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GEOTECHNICAL ENGINEERING EXPLORATION

Proposed Midland Road Subdivision
Bryant, Arkansas

PREPARED FOR:

Jonathan Hope
Hope Consulting
117 South Market Street
Benton, AR 72015

PREPARED BY:

MTA ENGINEERS
8001 National Drive
Little Rock, AR 72209

March 10th, 2022

MTA ENGINEERS

Jonathan Hope
Hope Consulting
117 South Market Street
Benton, AR 72015

March 10th, 2022

Subject: Report of Geotechnical Engineering Exploration
Proposed Duplexes at Midland Road
Bryant, Arkansas

Mr. Hope:

MTA Engineers has completed the authorized Geotechnical Engineering Exploration for the above referred project. This work was conducted in accordance with the agreement between MTA Engineers and Hope Consulting, detailed in MTA Engineers Proposal dated February 2nd, 2023.

The purpose of our work was to review general surface and subsurface conditions within the project site area, and to gather and present data relative to the design and construction of the proposed Midland Road Subdivision located in Bryant, Arkansas. This report outlines the exploration procedures used, exhibits the data obtained, and presents our recommendations.

MTA Engineers appreciates this opportunity to provide these services and looks forward to working with you on future projects. Please contact us if you have any questions or require additional information.

Sincerely,

MTA ENGINEERS

Kelton Price, P.E.
Project Engineer
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keltonp@mtaengineers.com

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 10650
KELTON W. PRICE

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EXECUTIVE SUMMARY

The geotechnical exploration was conducted near Midland Road located in Bryant, Arkansas. The general topography of the site was varying elevations. At the time of our visit, the site was heavily wooded.

In general, the soils will consist of stiff lean clay / silty sand, dense clayey sand with gravel and medium hard to hard shale. Subsurface conditions were consistent throughout the entirety of the proposed development. The potential to find buried stumps or other organic material is low. Major soil types encountered at each boring may be summarized as follow:

Table 1. Soil Types Encountered

SOIL TYPE	DESCRIPTION
CL	Lean Clay / Sandy Clay
ML / CL-ML	Sandy Silt / Sandy Silty Clay
SC / SM	Silty / Clayey Sand
CH	Expansive clay
Shale	Weathered Shale

See Table 2 General Strata Classification of Soil Logs or the individual soil logs found in Appendix B for a more detailed overview of the soils encountered on site.

Based on the nature of the existing strata encountered at the time of exploration, it is assumed that the proposed improvements will be above existing grades. The surface soils contain organics in all borings. In grass covered areas, the soils of Stratum I are stiff and will contain 6-in of topsoils. Stability of these soils will depend on soil moisture conditions at the time of construction, area of improvements may require over-excavation of 2-ft to remove silty isolated surface soils (deeper during wetter seasons). Additional over-excavation may be required in the footing trenches, depending upon weather conditions. A random presence a of CH clay was noted during exploration. Care should be taken to monitor CH when excavation and ensure no CH clay presence within 2-ft of pavement.

Based on the anticipated bearing load, it is recommended that any structure be supported on traditional shallow footings founded a minimum of 24-in below final grade, within Structural fill. Footings founded as recommended may be designed using a net allowable bearing capacity of 2,000-psf for continuous and individual spread footings.

The net allowable end bearing pressure is based on a factor of safety in excess of 3.0 with respect to the anticipated shear strength of the bearing stratum. Total and differential settlement is anticipated to be less than ½-in.

SUMMARY

- **Rock/Hard Dig:**
  - Excavation may be performed using medium to heavy duty equipment.
  - Weathered Shale was encountered in all borings.

- **Soils:**
  - Soils generally consist of stiff lean clay, silty sand, dense clayey sand, expansive clay and shale.
  - Structural fill should be placed according to the "Structural Fill" section of this report.
  - Stripping in the order of 6-in to remove organics.

- **Foundations/Slabs:**
  - Shallow footings founded a minimum of 24-in beneath final grade may be sized using a bearing pressure of 2,000-psf for continuous and individual spread footings.

- **Un-compacted Fill:**
  - No un-compacted fill was encountered on the property during the exploration.

- **Stump/Organic Findings:**
  - The potential to find stumps or other organic material beneath the surface is low.

- **Pavement:**
  - Recommended pavement sections are presented within this report.
  - Pavement must meet the requirement of City of Bryant

- **Miscellaneous:**
  - Groundwater was encountered near TP-10 & 11.

INTRODUCTION

This exploration was requested in order to evaluate existing subsurface conditions and provide geotechnical design recommendations. The results of this exploration and the geotechnical design recommendations for site construction are presented in this report.

Exploration was accomplished by:

1. Excavating 14 locations up to 10-ft or refusal, to explore subsurface soil, and groundwater conditions.

2. Obtaining samples from each stratum, within the accessible areas, using standard geotechnical sampling technique or standard penetration test.

3. Performing laboratory tests on various samples to determine pertinent engineering properties of the subsurface strata.

4. Analyzing field and laboratory test data to develop design recommendations.

The scope of this geotechnical exploration did not include an environmental assessment to determine the presence of wetlands and/ or hazardous or toxic materials in the soil or groundwater on or near this site. If there is concern of wetlands or a hazardous/ toxic material presence, a qualified environmental assessment consultant should be contacted to perform a site investigation before construction begins.

FIELD EXPLORATION

Subsurface conditions at the site were explored by using test pits to a depth of 10-ft at 14 test pit location. The approximate excavation locations are shown on the Excavation Location Plan (see Appendix A). Test Pit logs presenting descriptions of the soil strata encountered are included in Appendix B. Laboratory testing summary of the different soil types are located in Appendix D.

Samples were obtained throughout the entirety of most locations using bulk grab methods. The recorded penetrometer reading (tons/ft^2) are indicated on the Test Pit Logs in the Unconfined Compression Strength column. All soil samples encountered were removed from the field in moisture

tight containers and transported to our laboratory for further examination. At the lab, a visual classification was performed for each sample.

All various soil types were then analyzed for specific engineering properties.

GENERAL SITE AND SUBSURFACE CONDITIONS

The exploration for the proposed Subdivision located along Midland Road in Bryant, Arkansas. It is anticipated that proposed roads will be constructed near the existing grade. Soil as explored consisted of silty sands, lean sandy clays, and clayey sands with gravel above weathered shale. The stratigraphy encountered in the excavation locations is summarized in Table 2. Test Pit were advanced to a depth of 10-ft or refusal within the building and pavement areas using mini excavation procedures.

For a more detailed description of soils encountered while testing see the boring log sheets found in attached preliminary report.

Table2. General Strata Classification of Boring Logs

STRATA	DEPTH (ft)	SOIL CLASSIFICATION	SOIL DESCRIPTION	SIGNIFICANT PROPERTIES
STRATUM I (a)	0 – 2 to 4	SM & SC *TP-1, 2 & 4*	Silty Sand & Clayey Sand Surface Organics	Medium Dense Low Shrink Swell Potential Moderate bearing capacity
STRATUM I (b)	0 – 2 to 4	CL *Except in TP-1, 2, 3 and 8*	Lean Clay / Sandy Clay w/ surface Organics	Stiff to Very Stiff Moderate Bearing Low shrink swell potential
STRATUM I (c)	1 – 2 to 5	ML/ CL-ML *(Except TP-4 & TP-5)*	Sandy silt/ Sandy Silty Clayey	Stiff Moderate to High Bearing Capacity Moisture Sensitive
STRATUM II (a)	2 – 4	CH *(Only in TP-12)*	Expansive Clay	Very Stiff Moisture sensitive
STRATUM II (b)	2 to refusal	Shale *In all test pits*	Weathered Shale	Medium Hard to Hard Moderate Bearing Capacity

The significant properties and characteristics of the subsurface strata pertinent to design and constructions are as follows:

A. The topography of the site and planned building location.
B. The anticipated bearing loads.
C. Dense Sand-Clay-Gravel encountered in the several Test Pits.
D. Shale was encountered in all test pit excavations.
E. The anticipated pavement loading.

LABORATORY TESTING

Description of the soils encountered in the excavation was prepared in general accordance with applicable ASTM standards. The soil stratification shown on the test pit logs represents soil conditions at the specific excavation locations. There may be some variations that occur between or beyond the excavation locations.

The stratification lines on the test pit logs represent the approximate boundaries between soil types, but the actual transitions between soil layers in the subsurface of the proposed site may be gradual. Laboratory testing was performed to verify/evaluate classification, volumetric stability, and to determine water content. The results of all testing performed are represented in Appendix D Laboratory Test Summary.

ANALYSIS AND RECOMMENDATIONS

SITE PREPARATION

Based on the requirement of the city of Bryant, the existing soils are not suitable to be within the upper 2-ft of the subgrade; therefore, 2-ft of approved fill will be required in the areas of public streets. This can be achieved through over-excavation and backfill, raising the proposed grades, or a combination of both. Prior to the addition of any fill or the construction of any improvements, areas of proposed building and parking should be stripped to remove organics and stiff isolated silty sand. Areas of vegetation and trees within the building or paved areas should be grubbed to a depth of 6-in. The roadway areas should be proof-rolled using 62,000-lbs loaded dump truck (or equivalent load) to determine area of instability. Proof-roll should be performed in the presence of MTA Engineers. Any areas of instability should be further investigated. Isolated areas of over-excavation should be

anticipated. MTA recommends that all excavation be performed during dry periods and that positive drainage is maintained during construction. Water ponding will affect soil stability. Areas of instability will require over-excavation. Depths of over-excavation will vary, but could extend to 3-ft. Structural fill, where needed, should be placed as recommended in the "Structural Fill" section of the report. Positive drainage should be maintained throughout this process. The addition of excessive moisture could cause a significant loss of soil stability.

Consideration should be given to backfilling storm drains with clean gravel to allow for the removal of potential ground water that may accumulate above the shale strata. Frequent French drains may be required as well. If soft soils are encountered in the area of proposed roadways, a filter may be used to maintain separation of the soft soils from the approved fill.

The building pads should be constructed above the existing grade to provide positive drainage. Some over-excavation of footings could be required depending on the soil moisture condition at the time of excavation. Soil bearing information given in the building foundations section of this report will be based on these site preparation conditions.

STRUCTURAL FILL

Structural Fill within roadways must conform to City of Bryant requirements. Fill should consist of approved materials, which are free of organic matter and debris. For approval, samples of the proposed fill material should be submitted to MTA Engineers for classification testing. Select fill consisting of low plasticity soil such as lean clay or clayey gravel classifying as SC, CL, or GC according to the Unified Soils Classification System are generally considered suitable. High plasticity clay soils (soils with a Liquid Limit above 50) should not be used as fill.

Placement of approved fill should be achieved in multiple thin lifts. Each lift should not exceed 8-in in loose thickness. Compaction of these lifts should be performed with suitable equipment to achieve the compaction requirements noted in Table 3. Care should be taken that all compaction recommendations are performed.

If cohesive soils are to be used, compaction should be performed using a kneading-type vibratory compactor, such as a vibratory sheepsfoot. The material should be broken down sufficiently to provide a dense matrix of particles.

Table 3: Compaction Requirements

Material Type and Location	Minimum Compaction (percent of ASTM D1557)	Allowable variance in moisture from optimum
Structural Fill Beneath Pavement Sections	95%	Optimum to +3 (Clay Shale) -3 to +3 (Other Approved Select Fill)
Structural Fill Beneath Buildings	95%	Optimum to +3 (Clay Shale) -3 to +3 (Other Approved Select Fill)
Utility Backfill in Building Area and Pavement	95%	-3 to +3
Miscellaneous and Green Areas	90%	-3 to +3
Aggregate Base Course	95%	-3 to +3 at time of compaction

BUILDING FOUNDATIONS

All foundations must satisfy two basic and independent design criteria. First, foundations must have acceptable factor of safety against bearing failure under maximum design loads. Secondly, movement of the foundation due to consolidation, shrinkage, and/or swelling of the supporting strata should not exceed tolerable limits for the structure.

Construction factors such as installation of foundations units, excavation procedures, and surface and groundwater conditions should also be considered. These factors and the aforementioned subsurface conditions were influential in development of the following statement.

In view of the anticipated foundation loading and subsurface conditions encountered, it is suggested that the proposed structures be supported on a foundation system designed in accordance with the following recommendations.

FOUNDATIONS/ SLABS

Shallow Foundations

Based on the nature of existing soils encountered at the time of exploration and the anticipated loading, it is recommended that all structures be supported on traditional shallow footings founded a minimum of 24-in beneath final exterior grade, within Structural fill. In addition, to minimize the potential for localized shear failure within the soils, a minimum footing width of 24-in is recommended.

Shallow foundations founded as accounted may be designed using a net allowable bearing pressure of 2,000-psf for continuous and individual spread footings. The net allowable end bearing pressures will be based on a factor or safety in excess of 3.0. Total and differential settlement is anticipated to be less than ½-in.

