Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

InTEC Project No. S261012-R1
May 18, 2026

LENNAR

100 NE Loop 410 Suite 1155
San Antonio, Texas 78216

inTEC Integrated Testing and Engineering Company of San Antonio, L.P.
Geotechnical & Environmental Engineering • Construction Services • Geologic Assessment

May 18, 2026

Lennar Homes
1922 Dry Creek Way, Suite 101
San Antonio, Texas 78259

Attention: **Mr. Roy Olivarez**
Email: roy.olivarez@lennar.com

Re: Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

InTEC Project No. S261012-R1

Ladies & Gentlemen:

Integrated Testing and Engineering Company of San Antonio (InTEC) completed a **subsurface exploration and pavement thickness evaluation report** (InTEC Project No. S261012-R1 dated May 07, 2026) at the above referenced project site. As requested, updates based on Bexar County comments are presented in this revised report. No new field investigations were performed in completing this revised report.

We appreciate and wish to thank you for the opportunity to be of service to you on this project. If we can be of additional assistance during the foundation explorations, and materials testing-quality control phase of construction, please call us.

Sincerely,
InTEC of San Antonio

Murali Subramaniam, Ph. D., P.E.
Vice President

STATE OF TEXAS
MURALI SUBRAMANIAM
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05/20/2026

EXECUTIVE SUMMARY

The soil conditions at the location of the **proposed new streets at Guajolote Ranch, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector in San Antonio, Texas** were obtained from **drilling 38 borings to a depth of 12 feet each**. Laboratory tests were performed on selected specimens to evaluate the engineering characteristics of various soil strata encountered in the borings.

- The subsurface soils at the boring locations consist of dark brown clays to shallow depths underlain by light tan to tan marl, light tan to tan limestone, and tan weathered limestone to light tan limestone with caliche, gravel, and clay seams.

- The results of our exploration, laboratory testing, and engineering evaluation indicate that the underlying soils consist predominantly of **low to moderately plastic clays**, with potential for shrink-swell behavior due to changes in moisture content.

- **Estimated potential vertical rise (PVR)** using TxDOT Test Method TEX-124-E ranges from **1 to 1 ½ inches** at the current site grades. These values are based on standard modeling assumptions and **should not be interpreted as exact predictions of future movement**.

- The proposed pavements at this site may be supported by flexible pavement sections. Marl / Limestone subgrades are anticipated.

- At the time of construction, if the final street subgrade consists of material other than encountered in our borings, the recommendations may have to be revised. Pavement section recommendations for Local & Collector type streets are presented.

- **Groundwater was not encountered** in the borings at the time of drilling.

- Cut and fill information was not available at the time of this evaluation. Final pavement recommendations should be verified during construction based on actual exposed subgrade conditions.

- If subgrade soils differ significantly from those encountered during this investigation, geotechnical recommendations may require revision.

- Groundwater was not encountered during drilling.

- Long-term pavement performance will depend heavily on:
    - Proper drainage
    - Moisture management
    - Utility trench backfill quality
    - Construction practices
    - Ongoing maintenance

This summary is intended for general planning and design guidance only. Detailed descriptions, assumptions, analyses, and recommendations are provided in the full report and should be reviewed in their entirety. Any significant changes in site conditions, grading, or subsurface exposure should be evaluated by the geotechnical engineer.

Summary Table A – Input Parameters used in Asphalt Pavement Section Calculation

	Local Type A (no bus traffic)	**Local Type A** (with bus traffic)	**Local B**	**Collector**
ESAL	100,000	1,000,000	2,000,000	2,000,000
Reliability Level	R-70	R-70	R-90	R-90
Initial and Terminal Serviceability	4.2 and 2.0	4.2 and 2.0	4.2 and 2.0	4.2 and 2.5
Standard Deviation	0.45	0.45	0.45	0.45
Service Life	20 years	20 years	20 years	20 years
If heavy truck traffic is anticipated, please contact InTEC with anticipated traffic data for revised recommendations.				

Summary Table B – Minimum Flexible Pavement Recommendations – CBR = 5.0

Classification	Asphaltic Concrete			Aggregate Base, inches	Geogrid	Subgrade, inches	Structural Number
	Type D, inches	Type C, inches	Type B, inches				
Local Type A (no bus traffic)	2.00	-	-	8.50	No	*	2.07
	2.00	-	6.00	-	No	*	2.92
Local Type A (with bus traffic)	3.00	-	-	12.00	No	*	3.00
	3.00		6.00	-	No	*	3.36
Local Type B	3.00	-	-	17.00	No	*	3.70
	3.00	-	7.00	-	No	*	3.70
Collector	-	4.00	-	15.50	No	*	3.93
	2.00	2.00	-	15.50	No	*	3.93
	3.00	-	8.00	-	No	*	4.04

Design Notes:

- Pavement design follows the *City of San Antonio Pavement Design Guidelines*.
- Input parameters are summarized in **Table No. 3 (Summary Table A)**.
- Design California Bearing Ratio (CBR) = **5.0**
- Recommendations are provided for **Local Type A and Type B streets**.
- Laboratory testing and engineering evaluation indicate **highly plastic clays** at shallow depths. Estimated **Potential Vertical Rise (PVR)** at existing grade is **1 to 1 ½ inches**.
- For **repetitive or heavy truck traffic**, contact InTEC for revised pavement design recommendations using appropriate traffic inputs.

Subgrade Notes (*):

- Subgrade soils are anticipated to consist of **Marl to Limestone.**
- **Cut and fill information** is not available at this time.
- Fill used to raise the grade:
  - Existing clays should be removed to marl / limestone stratum prior to placement of fill.
  - approved fill material free should have a minimum CBR value of 5.0 and a maximum Plasticity Index value of 20.
  - **Proof-roll** subgrade prior to fill placement to identify and recompact weak zones.

Subgrade Treatment:

- **Marl to Limestone subgrades are anticipated.**
- **However, if the subgrade Plasticity Index values are greater than 20, the following option is recommended:**

- Stratum I clays removed to expose limestone stratum and replaced with on-site milled fill material (Plasticity Index value 20 or less).

Pavement and Drainage Notes:

- Pavement design is based on **CBR = 5.0** and parameters in Table No. 3 (Summary Table A).
- **Moisture control** beneath pavement is critical:
  - Prevent rain or irrigation water from infiltrating beneath the asphalt and base.
  - Consider **curbs extending ≥ 6 inches into subgrade** or backfilling with **compacted clay** against curb edges.
  - Ensure **lot grading and home construction** prevent trapped water near pavements.

Aggregate Base:

- Use TxDOT Item 247 A1-2 aggregate base
- Place in uniform lifts and compact to specified density and moisture content per city / county guidelines.

Asphalt:

- Provide asphalt materials and placement in accordance with City of San Antonio / TxDOT guidelines.

Verification:

- During construction, **InTEC personnel should verify subgrade** prior to base placement.

Summary Table C – Summary of Pavement Materials

Pavement Section	Material	Stabilization or Treatment	Thickness
Subgrade	Marl to Limestone (Plasticity Index <= 20)	Moisture conditioned clays	-
Base	TxDOT Item 247 A1-2	-	As recommended in pavement options (maximum of 6 inches per lift)
Asphalt	Type B, D	-	As recommended in pavement options

See report for more details

Summary Table D – Applicable procedures and minimum density and moisture percentages

All applicable City of San Antonio Standard Specifications for Construction, June 2008, should be followed. Some of the relevant procedures are shown below.

Pavement Material	Procedure *	Density and Moisture Control
Subgrade fill (maximum 6 inch thick lifts)	Item 107	As per construction specifications
Aggregate Base TxDOT Item 247 A1-2 (maximum 6 inch thick lift)	Item 200	As per construction specifications
Asphalt HMAC Type B, D	Item 205, 206	As per construction specifications

(*) City of San Antonio Standard Specifications for Construction, June 2008

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INTRODUCTION

General

This report presents the results of our **subsurface exploration and pavement thickness evaluation** for the **proposed new streets at Guajolote Ranch, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector in San Antonio, Texas.** This project was authorized by **Mr. Roy Olivarez.**

Purpose and Scope of Services

The purpose of our subsurface investigation was to evaluate the site's subsurface and ground water conditions and provide pavement thickness recommendations for the development phase of the project. Our scope of services includes the following:

1) excavating and sampling of 38 borings – to a depth of 12 feet each;
2) evaluation of the in-place conditions of the subsurface soils through field penetration tests;
3) observing the ground water conditions during drilling operations;
4) performing laboratory tests such as Atterberg limits, California Bearing Ratio (C.B.R.), and Moisture content tests;
5) review and evaluation of the field and laboratory test programs during their execution with modifications of these programs, when necessary, to adjust to subsurface conditions revealed by them;
6) compilation, generalization and analyses of the field and laboratory data in relation to the project requirements;
7) estimate of potential vertical movements;
8) preparation of pavement guidelines;
9) preparation of a written geotechnical engineering report for use by the members of the design team in their preparation of construction, contract, and specifications documents.

The Scope of Services **did not include slope stability or any environmental assessment** for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the Boring Logs regarding odors, colors or unusual or suspicious items or conditions are strictly for the information of the client.

Project Description

The proposed project involves the development of new streets at Guajolote Ranch, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector in San Antonio, Texas.

- The proposed pavement areas are anticipated to include Local & Collector type streets. Marl / Limestone subgrades are anticipated. Cut and fill information is not available at this time.

- A review of the aerial map indicates the site contains numerous trees / dense vegetation throughout.

- Review of the topographic map indicates the site generally slopes from north to south and inwards towards a drainage area running north-south through the center of the site.

- Limestone was encountered in the borings. The Bexar County Karst Map indicates some areas of the site are located within "Karst Zone 2" (areas having a high probability of containing suitable habitat for listed invertebrate karst species). Karst features are formed in limestone, dolomite, or gypsum by dissolution. A geophysical study of the site may indicate the presence and potential impact of Karst features, caves, or significant cavities on the building performance and construction delays. The thickness of the Stratum I clay is likely to vary across the site. Geophysical study is not within the scope of this investigation.

