ECS Southwest, LLP

Geotechnical Engineering Report

Mirany Road SF Development

NWQ of FM 2933 & CR 1116
Melissa, Texas

ECS Project Number 19:9402

April 26, 2024

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Mr. Abdul Mohammed
Melissa Realty Partner
5851 Legacy Circle, 6th Floor, #600
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ECS Project No. 19:9402

Reference: Geotechnical Engineering Report
Mirany Road SF Development
NWQ of FM 2933 & CR 1116
Melissa, Texas

Dear Mr. Mohammed:

ECS Southwest (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the referenced project. Our services were performed in general accordance with our agreed scope of work. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

It has been our pleasure to be of service to Melissa Realty Partner during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify the assumptions of subsurface conditions made for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

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EXECUTIVE SUMMARY

This Executive Summary is intended as a very brief overview of the geotechnical conditions that are expected to affect design and construction. The following summarizes the main findings of the exploration, particularly those that may have a cost impact on the planned development. Further, our foundation recommendations are summarized. Information gleaned from the executive summary should not be utilized in lieu of reading the entire geotechnical report.

- The geotechnical exploration performed for this study consisted of a total of 41 borings each drilled to depths of approximately 10 to 20 feet below the existing site grades.

- Groundwater seepage was observed in the borings, B-07, B-11, B-12, B-14, B-27, B-29 and B-37 at depths of about 2 to 14 feet during drilling and at depths of about 4 to 8 feet upon the completion of drilling. Ground water seepage was not overserved in the remaining borings during and at completion of drilling.

- We anticipate that the planned buildings will be designed for potential vertical movements (PVM) of soil of 4.5 inches or less. Therefore, the planned single-family buildings can be supported by monolithic post-tensioned slab-on-grade foundation system.

- The soils encountered at the site consist of moderate to high plasticity clays with moderate expansion/movement potential of about 1 to 3.5 inches considering seasonal soil moisture variation of dry to moist conditions. These potential movements reflect moisture changes in the soil that can occur over the life of the structure and after construction is complete. Since the buildings will be designed for PVM of up to 4.5 inches, subgrade improvements (or, moisture conditioning) will not be necessary.

- It is recommended that ECS conduct a geotechnical review of the project plans (prior to issuance for construction) to check to see that ECS' geotechnical recommendations have been properly interpreted and implemented.

- To prevent misinterpretation of ECS recommendations, ECS should be retained to perform quality control testing and documentation during construction of the earthwork and foundations for the project.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for the design and construction 48 - 1+ acre lots single-family development with associated pavement and utilities improvements on an approximate 62.2 acres site. The project includes our subsurface explorations and geotechnical laboratory testing programs, site characterization, engineering analyses, and development of recommendations for the design and construction of the planned development.

Our services were provided in accordance with ECS Proposal No. 14095-Rev2, dated December 13, 2023, and authorized by the client by providing the Work Authorization Form on January 23, 2024. The authorized proposal includes ECS Terms and Conditions of Service.

This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items.

- A review and description of our field and laboratory test procedures and the results of testing conducted.
- A review of surface topographical features and site conditions.
- A review of area and site geologic conditions.
- A review of subsurface soil stratigraphy with pertinent available physical properties.
- Logs of soil test borings and laboratory test results.
- General recommendations for building pad preparation to reduce active clay soil movements.
- Geotechnical recommendations for suitable foundation system.
- General recommendations for site preparation and construction of compacted fills, including an evaluation of on-site soils for use as compacted fills.
- General recommendations for underground septic tanks.
- General recommendations for pavement design.
- General recommendations for retaining walls.
- General recommendations for detention pond.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE

The project site is an approximately 62.2 acres lot located on the northwest quadrant of FM 2933 and County Road 1116 in Melissa, Texas. Based on our site reconnaissance, the site is currently vacant and covered by grass and scattered trees. The site has a steep slope on the northwest corner of the site with a maximum and minimum elevation of about 648 and 614 feet, respectively. The ground surface elevations noted in this report were obtained from NCTCOG (www.dfwmaps.com), which provided elevation contours in 2 feet intervals. These elevations are approximate and should not be used for budgeting and construction purposes. The boring locations/coordinates and elevations should be surveyed by a licensed surveyor for design and construction purposes. The general site location is depicted in the figure below and on the Site Location Diagram in Appendix A.

Site Location

2.2 PROPOSED CONSTRUCTION

The following information explains our understanding and assumptions of the planned development including proposed building and related infrastructure. Should the following information differ from the final design, ECS should be provided the opportunity to review the updated plan and modify our recommendations as appropriate.

Design Information/ Assumptions

SUBJECT	DESIGN INFORMATION / ASSUMPTIONS
Usage	Residential
Building Type	48 single-family residential
Column Loads (assumed)	200 kips (Full Dead and Live Load) maximum
Wall Loads (assumed)	3 kips per linear foot (klf) maximum

If ECS' understanding of the project is not correct, especially if the structural loads are different, please contact ECS so that we may review these changes and revise our recommendations, as appropriate.

3.0 FIELD EXPLORATION

Our scope of work included drilling a total of forty-one (41) borings to depths about 10 to 20 feet below the existing grades. Our borings were located with a handheld GPS unit and their approximate locations are shown on the Boring Location Diagram in Appendix A.

Shelby tubes sampling procedure in general accordance with ASTM D1587 was used to obtain soil samples. In the Shelby tube sampling procedure, a thin-walled, steel seamless tube with sharp cutting edges is pushed hydraulically into the soil, and a relatively undisturbed sample is obtained. Samples were removed from samplers in the field, visually classified, and appropriately sealed in sample containers to preserve their in-situ moisture contents. Samples of cohesive soil were tested with a calibrated hand "pocket" penetrometer. In this test, the unconfined compressive strength of a soil sample is estimated to be a maximum of 4.5 tons per square foot (tsf) by measuring the resistance of the soil sample to the penetration of a small diameter, calibrated, spring-loaded cylinder.

Standard Penetration Tests (SPTs) were also performed to obtain representative samples and penetration resistance measurements in general accordance with ASTM D1586. Soil samples were obtained at various intervals with the 1.625-inch inside diameter, 2-inch outside diameter, Split-Barrel sampler. The Split-Barrel sampler was first seated 6 inches to penetrate loose cuttings, and then was driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler each 6-inch increment was recorded. The penetration resistance "N-value" is defined as the number of hammer blows required to drive the sampler the final 12 inches and is indicated on the test boring logs. In very dense materials such as weathered rock material, the SPT test is usually stopped after 50 blows from the hammer and the measurement is recorded as 50 blows per distance penetrated (i.e., 50 over 3 inches).

Texas Cone Penetrometer tests were performed to evaluate the load-carrying capacity of the rock encountered. These tests were performed in general accordance with test method Tex-132-E in the Texas Department of Transportation (TxDOT) Manual of Testing Procedures. The results of these tests are shown on the attached boring logs at the depths of occurrence.

Field logs of the soils encountered in the borings were maintained by the drill crew. After recovery, each geotechnical soil sample was removed from the sampler and visually classified. Representative portions of each soil sample were then wrapped in plastic and transported to our laboratory for further visual examination and laboratory testing. After completion of the drilling operations, the boreholes were backfilled with auger cuttings to the existing ground surface. The surface was patched with asphalt and concrete in the borings that were drilled through pavements.

3.1 SUBSURFACE CHARACTERIZATION

The regional parent geologic mapping indicates that the site is located within Austin Chalk (Kau) geologic formations. The parent rock of the Austin Chalk Formation is a chalky massive limestone. In the North Texas area this rock varies from 300 to 500 feet thick in full section. It can commonly be seen in the bottoms of creeks and in some cliff-like outcrops as a bluish-gray rock. Upper portions of this limestone typically weather to form tan limestone containing more frequent fractures, joints, and clay layers. Through chemical and mechanical weathering, the Austin Chalk forms highly plastic residual clay soils. These clays typically exhibit moderate to high shrink/swell with changes in

moisture. The clays directly above the rock are typically tan in color and limy (calcareous). Clays progressively closer to the ground surface take on a darker brown appearance, have higher plasticity and contain less calcareous deposits and limestone fragments.

The subsurface conditions encountered were generally consistent with published geological mapping, with the exception of fill material. For specific subsurface information, please refer to the boring logs in Appendix B.

Subsurface Stratigraphy

Approximate Depth to Bottom of Strata (ft)	Elevation of Bottom of Strata (1) (ft)	Stratum	Description	Consistency
1 to 7	EL. +647 to +626	I (2)	(CH) FAT CLAY, dark brown, brown, light brown, with calcareous nodules, limestone fragments	Stiff to Hard
1 to 6	EL. +644 to +611	II (3)	(CL) LEAN CLAY, brown, light brown, with limestone fragments	Stiff to Hard
2 to 16 (5)	EL. +644 to +604	IV	LIMESTONE, tan, weathered, with clay layers	Rock
10 to 20 (5)	EL. +639 to +618	V (4)	LIMESTONE, gray	Rock

Notes:

(1) The ground surface elevations noted in this report were obtained from NCTCOG (www.dfwmaps.com), which provided elevation contours in 2 feet intervals. These elevations are approximate and should not be used for budgeting and construction purposes. The boring locations/coordinates and elevations should be surveyed by a licensed surveyor to be referenced for design and construction.
(2) Stratum not encountered on Borings B-01, B-02, B-03, B-06, B-07, B-09, B-16, B-21, B-22, B-26, B-30, and B-34.
(3) Stratum not encountered on Borings B-04, B-05, B-10, B-11 through B-15, B-17 through B-20, B-23, B-27, B-28, B-31 through B-33, and B-35 through B-41.
(4) Stratum not encountered on Borings B-01, B-07, and B-35
(5) Boring termination depths.

3.2 GROUNDWATER OBSERVATIONS

In auger drilling operations, water is not introduced into the borehole and the groundwater level can often be determined by observing water flowing into the excavation. Furthermore, visual observation of soil samples retrieved can often be used in evaluating the groundwater conditions.

Ground water seepage was observed in the borings, B-07, B-11, B-12, B-14, B-27, B-29 and B-37 at depths of about 2 to 14 feet during drilling and at depths of about 4 to 8 feet upon the completion of drilling. Ground water seepage was not overserved on the reaming borings during and at completion of drilling.

Water observed within this geologic setting is generally referred to as a partially perched condition. Specifically, rainfall that enters the site, either directly from overland flow or from adjacent properties, begins to percolate through surficial soils and within the sand seams and clay fissures

and travels along that interface. This groundwater remains trapped, or flow continues downhill with the water table occasionally surfacing to form wet springs and intermittent streams. In the low-lying areas and adjacent to existing creeks, shallow groundwater table may be present in a continuous condition.

Variations in groundwater levels can occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors not immediately apparent at the time of this exploration. The highest groundwater observations are normally observed in the late winter and early spring. Therefore, the groundwater conditions at this site could be different at the time of construction. The possibility of groundwater level fluctuation should be considered when developing the design and construction plans for the project.

3.3 LABORATORY TESTING

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. The tests included moisture content, Atterberg limits, percent passing No. 200 sieve, overburden swell tests, lime pH series, soluble sulfates, and hydrometer. A Summary of test results is included in Appendix C.

Soil samples were visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) including USCS classification symbols. After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

The soil samples will be retained in our laboratory for a period of 60 days, after which they will be discarded unless other instructions are received as to their disposition.

4.0 DESIGN RECOMMENDATIONS

The following recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions. If there are any changes to the project characteristics or if different subsurface conditions are encountered during construction, ECS should be consulted so that the recommendations of this report can be reviewed. Site grading information was not provided during this report preparation; however, we have assumed that the finished pad elevations will be within 2 feet from the existing site grades. If the finished pad elevation deviates from this assumed grade, the recommendations provided below should be evaluated by our office.

4.1 POTENTIAL VERTICAL MOVEMENTS

The clay soils encountered at this site have moderate expansion potential. These soils are susceptible to shrink/swell tendencies that will cause seasonal movements throughout the life of the structure. For single family residential structures, we understand that a PVM of up to 4.5 inches is acceptable.

Based on test method TEX-124-E in the Texas Department of Transportation (TxDOT) Manual of Testing Procedures, and our experience with similar soils, we estimate potential vertical soil movements (PVM) will be about 1 to 3.5 inches, based on dry conditions. The actual movements could be greater if poor drainage, ponded water, and/or other unusual sources of moisture are allowed to saturate the soils beneath the structure after construction.

4.2 SUBGRADE IMPROVEMENTS

As mentioned above, the PVMs are estimated to be on the order of 1 to 3.5 inches and the post-tensioned slab-on-grade foundation design tolerance upper limit is 4.5 inches. Therefore, subgrade improvement of building pads to reduce the magnitude of PVM will not be necessary. We should be contacted to review our recommendations for subgrade improvements if PVM of less than 4.5 inches is required. Additional fill required above the existing grades should be placed in controlled lifts and density as described later in Section 5.0 Site Construction Recommendations of this report.

Building pads should be covered with a minimum 10-mil polyethylene (poly) sheets if foundation construction will not occur within three weeks of completion of site grading operations. This is applicable where more than two feet of fill will be placed over the existing site grades to achieve finished pad elevation. Use of poly sheet cover is not necessary in areas where fill of less than two feet in thickness will be required to achieve finished pad elevation. Poly sheet cover will help maintain moisture within the pad subgrade. Where used, the poly sheets should extend a minimum five feet beyond the building perimeter and remain in-place until the start of foundation construction. All fill material required to raise the pad elevations to final finished pad elevation should be moisture conditioned. Recommendations for earthwork operations are found in “Section 5.2 Earthwork Operations” of this report.

4.2.1 Existing Vegetation

Existing or recently removed trees and root systems can cause detrimental and excessive movements to planned developments. These movements can exceed the desired movements and often results in

the maximum swell potential of the underlying clay soils due to desiccation of these clays. Therefore, where existing trees (or root balls) are located, these areas should be undercut, and moisture conditioned. Tree stumps should be excavated and all roots larger than 2 inches in diameter should be removed from the site. The excavated areas should be backfilled with on-site soils at controlled moisture and density as per the report recommendations.

4.3 FOUNDATION DESIGN

The planned single-family buildings may be supported on post-tensioned monolithic slab-on-grade foundation system. The following sections provide recommendations for foundation design, pavements, detention pond, underground septic tanks, seismic design parameters and retaining walls.

4.3.1 Monolithic Slab-On-Grade (PTI Design Considerations)

We recommend that the planned single-family residential structures be supported by a monolithic slab-on-grade/grade beam structural foundation system. The slab should be designed in accordance with WRI/CRSI "Design Slab-On-Ground Foundations" or PTI "Design and Construction of Post-Tensioned Slabs-On-Ground". The following design parameters are recommended for the Post-Tensioning Institute's slab-on-grade design method (3rd Edition):

Recommended PTI Parameters – Single-Family

Single-Family Buildings	Center Lift		Edge Lift	
	Em (feet)	Ym (inches)	Em (feet)	Ym (inches)
Existing Soil Conditions	8.3	1.8	4.1	3.3

A net allowable soil bearing pressure of 2,000 psf can be used to design grade beams founded on the reworked existing soils or compacted non-expansive fill, as described in the section titled "Earthwork Operations". Grade beams should have a minimum width of 12 inches to reduce the possibility of bearing and/or local shear or "punching" failures. Additionally, the grade beams should extend at least 12 inches and 18 inches below final adjacent grade to utilize this bearing pressure for interior and exterior beams, respectively. Building exterior grades should be sloped to drain surface water away from the structure. A soil modulus of subgrade reaction (ks) of 100 pci may be used in the design of the slab.

These design parameters assume that positive drainage will be provided to drain water away from the structures. Surrounding lawn and landscape areas will be irrigated in a manner that prevents excessive wetting or drying of soils adjacent to the foundations. Greater potential movements could occur with extreme wetting/drying of the soils due to ponding of water, plumbing leaks or lack of irrigation.

If floor treatments that are sensitive to moisture will be used, a vapor barrier consisting of a minimum 10-mil polyethylene sheeting or similar material should be placed beneath the slab to minimize moisture migration through the slab. If a vapor barrier is considered to provide moisture protection, special attention should be given to the surface curing of the slabs to minimize uneven drying of the slabs and associated cracking and/or slab curling. The use of a blotter or cushion layer above the vapor barrier can also be considered for project specific reasons. Please refer to ACI

302.1R96 Guide for Concrete Floor and Slab Construction and ASTM E 1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs for additional guidance on this issue.

4.4 BUILDING PERIMETER CONDITIONS

Soils placed along the exterior of the foundations should consist of on-site clays, placed, and compacted in accordance with this report. The purpose of this clay backfill is to reduce the possibility of surface or subsurface water infiltration beneath the structure. Additionally, where lateral penetrations (for utilities) into or below the structure occur, a clay plug (or suitable synthetic alternative) should be placed at the building line to reduce water infiltration, regardless of the backfill material. A clay plug detail is included in Appendix D.

Positive drainage away from the structures should also be provided. Additionally, irrigation of lawn and landscaped areas should be moderate, with no excessive wetting or drying of soils around the perimeter of the structures allowed. Trees and bushes/shrubs planted near the perimeter of the structures can withdraw large amounts of water from the soils and should be planted, at least at a distance equal to their anticipated mature height, away from the building. Where flatwork is placed against or near the structures, a positive seal must be installed and adequately maintained to limit water intrusion. Down spouts and gutters should be used to collect and distribute water at least 10 feet away from the structure.
Routine maintenance of the building perimeter condition is necessary so that the recommendations contained in this report are followed and maintained. Greater potential vertical movements could occur with extreme wetting or drying of the soils due to poor drainage, ponding of water, plumbing leaks, lack of irrigation, and/or lack of routine maintenance, etc.

4.5 UNDERGROUND SEPTIC TANKS (UST)

The foundation bearing elevation and the locations of the proposed underground septic tanks (UST) were not available at this time. However, this report is based on the assumption that the bottom of the foundation bearing depth is approximately 4 feet below the finished grade or the top of limestone, whichever is shallower. The underground septic tanks' foundation can be supported by a 2-foot layer of reworked subgrade, with a maximum allowable soil bearing pressure of 2,000 psf. Additionally, the underground septic tanks must be supported by 4 inches of sand, sandy loam, clay loam, or pea gravel, free of rocks larger than ½ inch in diameter, placed both at the bottom and surrounding the tank.

Groundwater was observed in borings during drilling and could be present at or above the proposed bottom of the UST's foundations. Thus, underground septic tanks must be designed to resist uplift pressures due to hydrostatic loading. ECS recommends a design water table at the surface be used to evaluate uplift pressures. The uplift force at the tank location could be resisted by the dead weight of the structure, and the effective weight of backfill placed over the tank. An effective soil unit weights of 125 pounds per cubic foot (pcf) above water table and 62½ pcf below the water table can be used for uplift analysis.

The excavation slopes for tank installation must be made and maintained in accordance with OSHA excavation safety standards. Shoring and significant dewatering will be necessary during construction activities due to the saturated granular materials disclosed by the test borings. The

excavation contractor should be consulted for the feasibility of excavation support options based on the soil conditions encountered in the borings. The temporary ground support systems must be designed by a Professional Engineer.