Slab-on-grade type construction is considered appropriate for the floor slab. We recommend that the slab be supported on 4-in of clean crushed stone or gravel (ASTM C-33 #57 or equivalent) on prepared subgrade. A Class A impervious moisture barrier with a minimum thickness of 10-mils, specified according to ASTM E-1745, should be provided between slab and the granular fill due to the potential for perched water to develop during the wetter seasons.

PAVEMENT DESIGN

Paved parking and drives will be constructed as part of the project. Design traffic volumes and loadings have not been determined. However, we anticipate that the drives will be subject to light vehicles and weekly service trucks. We anticipate that the drives will be placed at/or above the existing elevation. The following design criteria were used to develop the recommended pavement sections in conjunction with the AASHTO Design Guide 1996:

Table 3. Pavement Design Assumption Values

PAVEMENT DESIGN ASSUMPTION VALUES	
CBR	5
R-VALUE	15
SOIL SUPPORT VALUE (S)	5

Based on information obtained during this study, subgrade soils in the paved areas should generally consist of proof-rolled properly compacted Structural fill. Due to the random presence of Ch clay, care should be taken to avoid it within 2-ft of the pavement. Structural fill should be placed as recommended in the Structural fill section of the report. It is recommended that positive site drainage should be provided during construction and be incorporated during the final design.

All pavement sections must comply with the City of Bryant minimum requirements. It should be recognized that some periodic maintenance of pavement will be required. As a minimum, this should include periodic sealing of all joints and cracks to prevent surface water infiltration.

UN-COMPACTED FILL

No uncompacted fill was encountered on the property during our exploration. The cleared area near Midland Road contains unsuitable fill that should be removed prior to construction.

STUMP/ ORGANIC FINDINGS

The proposed improvement area is covered with light grassy vegetation and trees. The potential to find stumps or other organic material below the surface is low.

SEISMIC CONSIDERATION

Based on IBC-2015, a site soil **Class B** may be used for design purposes. Liquefaction potential of the soils in Stratum I(a, b & c), II(a & b) is negligible. Additional design information on Seismic Consideration is attached as Appendix E.

CONSTRUCTION PROCEDURES

The potential exists for increased perched water to develop during wetter seasons. Therefore, foundation excavation and any other site grading should be performed during drier periods to reduce the possibility of changes in conditions.

Subsurface conditions significantly at variance with those encountered within the borings should be brought to the attention of the engineer, and work delayed pending evaluation and/or preparation of additional recommendations, if warranted.

♦ ♦ ♦ ♦

The following illustrations are attached and complete this report:

Appendix A: Excavation Location Plan
Appendix B: Test Pit Logs
Appendix C: Key to terms and Symbols
Appendix D: Laboratory Test Summary
Appendix E: Seismic Design Criteria

♦ ♦ ♦ ♦

Appendix A : Excavation Location Plan


B-1
B-2
B-3
B-4
B-5
B-6
B-7
B-8
B-9
B-10
B-11
B-12
B-13
B-14
GREEN SPACE/ DRAINAGE AREA
4.46 ACRES 194133 Sq. Ft.
GREEN SPACE/ DRAINAGE AREA
6.79 ACRES 295818 Sq. Ft.
DETENTION AREA
3.54 ACRES 154090 Sq. Ft.
Ivy St
Willow St
Sherwood Rd
Wildwood Rd
Old Mae Wood Rd
Centark Circle

Appendix B:
Test Pit Logs

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Excavation Log Report

TEST PIT NO. TP-1
PAGE 1 OF 1

JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			MEDIUM DENSE, BROWN SILTY SAND W/ GRAVEL AND ORGANICS	SM	NP	14.5	NV		44.7		2.0 2.5
			BROWN-GREY, SANDY SILTY CLAY	CL-ML	17	16.3	24	7	53.7		2.5
5			MEDIUM HARD TO HARD, GREY-TAN, WEATHERED SHALE REFUSAL AT 6-FT ON SHALE Boring Terminated	SHALE							4.5
10											
15											
20											
25											
30											

COMPLETION DEPTH: 6 WATER DEPTH> INITIAL: AFTER 24 HOURS:

REMARKS:

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Ph. 870.530.8380 • Fax 870.972.0237

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Excavation Log Report TEST

PIT NO. TP-2
PAGE 1 OF 1

JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			MEDIUM DENSE, RED-TAN, SILTY SAND W/ ORGANICS	SM							2.0 2.5
			MEDIUM DENSE, BROWN, CLAYEY SAND	SC							2.5
5			MEDIUM HARD TO HARD, GREY-RED, WEATHERED SHALE REFUSAL AT 6-FT ON SHALE Boring Terminated	SHALE							4.5
10											
15											
20											
25											
30											

COMPLETION DEPTH: 6 WATER DEPTH> INITIAL: AFTER 24 HOURS:

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Excavation Log Report TEST

PIT NO. TP-3
PAGE 1 OF 1

JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			BROWN-TAN, SANDY SILT W/ GRAVEL	ML	NP	26.0	NV		54.9		2.0
			MEDIUM HARD TO HARD, GREY-RED, WEATHERED SHALE	SHALE							2.5
			REFUSAL AT 4-FT ON SHALE								4.0
			Boring Terminated								
5											
10											
15											
20											
25											
30											

COMPLETION DEPTH: 4 WATER DEPTH> INITIAL: AFTER 24 HOURS:

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Excavation Log Report

TEST PIT NO. TP-4
PAGE 1 OF 1

JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			STIFF, RED-TAN, LEAN CLAY W/ ORGANICS	CL	14	27.1	36	22	79.7		2.5 2.5
			MEDIUM DENSE, BROWN, CLAYEY SAND	SC							3.0
5			MEDIUM HARD TO HARD, GREY-RED, WEATHERED SHALE REFUSAL AT 6-FT ON SHALE Boring Terminated	SHALE							4.5
10											
15											
20											
25											
30											

COMPLETION DEPTH: 6 WATER DEPTH> INITIAL: AFTER 24 HOURS:

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Excavation Log Report

TEST PIT NO. TP-5
PAGE 1 OF 1

JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			STIFF, BROWN-TAN,SILTY CLAY W/ ORGANICS	CL							2.0
			MEDIUM HARD TO HARD, GREY-RED, WEATHERED SHALE	SHALE							2.5
			REFUSAL AT 4-FT ON SHALE								4.0
			Boring Terminated								
5											
10											
15											
20											
25											
30											

COMPLETION DEPTH: 4 WATER DEPTH> INITIAL: AFTER 24 HOURS:

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TEST PIT NO. TP-7
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JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			STIFF, BROWN, SILTY CLAY W/ ORGANICS	CL							2.5
			VERY STIFF, BROWN SILT W/ SAND	ML	NP	27.4	NV		74.4		3.0
											3.0
5			MEDIUM HARD TO HARD, GREY-TAN, WEATHERED SHALE REFUSAL AT 6-FT ON SHALE	SHALE							4.5
			Boring Terminated								
10											
15											
20											
25											
30											

COMPLETION DEPTH: 6 WATER DEPTH> INITIAL: AFTER 24 HOURS:

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TEST PIT NO. TP-8
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JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			STIFF, BROWN,SANDY CLAY W/ ORGANICS	CL							2.0
			MEDIUM HARD TO HARD, GREY-RED, WEATHERED SHALE	SHALE							2.5
			REFUSAL AT 4-FT ON SHALE								4.0
5			Boring Terminated								
10											
15											
20											
25											
30											

COMPLETION DEPTH: 4 WATER DEPTH> INITIAL: AFTER 24 HOURS:

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TEST PIT NO. TP-9
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JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			STIFF, BROWN-GREY, SANDY SILT W/ ORGANICS	ML	NP	25.6	NV		64.6		2.5 3.0
5			MEDIUM HARD TO HARD, GREY-TAN, WEATHERED SHALE REFUSAL AT 6-FT ON SHALE	SHALE							3.5 4.5
			Boring Terminated								
10											
15											
20											
25											
30											

COMPLETION DEPTH: 6 WATER DEPTH> INITIAL: AFTER 24 HOURS:

REMARKS:

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Ph. 479.756.0061 • Fax 479.756.9254

101 S. Church St. • Jonesboro, AR 72401
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TEST PIT NO. TP-10
PAGE 1 OF 1

JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 02/28/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			STIFF, BROWN-GREY,SILTY CLAY W/ ORGANICS	CL							1.5 4.5
5			MEDIUM HARD TO HARD, GREY-TAN, WEATHERED SHALE REFUSAL AT 6-FT ON SHALE	SHALE	21	21.7	26	5	52.5		4.0 4.5
			Boring Terminated								
10											
15											
20											
25											
30											

COMPLETION DEPTH: 6 WATER DEPTH> INITIAL: 2 AFTER 24 HOURS:

REMARKS:

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Excavation Log Report

TEST PIT NO. TP-11
PAGE 1 OF 1

JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 02/28/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			STIFF, BROWN-GREY,SILTY CLAY W/ ORGANICS	CL							1.5 2.5
			MEDIUM HARD TO HARD, GREY-TAN, WEATHERED SHALE	SHALE							2.5
5			BROWN-GREY LEAN CLAY W/ SAND REFUSAL AT 6-FT ON SHALE	CL	23	29.6	46	23	77.6		4.5
			Boring Terminated								
10											
15											
20											
25											
30											

COMPLETION DEPTH: 6 WATER DEPTH> INITIAL: 2 AFTER 24 HOURS:

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Excavation Log Report

TEST PIT NO. TP-12
PAGE 1 OF 1

JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			STIFF TO VERY STIFF, BROWN,SILTY CLAY W/ ORGANICS	CL							2.5 3.0
			VERY STIFF, RED EXPANSIVE CLAY W/ GRAVEL	CH	24	27.2	51	27	73.2		3.5
5			MEDIUM HARD TO HARD, RED, WEATHERED SHALE REFUSAL AT 6-FT ON SHALE Boring Terminated	SHALE							4.5
10											
15											
20											
25											
30											

COMPLETION DEPTH: 6 WATER DEPTH> INITIAL: AFTER 24 HOURS:

REMARKS:

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Excavation Log Report

TEST PIT NO. TP-13
PAGE 1 OF 1

JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			STIFF, BROWN-RED, SANDY CLAY W/ ORGANICS	CL							2.0
			MEDIUM HARD TO HARD, BROWN-TAN, WEATHERED SHALE	SHALE							2.5
			REFUSAL AT 4-FT ON SHALE								4.0
			Boring Terminated								
5											
10											
15											
20											
25											
30											

COMPLETION DEPTH: 4 WATER DEPTH> INITIAL: AFTER 24 HOURS:

REMARKS:

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Excavation Log Report

TEST PIT NO. TP-14
PAGE 1 OF 1

JOB NO. GEO23-023
JOB NAME: MIDLAND ROAD SUBDIVISION
COORDINATES: NORTH: _____ EAST: _____
STATION: _____
LOCATION: BRYANT, AR

DATE: 3/1/2023
TYPE OF DRILLING: EXCAVATION
EQUIPMENT: KUBOTA U35
LOGGED BY: CHRIS
DRILLED BY: STEWARD

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: EXISTING GRADE	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	PLASTICITY INDEX	PERCENT PASSING #200	NO. OF BLOWS PER 6-IN.	UNCONFINED COMPRESSION
			STIFF TO VERY STIFF, BROWN-TAN,SILTY CLAY W/ ORGANICS	CL							2.5 3.0
5			MEDIUM HARD TO HARD, TAN-GREY, WEATHERED SHALE REFUSAL AT 6-FT ON SHALE	SHALE							3.5 4.5
10			Boring Terminated								
15											
20											
25											
30											

COMPLETION DEPTH: 6 WATER DEPTH> INITIAL: AFTER 24 HOURS:

REMARKS:

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Appendix C:
Key to Terms

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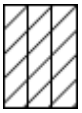
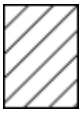
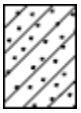
TERMS AND SYMBOLS USED ON BORING LOGS

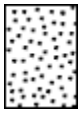
SOIL TYPES

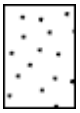

CLAY (CH)

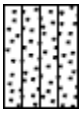

SILTY CLAY (CL)


CLAY (CL)

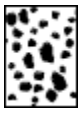

SANDY CLAY (CL)

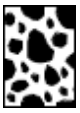

WELL-GRADED SAND (SW)

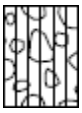

POORLY-GRADED SAND (SP)


SILTY SAND (SM)


CLAYEY SAND (SC)

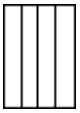

WELL-GRADED GRAVEL (GW)

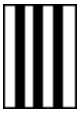

POORLY-GRADED GRAVEL (GP)

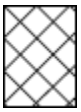

SILTY GRAVEL (GM)


SANDY SILT (ML)

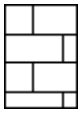

CLAYEY GRAVEL (GC)


SILT (ML)

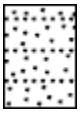

SILT (MH)

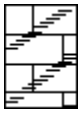

FILL MATERIAL

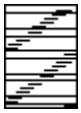
ROCK TYPES

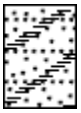

LIMESTONE


SHALE


SANDSTONE

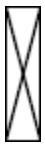

WEATHERED LIMESTONE


WEATHERED SHALE


WEATHERED SANDSTONE

SAMPLER TYPE


SHELBY TUBE SAMPLE


SPLIT SPOON SAMPLE


AUGER SAMPLE


NO RECOVERY

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SOIL GRAIN SIZE

U.S. STANDARD SIEVE								
12"	3"	3/4"	4	10	40	200		
BOULDERS	**COBBLES**	**GRAVEL**		**SAND**			**SILT**	**CLAY**
		COARSE	**FINE**	**COARSE**	**MEDIUM**	**FINE**		
304	76.2	19.1	4.75	2	0.42	0.074	0.002	
SOIL GRAIN SIZE IN MILIMETERS								

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on No 200 sieve): Includes (1) clean gravels and sands, and (2) silty clayey gravels and sands condition is rated according to relative density, as determined by laboratory tests.

