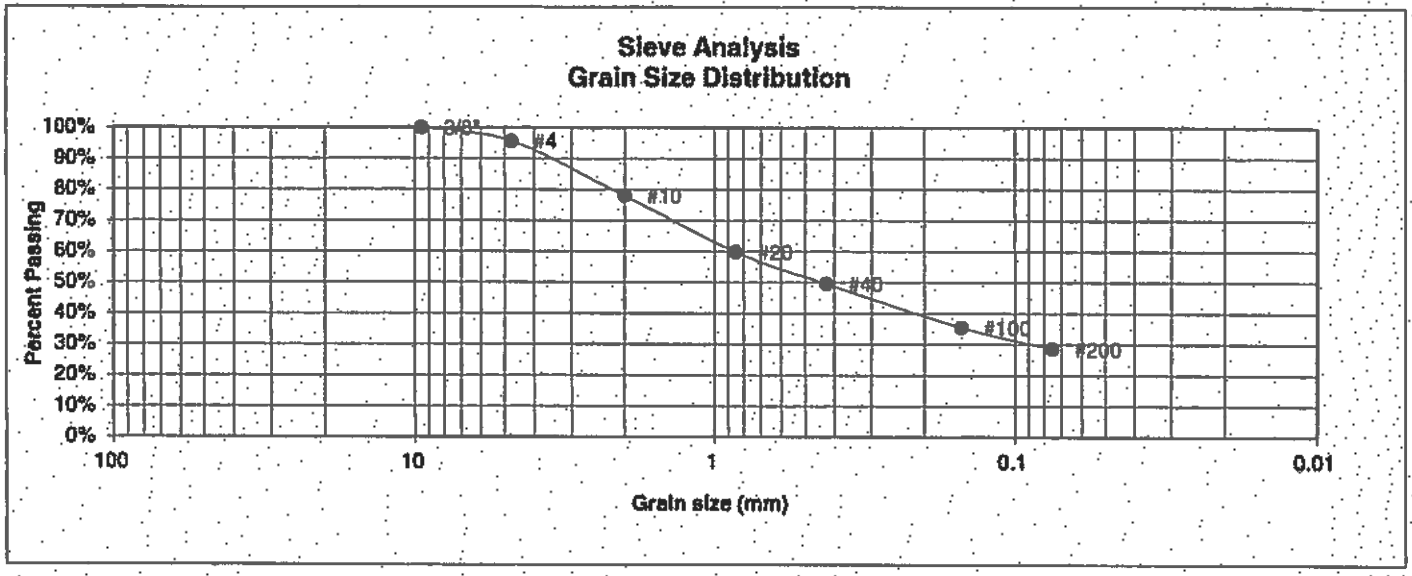
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LABORATORY TEST RESULTS

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JOB NO: 171671
FIG NO: B-23

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	7	JOB NO.	171671
DEPTH (FT)	0-3	TEST BY	BL
AASHTO CLASSIFICATION		GROUP INDEX	



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.6%
10	78.0%
20	59.9%
40	49.5%
100	35.5%
200	28.6%

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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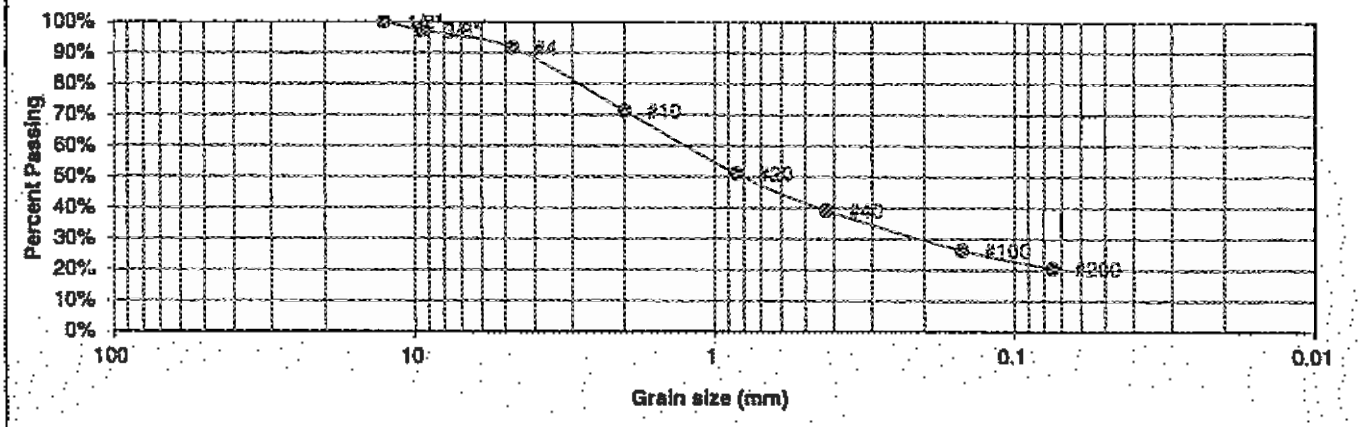
LABORATORY TEST RESULTS

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JOB NO.: 171671
FIG NO.: B-24

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	7	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.1%
4	91.6%
10	71.3%
20	51.1%
40	39.2%
100	26.3%
200	20.6%

Atterberg Limits

Plastic Limit	14
Liquid Limit	30
Plastic Index	16

Swell

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

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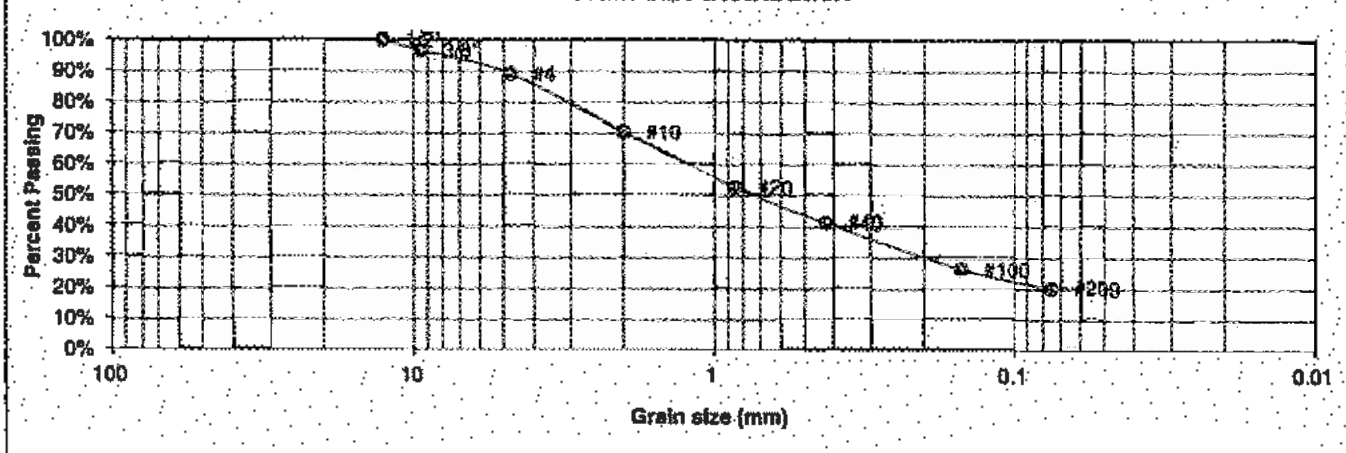
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 3/19/18

JOB NO.: 171671
FIG NO.: B-25

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	8	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.8%
4	89.2%
10	70.3%
20	52.6%
40	41.3%
100	26.5%
200	20.2%

Atterberg Limits	
Plastic Limit	8
Liquid Limit	27
Plastic Index	18

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

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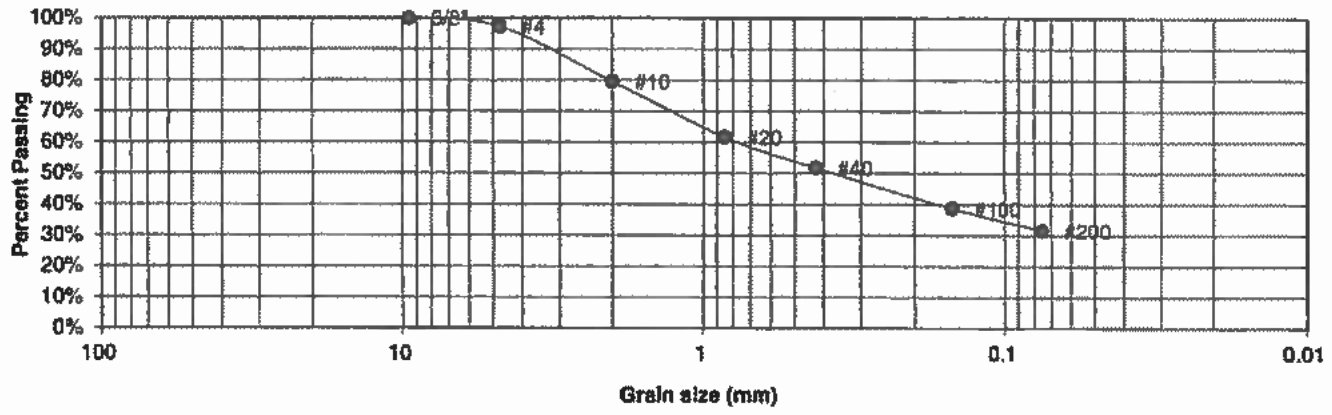
LABORATORY TEST RESULTS

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		BCC	2/19/18

JOB NO.: 171671
FIG NO.: B-26

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2, CBR #2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	10	JOB NO.	171671
DEPTH (FT)	0-3	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	1

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.3%
10	79.6%
20	61.7%
40	51.7%
100	38.6%
200	31.6%

Atterberg Limits

Plastic Limit	11
Liquid Limit	25
Plastic Index	14

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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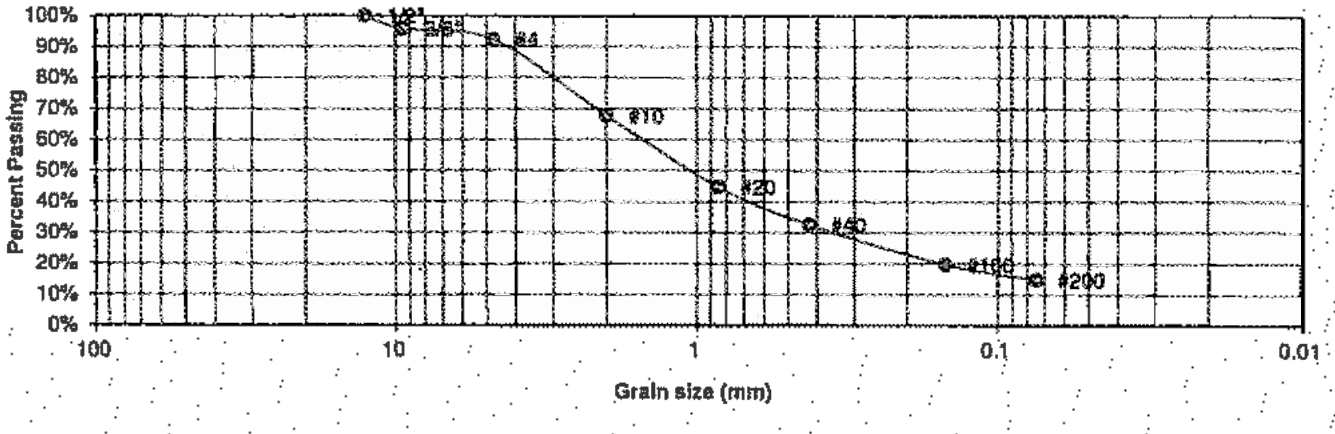
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 3/19/18

JOB NO.: 171671
FIG NO.: B-27

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	11	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.9%
4	92.4%
10	67.8%
20	44.8%
40	32.5%
100	19.7%
200	14.8%

Atterberg Limits	
Plastic Limit	14
Liquid Limit	26
Plastic Index	12

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

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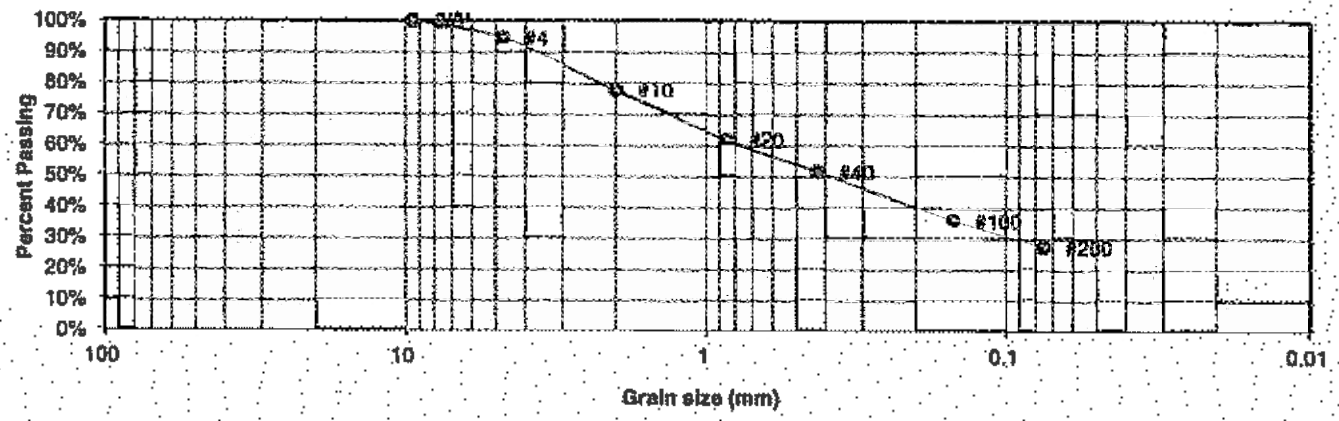
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		JCC	2/19/18

JOB NO.: 171671
FIG NO.: B-28

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	12	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.6%
10	77.8%
20	61.9%
40	51.7%
100	35.9%
200	27.3%

Atterberg Limits

Plastic Limit	15
Liquid Limit	26
Plastic Index	11

Swell

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

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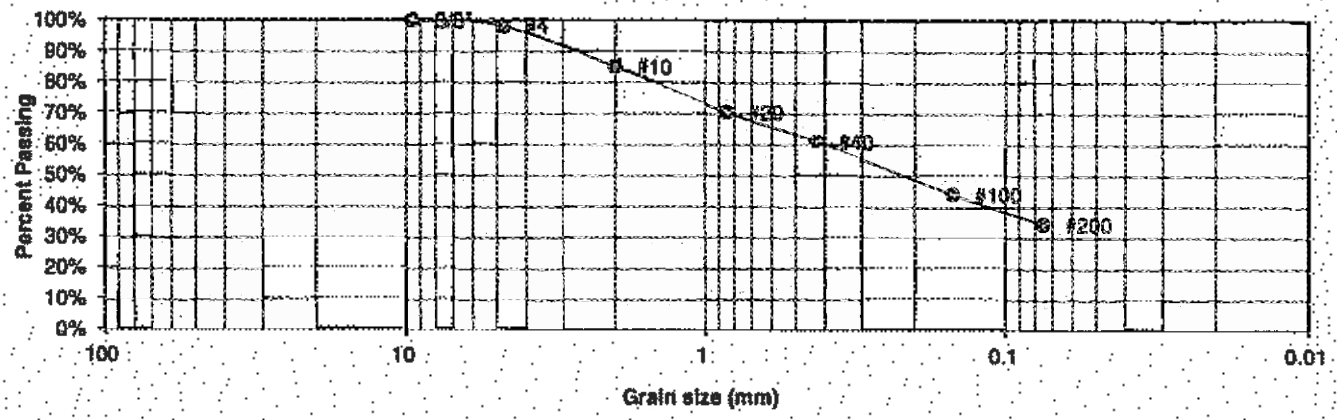
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO: 171671
FIG NO: B-29

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	18	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.1%
10	85.2%
20	70.5%
40	61.0%
100	44.1%
200	34.5%

Atterberg Limits	
Plastic Limit	13
Liquid Limit	24
Plastic Index	11

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

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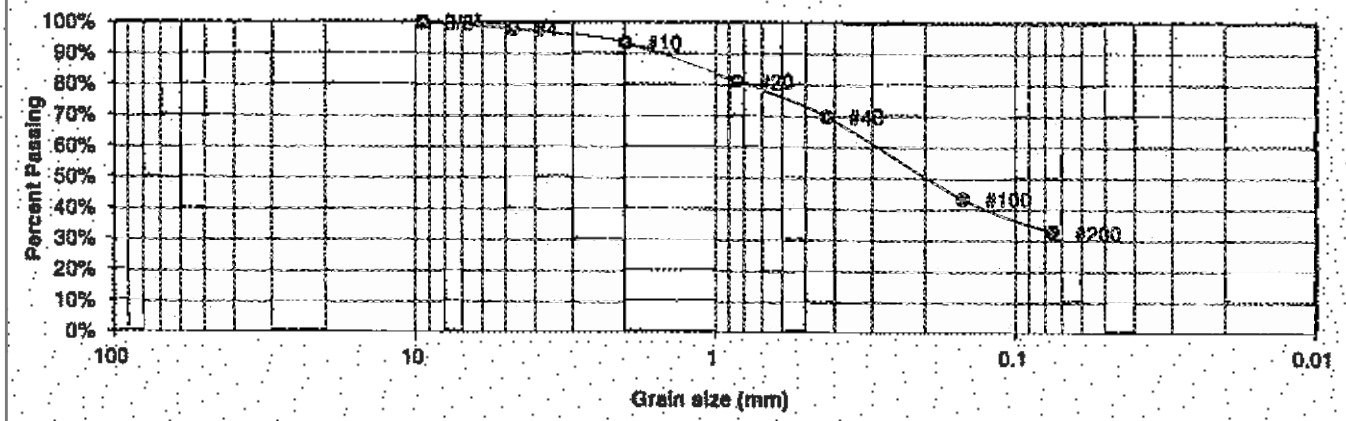
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: B-30

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	23	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.1%
10	93.4%
20	81.2%
40	69.9%
100	43.5%
200	32.6%

Atterberg Limits	
Plastic Limit	18
Liquid Limit	30
Plastic Index	12

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

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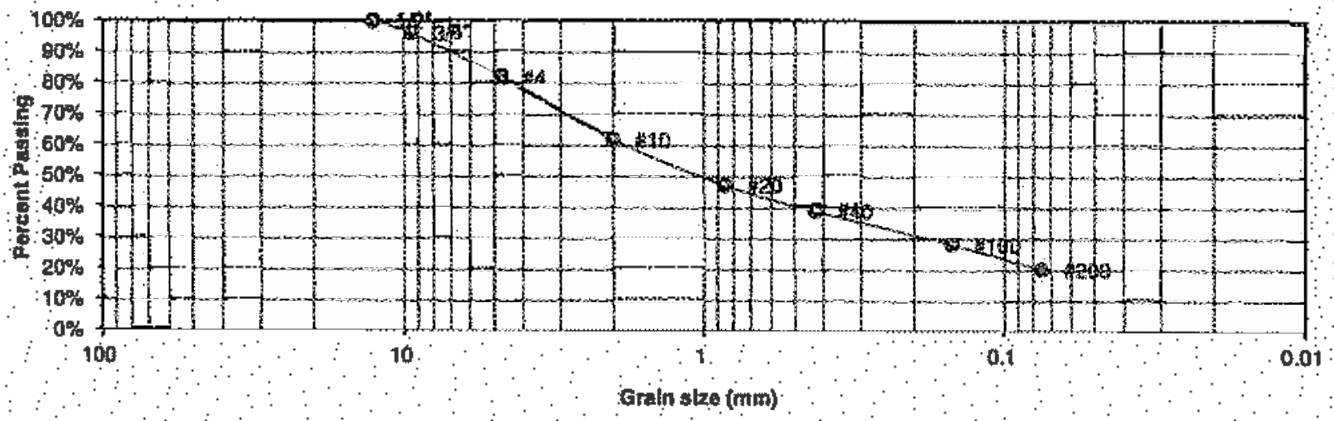
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-31

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	24	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.3%
4	82.0%
10	62.0%
20	47.3%
40	39.0%
100	28.3%
200	20.2%

Atterberg Limits

Plastic Limit	14
Liquid Limit	26
Plastic Index	12

Swell

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

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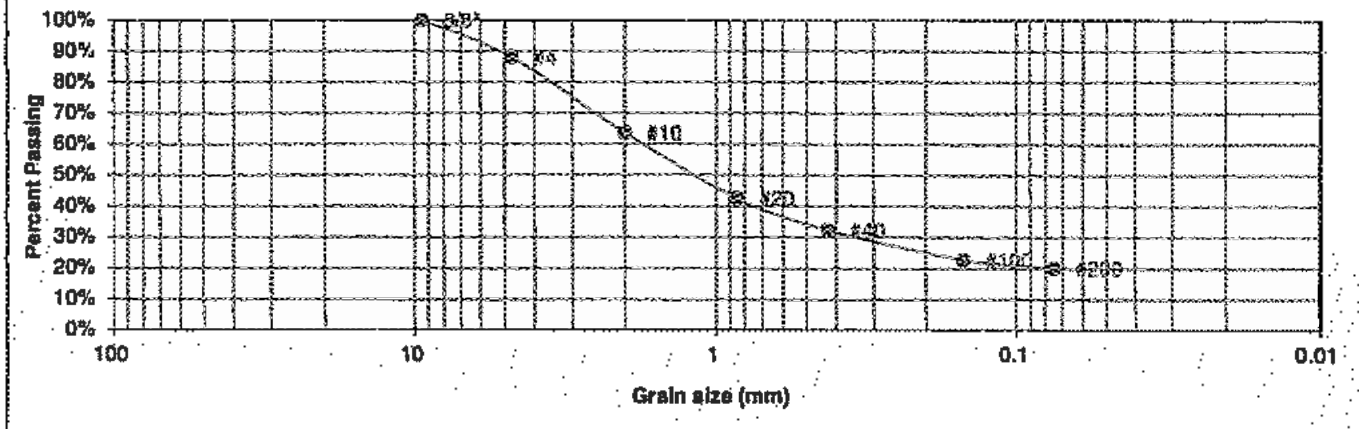
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-32

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	36	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	88.0%
10	63.7%
20	42.6%
40	32.4%
100	22.8%
200	20.1%

Atterberg Limits

Plastic Limit	19
Liquid Limit	30
Plastic Index	11

Swell

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

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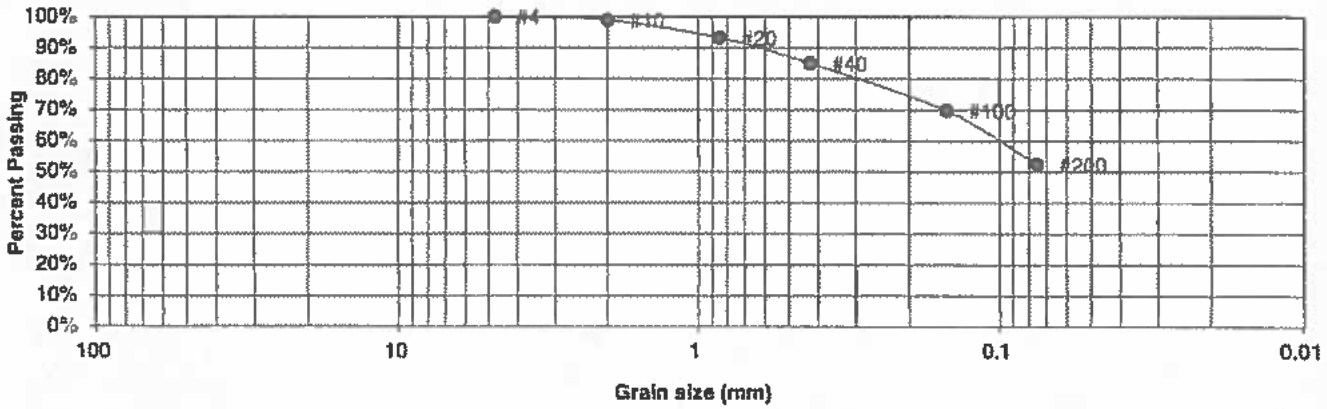
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO: 171671
FIG NO.: B-33

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	10	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	3

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.8%
20	93.2%
40	85.0%
100	69.7%
200	52.4%

Atterberg Limits	
Plastic Limit	15
Liquid Limit	28
Plastic Index	13

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

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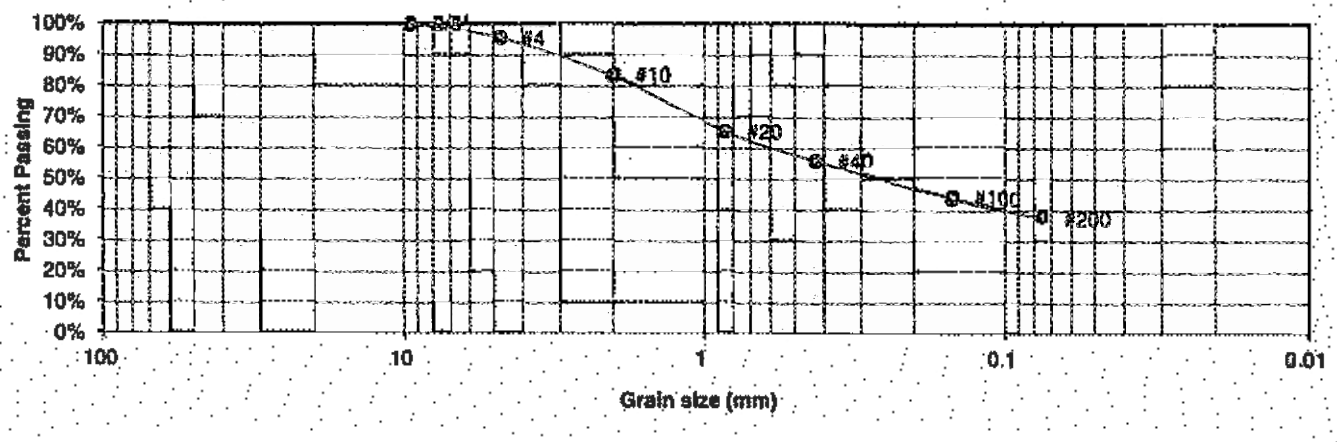
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: B-34

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3, CBR #2	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	15	JOB NO.	171671
DEPTH (FT)	0-3	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	2

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.8%
10	83.4%
20	65.6%
40	55.9%
100	43.7%
200	37.5%

Atterberg Limits	
Plastic Limit	12
Liquid Limit	29
Plastic Index	17

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

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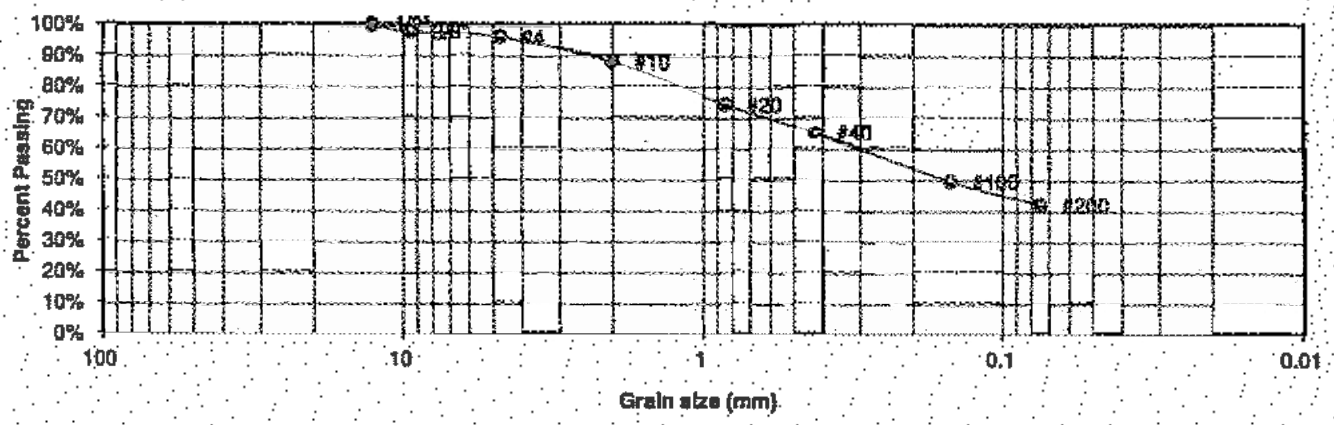
LABORATORY TEST RESULTS

DRAWN	DATE	CHECKED: SCC	DATE: 2/19/18

JOB NO. 171671
FIG NO. B-35

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	22	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	1

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.8%
4	96.3%
10	88.1%
20	74.5%
40	65.2%
100	49.8%
200	42.3%

Atterberg Limits

Plastic Limit	15
Liquid Limit	27
Plastic Index	12

Swell

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

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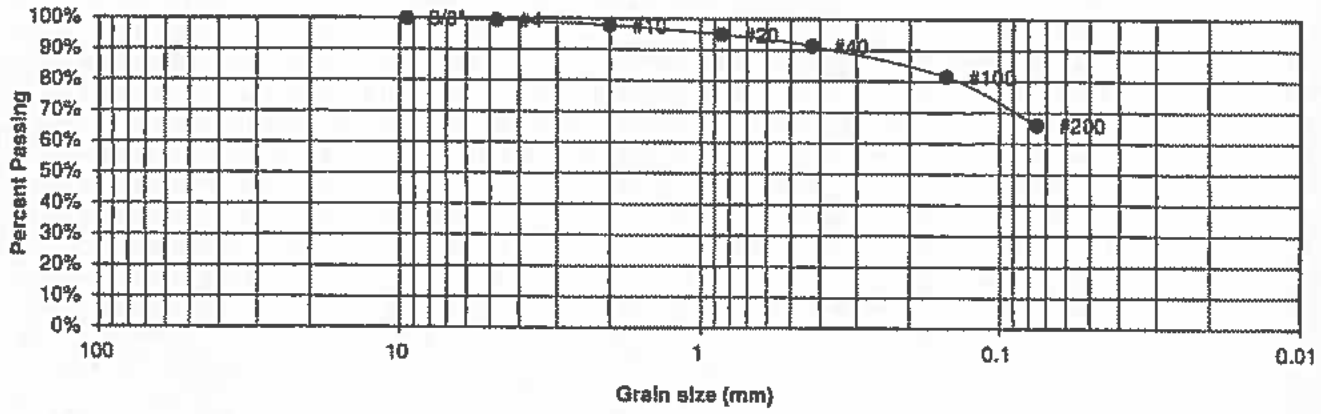
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO. 171671
FIG NO. B-36

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	25	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	4

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.4%
10	97.7%
20	95.0%
40	91.4%
100	81.5%
200	66.0%

Atterberg Limits

Plastic Limit	15
Liquid Limit	26
Plastic Index	11

Swell

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

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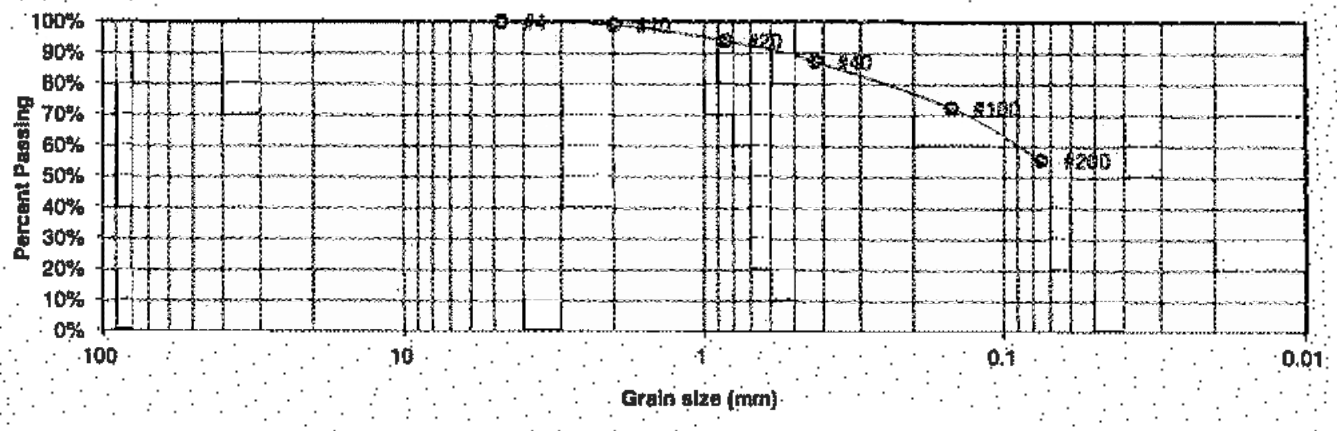
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO.: 171671
FIG NO.: B-37

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	26	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-4	GROUP INDEX	3

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.1%
20	94.1%
40	87.4%
100	72.3%
200	55.6%

Atterberg Limits

Plastic Limit	15
Liquid Limit	25
Plastic Index	10

Swell

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

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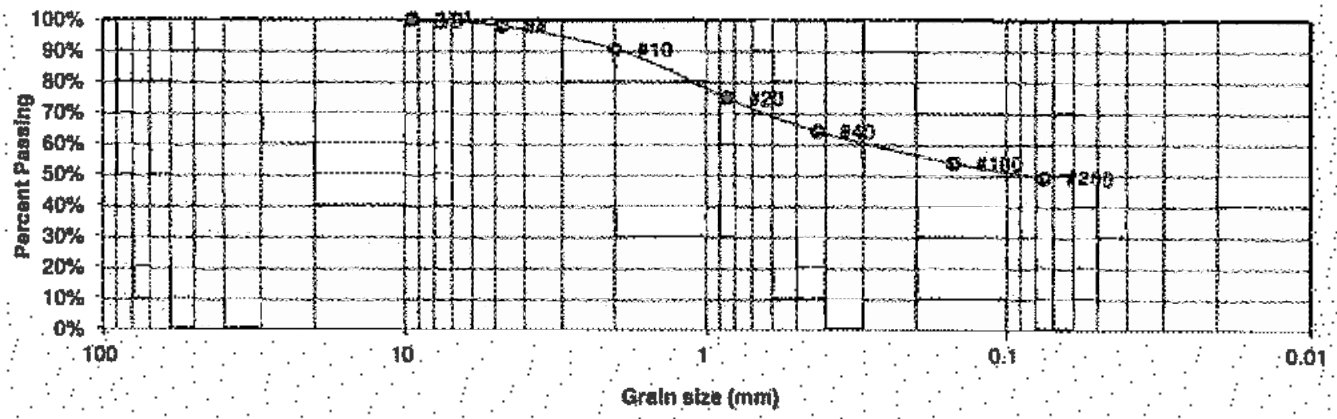
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		BCC	2/9/18

JOB NO.: 171671
FIG NO.: B-38

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	26	JOB NO.	171671
DEPTH (FT)	10	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	8

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.1%
10	90.6%
20	75.1%
40	64.4%
100	54.2%
200	49.4%

Atterberg Limits

Plastic Limit	14
Liquid Limit	39
Plastic Index	25

Swell

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

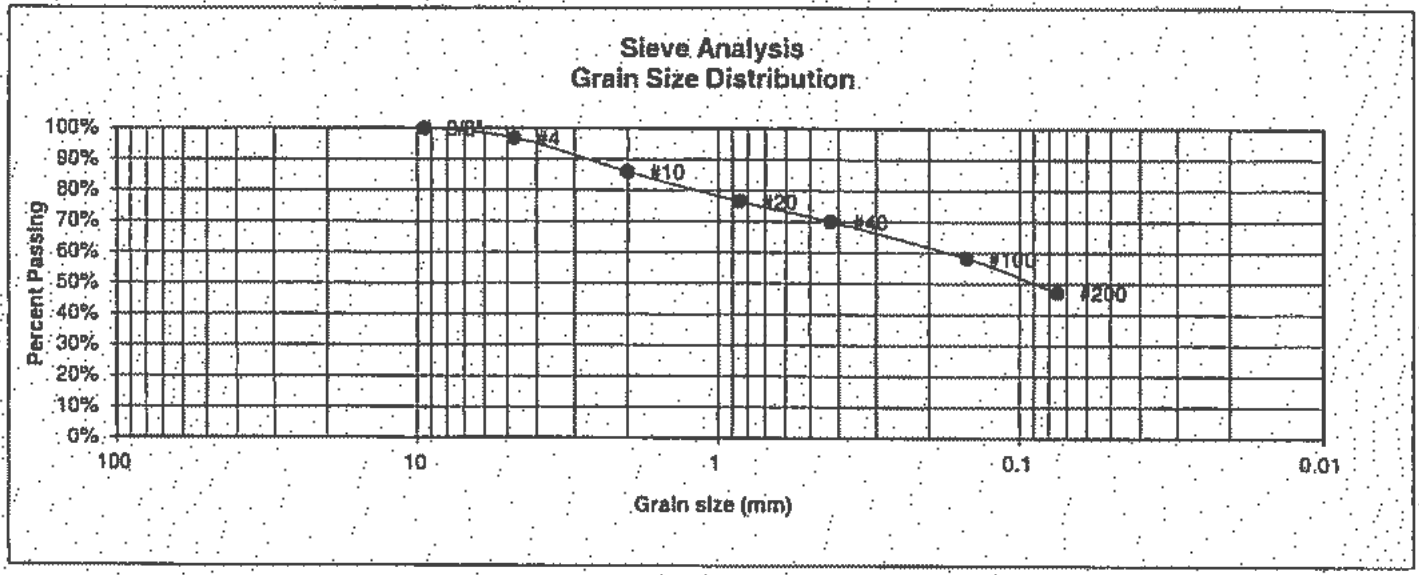
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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		JCC	8/19/18

JOB NO: 171671
FIG NO: B-39

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	27	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	2



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.9%
10	86.0%
20	76.5%
40	69.9%
100	58.2%
200	47.2%

Atterberg Limits	
Plastic Limit	16
Liquid Limit	28
Plastic Index	12

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

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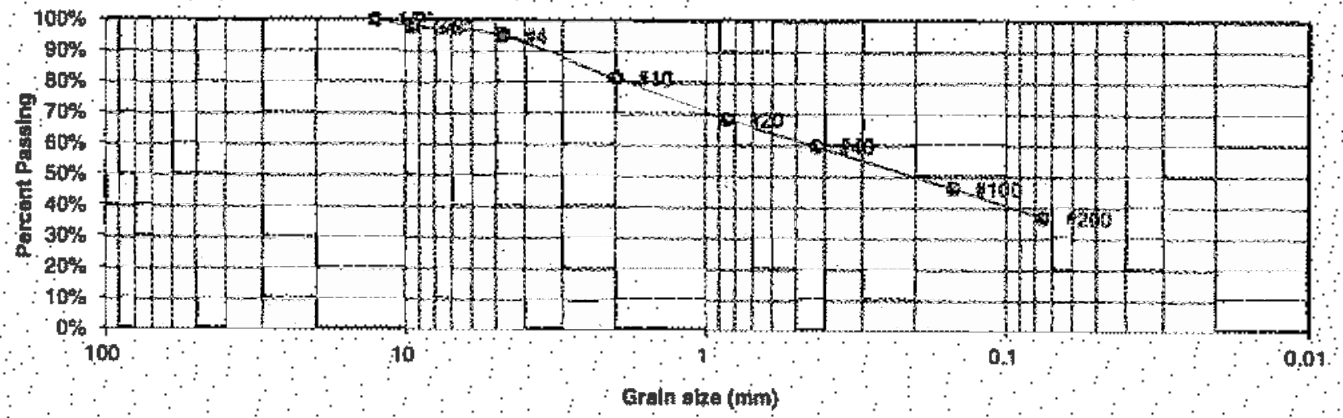
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-40

UNIFIED CLASSIFICATION	SC-SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	28	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-4	GROUP INDEX	0

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	95.2%
10	81.4%
20	68.4%
40	59.8%
100	46.3%
200	36.9%