The tank excavation may require dewatering such as installation of well points and/or using multiple sumps to lower water level at least 2 feet below the excavation bottom elevation to allow for construction. Appropriate precautions to manage seepage should be anticipated and the excavation contractor's Competent Person should have a clear understanding of the potential impact of water on the stability of the contractor's excavations. Water pumping operations should be performed and monitored such that migration of fines into the well points and sumps (which may adversely impact the stability of the excavations) and nearby off-site structures does not occur. Loss of fines can often result in settlement or movement of nearby structures, pavements, utilities, etc. The need and method of dewatering systems (e.g., conventional sumps and well points) should be evaluated by the foundation contractor based on the depth of excavations and groundwater conditions encountered at the time of excavation/construction. As noted in ***Section 5.1.4 Site Temporary Dewatering*** of this report, the contractor shall make their own assessment of temporary dewatering needs based upon the limited subsurface groundwater information presented in this report.

4.6 SEISMIC DESIGN CONSIDERATIONS

Seismic Site Classification: The International Building Code (IBC) 2015 requires site classification for seismic design based on the upper 100 feet of a soil profile. The methods are utilized in classifying sites, namely the shear wave velocity (v_s) method; the undrained shear strength (s_u) method; and the Standard Penetration Resistance (N-value) method. The undrained shear strength (s_u) method was used in classifying this site.

Seismic Site Classification

SEISMIC SITE CLASSIFICATION				
Site Class	**Soil Profile Name**	**Shear Wave Velocity, Vs, (ft./s)**	**N value (bpf)**	**S_u (psf)**
A	Hard Rock	Vs > 5,000 fps	N/A	N/A
B	Rock	2,500 < Vs ≤ 5,000 fps	N/A	N/A
C	Very dense soil and soft rock	1,200 < Vs ≤ 2,500 fps	>50	$S_u \geq 2{,}000$
D	Stiff Soil Profile	600 ≤ Vs ≤ 1,200 fps	15 to 60	1,000 ≤ S_u ≤ 2000
E	Soft Soil Profile	Vs < 600 fps	<15	S_u < 1000

Based upon our interpretation of the subsurface conditions, the appropriate Seismic Site Classification is "C" as shown in the preceding table.

Ground Motion Parameters: In addition to the seismic site classification, ECS has determined the design spectral response acceleration parameters following the IBC methodology. The design responses for the short (0.2 sec, S_{DS}) and 1-second period (S_{D1}) are noted at the far-right end of the following table.

Ground Motion Parameters

GROUND MOTION PARAMETERS [IBC 2015 Method]								
Period (sec)	**Mapped Spectral Response Accelerations (g)**		**Values of Site Coefficient for Site Class**		**Maximum Spectral Response Acceleration Adjusted for Site Class (g)**		**Design Spectral Response Acceleration (g)**	
Reference	Figures 1613.3.1 (1) & (2)		Tables 1613.3.3 (1) & (2)		Eqs. 16-37 & 16-38		Eqs. 16-39 & 16-40	
0.2	S_S	0.118	F_a	1.2	$S_{MS}=F_aS_s$	0.141	$S_{DS}=2/3\ S_{MS}$	**0.094**
1.0	S_1	0.058	F_v	1.7	$S_{M1}=F_vS_1$	0.099	$S_{D1}=2/3\ S_{M1}$	**0.066**

The Site Class definition should not be confused with the Seismic Design Category designation which the structural engineer typically assesses. If a higher site classification is beneficial to the project, we can provide additional testing methods that may yield more favorable results.

4.7 PAVEMENT SECTIONS

For the design and construction of exterior pavement, the subgrade should be prepared in accordance with the recommendations contained in this report and city guidelines.

As previously noted, the PVM of this site is estimated to be about 1 to 3.5 inches. Please note, the recommended pavement sections provided below are considered the minimum necessary to provide satisfactory performance based on the provided traffic loading. In some cases, jurisdictional minimum standards for pavement section construction may exceed those provided above.

Typical pavement sections are provided below. The Standard Duty and Medium Duty asphalt pavements with lime stabilization are adequate for design life of 50,000 and 100,000 ESAL, respectively. The Standard Duty and Medium Duty concrete pavements without lime stabilization are adequate for design life of 50,000 and 125,000 ESAL, respectively. If lime stabilization is performed beneath concrete pavements, the Standard Duty and Medium Duty concrete pavements are adequate for design life of 80,000 and 200,000 ESAL, respectively.

In some cases, jurisdictional standards for pavement section construction may exceed those provided below. In that case, the pavement sections should follow the jurisdictional standards.

Recommended Pavement Sections

PAVEMENT SUMMARY	PRIVATE PARKING	PRIVATE DRIVES
Concrete Thickness (in)	5 inches	6 inches
Concrete Strength (psi)	3,600 psi	3,600 psi
Subgrade Type Thickness (in)	6” Lime Stabilized (8%)	6” Lime Stabilized (8%)
Reinforcing Steel	# 3 bars @ 24” OCEW	#3 bars @ 18” OCEW

PAVEMENT SUMMARY	PRIVATE PARKING	PRIVATE DRIVES
Notes: *In Lieu of lime stabilization, private parking and drives pavement thickness can be increased by 1 inch.* *Concrete should be air entrained with a minimum entrained air of 3.0%.* *Pavement Design Life is 20 Years.* *Joints and Maintenance are critical to the long-term performance of the pavements.*		

Based on the information provided by the client and JBI Partners on April 25, 2024, we understand the residential roadway is being designed to consist of asphalt pavement according to the Collin County Roadway Standards. These standards pavement details consist of the following requirements: a 2-inch course surface treatment or 2 inches of hot mix asphalt concrete, an 8-inch flexible base beneath the asphalt, and a minimum 6-inch lime stabilized subgrade with 7% lime by dry weight of the soil. However, based on the lime pH series laboratory results, we recommended that the lime stabilized subgrade contains 8% lime by dry weight of the soil.

Pavement Materials

Pavement materials should be in accordance with the most current City of Melissa Engineering Standards, as well as the latest edition of North Central Texas Council of Governments (NCTCOG) Standard Specifications for Public Works Construction (4th Edition). Pavement should be specified, constructed, and tested to meet the following requirements:

1. All concrete shall be sulfate-resistant mix design.
2. Portland Cement Concrete: A minimum 3,600 psi compressive strength at 28 days for residential roadways, Fire Lane, and Alley pavement per City of Melissa standard drawings
3. Reinforcing steel may consist of #3 reinforcing steel bars placed at 18 inches on center each way for private pavement. The reinforcing steel should be placed at mid-point of the pavement section.
4. Concrete Pavement Joints:
    a. Longitudinal Joints spacing shall match lane lines unless noted otherwise.
    b. Expansion Joints in pavement shall be redwood boards only with a spacing of three hundred (300) feet. Expansion joints shall be sawcut within 24 hours of placement.
5. Lime Stabilized Subgrade: A minimum 8% lime by dry weight of soil. The material should be compacted to a minimum 95 percent of standard Proctor maximum dry density (ASTM D 698) and at or above three percentage points of the material's optimum moisture content.
6. Crushed Granular Base Material: Item 247 of the TxDOT Standard Specifications, Type A or D, Grade 1 or 2 or better. The material should be compacted to a minimum 95 percent of standard Proctor maximum dry density (ASTM D 698) and within three percentage points of the material's optimum moisture content.

4.7.1 Soluble Sulfates and Lime pH Series

Soluble sulfate tests were performed according to TxDOT test method; Tex-145-E on sampled soils to evaluate the potential for heave due to an expansive lime-sulfate reaction. The laboratory test results indicated that soluble sulfate concentrations are lower than 1,000 ppm in these soils.

Usually, soils with soluble sulfate concentrations of above 10,000 ppm or more indicate an unacceptable risk associated with sulfate-induced heave.

The soluble sulfate test results, presented below, are preliminary and provide information on the specific soils sampled and tested. Other soil at the site, and imported materials, may be more or less corrosive. Water-soluble sulfate concentrations can vary due to the addition of fertilizer, irrigation, and other possible development activities. Providing a detailed assessment of the corrosion potential of the site soil is not within our scope of work. A qualified corrosion specialist should be contacted if a detailed evaluation is required. Test results are summarized in the following table:

Soluble Sulfates (TEX-145-E)

Boring No.	Sample No.	Depth (feet)	SULFATES (ppm)
B-14	S-1	0 – 2	75
B-14	S-2	2 – 4	91
B-15	S-1	0 – 1	73
B-17	S-1	0 – 2	70
B-20	S-1	0 – 2	90
B-26	S-1	0 – 1	95
B-32	S-1	0 – 2	77
B-37	S-1	0 – 1	93
B-41	S-1	0 – 2	107

Based on the laboratory lime pH series test result, a lime application rate of 8% hydrated lime by dry weight of clay should be used for budgeting purposes. The lime-stabilized clay should be thoroughly mixed and appropriately mellowed for at least 48 hours and tested for gradation and lime solubility (pH) prior to final placement and compaction. Prior to using lime, additional sulfate testing and lime pH series should be performed on the pavement subgrade after final grading to determine the amount of sulfates and whether or not lime is suitable for use or if additional mixing or mellowing is required.

Once appropriately mixed and mellowed, this material may then be placed and compacted, in 8 inch loose lifts, at workable moisture contents 3 percentage points above the optimum moisture content and compacted to at least 95% of the Maximum Dry Density as obtain using the Standard Proctor Method (ASTM D-698). Lime treatment should extend at least 1 foot beyond exposed pavement edges to reduce the effects of shrinkage and associated loss of subgrade support. Density tests should be performed at a frequency of 1 test per 5,000 square feet of pavement. The actual amount of lime required should be confirmed by additional laboratory tests (lime series) during the construction phase.

All proposed paved areas should be proof rolled with heavy compaction equipment to attempt to locate any soft or undesirable soils so they can be removed and replaced with properly placed and compacted soils. Any new fill may consist of on-site soils or similar. These materials should be compacted to at least 95% of the Maximum Dry Density at or above optimum moisture content as obtained using the Standard Proctor Method (ASTM D698). Care should be taken to verify and preserve the specified moisture levels in the reworked clays prior to placement of the pavements.

An important consideration with the design and construction of pavements is surface and subsurface drainage. Where standing water develops, either on the pavement surface or within the base course layer, softening of the subgrade and other problems related to the deterioration of the pavement can be expected. Furthermore, good drainage should reduce the possibility of the subgrade materials becoming saturated during the normal service period of the pavement.

4.8 SITE RETAINING WALLS

Unlike below grade walls, site retaining walls are free to rotate at the top (not restrained). For these walls, the "Active" (k_a) soil condition should be used along with a triangular distribution of earth pressures. In addition, site retaining walls should be designed to withstand lateral earth pressures exerted by the backfill and any surcharge loads within the "Critical Soil Zone". The Critical Zone is defined as the area between the back of the retaining wall footing and an imaginary line projected upward and rearward at a 45-degree angle.

The lateral earth pressures developed behind site retaining walls are a function of the backfill soil type, backfill slope angle, and any surcharge loads. For the design of site retaining walls, we recommend the soil parameters provided below.

RETAINING WALL BACKFILL IN THE CRITICAL SOIL ZONE		
Soil Parameter	**Estimated Value**	**Estimated Value**
Soil Classification	PI of 20 or less	On-Site Soils
Coefficient of Active Earth Pressure (K_a)	0.29	0.45
Retained Soil Moist Unit Weight (γ)	125 pcf	120 pcf
Angle of Internal Friction (ϕ)	32°	22°
Active Equivalent Fluid Density (pcf)	40	54

FOUNDATION SOILS	
Soil Parameter	**Estimated value**
Allowable Soil Bearing Pressure	2,000 psf
Minimum Wall Embedment Below Grade	24 inches
Coefficient of Passive Earth Pressure (K_p)	2.2
Soil Moist Unit Weight (γ)	120 pcf
Interface Friction Angle [Concrete on Soil] (ϕ_f)	22°
Sliding Friction Coefficient [Concrete on Soil] (μ)	0.40
Passive Equivalent Fluid Pressure	265H (psf)

It is critical that the soils used for backfilling of the retaining walls meet the soil parameters recommended above. If the soils available do not meet those parameters, then ECS should be contacted to provide revised values, and to confirm that only suitable soils will be used for wall backfill.

Care should be used to avoid the operation of heavy equipment to compact the wall backfill since it may overload and damage the wall. In addition, such loads are not typically considered in the design of site retaining walls and are not provided for in our recommendations.

Wall Drainage: Retaining walls should be provided with drainage system to relieve hydrostatic pressures which may develop behind the walls. This system should consist of weepholes through the wall and a 4-inch perforated, closed joint drain line located along the backside of the walls above the top of the footing. The drain line should be surrounded by a minimum of 6 inches of AASHTO #57 Stone wrapped with an approved non-woven geotextile, such as Mirafi 140-N or equivalent. Wall drains can consist of a 12-inch-wide zone of free draining gravel, such as AASHTO #57 Stone, employed directly behind the wall and separated from the soils beyond with a non-woven geotextile. Alternatively, the wall drain can consist of a suitable geocomposite drainage board material. The wall drain should be hydraulically connected to the foundation drain.

4.9 DETENTION FACILITIES

For open detention features, we recommend that the side slopes be no steeper than 4H: 1V. The embankment section, including the backfill of the conduits through the natural soils, should be constructed as a homogenous section. Circular discharge conduits from the pond should be underlain by a concrete cradle on the upstream 1/3 and a drainage blanket installed down the downstream 2/3 of the embankment. Both Features extending up to the spring line of the pipe. For box structures, the concrete cradle is not required, but drainage should be considered.

All fills placed within the detention limits should be placed in lifts not exceeding 8 inches in loose thickness, moisture conditioned on the wet side of the optimum moisture content (3% or higher) and compacted to at least 95% of the Maximum Dry Density obtained in accordance with ASTM Specification D-698, Standard Proctor Method. Any fills placed within the embankment sections should be benched into natural soils in order to minimize weak planes and seepage zones between the new fill and natural soils. All subgrade soils (walkways, fill subgrade, etc.) should be scarified, re-worked, moisture conditioned and compacted to these requirements as well.

In order to facilitate the establishment of grass on the embankment side slopes, it is considered acceptable to place up to a 12-inch thick layer of topsoil on the faces of the embankment slopes. The topsoil material should be placed in maximum 6 inch loose lifts and should be compacted, or tracked in with at least four passes of a tracked dozer. The final slope configuration of the embankments should be constructed at gradients of 4H: 1V, or flatter to provide adequate factors of safety with respect to stability. The suggested maximum slopes are based on past experience with similar pond slopes and embankment construction within similar geologic settings. Embankment slopes should be vegetated as soon as possible after completion of construction. Protection against erosion is important to maintain slope profile.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

In a dry and undisturbed state, the upper 1-foot of the majority of the soil at the site should provide good subgrade support for fill placement and construction operations. However, when wet, this soil will degrade quickly with disturbance from contractor operations. The soils at the site are moisture and disturbance sensitive and contain fines which are considered erodible. Therefore, good site drainage and erosion control measures should be implemented during earthwork operations to maintain the integrity of the soil.

The surface of the site should be kept properly graded in order to enhance drainage of the surface water away from the proposed structures during the construction phase. We recommend that an attempt be made to enhance the natural drainage without interrupting its pattern, where possible.

Contractor should carefully plan activities to limit exposure of the subgrade to weather and construction equipment traffic and provide and maintain good site drainage during earthwork operations. All erosion and sedimentation shall be controlled in accordance with sound engineering practice and current jurisdictional requirements.

5.1.1 Stripping and Grubbing

The subgrade preparation should consist of stripping all existing vegetation, topsoil, deleterious materials, existing fill (as defined in this report), and soft or unsuitable soil from within the 5-foot outside the perimeter of buildings, and areas receiving new fill. Deeper topsoil or organic laden soils may be present in wet, low-lying, and poorly drained areas. ECS should be retained to verify that topsoil and unsuitable surficial materials have been removed prior to the placement of structural fill or construction of structures.

5.1.2 Proofrolling (Soil Subgrades)

Prior to fill placement or other construction on subgrades, the subgrades should be evaluated by an ECS field technician. The exposed subgrade should be thoroughly proofrolled with construction equipment having a minimum axle load of 10 tons [e.g. fully loaded tandem-axle dump truck]. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. This procedure is intended to assist in identifying any localized yielding materials.

Where proofrolling identifies areas that are yielding or “pumping” subgrade, those areas should be repaired prior to the placement of any subsequent Structural Fill or other construction materials. Methods of stabilization include undercutting, moisture conditioning, or chemical stabilization. The situation should be discussed with ECS to determine the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in determining the cause of the observed yielding materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade.

5.1.3 Rock Excavation Considerations

Shallow rock was encountered in some borings during our subsurface exploration and rock excavation techniques may be necessary for this project. It has been our experience that single-tooth rippers can usually rip to depths on the order of two (2) to three (3) feet below the top of the tan limestone in large, open, excavations. Below that, or in small excavations, more extensive efforts are required. If excavations are advanced deeper than 1 to 2 feet below the top of the tan limestone, excavation or ripping can be achieved only with great difficulty, and other means are normally required in order to facilitate removal of the rock.

For purposes of contract terms, we recommend that "rock" be defined as follows: "Rock shall be defined as those natural materials which cannot be excavated in an open excavation with a Caterpillar Model No. D-8, heavy duty tract type-tractor, weighted at not less than 285 hp (flywheel power) and equipped with a single-shank hydraulic ripper, capable of exerting not less than 45,000 lbs. breakout force, or equivalent machinery. For footings, utility trenches and pits, rock shall be defined as those materials that cannot be excavated with a Caterpillar Model No. 215D LC tract-type hydraulic excavator, equipped with a 42-inch wide short-tip radius rock bucket, rated at not less than 120 hp flywheel power with bucket-curling force of not less than 25,000 lbs. and stick-crowd force of not less than 18,000 lbs."

Depending on the excavation methods, the rock at this site will typically excavate in relatively large, blocky and platy pieces, which are difficult to compact for suitable long-term performance. Also, these materials experience rapid degradation due to weathering over relatively short periods of time, once exposed to air and water conditions. Therefore, these larger pieces, which break up as rock-like fragments in the initial excavation, must be compacted with sufficient compaction energy to substantially break them down into soil size particles during construction.

Excavated tan limestone may be suitable for fill within the building and paving limits. For the purposes of this report, all rock materials excavated at the site will be considered nondurable. Nondurable rock materials removed during excavations may be used as fill if suitably decomposed by mechanical effort. Durability is the term used to describe the ability of a rock or rock-like material to withstand long term chemical and mechanical weathering without size degradation. Any rock excavated from the site and used as earthwork fill should have a well-graded grain size distribution with rock and soil particles ranging from clay or silt size particles to a maximum size of 4 inches in diameter with 2 inches thick plates. Particles larger than this should be decomposed by mechanical compaction equipment to achieve the desired grain size distribution.

Once appropriately broken down, this material may then be placed and compacted at workable moisture contents above the optimum moisture content and compacted to at least 95% of the Maximum Dry Density as obtain using the Standard Proctor Method (ASTM D-698).

5.1.4 Site Temporary Dewatering

Based upon our subsurface exploration at this site, we believe construction dewatering at this site will be mainly limited to removing accumulated rainwater from low lying areas and some minor seepage.

Temporary sump pits can be used and established at an elevation below the bottom of the excavation subgrade. A perforated 55-gallon drum or other temporary structure could be used to house the pump.