DESCRIPTIVE TERMS	N VALUE	RELATIVE DENSITY
VERY LOOSE	0-4	0 – 15 %
LOOSE	4-10	15 – 35 %
MEDIUM DENSE	10-30	35 – 65 %
DENSE	30-50	65 – 85 %
VERY DENSE	50 and above	85 – 100 %

FINE GRAINED SOILS (major portion passing No 200 sieve): include (1) inorganic and organic silt and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer reading or by unconfined compression tests.

DESCRIPTIVE TERMS	N VALUE	UNCONFINED COMPRESSIVE STRENGTH TON / SQ. FT.
VERY SOFT	0-3	less than 0.25
SOFT	3-6	0.25 - 0.50
FIRM	6-12	0.50 - 1.00
STIFF	13-20	1.00 - 2.00
VERY STIFF	20-50	2.00- 4.00
HARD	50 and above	4.00 and higher

NOTE: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above because of planes of weakness or cracks in the soil. The consistency rating of such soils are based on penetrometer readings

TERMS CHARACTERIZING MOISTURE CONTENT

DRY: No water evident in sample; fines less than plastic limit.
MOIST: Sample feels damp; fines near the plastic limit.
VERY MOIST: Water visible on sample; fines greater than plastic limit and less than liquid limit.
WET: Sample bears free water; fines greater than liquid limit.

TERMS CHARACTERIZING SOIL STRUCTURE

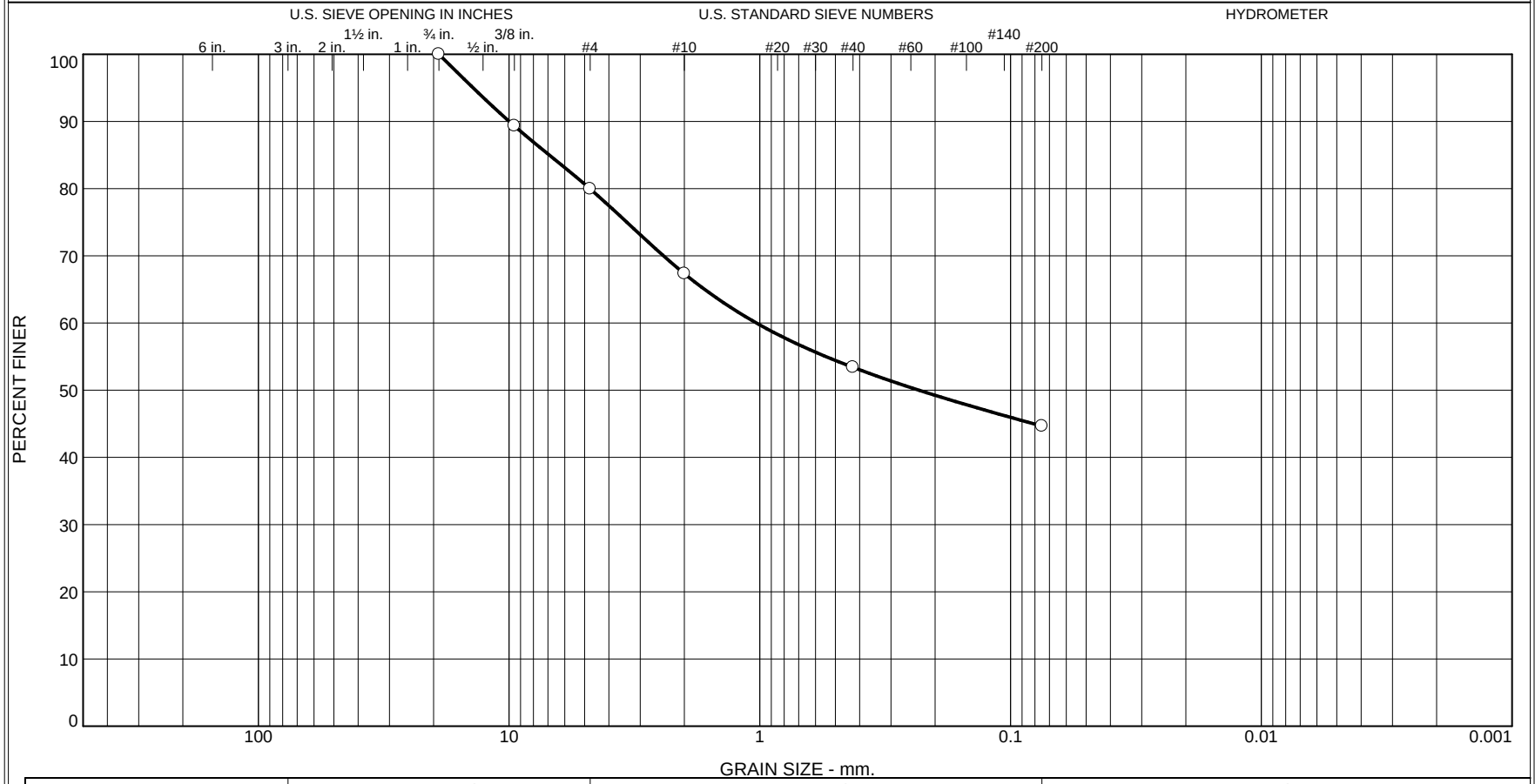
SLICKENSIDED: Having inclined planes of weakness that are slick and glassy in appearance.
FISSURED: Containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
LAMINATED: Composed of thin layer of varying color and texture.
INTERBEDDED: Composed of alternate layers of different soil types
CALCAREOUS: Containing appreciable quantities of calcium carbonate.
WELL GRADED: Having wide range in grain sizes and substantial amounts of all intermediate particle size.
POORLY GRADED: Predominantly of one grain size, or having a range of sizes with some intermediate size missing

---

Terms used in this report for describing soils according to their texture or grain size distribution are in accordance with UNIFIED SOIL CLASSIFICATION SYSTEM as described in technical Memorandum No 3-357, Waterways Experiment Station, March 1953

Appendix D: Laboratory Test Summary

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	20.0	12.6	14.0	8.7	44.7	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: TP-1 Depth: 1 Sample Number: S-2			3-3-2023

Client HOPE CONSULTING

Project MIDLAND ROAD SUBDIVISION

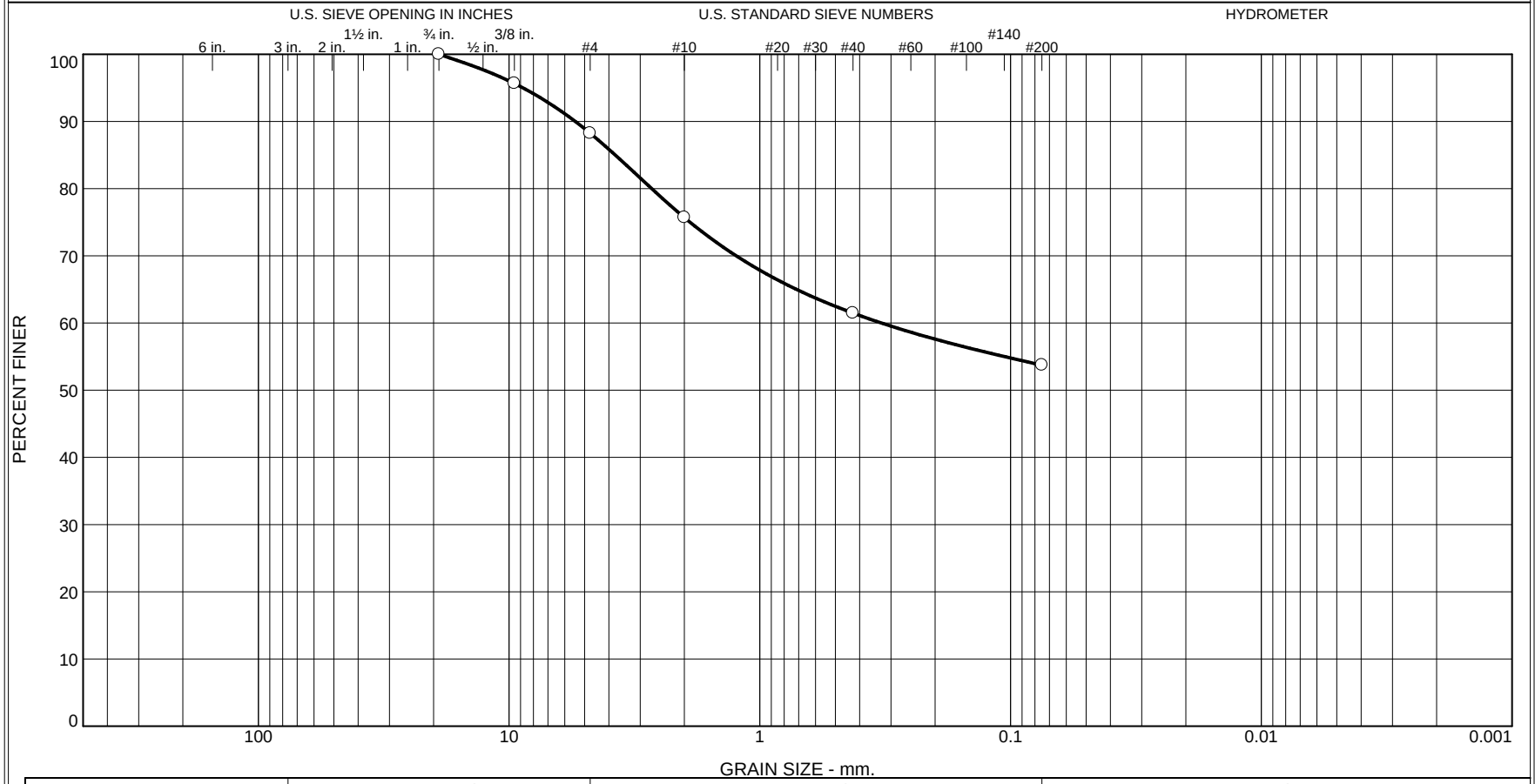
Project No. GEO23-023 Figure

Materials Testing of Arkansas

Little Rock, AR

Tested By: S. PENNINGTON **Checked By:** F. MONDUN

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.8	12.5	14.2	7.8	53.7	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: TP-1 Depth: 2 Sample Number: S-3			3-3-2023