Atterberg Limits	
Plastic Limit	17
Liquid Limit	21
Plastic Index	5

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

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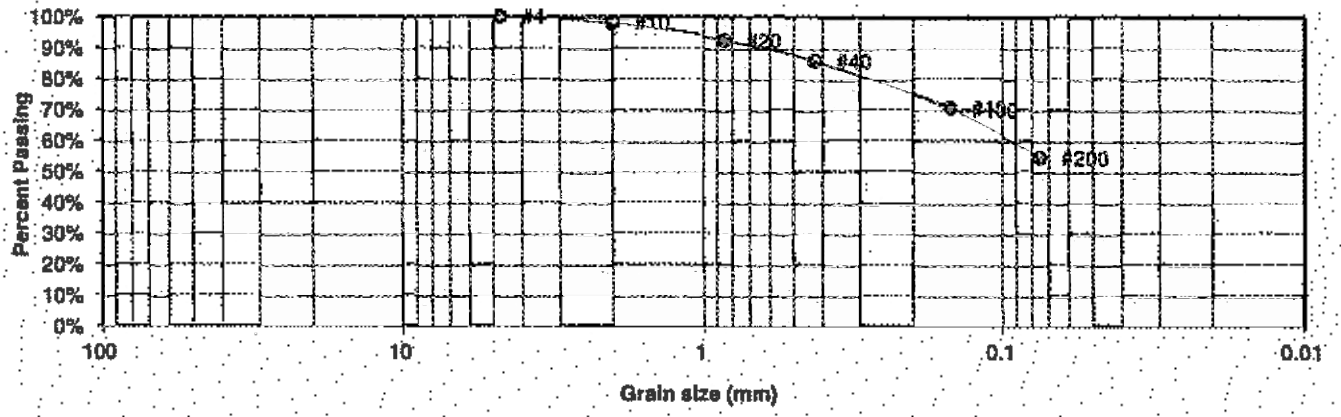
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 3/19/18

JOB NO.: 171671
FIG NO.: B-41

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	28	JOB NO.	171671
DEPTH (FT)	5	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	6

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.4%
20	92.9%
40	86.2%
100	70.6%
200	55.0%

Atterberg Limits	
Plastic Limit	14
Liquid Limit	31
Plastic Index	17

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

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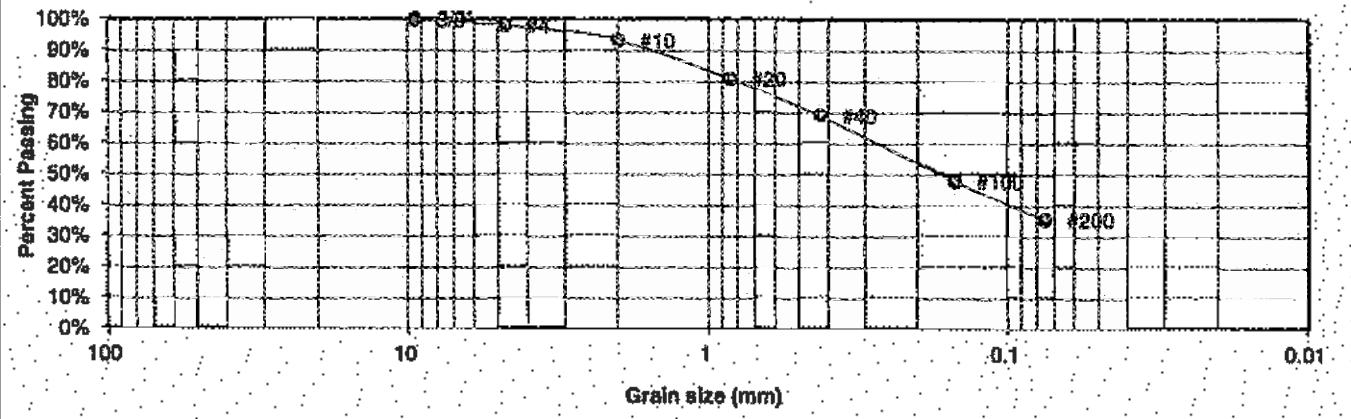
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-42

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	29	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.2%
10	93.3%
20	81.1%
40	69.1%
100	48.0%
200	35.6%

Atterberg Limits	
Plastic Limit	15
Liquid Limit	26
Plastic Index	11

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

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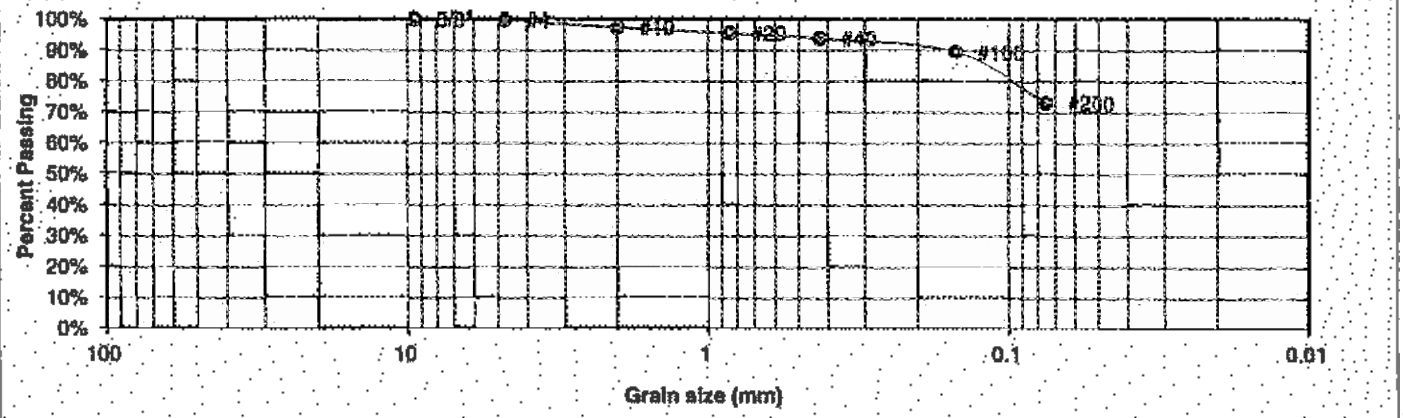
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO. 171671
FIG NO. B-43

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	29	JOB NO.	171671
DEPTH (FT)	5	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	6

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	97.4%
20	95.6%
40	93.9%
100	89.5%
200	73.1%

Atterberg Limits	
Plastic Limit	17
Liquid Limit	28
Plastic Index	11

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

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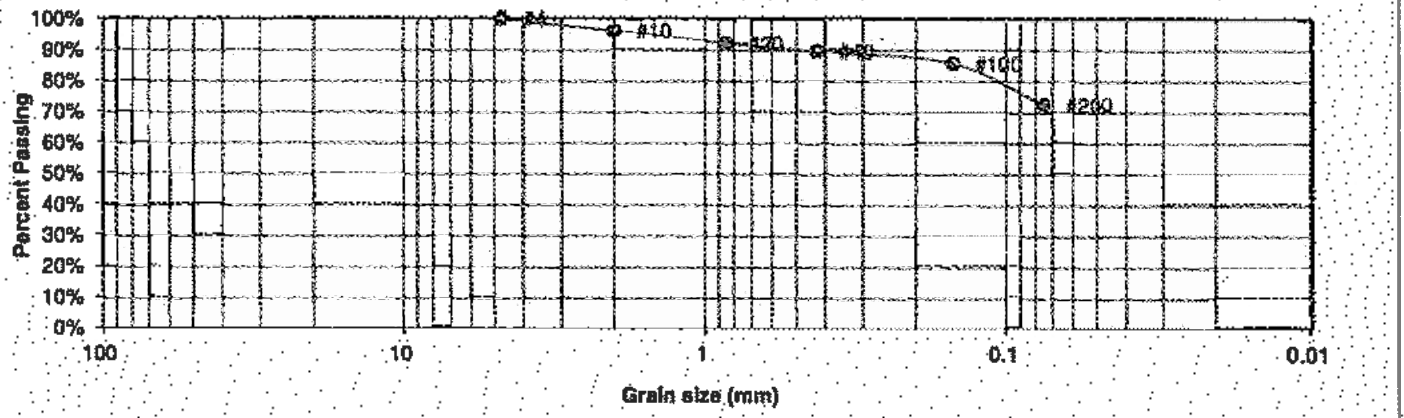
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-44

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	30	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	8

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	96.2%
20	92.2%
40	89.7%
100	85.8%
200	72.4%

Atterberg Limits	
Plastic Limit	15
Liquid Limit	30
Plastic Index	15

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

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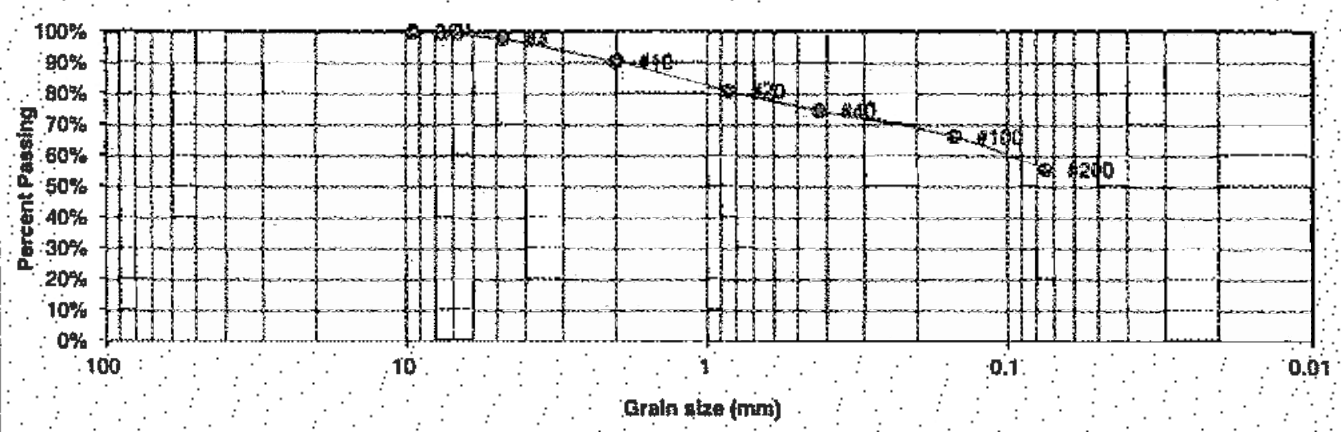
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO. 171671
FIG NO. B-45

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	32	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	5

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.9%
10	90.3%
20	81.0%
40	74.8%
100	66.4%
200	55.7%

Atterberg Limits

Plastic Limit	13
Liquid Limit	28
Plastic Index	15

Swell

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

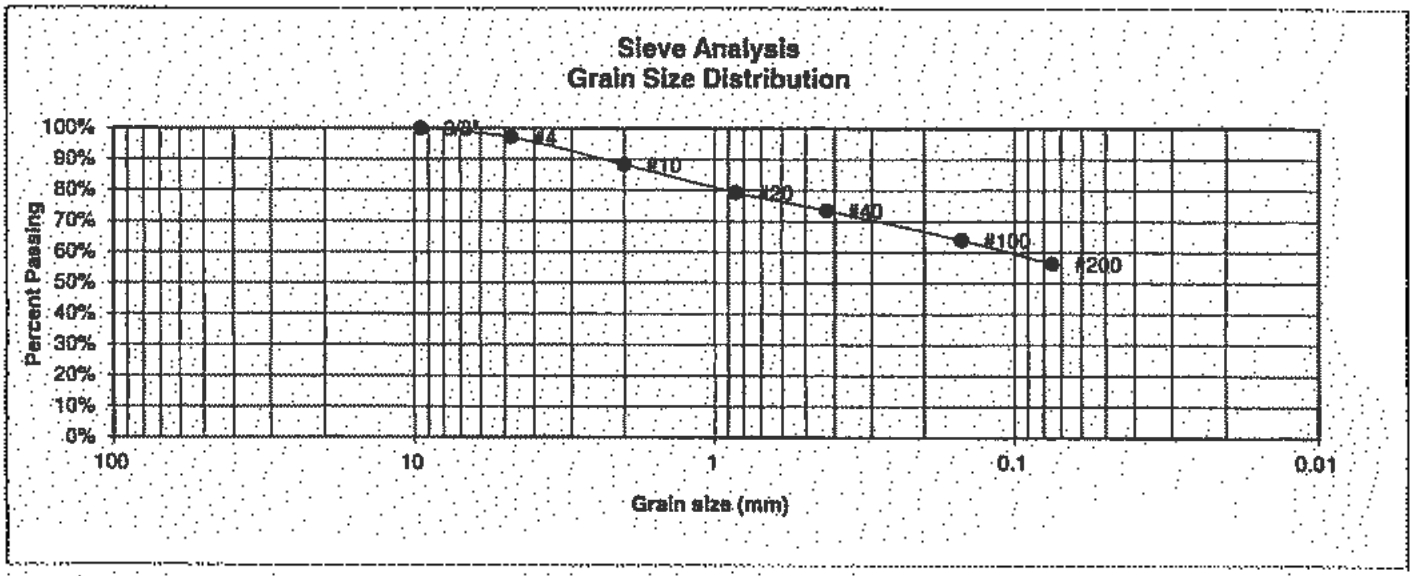
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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO 171671
FIG NO B-46

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	33	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-4	GROUP INDEX	1



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.1%
10	88.3%
20	79.3%
40	73.6%
100	64.0%
200	56.3%

Atterberg Limits	
Plastic Limit	14
Liquid Limit	21
Plastic Index	7

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

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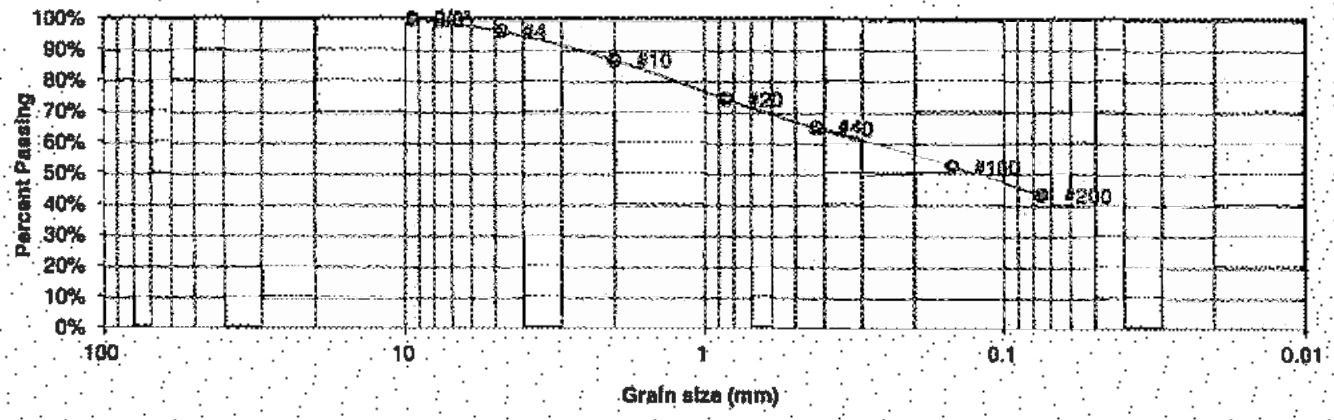
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-47

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	34	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	1

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.3%
10	87.0%
20	74.4%
40	65.1%
100	52.6%
200	43.5%

Atterberg Limits

Plastic Limit	16
Liquid Limit	27
Plastic Index	11

Swell

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

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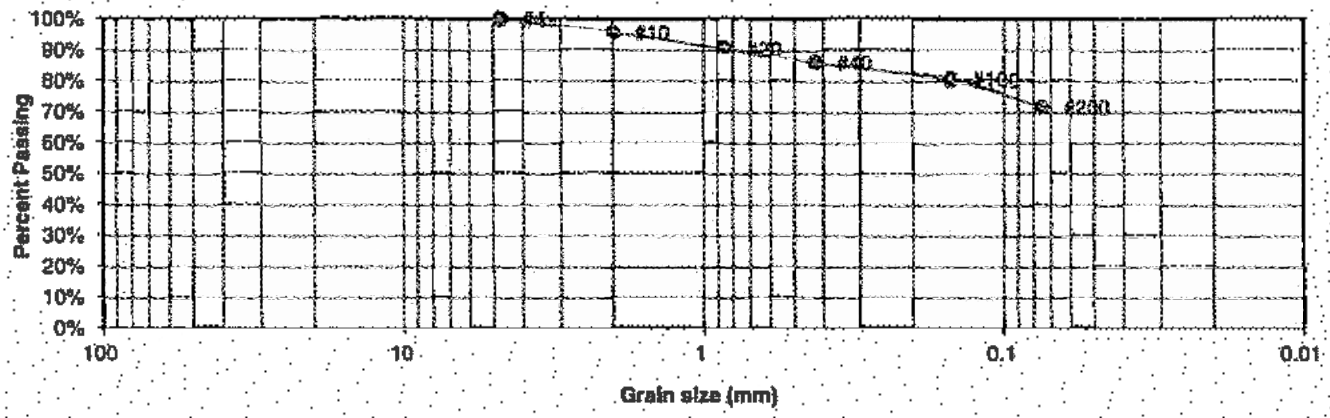
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO. 171671
FIG NO. B-48

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	37	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	6

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	95.9%
20	90.5%
40	86.2%
100	80.4%
200	71.8%

Atterberg Limits	
Plastic Limit	17
Liquid Limit	28
Plastic Index	11

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

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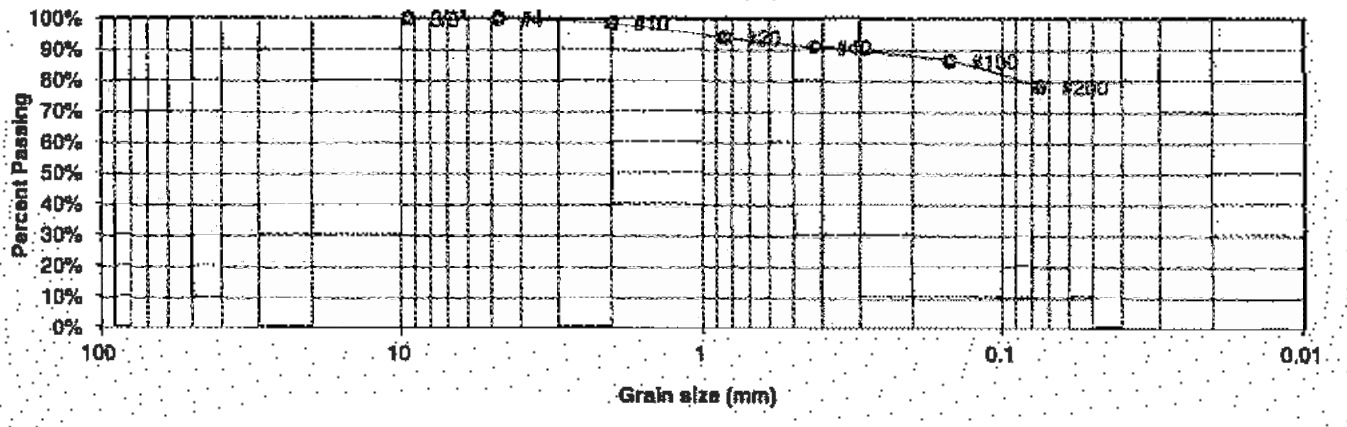
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-49

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	38	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-5	GROUP INDEX	7

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	100.0%
10	98.3%
20	94.0%
40	90.9%
100	86.7%
200	78.4%

Atterberg Limits	
Plastic Limit	19
Liquid Limit	30
Plastic Index	10

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

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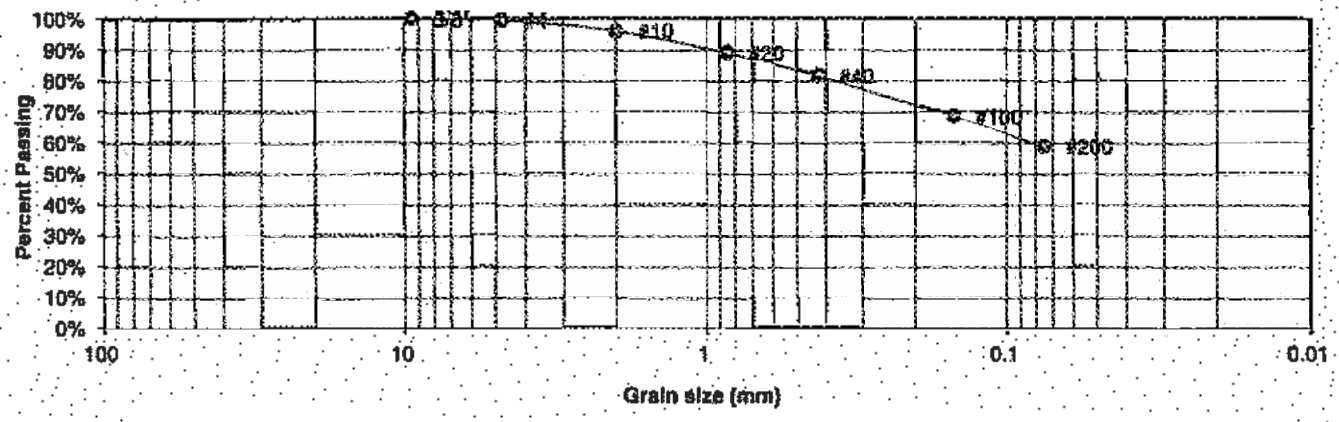
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO: 171671
FIG NO: B-50

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	39	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	6

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	96.2%
20	89.1%
40	81.8%
100	68.5%
200	59.0%

Atterberg Limits	
Plastic Limit	15
Liquid Limit	31
Plastic Index	16

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

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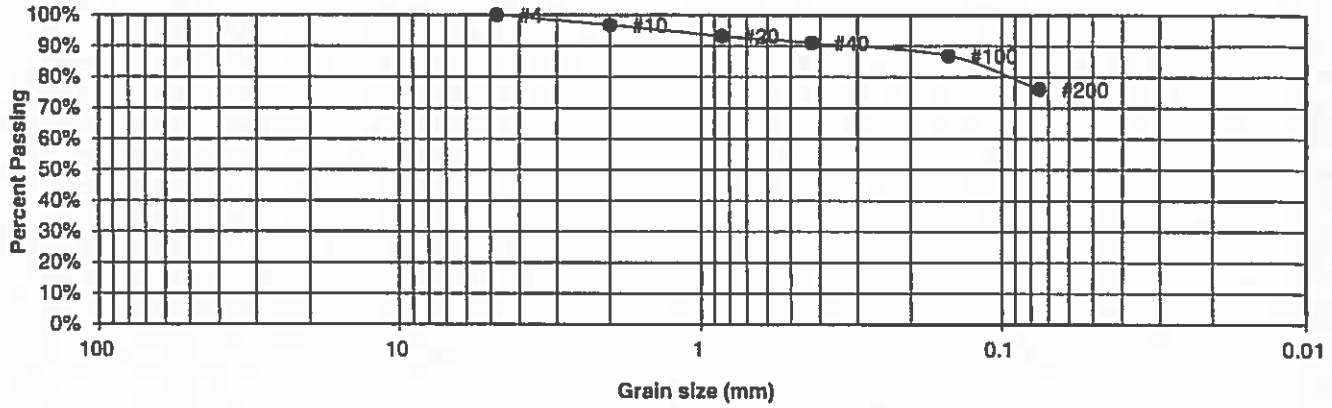
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/19

JOB NO: 171671
FIG NO: B-51

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	40	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-6	GROUP INDEX	9

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	96.8%
20	93.3%
40	91.1%
100	86.9%
200	76.1%

Atterberg Limits	
Plastic Limit	19
Liquid Limit	32
Plastic Index	14

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

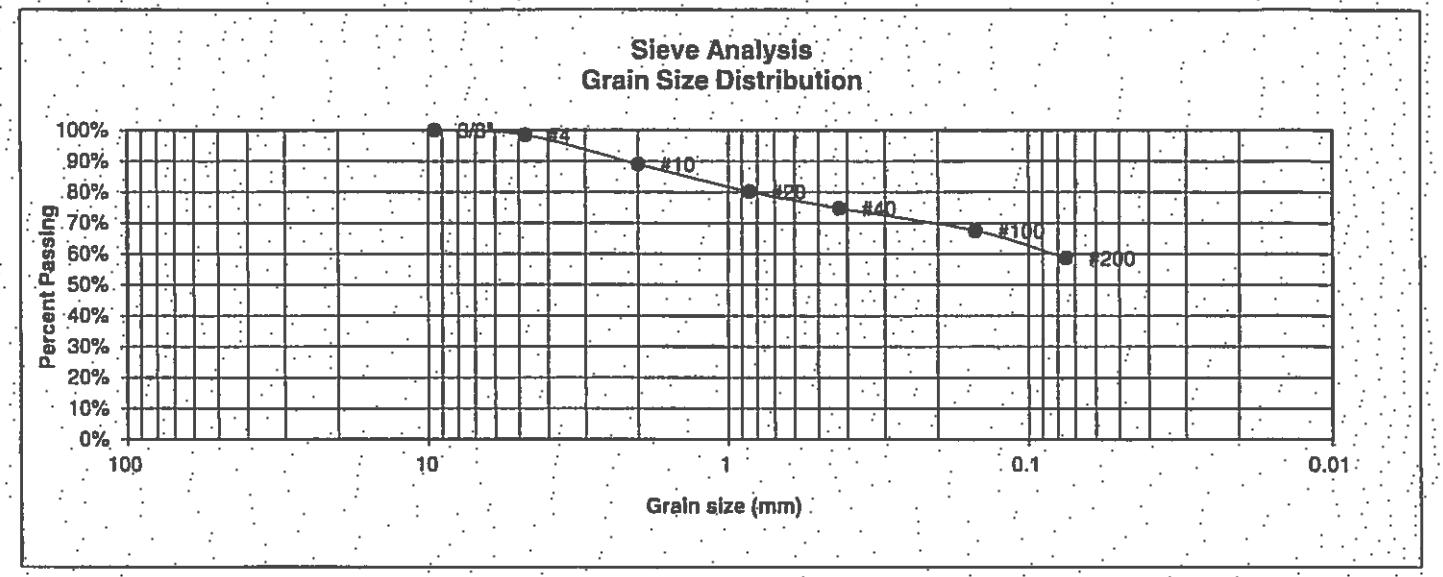
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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		JCC	3/19/18

JOB NO.: 171671
FIG NO.: B-52

UNIFIED CLASSIFICATION	CL-ML	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	41	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-4	GROUP INDEX	2



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.5%
10	89.0%
20	80.2%
40	74.8%
100	67.6%
200	58.7%

Atterberg Limits	
Plastic Limit	22
Liquid Limit	28
Plastic Index	6

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

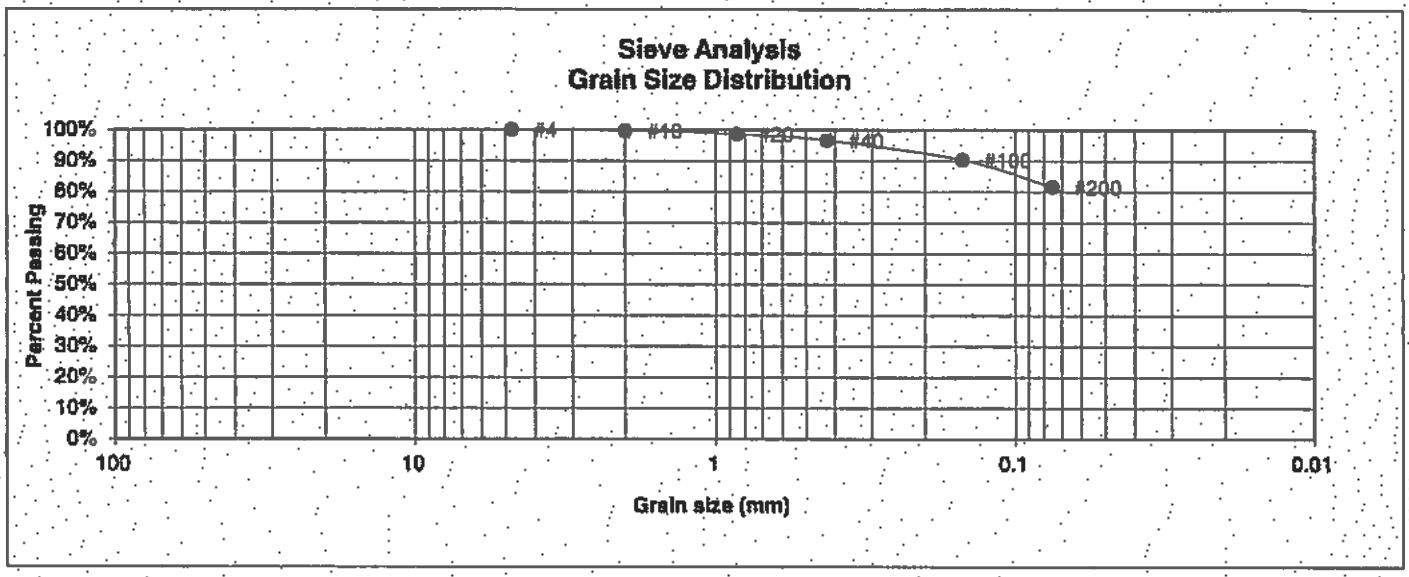
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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 7/19/18

JOB NO.: 171671
FIG NO.: B-53

UNIFIED CLASSIFICATION	CL	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	3	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	42	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-4	GROUP INDEX	4



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.7%
20	98.7%
40	96.7%
100	90.4%
200	81.6%

Atterberg Limits	
Plastic Limit	17
Liquid Limit	25
Plastic Index	8

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

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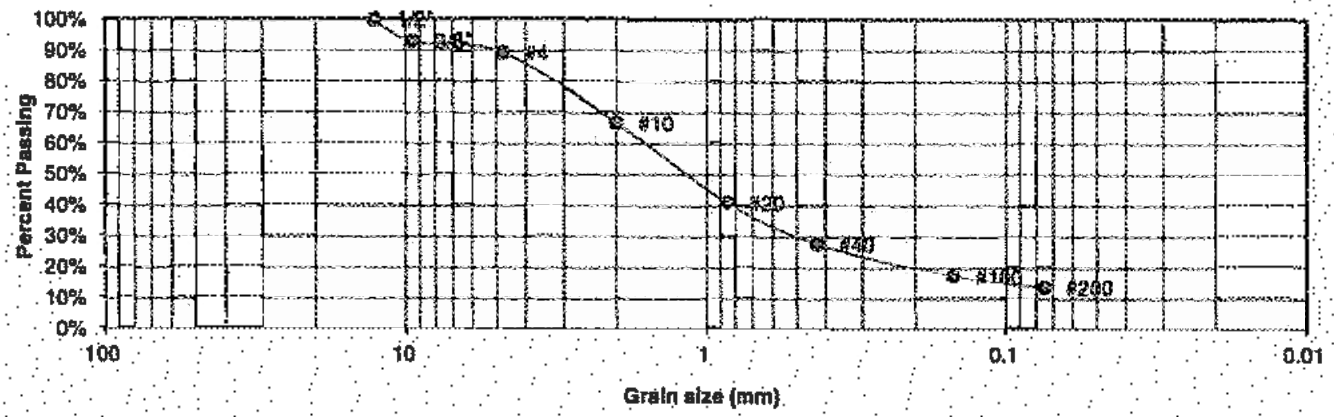
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 8/19/18

JOB NO.: 171671
FIG NO.: B-54

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	4	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	1	JOB NO.	171671
DEPTH (FT)	5	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	93.0%
4	89.4%
10	66.7%
20	41.0%
40	27.7%
100	17.1%
200	13.8%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

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

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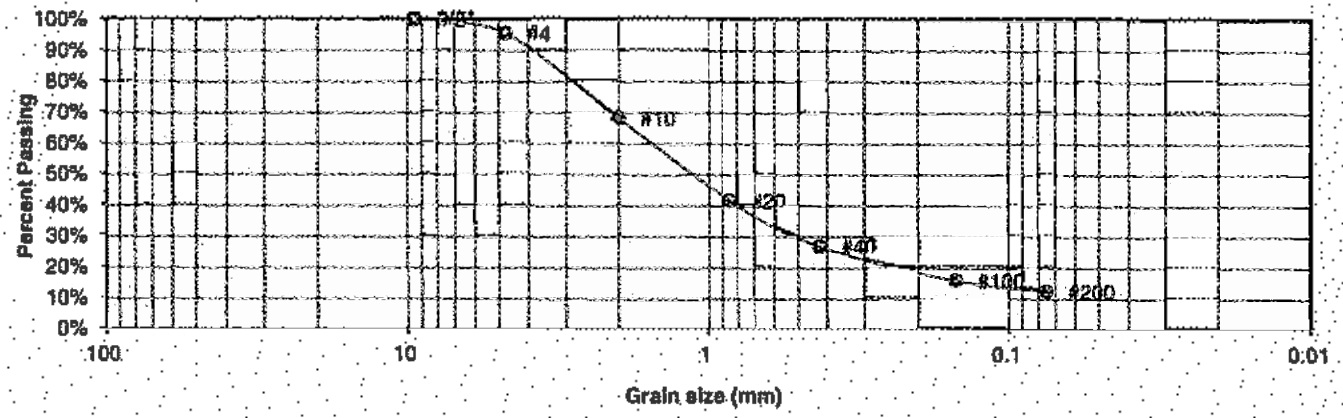
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: B-55

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	4	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	9	JOB NO.	171671
DEPTH (FT)	5	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.5%
10	68.2%
20	41.7%
40	27.0%
100	16.0%
200	12.6%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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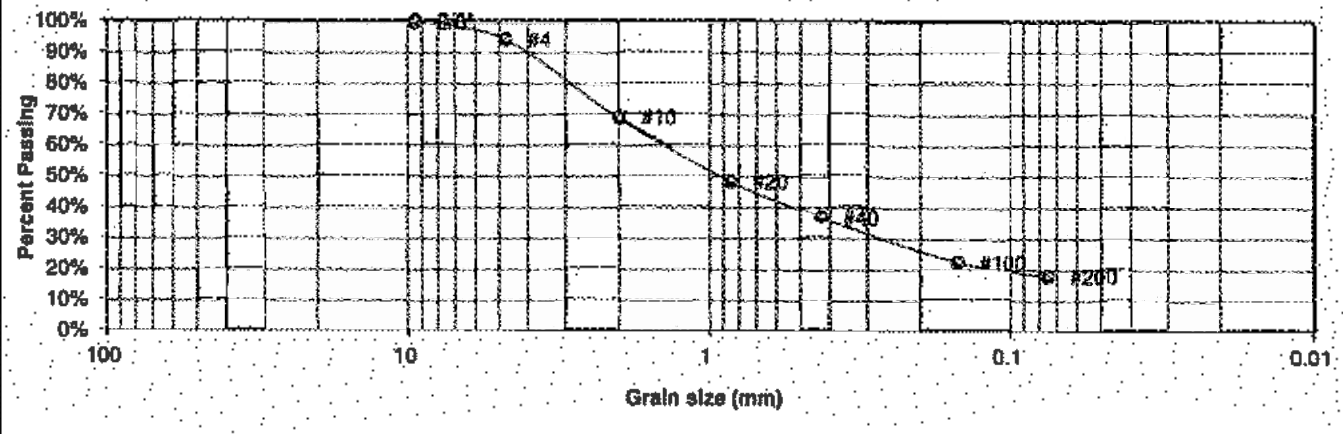
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO: 171671
FIG NO: B-56

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	4	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	15	JOB NO.	171671
DEPTH (FT)	1-2	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.3%
10	68.9%
20	48.5%
40	36.9%
100	22.5%
200	17.9%

Atterberg Limits	
Plastic Limit	20
Liquid Limit	39
Plastic Index	18

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

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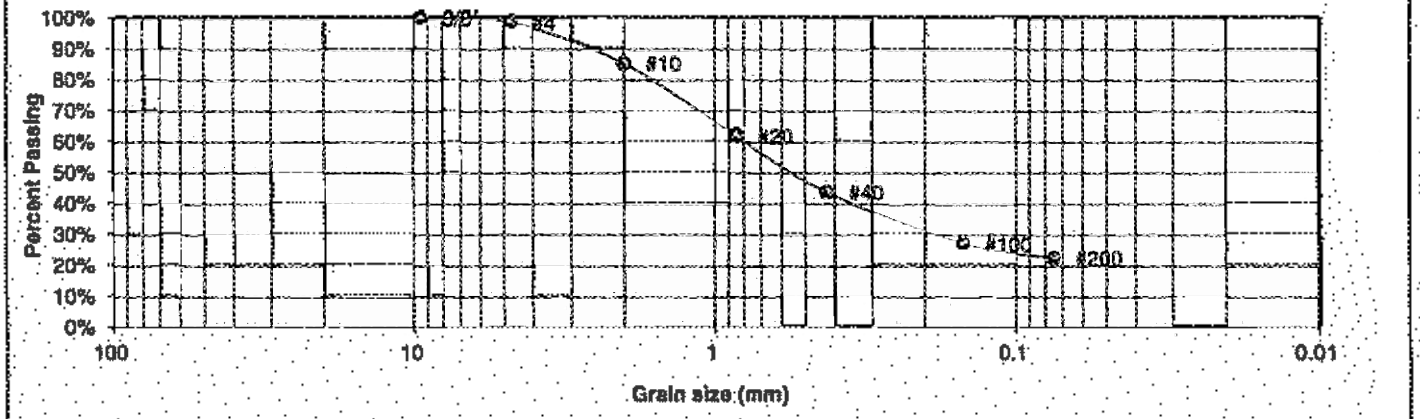
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: B-57

UNIFIED CLASSIFICATION	SC	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	4	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	23	JOB NO.	171671
DEPTH (FT)	10	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	1

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.7%
10	85.5%
20	62.0%
40	43.9%
100	27.1%
200	22.6%

Atterberg Limits	
Plastic Limit	21
Liquid Limit	38
Plastic Index	17

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

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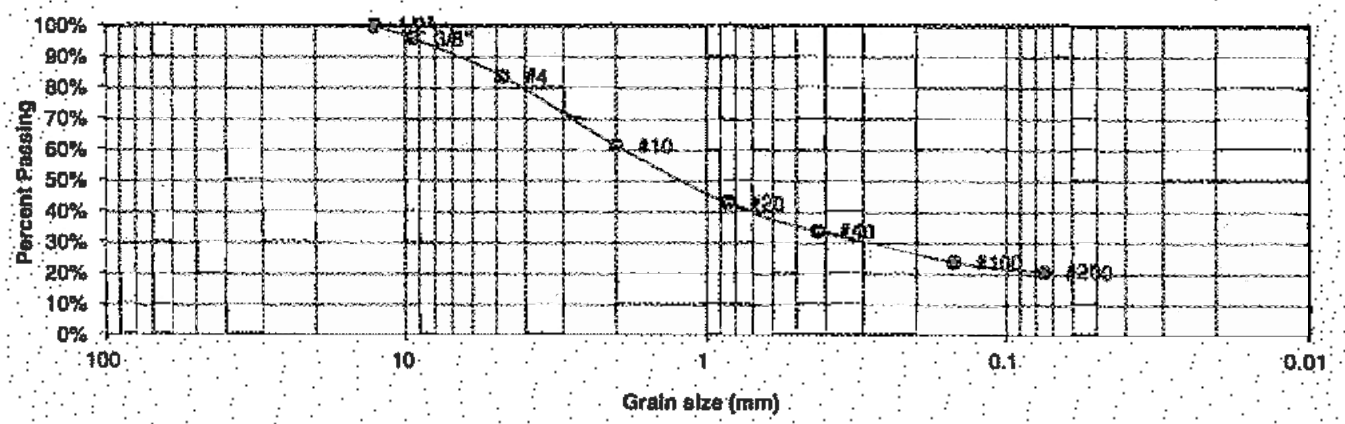
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO. 171671
FIG NO. B-58