SUBSURFACE EXPLORATION

Scope

The field exploration to determine the engineering characteristics of the subsurface materials included a reconnaissance of the project site, drilling the borings, performing Standard Penetration Tests, and obtaining Split Barrel samples.

Thirty-eight soil test borings were drilled at the approximate locations shown on the Boring Location Plan, Plate 1, included in the Illustration section of this report. These borings were **drilled to a depth of 12 feet each below the presently existing ground surface**. Boring locations were selected by the project geotechnical engineer and established in the field by the drilling crew using normal taping procedures.

Drilling and Sampling

The soil borings were performed with a drilling rig equipped with a rotary head. Conventional solid stem augers were used to advance the holes and samples of the subsurface materials were obtained **using a Split Barrel sampler.** The samples were identified according to boring number and depth, encased in polyethylene plastic wrapping to protect against moisture loss, and transported to our laboratory in special containers.

Field Tests and Water Level Measurements

Penetration Tests – During the sampling procedures, **Standard Penetration Tests were performed** in the borings in conjunction with the split-barrel sampling. The standard penetration value (N) is defined as the number of blows of a 140 pound hammer, falling thirty inches, required to advance the split-spoon sampler one foot into the soil. The sampler is lowered to the bottom of the drill hole and the number of blows recorded for each of the three successive increments of six inches penetration. The "N" value is obtained by adding the second and third incremental numbers. The results of the standard penetration test indicate the relative density and comparative consistency of the soils, and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components.

Water Level Measurements – Ground water was not encountered in the borings at the time of drilling. In relatively pervious soils, such as sandy soils, the indicated elevations are considered reliable ground water levels. In relatively impervious soils, the accurate determination of the ground water elevation may not be possible even after several days of observation. Seasonal variations, temperature and recent rainfall conditions may influence the levels of the ground water table and volumes of water will depend on the permeability of the soils.

Field Logs

A field log was prepared for each boring. Each log contained information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as silt, clay, gravel or sand and observations of ground water. It also contained an interpretation of subsurface conditions between samples. **Therefore, these logs included both factual and interpretive information.**

Presentation of the Data

The final logs represent our interpretation of **the contents of the field logs for the purpose delineated by our client.** The final logs are included on **Plates 2 thru 39** included in the Illustration section. A key to classification terms and symbols used on the logs is presented on **Plate 40.**

LABORATORY TESTING PROGRAM

Purpose

In addition to the field exploration, a supplemental laboratory testing program was conducted to determine additional **pertinent engineering characteristics** of the subsurface materials necessary in evaluating the soil parameters.

Laboratory Tests

All phases of the laboratory testing program were performed **in general accordance with the indicated applicable** ASTM Specifications as indicated in Table No. 1.

Table No. 1 – Laboratory Test Procedures

Laboratory Test	Applicable Test Standard
Liquid Limit, Plastic Limit and Plasticity Index of the Soils	ASTM D 4318
Moisture Content	ASTM D 2216
California Bearing Ratio	ASTM D 1883

In the laboratory, each sample **was observed and classified by a geotechnical engineer.** As a part of this classification procedure, the natural water contents of selected specimens were determined. Liquid and plastic limit tests were performed on representative specimens to determine the plasticity characteristics of the different soil strata encountered.

Presentation of the Data

In summary, the tests presented were conducted in the laboratory to evaluate the engineering characteristics of the subsurface materials. The results of all these tests are presented on appropriate Boring Logs. These laboratory test results were used to classify the soils encountered generally according to the Unified Soil Classification System (ASTM D 2487).

GENERAL SUBSURFACE CONDITIONS

Soil Stratigraphy

The soils underlying the site may be grouped into **one to two generalized strata** with similar physical and engineering properties. The lines designating the interface between soil strata on the logs represent approximate boundaries. Transition between materials may be gradual. The soil stratigraphy information at the boring locations are presented in **Boring Logs, Plates 2 thru 39.**

The engineering characteristics of the underlying soils, based on selected samples that were tested, are summarized and presented in the following paragraph.

The underlying dark brown clays, light tan to tan marl, light tan to tan limestone, and tan weathered limestone to light tan limestone are moderately plastic with tested liquid limit values varying from 18 to 42 and plasticity index values ranging from 05 to 22. The results of Standard Penetration Tests performed within these clays varied from 19 to greater than 50 blows per foot.

The above description presented is of a generalized nature to highlight the major soil stratification features and soil characteristics. Please refer to Boring Logs for soil stratigraphy information at a particular boring location.

Ground Water Observations

Ground water was not encountered in the borings at the time of drilling. Short term field observations generally do not provide accurate ground water levels. The contractor should check the subsurface water conditions prior to any excavation activities. The low permeability of the soils would require several days or longer for ground water to enter and stabilize in the bore holes. Ground water levels will fluctuate with seasonal climatic variations and changes in the land use.

It is not unusual to encounter shallow groundwater during or after periods of rainfall. The surface water tends to percolate down through the surface until it encounters a relatively impervious layer.

PAVEMENTS ON EXPANSIVE SOIL

The subsurface conditions at the site consist primarily of limestone with varying degrees of weathering. Pavement performance in limestone areas is generally governed by the strength and uniformity of the rock subgrade rather than by shrink–swell behavior typical of thick clay deposits.

However, localized clay soils may occur within weathered limestone zones, clay seams, or in trench backfill associated with underground utilities. These materials may undergo volume changes when subjected to fluctuations in moisture content. Where such materials occur beneath pavements, localized heave, settlement, or loss of support may occur.

Moisture variations within the upper portion of the soil profile may result from rainfall infiltration, irrigation, drainage conditions, or leakage from buried utilities. Utility trenches may also act as conduits for water movement and may influence moisture conditions in adjacent soils.

Proper drainage, uniform subgrade preparation, and adequate compaction of trench backfill materials are important factors in minimizing the potential effects of localized expansive soils on pavement performance.

Additional background information regarding expansive soil behavior is provided in **Appendix A.**

DESIGN ENGINEERING ANALYSIS

Pavement Design Considerations

Review of the borings and test data indicates that the following factors will affect the pavement design and construction at this site:

1) The underlying shallow soils are moderately plastic. Structures supported at shallow depths will be subjected to potential vertical movements on the order of **1 to 1 ½ inches** at the existing grade elevation of the borings.

2) The strengths of the underlying soils are adequate to support the proposed new streets.

3) Based on the stratigraphy observed at this site the final street subgrade is anticipated to be in Marl / Limestone subgrades. The final street subgrade should be observed and delineated by InTEC at the time of construction.

4) Ground water was not encountered in the borings at the time of drilling.

Vertical Movements

The potential vertical rise (PVR) for slab-on grade construction at the location of the structures had been estimated using Texas Department of Transportation Procedure TXDOT-124-E. This method utilizes the liquid limits, plasticity indices, and in-situ moisture contents for soils in the seasonally active zone, estimated to be about ten feet at the project site.

The estimated PVR value is based on the proposed floor system applying a sustained surcharge load of approximately 1.0 lb. per square inch on the subgrade materials. **Potential vertical movement on the order of 1 to 1 ½ inches was estimated at the existing grade elevations at the boring locations.** These PVR values will be realized if the subsoils are subjected to **moisture changes from average soil moisture conditions to wet soil moisture conditions.**

The PVR values are based on the current site grades. If cut and fill operations in excess of 6 inches are performed, the PVR values could change significantly. Higher PVR values than the above mentioned values will occur in areas where water is allowed to pond for extended periods.

If proper drainage is not maintained (allowing subgrade moisture content to change significantly) and / or if the pavement is underlain by utility trenches, resulting (a) potential vertical movements will be much greater than 2 to 3 times the anticipated vertical movements and (b) the subgrade strength may be reduced significantly reduced.

Expansive Clay Considerations (Pavement and Utilities)

Pavement support is anticipated to be provided primarily by marl and limestone. However, shallow clay zones and utility trench backfill may still influence pavement performance.

Utility trenches within pavement areas may be backfilled with on-site excavated materials, which could include clayey soils. These trench backfill zones may perform differently than surrounding marl or limestone subgrade and may create localized areas of increased movement or settlement potential.

Potential distress associated with utility trench backfill may include:

- Longitudinal cracking along utility alignments
- Localized settlement
- Localized heave
- Edge cracking
- Loss of support due to water infiltration
- Differential movement between trench backfill and adjacent subgrade

These effects are typically governed by moisture variation and backfill quality rather than pavement thickness alone. It should be noted that expansive clay does not shrink/swell without changes in moisture content, and thus good site design is very important to minimize movements. Even with proper construction, some cracking or localized deformation may occur over utility trenches due to the difference in behavior between clayey trench backfill and adjacent marl/limestone-supported pavement.

PAVEMENT GUIDELINES

General

Pavement areas at this site are expected to include **Local & Collector type** streets. The following recommendations are provided as **guidelines for pavement design and construction**.

These recommendations are based on:

1. The City of San Antonio Design Manual (June 2008).
2. **InTEC's experience** with subgrade soils similar to those encountered at this site;
3. **Pavement sections** that have performed successfully under comparable design and traffic conditions; and
4. The assumption that **final pavement grades will provide positive drainage**, preventing surface or edge infiltration from landscape areas, surface ponding, or poorly maintained joints and cracks.

Pavement Design

Pavement designs provide an adequate thickness of structural sections over a particular subgrade (in Pavement design provides sufficient **structural thickness** to distribute wheel loads to the underlying subgrade without exceeding its support capacity. The **support characteristics** of the subgrade are based on the **strength** of the subgrade soils and not their shrink–swell behavior.

Accordingly, pavement sections that are **structurally adequate** may still experience **cracking or distortion** due to shrink–swell movements of the expansive clays.

If the proposed pavements will carry **temporary construction traffic or repeated heavy truck loads**, thicker sections may be required. Please contact **InTEC** to discuss alternate design options.