Client HOPE CONSULTING

Project MIDLAND ROAD SUBDIVISION

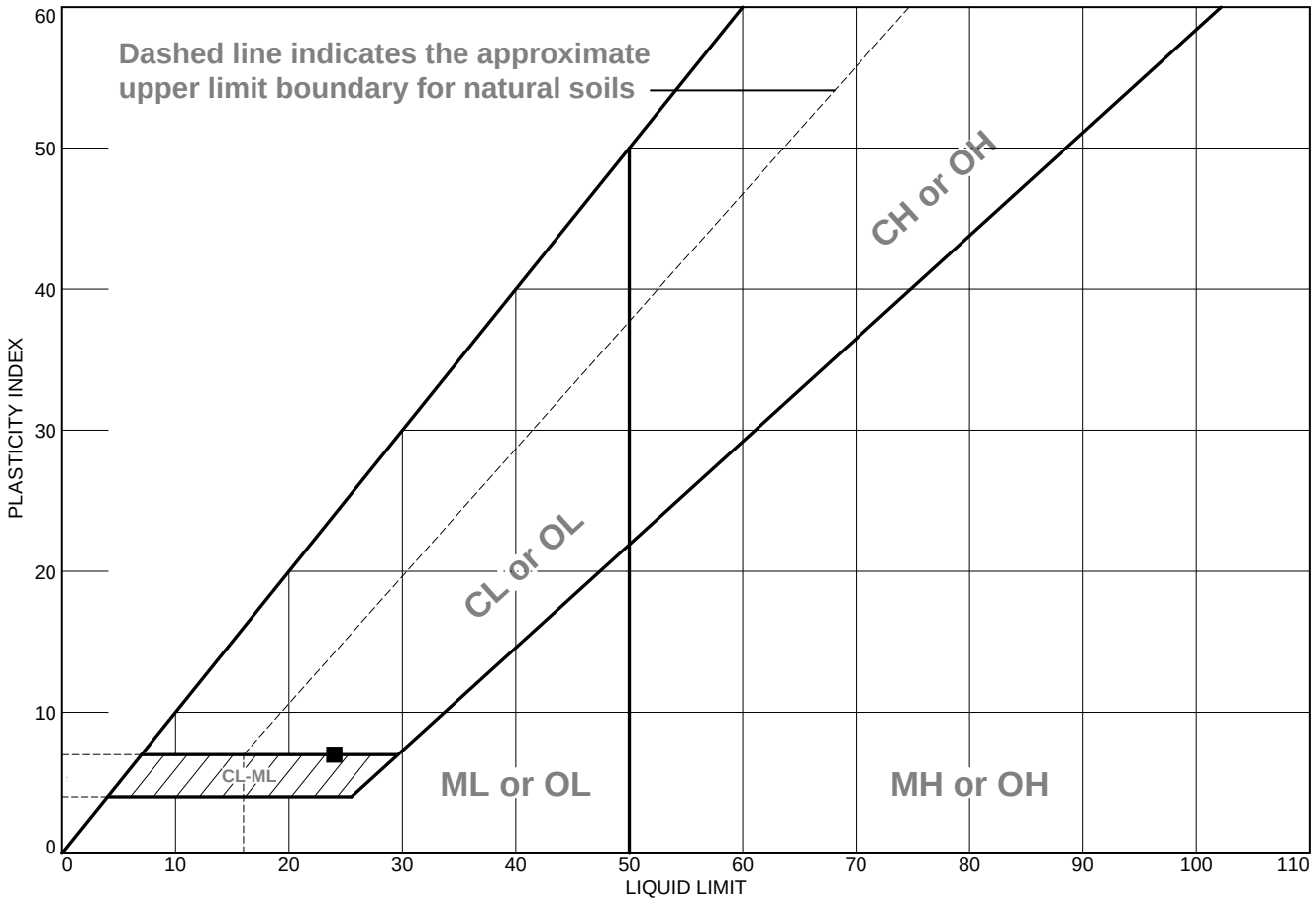
Project No. GEO23-023 Figure

Materials Testing of Arkansas

Little Rock, AR

Tested By: S. PENNINGTON **Checked By:** F. MONDUN

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN SILTY SAND W/ GRAVEL	NV	NP	NP	53.4	44.7	SM
■	BROWN-GREY, SANDY SILTY CLAY	24	17	7	61.5	53.7	CL-ML

Project No. GEO23-023 **Client:** HOPE CONSULTING

Project: MIDLAND ROAD SUBDIVISION

●**Source of Sample:** TP-1 **Depth:** 1 **Sample Number:** S-2

■**Source of Sample:** TP-1 **Depth:** 2 **Sample Number:** S-3

Remarks:

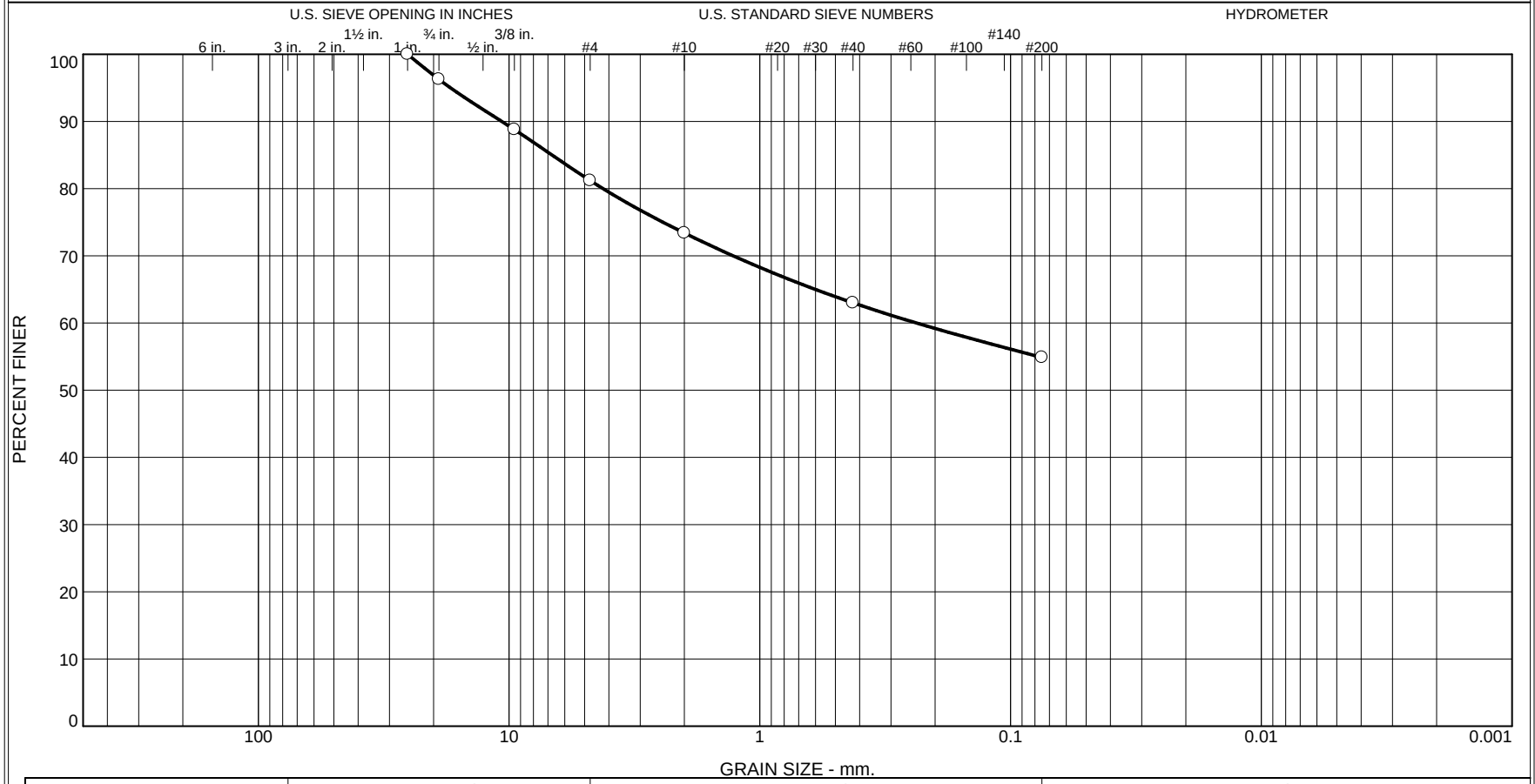
Materials Testing of Arkansas

Little Rock, AR

Figure

Tested By: C. SHEARER **Checked By:** F. MONDUN

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	3.7	15.1	7.8	10.4	8.1	54.9	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: TP-3 Depth: 0 Sample Number: S-1			3-3-2023

Client HOPE CONSULTING

Project MIDLAND ROAD SUBDIVISION

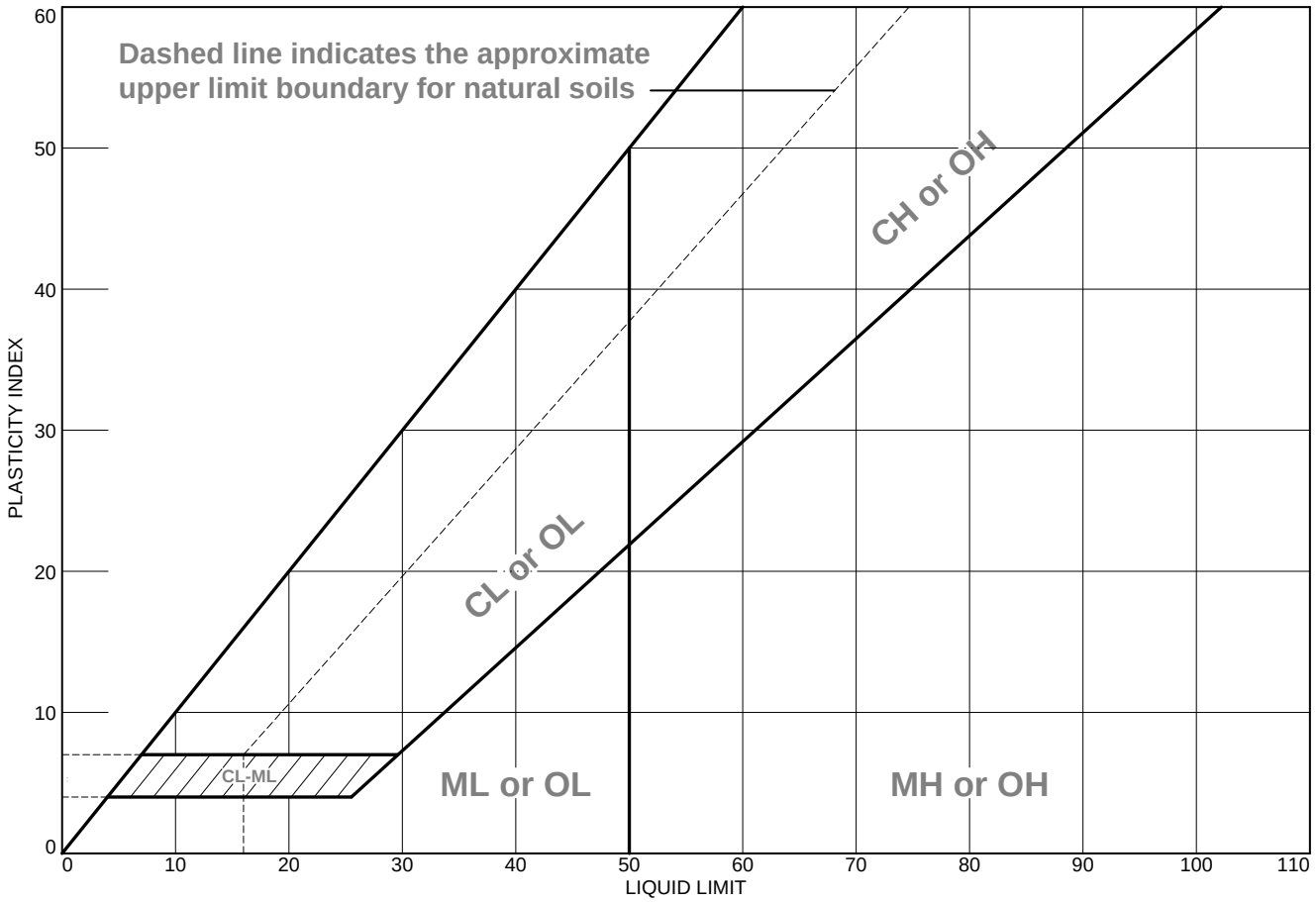
Project No. GEO23-023 Figure

Materials Testing of Arkansas

Little Rock, AR

Tested By: S. PENNINGTON **Checked By:** F. MONDUN

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN-TAN, SANDY SILT W/ GRAVEL	NV	NP	NP	63.0	54.9	ML

Project No. GEO23-023 **Client:** HOPE CONSULTING

Project: MIDLAND ROAD SUBDIVISION

●**Source of Sample:** TP-3 **Depth:** 0 **Sample Number:** S-1

Remarks:

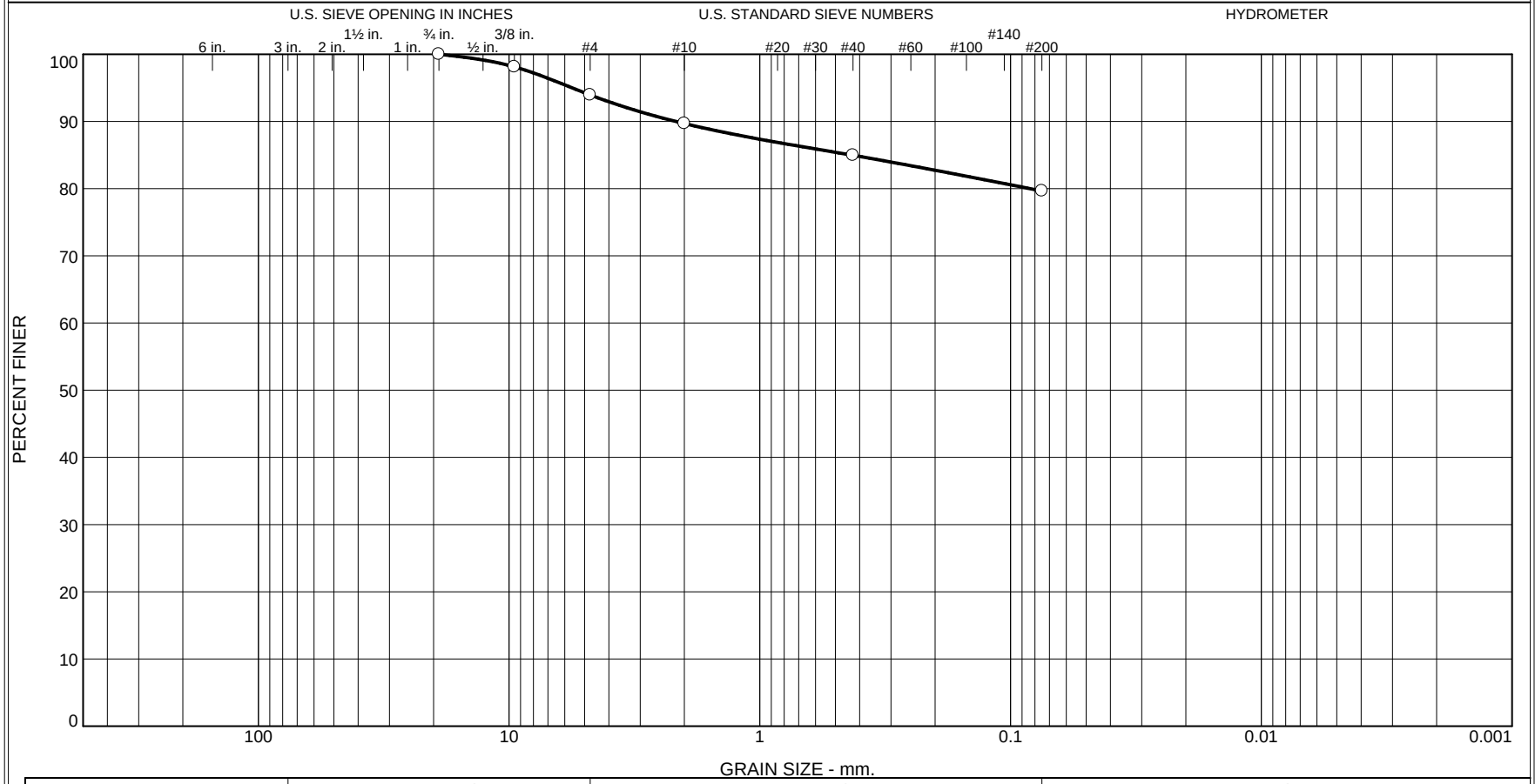
Materials Testing of Arkansas

Little Rock, AR

Figure

Tested By: C. SHEARER **Checked By:** F. MONDUN

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.1	4.2	4.7	5.3	79.7	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: TP-4 Depth: 1 Sample Number: S-2			3-3-2023

Client HOPE CONSULTING

Project MIDLAND ROAD SUBDIVISION

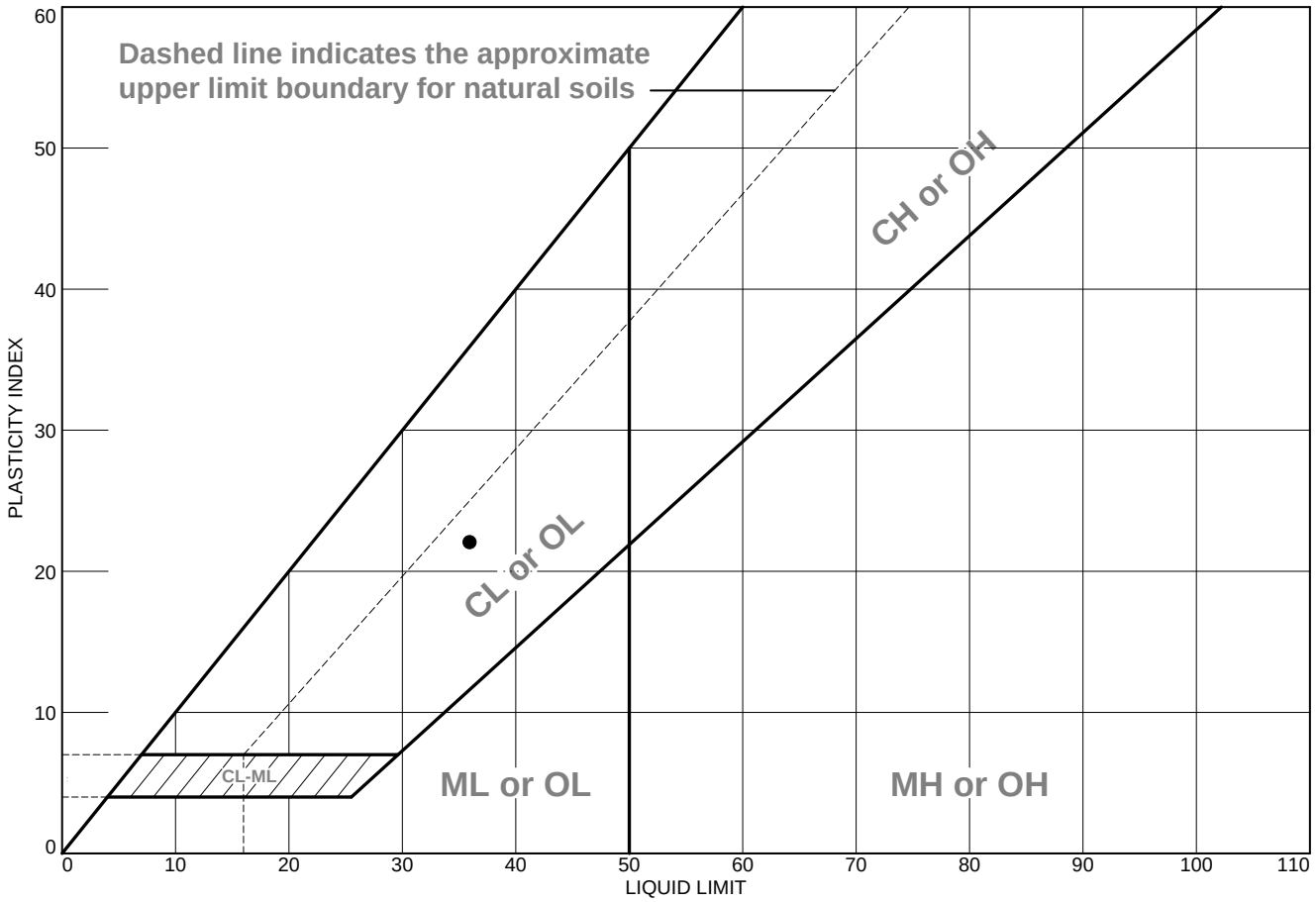
Project No. GEO23-023 Figure

Materials Testing of Arkansas

Little Rock, AR

Tested By: S. PENNINGTON **Checked By:** F. MONDUN

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	RED LEAN CLAY W/ SAND	36	14	22	85.0	79.7	CL

Project No. GEO23-023 **Client:** HOPE CONSULTING

Project: MIDLAND ROAD SUBDIVISION

●**Source of Sample:** TP-4 **Depth:** 1 **Sample Number:** S-2

Remarks:

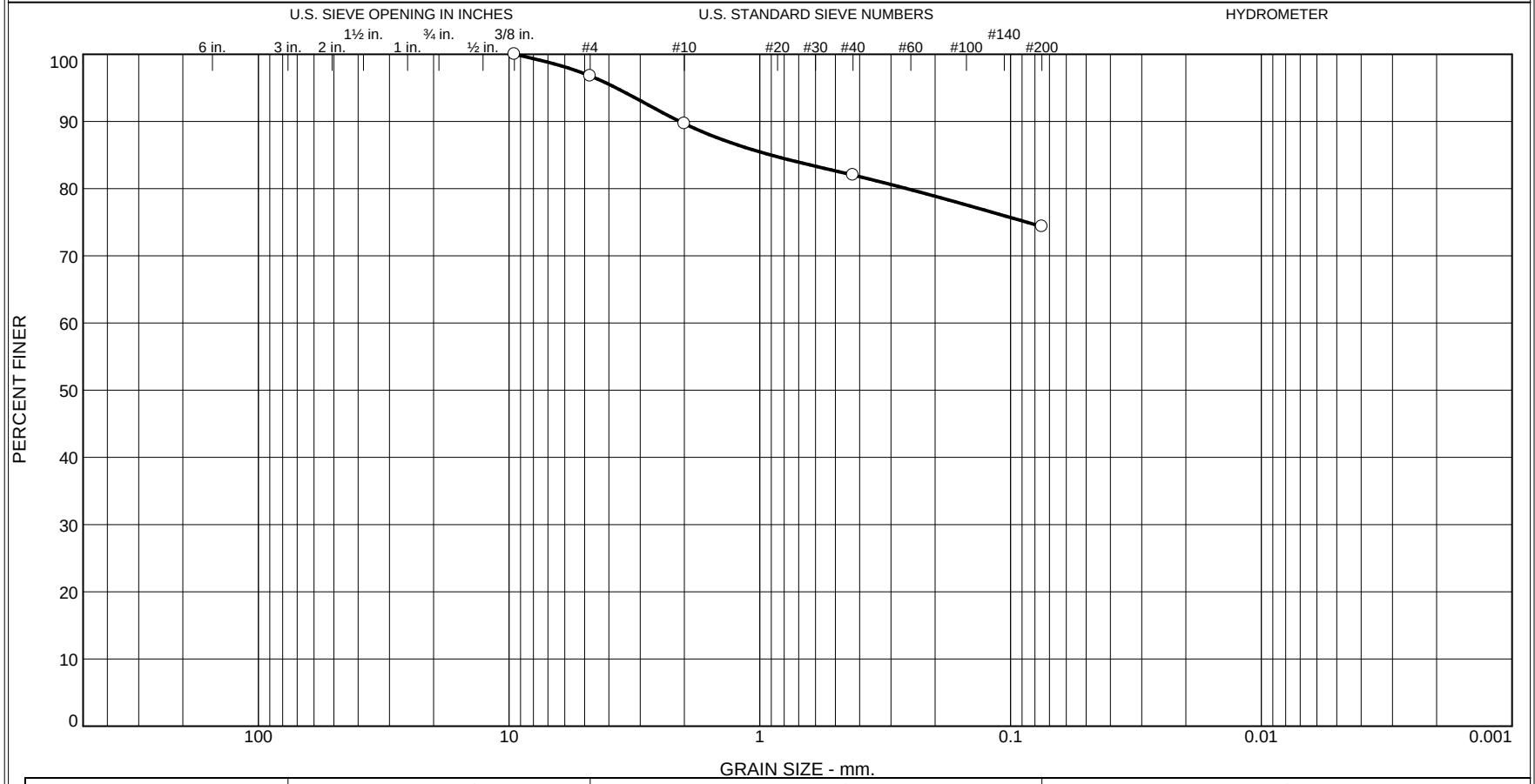
Materials Testing of Arkansas

Little Rock, AR

Figure

Tested By: C. SHEARER **Checked By:** F. MONDUN

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.2	7.1	7.7	7.6	74.4	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: TP-7 Depth: 1 Sample Number: S-2			3-3-2023