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	4	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	31	JOB NO.	171671
DEPTH (FT)	10	TEST BY	BL
AASHTO CLASSIFICATION	A-1-b	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.1%
4	83.8%
10	61.6%
20	42.9%
40	33.9%
100	23.9%
200	20.6%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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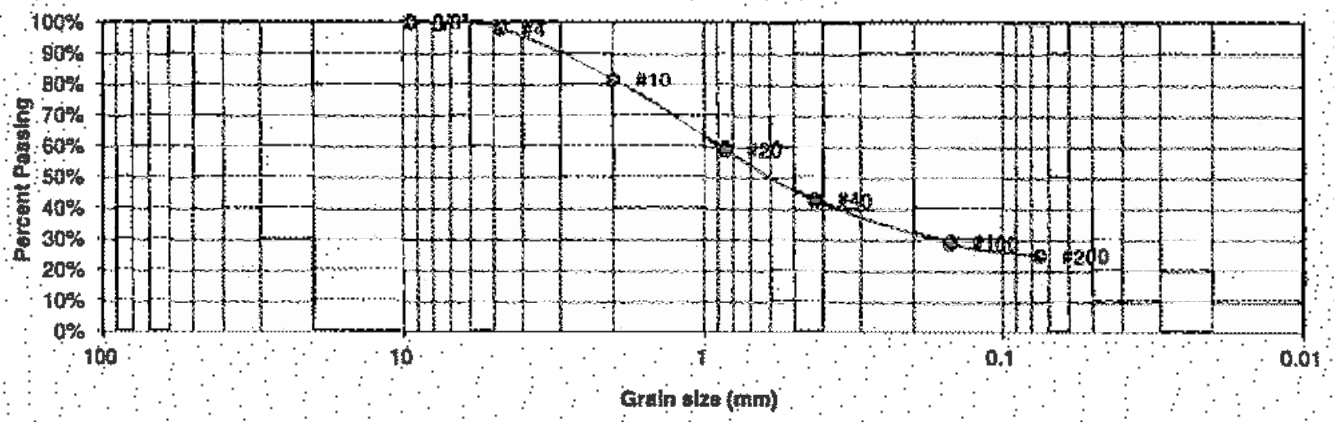
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 3/19/18

JOB NO. 171671
FIG NO. B-59

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	4	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	36	JOB NO.	171671
DEPTH (FT)	10	TEST BY	BL
AASHTO CLASSIFICATION	A-2-6	GROUP INDEX	1

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.3%
10	81.6%
20	59.1%
40	42.9%
100	29.0%
200	25.0%

Atterberg Limits

Plastic Limit	16
Liquid Limit	34
Plastic Index	18

Swell

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

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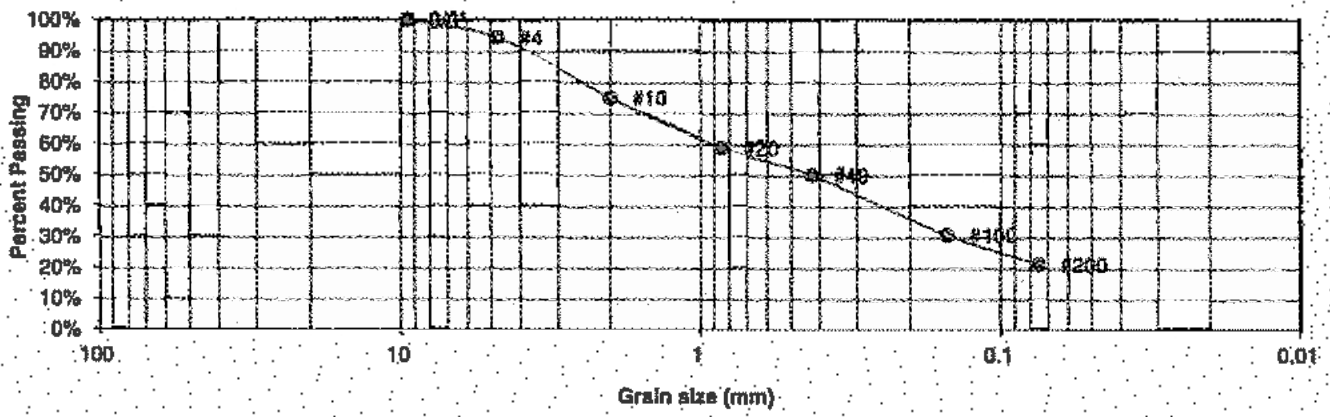
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 3/19/18

JOB NO. 171671
FIG NO. B-60

UNIFIED CLASSIFICATION	SM	CLIENT	PULPIT ROCK, LLC
SOIL TYPE #	4	PROJECT	FLYING HORSE NORTH, F-1
TEST BORING #	40	JOB NO.	171671
DEPTH (FT)	10	TEST BY	BL
AASHTO CLASSIFICATION	A-2-4	GROUP INDEX	0

Sieve Analysis
Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.6%
10	75.1%
20	59.1%
40	50.1%
100	31.0%
200	21.5%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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LABORATORY TEST RESULTS

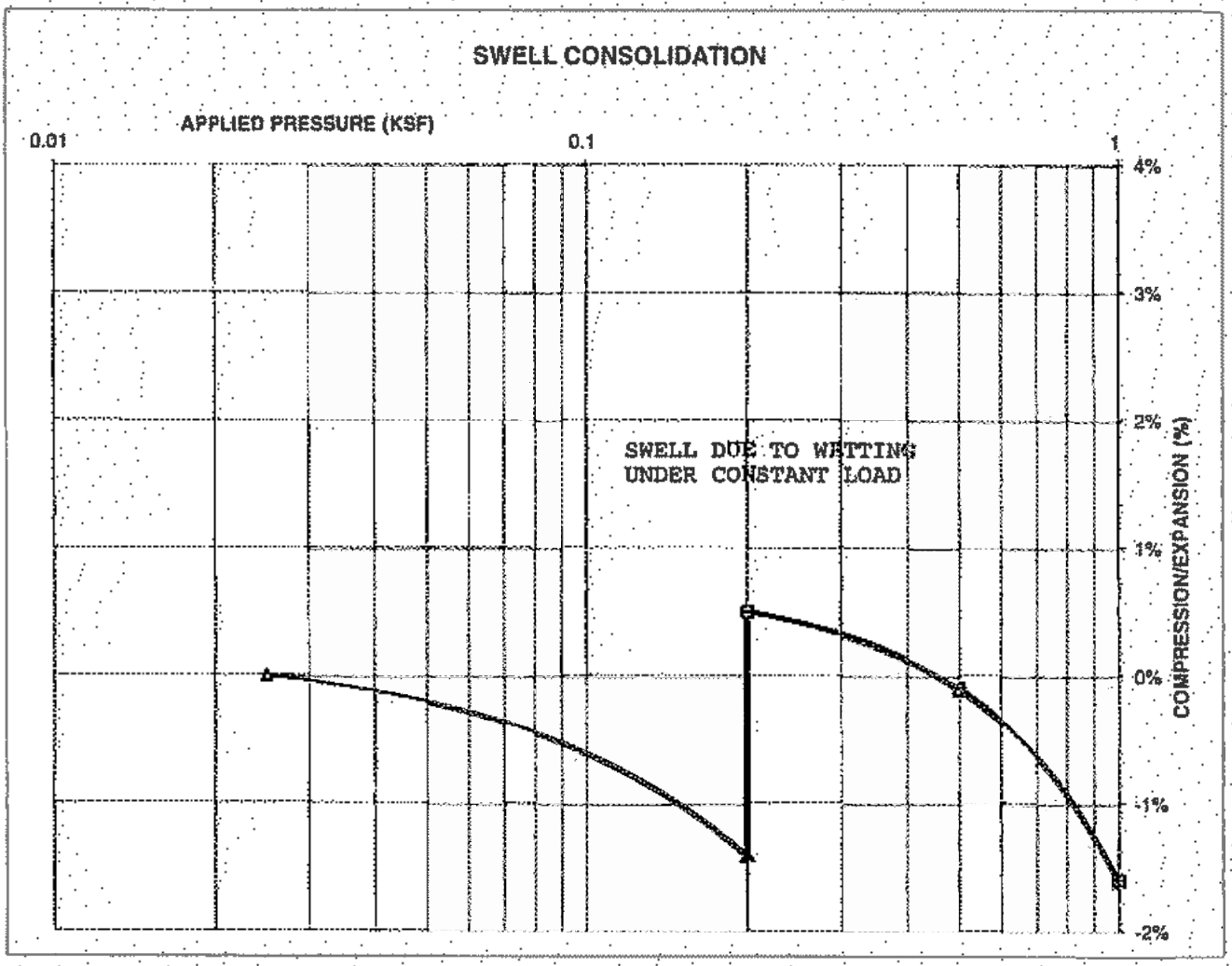
DRAWN:	DATE:	CHECKED: SCC	DATE: 7/19/18

JOB NO. 171671
FIG NO. B-61

CONSOLIDATION TEST RESULTS

TEST BORING #	1	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			111
NATURAL MOISTURE CONTENT			15.5%
SWELL/CONSOLIDATION (%)			1.9%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

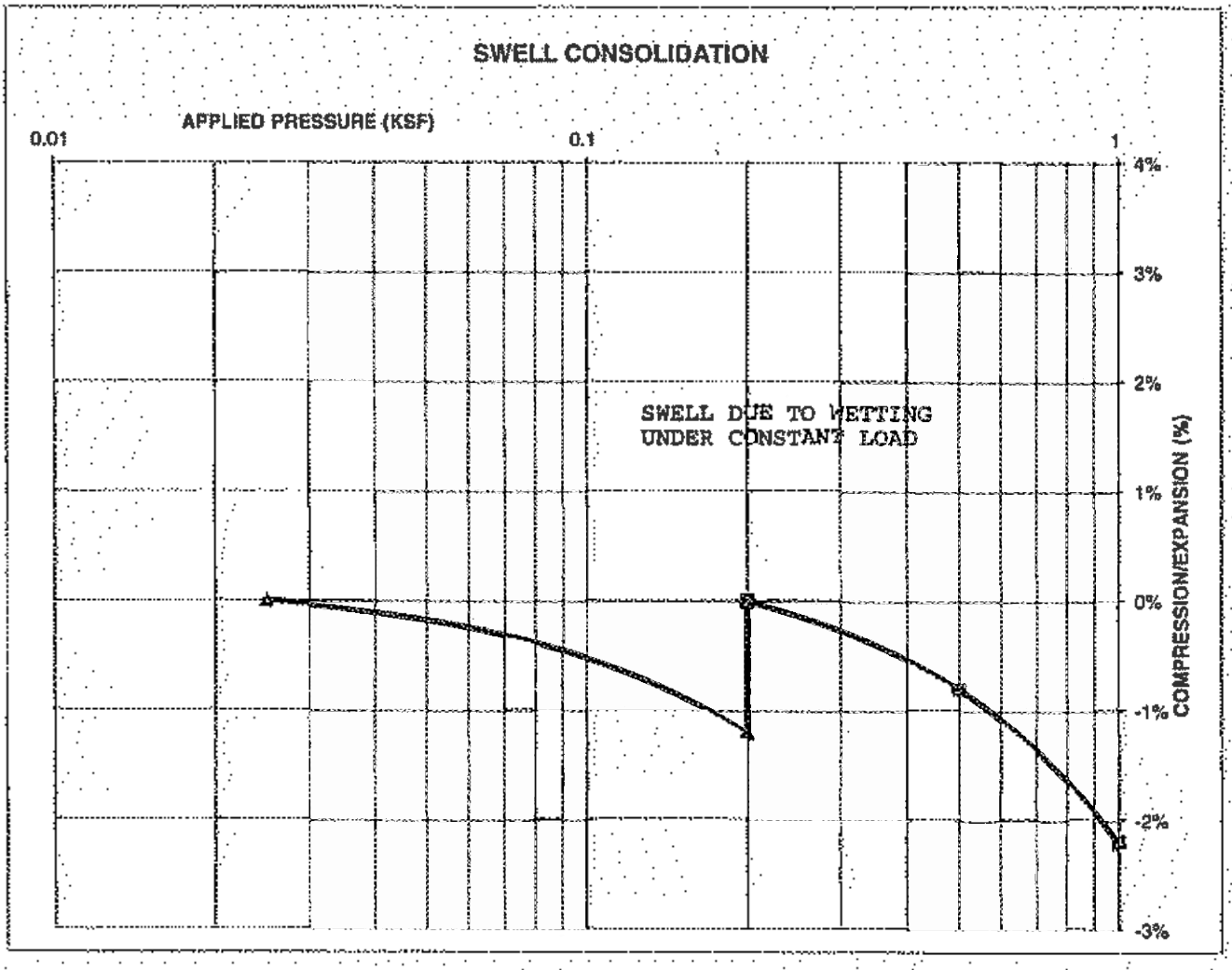
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: B-6.2

CONSOLIDATION TEST RESULTS

TEST BORING #	3	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			116
NATURAL MOISTURE CONTENT			12.7%
SWELL/CONSOLIDATION (%)			1.2%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

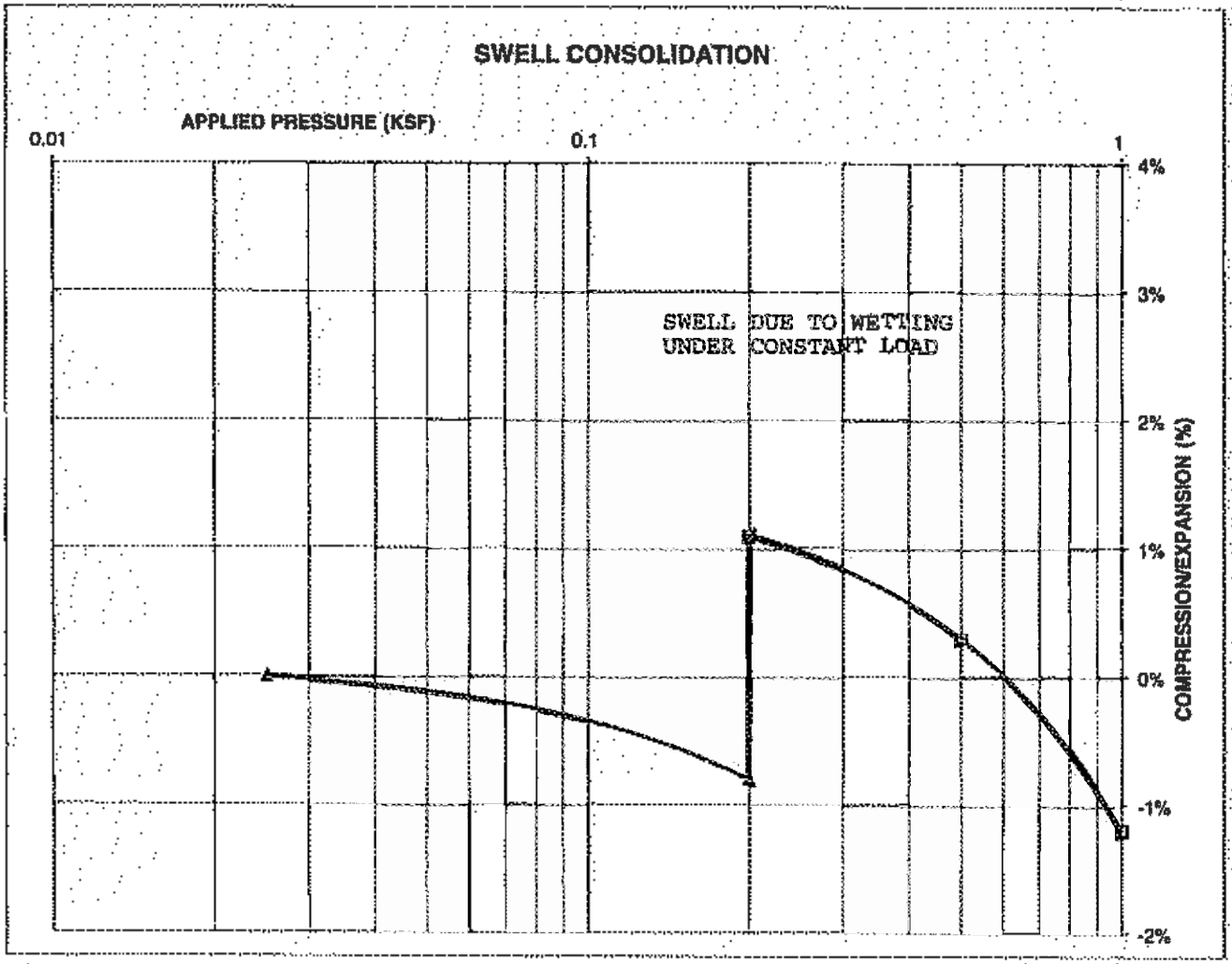
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: B-63

CONSOLIDATION TEST RESULTS

TEST BORING #	7	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			117
NATURAL MOISTURE CONTENT			12.2%
SWELL/CONSOLIDATION (%)			1.9%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

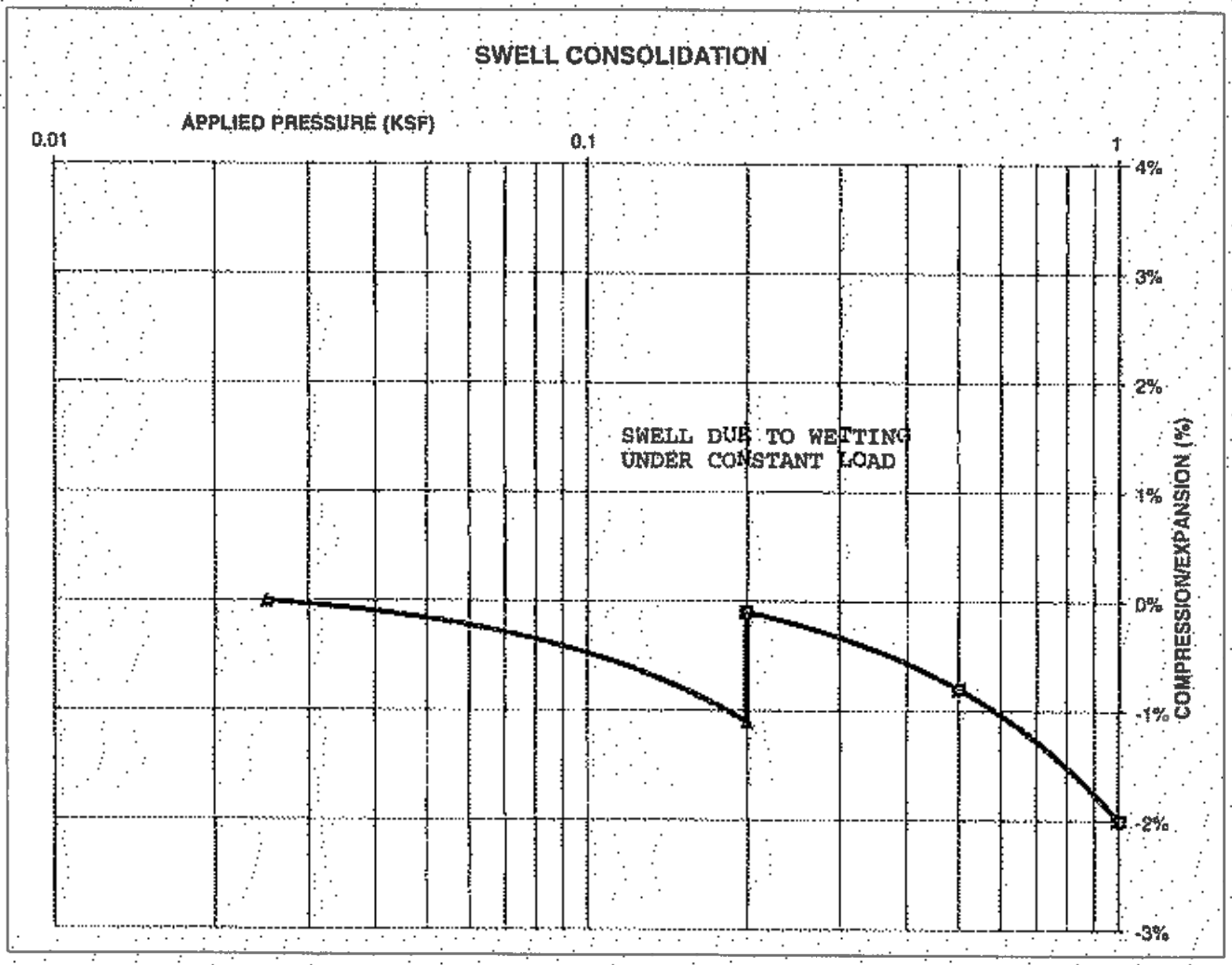
DRAWN:	DATE:	CHECKED:	DATE:
		SCE	2/19/18

JOB NO.: 171671
FIG NO.: B-64

CONSOLIDATION TEST RESULTS

TEST BORING #	8	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			103
NATURAL MOISTURE CONTENT			17.9%
SWELL/CONSOLIDATION (%)			1.0%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

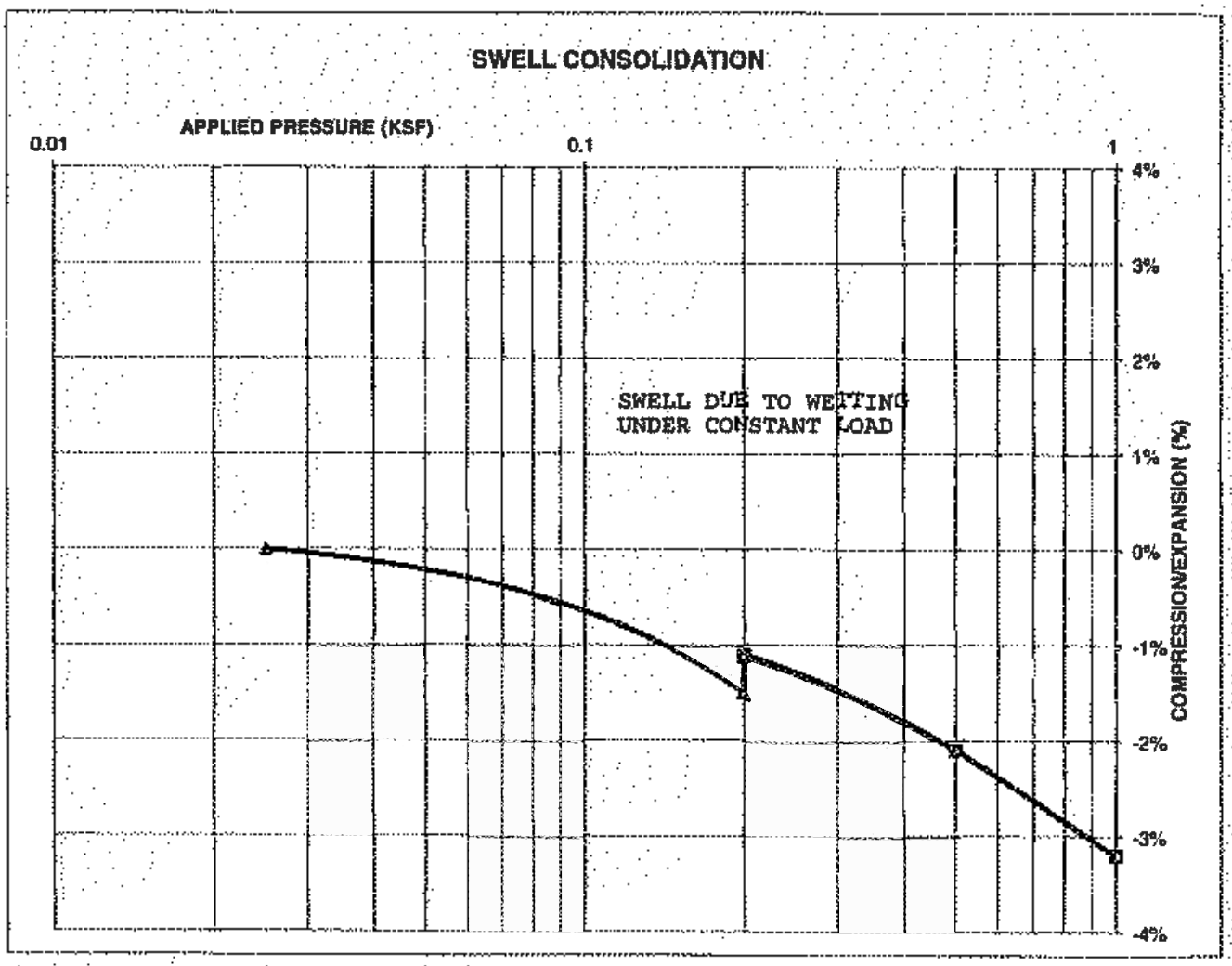
DRAWN:	DATE:	CHECKED:	DATE:
		SCE	2/19/18

JOB NO.: 171671
FIG NO.: B-65

CONSOLIDATION TEST RESULTS

TEST BORING #	10	DEPTH(ft)	0-3
DESCRIPTION	SC	SOIL TYPE	2, CBR #2
NATURAL UNIT DRY WEIGHT (PCF)			108
NATURAL MOISTURE CONTENT			16.9%
SWELL/CONSOLIDATION (%)			0.4%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

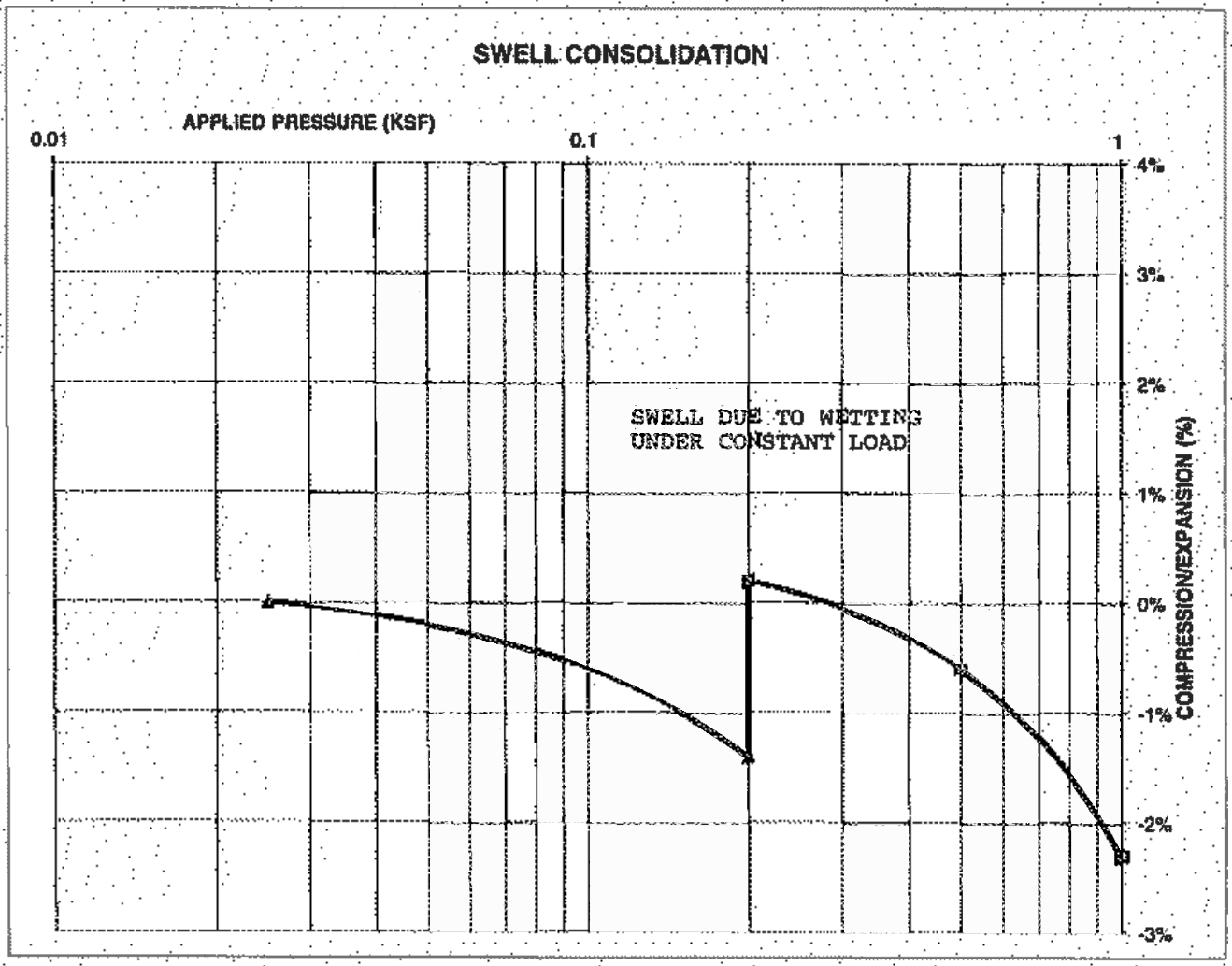
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	7/19/18

JOB NO.: 171671
FIG NO.: B-6c

CONSOLIDATION TEST RESULTS

TEST BORING #	11	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			101
NATURAL MOISTURE CONTENT			15.9%
SWELL/CONSOLIDATION (%)			1.6%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

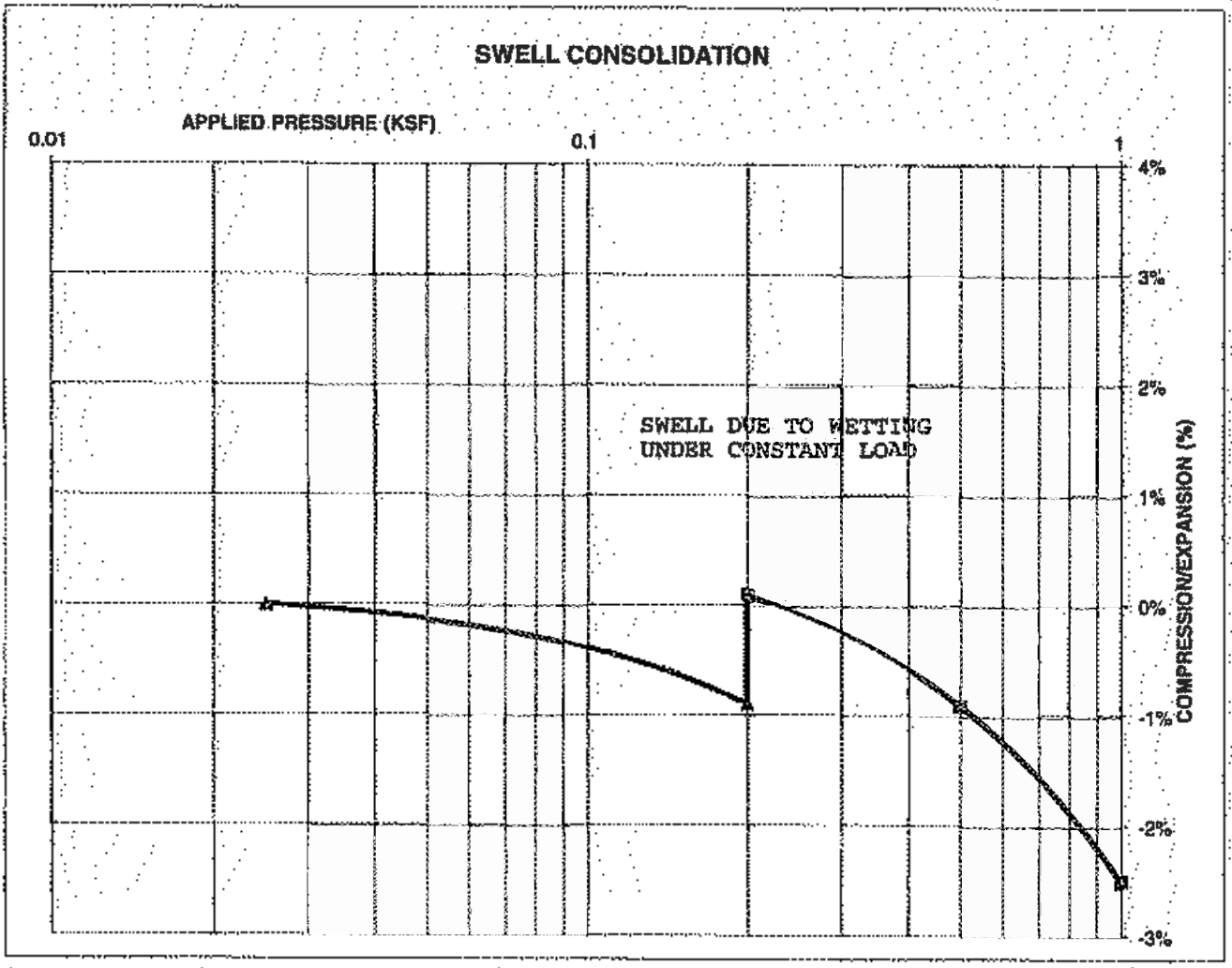
DRAWN:	DATE:	CHECKED:	DATE:
		SCL	7/19/18

JOB NO.: 171671
FIG NO.: B-67

CONSOLIDATION TEST RESULTS

TEST BORING #	12	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			106
NATURAL MOISTURE CONTENT			14.6%
SWELL/CONSOLIDATION (%)			1.0%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

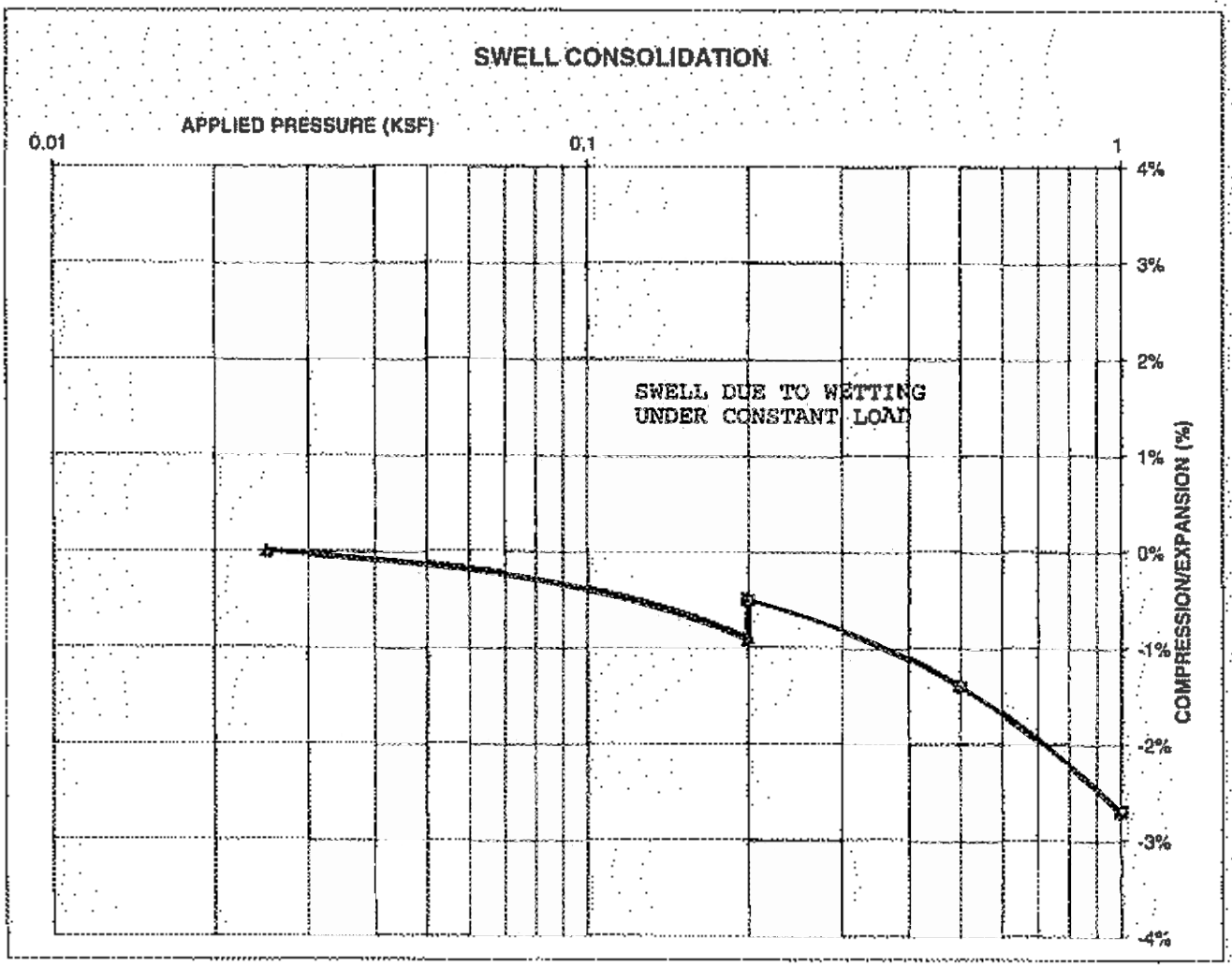
DRAWN:	DATE:	CHECKED: SEC	DATE: 2/19/19

JOB NO.: 171671
FIG NO.: B-68

CONSOLIDATION TEST RESULTS

TEST BORING #	18	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			105
NATURAL MOISTURE CONTENT			12.1%
SWELL/CONSOLIDATION (%)			0.4%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

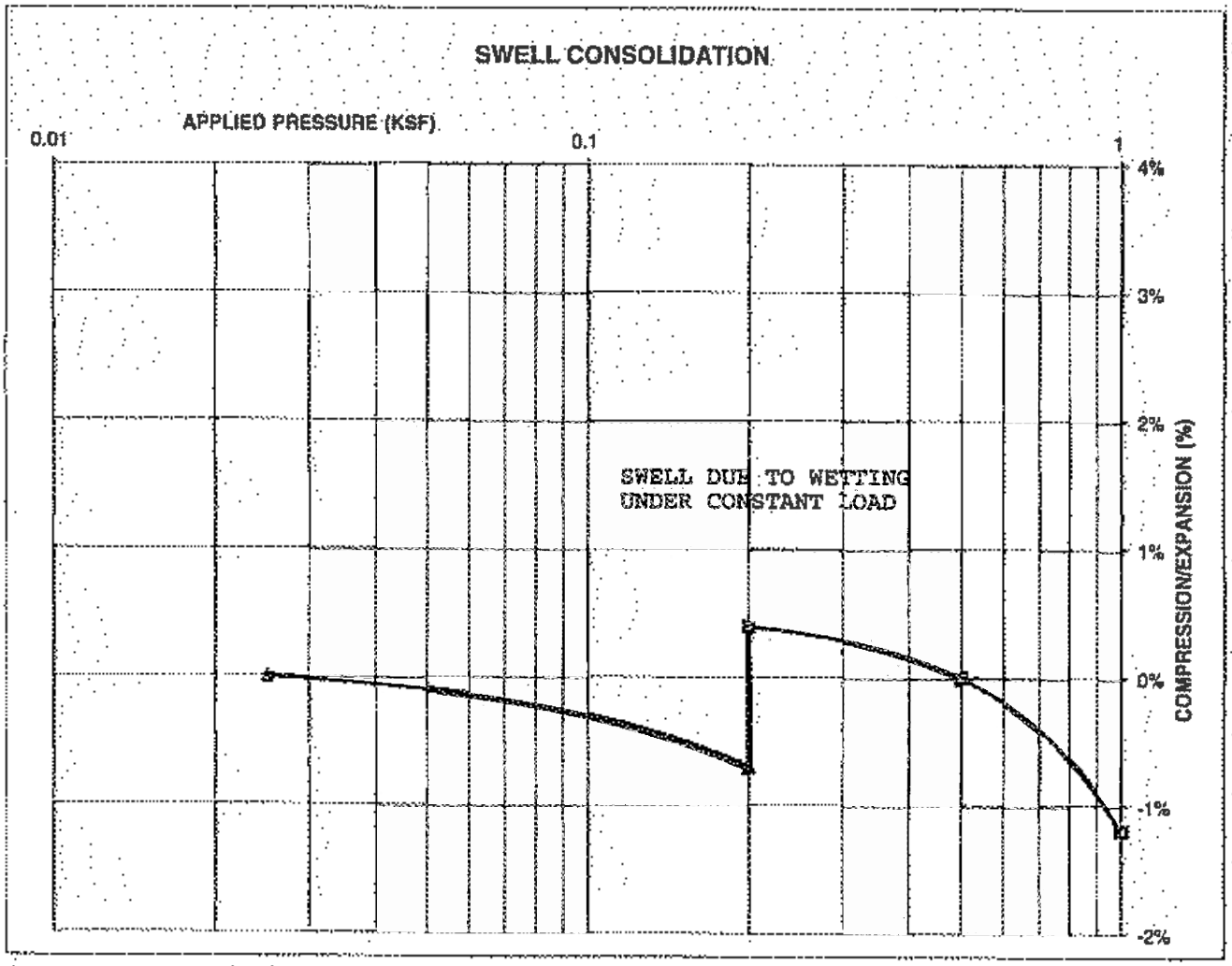
DRAWN	DATE	CHECKED	DATE
		SCC	7/19/18

JOB NO.: 171671
FIG NO.: B-69

CONSOLIDATION TEST RESULTS

TEST BORING #	23	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			111
NATURAL MOISTURE CONTENT			15.4%
SWELL/CONSOLIDATION (%)			1.1%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