It is essential to **minimize moisture fluctuations** in the subgrade to reduce shrink–swell movement. Pavement and adjacent areas must remain well drained, and **cracks should be sealed promptly** to prevent water infiltration.

In our experience:

- The majority of pavement distress observed over expansive clays can be attributed to **changes in subgrade moisture** or **prolonged saturation of the base layer**, which reduce subgrade support and induce movement.

- Pavements designed with a **minimum longitudinal grade of 1% or greater** generally perform better than flatter pavements, primarily because improved drainage minimizes surface ponding and moisture infiltration.

- Pavements constructed **without underlying utility trenches** tend to perform better, as utility backfill zones often act as **preferential moisture paths** and **differential support zones**, leading to localized settlement and cracking.

- Pavements situated at **slightly higher elevations than adjacent lots** typically exhibit better performance due to **improved surface drainage** and **reduced risk of edge moisture intrusion** from landscaped or irrigated areas.

- Any **design or construction measure** that limits **surface, edge, or subsurface moisture penetration** into the pavement system will significantly enhance long-term performance and durability.

“Alligator” Type Cracks

A layer of aggregate base is typically placed **beneath the concrete curb** surrounding pavement areas. This base layer can serve as a **pathway for surface water infiltration**, particularly if water enters through curb joints or adjacent landscape areas. When coupled with construction traffic, this condition often leads to **“alligator” cracking**.

Increasing the **moisture content within the pavement layers** after construction will significantly reduce subgrade support and can accelerate this distress.

Embedding **curbs at least 6 inches into the native clay subgrade** helps reduce this type of infiltration. In addition, **French drains installed along the outside of curbs** can further improve drainage. Alligator-type cracking can also result from **isolated weak or poorly compacted zones** within the pavement section.

Longitudinal Cracks

In highly expansive soils, asphalt pavements often develop **longitudinal cracks** roughly **1 to 4 feet inside the pavement edge**, parallel to the curb. These cracks are caused primarily by **differential drying and shrinkage** of the underlying clays. Moisture content variation in the subgrade can be reduced by installing **moisture barriers**:

- **Vertical moisture barriers** along pavement edges, or
- **Horizontal barriers** such as adjacent sidewalks or geogrid layers beneath the base course.

Both approaches help **stabilize moisture conditions** and reduce the potential for longitudinal and reflective cracking.

Periodic Maintenance

Pavements constructed over **expansive clays** will experience **cyclic shrink–swell movements** over time. Proper maintenance is therefore critical.

- **Seal cracks** as soon as they develop to prevent further water intrusion.
- **Monitor drainage and surface grades** periodically to ensure positive runoff.
- **Repair localized failures promptly** to prevent distress from spreading.

Pavement Sections

Residential **Local and Collector** type streets are typically designed as **flexible pavements**. Cut and fill information was not available at the time of this investigation; the **final street subgrade** is expected to consist of **Marl / Limestone soils**.

Minimum recommended flexible pavement sections for these anticipated subgrade conditions are presented in **Table No. 2** in the following page. Input parameters used for design are summarized in **Table No. 3**.

Table No. 2 – Minimum Flexible Pavement Recommendations – CBR = 5.0

Classification	Asphaltic Concrete			Aggregate Base, inches	Geogrid	Subgrade, inches	Structural Number
	Type D, inches	Type C, inches	Type B, inches				
Local Type A (no bus traffic)	2.00	-	-	8.50	No	*	2.07
	2.00	-	6.00	-	No	*	2.92
Local Type A (with bus traffic)	3.00	-	-	12.00	No	*	3.00
	3.00		6.00	-	No	*	3.36
Local Type B	3.00	-	-	17.00	No	*	3.70
	3.00	-	7.00	-	No	*	3.70
Collector	-	4.00	-	15.50	No	*	3.93
	2.00	2.00	-	15.50	No	*	3.93
	3.00	-	8.00	-	No	*	4.04

Design Notes:

- Pavement design follows the *City of San Antonio Pavement Design Guidelines*.
- Input parameters are summarized in **Table No. 3 (Summary Table A)**.
- Design California Bearing Ratio (CBR) = **5.0**
- Recommendations are provided for **Local Type A and Type B streets**.
- Laboratory testing and engineering evaluation indicate **highly plastic clays** at shallow depths. Estimated **Potential Vertical Rise (PVR)** at existing grade is **1 to 1 ½ inches**.
- For **repetitive or heavy truck traffic**, contact InTEC for revised pavement design recommendations using appropriate traffic inputs.

Subgrade Notes (*):

- Subgrade soils are anticipated to consist of **Marl to Limestone.**
- **Cut and fill information** is not available at this time.
- Fill used to raise the grade:
  - Existing clays should be removed to marl / limestone stratum prior to placement of fill.
  - approved fill material free should have a minimum CBR value of 5.0 and a maximum Plasticity Index value of 20.
  - **Proof-roll** subgrade prior to fill placement to identify and recompact weak zones.

Subgrade Treatment:

- **Marl to Limestone subgrades are anticipated.**
- **However, if the subgrade Plasticity Index values are greater than 20, the following option is recommended:**

- Stratum I clays removed to expose limestone stratum and replaced with on-site milled fill material (Plasticity Index value 20 or less).

Pavement and Drainage Notes:

- Pavement design is based on **CBR = 5.0** and parameters in Table No. 3 (Summary Table A).
- **Moisture control** beneath pavement is critical:
  - Prevent rain or irrigation water from infiltrating beneath the asphalt and base.
  - Consider **curbs extending ≥ 6 inches into subgrade** or backfilling with **compacted clay** against curb edges.
  - Ensure **lot grading and home construction** prevent trapped water near pavements.

Aggregate Base:

- Use TxDOT Item 247 A1-2 aggregate base
- Place in uniform lifts and compact to specified density and moisture content per city / county guidelines.

Asphalt:

- Provide asphalt materials and placement in accordance with City of San Antonio / TxDOT guidelines.

Verification:

- During construction, **InTEC personnel should verify subgrade** prior to base placement.

Table No. 3 – Input Parameters used in Asphalt Pavement Section Calculation

	Local Type A (no bus traffic)	**Local Type A** (with bus traffic)	**Local B**	**Collector**
ESAL	100,000	1,000,000	2,000,000	2,000,000
Reliability Level	R-70	R-70	R-90	R-90
Initial and Terminal Serviceability	4.2 and 2.0	4.2 and 2.0	4.2 and 2.0	4.2 and 2.5
Standard Deviation	0.45	0.45	0.45	0.45
Service Life	20 years	20 years	20 years	20 years
If heavy truck traffic is anticipated, please contact InTEC with anticipated traffic data for revised recommendations.				

Subgrade Preparation

Proper subgrade preparation is critical to long-term pavement performance.

Prior to pavement construction:

- Remove existing pavement, vegetation, organic materials, and other unsuitable soils
- Remove soft, loose, or compressible soils
- Exposed subgrade should be proof-rolled and evaluated
- Weak or unstable zones should be undercut and recompacted
- Final subgrade should comply with applicable municipal or county requirements
- Base course placement should occur promptly after subgrade approval to minimize moisture loss or deterioration

Drainage During Subgrade Preparation

- Final subgrade elevations should promote positive drainage
- Water should be directed toward designated drainage outlets
- Low areas or drainage collection zones may require free-draining rock and outlet systems
- Voids or soft zones should be filled with approved compacted materials

Prevent prolonged exposure of prepared subgrade to rainfall or drying.

Deeper Fills

If the fill depth exceeds **4 feet**, the potential for **subgrade settlement** should be evaluated. Fill materials shall **meet or exceed the design CBR** used for pavement design.

Expansive Clay Fills (PI > 20)

- Compact to **at least 95 percent** of the **maximum dry density** at a **moisture content between optimum and +3 percent** of optimum (Tex-114-E).
- These criteria apply at **all fill depths** to help reduce post-construction swell and shrinkage potential.

Granular or Low-Plasticity Fills (PI ≤ 20)

- For **fill depths ≤ 10 feet**, compact to **at least 98 percent** of the maximum dry density at a **moisture content not less than optimum** (Tex-114-E).

- For **fill depths > 10 feet**, compact each lift to **at least 100 percent** of the maximum dry density at a **moisture content within ±2 percent of optimum** (Tex-114-E).

General Requirements

- Place fill in **uniform lifts not exceeding 8 inches (loose)**.
- Apply the same compaction criteria at **culvert crossings and other deep backfill areas** to minimize post-construction settlement and differential movement adjacent to structures.
- Once **cut and fill information** is available, please contact **InTEC** so the effects of grade changes can be evaluated and **project-specific fill and compaction recommendations** provided.

Base Course

Based on the survey of locally available materials, a **crushed limestone aggregate or gravel base course** is considered the most practical material for the asphalt pavement section.

The base course should conform to the **Texas Department of Transportation (TxDOT) Standard Specifications, Item 247, Type A, Grade 1-2**, and should be installed in accordance with all applicable **City and County guidelines**.

At a minimum, the base material should be **moisture-conditioned to near optimum** and **compacted in uniform lifts** to not less than **95 percent of the maximum dry density**, as determined by **TxDOT Test Method Tex-113-E**, or to higher requirements if specified by the governing agency.

Asphaltic Concrete

The asphaltic concrete surface course material and installation shall conform to the City of San Antonio Standard Specifications for Construction (2008) and all applicable TxDOT and County requirements for the respective street classification.

At a minimum, the asphalt should be placed in uniform lifts, at the specified temperature range, and compacted to the minimum density required by the governing agency.

Proper attention should be given to surface drainage and edge protection to prevent moisture infiltration beneath the pavement, which can lead to premature cracking or deformation.

Perimeter Drainage

Proper perimeter drainage should be provided to minimize infiltration of surface water from compacted areas adjacent to the pavement. It is recommended that curbs extend a minimum of 6 inches into the subgrade layer to reduce the potential for water intrusion beneath the pavement edges. A flexible crack sealant compatible with both asphalt and concrete should be applied along all asphalt–concrete interfaces to prevent surface water entry.