Client HOPE CONSULTING

Project MIDLAND ROAD SUBDIVISION

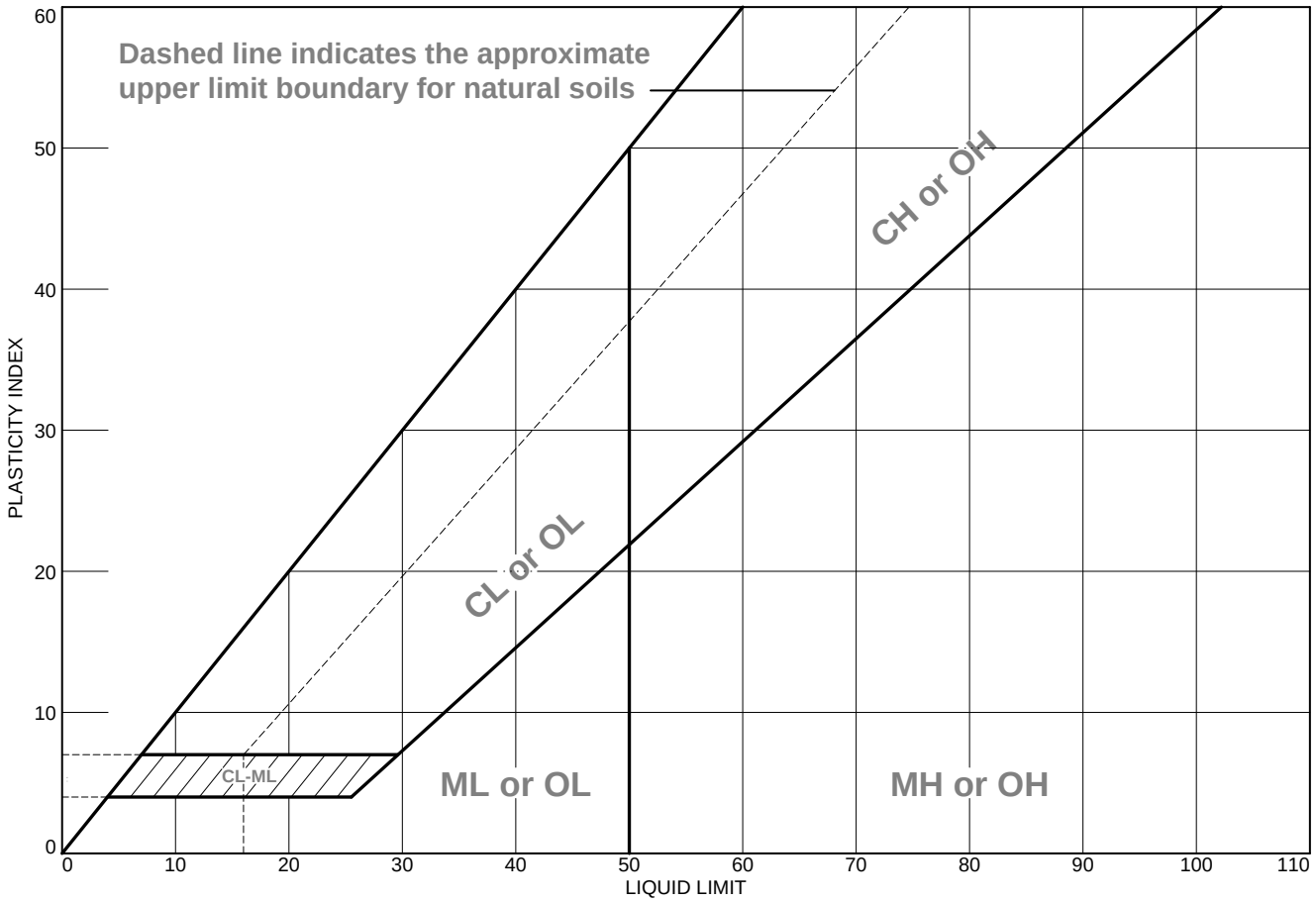
Project No. GEO23-023 Figure

Materials Testing of Arkansas

Little Rock, AR

Tested By: S. PENNINGTON **Checked By:** F. MONDUN

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN SILT W/ SAND	NV	NP	NP	82.0	74.4	ML

Project No. GEO23-023 **Client:** HOPE CONSULTING

Project: MIDLAND ROAD SUBDIVISION

●**Source of Sample:** TP-7 **Depth:** 1 **Sample Number:** S-2

Remarks:

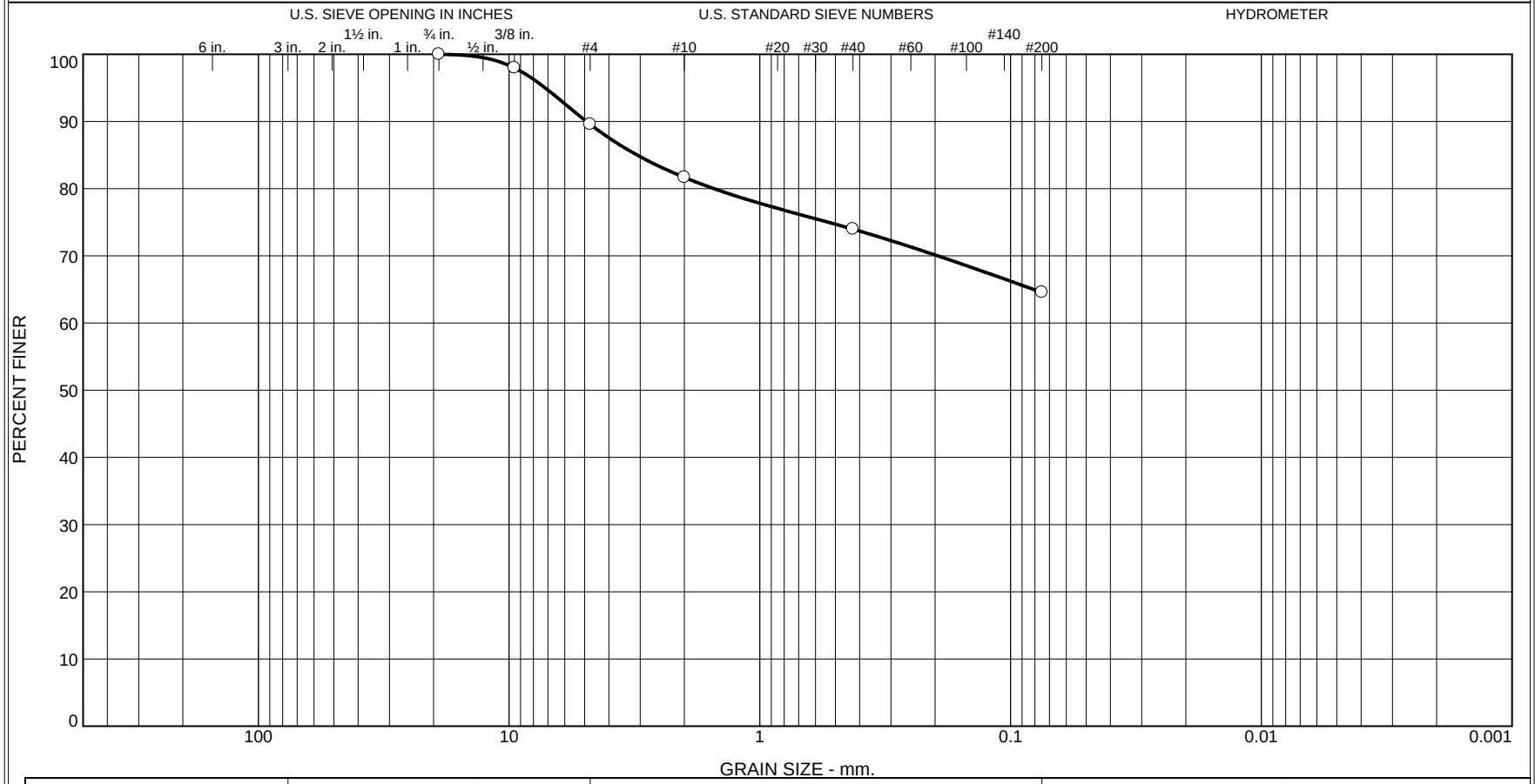
Materials Testing of Arkansas

Little Rock, AR

Figure

Tested By: C. SHEARER **Checked By:** F. MONDUN

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.4	7.9	7.7	9.4	64.6	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: TP-9 Depth: 0 Sample Number: S-1			3-3-2023

Client HOPE CONSULTING

Project MIDLAND ROAD SUBDIVISION

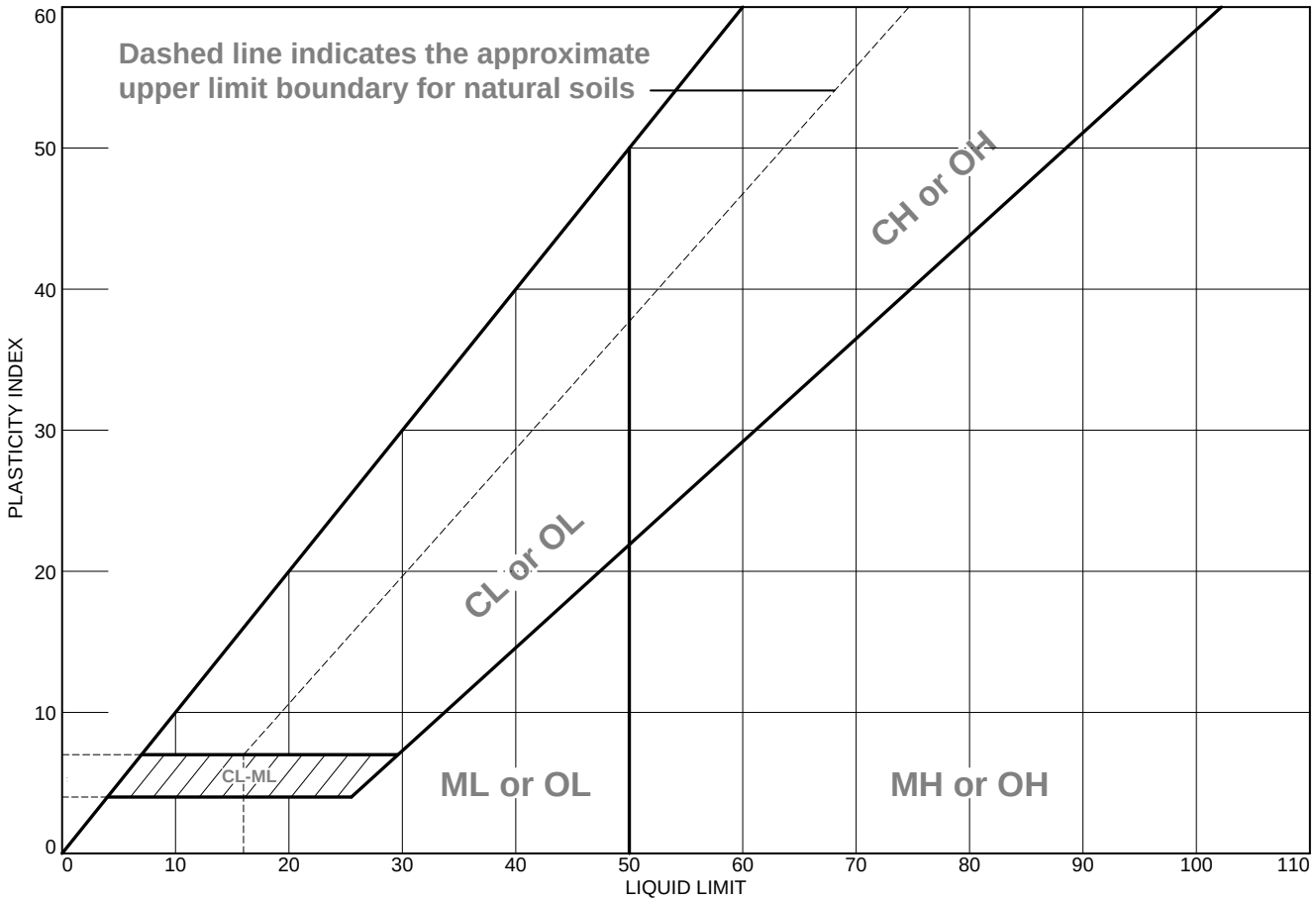
Project No. GEO23-023 Figure

Materials Testing of Arkansas

Little Rock, AR

Tested By: S. PENNINGTON **Checked By:** F. MONDUN

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN-GREY, SANDY SILT W/ ORGANICS	NV	NP	NP	74.0	64.6	ML

Project No. GEO23-023 **Client:** HOPE CONSULTING

Project: MIDLAND ROAD SUBDIVISION

●**Source of Sample:** TP-9 **Depth:** 0 **Sample Number:** S-1

Remarks:

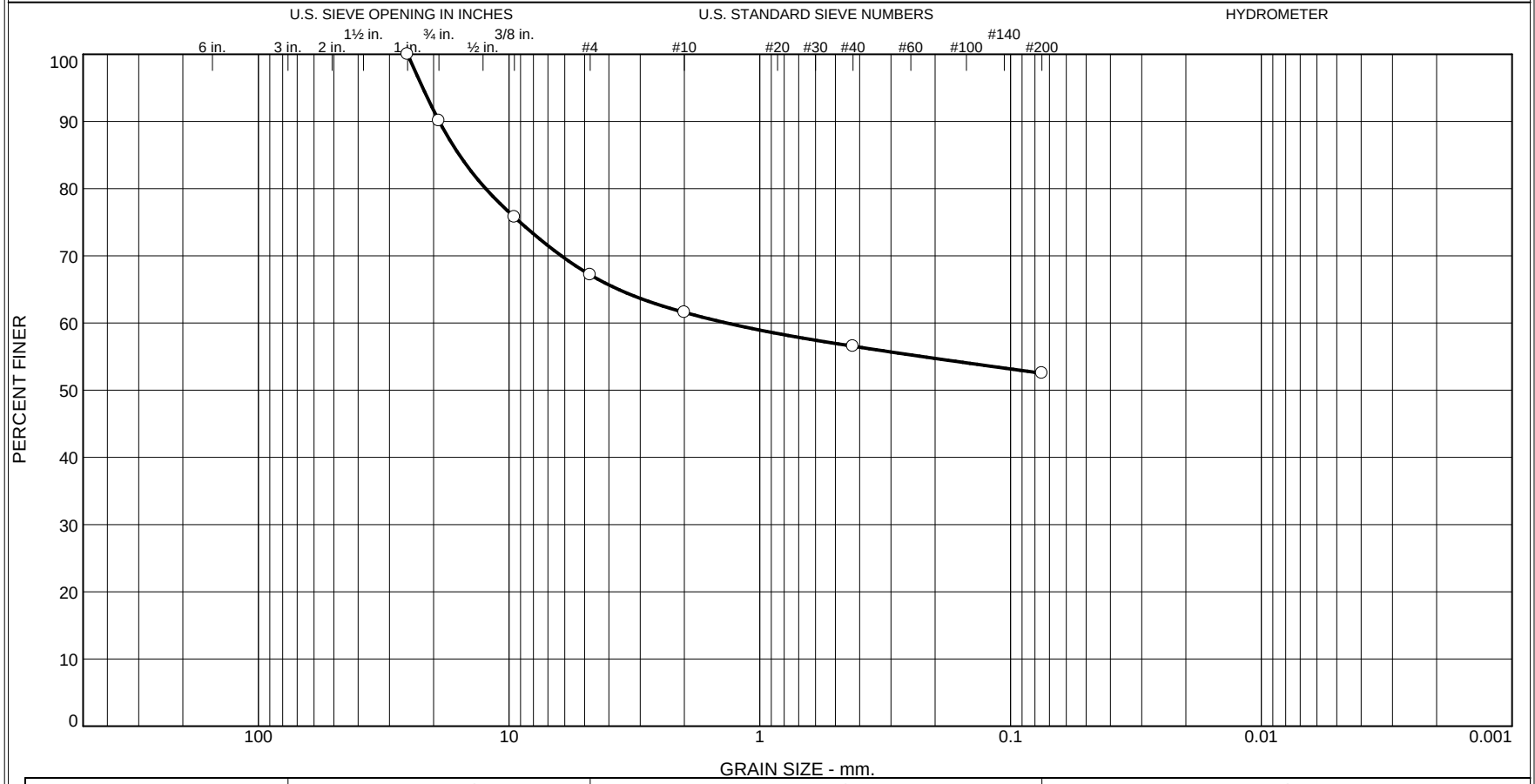
Materials Testing of Arkansas

Little Rock, AR

Figure

Tested By: C. SHEARER **Checked By:** F. MONDUN

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	9.9	22.9	5.6	5.1	4.0	52.5	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: TP-10 Depth: 4 Sample Number: S-4			3-3-2023

Client HOPE CONSULTING

Project MIDLAND ROAD SUBDIVISION

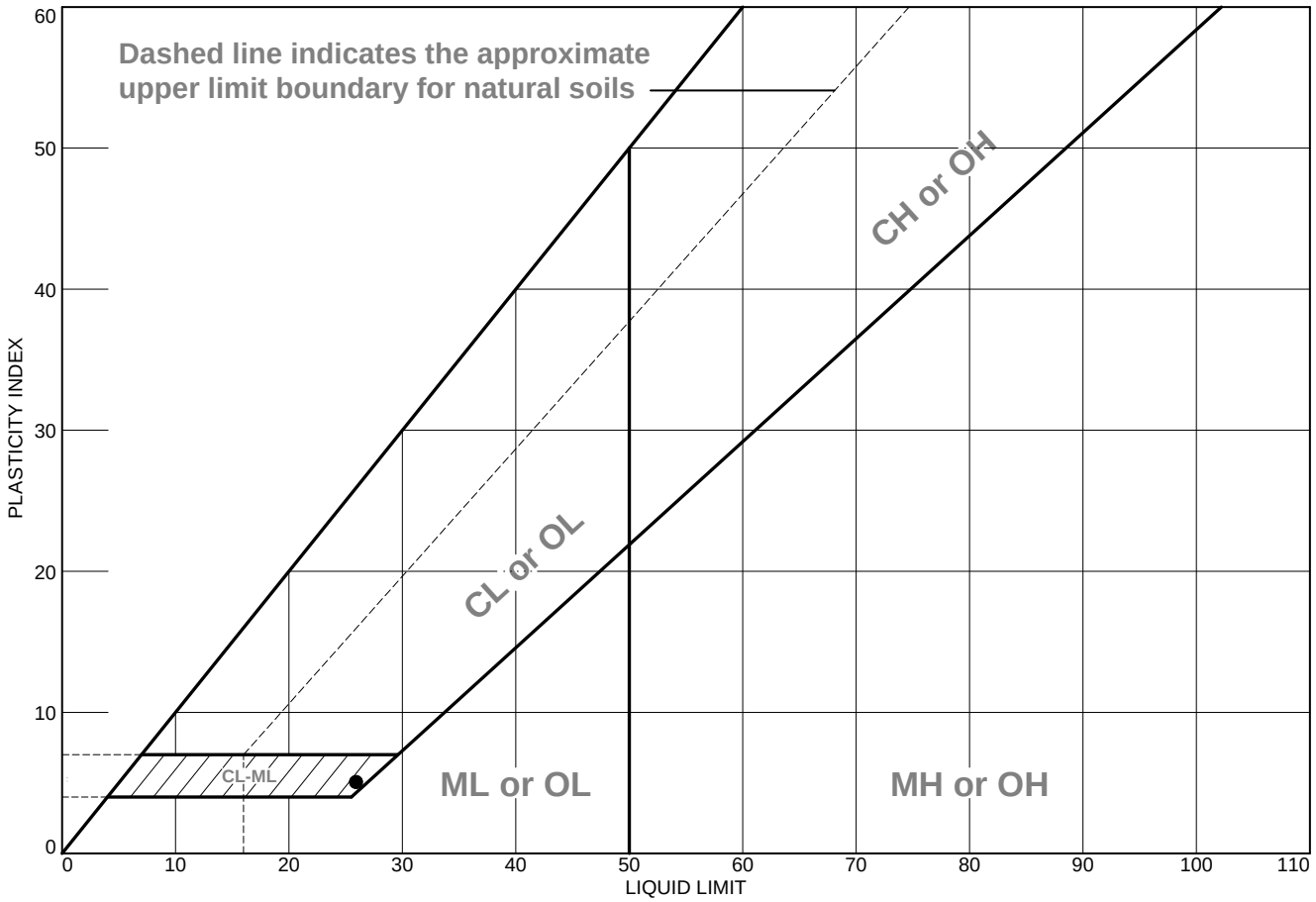
Project No. GEO23-023 Figure

Materials Testing of Arkansas

Little Rock, AR

Tested By: S. PENNINGTON **Checked By:** F. MONDUN

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN, GRAVELLY SILTY CLAY	26	21	5	56.5	52.5	CL-ML

Project No. GEO23-023 **Client:** HOPE CONSULTING

Project: MIDLAND ROAD SUBDIVISION

●**Source of Sample:** TP-10 **Depth:** 4 **Sample Number:** S-4

Remarks:

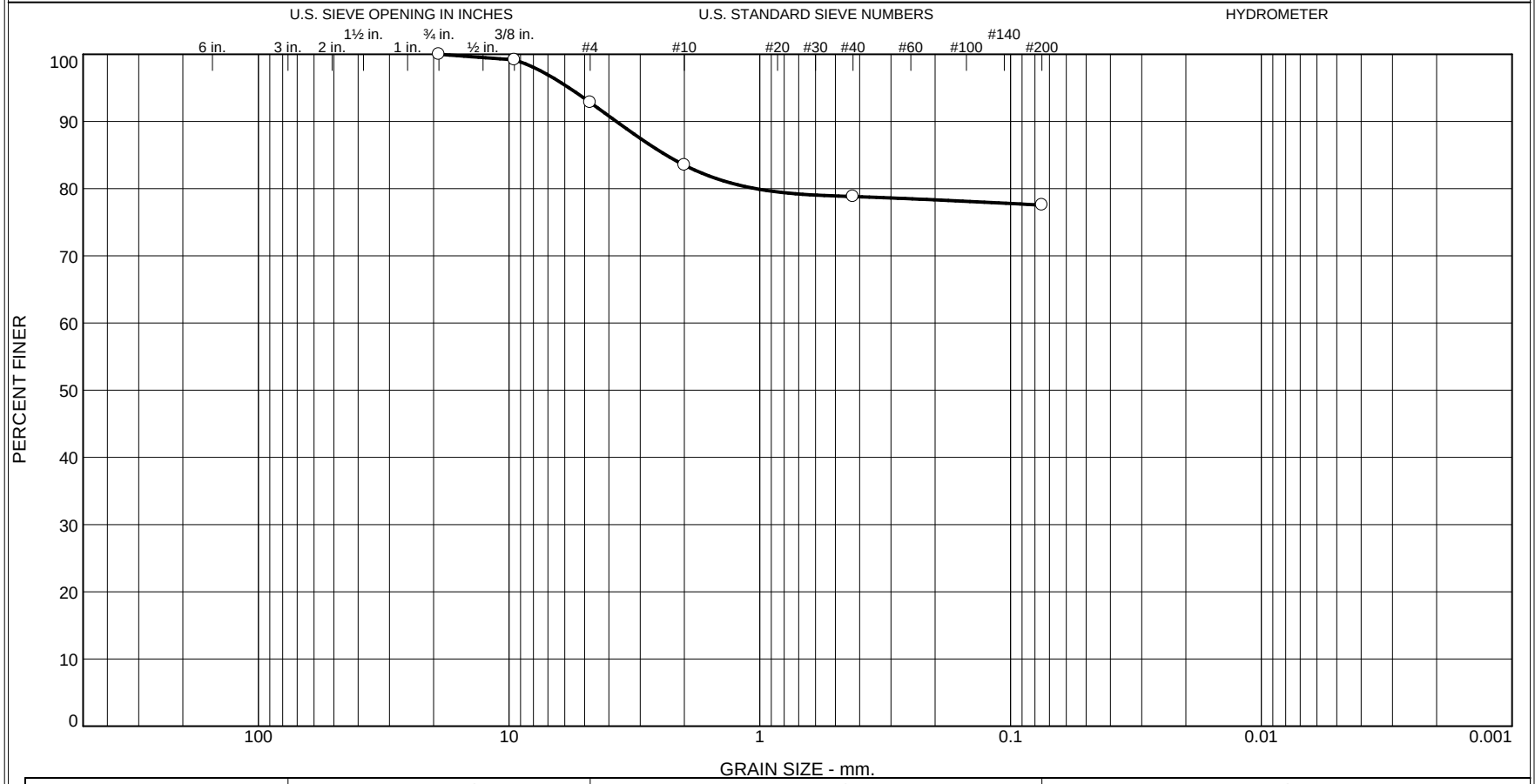
Materials Testing of Arkansas

Little Rock, AR

Figure

Tested By: C. SHEARER **Checked By:** F. MONDUN

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.2	9.3	4.7	1.2	77.6	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: TP-11 Depth: 4 Sample Number: S-4			3-3-2023