Details of a typical French drainage installation are included in Appendix D. A typical French drain consists of an 18 to 24-inch wide by 18 to 24-inch-deep bed of AASHTO #57 stone wrapped in a medium duty, non-woven geotextile. Actual dimensions should be as determined necessary during construction. After the installation has been completed, the geotextile should be wrapped over the top of the gravel followed by placement of backfill.

5.2 EARTHWORK OPERATIONS

The following sections describe soil reusability, and requirements for fill placement and utility installation.

5.2.1 Fill Placement

Prior to placement of any new fill or other construction material, subgrade soils should be scarified to a minimum depth of 8 inches, moisture conditioned to a workable moisture content at or above the optimum value and compacted to at least 95% of Maximum Dry Density as obtained by the Standard Proctor Method (ASTM D-698).

Imported fill material to be placed in the building pad areas should not have a Plasticity Index (PI) of greater than the material encountered onsite and should be approved by ECS prior to its use. Details regarding select fill and moisture conditioning are presented in the "Materials Specifications" section of this report.

Soil moisture levels should be maintained (by various methods that can include covering with plastic, watering, etc.) until new fill, pavements, or slabs are placed. Fill soils should be placed in maximum 8-inch loose lifts for mass grading operations and maximum 4 inches for trench type excavations where walk behind or "jumping jack" compaction equipment is used.

Upon completion of the filling operations, care should be taken to maintain the soil moisture content prior to construction of floor slabs and/or pavements. If the soil becomes desiccated, the affected material should be removed and replaced, or these materials should be scarified, moisture conditioned and recompacted.

5.2.2 Utility Installation

Utility cuts should not be left open for more than 24 hours or during times when precipitation is anticipated and should be properly backfilled. Backfilling should be accomplished with properly compacted on-site soils, rather than granular materials. If granular materials are used, a utility trench cut-off at the building line is recommended to help prevent water from migrating through the utility trench backfill to beneath the structures.

5.2.3 Earthwork Testing

Field density and moisture tests should be performed by ECS on each lift as necessary to verify that adequate compaction is achieved. One test per 2,500 square feet per lift and 5,000 square feet per lift is recommended in the building pads and private paving areas, respectively (two tests minimum per lift). Utility trench backfill should be tested at a rate of one test per lift per each 150 linear feet of trench (two tests minimum per lift). Certain jurisdictional requirements may require testing in addition to that noted previously. Therefore, these recommendations should be reviewed, and the more stringent specifications should be followed.

5.3 MATERIAL SPECIFICATIONS

The recommendations provided in the "Subgrade Improvements" portion of this report outline the subgrade improvement options required in order to achieve the desired PVM. This section is intended to outline the material requirements of those recommendations.

5.3.1 Moisture Conditioning

Within the planned pads and flatwork sensitive to movements, moisture conditioning should be performed as outlined in this report. Reworking of the existing clays, and new clayey fill, is performed to increase the moisture of the clays to a level that reduces their ability to absorb additional water that could result in post-construction heave in these soils.

Building pads receiving fill should be scarified to a minimum depth of six inches and recompacted. Organic and other deleterious materials should be removed from the fill material prior to placement and compaction. Fill should be placed at loose lift thickness of 8 inches or less. During this process, the clay fill should receive adequate amounts of water to attain an even moisture content of at least +3% or higher above the optimum moisture content. During the addition of water, the soils should be adequately mixed, and re-mixed, to achieve an even distribution of the moisture throughout the soil mass. Once appropriately mixed, the material should be compacted to at least 95% of the Maximum Dry Density as obtained using the Standard Proctor Method (ASTM D-698).

Tree stumps and roots larger than 2 inches in diameter should be excavated from the building pad areas and removed from the site. The excavated areas should be backfilled with on-site soils in controlled lifts and compaction as described in above paragraph.

Outside of the pad areas and where clay is used to establish site grades, we recommend that this material be placed and compacted to at least 95% of the Maximum Dry Density as obtained using the Standard Proctor Method (ASTM D-698). These soils should be free of deleterious materials and be reworked to achieve an even distribution of water in order to achieve a moisture content of at least above the material optimum moisture content. Care should be taken to verify and preserve the specified moisture levels in the reworked clays.

5.4 FOUNDATION AND SLAB OBSERVATIONS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils in foundations if the foundation excavations remain open for a prolonged time period. Therefore, foundation concrete should be placed immediately after the excavation has been completed, cleaned, and observed. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation immediately prior to placement of concrete.

5.5 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally acceptable for support of utility pipes. The pipe subgrades should be observed and probed for stability by ECS. Any loose or yielding materials encountered should be removed and replaced with acceptable material.

Utility Backfilling: The granular bedding material (often AASHTO #57 stone) should be at least 4 inches thick, but not less than that specified by the civil engineer's project drawings and specifications. We recommend that the bedding materials be placed up to the spring line of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the project requirements.

Excavation Safety: All excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

6.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by Client. If any of this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

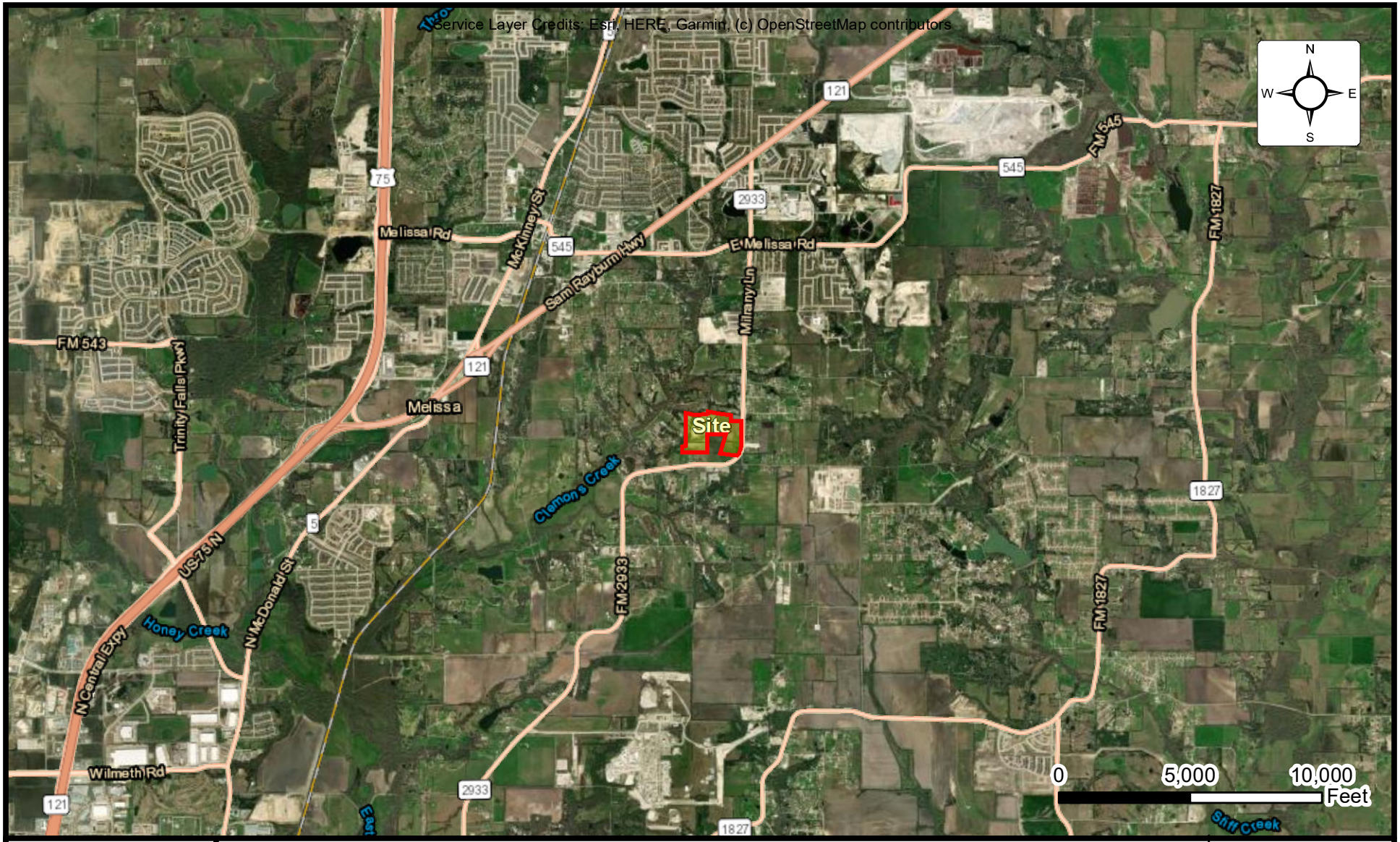
We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations, and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

Appendix A - Drawings and Reports

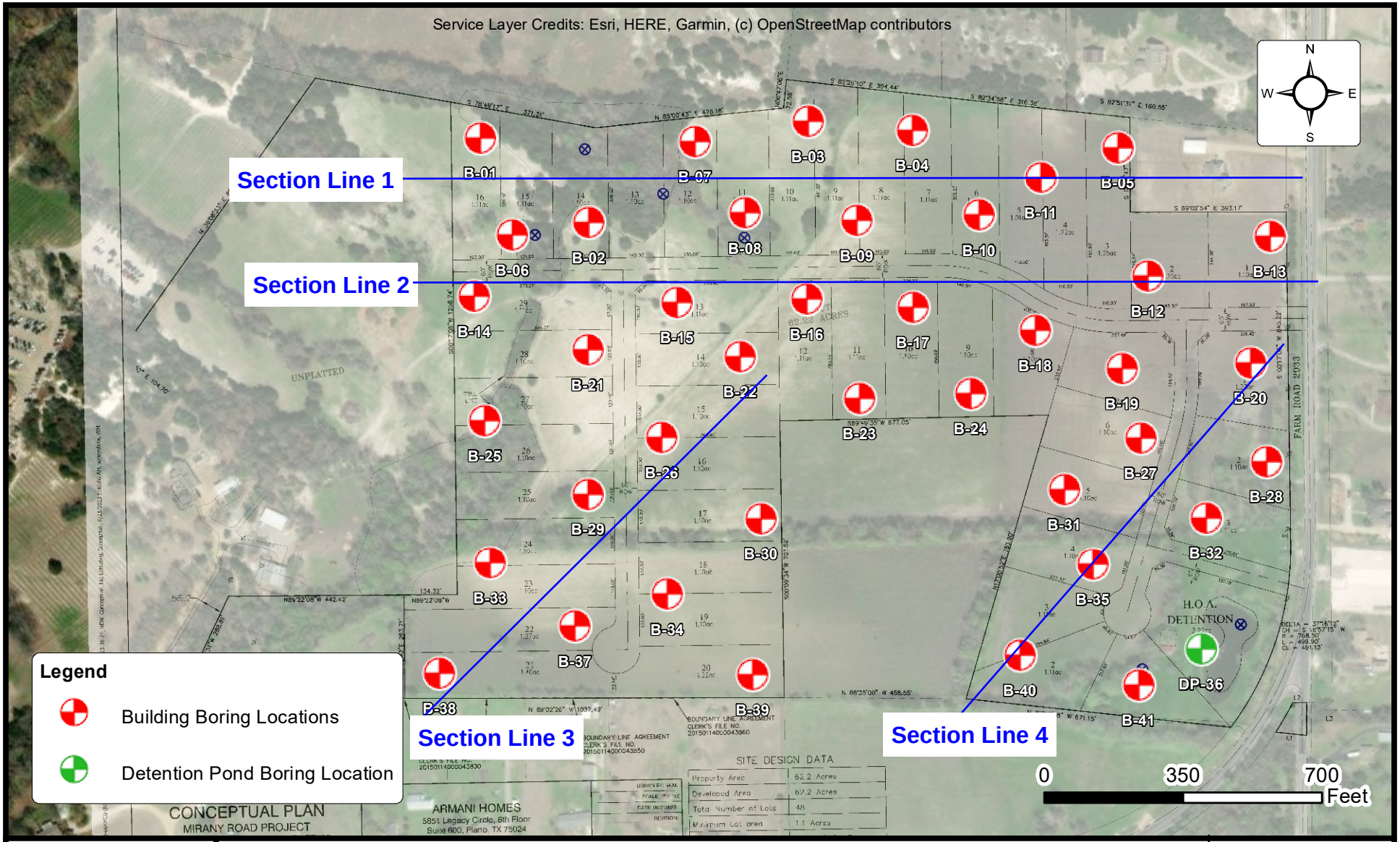
Site Location Diagram
Boring Location Diagram(s)
Subsurface Cross-Section(s)
Geologic Survey Map



SITE LOCATION DIAGRAM
MIRANY ROAD SF DEVELOPMENT

FM 2933 & CR 1116, MELISSA, TEXAS
MELISSA REALTY PARTNERS, LLC

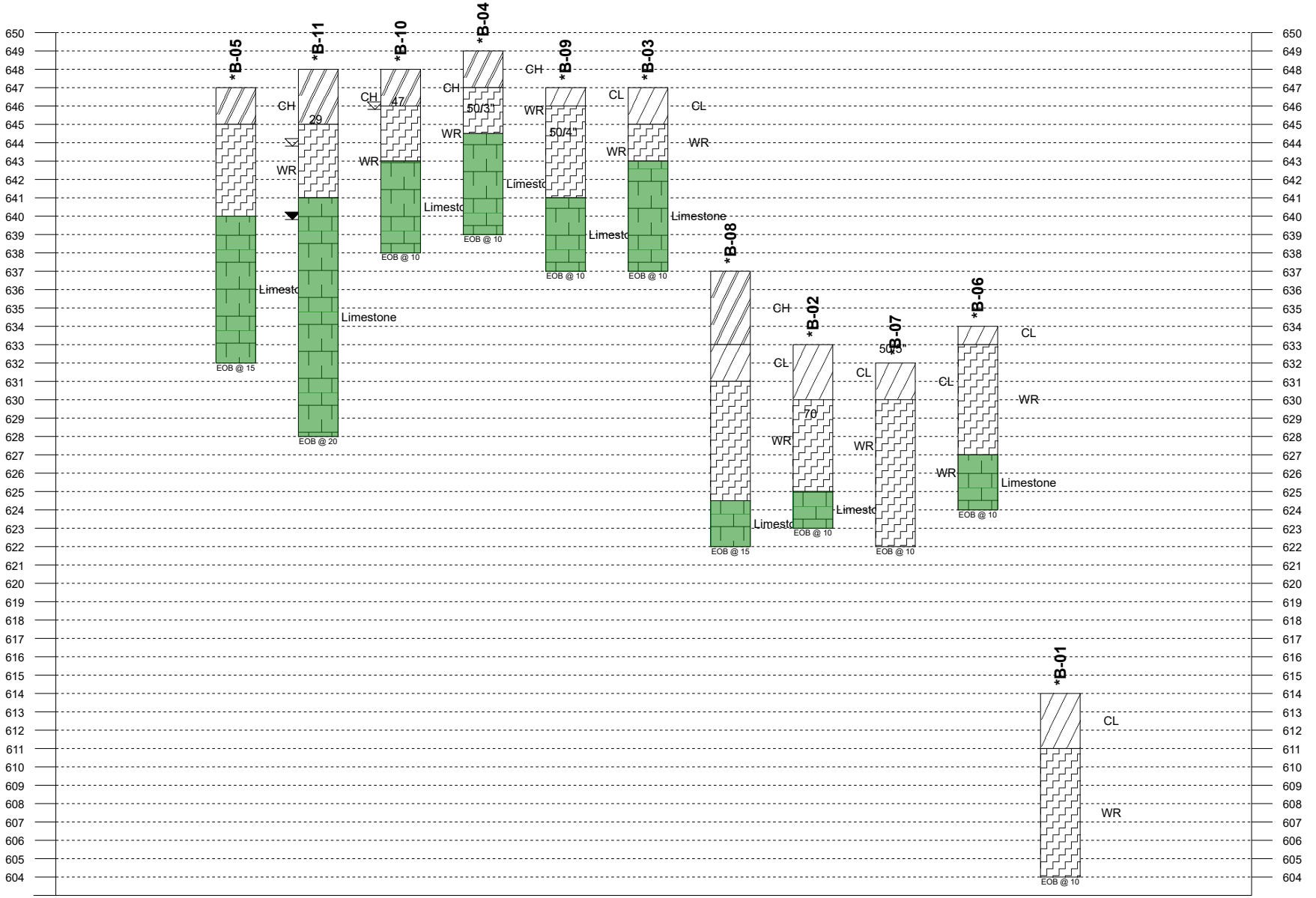
ENGINEER	KKP
SCALE	AS NOTED
PROJECT NO.	19:9402
FIGURE	1 OF 1
DATE	2/9/2024



BORING LOCATION DIAGRAM
MIRANY ROAD SF DEVELOPMENT

FM 2933 & CR 1116, MELISSA, TEXAS
MELISSA REALTY PARTNERS, LLC

ENGINEER	KKP
SCALE	AS NOTED
PROJECT NO.	19:9402
FIGURE	1 OF 1
DATE	2/9/2024



Legend Key

- Fat Clay (CH)
- Weathered Limestone (WR)
- Lean Clay (CL)
- Limestone

Notes:

1- EOB: END OF BORING AR: AUGER REFUSAL SR: SAMPLER REFUSAL.
2- THE NUMBER BELOW THE STRIPS IS THE DISTANCE ALONG THE BASELINE.
3- SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
4- STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

Plastic Limit Water Content Liquid Limit X—●—△	WL (First Encountered)		Fill
[FINES CONTENT %]	WL (Completion)		Possible Fill
BOTTOM OF CASING	WL (Seasonal High Water)		Probable Fill
LOSS OF CIRCULATION	WL (Stabilized)		Rock