Where significant grade transitions occur within the pavement area (for example, from slopes of 3–4 percent to < 1 percent), a 3- by 5-inch gravel subgrade layer with a subsurface drain system (such as Akwadrain® or equivalent) along the pavement edges, tied to an appropriate outlet, should be considered. This system will help intercept and remove infiltrating water, improving long-term pavement performance. Please contact InTEC for project-specific perimeter and subsurface drainage recommendations.

CONSTRUCTION GUIDELINES

Construction Monitoring

As Geotechnical Engineer of Record, **InTEC** should be actively involved in monitoring **earthwork and pavement construction**. Proper pavement performance depends not only on design but also on consistent construction quality.

Contact **InTEC** prior to construction to incorporate **earthwork, subgrade, and pavement monitoring** into the project’s quality control plan.

Site Preparation

Site preparation should include removal of **vegetation, organic material, and loose soils** to a minimum depth of **6 inches** within pavement areas.

- The exposed **subgrade should be proof-rolled** and approved by InTEC prior to fill or stabilization.
- Any soft or yielding areas should be **removed, replaced with approved fill**, and **recompacted**.
- The prepared subgrade should be **maintained in a moist condition** until subsequent materials are placed to prevent desiccation cracking.
- All **old underground utilities or structures** within pavement limits should be properly **removed or sealed**, and the resulting voids **backfilled and compacted** in 6-inch lifts to **at least 95 percent of maximum dry density** (ASTM D698).

Maintain **positive surface drainage** at all times to avoid ponding and deterioration of the prepared subgrade.

Proof Rolling

Proof-rolling should be performed using a **25-ton pneumatic roller** (approximately **90 psi ground contact pressure**) or other approved equipment.

- InTEC must **observe the proof-rolling operation**.

- Weak or pumping zones should be **excavated and replaced with select fill** compacted to the required density.
- Retest all repaired areas to verify compliance before proceeding with subsequent pavement layers.

Compaction and Fill Placement

If **low or disturbed areas** are encountered during grading, remove any **wet, loose, or deleterious soils** prior to fill placement.

- The sides of the excavation should be **squared**, not bowl-shaped, and the bottom **proof-rolled**.
- On-site material free of deleterious matter may be reused for fill if approved by InTEC.
- Fill should be **placed in uniform lifts not exceeding 8 inches (loose)** and **compacted to at least 95 percent of the maximum dry density** (ASTM D698) at a **moisture content within optimum to +3 percent**.
- Each lift should be **tested and approved by InTEC** before additional lifts are placed.
- The exposed subgrade should not be allowed to dry out prior to placement of the base course.

Select Fill

Use crushed limestone with LL < 40, PI = 5–20, and <30% passing No. 200 sieve. Max particle size: 3 inches. Place in 6-inch compacted lifts and compact to 95% of ASTM D 698 dry density within ± 2% of optimum moisture. Each lift must be tested and approved by InTEC.

General Fill

General fill refers to soil placed in non-structural and non-movement-sensitive areas—for example, behind curbs, within landscape zones, or in general site grading areas outside pavement and foundation limits. It is not intended to provide support for pavements, slabs, or other structures sensitive to movement.

General fill materials may consist of clean on-site soils, select fill, or imported materials that exhibit satisfactory compaction characteristics.

General fill should be free of deleterious matter, debris, and organics, with maximum particle size not exceeding 6 inches.

The purpose of general fill is to provide stable site grading and uniform surface elevation, not to serve as a load-bearing layer.

Because general fill is not designed for structural support, greater vertical or differential movements should be anticipated compared to select or structural fills.

General Fill Compaction

Place general fill in uniform lifts not exceeding 8 inches (loose).

Compact each lift to a minimum of 95 percent of the maximum dry density (ASTM D698) at a moisture content within ±3 percent of optimum.

Each lift should be tested and approved by InTEC before placement of the next lift.

Compaction criteria may be modified in consultation with the Owner and Geotechnical Engineer based on site conditions and performance expectations.

Ground Water and Drainage Considerations

Groundwater was not encountered at the time of drilling; however, **minor seepage** may occur during or after grading, particularly following heavy rainfall.

- If seepage is observed within pavement areas, it should be **intercepted using subsurface drains** or other approved dewatering methods.
- **Temporary drainage provisions** should be maintained throughout construction to minimize water infiltration into prepared subgrades.
- Standing water should be **removed promptly by pumping**, and the affected areas should be allowed to dry and re-proof-rolled before proceeding.

Construction Slopes

Cut and fill slopes associated with pavement and site grading should be constructed to provide long-term stability and positive drainage.

Temporary Slopes: For short-term construction excavations in cohesive soils (Stratum I and II clays), temporary slopes up to 1H:1V are generally stable, provided they are not left exposed to prolonged rainfall.

Fill Slopes: Compacted fill slopes should not be steeper than 1H:1V and should be benched and keyed into firm material. Fill should be placed and compacted in lifts not exceeding 3–5 feet vertically.

Permanent Slopes: Permanent exterior slopes should not exceed 3H:1V. Where pedestrian access or maintenance traffic is anticipated, flatter slopes such as 5H:1V are preferred for safety and erosion control.

Erosion Protection: All permanent slopes should be protected against erosion using vegetation, rock riprap, or other approved surface stabilization methods.

Control Testing and Field Observation

Subgrade preparation, stabilization, base placement, and asphalt paving should be **monitored by InTEC** or its authorized representative.

- As a guideline, perform **at least one in-place density test every 100 linear feet of roadway**, or more frequently as required by the governing agency.
- A **minimum of three density tests per lift** is recommended for each distinct pavement area.
- Any areas not meeting the required compaction shall be **recompacted and retested** until compliance is achieved.

Time of Construction

Pavement should not be constructed over subgrade or base materials that are excessively wet, dry, eroded, or otherwise disturbed.

If the pavement is installed after an extended dry period, subsequent re-wetting from rainfall or irrigation may cause heave, edge movement, or cracking. Conversely, if the pavement is installed immediately following a wet period, later drying may cause shrinkage and surface deformation.

Following significant rainfall events, special attention should be given to the condition of both the subgrade and the base course. Even if these layers were previously tested and approved, surface runoff can erode, soften, or reduce compaction, particularly along curb lines, edges, and low-lying areas.

Any areas showing signs of erosion, pumping, or softening must be regraded, moisture-conditioned, and recompacted prior to asphalt placement. InTEC should be notified to re-inspect and verify the condition of the subgrade and base before paving resumes.

Failure to perform these steps may result in premature edge distress, rutting, or cracking shortly after construction.

DRAINAGE AND MAINTENANCE

Proper **drainage** and long-term **moisture management** are critical to pavement performance, particularly in areas underlain by **expansive clay soils**. Seasonal or localized changes in soil moisture can lead to **pavement cracking, edge movement, and differential heave**, especially if surface or subsurface water is allowed to infiltrate beneath the pavement or along curb lines.

Surface Drainage

- Pavements should be graded to maintain a **minimum surface slope of 2%** to ensure rapid runoff of rainfall and irrigation water.
- **Depressions or birdbaths** where water can pond should be avoided or corrected immediately.
- **Curb and gutter sections** should be constructed to prevent water from seeping beneath the pavement edge; consider curbs that **extend at least 6 inches into the subgrade** for improved moisture cutoff.
- At **driveway tie-ins and intersections**, positive drainage must be maintained to prevent water from standing or flowing across the pavement surface.

Edge and Perimeter Protection

- Per typical standard details, the **aggregate base extends approximately 18 inches beyond the back of curb** to provide full support. However, this extended base zone can act as a **moisture pathway** if not properly sealed.
- To reduce the risk of **water infiltration beneath the pavement**, the area **behind the curb** should be **backfilled with compacted, low-permeability clay** or treated with an appropriate **sealant cutoff** against the exposed base.
- Proper **surface grading** should also be maintained to direct water away from the curb line and prevent ponding at the back of curb.

Subsurface Drainage

- In areas with **steep grade transitions** (e.g., slope breaks from 3–4% to < 1%) or where water tends to collect, consider providing a **subsurface drain system** such as **Akwadrain®** or equivalent along pavement edges, tied to a suitable outlet.
- Subsurface drains should be installed **below the base course** elevation and surrounded by **free-draining gravel** wrapped in geotextile filter fabric.
- All drain outlets should be **daylighted** and protected with **rodent screens** and **riprap aprons** to ensure positive discharge.

Utility Trenches

- **Utility trenches** that cross or parallel pavement sections can act as **conduits for subsurface water flow**.
- Trench backfill should be **compacted as per applicable agency guidelines** (such as SAWS, TxDOT, or governing municipality) to ensure uniform support and reduce future settlement.
- Where feasible, **include clay plugs or cutoff collars** at intervals to prevent water migration beneath the pavement.
- Poorly compacted trench backfill often leads to **localized settlement** and **longitudinal cracking** along utility alignments.

Long-Term Maintenance

- Maintain all **surface and subsurface drainage systems** in good working order. Clogged inlets, outlets, or broken drain lines can quickly lead to moisture buildup and pavement distress.
- **Inspect and seal cracks** regularly to limit moisture entry into the base and subgrade.
- During dry seasons, avoid excessive irrigation near pavement edges that can induce **moisture differentials**.

- If evidence of **edge softening, rutting, or pumping** is observed, the affected areas should be **evaluated and repaired promptly** to prevent further deterioration.

- The performance estimates and design recommendations in this report assume that **proper drainage is installed and maintained**. Neglect or alteration of these systems can significantly increase pavement movement and reduce service life.

LIMITATIONS

The analyses and recommendations submitted in this report are based upon the data obtained from **38 borings drilled at the site**.

The **pavement recommendations** in this report should be **reviewed and confirmed during construction**, particularly in relation to actual **cut and fill conditions** observed in the field. If subsurface conditions differ from those assumed, **InTEC must be notified immediately** to evaluate whether revisions to the recommendations are necessary.

The data, analyses, and interpretations provided represent **InTEC's professional judgment and opinion**, based on limited sampling and currently available information. They should not be considered an exact or complete representation of all subsurface conditions.