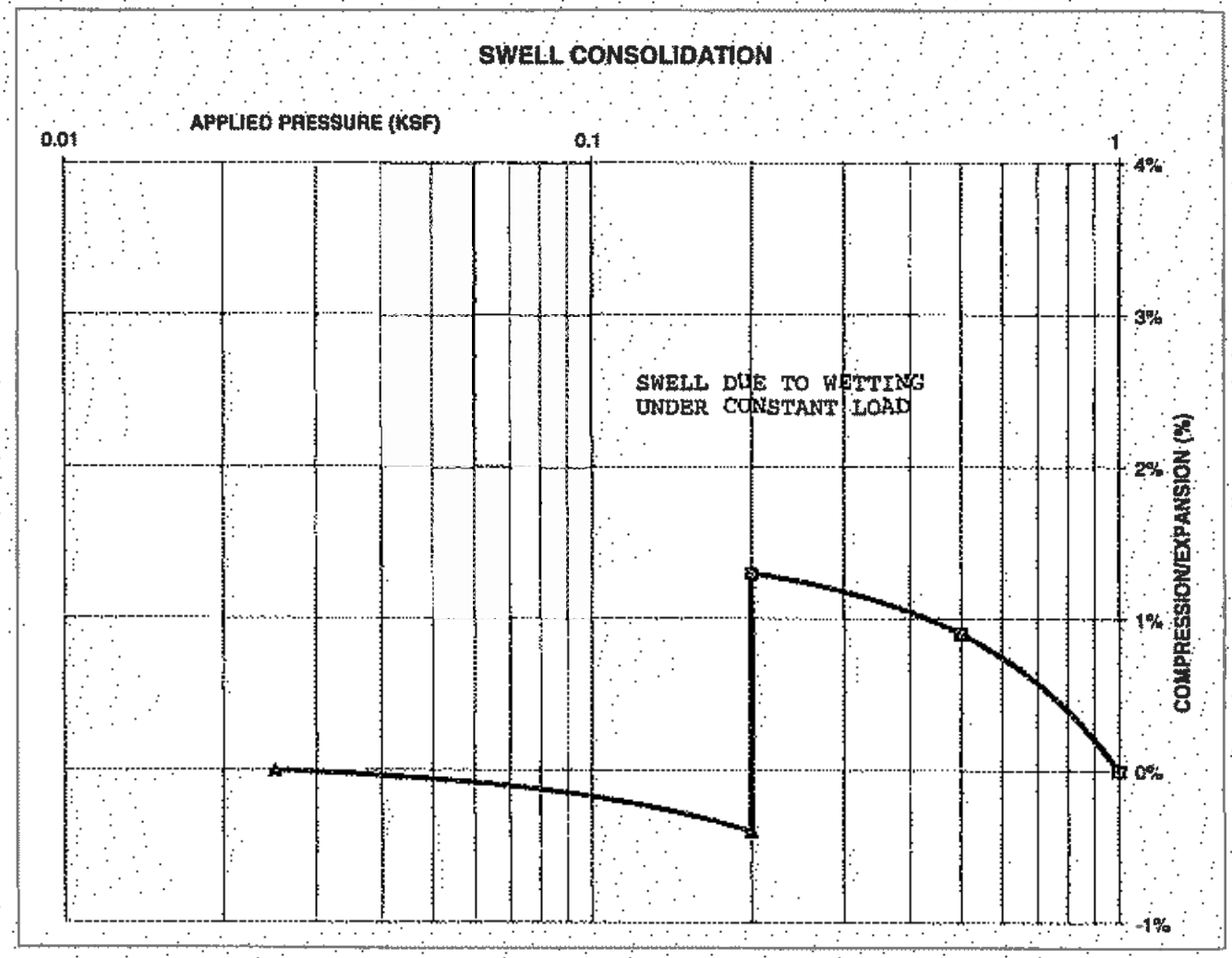
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-70

CONSOLIDATION TEST RESULTS

TEST BORING #	24	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			115
NATURAL MOISTURE CONTENT			14.7%
SWELL/CONSOLIDATION (%)			1.7%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

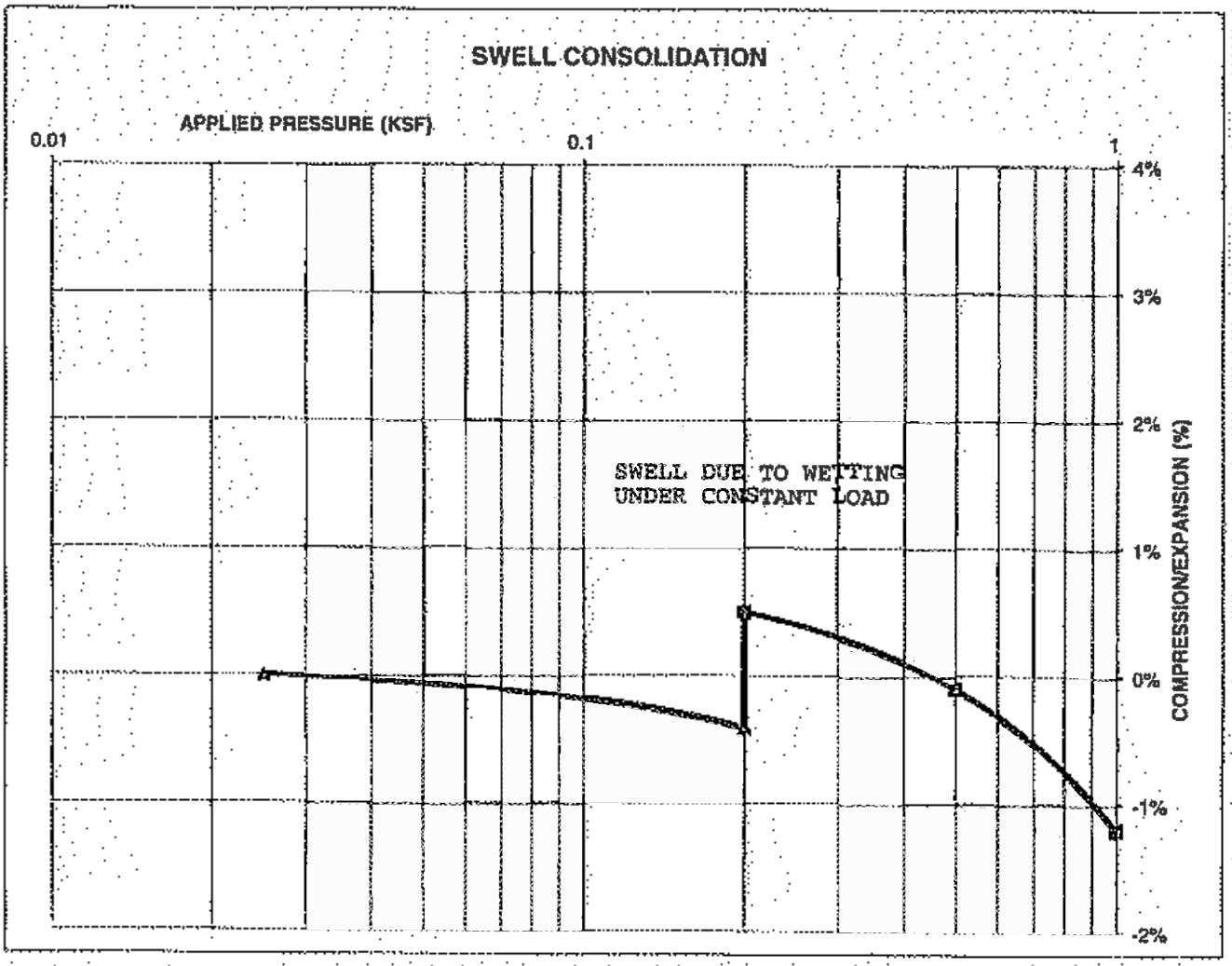
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	7/19/18

JOB NO. 171671
FIG NO. B-71

CONSOLIDATION TEST RESULTS

TEST BORING #	36	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			121
NATURAL MOISTURE CONTENT			5.7%
SWELL/CONSOLIDATION (%)			0.9%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

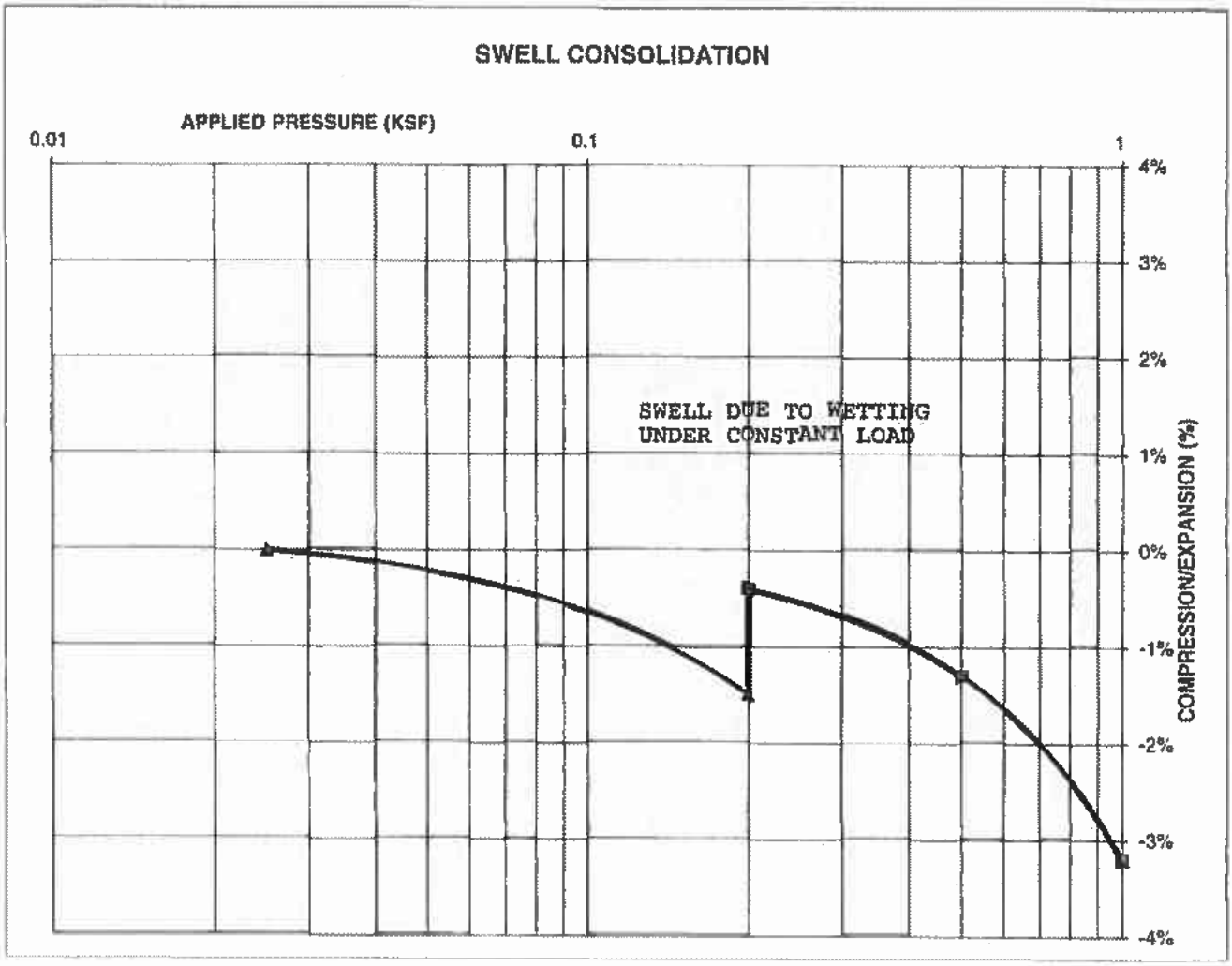
DRAWN:	DATE:	CHECKED:	DATE:
		SLC	5/19/18

JOB NO.: 171671
FIG NO.: B-72

CONSOLIDATION TEST RESULTS

TEST BORING #	10	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			111
NATURAL MOISTURE CONTENT			16.9%
SWELL/CONSOLIDATION (%)			1.1%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

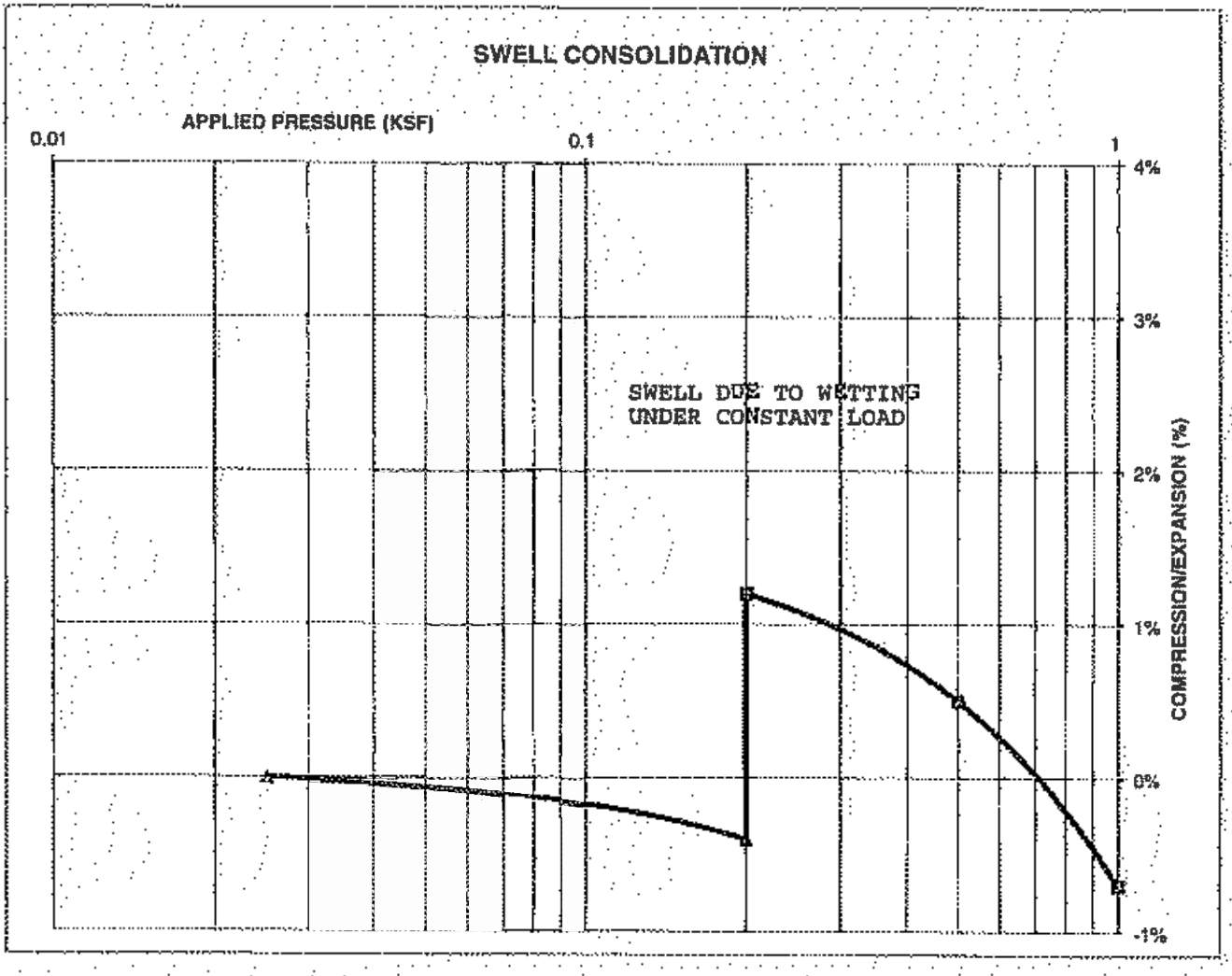
DRAWN:	DATE:	CHECKED:	DATE:
		SLC	3/19/18

JOB NO.: 171671
FIG NO.: B-3

CONSOLIDATION TEST RESULTS

TEST BORING #	15	DEPTH(ft)	0-3
DESCRIPTION	SC	SOIL TYPE	3, CBR #3
NATURAL UNIT DRY WEIGHT (PCF)			115
NATURAL MOISTURE CONTENT			15.3%
SWELL/CONSOLIDATION (%)			1.6%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

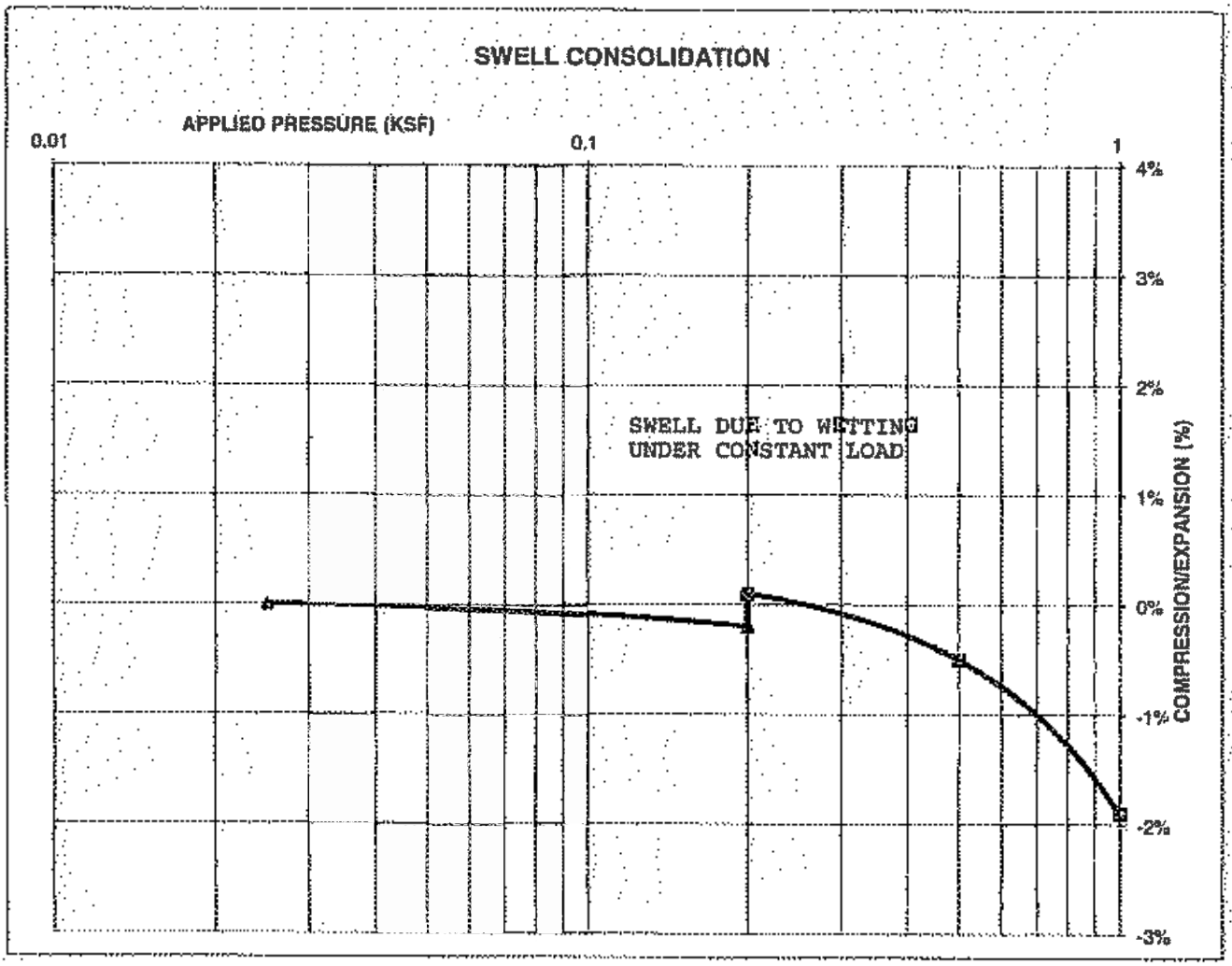
DRAWN:	DATE:	CHECKED:	DATE:
		SEC	2/19/18

JOB NO.: 171671
FIG NO.: B-74

CONSOLIDATION TEST RESULTS

TEST BORING #	22	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			107
NATURAL MOISTURE CONTENT			10.8%
SWELL/CONSOLIDATION (%)			0.3%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

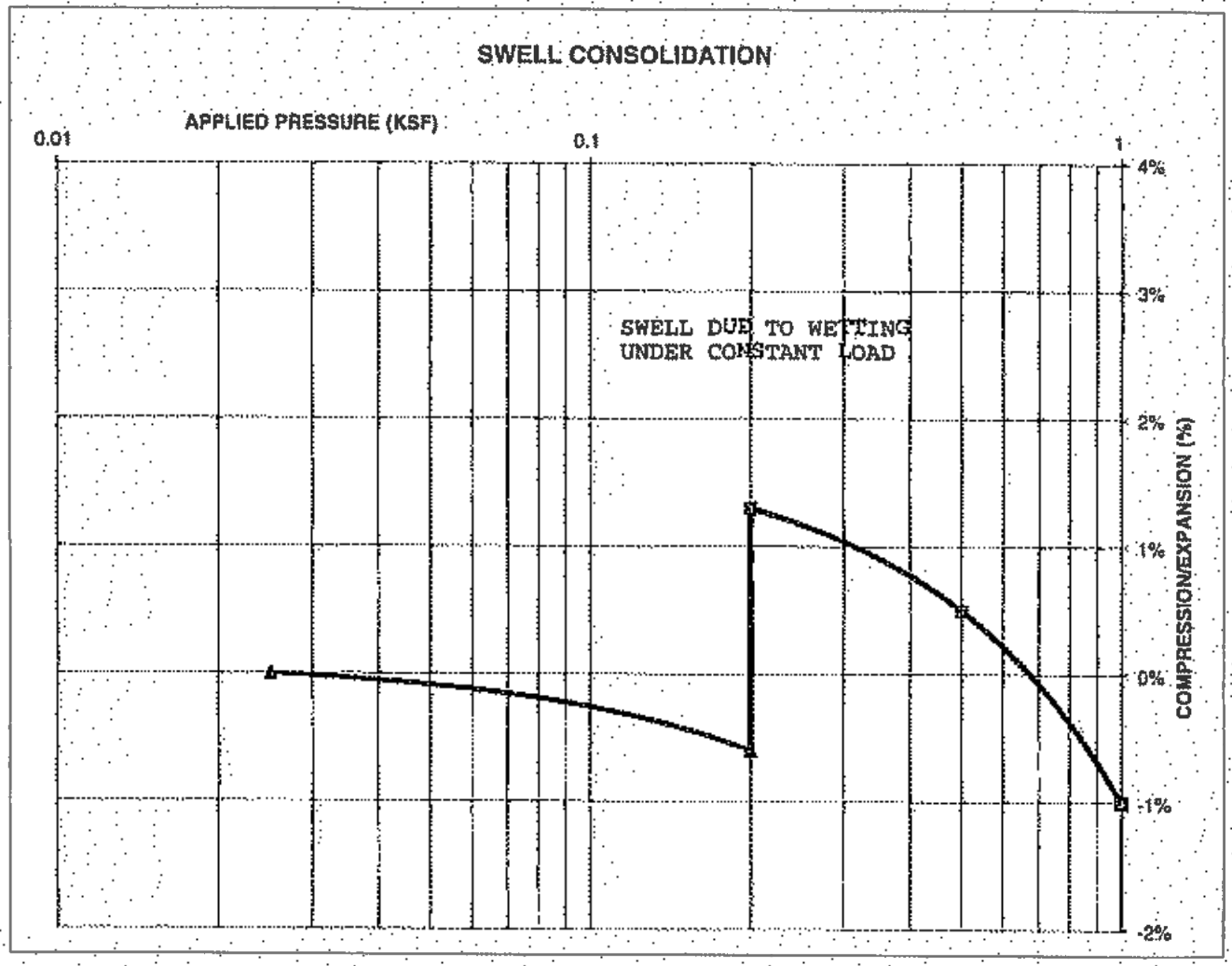
DRAWN:	DATE:	CHECKED: SCC	DATE: 2/19/18

JOB NO: 171671
FIG NO: B-15

CONSOLIDATION TEST RESULTS

TEST BORING #	25	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			140
NATURAL MOISTURE CONTENT			8.1%
SWELL/CONSOLIDATION (%)			1.9%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

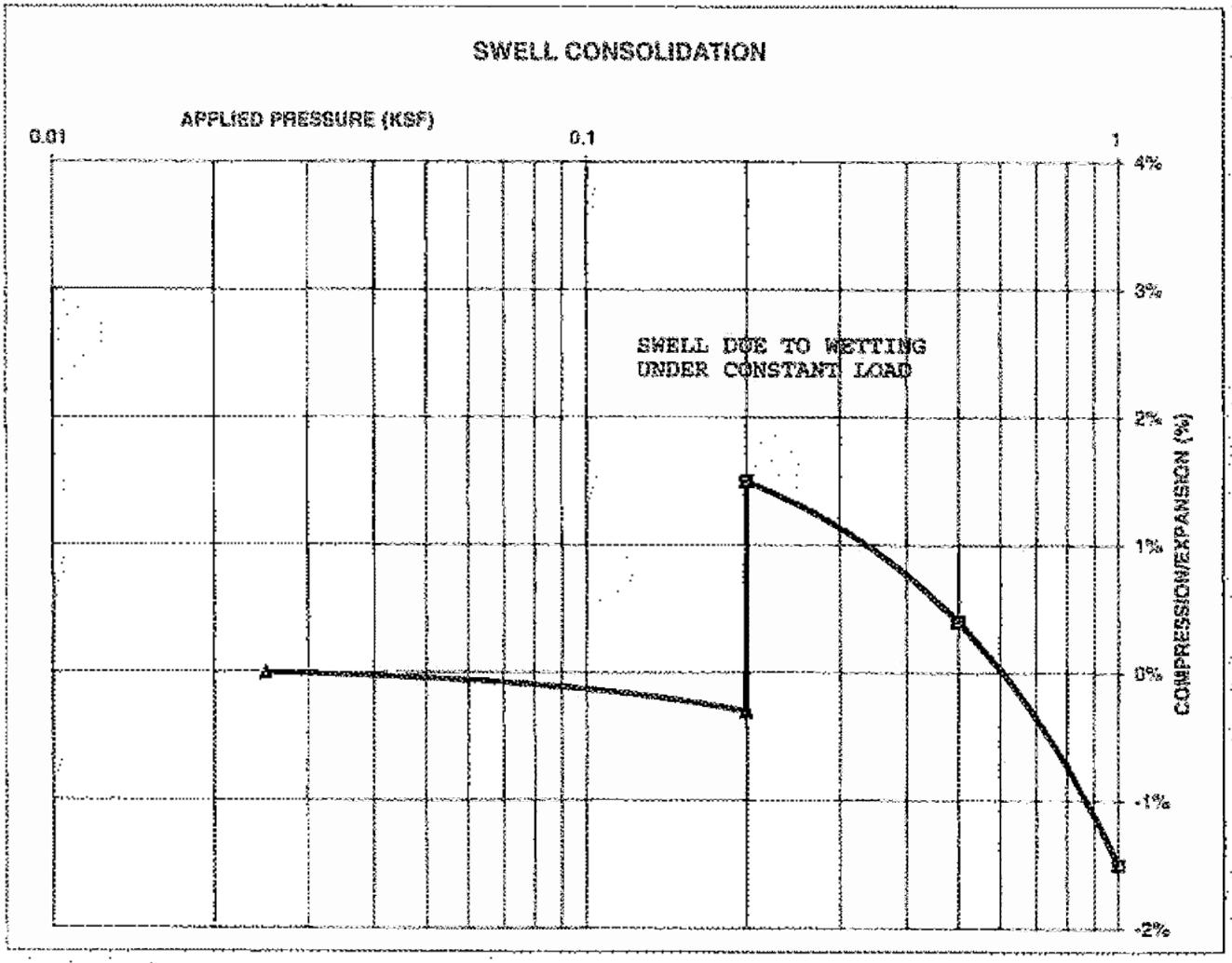
DRAWN:	DATE:	CHECKED: SCC	DATE: 3/19/18

JOB NO.: 171671
FIG NO.: B-76

CONSOLIDATION TEST RESULTS

TEST BORING #	26	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			113
NATURAL MOISTURE CONTENT			11.8%
SWELL/CONSOLIDATION (%)			1.8%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

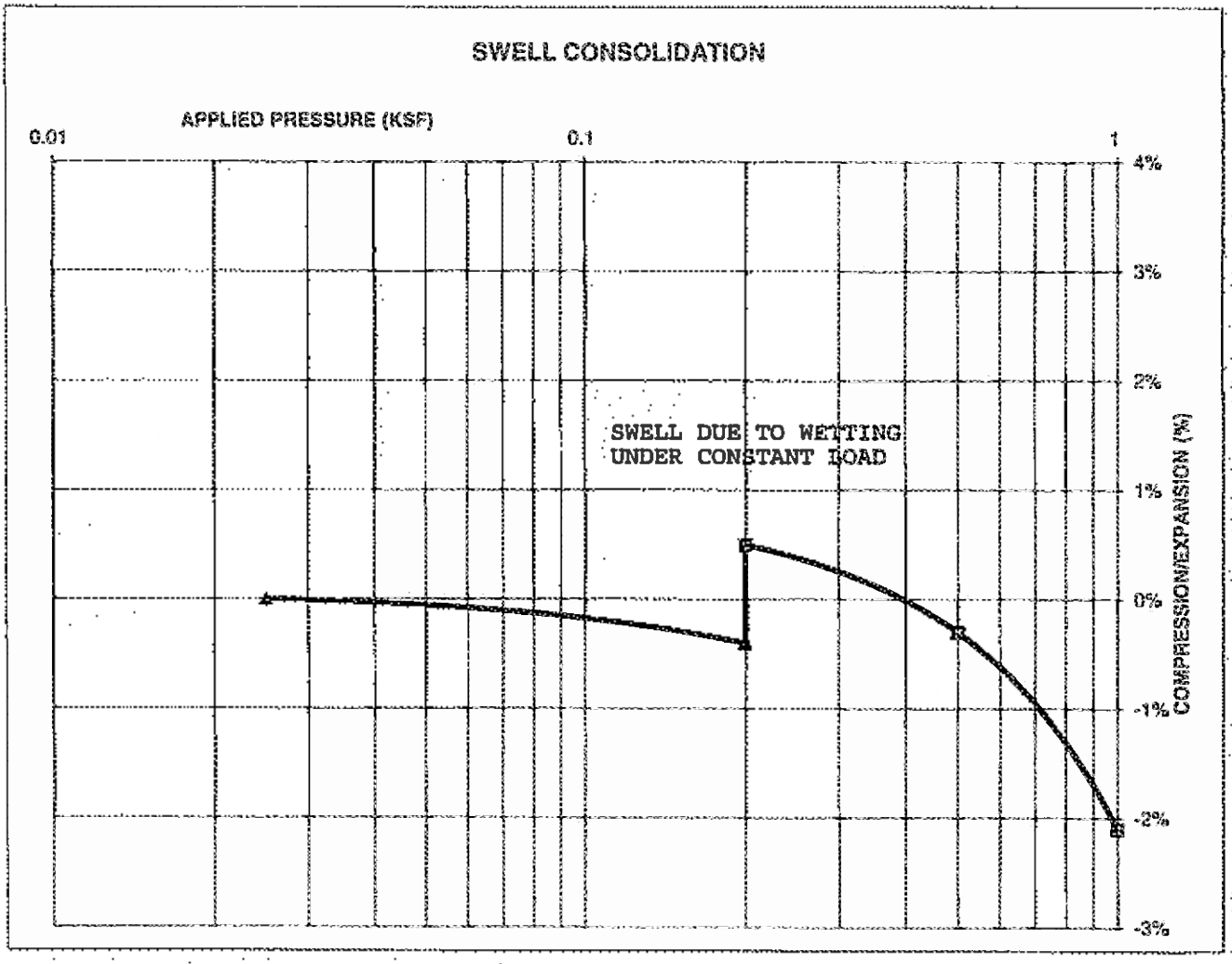
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	7/19/18

JOB NO.: 171671
FIG NO.: B-77

CONSOLIDATION TEST RESULTS

TEST BORING #	27	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			108
NATURAL MOISTURE CONTENT			9.3%
SWELL/CONSOLIDATION (%)			0.9%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

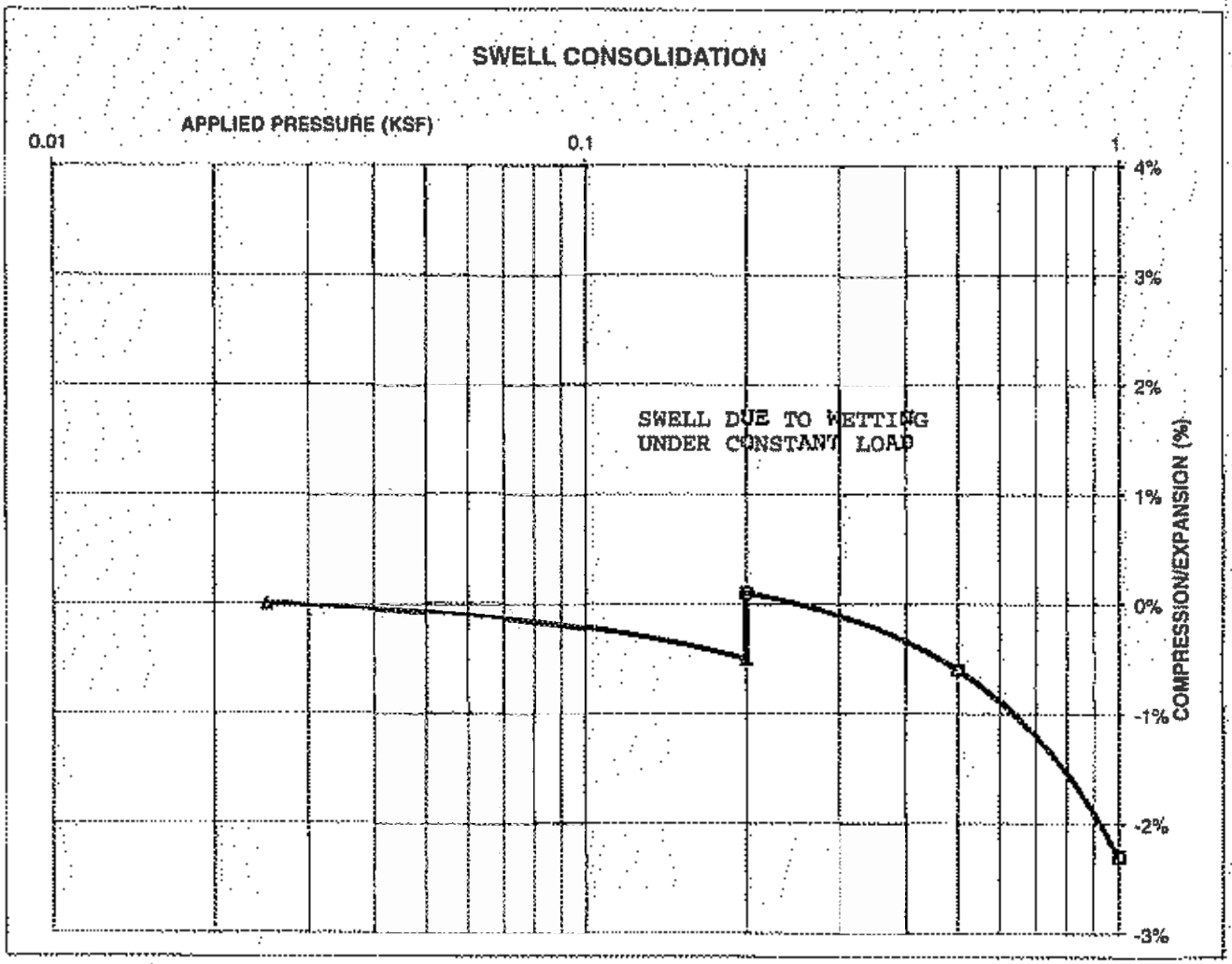
DRAWN:	DATE:	CHECKED:	DATE:
		SEC	2/19/18

JOB NO.: 171671
FIG NO.: B-78

CONSOLIDATION TEST RESULTS

TEST BORING #	28	DEPTH(ft)	1-2
DESCRIPTION	SC-SM	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			118
NATURAL MOISTURE CONTENT			8.7%
SWELL/CONSOLIDATION (%)			0.6%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

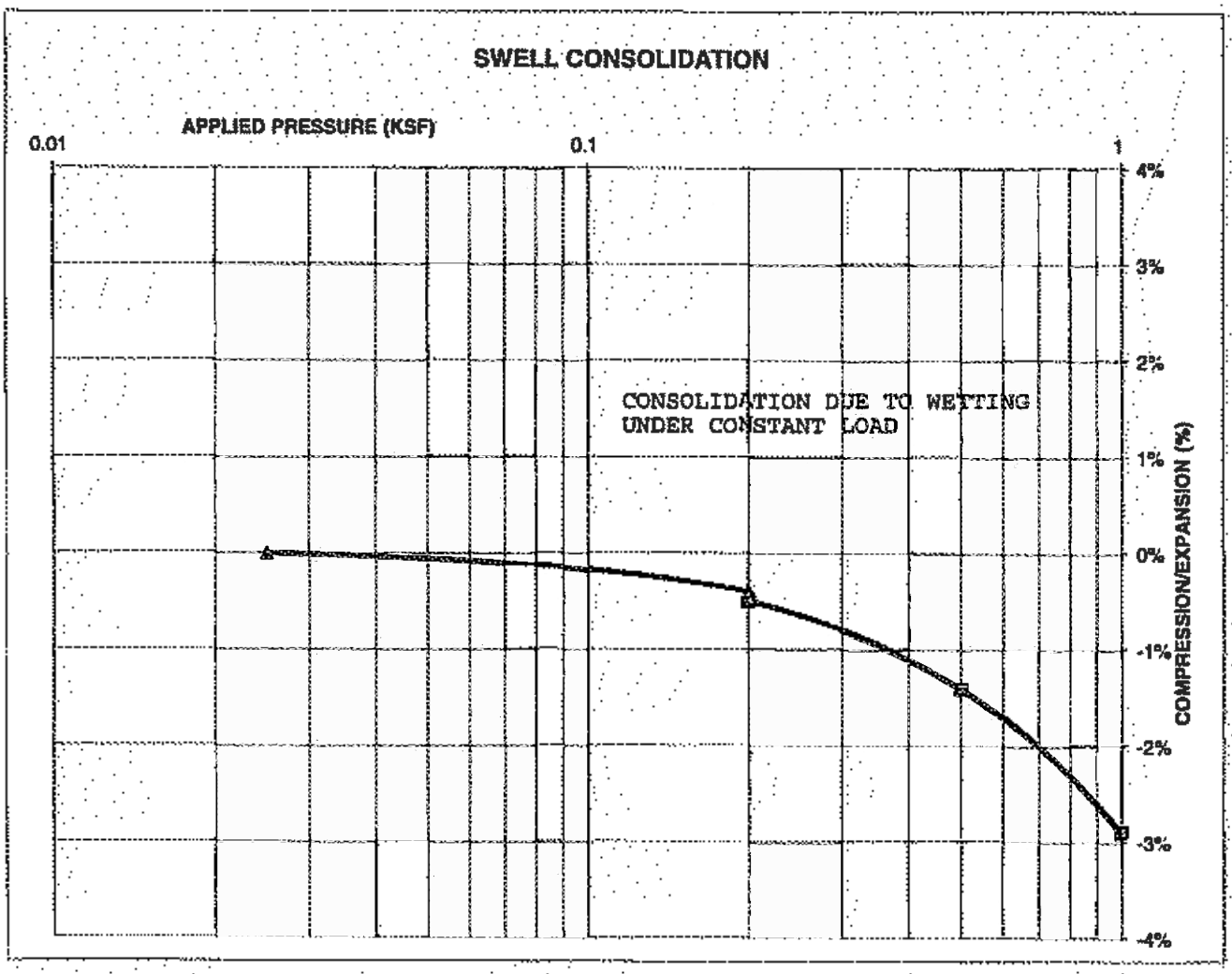
DRAWN:	DATE:	CHECKED:	DATE:
		SEC	5/19/18