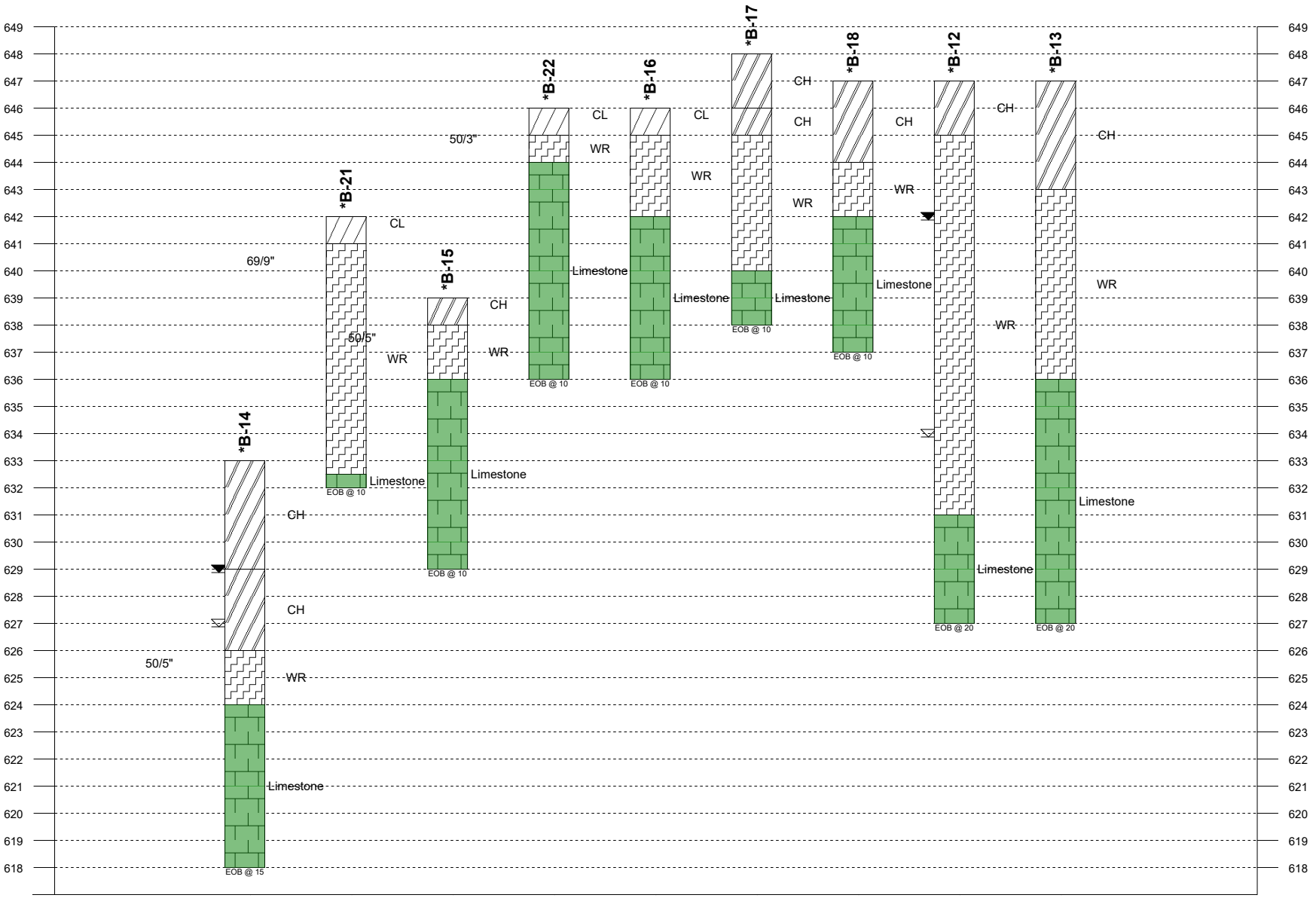
GENERALIZED SUBSURFACE PROFILE Section line 1

Mirany Road SF Development

Melissa Realty Partners, LLC

NWQ FM 2933 & CR 1116, Melissa, Texas, 75454

Project No: 19:9402 Date: 04/26/2024



Legend Key

- Fat Clay (CH)
- Lean Clay (CL)
- Weathered Limestone (WR)
- Limestone

Notes:

1- EOB: END OF BORING AR: AUGER REFUSAL SR: SAMPLER REFUSAL.
2- THE NUMBER BELOW THE STRIPS IS THE DISTANCE ALONG THE BASELINE.
3- SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
4- STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

Plastic Limit Water Content Liquid Limit (X—●—△)	WL (First Encountered)	Fill
[FINES CONTENT %]	WL (Completion)	Possible Fill
BOTTOM OF CASING	WL (Seasonal High Water)	Probable Fill
100% LOSS OF CIRCULATION	WL (Stabilized)	Rock

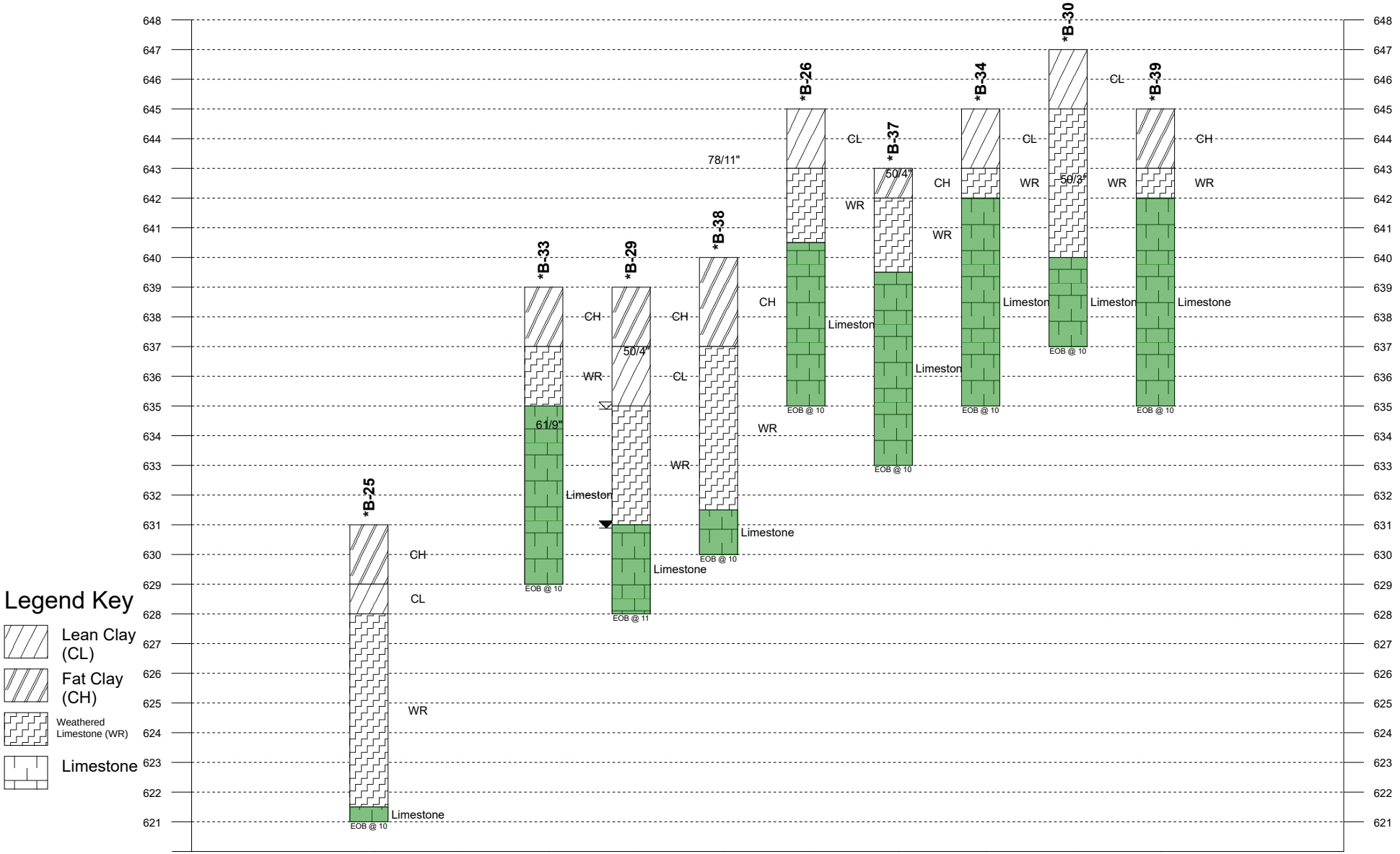
GENERALIZED SUBSURFACE PROFILE Section line 2

Mirany Road SF Development

Melissa Realty Partners, LLC

NWQ FM 2933 & CR 1116, Melissa, Texas, 75454

Project No: 19:9402 Date: 04/26/2024



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1- EOB: END OF BORING AR: AUGER REFUSAL SR: SAMPLER REFUSAL.
2- THE NUMBER BELOW THE STRIPS IS THE DISTANCE ALONG THE BASELINE.
3- SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
4- STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

Plastic Limit Water Content Liquid Limit	WL (First Encountered)	Fill	
[FINES CONTENT %]	WL (Completion)	Possible Fill	
BOTTOM OF CASING	WL (Seasonal High Water)	Probable Fill	
LOSS OF CIRCULATION	WL (Stabilized)	Rock	

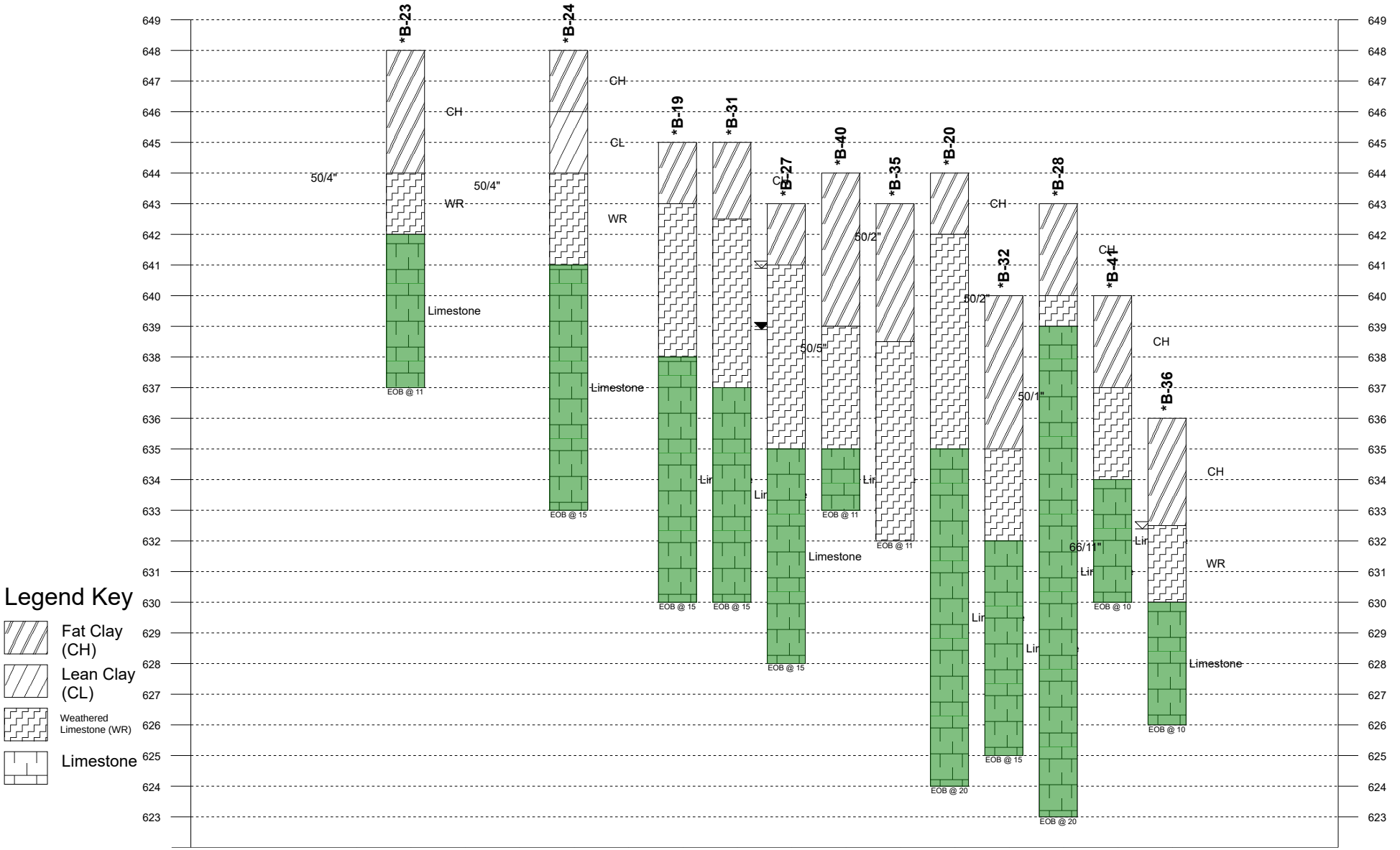
GENERALIZED SUBSURFACE PROFILE Section line 3

Mirany Road SF Development

Melissa Realty Partners, LLC

NWQ FM 2933 & CR 1116, Melissa, Texas, 75454

Project No: 19:9402 Date: 04/26/2024



Legend Key

- Fat Clay (CH)
- Lean Clay (CL)
- Weathered Limestone (WR)
- Limestone

Notes:

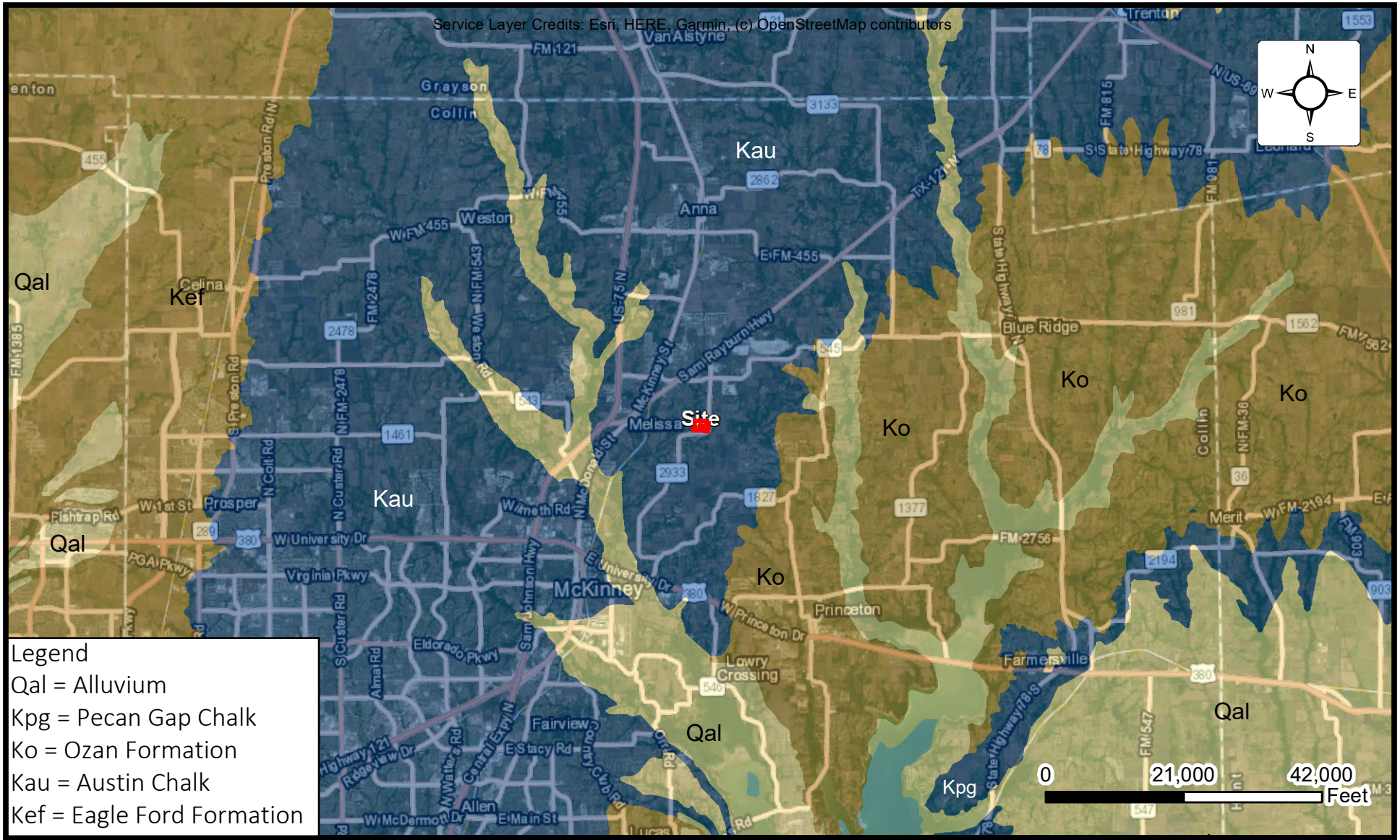
1- EOB: END OF BORING AR: AUGER REFUSAL SR: SAMPLER REFUSAL.
2- THE NUMBER BELOW THE STRIPS IS THE DISTANCE ALONG THE BASELINE.
3- SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
4- STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

Plastic Limit Water Content Liquid Limit (X—●—△)	WL (First Encountered)	Fill
[FINES CONTENT %]	WL (Completion)	Possible Fill
BOTTOM OF CASING	WL (Seasonal High Water)	Probable Fill
100% LOSS OF CIRCULATION	WL (Stabilized)	Rock

GENERALIZED SUBSURFACE PROFILE Section line 4

Mirany Road SF Development
Melissa Realty Partners, LLC
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454

Project No: 19:9402 Date: 04/26/2024



GEOLOGIC SURVEY MAP
MIRANY ROAD SF DEVELOPMENT

FM 2933 & CR 1116, MELISSA, TEXAS
MELISSA REALTY PARTNERS, LLC

ENGINEER	KKP
SCALE	AS NOTED
PROJECT NO.	19:9402
FIGURE	1 OF 1
DATE	2/9/2024

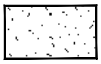
Appendix B – Field Operations

Reference Notes
Boring Logs

REFERENCE NOTES FOR BORING LOGS

MATERIAL[1,2]


ASPHALT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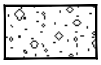
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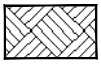
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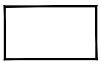
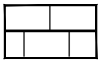
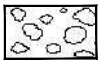
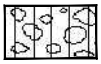

VOID


BRICK

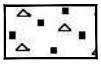

AGGREGATE BASE COURSE

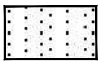

GW **WELL-GRADED GRAVEL**
gravel-sand mixtures, little or no fines

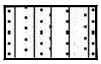

GP **POORLY-GRADED GRAVEL**
gravel-sand mixtures, little or no fines


GM **SILTY GRAVEL**
gravel-sand-silt mixtures

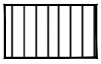

GC **CLAYEY GRAVEL**
gravel-sand-clay mixtures

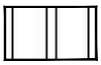

SW **WELL-GRADED SAND**
gravelly sand, little or no fines

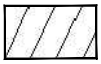

SP **POORLY-GRADED SAND**
gravelly sand, little or no fines


SM **SILTY SAND**
sand-silt mixtures

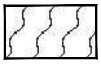

SC **CLAYEY SAND**
sand-clay mixtures

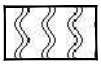

ML **SILT**
non-plastic to medium plasticity

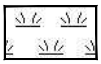

MH **ELASTIC SILT**
high plasticity


CL **LEAN CLAY**
low to medium plasticity


CH **FAT CLAY**
high plasticity


OL **ORGANIC SILT or CLAY**
non-plastic to low plasticity


OH **ORGANIC SILT or CLAY**
high plasticity


PT **PEAT**
highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, Q_P[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective *(ex: "Silty")*	25 - 45	30 - 45

WATER LEVELS[6]

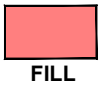

WL (First Encountered)


WL (Completion)


WL (Seasonal High Water)


WL (Stabilized)

FILL AND ROCK


FILL


POSSIBLE FILL


PROBABLE FILL


ROCK

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 14.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-01**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.265408	**-96.554785**		**614.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	24	24	(CL) LEAN CLAY, brown, light brown, moist, very stiff to hard, with limestone fragments			
	S-2	ST	12	12				
	S-3	SS	12	12	LIMESTONE, tan, weathered, with clay layers			22-50
5							609	50[1] 50[0]
10					**END OF BORING AT 10 FT**		604	50[1] 50[1]
15							599	
20							594	
25							589	
30							584	