This report is **not intended to dictate construction means, methods, equipment selection, or scheduling**. Use of the report for purposes such as **bidding, cost estimating, or contractor logistics** is at the sole risk of the user.

Revisions to this report may be required if any of the following occur:

- Changes to the **proposed grading or pavement design**;
- Alteration of **drainage patterns or site use**;
- Significant **cut or fill activities** not previously anticipated; or
- A substantial **delay between field exploration and construction**.

InTEC affirms that the findings and recommendations herein are consistent with the **standard of care** exercised by geotechnical engineers practicing under similar conditions in this region. **No other warranties, express or implied, are made.**

This report has been prepared for the exclusive use of **Lennar Homes** for pavement thickness evaluation for the **proposed new streets at Guajolote Ranch, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector in San Antonio, Texas.**

Appendix A – Background Information on Expansive Soil Behavior

Certain clay soils have the ability to undergo volume changes in response to variations in moisture content. When these soils absorb water they may increase in volume (swell), and when moisture is lost they may decrease in volume (shrink). Repeated wetting and drying cycles can result in ground movement that may affect lightly loaded structures and pavements where expansive clays are present.

Evaluation of Shrink–Swell Potential

The potential for shrink–swell behavior is typically evaluated through a combination of subsurface exploration, laboratory testing, and engineering evaluation. Index properties such as plasticity index, liquid limit, and other soil classification parameters are commonly used to indicate the presence of expansive clay minerals. Laboratory testing may also be used to evaluate the potential magnitude of volume change under anticipated field conditions.

Two primary conditions must exist for shrink–swell movement to occur:

- The soil must possess expansive characteristics.
- Moisture conditions within the soil must change.

If either of these conditions is absent, significant shrink–swell movement is unlikely to occur.

Mechanism of Soil Swelling

Volume change in expansive clays is associated with the interaction between clay particles and water. Clay particles have surface electrical charges that attract water molecules and influence the spacing between particles. When additional water becomes available within the soil structure, the spacing between clay particles may increase, resulting in swelling. Conversely, when water is removed from the soil, particle spacing decreases and the soil mass shrinks.

The magnitude of this volume change depends on several factors, including clay mineralogy, soil plasticity, initial moisture condition, and the degree of confinement within the soil profile.

Moisture Variation and the Active Zone

Moisture variation typically occurs within the upper portion of the soil profile, often referred to as the active zone. This zone is influenced by environmental and surface conditions such as rainfall patterns, evaporation, vegetation, irrigation practices, and surface drainage conditions.

The thickness of the active zone can vary depending on climate, soil type, and site conditions. Soil movements associated with shrink–swell behavior generally occur within this zone where moisture fluctuations are most pronounced.

Environmental and Construction Influences

Several environmental and construction-related factors may influence the degree of moisture variation in expansive soils. These include:

- Surface drainage conditions that allow water to accumulate near pavements or structures
- Vegetation, which may locally remove moisture from soils through root activity
- Irrigation or landscaping practices that introduce additional water into the soil
- Changes in surface cover, such as the placement of pavements or slabs, which modify natural moisture exchange with the atmosphere

Proper grading and drainage practices are important to reduce the potential for moisture accumulation adjacent to pavements and structures.

Effects of Utility Trenches and Backfill

Underground utilities such as water lines, sewer lines, and communication conduits are often installed within trenches that are backfilled with materials different from the surrounding native soils. These trenches may act as pathways for water movement through the subsurface. In some cases, trench backfill materials may also be more susceptible to settlement if not properly compacted.

Where expansive clays are present adjacent to trenches, the movement of water within these zones may influence local moisture conditions and contribute to swelling or softening of surrounding soils. Proper compaction of trench backfill and control of water sources are therefore important considerations for long-term pavement performance.

Summary

The potential for shrink–swell movement in expansive soils depends on soil properties, moisture variation, and site conditions. While expansive soils are common in many regions, the degree to which they affect pavement performance varies depending on local subsurface conditions and environmental factors. Appropriate site grading, drainage control, and proper construction practices can significantly reduce the potential impacts of expansive soil behavior.

Illustration Section

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Topographic Map	Plate 1C
Geologic Map	Plate 1D
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Edwards Aquifer Map	Plate 1F
Bexar County Karst Map	Plate 1G
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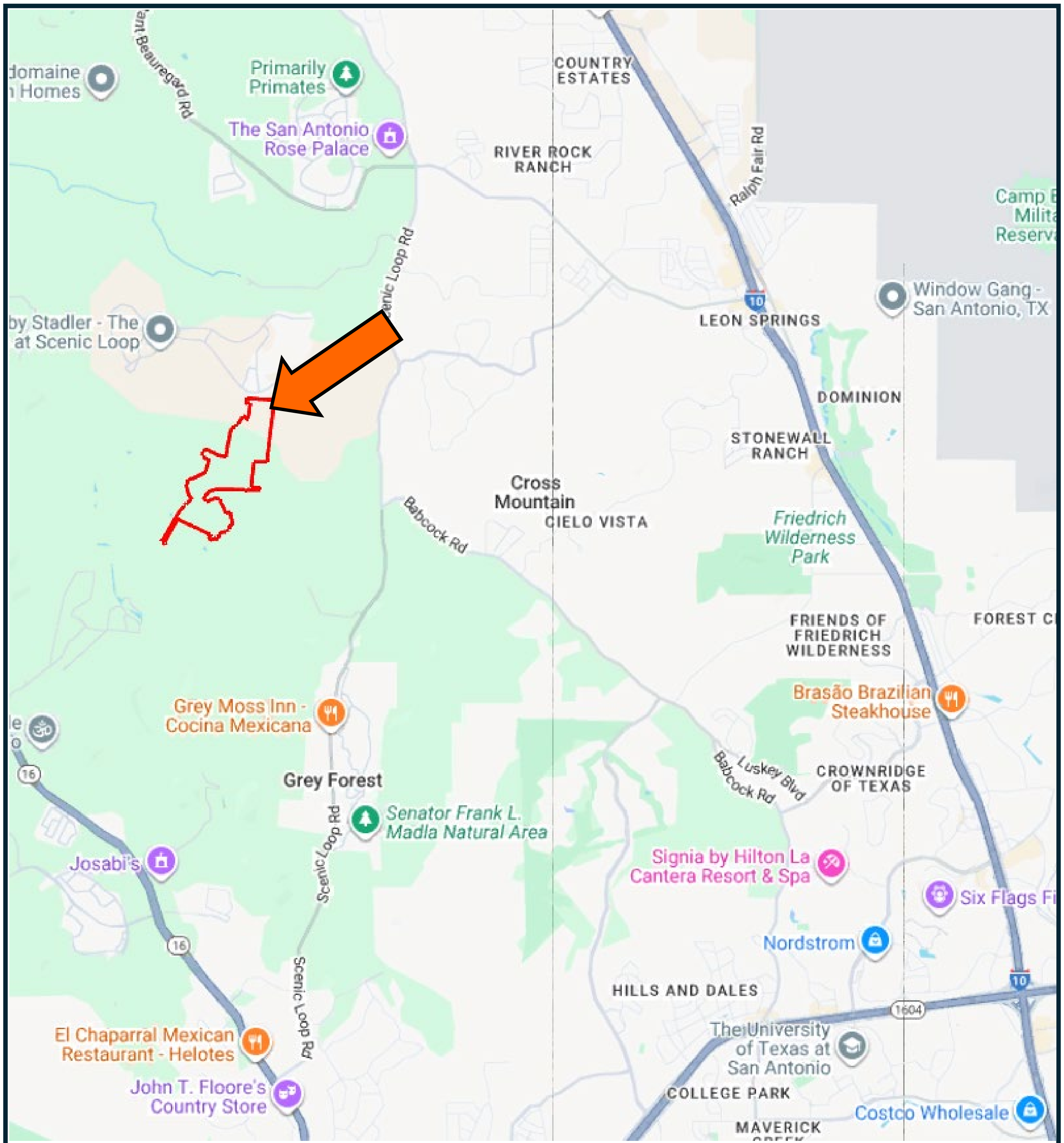
Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