JOB NO.: 171671
FIG NO.: B-79

CONSOLIDATION TEST RESULTS

TEST BORING #	28	DEPTH(ft)	5
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			117
NATURAL MOISTURE CONTENT			8.8%
SWELL/CONSOLIDATION (%)			-0.1%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

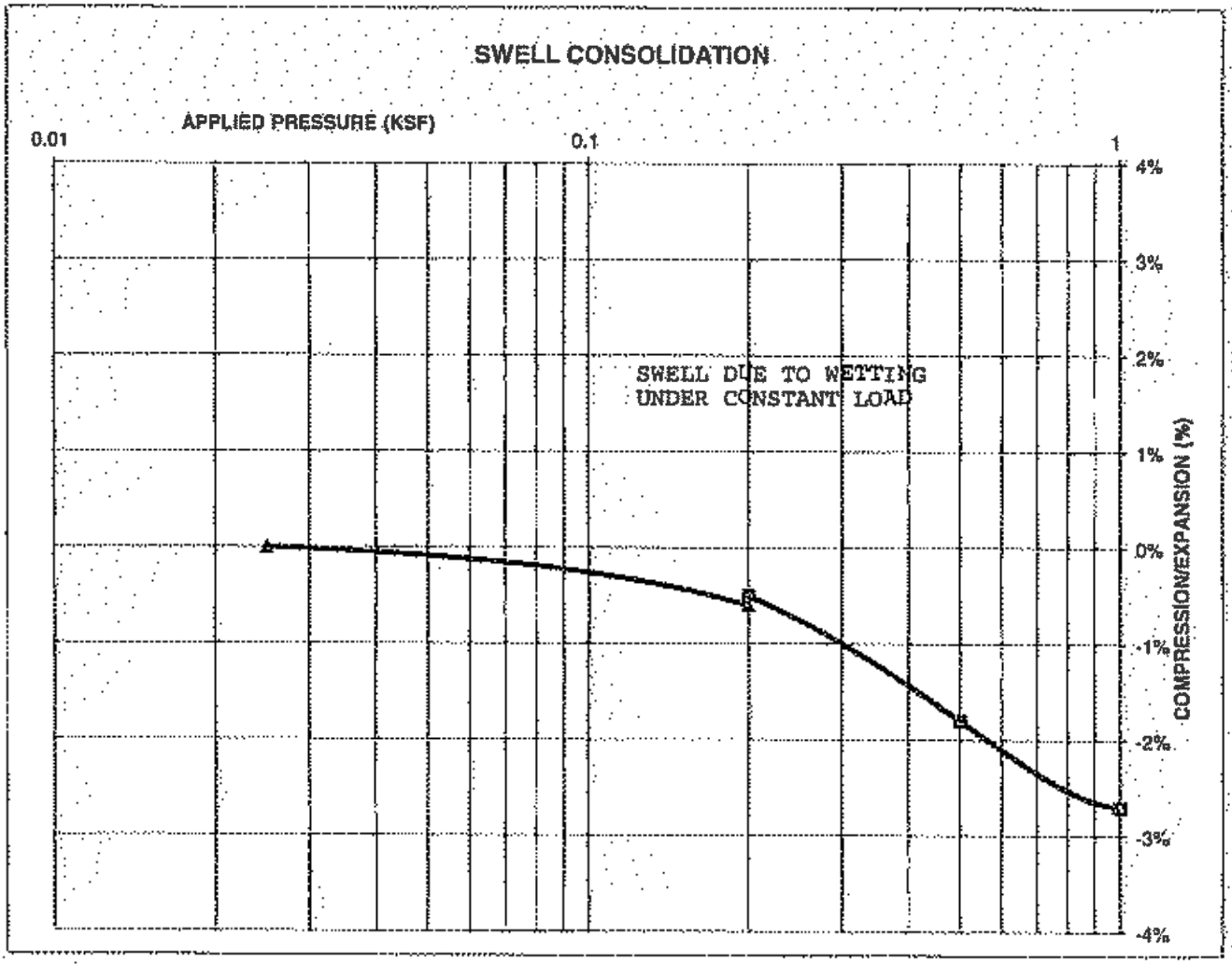
DRAWN:	DATE:	CHECKED:	DATE:
		SLC	2/14/12

JOB NO.: 171671
FIG NO.: B-80

CONSOLIDATION TEST RESULTS

TEST BORING #	29	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			119
NATURAL MOISTURE CONTENT			11.2%
SWELL/CONSOLIDATION (%)			0.1%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

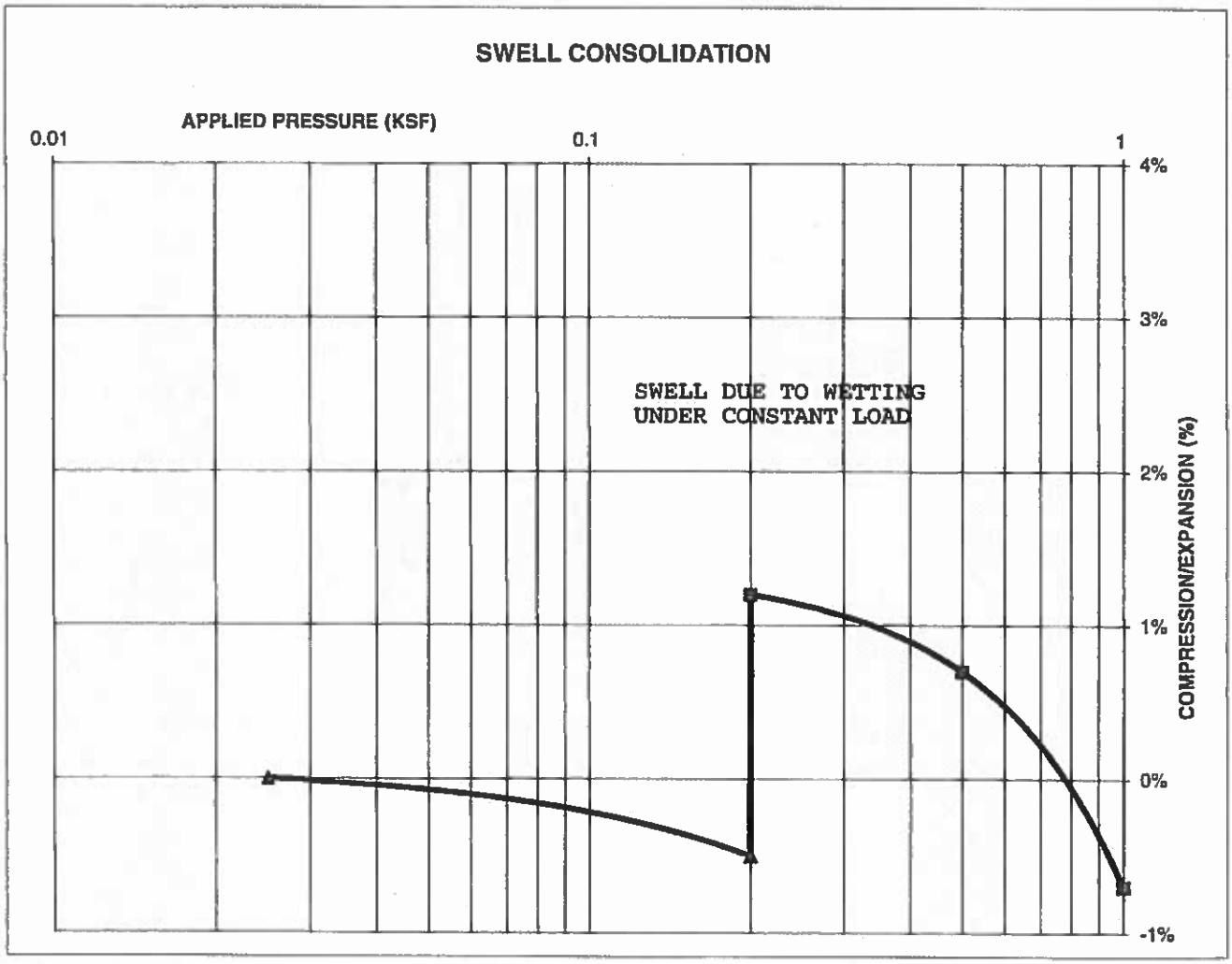
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO. 171671
FIG NO.: B-81

CONSOLIDATION TEST RESULTS

TEST BORING #	29	DEPTH(ft)	5
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			110
NATURAL MOISTURE CONTENT			17.2%
SWELL/CONSOLIDATION (%)			1.7%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

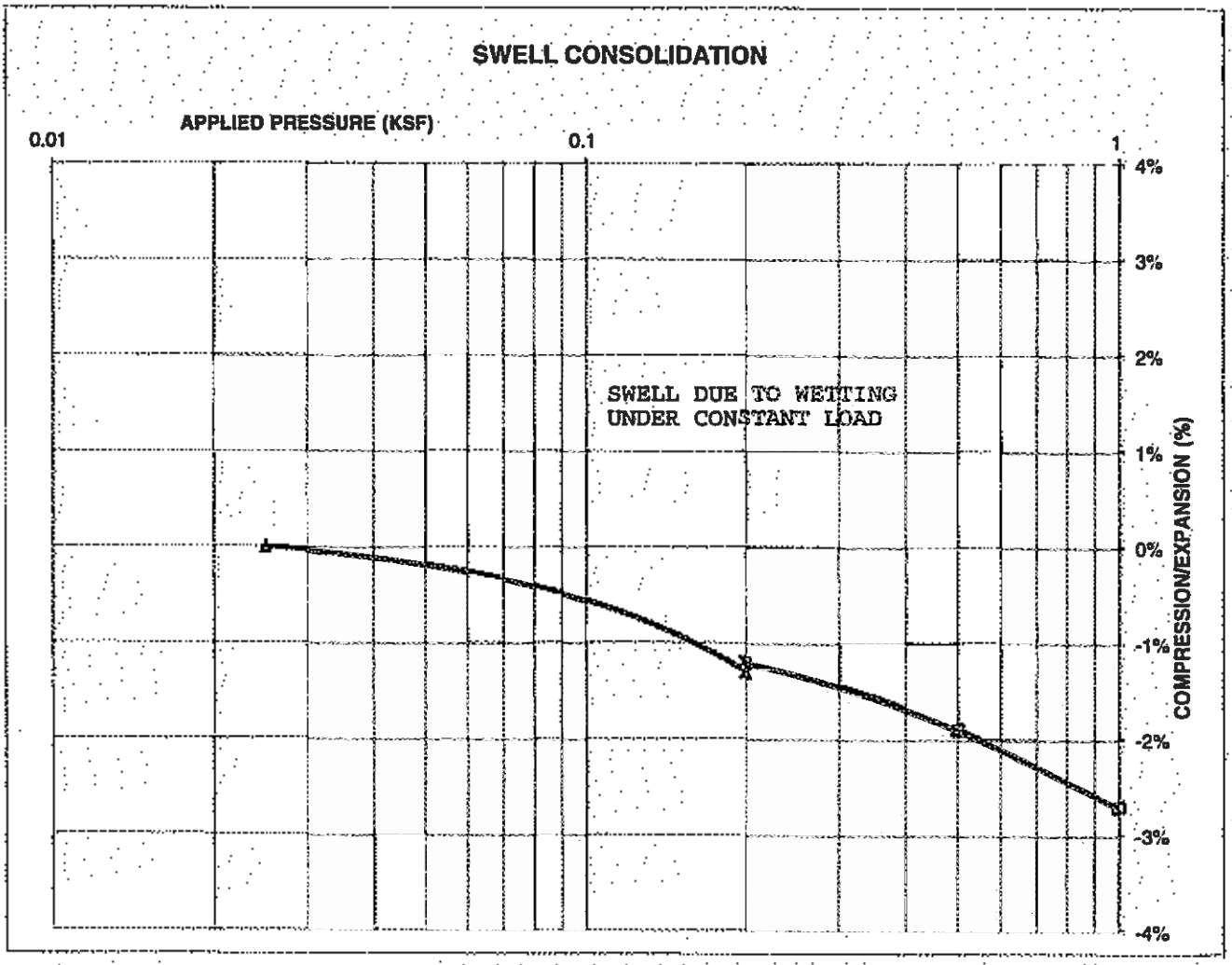
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	5/19/18

JOB NO.: 171671
FIG NO.: B-82

CONSOLIDATION TEST RESULTS

TEST BORING #	30	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			114
NATURAL MOISTURE CONTENT			7.5%
SWELL/CONSOLIDATION (%)			0.1%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

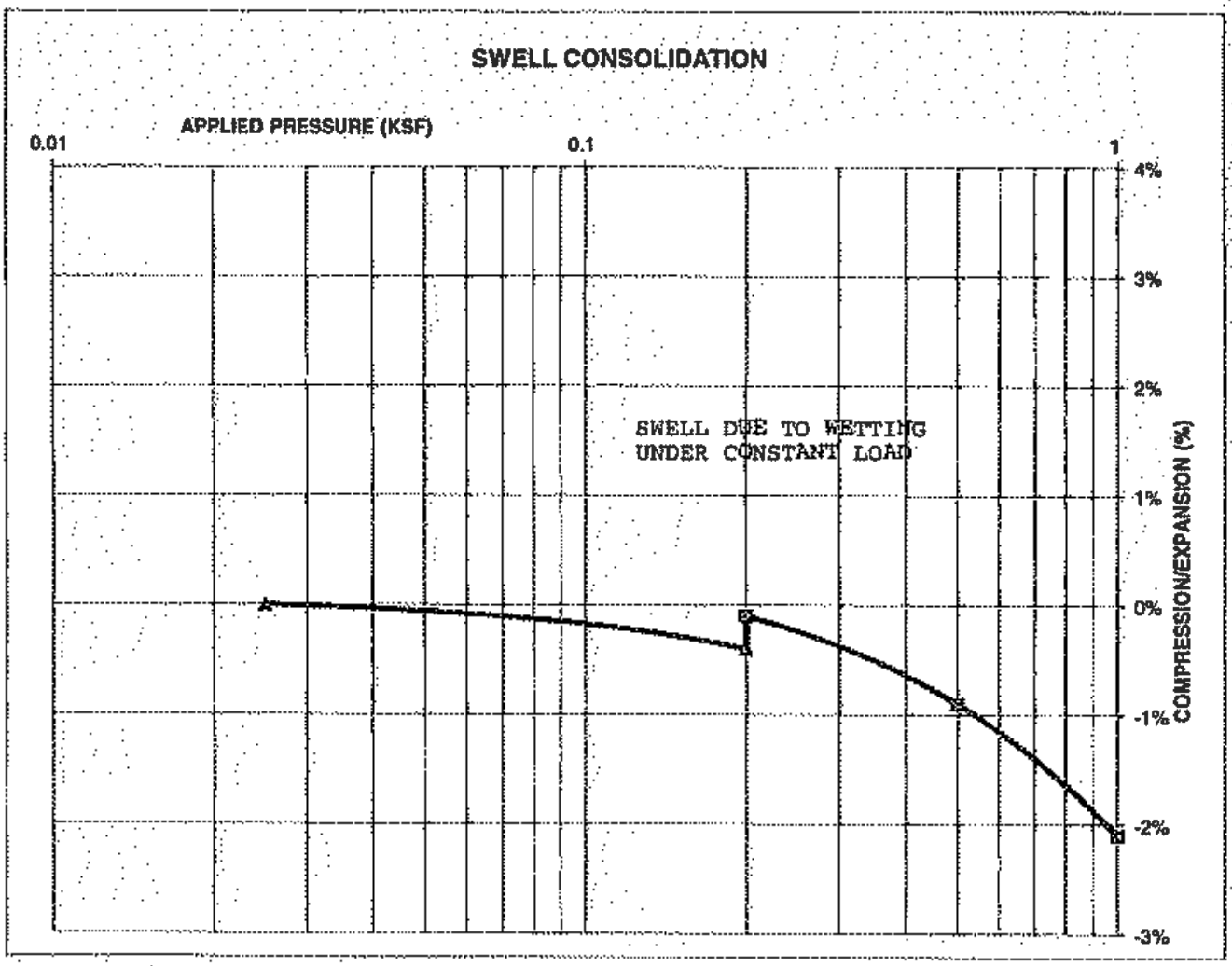
DRAWN:	DATE:	CHECKED:	DATE:
		SEC	2/19/18

JOB NO. 171671
FIG NO. B-83

CONSOLIDATION TEST RESULTS

TEST BORING #	32	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			112
NATURAL MOISTURE CONTENT			10.7%
SWELL/CONSOLIDATION (%)			0.3%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

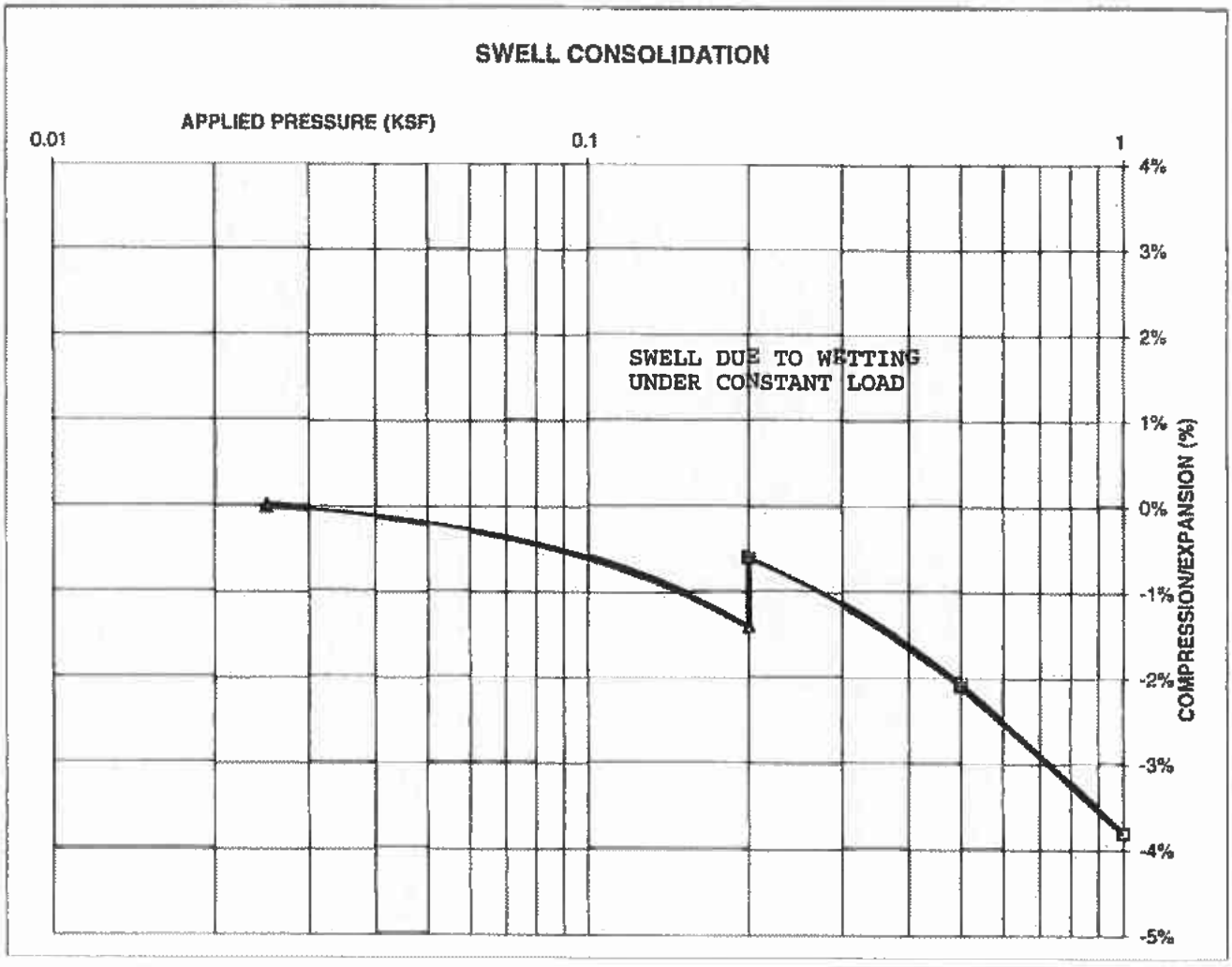
DRAWN:	DATE:	CHECKED:	DATE:
		SLC	2/19/18

JOB NO: 171671
FIG NO: B-84

CONSOLIDATION TEST RESULTS

TEST BORING #	33	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			105
NATURAL MOISTURE CONTENT			14.4%
SWELL/CONSOLIDATION (%)			0.8%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

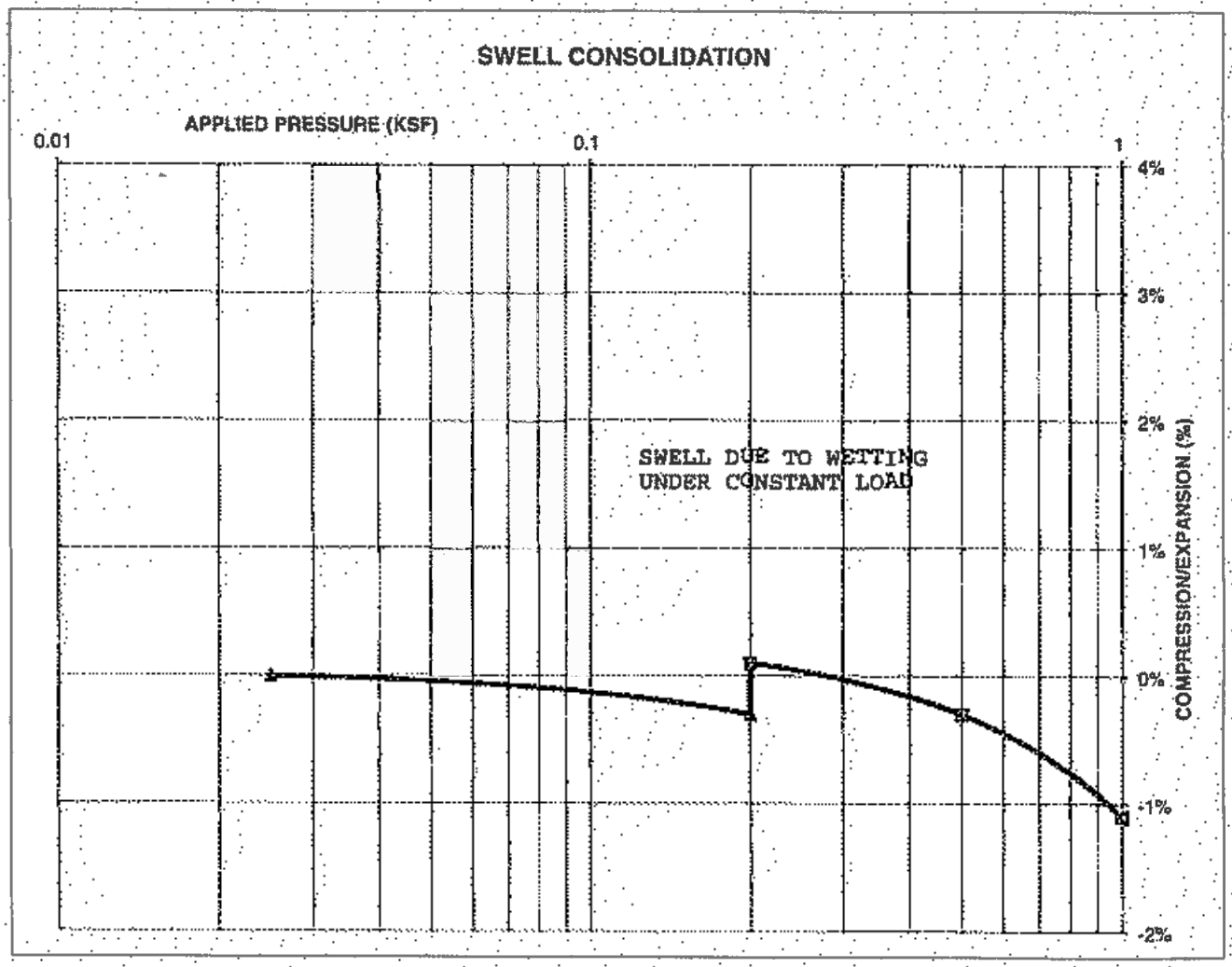
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO: 171671
FIG NO: B-85

CONSOLIDATION TEST RESULTS

TEST BORING #	34	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			114
NATURAL MOISTURE CONTENT			7.6%
SWELL/CONSOLIDATION (%)			0.4%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

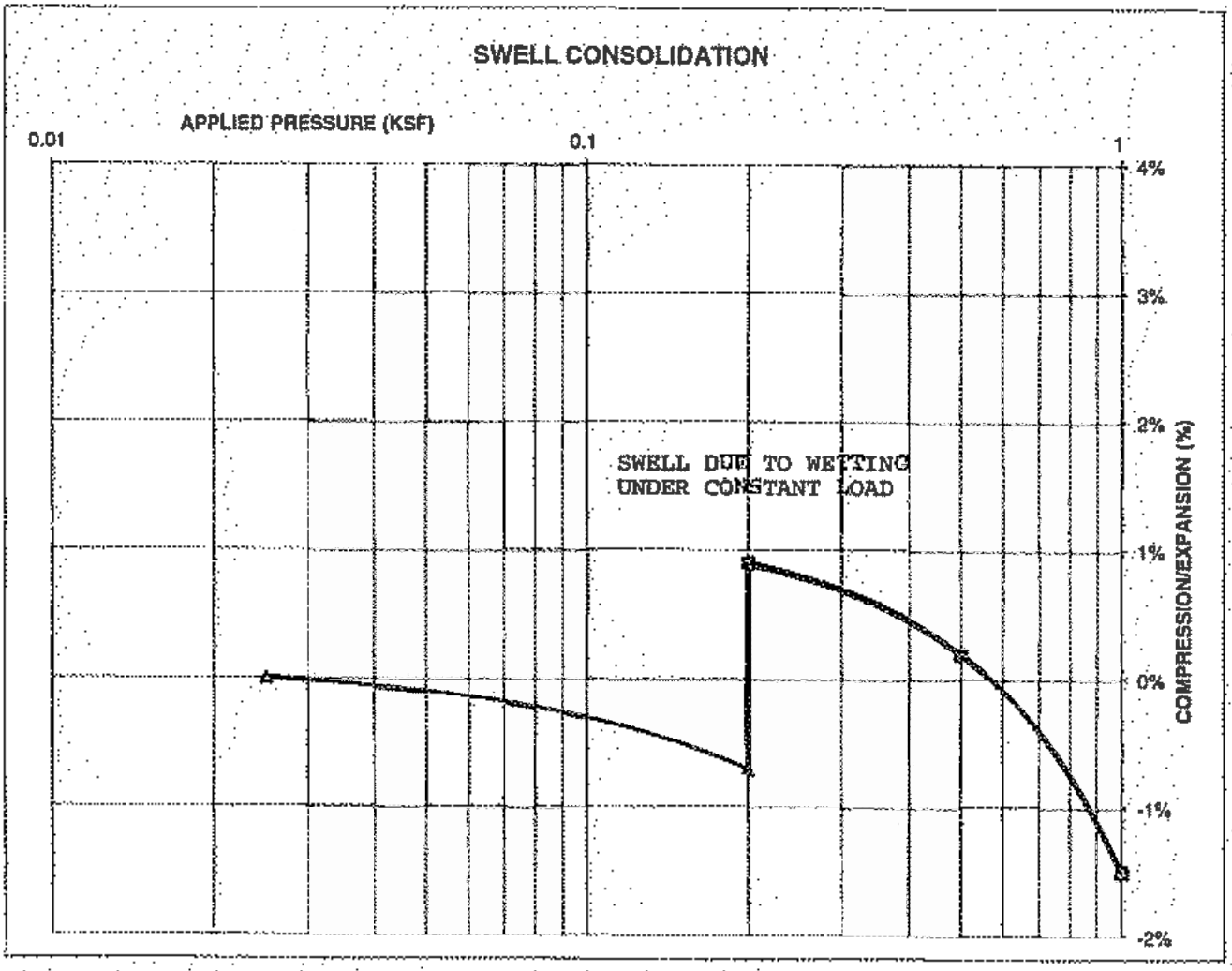
DRAWN:	DATE:	CHECKED: SCC	DATE: 7/19/18

JOB NO. 171671
FIG NO. B-86

CONSOLIDATION TEST RESULTS

TEST BORING #	37	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			108
NATURAL MOISTURE CONTENT			16.3%
SWELL/CONSOLIDATION (%)			1.6%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

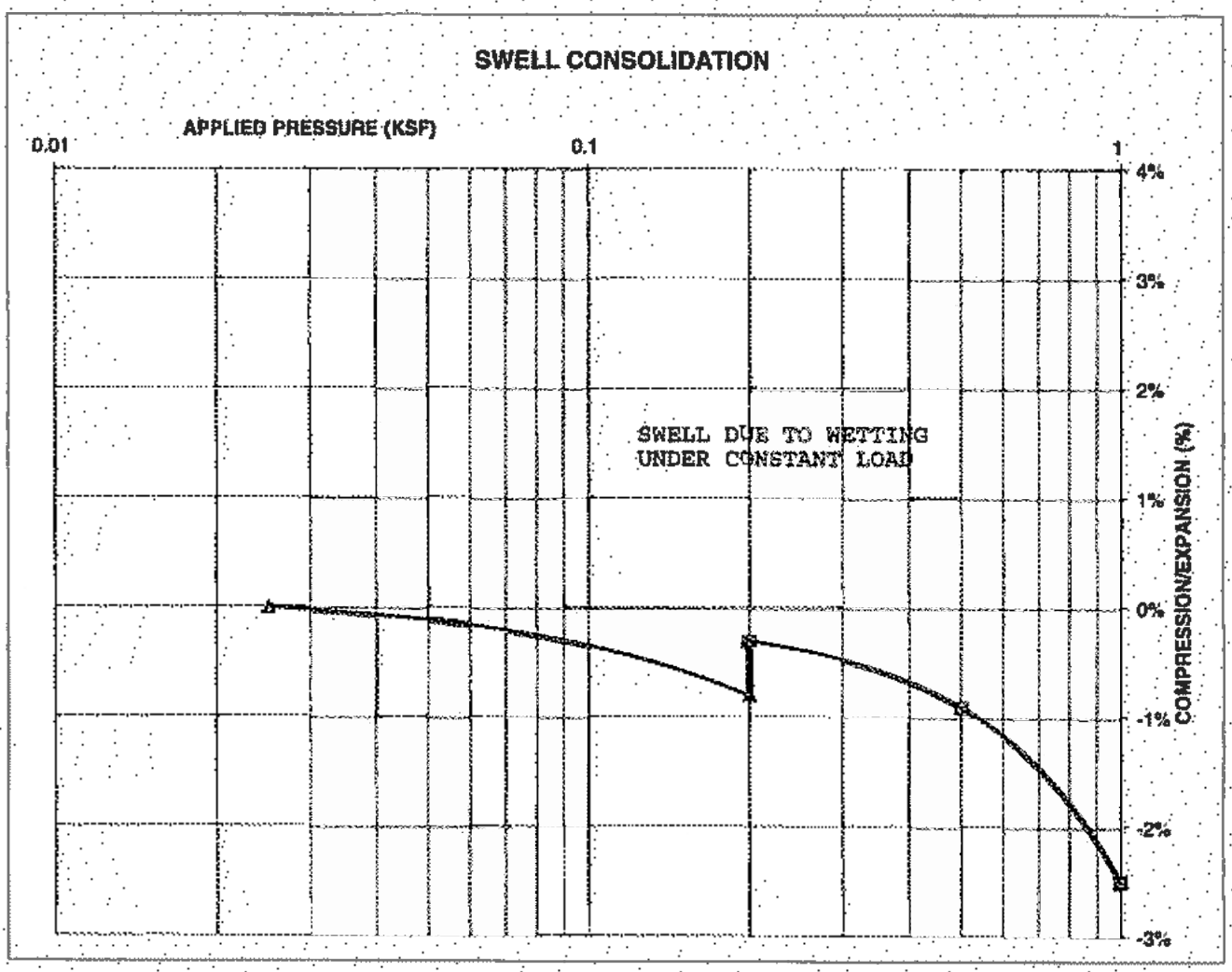
DRAWN:	DATE:	CHECKED: BCC	DATE: 2/19/18

JOB NO: 171671
FIG NO.: B-87

CONSOLIDATION TEST RESULTS

TEST BORING #	38	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			118
NATURAL MOISTURE CONTENT			11.3%
SWELL/CONSOLIDATION (%)			0.5%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

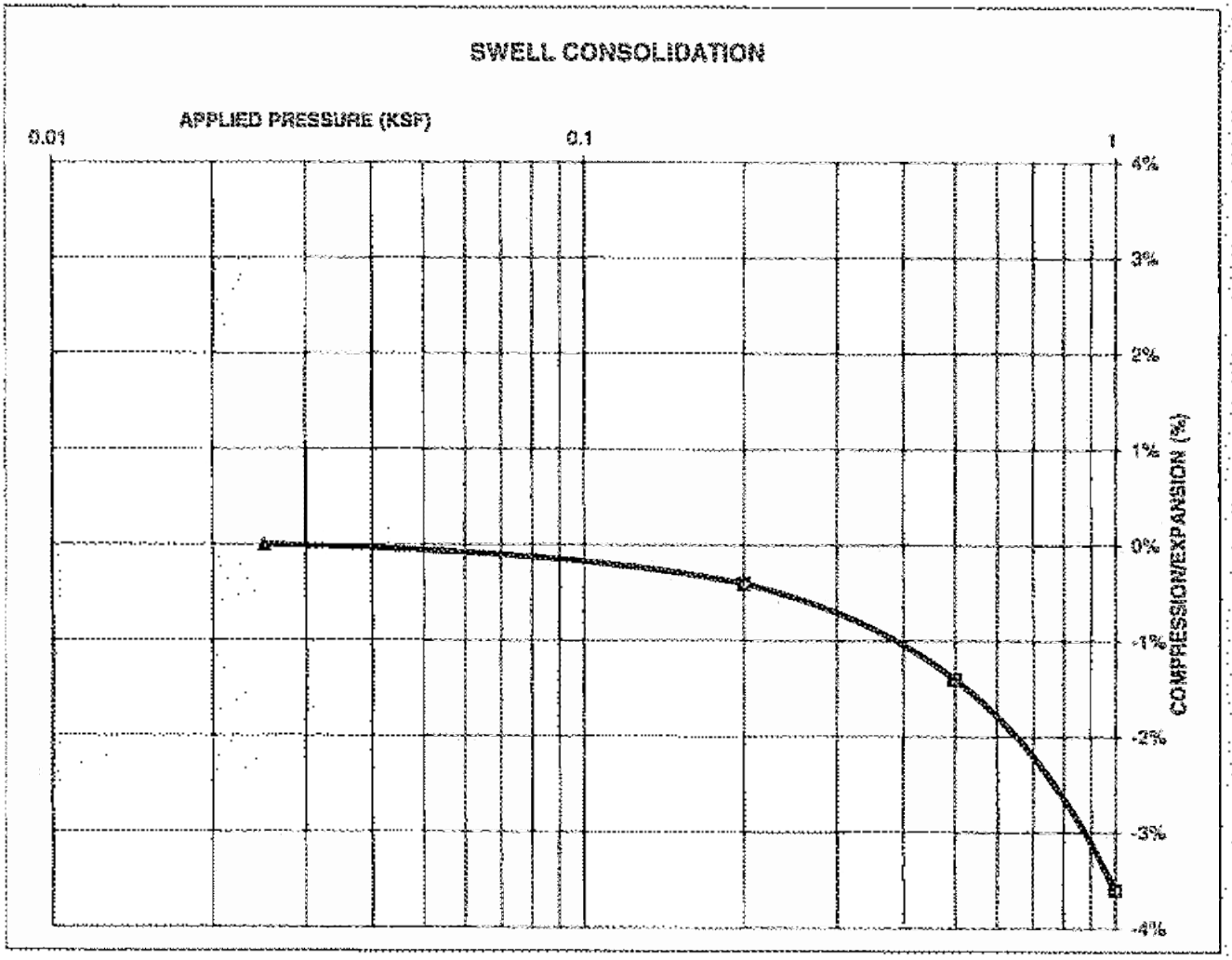
DRAWN:	DATE:	CHECKED:	DATE:
		LLC	3/19/18

JOB NO: 171671
FIG NO: B-88

CONSOLIDATION TEST RESULTS

TEST BORING #	39	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			116
NATURAL MOISTURE CONTENT			7.4%
SWELL/CONSOLIDATION (%)			0.0%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

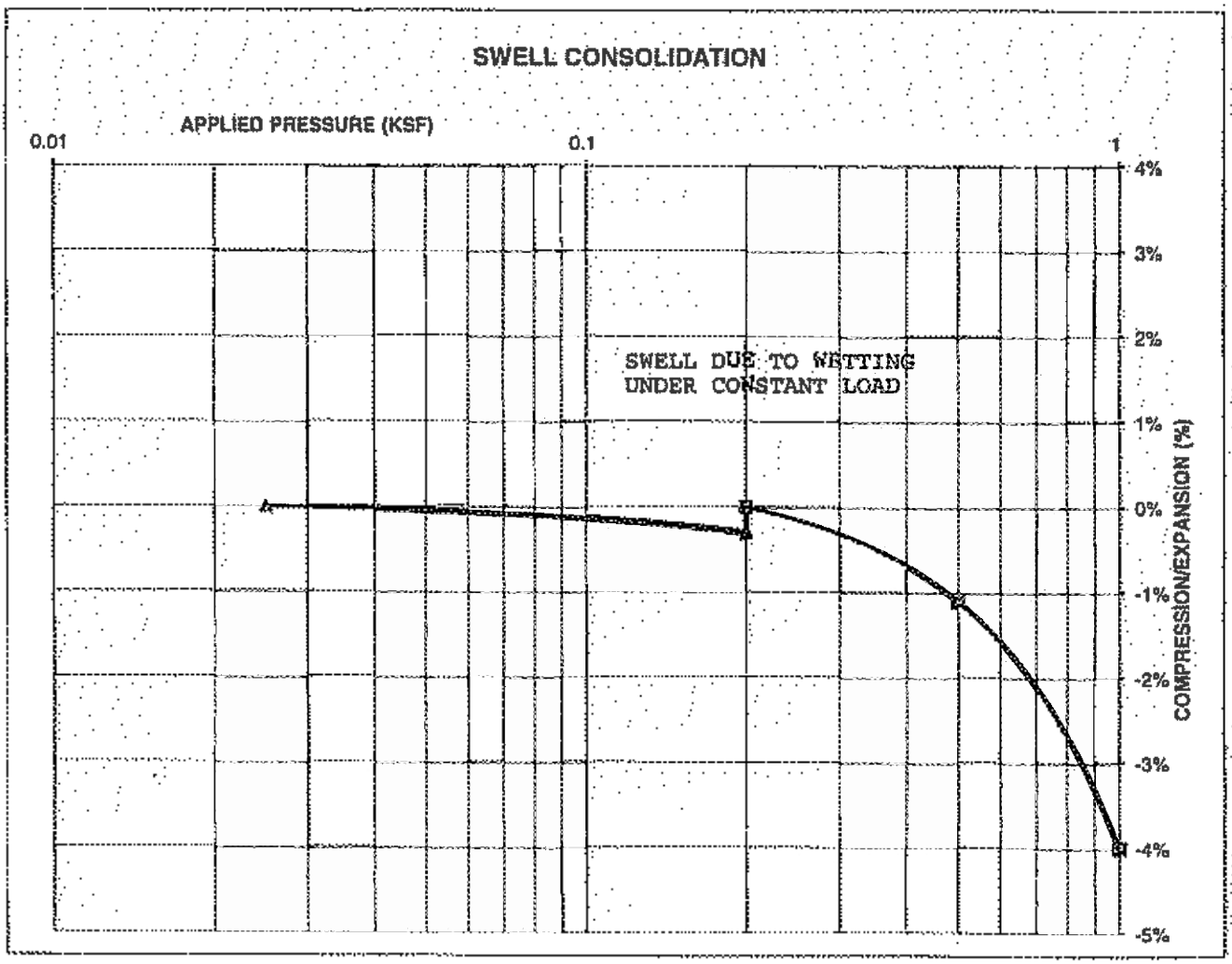
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: B-89