Plastic Limit Water Content Liquid Limit

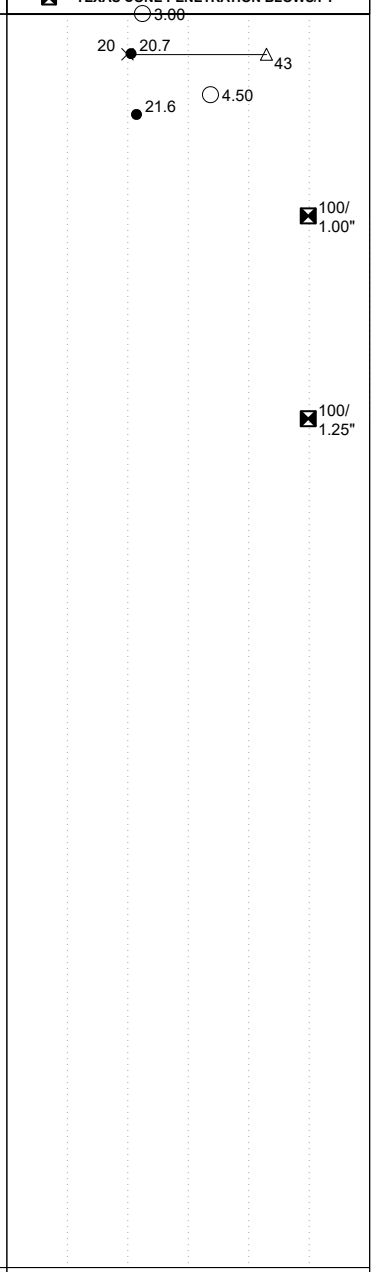
STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**Dry**	BORING STARTED: **Mar 27 2024**		CAVE IN DEPTH:
WL (Completion)	**Dry**	BORING COMPLETED: **Mar 27 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-02**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.265335	**-96.553051**		**633.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	24	24	(CL) LEAN CLAY, brown, light brown, moist, hard, with limestone fragments			
	S-2	ST	12	12				
	S-3	SS	12	12	LIMESTONE, tan, weathered, with clay layers			33-50
5							628	50[0] 50[0]
					LIMESTONE, gray			
10					**END OF BORING AT 10 FT**		623	50[1] 50[1]
15							618	
20							613	
25							608	
30							603	

4.50 24.3 4.50 20.0 100/ 0.50" 100/ 1.25"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 27 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 27 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-03**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.265483	**-96.552061**		**647.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CL) LEAN CLAY, brown, light brown, moist, hard, with limestone fragments			
	S-2	SS	10	10	LIMESTONE, tan, weathered, with clay layers			15-50/4" (50/4")
5					LIMESTONE, gray		642	50[1] 50[0]
10					**END OF BORING AT 10 FT**		637	50[1] 50[0]
15							632	
20							627	
25							622	
30							617	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

4.50

18 24.4 40

50/4"

100/ 0.75"

100/ 0.75"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**Dry**	BORING STARTED: **Mar 27 2024**		CAVE IN DEPTH:
WL (Completion)	**Dry**	BORING COMPLETED: **Mar 27 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-04**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.265409	**-96.551233**		**649.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, stiff, with limestone fragments			
	S-2	SS	18	18	LIMESTONE, tan, weathered, with clay layers			14-23-24 (47)
5					LIMESTONE, gray		644	50[1] 50[0]
10					**END OF BORING AT 10 FT**		639	50[1] 50[0]
15							634	
20							629	
25							624	
30							619	

1.50 47 100/1.00" 100/0.75"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 22 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 22 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-05**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.265264	**-96.549520**		**647.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff, with limestone fragments			
					LIMESTONE, tan, weathered, with clay layers			50[2] 50[1]
5							642	50[1] 50[0]
					LIMESTONE, gray			
10							637	50[1] 50[0]
15					**END OF BORING AT 15 FT**		632	50[0] 50[0]
20							627	
25							622	
30							617	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

2.00

27 77

100/ 2.50"

100/ 1.00"

100/ 0.75"

100/ 0.50"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Jan 31 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Jan 31 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-06**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264734	**-96.554521**		**634.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	12	12	(CL) LEAN CLAY, brown, light brown, moist, hard, with limestone fragments			50/5" (50/5")
	S-2	SS	5	5	LIMESTONE, tan, weathered, with clay layers		629	50[1] 50[0]
5					LIMESTONE, gray		624	50[1] 50[1]
10					**END OF BORING AT 10 FT**		619	
15							614	
20							609	
25							604	
30								

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

20 20.8 4.50 45 50/5"

100/ 1.00"

100/ 1.50"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 27 2024**	CAVE IN DEPTH:	
WL (Completion) **Dry**	BORING COMPLETED: **Mar 27 2024**	HAMMER TYPE: **Auto**	
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-07**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264813	**-96.553174**		**632.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	24	24	(CL) LEAN CLAY, brown, light brown, moist, hard, with limestone fragments			
	S-2	SS	18	18	LIMESTONE, tan, weathered, with clay layers			37-20-50 (70)
5							627	50[1] 50[1]
10					**END OF BORING AT 10 FT**		622	50[0] 50[0]
15							617	
20							612	
25							607	
30							602	

Plastic Limit Water Content Liquid Limit

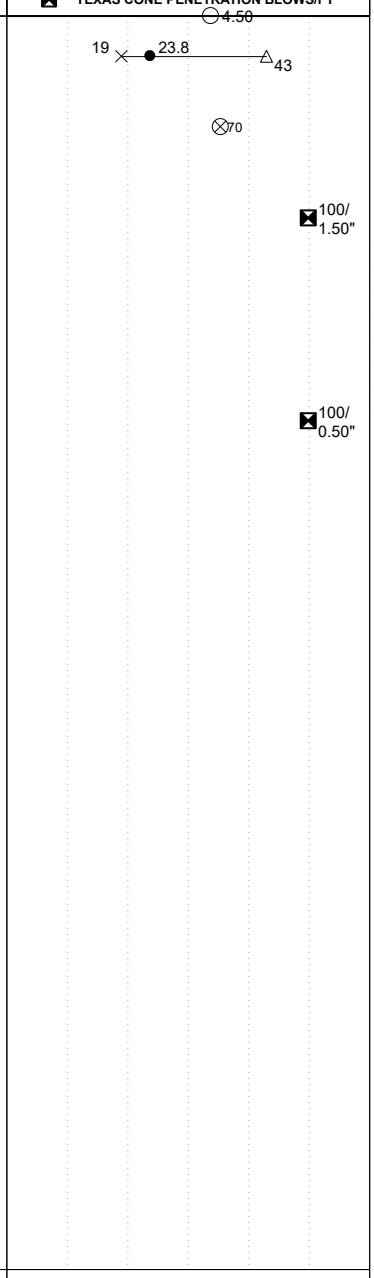
STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED: **Mar 27 2024**		CAVE IN DEPTH:
▼ WL (Completion)	**Dry**	BORING COMPLETED: **Mar 27 2024**		HAMMER TYPE: **Auto**
⧩ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
⧩ WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-08**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264856	**-96.552601**		**637.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown, brown, moist, very stiff to hard, with calcareous nodules		637	
	S-2	ST	24	24				
5	S-3	ST	24	24	(CL) LEAN CLAY, light brown, moist, hard, with limestone fragments		632	
	S-4	SS	12	12	LIMESTONE, tan, weathered, with clay layers			19-50
10							627	50[1] 50[0]
					LIMESTONE, gray			
15					**END OF BORING AT 15 FT**		622	50[1] 50[0]
20							617	
25							612	
30							607	

Plastic Limit Water Content Liquid Limit

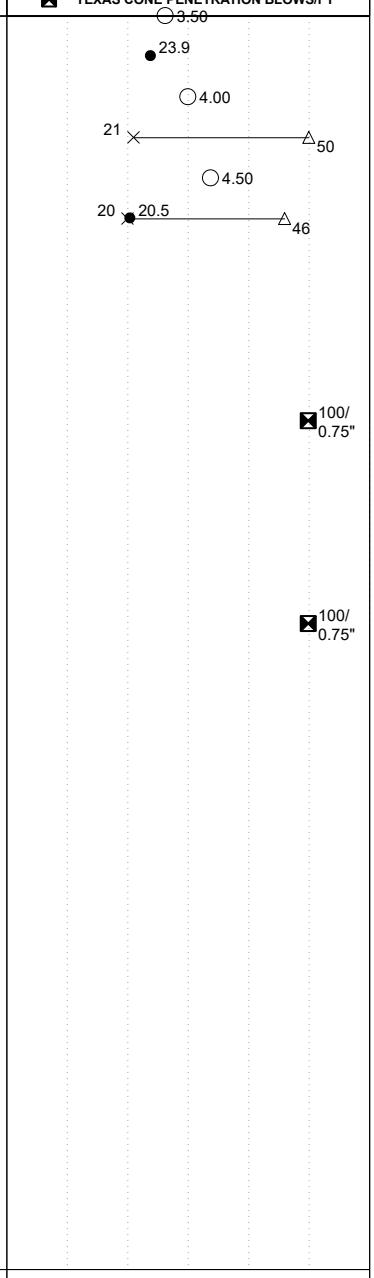
STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**Dry**	BORING STARTED: **Mar 27 2024**		CAVE IN DEPTH:
WL (Completion)	**Dry**	BORING COMPLETED: **Mar 27 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-09**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264795	**-96.551679**		**647.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	12	12	(CL) LEAN CLAY, light brown, moist, hard, with limestone fragments			50/3" (50/3")
	S-2	SS	3	3	LIMESTONE, tan, weathered, with clay layers			
5							642	50[1] 50[1]
					LIMESTONE, gray			
10					**END OF BORING AT 10 FT**		637	50[1] 50[0]
15							632	
20							627	
25							622	
30							617	

29.7 4.50 50/3" 100/1.25" 100/0.75"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 26 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 26 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-10**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264809	**-96.550663**		**648.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, stiff, with limestone fragments	▽		
	S-2	SS	18	18	LIMESTONE, tan, weathered, with clay layers			17-18-11 (29)
5					LIMESTONE, gray		643	50[1] 50[0]
10					**END OF BORING AT 10 FT**		638	50[1] 50[1]
15							633	
20							628	
25							623	
30							618	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY — RQD — REC

○ CALIBRATED PENETROMETER TON/SF

⊠ TEXAS CONE PENETRATION BLOWS/FT

○ 1.50

⊗ 29

⊠ 100/ 0.75"

⊠ 100/ 1.25"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**2.00**	BORING STARTED: **Mar 22 2024**	CAVE IN DEPTH:
▼ WL (Completion)	**Dry**	BORING COMPLETED: **Mar 22 2024**	HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV** / LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-11**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.265059	**-96.550154**		**648.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff to hard, with limestone fragments			
	S-2	ST	12	12				
					LIMESTONE, tan, weathered, with clay layers	▽		
5							643	50[1] 50[1]
					LIMESTONE, gray	▼		
10							638	50[1] 50[0]
15							633	50[0] 50[0]
20					**END OF BORING AT 20 FT**		628	50[0] 50[0]
25							623	
30							618	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

○ CALIBRATED PENETROMETER TON/SF

▣ TEXAS CONE PENETRATION BLOWS/FT

○2.00 26 × 74 ○4.50 ●20.1

▣ 100/1.50" ▣ 100/0.75" ▣ 100/0.50" ▣ 100/0.50"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**4.00**	BORING STARTED: **Jan 31 2024**		CAVE IN DEPTH:
▼ WL (Completion)	**8.00**	BORING COMPLETED: **Jan 31 2024**		HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-12**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264375	**-96.549292**		**647.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*	
	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff, with limestone fragments			50[2] 50[1]	3.00 27 78 100/ 3.00"
					LIMESTONE, tan, weathered, with clay layers				
5						▼	642	50[1] 50[1]	100/ 1.50"
10						▽	637	50[1] 50[0]	100/ 1.00"
15							632	50[1] 50[0]	100/ 0.75"
					LIMESTONE, gray				
20					**END OF BORING AT 20 FT**		627	50[0] 50[0]	100/ 0.50"
25							622		
30							617		

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**13.00**	BORING STARTED: **Jan 31 2024**	CAVE IN DEPTH:
▼ WL (Completion)	**5.00**	BORING COMPLETED: **Jan 31 2024**	HAMMER TYPE: **Auto**
▼▽ WL (Seasonal High Water)		EQUIPMENT: **ATV** / LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-13**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264622	**-96.548272**		**647.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff to hard, with limestone fragments			
	S-2	ST	24	24				
5					LIMESTONE, tan, weathered, with clay layers		642	50[2] 50[1]
10							637	50[1] 50[0]
15					LIMESTONE, gray		632	50[1] 50[0]
20					**END OF BORING AT 20 FT**		627	50[0] 50[0]
25							622	
30							617	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

2.25 33.6 4.50 26 83

100/ 2.75" 100/ 1.00" 100/ 0.75" 100/ 0.50"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Jan 31 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Jan 31 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-14**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264310	**-96.554853**		**633.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown, brown, moist, very stiff, with calcareous nodules			
	S-2	ST	24	24				
5	S-3	ST	24	24	(CH) FAT CLAY, light brown, moist, very stiff, with limestone fragments	▼	628	
	S-4	ST	12	12		▽		
	S-5	SS	11	11	LIMESTONE, tan, weathered, with clay layers			18-50/5" (50/5")
10					LIMESTONE, gray		623	50[1] 50[0]
15					**END OF BORING AT 15 FT**		618	50[0] 50[0]
20							613	
25							608	
30							603	

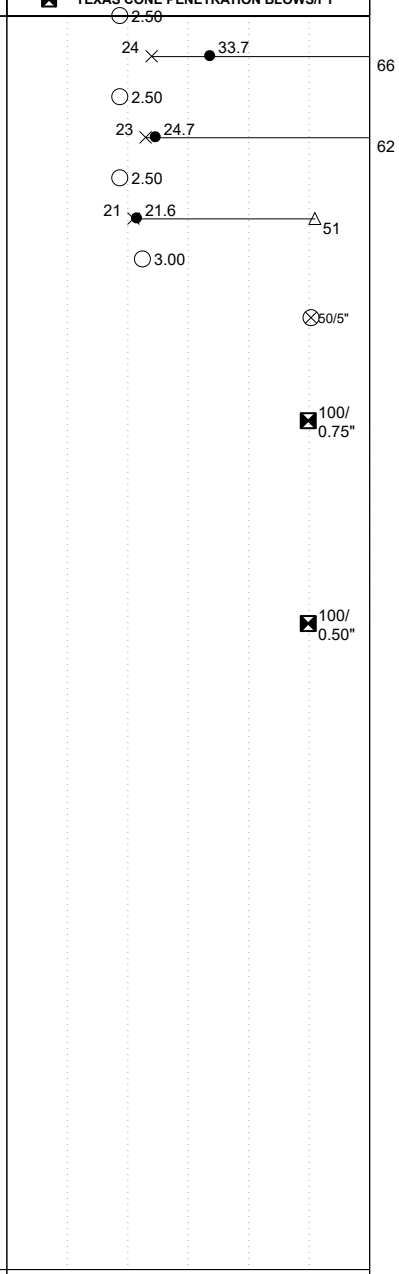
Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY — RQD — REC

○ CALIBRATED PENETROMETER TON/SF

⊠ TEXAS CONE PENETRATION BLOWS/FT



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**6.00**	BORING STARTED: **Mar 27 2024**		CAVE IN DEPTH:
▼ WL (Completion)	**4.00**	BORING COMPLETED: **Mar 27 2024**		HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-15**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264255	**-96.553172**		**639.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	12	12	(CH) FAT CLAY, brown to light brown, moist, very stiff, with limestone fragments			
	S-2	SS	11	11	LIMESTONE, an, weathered, with clay layers			15-50/5" (50/5")
					LIMESTONE, gray			
5							634	50[1] 50[1]
10					**END OF BORING AT 10 FT**		629	50[1] 50[1]
15							624	
20							619	
25							614	
30							609	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

2.00 27.4 50/5" 100/ 1.25" 100/ 1.50"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 27 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 27 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-16**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264247	**-96.552102**		**646.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	12	12	(CL) LEAN CLAY, brown, light brown, moist, hard, with limestone fragments			15-50
	S-2	SS	12	12	LIMESTONE, tan, weathered, with clay layers			
5					LIMESTONE, gray		641	50[1] 50[1]
10					**END OF BORING AT 10 FT**		636	50[1] 50[0]
15							631	
20							626	
25							621	
30							616	

19 — 26.0 — 4.50 — 45

100/ 1.25"

100/ 0.75"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered) **Dry**	BORING STARTED: **Mar 26 2024**		CAVE IN DEPTH:
▼ WL (Completion) **Dry**	BORING COMPLETED: **Mar 26 2024**		HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-17**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264174	**-96.551223**		**648.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff, with calcareous nodules			
	S-2	ST	12	12	(CH) FAT CLAY, brown, light brown, moist, hard, with limestone fragments			50
	S-3	SS	6	6	LIMESTONE, tan, weathered, with clay layers		643	50[1] 50[1]
10					LIMESTONE, gray		638	50[1] 50[1]
					END OF BORING AT 10 FT			
15							633	
20							628	
25							623	
30							618	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

2.50 26 31.3 74 25.6 4.50 100/ 2.00" 100/ 1.50"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 26 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 26 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-18**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.264001	**-96.550232**		**647.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff, with limestone fragments			
	S-2	ST	12	12				
	S-3	SS	6	6	LIMESTONE, tan, weathered, with clay layers			50
5					LIMESTONE, gray		642	50[1] 50[0]
10					**END OF BORING AT 10 FT**		637	50[1] 50[0]
15							632	
20							627	
25							622	
30							617	

Plastic Limit Water Content Liquid Limit
X——●——△

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY
RQD REC

○ CALIBRATED PENETROMETER TON/SF

☒ TEXAS CONE PENETRATION BLOWS/FT

○ 1.00
○ 2.00
☒ 100/ 0.75"
☒ 100/ 1.00"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED:	**Mar 22 2024**	CAVE IN DEPTH:
▼ WL (Completion)	**Dry**	BORING COMPLETED:	**Mar 22 2024**	HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-19**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.263732	**-96.549512**		**645.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff, with limestone fragments			
					LIMESTONE, tan, weathered, with clay layers			50[2] 50[1]
5							640	50[1] 50[1]
					LIMESTONE, gray			
10							635	50[1] 50[0]
15					**END OF BORING AT 15 FT**		630	50[0] 50[0]
20							625	
25							620	
30							615	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

2.00

26

73

100/ 2.75"

100/ 1.25"

100/ 0.75"

100/ 0.50"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Jan 31 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Jan 31 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-20**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.263755	**-96.548453**		**644.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*	
	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff, with limestone fragments				2.00
	~~S-2~~	~~SS~~	~~2~~	~~2~~	LIMESTONE, tan, weathered, with clay layers			50/2" (50/2")	26 70 50/2"
5							639	50[1] 50[0]	100/ 1.00"
10					LIMESTONE, gray		634	50[1] 50[0]	100/ 0.75"
15							629	50[1] 50[0]	100/ 0.75"
20					**END OF BORING AT 20 FT**		624	50[0] 50[0]	100/ 0.50"
25							619		
30							614		