InTEC Project Number
S261012

Date:
01/21/2026



Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

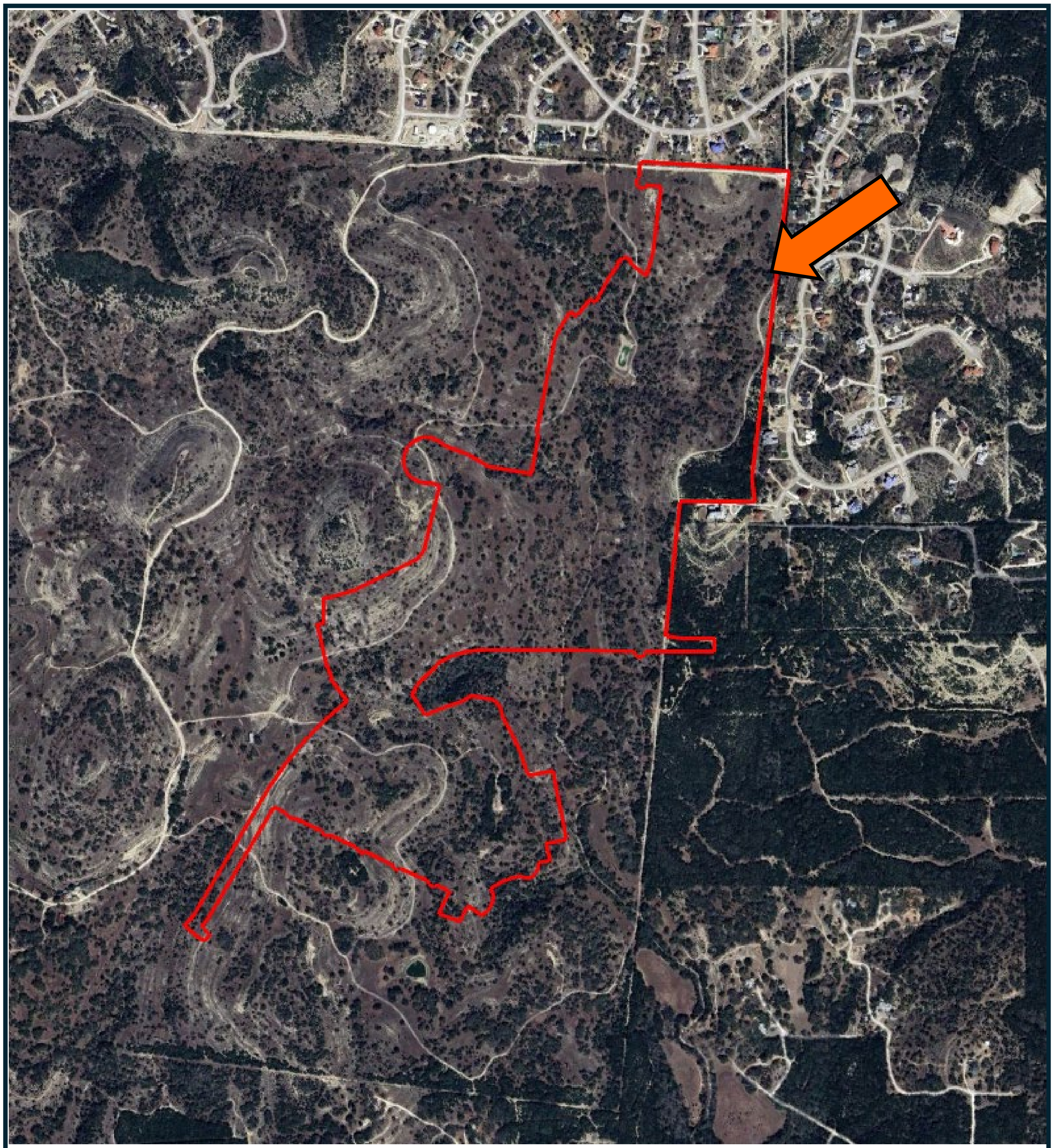
Vicinity Map

InTEC Project Number
S261012

Date:
01/21/2026

Integrated Testing and Engineering Company of San Antonio, L.P.

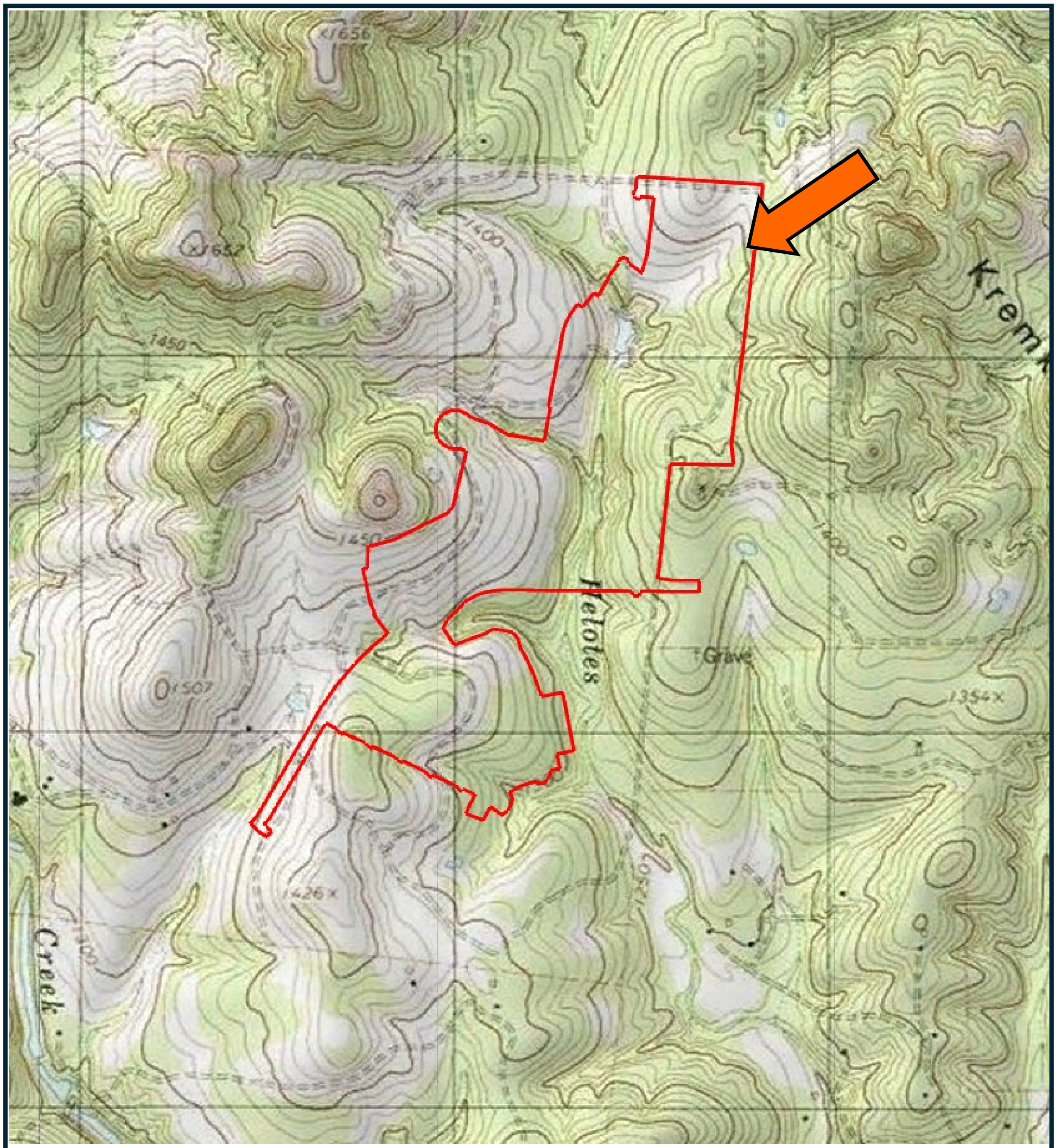
Plate No. 1A



Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

Aerial Map – Approximate Location

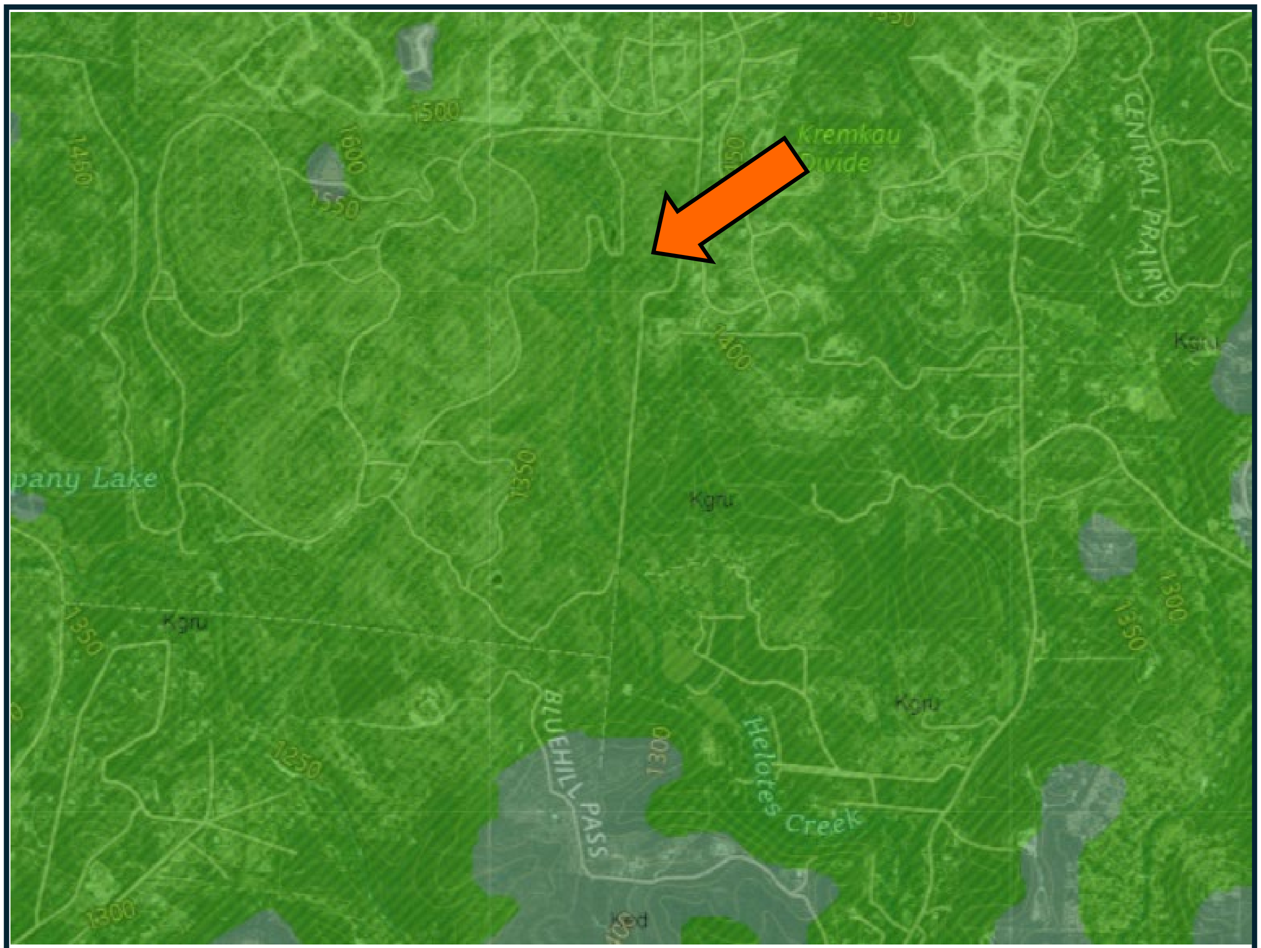
InTEC Project Number **S261012**	Date: 01/21/2026



Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9,
10, 13, and Phase 4 Collector
San Antonio, Texas

Topographic Map – Approximate Location

InTEC Project Number **S261012**	Date: 01/21/2026



Kgru – Upper Glen Rose Formation

Limestone, dolomite, and marl as alternating resistant and recessive beds forming stairstep topography; limestone, aphanitic to fine grained, hard to soft and marly, light gray to yellowish gray; dolomite, fine grained, porous, yellowish brown; marine megafossils include molluscan steinkerns, rudistids, oysters, and echinoids. Upper part, Kgru, relatively thinner bedded, more dolomitic, and less fossiliferous; thickness about 400 feet. Thickness of Glen Rose Formation 900 feet

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

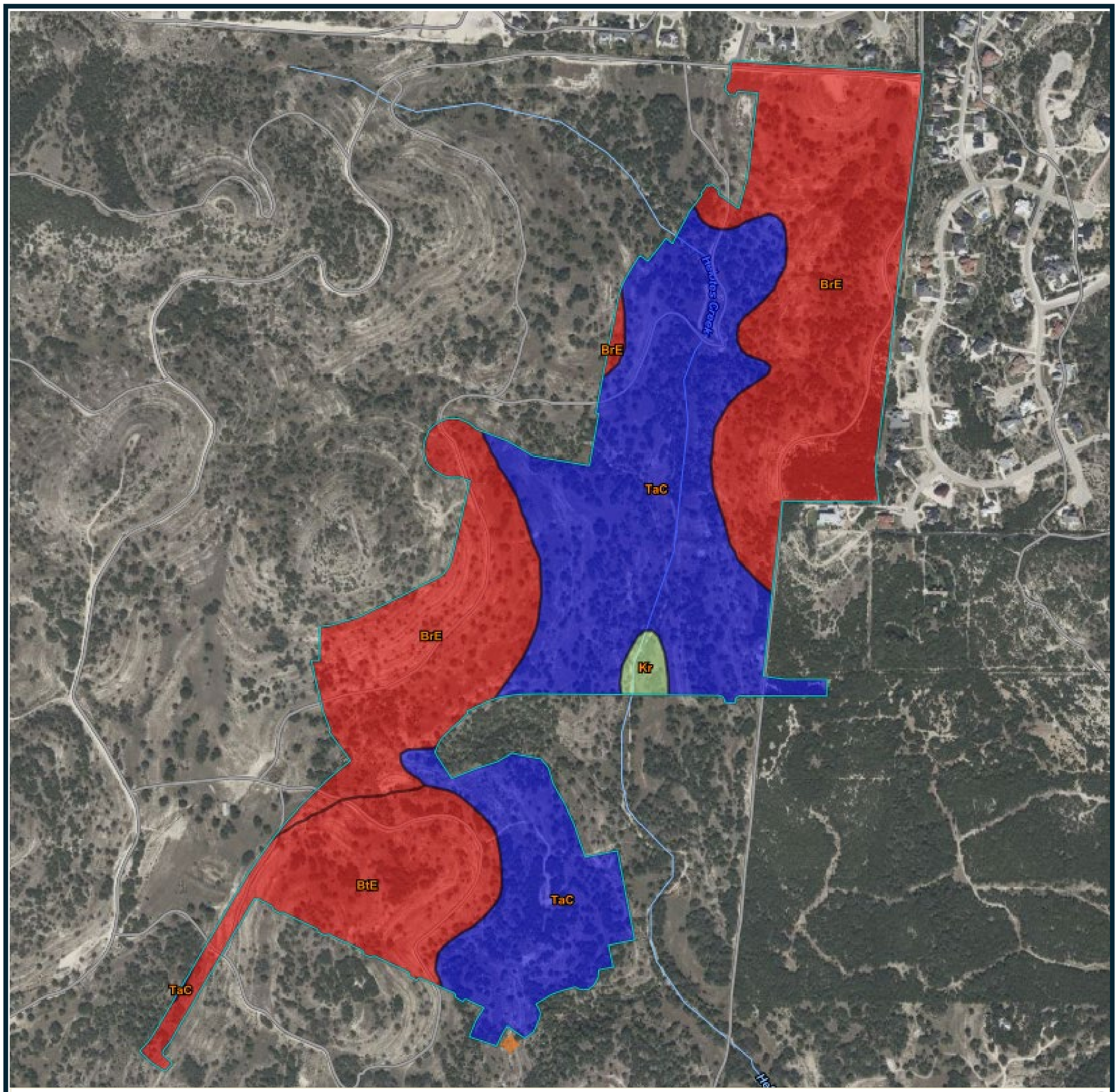
Geologic Map – Approximate Location

InTEC Project Number
S261012

Date:
01/21/2026

Integrated Testing and Engineering Company of San Antonio, L.P.

Plate No. 1D



Bexar County, Texas

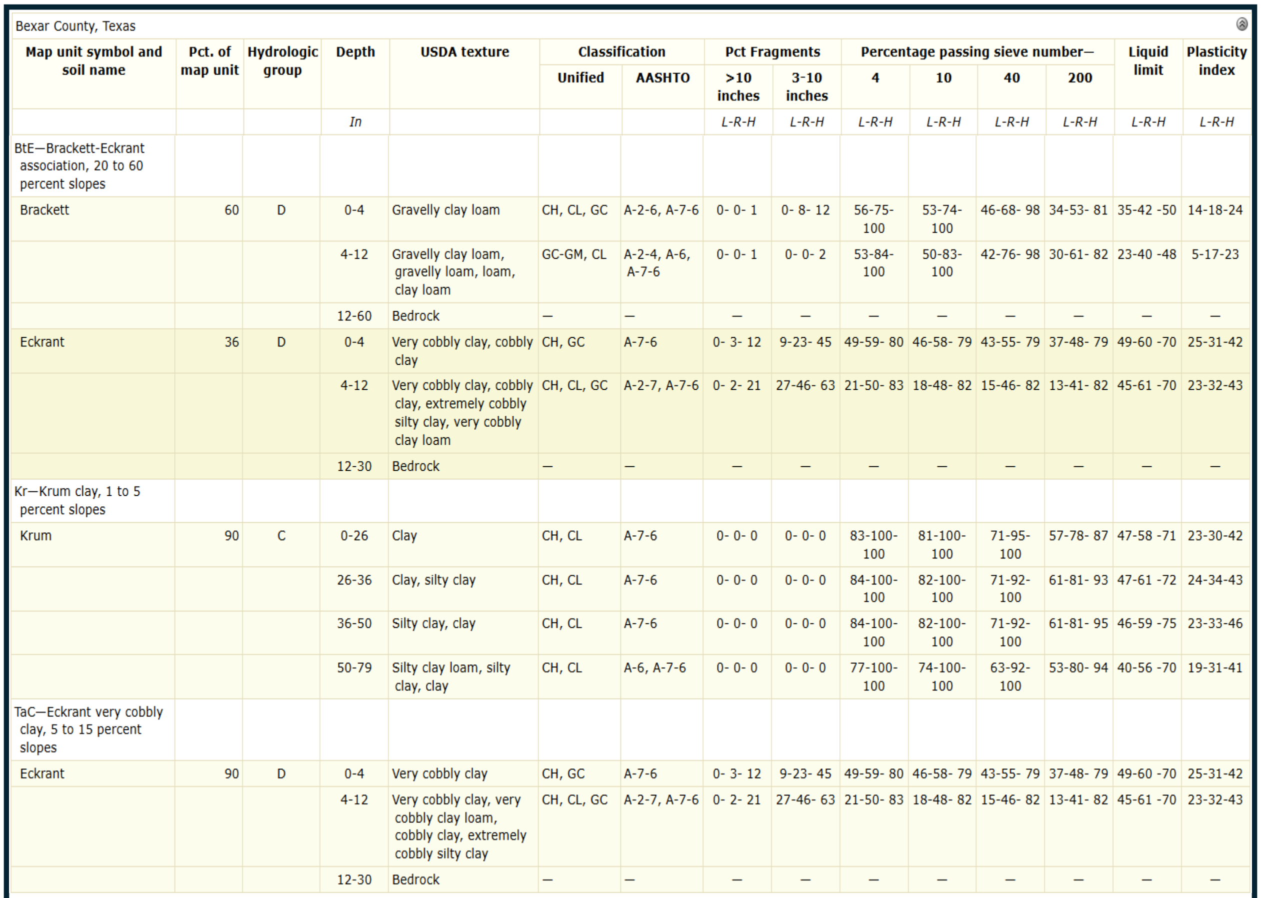
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
BrE—Brackett gravelly clay loam, 12 to 20 percent slopes														
Brackett	90	D	0-4	Gravelly clay loam	CH, CL, GC	A-2-6, A-7-6	0- 0- 1	0- 8- 12	56-75-100	53-74-100	46-68- 98	34-53- 81	35-42 -50	14-18-24
			4-12	Gravelly clay loam, gravelly loam, loam, clay loam	GC-GM, CL	A-2-4, A-6, A-7-6	0- 0- 1	0- 0- 2	53-84-100	50-83-100	42-76- 99	30-61- 82	25-40 -48	7-17-23
			12-60	Bedrock	—	—	—	—	—	—	—	—	—	—