CONSOLIDATION TEST RESULTS

TEST BORING #	40	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			121
NATURAL MOISTURE CONTENT			7.5%
SWELL/CONSOLIDATION (%)			0.3%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

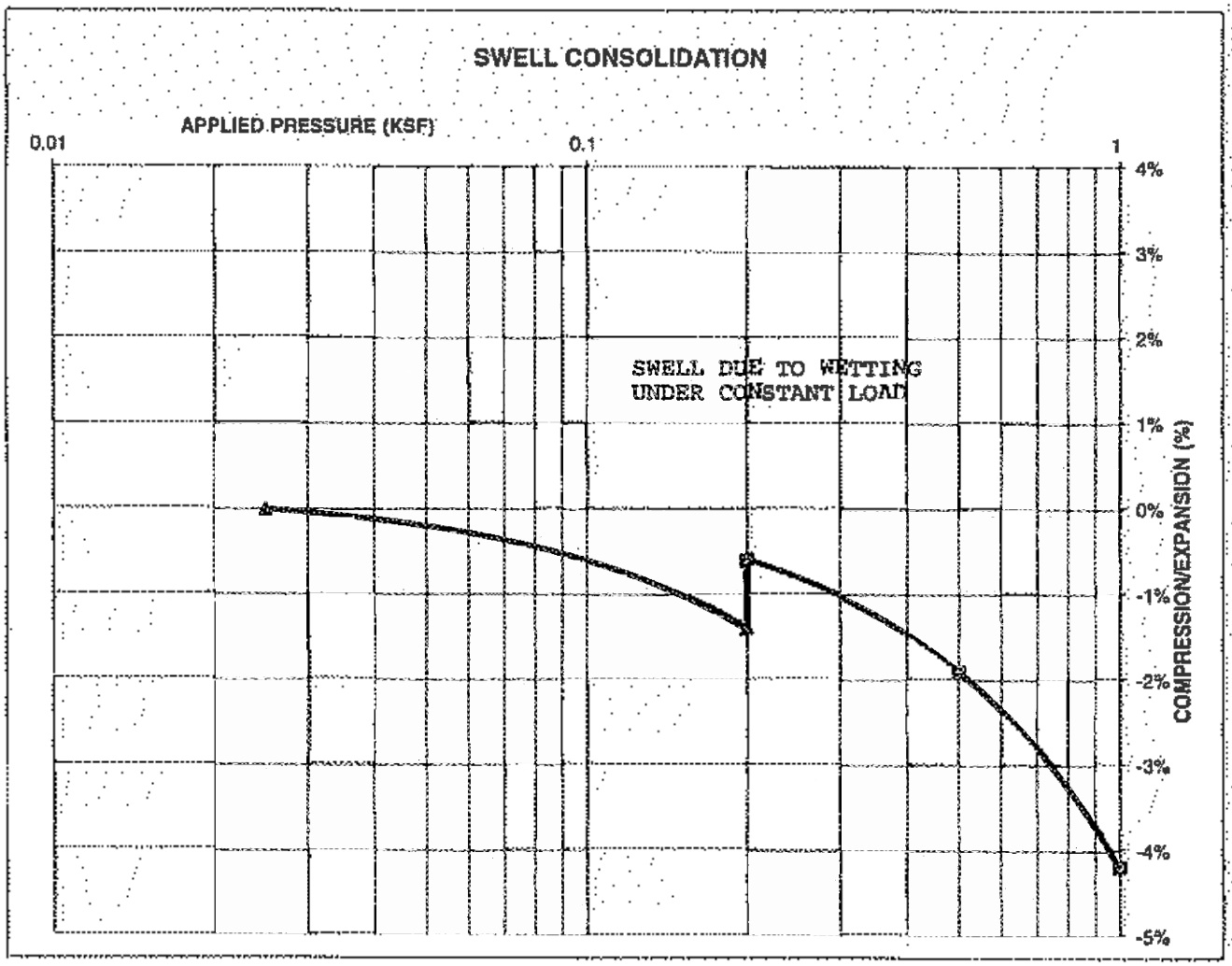
DRAWN:	DATE:	CHECKED:	DATE:
		SLC	3/15/18

JOB NO: 171671
FIG NO: B-90

CONSOLIDATION TEST RESULTS

TEST BORING #	41	DEPTH(ft)	1-2
DESCRIPTION	CL-ML	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			114
NATURAL MOISTURE CONTENT			16.3%
SWELL/CONSOLIDATION (%)			0.8%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

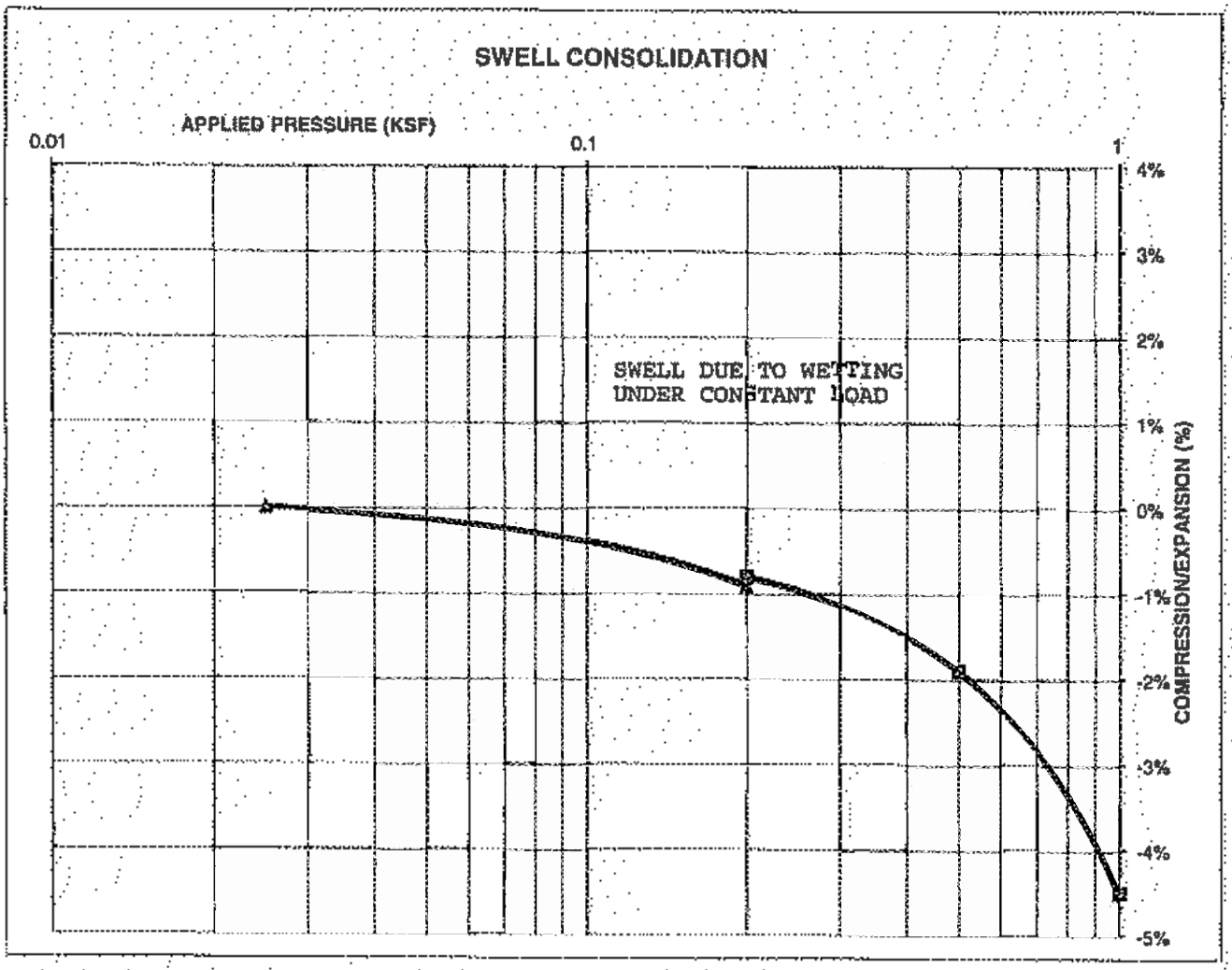
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-91

CONSOLIDATION TEST RESULTS

TEST BORING #	42	DEPTH(ft)	1-2
DESCRIPTION	CL	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			115
NATURAL MOISTURE CONTENT			10.8%
SWELL/CONSOLIDATION (%)			0.1%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

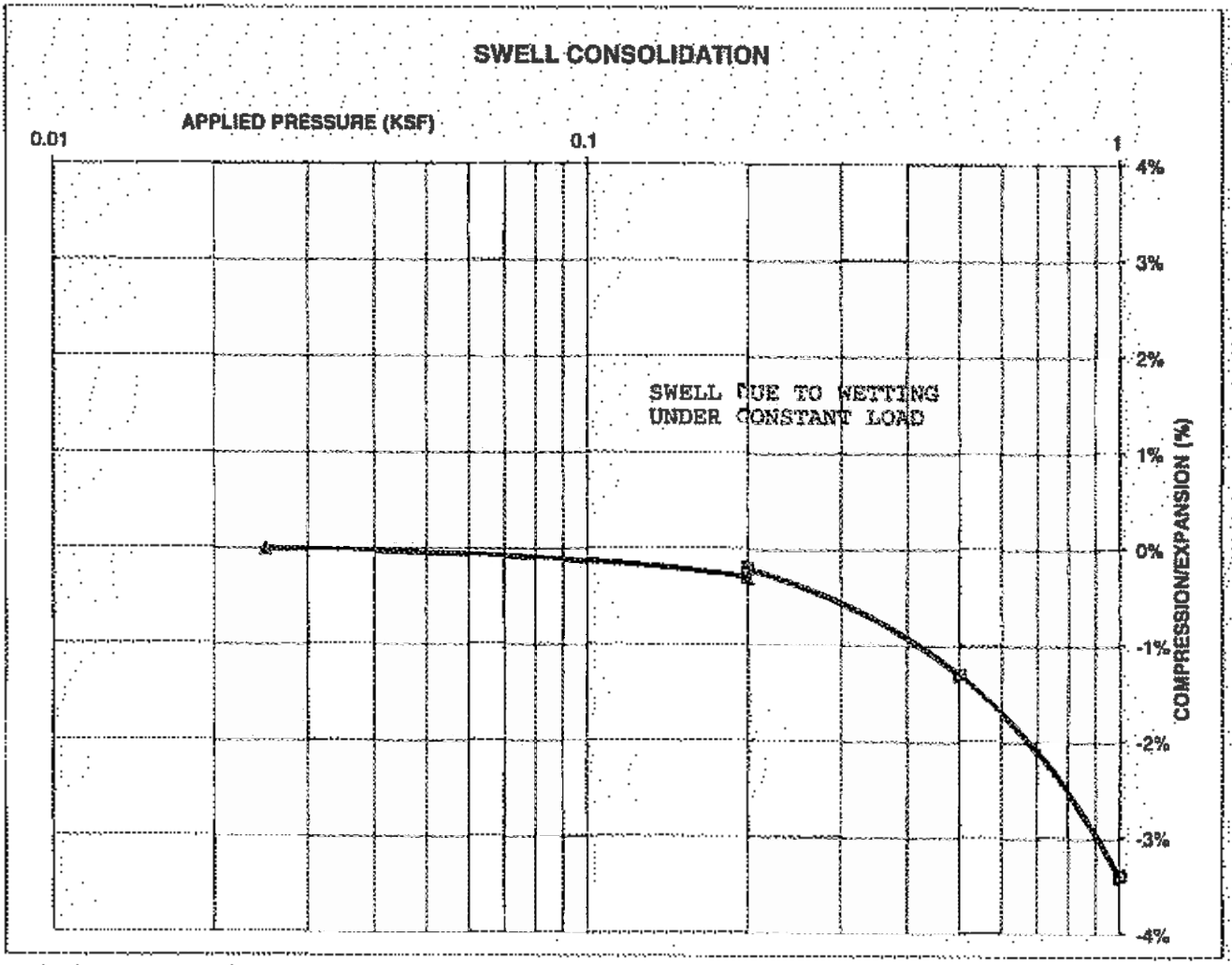
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO. 171671
FIG NO.: B-92

CONSOLIDATION TEST RESULTS

TEST BORING #	15	DEPTH(ft)	1-2
DESCRIPTION	SC	SOIL TYPE	4
NATURAL UNIT DRY WEIGHT (PCF)			110
NATURAL MOISTURE CONTENT			7.6%
SWELL/CONSOLIDATION (%)			0.1%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

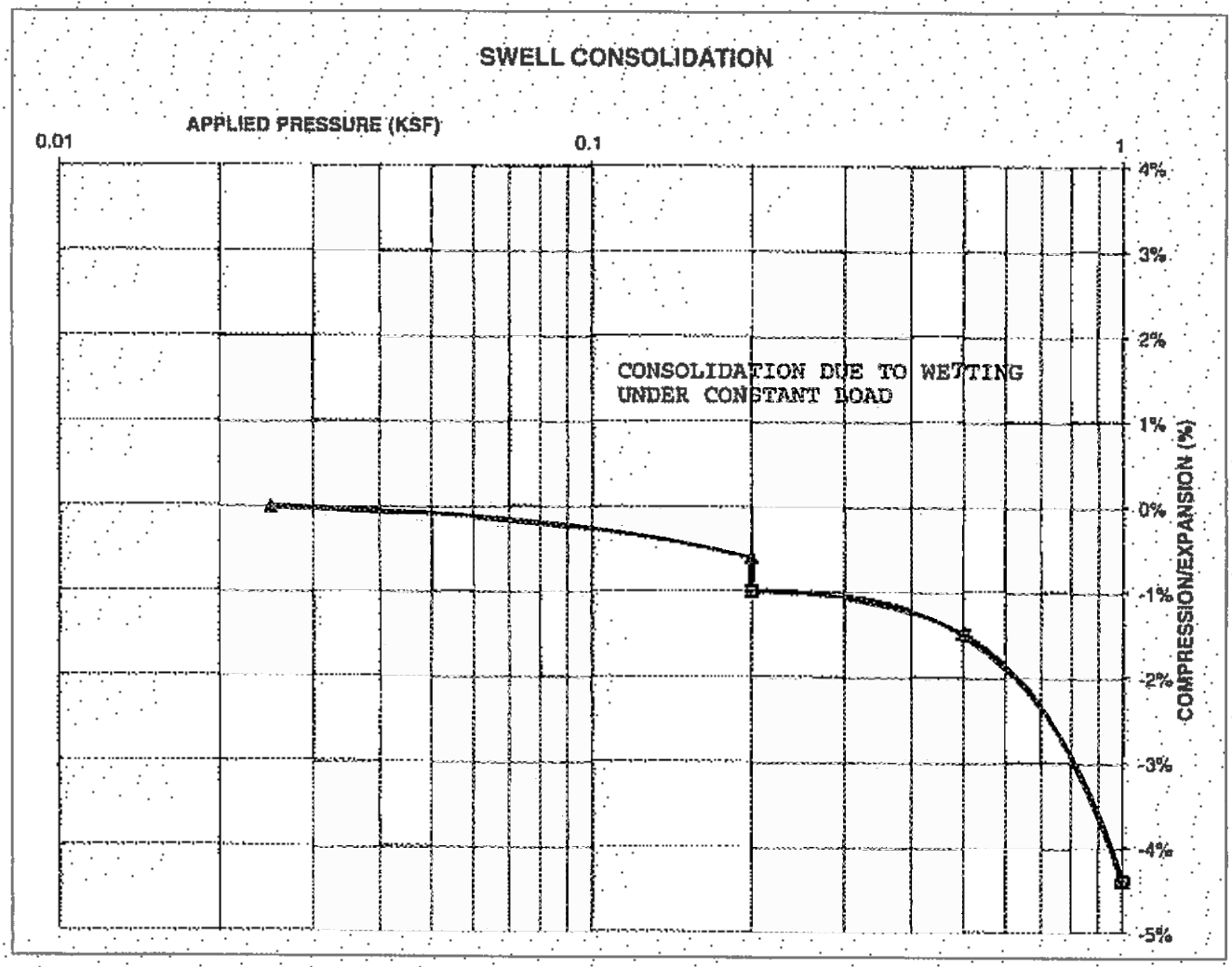
DRAWN:	DATE:	CHECKED: SCC	DATE: 3/15/18

JOB NO.: 171671
FIG NO.: B-93

CONSOLIDATION TEST RESULTS

TEST BORING #	23	DEPTH(ft)	10
DESCRIPTION	SC	SOIL TYPE	4
NATURAL UNIT DRY WEIGHT (PCF)			113
NATURAL MOISTURE CONTENT			12.9%
SWELL/CONSOLIDATION (%)			-0.4%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

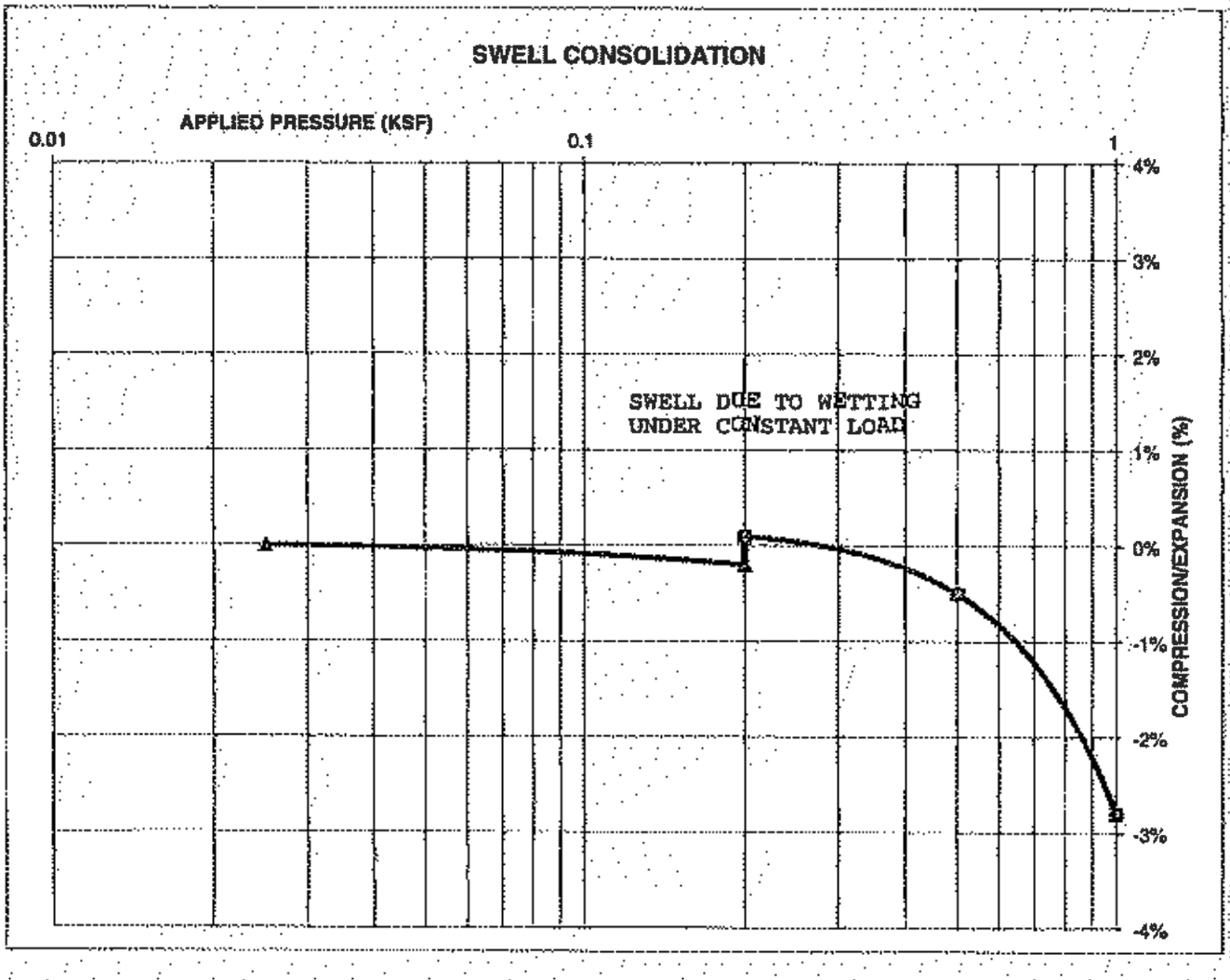
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/9/18

JOB NO.: 171671
FIG NO.: B-94

CONSOLIDATION TEST RESULTS

TEST BORING #	26	DEPTH(ft)	10
DESCRIPTION	SC	SOIL TYPE	4
NATURAL UNIT DRY WEIGHT (PCF)			112
NATURAL MOISTURE CONTENT			13.4%
SWELL/CONSOLIDATION (%)			0.3%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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SWELL CONSOLIDATION
TEST RESULTS

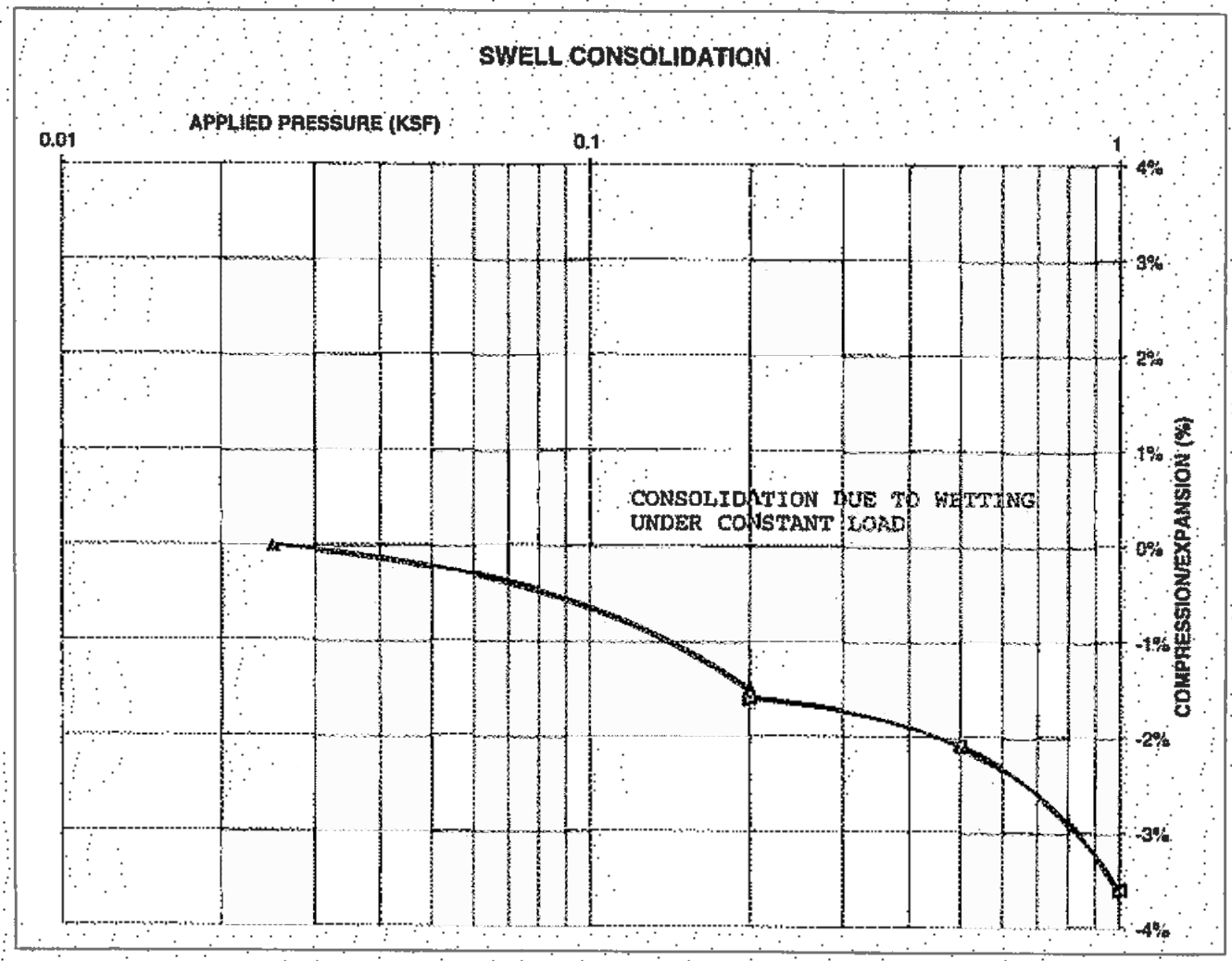
DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-95

CONSOLIDATION TEST RESULTS

TEST BORING #	36	DEPTH(ft)	10
DESCRIPTION	SM	SOIL TYPE	4
NATURAL UNIT DRY WEIGHT (PCF)			114
NATURAL MOISTURE CONTENT			12.3%
SWELL/CONSOLIDATION (%)			-0.1%

JOB NO. 171671
CLIENT PULPIT ROCK, LLC
PROJECT FLYING HORSE NORTH, F-1



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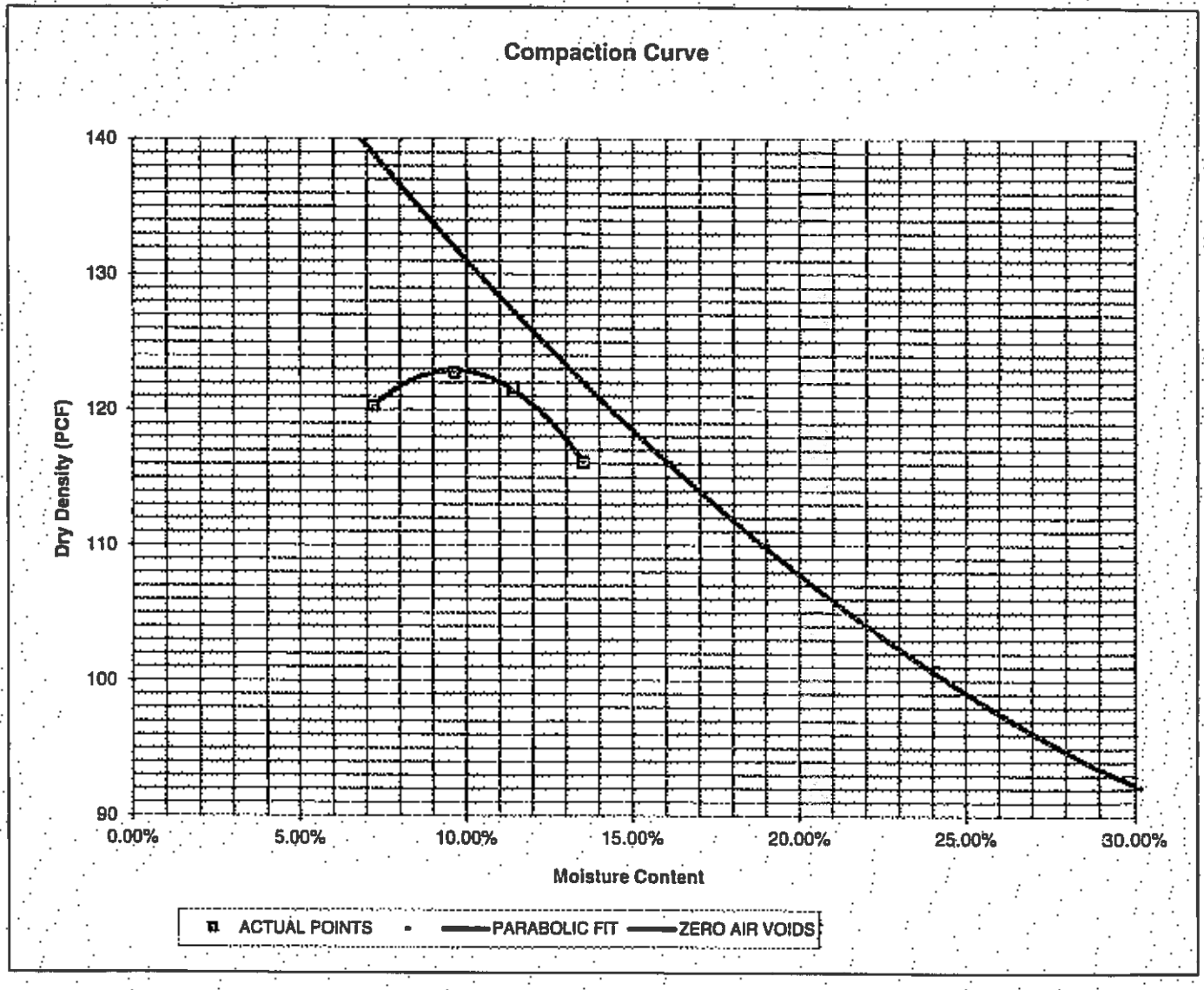
SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-96

PROJECT	FLYING HORSE NORTH, F-1	CLIENT	PULPIT ROCK, LLC
SAMPLE LOCATION	TB-4 @ 0-3'	JOB NO.	171671
SOIL DESCRIPTION	FILL, SAND, SILTY, BROWN	DATE	02/07/18

IDENTIFICATION	SM	COMPACTION TEST #	1, SOIL TYPE #1
TEST DESIGNATION / METHOD	ASTM D-1557-A	TEST BY	DC
MAXIMUM DRY DENSITY (PCF)	122.9	OPTIMUM MOISTURE	9.7%



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MOISTURE DENSITY RELATION

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-97

CBR TEST LOAD DATA

JOB NO: 171671
CLIENT: PULPIT ROCK, LLC
PROJECT: FLYING HORSE NORTH, F-1
SOIL TYPE: 1, CBR #1

PISTON DIAMETER (cm)	PISTON AREA (in^2)
4.958	2.99250919

PENETRATION DEPTH (INCHES)	*10 BLOWS* MOLD # 11 LOAD(LBS) (LBS)	STRESS (PSI)	*25 BLOWS* MOLD # 10 LOAD(LBS) (LBS)	STRESS (PSI)	*56 BLOWS* MOLD # 15 LOAD(LBS) (LBS)	STRESS (PSI)
0.000	0	0.00	0	0.00	0	0.00
0.025	88	29.41	106	35.42	199	66.50
0.050	101	33.75	211	70.51	350	116.96
0.075	141	47.12	246	82.21	411	137.34
0.100	156	52.13	346	115.62	476	159.06
0.125	185	61.82	411	137.34	527	176.11
0.150	193	64.49	444	148.37	589	196.82
0.175	201	67.17	491	164.08	665	222.22
0.200	215	71.85	504	168.42	730	243.94
0.300	241	80.53	589	196.82	965	322.47
0.400	254	84.88	667	222.89	1016	339.51
0.500	269	89.89	748	249.96	1189	397.33

FINAL MOISTURE CONTENT

	MOLD # 11	MOLD # 10	MOLD # 15
CAN #	350	353	347
WT. CAN	6.83	7.16	7.17
WT. CAN+WET	182.27	188.92	193.63
WT. CAN+DRY	149.81	158.11	165.63
WT. H20	32.46	30.81	28
WT. DRY SOIL	142.98	150.95	158.46
MOISTURE CONTENT	22.70%	20.41%	17.67%
WET DENSITY (PCF)	121.1	129.2	135.1
DRY DENSITY (PCF)	110.4	117.8	123.1
BEARING RATIO	5.21	11.56	15.91

90% OF DRY DENSITY	110.6
95% OF DRY DENSITY	116.8

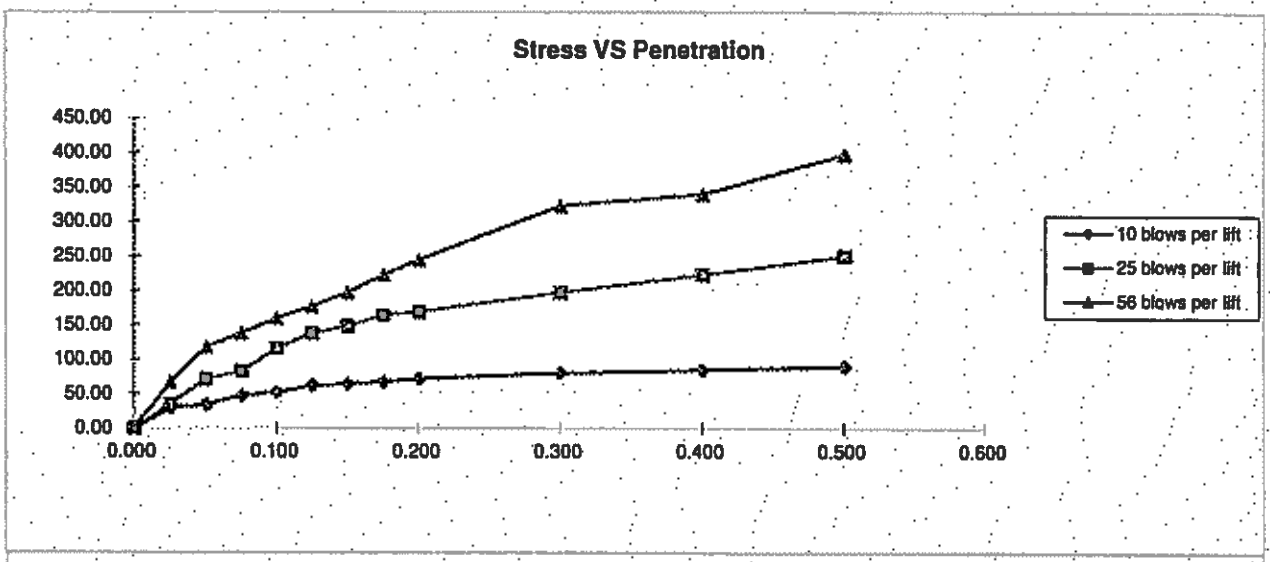
BEARING RATIO AT 90% OF MAX	5.40	- R VALUE	12
BEARING RATIO AT 95% OF MAX	10.69	- R VALUE	30

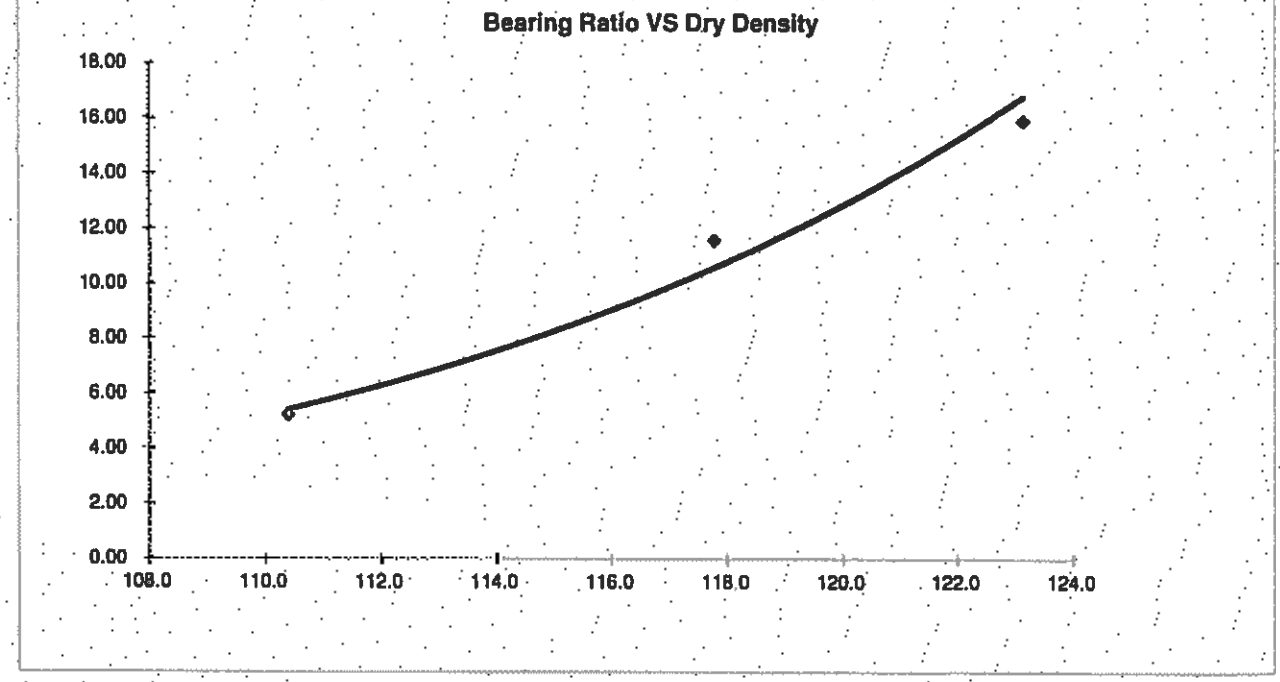
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505 ELKTON DRIVE
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CBR TEST DATA