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Jan 31 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Jan 31 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-21**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.263931	**-96.553907**		**642.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	12	12	(CL) LEAN CLAY, brown, light brown, moist, hard, with limestone fragments			
	S-2	SS	15	15	LIMESTONE, tan, weathered, with clay layers			16-19-50/3" (69/9")
5							637	50[1] 50[1]
10					LIMESTONE, gray **END OF BORING AT 10 FT**		632	50[1] 50[1]
15							627	
20							622	
25							617	
30							612	

19.2 4.50 69/9" 100/1.25" 100/1.50"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 27 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 27 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-22**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.263858	**-96.552660**		**646.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	12	12	(CL) LEAN CLAY, brown, light brown, moist, very stiff, with limestone fragments			50/3" (50/3")
	S-2	SS	3	3	LIMESTONE, tan, weathered, with clay layers			
					LIMESTONE, gray			
5							641	50[1] 50[0]
10					**END OF BORING AT 10 FT**		636	50[1] 50[0]
15							631	
20							626	
25							621	
30							616	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

18 3.00 26.6 41 50/3" 100/0.75" 100/0.75"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**Dry**	BORING STARTED: **Mar 26 2024**		CAVE IN DEPTH:
WL (Completion)	**Dry**	BORING COMPLETED: **Mar 26 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-23**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.263555	**-96.551682**		**648.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, stiff, with limestone fragments			
	S-2	ST	24	24				
	S-3	SS	4	4	LIMESTONE, tan, weathered, with clay layers		643	50/4" (50/4")
10					LIMESTONE, gray		638	50[1] 50[1]
					END OF BORING AT 11 FT			
15							633	
20							628	
25							623	
30							618	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

1.50

31.4

1.75

23 25.7

5

9

50/4"

100/ 1.75"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**Dry**	BORING STARTED: **Mar 26 2024**		CAVE IN DEPTH:
WL (Completion)	**Dry**	BORING COMPLETED: **Mar 26 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-24**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.263574	**-96.550757**		**648.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown, moist, stiff, with calcareous nodule			
	S-2	ST	24	24	(CL) LEAN CLAY, light brown, moist, very stiff, with limestone fragments			
	S-3	SS	10	10	LIMESTONE, tan, weathered, with clay layers		643	20-50/4" (50/4")
5					LIMESTONE, gray			
10							638	50[1] 50[0]
15					**END OF BORING AT 15 FT**		633	50[1] 50[0]
20							628	
25							623	
30							618	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

1.00

2.00

50/4"

100/ 0.75"

100/ 0.75"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 22 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 22 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-25**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.263455	**-96.554779**		**631.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown, moist, very stiff, with calcareous ndoules			
	S-2	ST	12	12	(CL) LEAN CLAY, brown, light brown, moist, hard, with limestone fragments			19-50
	S-3	SS	12	12	LIMESTONE, tan, weathered, with clay layers		626	50[1] 50[1]
10					LIMESTONE, gray **END OF BORING AT 10 FT**		621	50[1] 50[1]
15							616	
20							611	
25							606	
30							601	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

2.50 25.6 4.50 20 23.4 46 100/1.50" 100/1.25"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED: **Mar 27 2024**	CAVE IN DEPTH:
▼ WL (Completion)	**Dry**	BORING COMPLETED: **Mar 27 2024**	HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV** / LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-26**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.263315	**-96.553327**		**645.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	12	12	(CL) LEAN CLAY, brown, light brown, moist, hard, with limestone fragments			
	S-2	SS	17	17				14-28-50/5" (78/11")
					LIMESTONE, tan, weathered, with clay layers			
5					LIMESTONE, gray		640	50[1] 50[1]
10					**END OF BORING AT 10 FT**		635	50[1] 50[0]
15							630	
20							625	
25							620	
30							615	

20 25.2 4.50 44

78/11"

100/ 1.50"

100/ 0.75"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 26 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 26 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-27**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.263249	**-96.549367**		**643.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*	
	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff, with limestone fragments				
	S-2	SS	6	6	LIMESTONE, tan, weathered, with clay layers			50	
5							638	50[4] 50[3]	100/6.50"
					LIMESTONE, gray				
10							633	50[1] 50[0]	100/0.75"
15					**END OF BORING AT 15 FT**		628	50[1] 50[0]	100/0.75"
20							623		
25							618		
30							613		

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **2.00**	BORING STARTED: **Mar 22 2024**		CAVE IN DEPTH:
WL (Completion) **4.00**	BORING COMPLETED: **Mar 22 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-28**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.263063	**-96.548340**		**643.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff, with limestone fragments			
	S-2	ST	12	12				
	S-3	SS	2	2	LIMESTONE, tan, weathered, with clay layers			50/2" (50/2")
5					LIMESTONE, gray		638	50[1] 50[0]
10							633	50[0] 50[0]
15							628	50[1] 50[0]
20					**END OF BORING AT 20 FT**		623	50[0] 50[0]
25							618	
30							613	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

1.50 27.3 2.00 22 50/2" 5 7 100/1.00" 100/0.50" 100/0.75" 100/0.50"

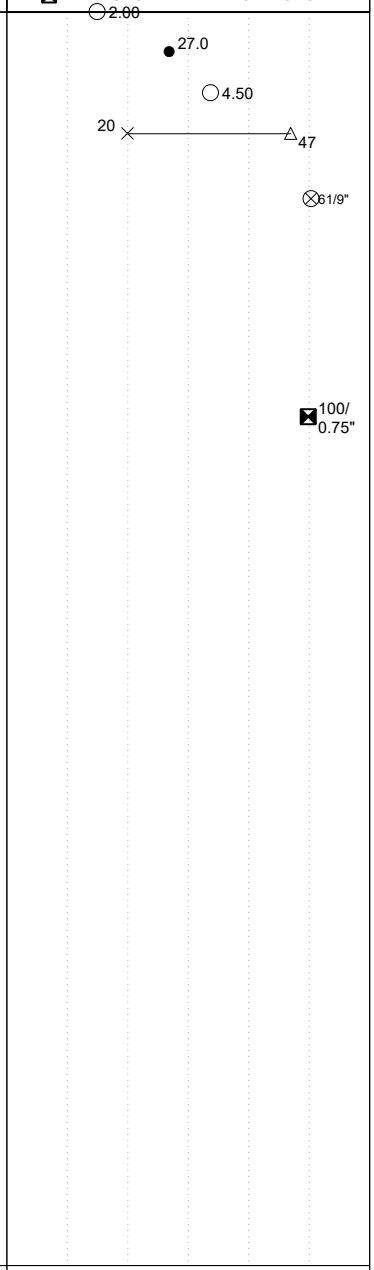
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Jan 31 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Jan 31 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-29**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.262925	**-96.553934**		**639.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown, moist, very stiff, with calcareous ndoules			
	S-2	ST	24	24	(CL) LEAN CLAY, brown, light brown, moist, hard, with limestone fragments			
5	S-3	SS	15	15	LIMESTONE, tan, weathered, with clay layers		634	12-11-50/3" (61/9")
					LIMESTONE, gray		629	50[1] 50[0]
10					**END OF BORING AT 11 FT**			
15							624	
20							619	
25							614	
30							609	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**4.00**	BORING STARTED: **Mar 26 2024**		CAVE IN DEPTH:
▼ WL (Completion)	**8.00**	BORING COMPLETED: **Mar 26 2024**		HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV**	LOGGED BY: **MEP**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)				

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-30**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.262744	**-96.552515**		**647.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	24	24	(CL) LEAN CLAY, brown, light brown, moist, hard, with limestone fragments			
	S-2	SS	6	6	LIMESTONE, tan, weathered, with clay layers			50
5							642	50[2] 50[1]
					LIMESTONE, gray			
10					**END OF BORING AT 10 FT**		637	50[1] 50[1]
15							632	
20							627	
25							622	
30							617	

4.50 tsf

20 29.0 48

100/ 2.50"

100/ 1.50"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 26 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 26 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY:	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-31**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.262903	**-96.550001**		**645.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*	
	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, stiff, with limestone fragments				1.25
	S-2	ST	6	6				50	1.00
	S-3	SS	6	6	LIMESTONE, tan, weathered, with clay layers				
5							640	50[4] 50[2]	100/ 5.50"
					LIMESTONE, gray				
10							635	50[1] 50[0]	100/ 0.75"
15					**END OF BORING AT 15 FT**		630	50[1] 50[0]	100/ 0.75"
20							625		
25							620		
30							615		

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED: **Mar 22 2024**	CAVE IN DEPTH:
▼ WL (Completion)	**Dry**	BORING COMPLETED: **Mar 22 2024**	HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV** / LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-32**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.262681	**-96.548853**		**640.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown, moist, firm to stiff, with limestone fragments			
	S-2	ST	24	24				
	S-3	ST	12	12				
5	S-4	SS	6	6	LIMESTONE, tan, weathered, with clay layers		635	4
					LIMESTONE, gray			
10							630	50[1] 50[1]
15					**END OF BORING AT 15 FT**		625	50[1] 50[0]
20							620	
25							615	
30							610	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

0.75

1.50

1.75

100/ 1.50"

100/ 1.00"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 29 2024**	CAVE IN DEPTH:	
WL (Completion) **Dry**	BORING COMPLETED: **Mar 29 2024**	HAMMER TYPE: **Auto**	
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-33**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.262468	**-96.554748**		**639.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit
X———●———△

⊗ STANDARD PENETRATION BLOWS/FT
ROCK QUALITY DESIGNATION & RECOVERY
RQD —— REC
○ CALIBRATED PENETROMETER TON/SF
⊠ TEXAS CONE PENETRATION BLOWS/FT
○ 1.25

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*	
	S-1	ST	24	24	(CH) FAT CLAY, dark brown, moist, stiff, with limestone fragments				
	S-2	SS	12	12	LIMESTONE, tan, weathered, with clay layers			29-50	
5					LIMESTONE, gray		634	50[1] 50[0]	⊠ 100/0.75"
10					**END OF BORING AT 10 FT**		629	50[1] 50[0]	⊠ 100/0.75"
15							624		
20							619		
25							614		
30							609		

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED: **Mar 29 2024**	CAVE IN DEPTH:
▼ WL (Completion)	**Dry**	BORING COMPLETED: **Mar 29 2024**	HAMMER TYPE: **Auto**
⧩ WL (Seasonal High Water)		EQUIPMENT: **ATV** / LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
⧩ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-34**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.262225	**-96.553294**		**645.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*	
	S-1	ST	24	24	(CL) LEAN CLAY, dark brown to light brown, moist, very stiff, with limestone fragments				
	S-2	SS	4	4	LIMESTONE, tan, weathered, with clay layers			50/4" (50/4")	50/4"
					LIMESTONE, gray				
5							640	50[1] 50[0]	100/ 0.75"
10					**END OF BORING AT 10 FT**		635	50[1] 50[0]	100/ 0.75"
15							630		
20							625		
25							620		
30							615		

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 29 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 29 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-35**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.262381	**-96.549793**		**643.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, firm to hard			
	S-2	ST	24	24				
	S-3	ST	6	6				
5	S-4	SS	5	5	LIMESTONE, tan, weathered, with clay layers		638	50/5" (50/5")
10							633	50[1] 50[0]
					END OF BORING AT 11 FT			
15							628	
20							623	
25							618	
30							613	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED: **Mar 29 2024**	CAVE IN DEPTH:
▼ WL (Completion)	**Dry**	BORING COMPLETED: **Mar 29 2024**	HAMMER TYPE: **Auto**
⧩ WL (Seasonal High Water)		EQUIPMENT: **ATV** / LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
⧩ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-36**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.261901	**-96.548600**		**636.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, stiff, with limestone fragments			
	S-2	ST	18	18				
	S-3	SS	17	17	LIMESTONE, tan, weathered, with clay layers			11-16-50/5" (66/11")
5							631	50[1] 50[1]
					LIMESTONE, gray			
10					**END OF BORING AT 10 FT**		626	50[1] 50[0]
15							621	
20							616	
25							611	
30							606	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

1.25

1.25

66/11"

100/ 1.00"

100/ 1.00"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **3.50**	BORING STARTED: **Mar 29 2024**		CAVE IN DEPTH:
WL (Completion)	BORING COMPLETED: **Mar 29 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-37**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.262027	**-96.554066**		**643.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	12	12	(CH) FAT CLAY, dark brown to light brown, moist, stiff, with limestone fragments			
	S-2	SS	6	6	LIMESTONE, tan, weathered, with clay layers			50
5					LIMESTONE, gray		638	50[1] 50[0]
10					**END OF BORING AT 10 FT**		633	50[0] 50[0]
15							628	
20							623	
25							618	
30							613	

Plastic Limit Water Content Liquid Limit
X———●———△

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY
RQD REC

○ CALIBRATED PENETROMETER TON/SF

☒ TEXAS CONE PENETRATION BLOWS/FT
○ 1.25

☒ 100/0.75"

☒ 100/0.50"

BOTTOM OF CASING

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED: **Mar 29 2024**	CAVE IN DEPTH:
▼ WL (Completion)	**Dry**	BORING COMPLETED: **Mar 29 2024**	HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV** / LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-38**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.261709	**-96.555184**		**640.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, stiff to very stiff, with limestone fragments			
	S-2	ST	12	12				
	S-3	SS	4	4	LIMESTONE, tan, weathered, with clay layers			50/4" (50/4")
5							635	50[1] 50[0]
					LIMESTONE, gray			
10					**END OF BORING AT 10 FT**		630	50[1] 50[0]
15							625	
20							620	
25							615	
30							610	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

2.00

1.50

50/4"

100/ 0.75"

100/ 0.75"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered)	**Dry**	BORING STARTED: **Mar 29 2024**	CAVE IN DEPTH:
WL (Completion)	**Dry**	BORING COMPLETED: **Mar 29 2024**	HAMMER TYPE: **Auto**
WL (Seasonal High Water)		EQUIPMENT: **ATV** / LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-39**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.261657	**-96.552589**		**645.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*	
	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff, with limestone fragments				
	S-2	SS	9	9	LIMESTONE, tan, weathered, with clay layers			35-50/3" (50/3")	50/3"
5					LIMESTONE, gray		640	50[1] 50[0]	100/ 0.75"
10					**END OF BORING AT 10 FT**		635	50[1] 50[0]	100/ 0.75"
15							630		
20							625		
25							620		
30							615		

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 29 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 29 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-40**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.261755	**-96.550404**		**644.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
0	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, stiff to hard, with limestone fragments			
	S-2	ST	24	24				
	S-3	ST	12	12				
5					LIMESTONE, tan, weathered, with clay layers		639	50[4] 50[5]
10					LIMESTONE, gray		634	50[1] 50[0]
					END OF BORING AT 11 FT			
15							629	
20							624	
25							619	
30							614	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

1.00 1.75 4.25 100/ 8.25" 100/ 0.75"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered) **Dry**	BORING STARTED: **Mar 29 2024**		CAVE IN DEPTH:
WL (Completion) **Dry**	BORING COMPLETED: **Mar 29 2024**		HAMMER TYPE: **Auto**
WL (Seasonal High Water)	EQUIPMENT: **ATV**	LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Melissa Realty Partners, LLC	**19:9402**	**B-41**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Mirany Road SF Development	**Total Depth**		
SITE LOCATION:			LOSS OF CIRCULATION
NWQ FM 2933 & CR 1116, Melissa, Texas, 75454			
LATITUDE:	LONGITUDE:	STATION:	SURFACE ELEVATION:
33.261533	**-96.549417**		**640.0**

BOTTOM OF CASING

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD REC

CALIBRATED PENETROMETER TON/SF

TEXAS CONE PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (N - Value)*
	S-1	ST	24	24	(CH) FAT CLAY, dark brown to light brown, moist, very stiff, with limestone fragments			
	S-2	ST	12	12				
	S-3	SS	7	7	LIMESTONE, tan, weathered, with clay layers			31-50/1" (50/1")
5							635	50[0] 50[0]
					LIMESTONE, gray			
10					**END OF BORING AT 10 FT**		630	50[1] 50[1]
15							625	
20							620	
25							615	
30							610	

3.50 2.25 50/1" 100/0.50" 100/1.25"

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**Dry**	BORING STARTED: **Mar 29 2024**	CAVE IN DEPTH:
▼ WL (Completion)	**Dry**	BORING COMPLETED: **Mar 29 2024**	HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV** / LOGGED BY: **MJM1**	DRILLING METHOD: **CFA**
▽ WL (Stabilized)			

GEOTECHNICAL BOREHOLE LOG

Appendix C – Laboratory Testing

Laboratory Testing Summary
Other Laboratory Test Results

ECS Southwest, LLP
Carrollton, Texas
Laboratory Testing Summary

Date: 4/18/2024

Project Number: 19:9402 **Project Name:** Mirany Road SF Development (Melissa, TX)

Project Engineer: MEP **Principal Engineer:** KKP **Summary By:** MEP

Boring Number	Sample Number	Depth (feet)	MC[1] (%)	Soil Type[2]	Atterberg Limits[3]			Percent Passing No. 200 Sieve[5]	Dry Unit Weight (pcf)	One-Dimensional Swell[6]				Soluble Sulfate (ppm)
					LL	PL	PI			Final Moisture (%)	Overburden (psf)	Swell (%)	Load Back Pressure (psf)	
B-01	S-1	0 - 2	20.7	**CL**	43	20	23							
	S-2	2 - 3	21.6											
B-02	S-1	0 - 2	24.3											
	S-2	2 - 3	20.0											
B-03	S-1	0 - 2	24.4	**CL**	40	18	22							
B-04	S-1	0 - 2	29.3	**CH**	60	24	36							
B-05	S-1	0 - 2	40.4	**CH**	77	27	50	95.1	76.5	40.7	140	0.2		
B-06	S-1	0 - 1	20.8	**CL**	45	20	25							
B-07	S-1	0 - 2	23.8	**CL**	43	19	24							
B-08	S-1	0 - 2	23.9											
	S-2	2 - 4	21.0	**CH**	50	21	29	93.8	95.0	21.6	380	0.0		
	S-3	4 - 6	20.5	**CL**	46	20	26							
B-09	S-1	0 - 1	29.7											
B-10	S-1	0 - 2	38.8	**CH**	75	26	49							

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 7260, 5. ASTM D 1140, 6. ASTM D 4546

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, NP: Non Plastic, DB: DryBack

ECS Southwest, LLP
Carrollton, Texas
Laboratory Testing Summary

Date: 4/18/2024

Project Number: 19:9402 **Project Name:** Mirany Road SF Development (Melissa, TX)