Client HOPE CONSULTING

Project MIDLAND ROAD SUBDIVISION

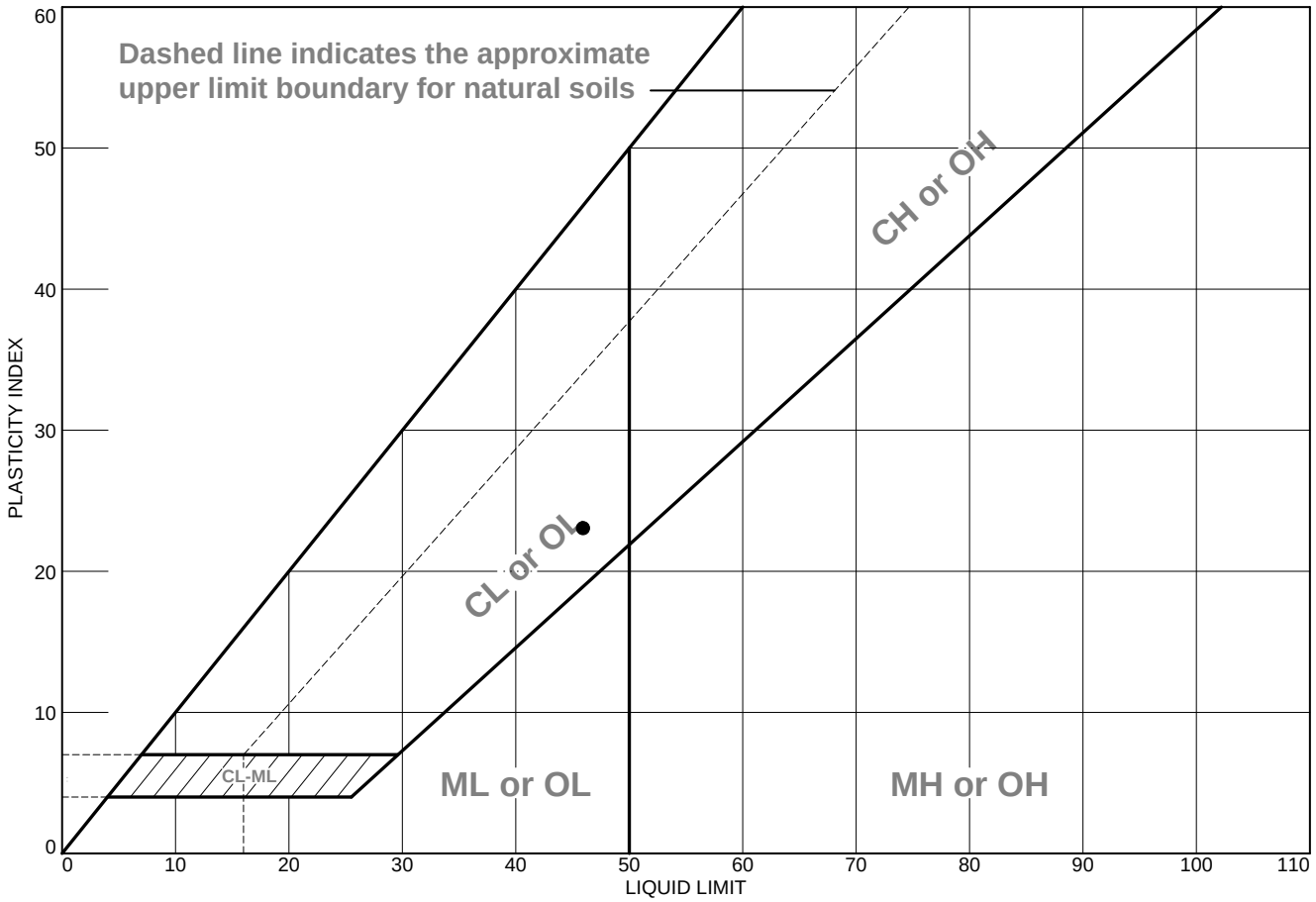
Project No. GEO23-023 Figure

Materials Testing of Arkansas

Little Rock, AR

Tested By: S. PENNINGTON **Checked By:** F. MONDUN

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN-GREY LEAN CLAY W/ SAND	46	23	23	78.8	77.6	CL

Project No. GEO23-023 **Client:** HOPE CONSULTING

Project: MIDLAND ROAD SUBDIVISION

●**Source of Sample:** TP-11 **Depth:** 4 **Sample Number:** S-4

Remarks:

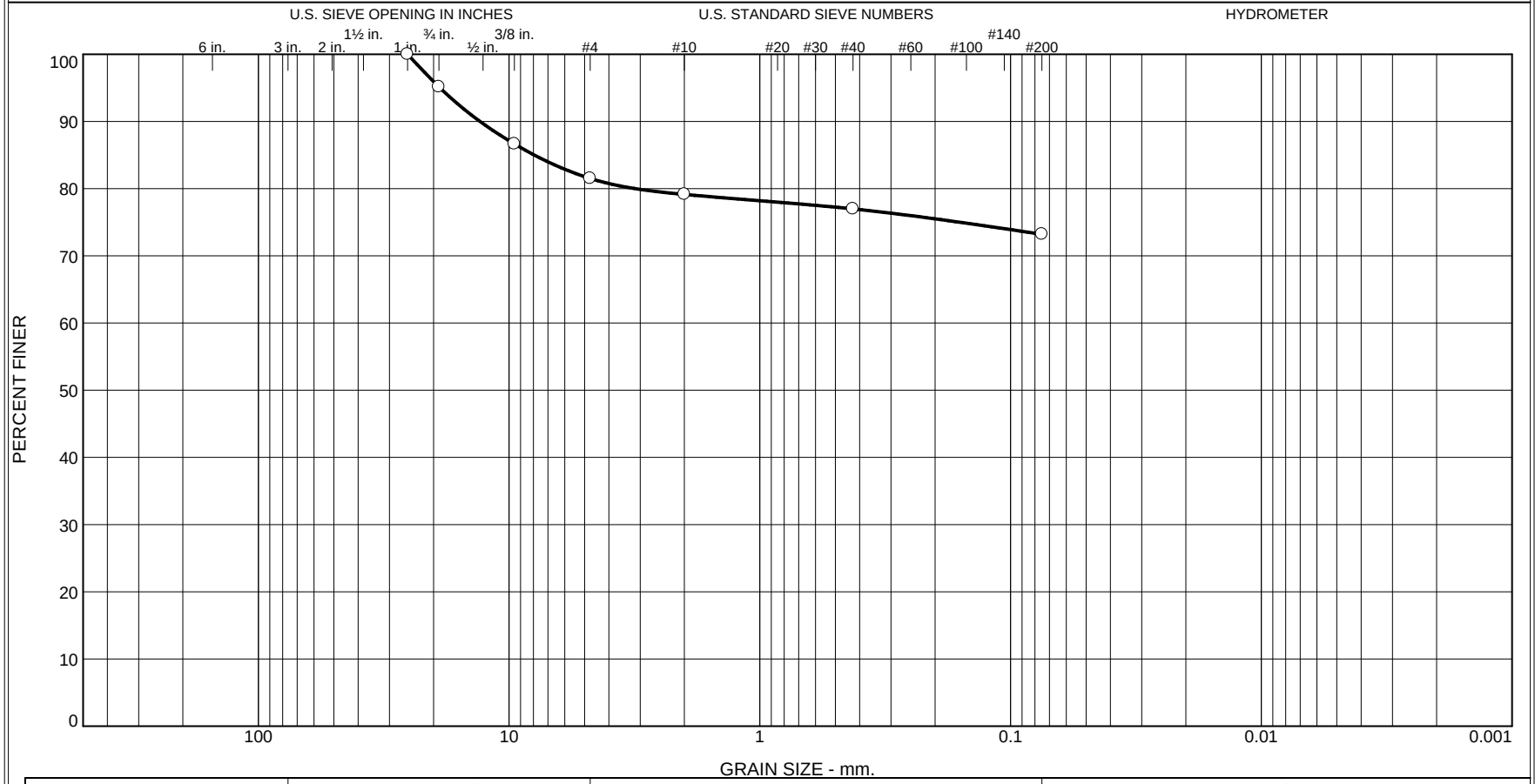
Materials Testing of Arkansas

Little Rock, AR

Figure

Tested By: C. SHEARER **Checked By:** F. MONDUN

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	4.8	13.7	2.4	2.1	3.8	73.2	

Identification	Date Sampled	Date Received	Date Tested
Source of Sample: TP-12 Depth: 2 Sample Number: S-3			3-3-2023

Client HOPE CONSULTING

Project MIDLAND ROAD SUBDIVISION

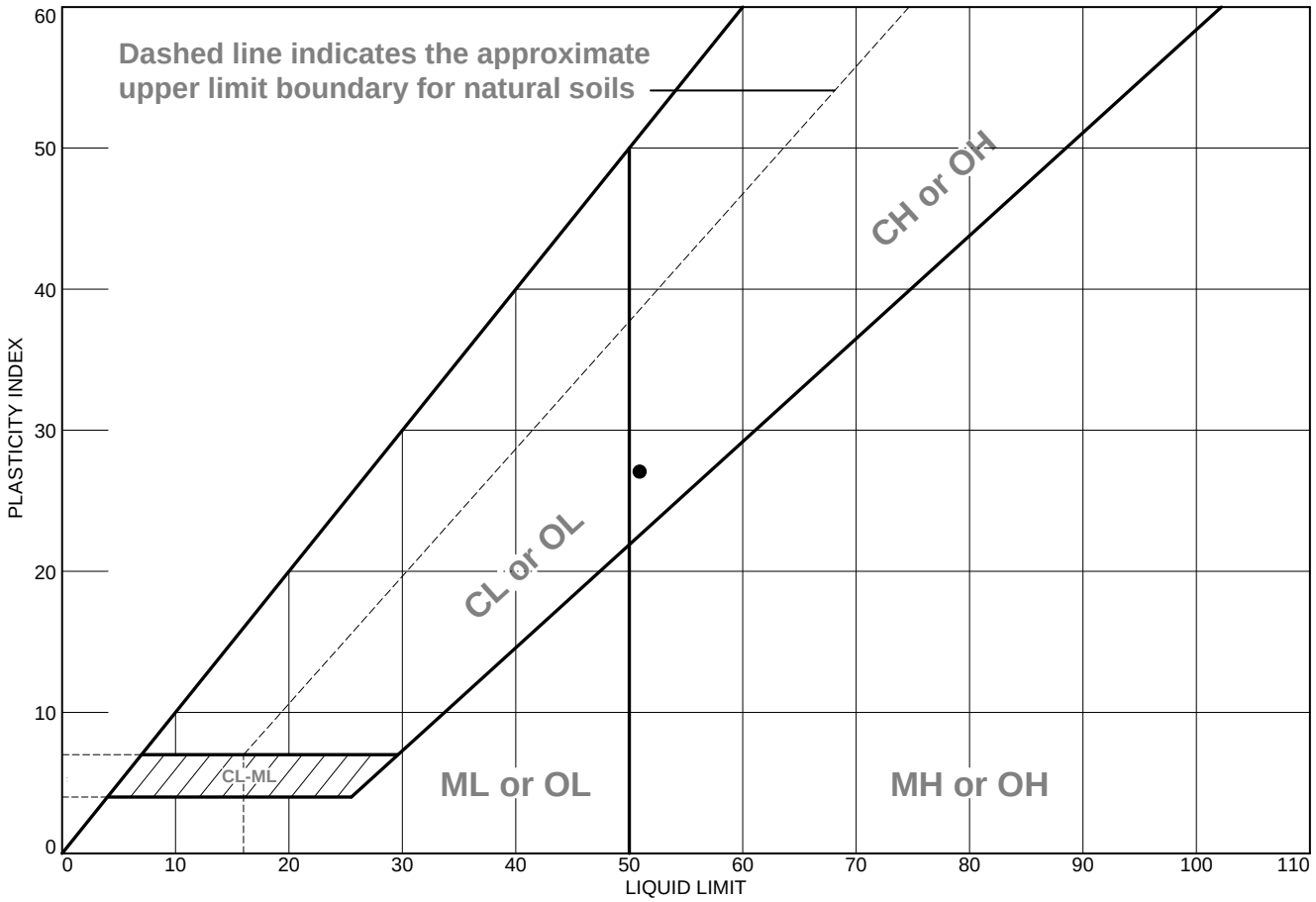
Project No. GEO23-023 Figure

Materials Testing of Arkansas

Little Rock, AR

Tested By: S. PENNINGTON **Checked By:** F. MONDUN

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	RED EXPANSIVE CLAY W/ GRAVEL	51	24	27	77.0	73.2	CH

Project No. GEO23-023 **Client:** HOPE CONSULTING

Project: MIDLAND ROAD SUBDIVISION

●**Source of Sample:** TP-12 **Depth:** 2 **Sample Number:** S-3

Remarks:

Materials Testing of Arkansas

Little Rock, AR

Figure

Tested By: C. SHEARER **Checked By:** F. MONDUN

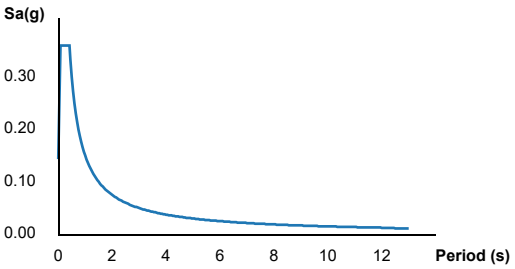
Appendix E:
Seismic Design Criteria

Hazards by Location

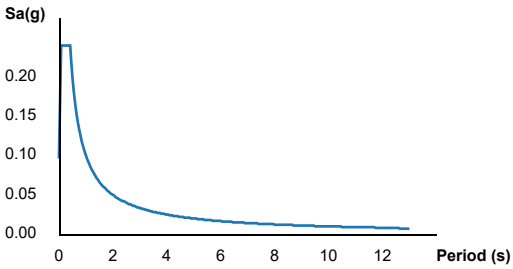
Search Information

Coordinates:	34.65036519728192, -92.46651549255981
Elevation:	360 ft
Timestamp:	2023-03-10T23:13:28.070Z
Hazard Type:	Seismic
Reference Document:	IBC-2015
Risk Category:	II
Site Class:	B

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.359	MCE_R ground motion (period=0.2s)
S_1	0.15	MCE_R ground motion (period=1.0s)
S_{MS}	0.359	Site-modified spectral acceleration value
S_{M1}	0.15	Site-modified spectral acceleration value
S_{DS}	0.239	Numeric seismic design value at 0.2s SA
S_{D1}	0.1	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	B	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1	Site amplification factor at 1.0s
CR_S	0.837	Coefficient of risk (0.2s)
CR_1	0.813	Coefficient of risk (1.0s)
PGA	0.184	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.184	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	0.359	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.429	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.15	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.184	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)

PGAd	0.6	Factored deterministic acceleration value (PGA)

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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