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/9/18

JOB NO.: 171671
FIG NO.: B-98





BEARING RATIO AT 90% OF MAX	5.40 ~ R VALUE	12.00
BEARING RATIO AT 95% OF MAX	10.69 ~ R VALUE	30.00

JOB NO: 171671
SOIL TYPE: 1, CBR #1

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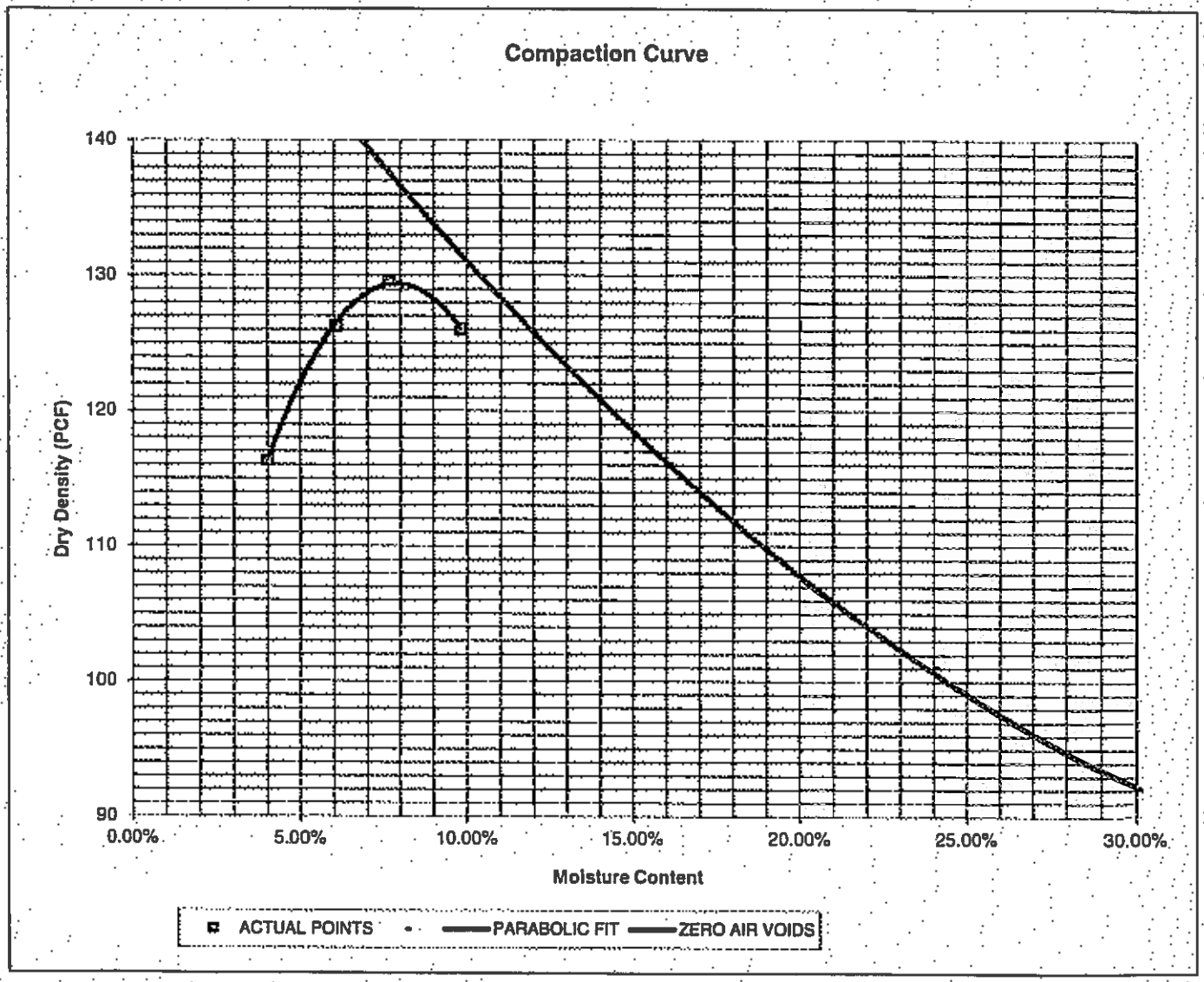
CALIFORNIA BEARING RATIO

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: B-99

PROJECT	FLYING HORSE NORTH, F-1	CLIENT	PULPIT ROCK, LLC
SAMPLE LOCATION	TB-10 @ 0-3'	JOB NO.	171671
SOIL DESCRIPTION	SAND, CLAYEY, BROWN	DATE	10/25/17

IDENTIFICATION	SC	COMPACTION TEST #	2, SOIL TYPE #2
TEST DESIGNATION / METHOD	ASTM D-1557-A	TEST BY	AS
MAXIMUM DRY DENSITY (PCF)	129.6	OPTIMUM MOISTURE	7.9%



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MOISTURE DENSITY RELATION

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/19/18

JOB NO.: 171671
FIG NO.: B-100

CBR TEST LOAD DATA

JOB NO: 171671
CLIENT: PULPIT ROCK, LLC
PROJECT: FLYING HORSE NORTH, F-1
SOIL TYPE: 2, CBR #2

PISTON DIAMETER (cm)	PISTON AREA (in^2)
4.958	2.99250919

PENETRATION DEPTH (INCHES)	*10 BLOWS* MOLD # 16 LOAD(LBS) (LBS)	STRESS (PSI)	*25 BLOWS* MOLD # 15 LOAD(LBS) (LBS)	STRESS (PSI)	*56 BLOWS* MOLD # 11 LOAD(LBS) (LBS)	STRESS (PSI)
0.000	0	0.00	0	0.00	0	0.00
0.025	99	33.08	143	47.79	164	54.80
0.050	179	59.82	247	82.54	294	98.25
0.075	227	75.86	374	124.98	458	153.05
0.100	269	89.89	510	170.43	598	199.83
0.125	302	100.92	689	230.24	747	249.62
0.150	343	114.62	794	265.33	854	285.38
0.175	365	121.97	930	310.78	985	329.16
0.200	382	127.65	1073	358.56	1202	401.67
0.300	455	152.05	1563	522.30	1703	569.09
0.400	523	174.77	1904	636.26	2169	724.81
0.500	597	199.50	2302	769.25	2704	903.59

FINAL MOISTURE CONTENT

	MOLD # 16	MOLD # 15	MOLD # 11
CAN #	343	354	355
WT. CAN	7.03	6.9	6.99
WT. CAN+WET	190.44	208.66	213.87
WT. CAN+DRY	170.13	188.72	195.98
WT. H20	20.31	19.94	17.89
WT. DRY SOIL	163.1	181.82	188.99
MOISTURE CONTENT	12.45%	10.97%	9.47%
WET DENSITY (PCF)	125.1	135.2	139.7
DRY DENSITY (PCF)	116.0	125.3	129.5
BEARING RATIO	8.99	17.04	19.98

90% OF DRY DENSITY	116.6
95% OF DRY DENSITY	123.1

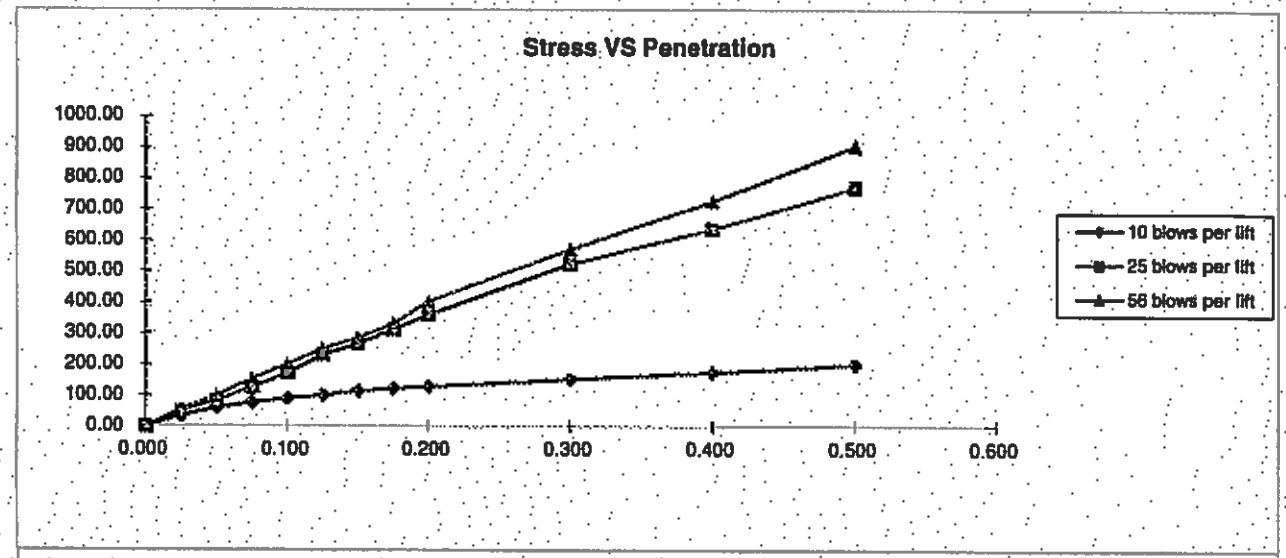
BEARING RATIO AT 90% OF MAX	9.57	~ R VALUE	26
BEARING RATIO AT 95% OF MAX	15.15	~ R VALUE	50

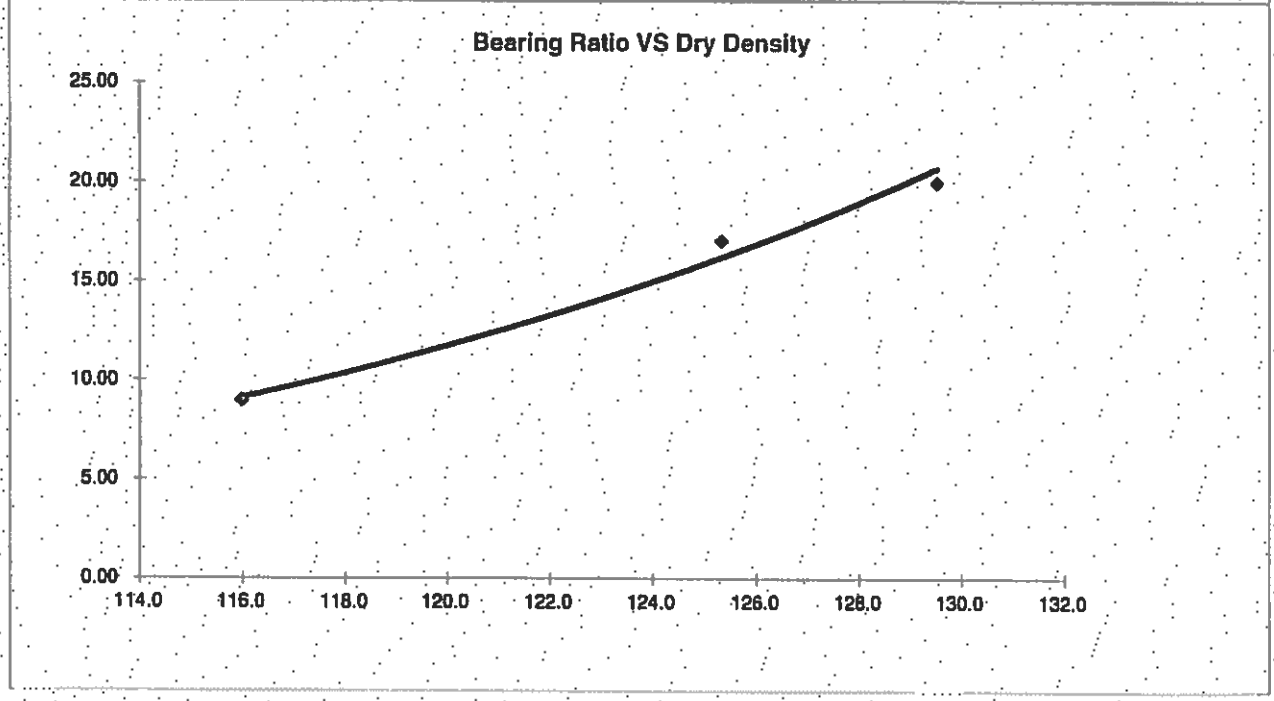
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CBR TEST DATA

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-101





BEARING RATIO AT 90% OF MAX	9.57 ~ R VALUE	26.00
BEARING RATIO AT 95% OF MAX	15.15 ~ R VALUE	50.00

JOB NO: 171671
SOIL TYPE: 2, CBR #2

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CALIFORNIA BEARING RATIO

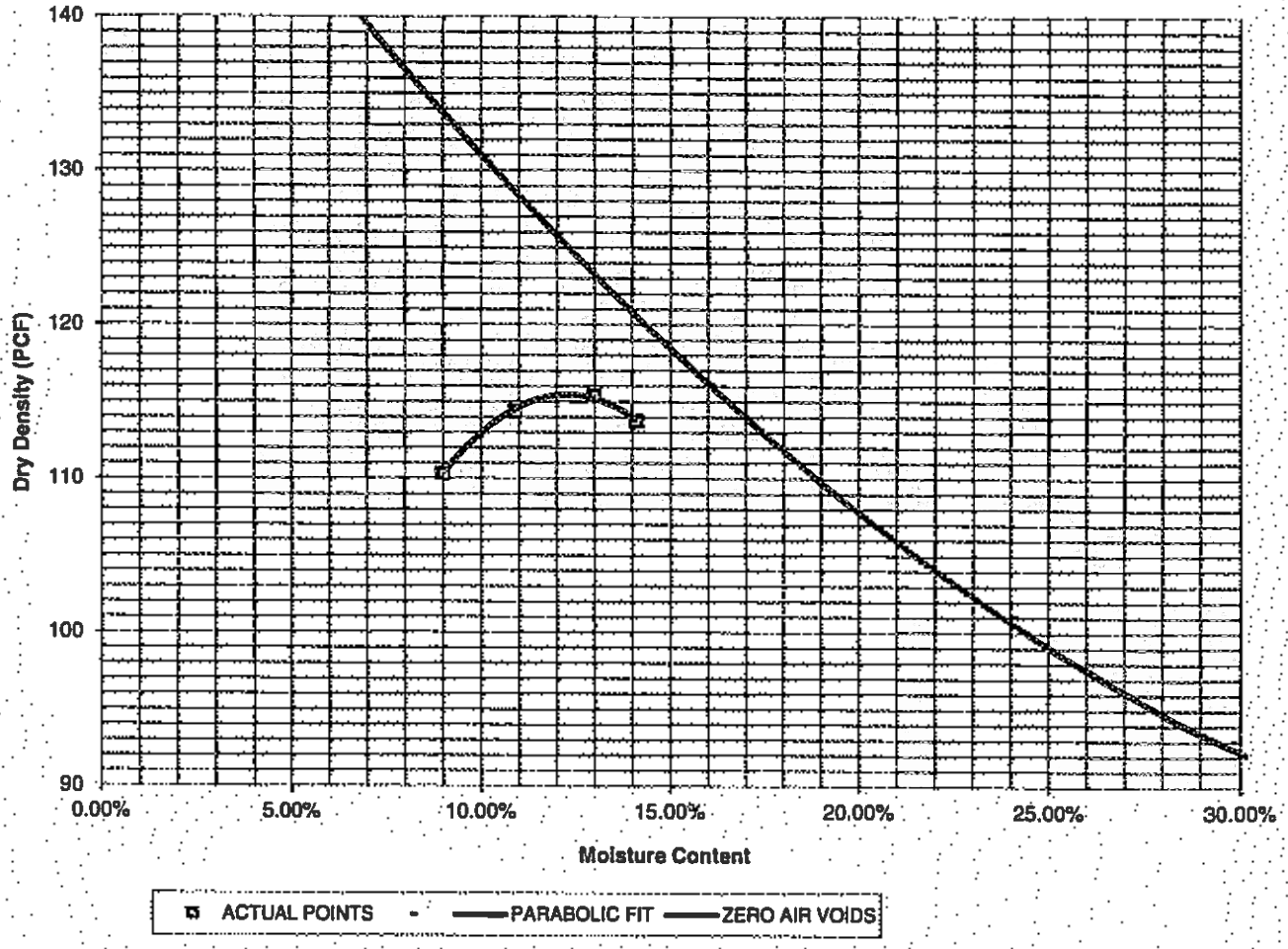
DRAWN:	DATE:	CHECKED: SEC	DATE: 7/19/18

JOB NO.: 171671
FIG NO.: B-102

PROJECT	FLYING HORSE NORTH, F-1	CLIENT	PULPIT ROCK, LLC
SAMPLE LOCATION	TB-15 @ 0-3'	JOB NO.	171671
SOIL DESCRIPTION	0	DATE	11/16/17

IDENTIFICATION	SC	COMPACTION TEST #	3, SOIL TYPE #3
TEST DESIGNATION / METHOD	ASTM D-698-A	TEST BY	
MAXIMUM DRY DENSITY (PCF)	115.8	OPTIMUM MOISTURE	12.6%

Compaction Curve



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MOISTURE DENSITY RELATION

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	3/9/18

JOB NO.: 171671

FIG NO.: B-103

CBR TEST LOAD DATA

JOB NO: 171671
CLIENT: PULPIT ROCK, LLC
PROJECT: FLYING HORSE NORTH, F-1
SOIL TYPE: 3, CBR #3

PISTON DIAMETER (cm)	PISTON AREA (in²)
4.956	2.99250919

PENETRATION DEPTH (INCHES)	10 BLOWS MOLD # 1 LOAD(LBS) (LBS)	STRESS (PSI)	25 BLOWS MOLD # 15 LOAD(LBS) (LBS)	STRESS (PSI)	56 BLOWS MOLD # 11 LOAD(LBS) (LBS)	STRESS (PSI)
0.000	0	0.00	0	0.00	0	0.00
0.025	14	4.68	51	17.04	66	22.06
0.050	23	7.69	73	24.39	83	27.74
0.075	38	12.70	88	29.41	98	32.75
0.100	46	15.37	98	32.75	111	37.09
0.125	51	17.04	118	39.43	124	41.44
0.150	59	19.72	126	42.11	138	46.12
0.175	64	21.39	134	44.78	144	48.12
0.200	76	25.40	139	46.45	149	49.79
0.300	84	28.07	171	57.14	182	60.82
0.400	93	31.08	206	68.84	212	70.84
0.500	101	33.75	231	77.19	242	80.87

FINAL MOISTURE CONTENT

	MOLD # 1	MOLD # 15	MOLD # 11
CAN #	350	349	350
WT. CAN	6.79	6.84	6.79
WT. CAN+WET	187.54	198.93	194.697
WT. CAN+DRY	163.32	175.42	172.39
WT. H20	24.22	23.51	22.307
WT. DRY SOIL	156.53	168.58	165.6
MOISTURE CONTENT	15.47%	13.95%	13.47%

WET DENSITY (PCF)	120.4	126.3	128.3
DRY DENSITY (PCF)	106.9	112.2	113.9

BEARING RATIO		1.54	3.27	3.71
90% OF DRY DENSITY	104.2			
95% OF DRY DENSITY	110.0			

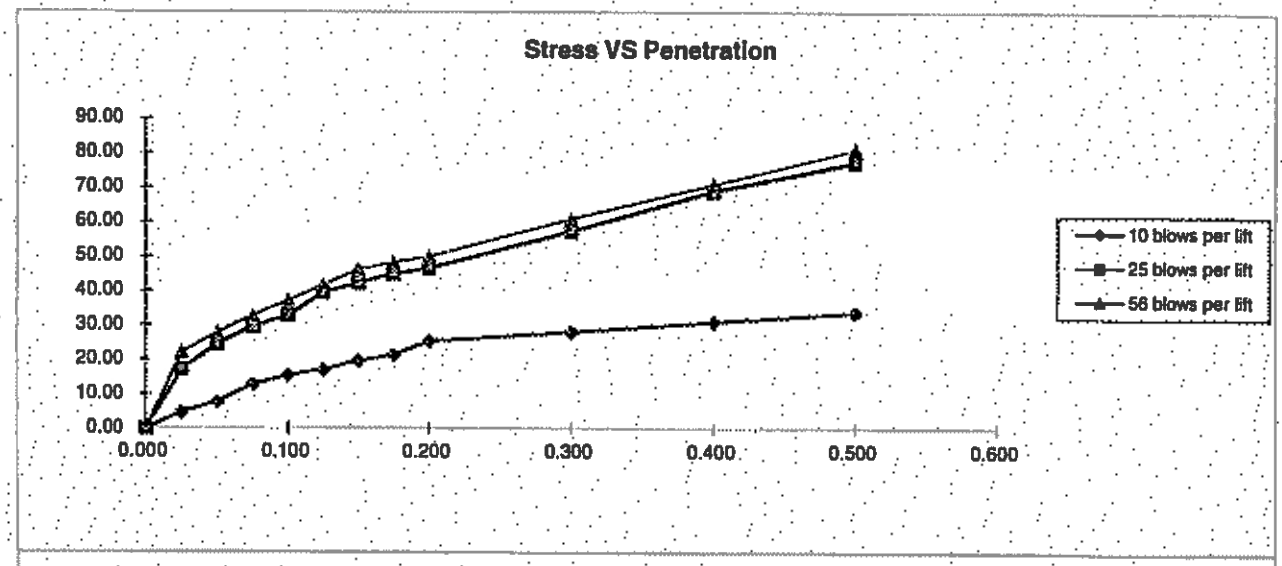
BEARING RATIO AT 90% OF MAX	1.00	~ R VALUE	1
BEARING RATIO AT 95% OF MAX	2.56	~ R VALUE	6

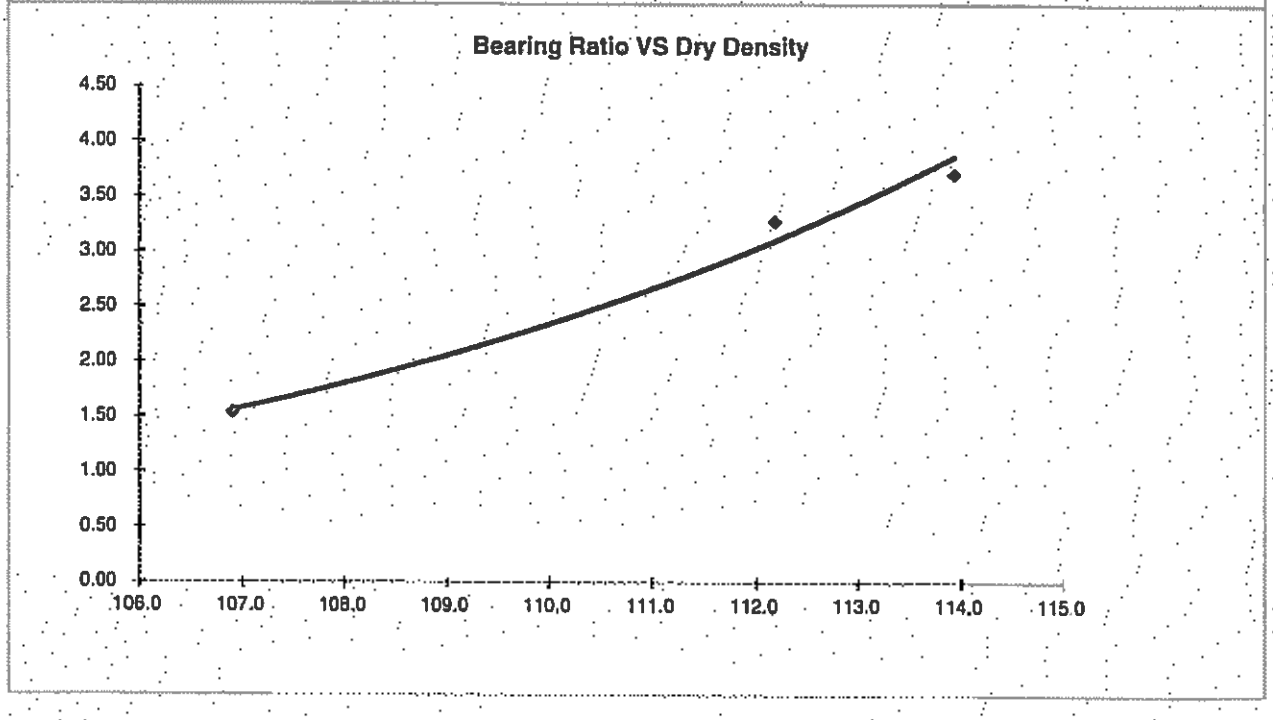
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CBR TEST DATA

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO: 171671
FIG NO: B-104





BEARING RATIO AT 90% OF MAX	1.00 ~ R VALUE	1.00
BEARING RATIO AT 95% OF MAX	2.56 ~ R VALUE	6.00

JOB NO: 171671
SOIL TYPE: 3, CBR #3

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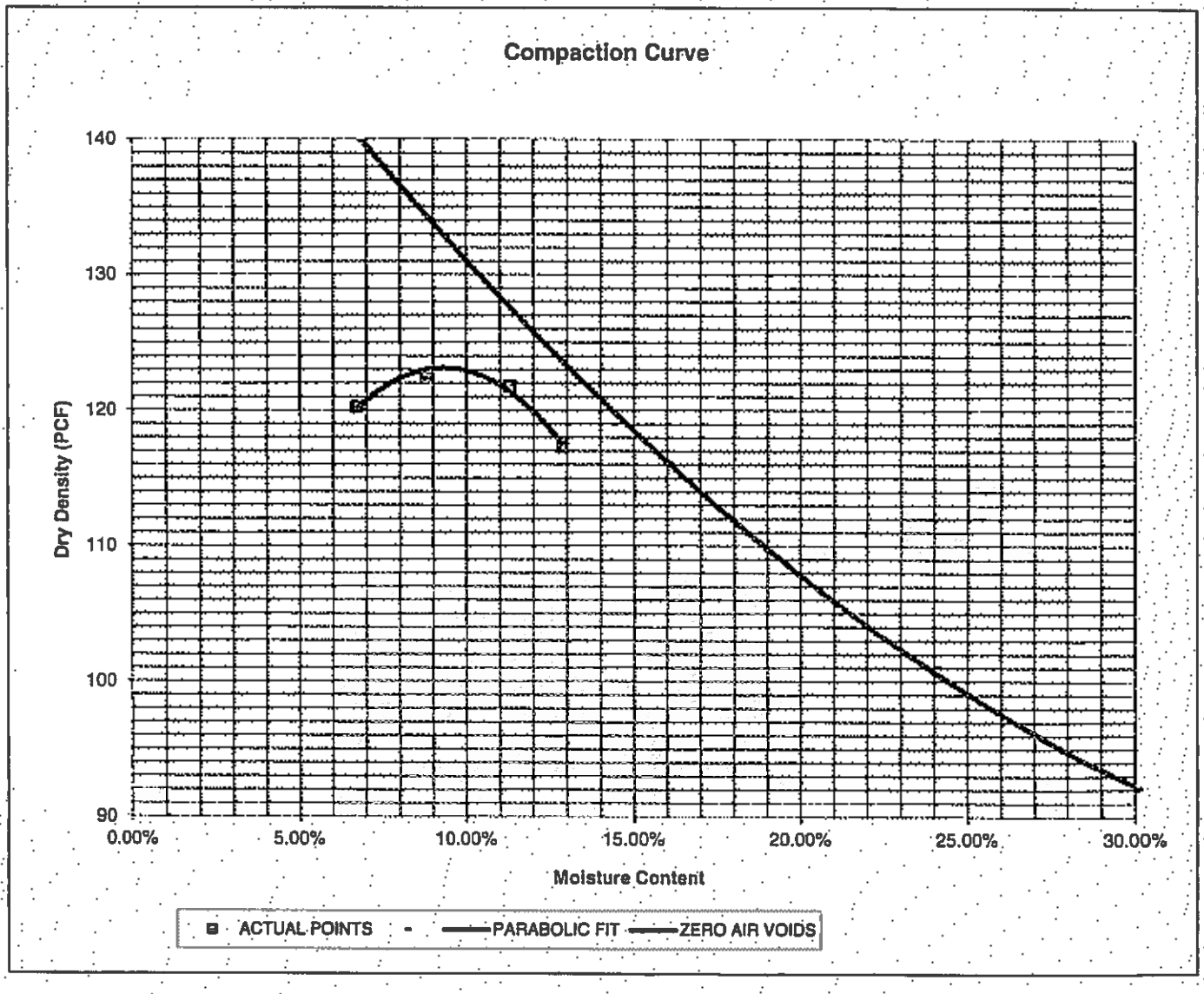
CALIFORNIA BEARING RATIO

DRAWN:	DATE:	CHECKED:	DATE:
		SLC	7/19/18

JOB NO: 171671
FIG NO: B-105

PROJECT	FLYING HORSE NORTH, F-1	CLIENT	PULPIT ROCK, LLC
SAMPLE LOCATION	TB-32 @ 0-3'	JOB NO.	171671
SOIL DESCRIPTION	FILL, SAND, CLAYEY, BROWN	DATE	01/02/18

IDENTIFICATION	SC	COMPACTION TEST #	4
TEST DESIGNATION / METHOD	ASTM D-1557-A	TEST BY	AS
MAXIMUM DRY DENSITY (PCF)	123.1	OPTIMUM MOISTURE	9.3%



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MOISTURE DENSITY RELATION

DRAWN:	DATE:	CHECKED:	DATE:
		SCC	2/19/18

JOB NO.: 171671
FIG NO.: B-106

CLIENT	PULPIT ROCK, LLC	JOB NO.	171671
PROJECT	FLYING HORSE NORTH, F-1	DATE	11/6/2017
LOCATION	FLYING HORSE NORTH, F-1	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-3	1-2	2	SC	<0.01
TB-7	1-2	2	SC	<0.01
TB-11	1-2	2	SC	0.01
TB-18	1-2	2	SC	<0.01
TB-17	1-2	1	SC	<0.01
TB-19	1-2	1	SC	0.01
TB-22	1-2	3	SC	<0.01
TB-26	1-2	3	CL	<0.01
TB-41	1-2	3	CL-ML	<0.01
TB-23	10	4	SC	<0.01
TB-36	10	4	SM	0.01

QC BLANK PASS

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LABORATORY TEST
SULFATE RESULTS

DRAWN:	DATE:	CHECKED: SCC	DATE: 2/15/18

JOB NO.: 171671
FIG NO.: B-107

APPENDIX C: Pavement Design Calculations

FLEXIBLE PAVEMENT DESIGN

DESIGN DATA — PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - RURAL LOCAL - SOIL TYPE 1

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	36,500
Hveem Stabilometer (R Value) Results:	R =	20
Standard Deviation	S_o =	0.45
Loss in Serviceability	Δpsi =	2.0
Reliability	Reliability =	75
Reliability (z-statistic)	Z_R =	-0.67
Soil Resilient Modulus	M_R =	4940

Weighted Structural Number (WSN): → WSN = 2.10

DESIGN TABLES AND EQUATIONS

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

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

$k = M_R / 19.4$

Where:

M_R = resilient modulus (psi)

S_1 = the soil support value

R = R-value obtained from the Hveem stabilometer

CBR = California Bearing Ratio

Reliability (%)	Z_R (z-statistic)
75	-0.67
80	-0.84
85	-1.04
90	-1.28
94	-1.56
95	-1.65
96	-1.75
97	-1.88
98	-2.05
99	-2.33
99.9	-3.09
99.99	-3.75

$$\log_{10}W_{18} = Z_R * S_O + 9.36*\log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32*\log_{10}M_R - 8.07$$

Left	Right	Difference
4.56	4.56	0.0

Job No. 171671
Fig. No. 1

DESIGN CALCULATIONS

DESIGN DATA PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - RURAL LOCAL - SOIL TYPE 1

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	36,500
Hveem Stabilometer (R Value) Results:	R =	20
Weighted Structural Number (WSN):	WSN =	2.10

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.11 Strength Coefficient - Aggregate Base Course

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Base Course (inches)

FOR FULL DEPTH ASPHALT SECTION (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 4.8 inches of Full Depth Asphalt
Use 5.0 inches Full Depth

FOR ASPHALT + AGGREGATE BASE COURSE SECTION

Asphalt Thickness (t) = [3.5] inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 5.1 inches of Aggregate
Base Course, use 6.0 inches

RECOMMENDED ALTERNATIVES

1. 3.5 inches of Asphalt + 6.0 inches of Aggregate Base Course, or
2. 5.0 inches of Asphalt

Job No. 171671
Fig. No. 2

DESIGN CALCULATIONS

CEMENT TREATED SECTIONS - RURAL LOCAL

DESIGN DATA: PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - RURAL LOCAL - SOIL TYPE 1

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	36,500
Hveem Stabilometer (R Value) Results:	R =	20
Weighted Structural Number (WSN):	WSN =	2.1

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.12 Strength Coefficient - Cement Treated Subgrade.

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Cement Treated Subgrade (inches)

FOR FULL DEPTH ASPHALT SECTION - (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 4.8 inches of Full Depth Asphalt
Use 5.0 inches Full Depth

FOR ASPHALT + CEMENT TREATED SUBGRADE SECTION

Asphalt Thickness (t) = 4 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 2.8 inches
Use 10.0 inches of Cement Treated Subgrade.

RECOMMENDED ALTERNATIVES

1. 4.0 inches of Asphalt + 10 inches of Cement Treated Subgrade.
2. 5.0 inches of Full Depth Asphalt

Job No. 171671
Fig. No. C-3

FLEXIBLE PAVEMENT DESIGN

DESIGN DATA — PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - RURAL LOCAL - SOIL TYPE 2

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	36,500
Hveem Stabilometer (R Value) Results:	R =	38
Standard Deviation	S_o =	0.45
Loss in Serviceability	Δpsi =	2.0
Reliability	Reliability =	75
Reliability (z-statistic)	Z_R =	-0.67
Soil Resilient Modulus	M_R =	8896

Weighted Structural Number (WSN): → WSN = 1.67

DESIGN TABLES AND EQUATIONS

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

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

$k = M_R / 19.4$

Where:

M_R = resilient modulus (psi)

S_t = the soil support value

R = R-value obtained from the Hveem stabilometer

CBR = California Bearing Ratio

Reliability (%)	Z_R (z-statistic)
75	-0.67
80	-0.84
85	-1.04
90	-1.28
94	-1.56
95	-1.65
96	-1.75
97	-1.88
98	-2.05
99	-2.33
99.9	-3.09
99.99	-3.75

$$\log_{10}W_{18} = Z_R * S_O + 9.36*\log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32*\log_{10}M_R - 8.07$$

Left	Right	Difference
4.56	4.56	0.0

Job No. 171671
Fig. No. 4

DESIGN CALCULATIONS

DESIGN DATA PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - RURAL LOCAL - SOIL TYPE 2

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	36,500
Hveem Stabilometer (R Value) Results:	R =	38
Weighted Structural Number (WSN):	WSN =	1.67

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.11 Strength Coefficient - Aggregate Base Course

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Base Course (inches)

FOR FULL DEPTH ASPHALT SECTION (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 3.8 inches of Full Depth Asphalt
Use 5.0 inches Full Depth

FOR ASPHALT + AGGREGATE BASE COURSE SECTION

Asphalt Thickness (t) = [3] inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 3.2 inches of Aggregate
Base Course, use 4.0 inches

RECOMMENDED ALTERNATIVES

1. 3.0 inches of Asphalt + 4.0 inches of Aggregate Base Course, or
2. 5.0 inches of Asphalt

Job No. 171671
Fig. No. 5

DESIGN CALCULATIONS

CEMENT TREATED SECTIONS - RURAL LOCAL

DESIGN DATA: PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - RURAL LOCAL - SOIL TYPE 2

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	36,500
Hveem Stabilometer (R Value) Results:	R =	38
Weighted Structural Number (WSN):	WSN =	1.67

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.12 Strength Coefficient - Cement Treated Subgrade.

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Cement Treated Subgrade (inches)

FOR FULL DEPTH ASPHALT SECTION - (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 3.8 inches of Full Depth Asphalt
Use 5.0 inches Full Depth

FOR ASPHALT + CEMENT TREATED SUBGRADE SECTION

Asphalt Thickness (t) = 4 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = -0.8 inches
Use 10.0 inches of Cement Treated Subgrade.

RECOMMENDED ALTERNATIVES

1. 4.0 inches of Asphalt + 10 inches of Cement Treated Subgrade.
2. 5.0 inches of Full Depth Asphalt

Job No. 171671
Fig. No. C-6

FLEXIBLE PAVEMENT DESIGN

DESIGN DATA — PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - RURAL LOCAL - SOIL TYPE 3

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	36,500
Hveem Stabilometer (R Value) Results:	R =	6
Standard Deviation	S_o =	0.45
Loss in Serviceability	Δpsi =	2.0
Reliability	Reliability =	75
Reliability (z-statistic)	Z_R =	-0.67
Soil Resilient Modulus	M_R =	3126

Weighted Structural Number (WSN): → WSN = 2.50

DESIGN TABLES AND EQUATIONS

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

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

$k = M_R / 19.4$

Where:

M_R = resilient modulus (psi)

S_1 = the soil support value

R = R-value obtained from the Hveem stabilometer

CBR = California Bearing Ratio

Reliability (%)	Z_R (z-statistic)
75	-0.67
80	-0.84
85	-1.04
90	-1.28
94	-1.56
95	-1.65
96	-1.75
97	-1.88
98	-2.05
99	-2.33
99.9	-3.09
99.99	-3.75

$$\log_{10}W_{18} = Z_R * S_O + 9.36*\log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32*\log_{10}M_R - 8.07$$

Left	Right	Difference
4.56	4.56	0.0

Job No. 171671
Fig. No. 7

DESIGN CALCULATIONS

DESIGN DATA PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - RURAL LOCAL - SOIL TYPE 3

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	36,500
Hveem Stabilometer (R Value) Results:	R =	6
Weighted Structural Number (WSN):	WSN =	2.50

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.11 Strength Coefficient - Aggregate Base Course

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Base Course (inches)

FOR FULL DEPTH ASPHALT SECTION (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 5.7 inches of Full Depth Asphalt
Use 6.0 inches Full Depth

FOR ASPHALT + AGGREGATE BASE COURSE SECTION

Asphalt Thickness (t) = [4] inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 6.7 inches of Aggregate
Base Course, use 7.0 inches

RECOMMENDED ALTERNATIVES

1. 4.0 inches of Asphalt + 7.0 inches of Aggregate Base Course, or
2. 6.0 inches of Asphalt

Job No. 171671
Fig. No. 8

DESIGN CALCULATIONS

CEMENT TREATED SECTIONS - RURAL LOCAL

DESIGN DATA: PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - RURAL LOCAL - SOIL TYPE 3

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	36,500
Hveem Stabilometer (R Value) Results:	R =	6
Weighted Structural Number (WSN):	WSN =	2.5

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.12 Strength Coefficient - Cement Treated Subgrade.

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Cement Treated Subgrade (inches)

FOR FULL DEPTH ASPHALT SECTION - (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 5.7 inches of Full Depth Asphalt
Use 6.0 inches Full Depth

FOR ASPHALT + CEMENT TREATED SUBGRADE SECTION

Asphalt Thickness (t) = 4 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 6.2 inches
Use 10.0 inches of Cement Treated Subgrade.

RECOMMENDED ALTERNATIVES

1. 3.0 inches of Asphalt + 10 inches of Cement Treated Subgrade.
2. 6.0 inches of Full Depth Asphalt

Job No. 171671
Fig. No. C-9

FLEXIBLE PAVEMENT DESIGN

STANDARD SECTIONS - RURAL MINOR COLLECTOR

DESIGN DATA — PULPIT ROCK, LLC

FLYING HORSE NORTH, FILING 1 - SOIL TYPE 1

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	109,500
Hveem Stabilometer (R Value) Results:	R =	20
Standard Deviation	S_o =	0.45
Loss in Serviceability	Δpsi =	2.5
Reliability	Reliability =	80
Reliability (z-statistic)	Z_R =	-0.84
Soil Resilient Modulus	M_R =	4940

Weighted Structural Number (WSN): ⟶ WSN = 2.53

DESIGN TABLES AND EQUATIONS

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

$M_R = 10^{\{(S_1 + 18.72) / 6.24\}}$

$\mathbf{M_R = 2555 * CBR^{0.64}}$

$k = M_R / 19.4$

Where:

M_R = resilient modulus (psi)

S_1 = the soil support value

R = R-value obtained from the Hveem stabilometer

CBR = California Bearing Ratio

Reliability (%)	Z_R (z-statistic)
80	-0.84
85	-1.04
90	-1.28
93	-1.48
94	-1.56
95	-1.65
96	-1.75
97	-1.88
98	-2.05
99	-2.33
99.9	-3.09
99.99	-3.75

$$\log_{10}W_{18} = Z_R * S_O + 9.36 * \log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 * \log_{10}M_R - 8.07$$

Left	Right	Difference
5.04	5.03	0.0

Job No. 171671

Fig. No. C-10

DESIGN CALCULATIONS

STANDARD SECTIONS - RURAL MINOR COLLECTOR

DESIGN DATA PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 1

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	109,500
Hveem Stabilometer (R Value) Results:	R =	20
Weighted Structural Number (WSN):	WSN =	2.53

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.11 Strength Coefficient - Aggregate Base Course

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Base Course (inches)

FOR FULL DEPTH ASPHALT SECTION

$D_1 = (WSN)/C_1$ = 5.7 inches of Full Depth Asphalt
Use 6.0 inches Full Depth

FOR ASPHALT + AGGREGATE BASE COURSE SECTION

Asphalt Thickness (t) = 4 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 7.0 inches of Aggregate
Base Course, use 7.0 inches

Asphalt Thickness (t) = 4.5 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 5.0 inches of Aggregate
Base Course, use 6.0 inches

RECOMMENDED ALTERNATIVES

1. 4.0 inches of Asphalt + 7.0 inches of Aggregate Base Course, or
2. 4.5 inches of Asphalt + 6.0 inches of Aggregate Base Course, or
3. 6.0 inches of Asphalt

Job No. 171671
Fig. No. C-11

DESIGN CALCULATIONS

CEMENT TREATED SECTIONS - RURAL MINOR COLLECTOR

DESIGN DATA: PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 1

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	109,500
Hveem Stabilometer (R Value) Results:	R =	20
Weighted Structural Number (WSN):	WSN =	2.53

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.12 Strength Coefficient - Cement Treated Subgrade.