Project Engineer: MEP **Principal Engineer:** KKP **Summary By:** MEP

Boring Number	Sample Number	Depth (feet)	MC[1] (%)	Soil Type[2]	Atterberg Limits[3]			Percent Passing No. 200 Sieve[5]	Dry Unit Weight (pcf)	One-Dimensional Swell[6]				Soluble Sulfate (ppm)
					LL	PL	PI			Final Moisture (%)	Overburden (psf)	Swell (%)	Load Back Pressure (psf)	
B-11	S-1	0 - 2	40.7	**CH**	74	26	48		75.9	40.8	140	0.2		
	S-2	2 - 3	20.1											
B-12	S-1	0 - 2	35.2	**CH**	78	27	51		82.6	35.5	140	0.4		
B-13	S-1	0 - 2	33.6											
	S-2	2 - 4	31.1	**CH**	83	26	57		87.6	31.6	380	0.5		
B-14	S-1	0 - 2	33.7	**CH**	66	24	42							75
	S-2	2 - 4	24.7	**CH**	62	23	39	87.1	89.5					91
	S-3	4 - 6	21.6	**CH**	51	21	30							
B-15	S-1	0 - 1	27.4											73
B-16	S-1	0 - 1	26.0	**CL**	45	19	26							
B-17	S-1	0 - 2	31.3	**CH**	74	26	48							70
	S-2	2 - 3	25.6											
B-18	S-1	0 - 2	28.1	**CH**	73	26	47							
	S-2													
B-19	S-1	0 - 2	38.8	**CH**	73	26	47		76.9	38.9	140	0.2		
B-20	S-1	0 - 2	39.6	**CH**	70	26	44		76.5	40.2	140	0.3		90
B-21	S-1	0 - 1	19.2											

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 7260, 5. ASTM D 1140, 6. ASTM D 4546

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, NP: Non Plastic, DB: DryBack

ECS Southwest, LLP
Carrollton, Texas
Laboratory Testing Summary

Date: 4/18/2024

Project Number: 19:9402 **Project Name:** Mirany Road SF Development (Melissa, TX)

Project Engineer: MEP **Principal Engineer:** KKP **Summary By:** MEP

Boring Number	Sample Number	Depth (feet)	MC[1] (%)	Soil Type[2]	Atterberg Limits[3]			Percent Passing No. 200 Sieve[5]	Dry Unit Weight (pcf)	One-Dimensional Swell[6]				Soluble Sulfate (ppm)
					LL	PL	PI			Final Moisture (%)	Surcharge (psf)	Swell (%)	Load Back Pressure (psf)	
B-22	S-1	0 - 1	26.6	**CL**	41	18	23							
B-23	S-1	0 - 2	31.4											
	S-2	2 - 4	25.7	**CH**	59	23	36							
B-24	S-1	0 - 2	36.8											
	S-2	2 - 4	28.9	**CL**	44	20	24	90.2	88.8	29.0	380	0.0		
B-25	S-1	0 - 2	25.6											
	S-2	2 - 3	23.4	**CL**	46	20	26		96.3	23.6	320	0.0		
B-26	S-1	0 - 1	25.2	**CL**	44	20	24							95
B-27	S-1	0 - 2	32.5	**CH**	66	25	41							
B-28	S-1	0 - 2	27.3											
	S-2	2 - 3	28.8	**CH**	57	22	35		88.9	28.9	320	0.0		
B-29	S-1	0 - 2	27.0											
	S-2	2 - 4	24.2	**CL**	47	20	27		96.4	24.5	380	0.0		
B-30	S-1	0 - 2	29.0	**CL**	48	20	28							
B-31	S-1	0 - 2	34.8	**CH**	77	26	51							
B-32	S-1	0 - 2												77
	S-2	2 - 4	28.1	**CH**	69	24	45		85.3	28.2	380	0.0		

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 7260, 5. ASTM D 1140, 6. ASTM D 4546

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, NP: Non Plastic, DB: DryBack

ECS Southwest, LLP
Carrollton, Texas
Laboratory Testing Summary

Date: 4/18/2024

Project Number: 19:9402 **Project Name:** Mirany Road SF Development (Melissa, TX)

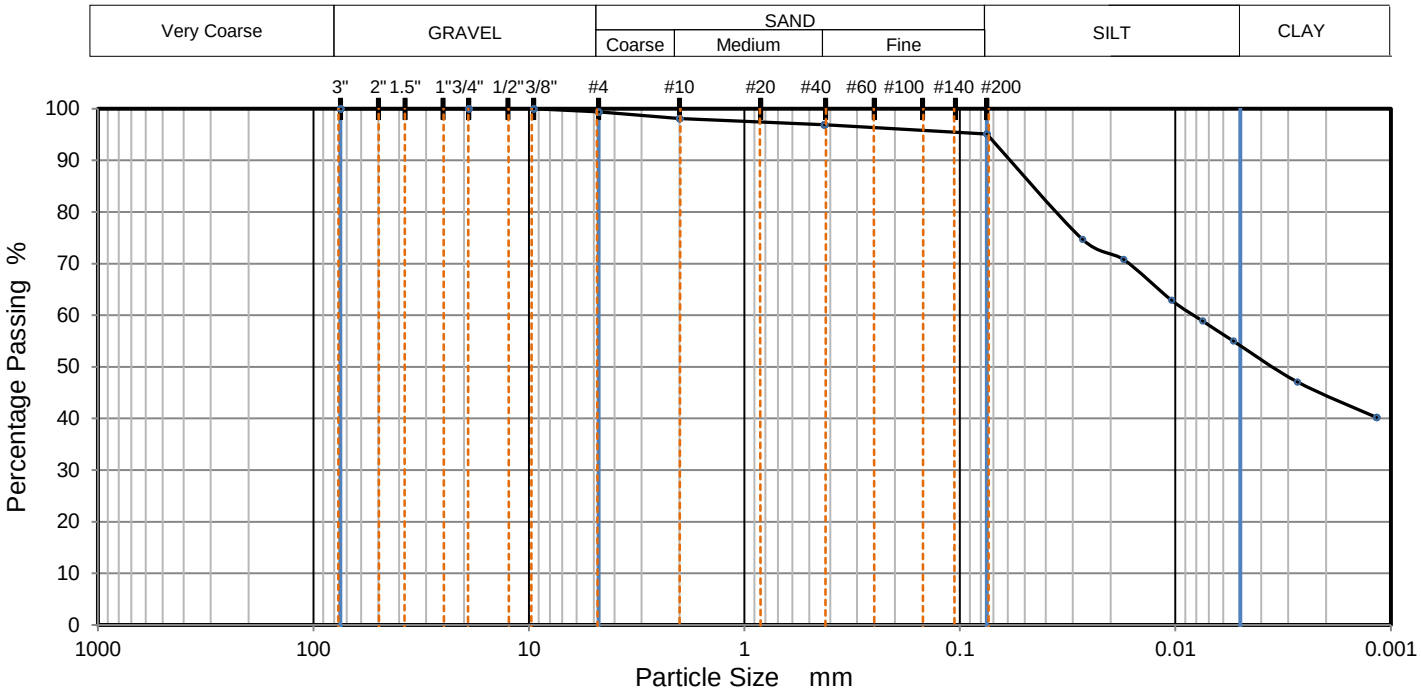
Project Engineer: MEP **Principal Engineer:** KKP **Summary By:** MEP

Boring Number	Sample Number	Depth (feet)	MC[1] (%)	Soil Type[2]	Atterberg Limits[3]			Percent Passing No. 200 Sieve[5]	Dry Unit Weight (pcf)	One-Dimensional Swell[6]				Soluble Sulfate (ppm)
					LL	PL	PI			Final Moisture (%)	Surcharge (psf)	Swell (%)	Load Back Pressure (psf)	
B-32	S-3	4 - 5	30.2											
B-33	S-1	0 - 2	28.2											
B-34	S-1	0 - 2	28.1	**CL**	47	20	27							
B-35	S-1	0 - 2	34.0											
	S-2	2 - 4	24.5	**CH**	67	25	42		88.6	24.7	380	0.0		
B-36	S-1	0 - 2	33.4	**CH**	74	26	48							
B-37	S-1	0 - 1	33.3											
														93
B-38	S-1	0 - 2	37.1											
	S-2	2 - 3	26.4											
B-39	S-1	0 - 2	25.0	**CH**	59	23	36							
B-40	S-2	2 - 4	34.8	**CH**	78	27	51	94.7						
	S-3	4 - 5	20.4											
B-41	S-1	0 - 2	26.1	**CH**	64	23	41							107
	S-2	2 - 3	20.7											

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 7260, 5. ASTM D 1140, 6. ASTM D 4546

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, NP: Non Plastic, DB: DryBack

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0270	74.7
3/4"	100.0	0.0174	70.8
3/8"	100.0	0.0104	62.9
#4	99.4	0.0075	58.9
#10	98.1	0.0054	55.0
#40	96.9	0.0027	47.1
#200	95.1	0.0012	40.2
		Specific Gravity (Historical)	
		2.65	

Dry Mass of sample, g	171.7

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.6
Coarse Sand, #4 to #10 sieve	1.3
Medium Sand, #10 to #40	1.2
Fine Sand, #40 to #200	1.8
Silt, 75µm to 5 µm	41.0
Clay < 5µm	54.1

USCS	CH	Liquid Limit	77	D90	0.058	D50	0.003	D10	
AASHTO	A-7-6	Plastic Limit	27	D85	0.045	D30		Cu	
USCS Group Name	Fat clay	Plasticity Index	50	D60	0.008	D15		Cc	

Project: Mirany Road SF Development (Melissa, TX)
Client: Melissa Realty Partners, LLC
Sample Description:
Sample Source: B-05

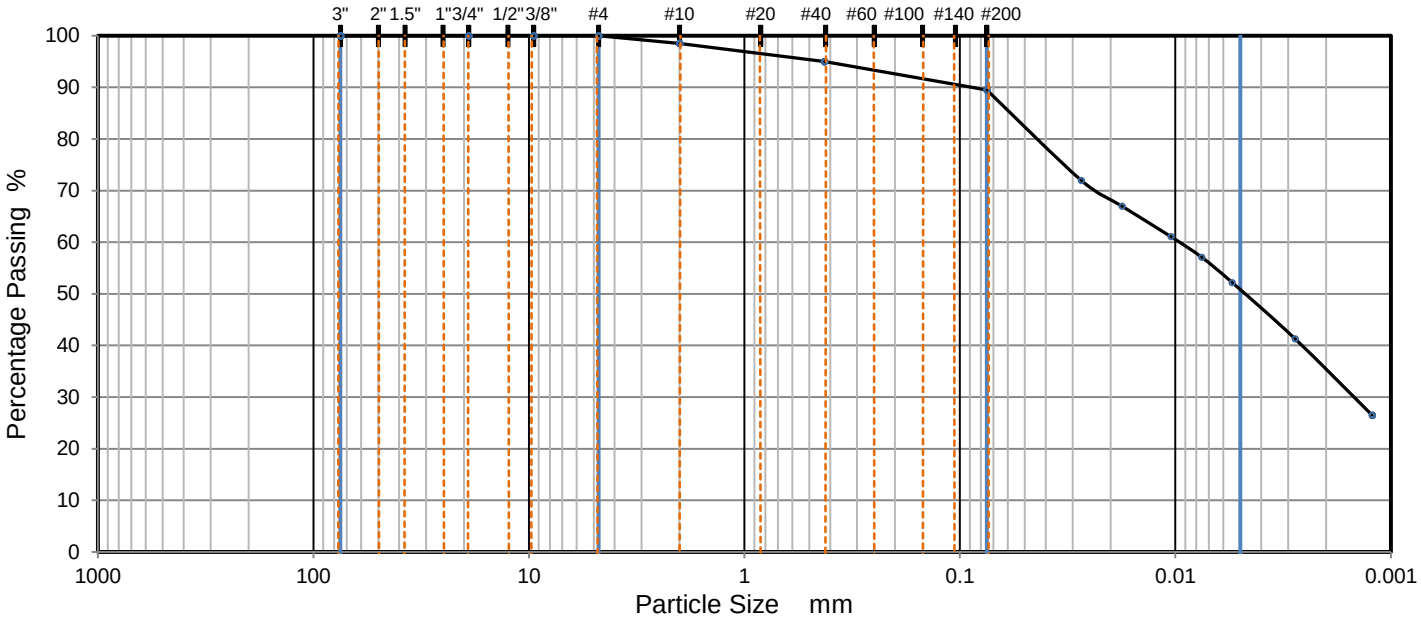
Project No.: 19:9402
Depth (ft): 0.0 - 2.0
Sample No.: S-1
Date Reported: 4/25/2024

Office / Lab	Address	Office Number / Fax
ECS Southwest LLP - Dallas	3033 Kellway Drive Suite 110 Carrollton, TX 75006	(972)392-3222 (214)483-9684

Tested by	Checked by	Approved by	Date Received	Remarks
KMarupudi	AThomas	AThomas		

PARTICLE SIZE DISTRIBUTION

Very Coarse	GRAVEL	SAND			SILT	CLAY
		Coarse	Medium	Fine		



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0274	72.0
3/4"	100.0	0.0177	67.0
3/8"	100.0	0.0105	61.1
#4	100.0	0.0076	57.1
#10	98.5	0.0055	52.2
#40	95.0	0.0028	41.3
#200	89.5	0.0012	26.5
		Specific Gravity (Historical)	
		2.65	

Dry Mass of sample, g	168.7

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	1.5
Medium Sand, #10 to #40	3.5
Fine Sand, #40 to #200	5.5
Silt, 75µm to 5 µm	38.7
Clay < 5µm	50.8

USCS	CH	Liquid Limit	62	D90	0.088	D50	0.005	D10	
AASHTO	A-7-6	Plastic Limit	23	D85	0.058	D30	0.001	Cu	
USCS Group Name	Fat clay	Plasticity Index	39	D60	0.010	D15		Cc	

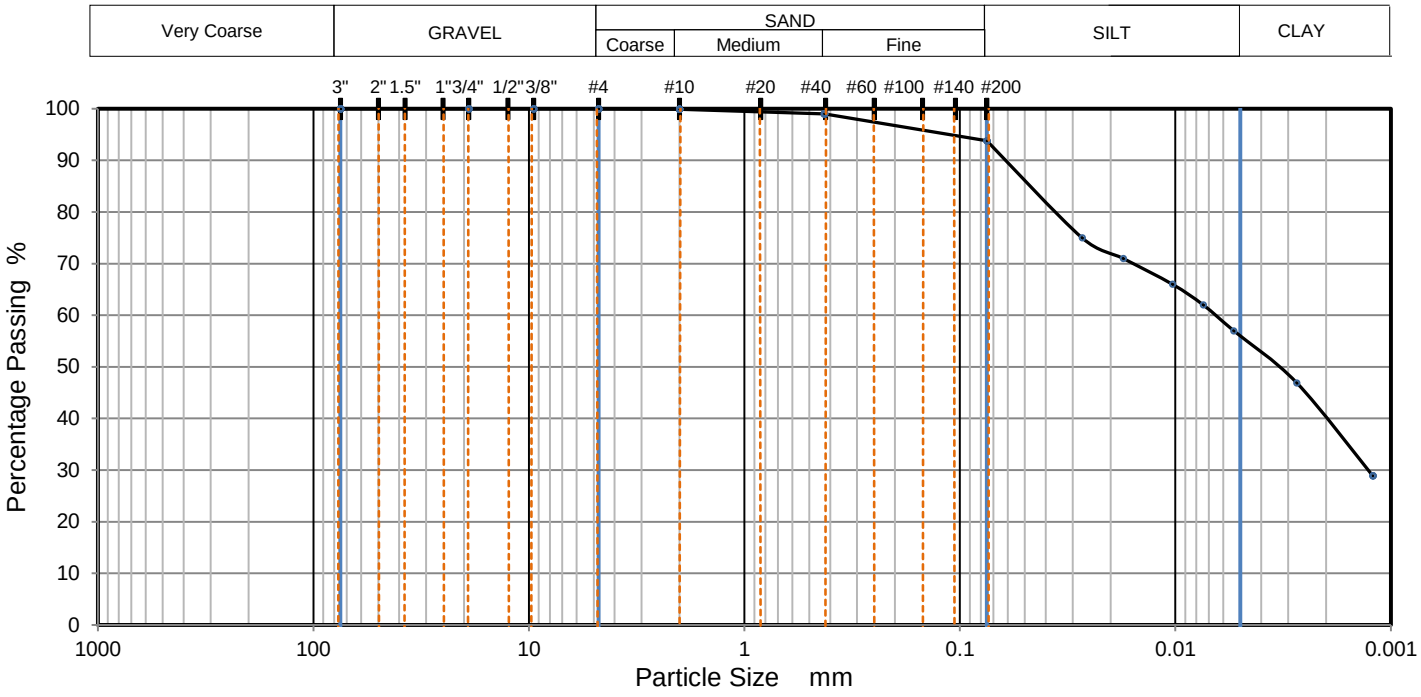
Project: Mirany Road SF Development (Melissa, TX)
Client: Melissa Realty Partners, LLC
Sample Description:
Sample Source: B-14

Project No.: 19:9402
Depth (ft): 2.0 - 4.0
Sample No.: S-2
Date Reported: 4/25/2024

Office / Lab	Address	Office Number / Fax
ECS Southwest LLP - Dallas	3033 Kellway Drive Suite 110 Carrollton, TX 75006	(972)392-3222 (214)483-9684

Tested by	Checked by	Approved by	Date Received	Remarks
KMarupudi	AThomas	AThomas		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0271	75.0
3/4"	100.0	0.0175	71.0
3/8"	100.0	0.0103	66.0
#4	100.0	0.0074	62.0
#10	99.9	0.0054	57.0
#40	99.0	0.0027	46.9
#200	93.8	0.0012	28.9
		Specific Gravity (Historical)	
		2.65	

Dry Mass of sample, g	232.6

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	0.1
Medium Sand, #10 to #40	0.9
Fine Sand, #40 to #200	5.2
Silt, 75µm to 5 µm	37.9
Clay < 5µm	55.9

USCS	CH	Liquid Limit	50	D90	0.061	D50	0.003	D10	
AASHTO	A-7-6	Plastic Limit	21	D85	0.047	D30	0.001	Cu	
USCS Group Name	Fat clay	Plasticity Index	29	D60	0.007	D15		Cc	

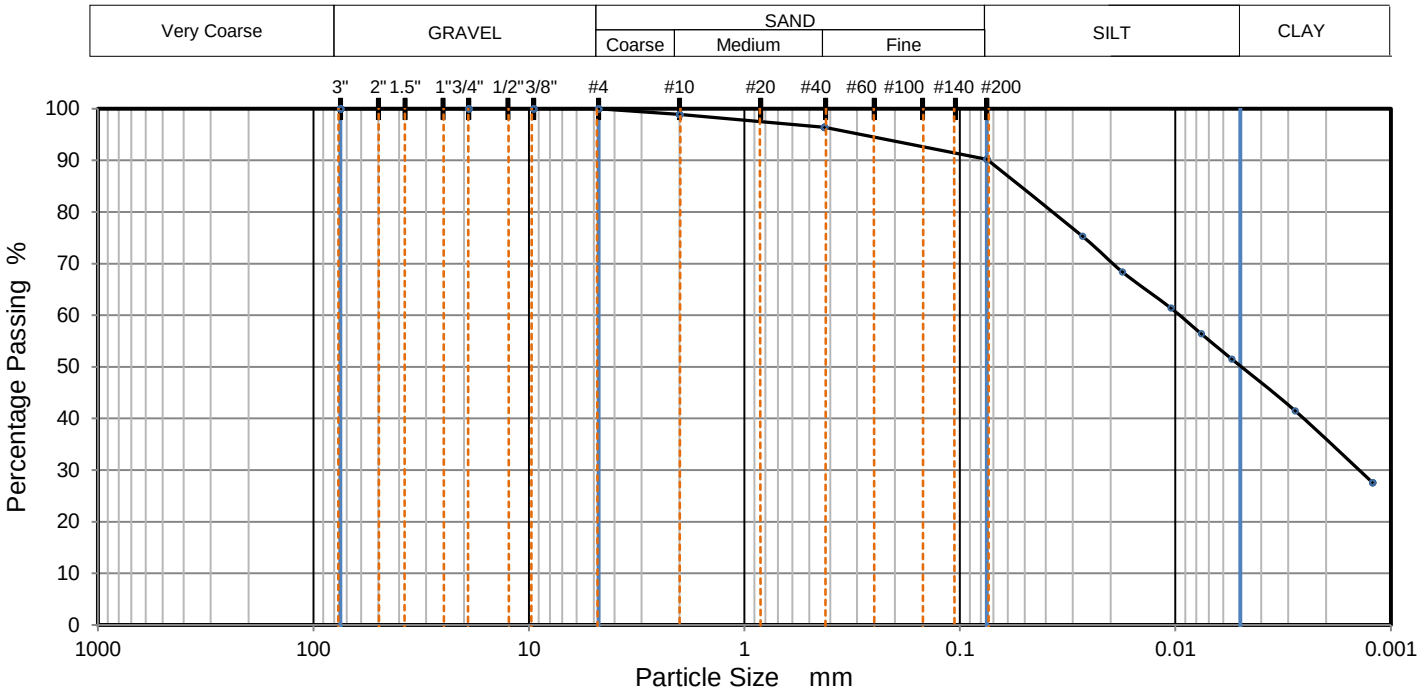
Project: Mirany Road SF Development (Melissa, TX)
Client: Melissa Realty Partners, LLC
Sample Description:
Sample Source: B-08

Project No.: 19:9402
Depth (ft): 2.0 - 4.0
Sample No.: S-2
Date Reported: 4/25/2024

Office / Lab	Address	Office Number / Fax
ECS Southwest LLP - Dallas	3033 Kellway Drive Suite 110 Carrollton, TX 75006	(972)392-3222 (214)483-9684

Tested by	Checked by	Approved by	Date Received	Remarks
KMarupudi	AThomas	AThomas		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0270	75.3
3/4"	100.0	0.0176	68.4
3/8"	100.0	0.0105	61.4
#4	100.0	0.0076	56.4
#10	98.9	0.0055	51.5
#40	96.4	0.0028	41.5
#200	90.2	0.0012	27.6
		Specific Gravity (Historical)	
		2.65	

Dry Mass of sample, g	180.5

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.0
Coarse Sand, #4 to #10 sieve	1.1
Medium Sand, #10 to #40	2.5
Fine Sand, #40 to #200	6.2
Silt, 75µm to 5 µm	40.0
Clay < 5µm	50.2

USCS	CL	Liquid Limit	44	D90	0.074	D50	0.005	D10	
AASHTO	A-7-6	Plastic Limit	20	D85	0.053	D30	0.001	Cu	
USCS Group Name	Lean clay	Plasticity Index	24	D60	0.010	D15		Cc	

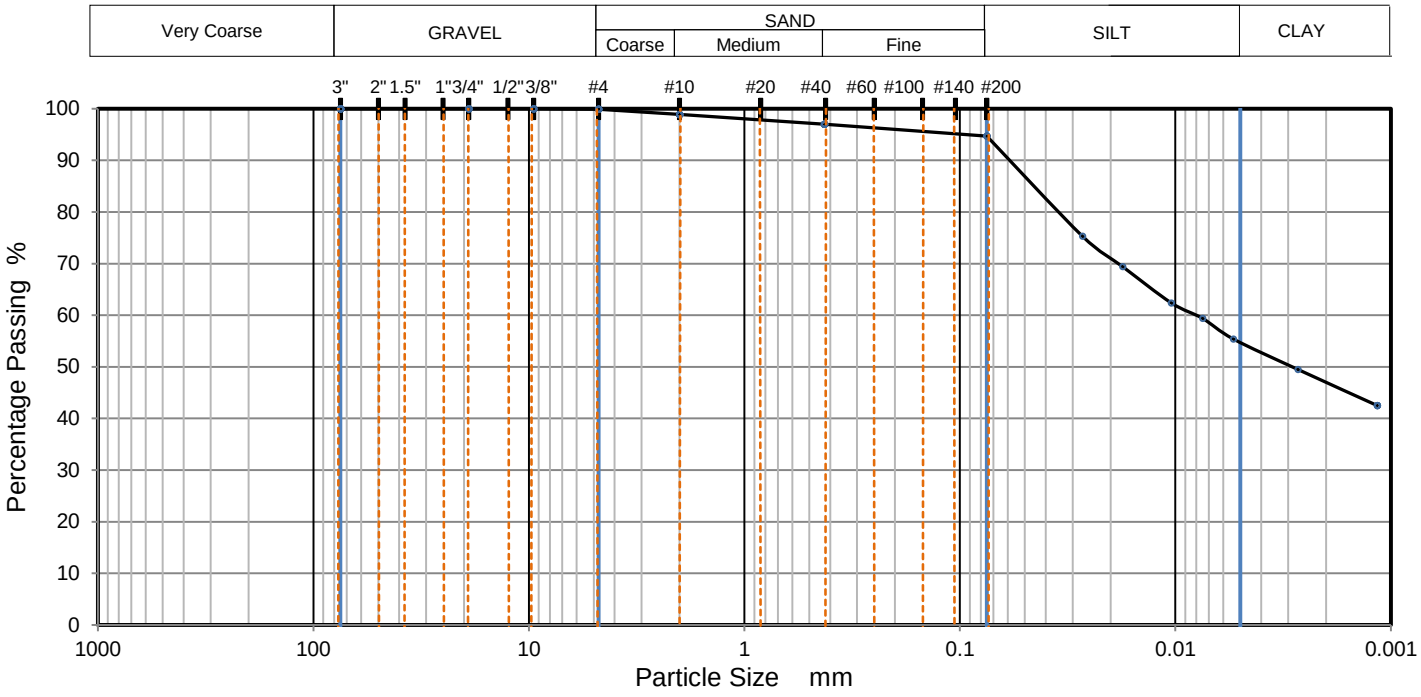
Project: Mirany Road SF Development (Melissa, TX)
Client: Melissa Realty Partners, LLC
Sample Description:
Sample Source: B-24

Project No.: 19:9402
Depth (ft): 2.0 - 4.0
Sample No.: S-2
Date Reported: 4/25/2024

Office / Lab	Address	Office Number / Fax
ECS Southwest LLP - Dallas	3033 Kellway Drive Suite 110 Carrollton, TX 75006	(972)392-3222 (214)483-9684

Tested by	Checked by	Approved by	Date Received	Remarks
KMarupudi	AThomas	AThomas		

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0	0.0270	75.3
3/4"	100.0	0.0176	69.4
3/8"	100.0	0.0105	62.4
#4	99.9	0.0075	59.4
#10	98.9	0.0054	55.4
#40	97.0	0.0027	49.5
#200	94.7	0.0012	42.5
		Specific Gravity (Historical)	
		2.65	

Dry Mass of sample, g	203.0

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	0.1
Coarse Sand, #4 to #10 sieve	1.0
Medium Sand, #10 to #40	1.9
Fine Sand, #40 to #200	2.3
Silt, 75µm to 5 µm	39.9
Clay < 5µm	54.8

USCS	CH	Liquid Limit	78	D90	0.059	D50	0.003	D10	
AASHTO	A-7-6	Plastic Limit	27	D85	0.045	D30		Cu	
USCS Group Name	Fat clay	Plasticity Index	51	D60	0.008	D15		Cc	

Project: Mirany Road SF Development (Melissa, TX)
Client: Melissa Realty Partners, LLC
Sample Description:
Sample Source: B-40

Project No.: 19:9402
Depth (ft): 2.0 - 4.0
Sample No.: S-2
Date Reported: 4/25/2024

Office / Lab	Address	Office Number / Fax
ECS Southwest LLP - Dallas	3033 Kellway Drive Suite 110 Carrollton, TX 75006	(972)392-3222 (214)483-9684

Tested by	Checked by	Approved by	Date Received	Remarks
KMarupudi	AThomas	AThomas		

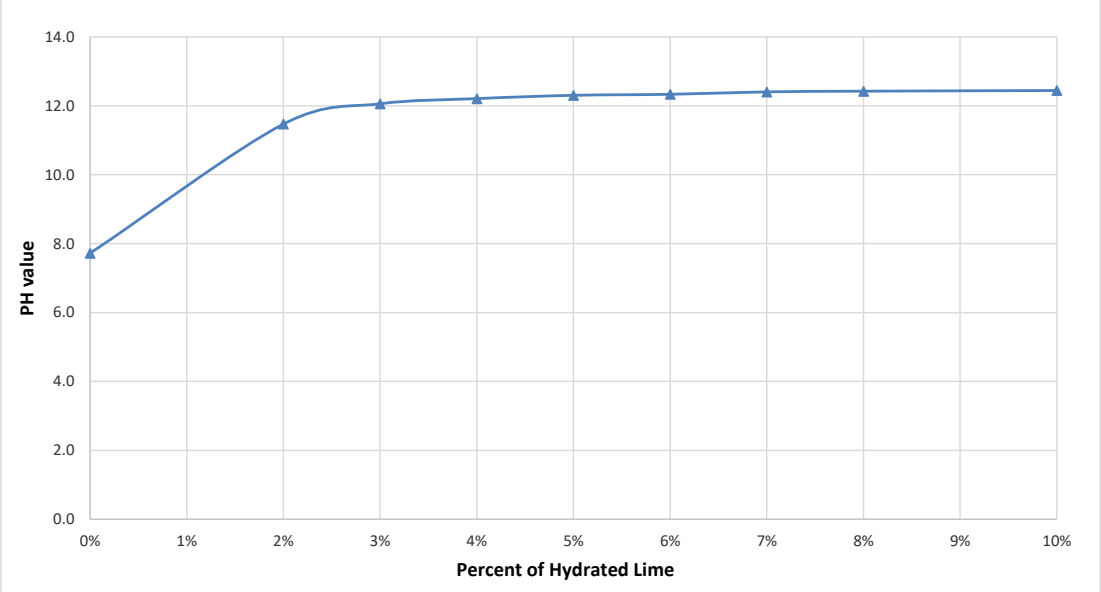
ECS Southwest, LLP
Dallas, TX

Project No: 19:9402
Project : Mirany Road SF Development (Melissa, TX)
Source : B-17, 0'-2'
Sample Information: Clay, dark brown

Date : 04/26/2024
Tested By :KM

Lime pH Series Test

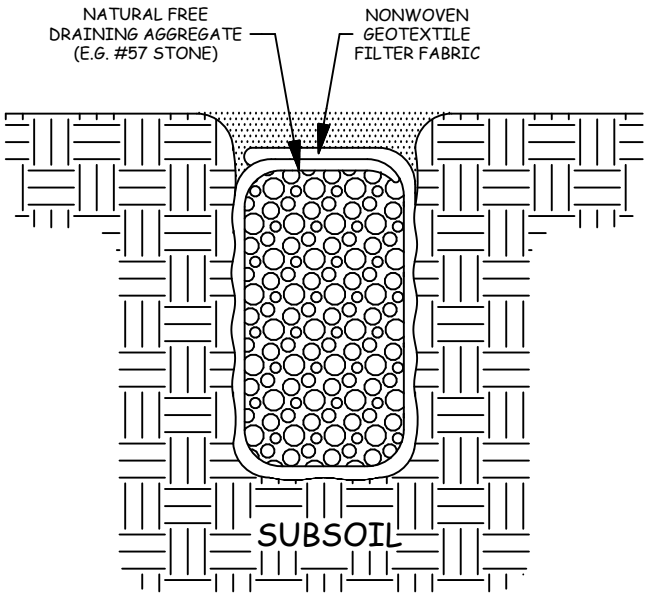
% of Hydrated Lime	Corrected pH	Remarks
0%	7.7	
2%	11.5	
3%	12.1	
4%	12.2	
5%	12.3	
6%	12.3	
7%	12.4	
8%	12.4	
10%	12.4	



Appendix D – Supplemental Documents

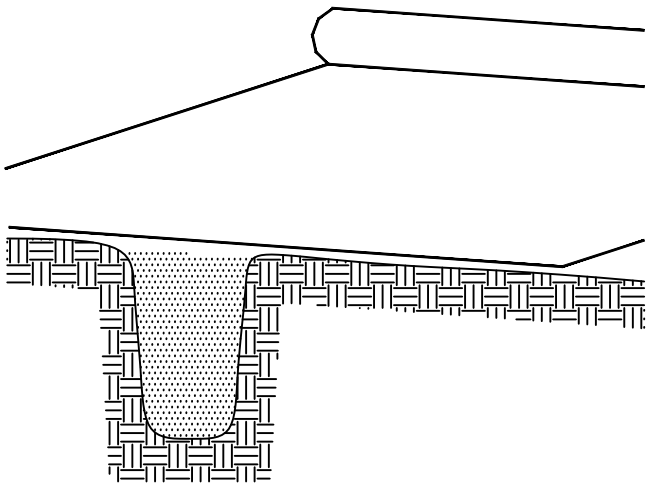
Drawings/Details

FINAL CONFIGURATION



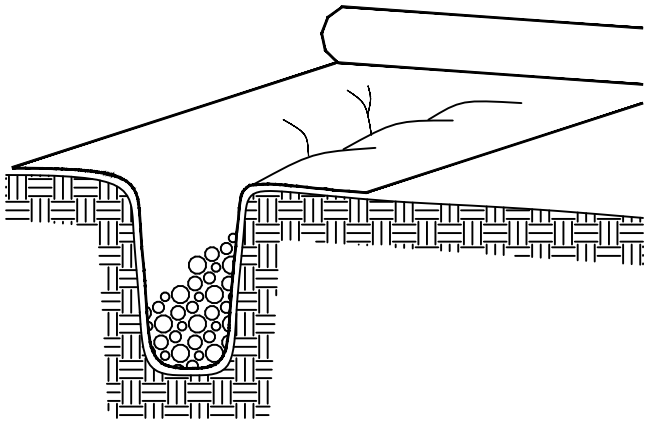
SUBDRAIN USING FILTER FABRIC

STEP 1



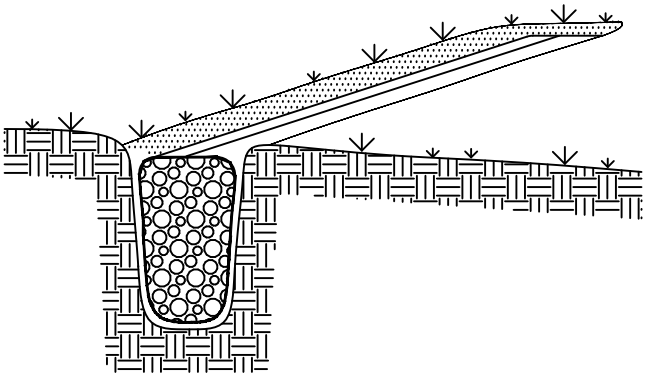
FABRIC IS UNROLLED DIRECTLY OVER TRENCH

STEP 2



THE TRENCH IS FILLED WITH AGGREGATE

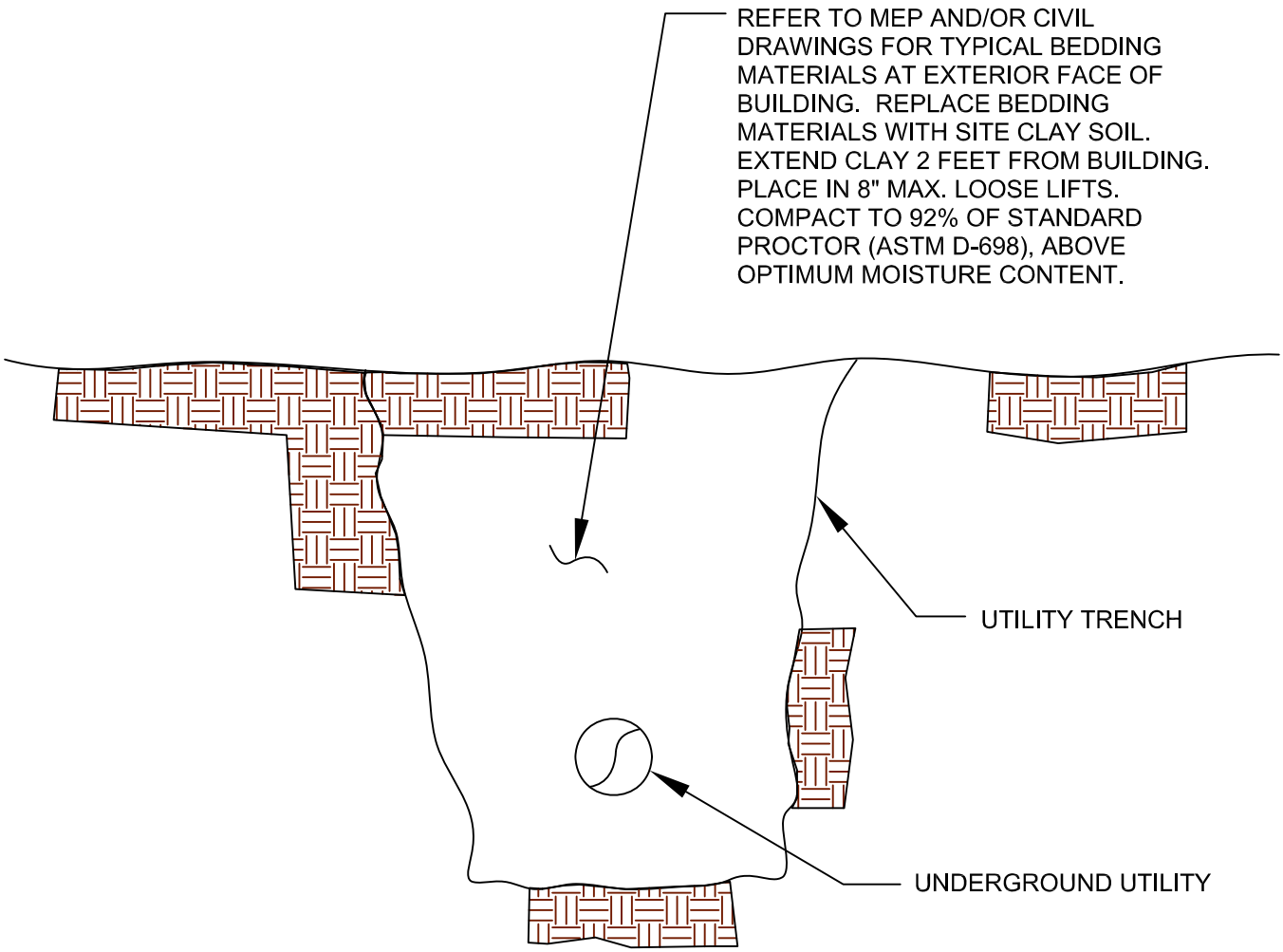
STEP 3



THE FABRIC IS LAPPED CLOSED AND
COVERED WITH BASE STONE

FRENCH DRAIN
INSTALLATION PROCEDURE

NOT TO SCALE



TYPICAL DETAIL DIAGRAM	ECS	**CLAY PLUG AT UTILITY TRENCH**	ENGINEER	SCALE NTS
			DRAFTSMAN CLL	PROJECT NO.
			REVISIONS	SHEET 1 OF 1
				DATE 1/25/2021