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Cement Treated Subgrade (inches)

FOR FULL DEPTH ASPHALT SECTION - (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 5.8 inches of Full Depth Asphalt
Use 6.0 inches Full Depth

FOR ASPHALT + CEMENT TREATED SUBGRADE SECTION

Asphalt Thickness (t) = 4 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 6.4 inches
Use 10.0 inches of Cement Treated Subgrade.

RECOMMENDED ALTERNATIVES

1. 4.0 inches of Asphalt + 10 inches of Cement Treated Subgrade.
2. 6.0 inches of Full Depth Asphalt

Job No. 171671
Fig. No. C-12

FLEXIBLE PAVEMENT DESIGN

STANDARD SECTIONS - RURAL MINOR COLLECTOR

DESIGN DATA — PULPIT ROCK, LLC

FLYING HORSE NORTH, FILING 1 - SOIL TYPE 2

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	109,500
Hveem Stabilometer (R Value) Results:	R =	38
Standard Deviation	S_o =	0.45
Loss in Serviceability	Δpsi =	2.5
Reliability	Reliability =	80
Reliability (z-statistic)	Z_R =	-0.84
Soil Resilient Modulus	M_R =	8896

Weighted Structural Number (WSN): → WSN = 2.05

DESIGN TABLES AND EQUATIONS

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

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

$M_R = 2555 * CBR^{0.64}$

$k = M_R / 19.4$

Where:

M_R = resilient modulus (psi)

S_1 = the soil support value

R = R-value obtained from the Hveem stabilometer

CBR = California Bearing Ratio

Reliability (%)	Z_R (z-statistic)
80	-0.84
85	-1.04
90	-1.28
93	-1.48
94	-1.56
95	-1.65
96	-1.75
97	-1.88
98	-2.05
99	-2.33
99.9	-3.09
99.99	-3.75

$$\log_{10}W_{18} = Z_R * S_O + 9.36 * \log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 * \log_{10}M_R - 8.07$$

Left	Right	Difference
5.04	5.04	0.0

Job No. 171671

Fig. No. C-13

DESIGN CALCULATIONS

STANDARD SECTIONS - RURAL MINOR COLLECTOR

DESIGN DATA PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 2

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	109,500
Hveem Stabilometer (R Value) Results:	R =	38
Weighted Structural Number (WSN):	WSN =	2.05

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.11 Strength Coefficient - Aggregate Base Course

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Base Course (inches)

FOR FULL DEPTH ASPHALT SECTION

$D_1 = (WSN)/C_1$ = 4.7 inches of Full Depth Asphalt
Use 5.0 inches Full Depth

FOR ASPHALT + AGGREGATE BASE COURSE SECTION

Asphalt Thickness (t) = 3 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 6.6 inches of Aggregate
Base Course, use 7.0 inches

Asphalt Thickness (t) = 3.5 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 4.6 inches of Aggregate
Base Course, use 6.0 inches

RECOMMENDED ALTERNATIVES

1. 3.0 inches of Asphalt + 7.0 inches of Aggregate Base Course, or
2. 3.5 inches of Asphalt + 6.0 inches of Aggregate Base Course, or
3. 5.0 inches of Asphalt

Job No. 171671
Fig. No. C-14

DESIGN CALCULATIONS

CEMENT TREATED SECTIONS - RURAL MINOR COLLECTOR

DESIGN DATA: PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 2

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	109,500
Hveem Stabilometer (R Value) Results:	R =	38
Weighted Structural Number (WSN):	WSN =	2.05

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.12 Strength Coefficient - Cement Treated Subgrade.

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Cement Treated Subgrade (inches)

FOR FULL DEPTH ASPHALT SECTION - (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 4.7 inches of Full Depth Asphalt
Use 5.0 inches Full Depth

FOR ASPHALT + CEMENT TREATED SUBGRADE SECTION

Asphalt Thickness (t) = 4 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 2.4 inches
Use 10.0 inches of Cement Treated Subgrade.

RECOMMENDED ALTERNATIVES

1. 4.0 inches of Asphalt + 10 inches of Cement Treated Subgrade.
2. 5.0 inches of Full Depth Asphalt

Job No. 171671
Fig. No. C-15

FLEXIBLE PAVEMENT DESIGN

STANDARD SECTIONS - RURAL MINOR COLLECTOR

DESIGN DATA — PULPIT ROCK, LLC

FLYING HORSE NORTH, FILING 1 - SOIL TYPE 3

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	109,500
Hveem Stabilometer (R Value) Results:	R =	6
Standard Deviation	S_o =	0.45
Loss in Serviceability	Δpsi =	2.5
Reliability	Reliability =	80
Reliability (z-statistic)	Z_R =	-0.84
Soil Resilient Modulus	M_R =	3126

Weighted Structural Number (WSN): ⟶ WSN = 2.96

DESIGN TABLES AND EQUATIONS

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

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

$\mathbf{M_R = 2555 * CBR^{0.64}}$

$k = M_R / 19.4$

Where:

M_R = resilient modulus (psi)

S_1 = the soil support value

R = R-value obtained from the Hveem stabilometer

CBR = California Bearing Ratio

Reliability (%)	Z_R (z-statistic)
80	-0.84
85	-1.04
90	-1.28
93	-1.48
94	-1.56
95	-1.65
96	-1.75
97	-1.88
98	-2.05
99	-2.33
99.9	-3.09
99.99	-3.75

$$\log_{10}W_{18} = Z_R * S_O + 9.36 * \log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 * \log_{10}M_R - 8.07$$

Left	Right	Difference
5.04	5.03	0.0

Job No. 171671

Fig. No. C-16

DESIGN CALCULATIONS

STANDARD SECTIONS - RURAL MINOR COLLECTOR

DESIGN DATA PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 3

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	109,500
Hveem Stabilometer (R Value) Results:	R =	6
Weighted Structural Number (WSN):	WSN =	2.96

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.11 Strength Coefficient - Aggregate Base Course

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Base Course (inches)

FOR FULL DEPTH ASPHALT SECTION

$D_1 = (WSN)/C_1$ = 6.7 inches of Full Depth Asphalt
Use 7.0 inches Full Depth

FOR ASPHALT + AGGREGATE BASE COURSE SECTION

Asphalt Thickness (t) = 4.5 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 8.9 inches of Aggregate
Base Course, use 9.0 inches

Asphalt Thickness (t) = 5 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 6.9 inches of Aggregate
Base Course, use 7.0 inches

RECOMMENDED ALTERNATIVES

1. 4.5 inches of Asphalt + 9.0 inches of Aggregate Base Course, or
2. 5.0 inches of Asphalt + 7.0 inches of Aggregate Base Course, or
3. 7.0 inches of Asphalt

Job No. 171671
Fig. No. C-17

DESIGN CALCULATIONS

CEMENT TREATED SECTIONS - RURAL MINOR COLLECTOR

DESIGN DATA: PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 3

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	109,500
Hveem Stabilometer (R Value) Results:	R =	6
Weighted Structural Number (WSN):	WSN =	2.96

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.12 Strength Coefficient - Cement Treated Subgrade.

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Cement Treated Subgrade (inches)

FOR FULL DEPTH ASPHALT SECTION - (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 6.7 inches of Full Depth Asphalt
Use 7.0 inches Full Depth

FOR ASPHALT + CEMENT TREATED SUBGRADE SECTION

Asphalt Thickness (t) = 4 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 10.0 inches
Use 10.0 inches of Cement Treated Subgrade.

RECOMMENDED ALTERNATIVES

1. 4.0 inches of Asphalt + 10 inches of Cement Treated Subgrade.
2. 7.0 inches of Full Depth Asphalt

Job No. 171671
Fig. No. C-18

FLEXIBLE PAVEMENT DESIGN

STANDARD SECTIONS - RURAL MAJOR COLLECTOR

DESIGN DATA — PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 1

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	273,750
Hveem Stabilometer (R Value) Results:	R =	20
Standard Deviation	S_o =	0.45
Loss in Serviceability	Δpsi =	2.5
Reliability	Reliability =	80
Reliability (z-statistic)	Z_R =	-0.84
Soil Resilient Modulus	M_R =	4940

Weighted Structural Number (WSN): ⟶ WSN = 2.91

DESIGN TABLES AND EQUATIONS

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

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

$M_R = 2555 * CBR^{0.64}$

$k = M_R / 19.4$

Where:

M_R = resilient modulus (psi)

S_1 = the soil support value

R = R-value obtained from the Hveem stabilometer

CBR = California Bearing Ratio

Reliability (%)	Z_R (z-statistic)
80	-0.84
85	-1.04
90	-1.28
93	-1.48
94	-1.56
95	-1.65
96	-1.75
97	-1.88
98	-2.05
99	-2.33
99.9	-3.09
99.99	-3.75

$$\log_{10}W_{18} = Z_R * S_O + 9.36 * \log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 * \log_{10}M_R - 8.07$$

Left	Right	Difference
5.44	5.44	0.0

Job No. 171671
Fig. No. C-19

DESIGN CALCULATIONS

STANDARD SECTIONS - RURAL MAJOR COLLECTOR

DESIGN DATA PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 1

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	273,750
Hveem Stabilometer (R Value) Results:	R =	20
Weighted Structural Number (WSN):	WSN =	2.91

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.11 Strength Coefficient - Aggregate Base Course

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Base Course (inches)

FOR FULL DEPTH ASPHALT SECTION

$D_1 = (WSN)/C_1$ = 6.6 inches of Full Depth Asphalt
Use 7.0 inches Full Depth

FOR ASPHALT + AGGREGATE BASE COURSE SECTION

Asphalt Thickness (t) = 4.5 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 8.4 inches of Aggregate
Base Course, use 8.5 inches

RECOMMENDED ALTERNATIVES

1. 4.5 inches of Asphalt + 8.5 inches of Aggregate Base Course, or
3. 7.0 inches of Asphalt

Job No. 171671
Fig. No. C-20

DESIGN CALCULATIONS

CEMENT TREATED SECTIONS - RURAL MAJOR COLLECTOR

DESIGN DATA: PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 1

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	273,750
Hveem Stabilometer (R Value) Results:	R =	20
Weighted Structural Number (WSN):	WSN =	2.91

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.12 Strength Coefficient - Cement Treated Subgrade.

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Cement Treated Subgrade (inches)

FOR FULL DEPTH ASPHALT SECTION - (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 6.6 inches of Full Depth Asphalt
Use 7.0 inches Full Depth

FOR ASPHALT + CEMENT TREATED SUBGRADE SECTION

Asphalt Thickness (t) = 4 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 9.6 inches
Use 10.0 inches of Cement Treated Subgrade.

RECOMMENDED ALTERNATIVES

1. 4.0 inches of Asphalt + 10 inches of Cement Treated Subgrade.
2. 7.0 inches of Full Depth Asphalt

Job No. 171671
Fig. No. C-21

FLEXIBLE PAVEMENT DESIGN

STANDARD SECTIONS - RURAL MAJOR COLLECTOR

DESIGN DATA — PULPIT ROCK, LLC

FLYING HORSE NORTH, FILING 1 - SOIL TYPE 2

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	273,750
Hveem Stabilometer (R Value) Results:	R =	38
Standard Deviation	S_o =	0.45
Loss in Serviceability	Δpsi =	2.5
Reliability	Reliability =	80
Reliability (z-statistic)	Z_R =	-0.84
Soil Resilient Modulus	M_R =	8896

Weighted Structural Number (WSN): → WSN = 2.37

DESIGN TABLES AND EQUATIONS

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

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

$M_R = 2555 * CBR^{0.64}$

$k = M_R / 19.4$

Where:

M_R = resilient modulus (psi)

S_1 = the soil support value

R = R-value obtained from the Hveem stabilometer

CBR = California Bearing Ratio

Reliability (%)	Z_R (z-statistic)
80	-0.84
85	-1.04
90	-1.28
93	-1.48
94	-1.56
95	-1.65
96	-1.75
97	-1.88
98	-2.05
99	-2.33
99.9	-3.09
99.99	-3.75

$$\log_{10}W_{18} = Z_R * S_O + 9.36 * \log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 * \log_{10}M_R - 8.07$$

Left	Right	Difference
5.44	5.44	0.0

Job No. 171671

Fig. No. C-22

DESIGN CALCULATIONS

STANDARD SECTIONS - RURAL MAJOR COLLECTOR

DESIGN DATA PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 2

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	273,750
Hveem Stabilometer (R Value) Results:	R =	38
Weighted Structural Number (WSN):	WSN =	2.37

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.11 Strength Coefficient - Aggregate Base Course

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Base Course (inches)

FOR FULL DEPTH ASPHALT SECTION

$D_1 = (WSN)/C_1$ = 5.4 inches of Full Depth Asphalt
Use 5.5 inches Full Depth

FOR ASPHALT + AGGREGATE BASE COURSE SECTION

Asphalt Thickness (t) = 3.5 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 7.5 inches of Aggregate
Base Course, use 8.0 inches

RECOMMENDED ALTERNATIVES

1. 3.5 inches of Asphalt + 8.0 inches of Aggregate Base Course, or
2. 5.5 inches of Asphalt

Job No. 171671
Fig. No. C-23

DESIGN CALCULATIONS

CEMENT TREATED SECTIONS - RURAL MAJOR COLLECTOR

DESIGN DATA: PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 2

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	273,750
Hveem Stabilometer (R Value) Results:	R =	38
Weighted Structural Number (WSN):	WSN =	2.37

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.12 Strength Coefficient - Cement Treated Subgrade.

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Cement Treated Subgrade (inches)

FOR FULL DEPTH ASPHALT SECTION - (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 5.4 inches of Full Depth Asphalt
Use 5.5 inches Full Depth

FOR ASPHALT + CEMENT TREATED SUBGRADE SECTION

Asphalt Thickness (t) = 4 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 5.1 inches
Use 10.0 inches of Cement Treated Subgrade.

RECOMMENDED ALTERNATIVES

1. 4.0 inches of Asphalt + 10 inches of Cement Treated Subgrade.
2. 5.5 inches of Full Depth Asphalt

Job No. 171671
Fig. No. C-24

FLEXIBLE PAVEMENT DESIGN

STANDARD SECTIONS - RURAL MAJOR COLLECTOR

DESIGN DATA — PULPIT ROCK, LLC

FLYING HORSE NORTH, FILING 1 - SOIL TYPE 3

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL (W_{18}) =	273,750
Hveem Stabilometer (R Value) Results:	R =	6
Standard Deviation	S_o =	0.45
Loss in Serviceability	Δpsi =	2.5
Reliability	Reliability =	80
Reliability (z-statistic)	Z_R =	-0.84
Soil Resilient Modulus	M_R =	3126

Weighted Structural Number (WSN): ⟶ WSN = 3.39

DESIGN TABLES AND EQUATIONS

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

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

$M_R = 2555 * CBR^{0.64}$

$k = M_R / 19.4$

Where:

M_R = resilient modulus (psi)

S_1 = the soil support value

R = R-value obtained from the Hveem stabilometer

CBR = California Bearing Ratio

Reliability (%)	Z_R (z-statistic)
80	-0.84
85	-1.04
90	-1.28
93	-1.48
94	-1.56
95	-1.65
96	-1.75
97	-1.88
98	-2.05
99	-2.33
99.9	-3.09
99.99	-3.75

$$\log_{10}W_{18} = Z_R * S_O + 9.36*\log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32*\log_{10}M_R - 8.07$$

Left	Right	Difference
5.44	5.44	0.0

Job No. 171671

Fig. No. C-25

DESIGN CALCULATIONS

STANDARD SECTIONS - RURAL MAJOR COLLECTOR

DESIGN DATA PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 3

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	273,750
Hveem Stabilometer (R Value) Results:	R =	6
Weighted Structural Number (WSN):	WSN =	3.39

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.11 Strength Coefficient - Aggregate Base Course

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Base Course (inches)

FOR FULL DEPTH ASPHALT SECTION

$D_1 = (WSN)/C_1$ = 7.7 inches of Full Depth Asphalt
Use 8.0 inches Full Depth

FOR ASPHALT + AGGREGATE BASE COURSE SECTION

Asphalt Thickness (t) = 5 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 10.8 inches of Aggregate
Base Course, use 11.0 inches

Asphalt Thickness (t) = 5.5 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 8.8 inches of Aggregate
Base Course, use 9.0 inches

RECOMMENDED ALTERNATIVES

1. 5.0 inches of Asphalt + 11.0 inches of Aggregate Base Course, or
2. 5.5 inches of Asphalt + 9.0 inches of Aggregate Base Course, or
3. 8.0 inches of Asphalt

Job No. 171671
Fig. No. C-26

DESIGN CALCULATIONS

CEMENT TREATED SECTIONS - RURAL MAJOR COLLECTOR

DESIGN DATA: PULPIT ROCK, LLC
FLYING HORSE NORTH, FILING 1 - SOIL TYPE 3

Equivalent (18 kip) Single Axle Load Applications (ESAL):	ESAL =	273,750
Hveem Stabilometer (R Value) Results:	R =	6
Weighted Structural Number (WSN):	WSN =	3.39

DESIGN EQUATION

$$WSN = C_1D_1 + C_2D_2$$

C_1 = 0.44 Strength Coefficient - Hot Bituminous Asphalt
C_2 = 0.12 Strength Coefficient - Cement Treated Subgrade.

D_1 = Depth of Asphalt (inches)
D_2 = Depth of Cement Treated Subgrade (inches)

FOR FULL DEPTH ASPHALT SECTION - (CURRENTLY NOT ALLOWED)

$D_1 = (WSN)/C_1$ = 7.7 inches of Full Depth Asphalt
Use 8.0 inches Full Depth

FOR ASPHALT + CEMENT TREATED SUBGRADE SECTION

Asphalt Thickness (t) = 5 inches
$D_2 = ((WSN) - (t)(C_1))/C_2$ = 9.9 inches
Use 10.0 inches of Cement Treated Subgrade.

RECOMMENDED ALTERNATIVES

1. 5.0 inches of Asphalt + 10 inches of Cement Treated Subgrade.
2. 8.0 inches of Full Depth Asphalt

Job No. 171671
Fig. No. C-27

APPENDIX D: Flying Horse North Traffic Study by LSC Transportation Consultants, Inc., dated July 21, 2016, Job No. 164050

LSC TRANSPORTATION CONSULTANTS, INC.
545 East Pikes Peak Ave., Suite 210
Colorado Springs, CO 80903
(719) 633-2868
FAX (719) 633-5430
E-mail: lsc@lsctrans.com
Website: http://www.lsctrans.com

Flying Horse North
Updated Traffic Impact Analysis
(LSC #164050)

July 21, 2016

Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.

Jeffrey C. Hodsdon, P.E. #31684

COLORADO LICENSED
JEFFREY C. HODSDON
31684
PROFESSIONAL ENGINEER

Date 7/21/16

Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

Drew Ballick
PRI #2, LLC
6385 Corporate Drive
Colorado Springs, CO 80919

Date 7-21-16

LSC TRANSPORTATION CONSULTANTS, INC.
545 East Pikes Peak Avenue, Suite 210
Colorado Springs, CO 80903
(719) 633-2868
FAX (719) 633-5430
E-mail: lsc@lscts.com
Website: http://www.lsctrans.com

July 21, 2016

Mr. Drew Balsick
PRI #2, LLC
6385 Corporate Drive
Colorado Springs, CO 80919

RE: Flying Horse North
El Paso County, Colorado
Updated Traffic Impact Analysis
LSC #164050

Dear Drew:

LSC Transportation Consultants, Inc. has prepared this updated traffic impact study for the proposed Flying Horse North at Shamrock Ranch development. As shown in Figure 1, the site is located generally south of Hodgen Road and west of Black Forest Road in El Paso County, Colorado.

LAND USE AND ACCESS

The Flying Horse North at Shamrock Ranch site is located south of Hodgen Road and west of Black Forest Road. A narrow portion of the site extends west to State Highway 83/Stagecoach Road. At buildout, the site is planned to contain 283 single-family homes and an 18-hole golf course. The site plan is shown in Figure 2a.

Access

Access is proposed via a new east/west road (Stagecoach Road) that would extend from SH 83 at an existing full-movement access for the Westcott Fire Station No. 2, which aligns with Stagecoach Road, to Black Forest Road aligning with the north intersection of Terra Ridge Circle. Access would also be provided via an extension of Holmes Road into the site.

Additionally, full-movement access is proposed to Hodgen Road about 1,340 feet west of Black Forest Road. Three full-movement access points are proposed to Black Forest Road aligning with Monty Place, aligning with Alpaca Heights, and about 725 feet south of Black Forest/Terra Ridge Circle (south). Per the *El Paso County Engineering Criteria Manual (ECM)* the minimum intersection spacing on both Hodgen Road and Black Forest Road is 1,320 feet. The south access point to Black Forest Road will require a deviation to this criteria.

Phasing

The project would be completed in phases. The phasing plan is shown in Figure 2b. Stagecoach Road is initially planned to be built east from SH 83 about two miles to serve Phase 1 and west from Black Forest Road about 1,600 feet to serve Phase 2. An emergency road will be constructed between these two sections. Stagecoach Road will be improved adjacent to Phase 3 with that phase and completed with Phase 4.

The extension of Holmes Road north through the site to Stagecoach Road is not planned until Phase 9. The proposed south full-movement access to Black Forest Road is not planned until Phase 11. The proposed full-movement site access to Hodgen Road is not planned until Phase 12. The proposed full-movement access points to Black Forest Road aligning with Alpaca Heights and Monty Place are not planned until Phase 13.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

The area roadways in the site's vicinity are shown on Figure 1 and are described below.

- **Hodgen Road** is a two-lane paved Rural Minor Arterial road that extends east from the intersection of Roller Coaster Road/Baptist Road to Eastonville Road. The speed limit on Hodgen Road is generally 55 miles per hour (mph) east of SH 83.

- **State Highway (SH) 83** extends from Colorado Springs north to Parker and areas of southeast Denver. In the vicinity of the site, SH 83 is classified as a Regional Highway (R-A). At this location, SH 83 is a two-lane rural highway with two- to four-foot shoulders and a speed limit of 55 miles per hour (mph). The intersection with Hodgen Road is signalized.

- **Shoup Road** is a two-lane, paved Rural Minor Arterial road that extends east from SH 85 Highway (US) 83 to just east of Vollmer Road. The posted speed limit on Shoup Road is 45 mph.

- **Black Forest Road** is a two-lane, paved Rural Minor Arterial road that extends north from Woodmen Road to County Line Road. Black Forest Road is offset about one-quarter mile to the east at Hodgen Road. In the vicinity of the site the posted speed limit on Black Forest Road is 45 mph.

- **Holmes Road** is a rural local paved two-lane road that extends north from Shoup Road to just north of Vessey Road. Holmes Road is planned to be extended north into the site as part of this development. The posted speed limit on Homes Road is 30 mph.

- **Vessey Road** is a rural local paved two-lane road that extends east from the Catherdral Pines development to Black Forest Road.

Existing Traffic Conditions

Figure 3 shows the existing traffic volumes at the intersection of SH 83/Stagecoach based on traffic counts conducted by LSC in January 2016 and at the intersection of Hodgen/Black Forest (west) based on traffic counts conducted by LSC in December 2014. The traffic counts at Hodgen/Black Forest have not been recounted in 2016 due to the closure of Black Forest Road at Kettle Creek. The traffic count reports are attached. Figure 3 also shows CDOT annual average daily traffic volumes and LSC estimates of average daily traffic on County roads.

Existing Level of Service

Level of service (LOS) is a quantitative measure of the level of delay at an intersection. Level of service is indicated on a scale from "A" to "F." LOS A represents control delay of less than 10 seconds for unsignalized and signalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections and more than 80 seconds for signalized intersections. Table 1 shows the level of service delay ranges.

Table 1
Intersection Levels of Service Delay Ranges

Level of Service	Signalized Intersections	Unsignalized Intersections
	Control Delay (seconds per vehicle)	
A	10 sec or less	10 sec or less
B	10-20 sec	10-15 sec
C	20-35 sec	15-25 sec
D	35-55 sec	25-35 sec
E	55-80 sec	35-50 sec
F	80 sec or more	50 sec or more

The intersections of SH 83/Stagecoach and Hodgen/Black Forest (west) were analyzed to determine the existing levels of service during the peak hours based on the unsignalized method of analysis procedures outlined in the *Highway Capacity Manual, 2010 Edition* by the Transportation Research Board. The results of the level of service analysis are shown in Figure 2. The level of service reports are attached.

As shown on Figure 3, all movements at the intersections of SH 83/Stagecoach and Hodgen/Black Forest (west) are currently operating at level of service C or better during the peak hours.

BACKGROUND TRAFFIC

Background traffic is the traffic estimated for the existing and planned future roadways in the study area. These include the new roadways planned for Flying Horse North including Stagecoach Road

between SH 83 and Black Forest Road (completed with Phase 4) and the Holmes Road extension north to Stagecoach Road (not until Phase 9). Although background traffic estimates include the new on-site roadways, they do not include traffic to be generated by the site land uses (283 single-family homes and the golf course). Background traffic has been presented in this manner to clearly show estimates of non-site traffic volumes on the new roadway connections through this proposed development. Most of the traffic using the on-site roads—Stagecoach and Holmes north of its current terminus—represents a shift of local traffic volume from other current travel routes with the new routes through the Flying Horse North site. LSC does not anticipate use of the new on-site road connections by non-local-area traffic/through traffic.

Short Term

Flying Horse North is projected to plat about 10 to 20 lots per year. Based on this rate of development Phases One through Six are estimated to be built out between six and fourteen years, therefore a short-term horizon of 10 years was selected for the traffic analysis. Figure 4 shows the short-term (year 2026) background traffic volumes on the area roadway segments and at the intersections in the vicinity of the site. The short-term background traffic volumes assume Stagecoach Road built east from SH 83 about two miles to serve Phase 1 and west from Black Forest Road about 1,600 feet to serve Phase 2 only with a gravel pilot road/ungated emergency road between these two sections. The short-term background volumes also assume Holmes Road has not been extended north to Stagecoach Road. The background traffic volumes on SH 83 are estimates by LSC based on the Colorado Department of Transportation (CDOT) twenty-year growth factors for the section of SH 83 adjacent to the site. The background traffic volumes on Hodgen Road and Black Forest Road assume a growth rate of two percent per year. The short-term background traffic volumes on Hodgen Road and Black Forest assume the existing alignment of Black Forest Road at Hodgen Road.

Long Term

Figure 5 shows the 2040 background traffic volumes on the roadway segments and the intersections in the study area. The 2040 background traffic volumes assume completion of Stagecoach Road from SH 83 to Black Forest Road and the extension of Holmes Road north to Stagecoach Road. The background traffic volumes on SH 83 are estimates by LSC based on the Colorado Department of Transportation (CDOT) twenty-year growth factors for the section of SH 83 adjacent to the site. The background traffic volumes on Hodgen Road and Black Forest Road assume a growth rate of two percent per year. The 2040 background traffic volumes on Hodgen Road and Black Forest assume the existing alignment of Black Forest Road at Hodgen Road.

Level of Service Analysis

Figures 4 and 5 also present the results of the background traffic level of service analysis. The figures indicate LSC assumptions for the background condition, intersection traffic control, and lane geometry.

TRIP GENERATION

The site-generated vehicle-trips were estimated using the nationally published trip generation rates from *Trip Generation, 9th Edition, 2012* by the Institute of Transportation Engineers (ITE). Table 2 shows the site's average weekday, morning peak-hour, and afternoon peak-hour trip generation estimates for Phases 1 and 2, Phases 1 through 6, and at buildout.

At buildout, the Flying Horse North at Shamrock Ranch site could be expected to generate about 3,337 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, which typically occurs for one hour between 6:30 and 8:30 a.m., about 82 vehicles would enter and 167 vehicles would exit the site. During the afternoon peak hour, which typically occurs for one hour between 4:30 and 6:30 p.m., about 205 vehicles would enter and 130 vehicles would exit the site.

DIRECTIONAL DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated trips on the area roadway network is an important factor in determining the site's traffic impacts. Figure 6 shows directional distribution estimates for the site-generated trips. The estimates have been based on the following factors: the site's land uses, the roadway network and access connections, and the site's location with respect to the nearby employment, commercial centers, other residential areas, and the balance of the Colorado Springs metropolitan area.

When the distribution percentages in Figure 6 are applied to the trip generation estimates shown in Table 2, the site-generated traffic volumes on the area roadways can be determined. The site-generated traffic volumes are shown in Figures 7, 8, 9a, and 9b. The figures also show average weekday traffic volumes on the internal and off-site roadways.

Figure 7 shows the Phase 1 and Phase 2 site-generated traffic volumes. The Phase 1 and Phase 2 site-generated traffic volume estimates assume Stagecoach Road built east from SH 83 about two miles to serve Phase 1 and west from Black Forest Road about 1,600 feet to serve Phase 2 with a gravel pilot road/ungated emergency road between these two sections. No traffic was estimated to use the gravel pilot road. These volumes assume no direct access to Hodgen Road and access to Black Forest Road via Stagecoach Road only. Figure 8 shows the site-generated traffic volumes through Phase 6 (including the golf course). The Phase 1 to Phase 6 site-generated traffic volume estimates assume Stagecoach Road has been completed between SH 83 and Black Forest Road but assumes Holmes Road has not been extended north through the site to Stagecoach Road. These volumes also assume no direct access to Hodgen Road or access to Black Forest Road via Stagecoach Road only.

Figure 9a shows the buildout site-generated traffic volumes at all of the proposed site access points and at the adjacent intersections. Figure 9b shows the buildout site-generated traffic volumes at three off-site intersections: Black Forest Road/Vessey Road, Vessey Road/Holmes Road, and Shoup Road/Holmes Road. The buildout site-generated traffic volumes assume Stagecoach Road has been extended from SH 83 to Black Forest Road and Holmes Road has been extended north through the

site to Stagecoach Road. These volumes also assume the full-movement access to Hodgen Road and the three full-movement access points to Black Forest Road are all constructed and open.

EXISTING PLUS PHASE 1 AND 2 SITE-GENERATED TRAFFIC

Figure 10 shows the sum of the existing traffic volumes from Figure 3 plus the Phase 1 and Phase 2 site-generated traffic volumes from Figure 7. These volumes represent the short-term Phase 1 and Phase 2-only impacts of this development.

SHORT-TERM TOTAL TRAFFIC

Figure 11 shows the short-term total traffic volumes at the intersections in the vicinity of the site assuming buildout of Phases 1 through 6 of the Flying Horse North at Shamrock Ranch and the golf course (assumed to occur during Phase 3). These volumes are the sum of the short-term background traffic volumes from Figure 4 plus the Phase 1 through Phase 6 site-generated traffic volumes from Figure 8.

2040 TOTAL TRAFFIC

Figure 12 shows the 2040 total traffic volumes at the intersection in the vicinity of the site. These volumes are the sum of the 2040 background volumes from Figure 5 plus the buildout site-generated traffic volumes from Figure 9a.

PROJECTED LEVEL OF SERVICE

The intersections in the vicinity of the site have been analyzed to determine the projected level of service based on the unsignalized method of analysis procedures outlined in the *Highway Capacity Manual, 2010 Edition* by the Transportation Research Board.

The intersections of Hogden/Black Forest, the full-movement site access to Hodgen Road, and both full-movement access points to Black Forest Road are all projected to operate at level of service C or better during the peak hours for all movements as Stop-sign-controlled intersections based on the projected existing plus Phase 1 and Phase 2 site-generated, short-term total, and 2040 total traffic volumes.

All movements at the Stop-sign-controlled intersection of SH 83/Stagecoach are projected to operate at level of service C or better during the peak hours based on the existing plus Phase 1 and Phase 2 site-generated traffic. Prior to completion of Phase 6 a southbound left-turn acceleration lane will be required on SH 83 at Stagecoach Road. A simulation was performed using Synchro/SimTraffic to determine the impact of this lane. The simulation was run five times and the results averaged. The average delay for each movement was then compared to the delay showed in Table 1 to determine the projected level of service. The 2040 analysis indicates the westbound approach left-turn movement at this intersection is projected to operate at LOS E during the afternoon peak hour. It is unlikely a traffic signal warrant will be met based on the projected traffic volumes and assuming the intersection laneage shown in Figure 12.

TRAFFIC SIGNAL WARRANT ANALYSIS

The intersection of SH 83/Stagecoach was analyzed to determine if a Four-Hour Vehicular Volume Traffic Signal Warrant would be met or close to being met based on the projected 2040 total traffic volumes and lane geometry. As shown in Figure 13 this intersection is not projected to meet the thresholds for a Four-Hour Vehicular Volume Traffic Signal Warrant during the morning and afternoon peak hours based on the short-term scenario.

AVERAGE DAILY TRAFFIC IMPACTS

At buildout, Flying Horse North is projected to add about 185 vehicles per day to Holmes Road just south of Vessey Road. However, with the extension of Holmes Road north to Stagecoach Road about 400 trips generated by the existing land uses south of the site are projected to be rerouted to use this new connection. The net impact to Holmes Road south of Vessey Road is therefore negligible.

CONCLUSIONS

Trip Generation

- At buildout the Flying Horse North at Shamrock Ranch site could be expected to generate about 3,337 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour about 82 vehicles would enter and 167 vehicles would exit the site. During the afternoon peak hour about 205 vehicles would enter and 130 vehicles would exit the site.

Traffic Volume Impacts

- At buildout the site is projected to add about 185 vehicle-trips per day to Holmes Road just north of Shoup Road. However, a portion of the existing traffic using Holmes Road just north of Shoup would instead use the new Phase 9 extension of Holmes to Stagecoach through Flying Horse North at Shamrock Ranch.

- At buildout the site is projected to add about 1,340 vehicle trips per day to SH 83 just south of Stagecoach Road. This represents an increase of about seven percent above the projected 2040 background traffic volume.

- At buildout the site is projected to add about 400 vehicle-trips per day to Hodgen Road just west of the proposed site access point. This represents an increase of about 4.3 percent above the projected 2040 background traffic volume.

- At buildout the site is projected to add about 345 vehicle-trips per day to Black Forest Road just south of Hodgen Road. This represents an increase of about 10.6 percent above the projected 2040 background traffic volume.

Level of Service

- The intersections of Hogden/Black Forest, the full-movement site access to Hodgen Road, and both full-movement access points to Black Forest Road are all projected to operate at level of service C or better during the peak hours for all movements as Stop-sign-controlled intersections based on the projected existing plus Phase 1 site-generated, short-term total, and 2040 total traffic volumes.

- All movements at the Stop-sign-controlled intersection of SH 83/Stagecoach are projected to operate at level of service C or better during the peak hours based on the existing plus Phase 1 and Phase 2 site-generated traffic and short-term total traffic (through Phase 6). The 2040 analysis indicates the westbound approach left-turn movement at this intersection is projected to operate at LOS E during the afternoon peak hour. It is unlikely a traffic signal warrant will be met based on the projected traffic volumes and assuming the intersection laneage shown in Figure 12 including a southbound left-turn acceleration lane on SH 83.

Traffic Signal Warrants

- The projected 2040 peak-hour total traffic volumes and lane geometry at the intersection of SH 83/Stagecoach Road are not projected to meet the thresholds for a Four-Hour Vehicular Volume Traffic Signal Warrant.

Auxiliary Turn Lanes

- Table 3 shows a summary of the auxiliary turn lanes that will be required by phase of this project.

Phases 1 and 2

- No auxiliary turn lanes will be required based on the projected existing plus Phase 1 and Phase 2 site-generated traffic volumes.

Phase 3

- Based on the projected short-term total traffic volumes and the criteria contained in the *State of Colorado Highway Access Code*, a northbound right-turn deceleration lane would be required on SH 83 approaching Stagecoach Road. The short-term total traffic volumes assume buildout of Flying Horse North at Shamrock Ranch through Phase 6 and the golf course and assumes the construction of Stagecoach Road from SH 83 to Black Forest Road. This lane should be 378 feet long plus a 222-foot-long taper.

- Based on the short-term total traffic volumes and the criteria contained in the *State of Colorado Highway Access Code*, a northbound right-turn acceleration lane would be required on SH 83 at Stagecoach Road. The short-term total assumes buildout of Flying Horse North at Shamrock

Ranch through Phase 6 and the golf course and assumes the construction of Stagecoach Road from SH 83 to Black Forest Road. This lane should be 738 feet long plus a 222-foot-long taper.

- Based on the projected short-term total site-generated traffic volumes and the criteria contained in the *State of Colorado Highway Access Code*, a southbound left-turn lane would be required on SH 83 approaching Stagecoach Road. This lane should be 418 feet long plus a 222-foot-long taper.

- Based on comments received from the Colorado Department of Transportation a southbound left-turn acceleration lane will be required on SH 83 from Stagecoach Road. This lane should be 738 feet long plus a 222 foot taper (adjusted for grades as necessary).

Phase 7

- Based on the projected 2040 total traffic volumes and on the criteria contained in the *El Paso County Engineering Criteria Manual* a northbound left-turn lane would be required on Black Forest Road approaching the north full-movement site access (Stagecoach Road). The 2040 total volumes assume buildout of Flying Horse North at Shamrock Ranch, the construction of Stagecoach Road from SH 83 to Black Forest Road, and the extension of Holmes Road north to Stagecoach Road. Based on a design speed of 60 mph for a Rural Minor Arterial, this lane should be 340 feet long plus a 240-foot-long taper.

Buildout

- Based the projected existing plus Phase 1 and Phase 2 site-generated traffic, short-term total, and 2040 total volumes and on the criteria contained in the *El Paso County Engineering Criteria Manual* no auxiliary turn lanes would be required on Hodgen Road approaching the proposed full-movement site access just west of Black Forest Road.

- There is an existing eastbound right-turn deceleration lane and westbound left-turn lane on Hodgen Road approaching Black Forest Road. Based on the criteria contained in the *El Paso County Engineering Criteria Manual* no additional turn lanes would be required at this intersection based on the projected existing plus Phase 1 and Phase 2 site-generated traffic, short-term total, and 2040 total traffic volumes.

- Based on the projected existing plus Phase 1 and Phase 2 site-generated traffic, short-term total, and 2040 total volumes and the criteria contained in the *El Paso County Engineering Criteria Manual* southbound right-turn deceleration lanes would not be required on Black Forest Road approaching the proposed full-movement site access points.

- Based on the projected existing plus Phase 1 and Phase 2 site-generated traffic, short-term total, and 2040 total volumes and the criteria contained in the *El Paso County Engineering Criteria Manual* no auxiliary turn lanes would be required on Black Forest Road approaching the proposed full-movement site access points.

Roadway Classifications

- Stagecoach Road should be classified as a Rural Minor Residential Collector from SH 83 to Black Forest Road. The projected traffic volume for the west portion of this roadway would exceed the *Engineering Criteria Manual* design average daily traffic criteria for Rural Minor Residential Collector roadways. A deviation request will be submitted separately.

- LSC recommends all other roadways within Flying Horse North at Shamrock Ranch be classified as Rural Local.

Other Deviations

- The proposed full-movement access to Black Forest Road, about 725 feet south of Black Forest/Terra Ridge Circle (south) proposed for Phase 11, will require a deviation to the *El Paso County Engineering Criteria Manual* (ECM) as the proposed spacing is less than the minimum intersection spacing for Minor Arterials. The proposed location was selected for the best sight distance. A deviation request will be submitted separately.

Countywide Road Impact Fee Program

- The Flying Horse North at Shamrock Ranch development will be required to participate in the Countywide Road Impact Fee program. The specific PID option (or opt-out option) as well as the specific calculated fee amount will be provided with the submittal of the Preliminary Plan or Final Plat. The fee per residential dwelling unit will be payable at the time of the building permit.

* * * * *

Please contact me if you have any questions regarding this report.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By _____
Jeffrey C. Hodsdon, P.E., PTOE
Principal

JCH:KDF:bjwb

Enclosures: Tables 2 and 3
Figures 1-13
Traffic Count Reports
Level of Service Reports