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

Soil Map – Approximate Location

InTEC Project Number
S261012

Date:
01/21/2026



Bexar County, Texas

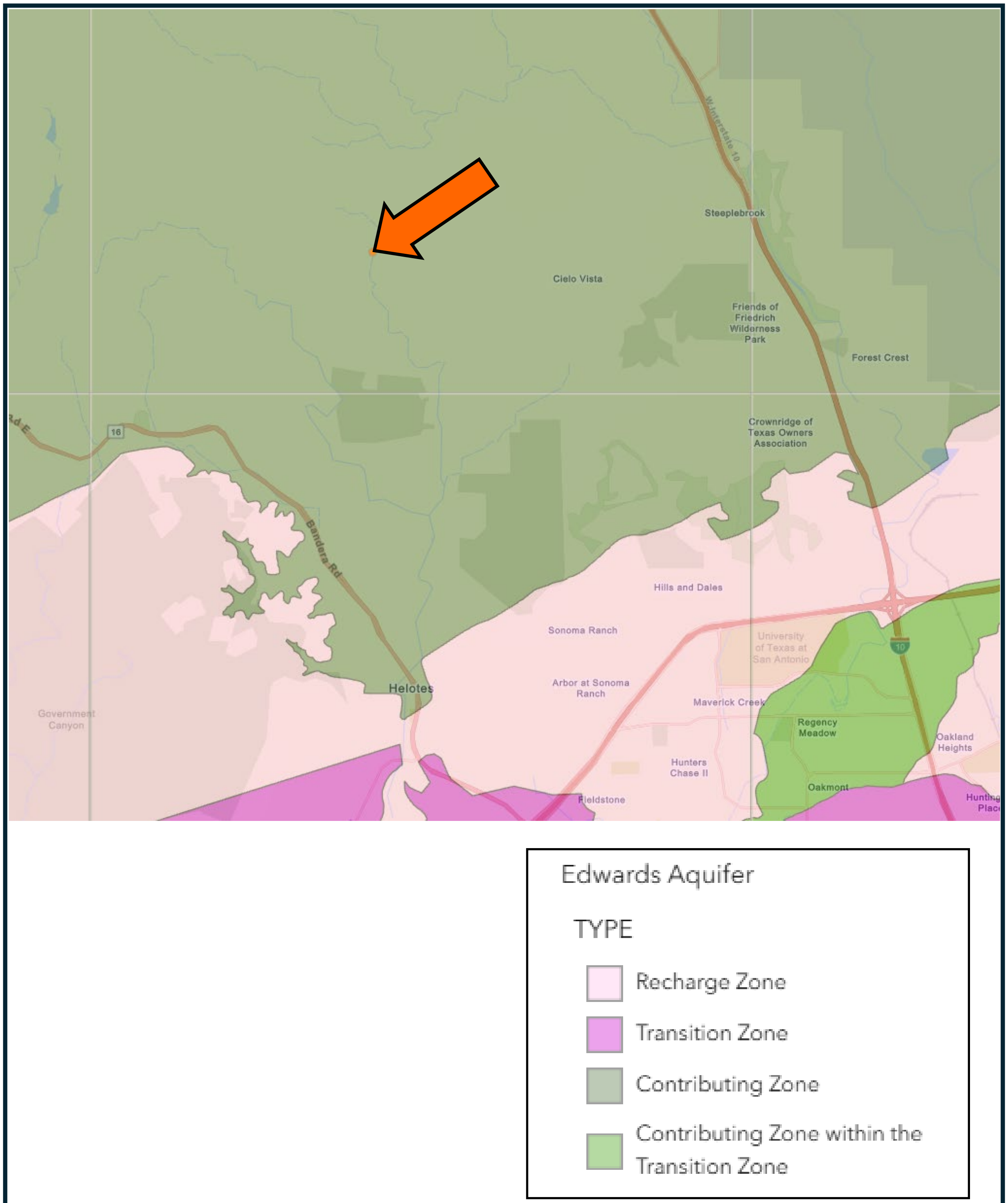
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
BtE—Brackett-Eckrant association, 20 to 60 percent slopes														
Brackett	60	D	0-4	Gravelly clay loam	CH, CL, GC	A-2-6, A-7-6	0- 0- 1	0- 8- 12	56-75-100	53-74-100	46-68- 98	34-53- 81	35-42 -50	14-18-24
			4-12	Gravelly clay loam, gravelly loam, loam, clay loam	GC-GM, CL	A-2-4, A-6, A-7-6	0- 0- 1	0- 0- 2	53-84-100	50-83-100	42-76- 98	30-61- 82	23-40 -48	5-17-23
			12-60	Bedrock	—	—	—	—	—	—	—	—	—	—
Eckrant	36	D	0-4	Very cobbly clay, cobbly clay	CH, GC	A-7-6	0- 3- 12	9-23- 45	49-59- 80	46-58- 79	43-55- 79	37-48- 79	49-60 -70	25-31-42
			4-12	Very cobbly clay, cobbly clay, extremely cobbly silty clay, very cobbly clay loam	CH, CL, GC	A-2-7, A-7-6	0- 2- 21	27-46- 63	21-50- 83	18-48- 82	15-46- 82	13-41- 82	45-61 -70	23-32-43
			12-30	Bedrock	—	—	—	—	—	—	—	—	—	—
Kr—Krum clay, 1 to 5 percent slopes														
Krum	90	C	0-26	Clay	CH, CL	A-7-6	0- 0- 0	0- 0- 0	83-100-100	81-100-100	71-95-100	57-78- 87	47-58 -71	23-30-42
			26-36	Clay, silty clay	CH, CL	A-7-6	0- 0- 0	0- 0- 0	84-100-100	82-100-100	71-92-100	61-81- 93	47-61 -72	24-34-43
			36-50	Silty clay, clay	CH, CL	A-7-6	0- 0- 0	0- 0- 0	84-100-100	82-100-100	71-92-100	61-81- 95	46-59 -75	23-33-46
			50-79	Silty clay loam, silty clay, clay	CH, CL	A-6, A-7-6	0- 0- 0	0- 0- 0	77-100-100	74-100-100	63-92-100	53-80- 94	40-56 -70	19-31-41
TaC—Eckrant very cobbly clay, 5 to 15 percent slopes														
Eckrant	90	D	0-4	Very cobbly clay	CH, GC	A-7-6	0- 3- 12	9-23- 45	49-59- 80	46-58- 79	43-55- 79	37-48- 79	49-60 -70	25-31-42
			4-12	Very cobbly clay, very cobbly clay loam, cobbly clay, extremely cobbly silty clay	CH, CL, GC	A-2-7, A-7-6	0- 2- 21	27-46- 63	21-50- 83	18-48- 82	15-46- 82	13-41- 82	45-61 -70	23-32-43
			12-30	Bedrock	—	—	—	—	—	—	—	—	—	—

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

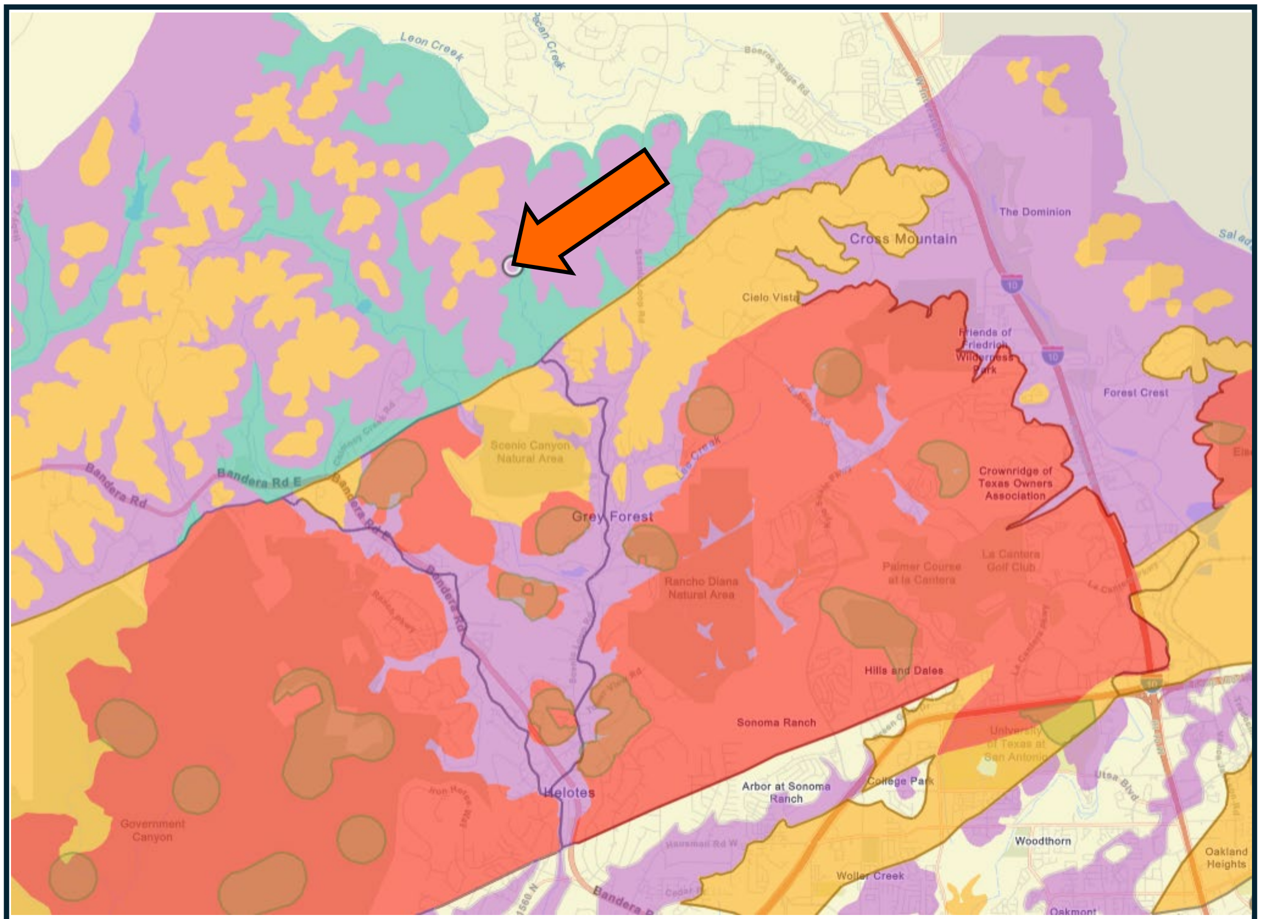
Soil Map – Continued

InTEC Project Number
S261012

Date:
01/21/2026



Subsurface Exploration and Pavement Analysis Proposed New Streets Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector San Antonio, Texas	**Edwards Aquifer Map**
InTEC Project Number **S261012**	Date: 01/21/2026



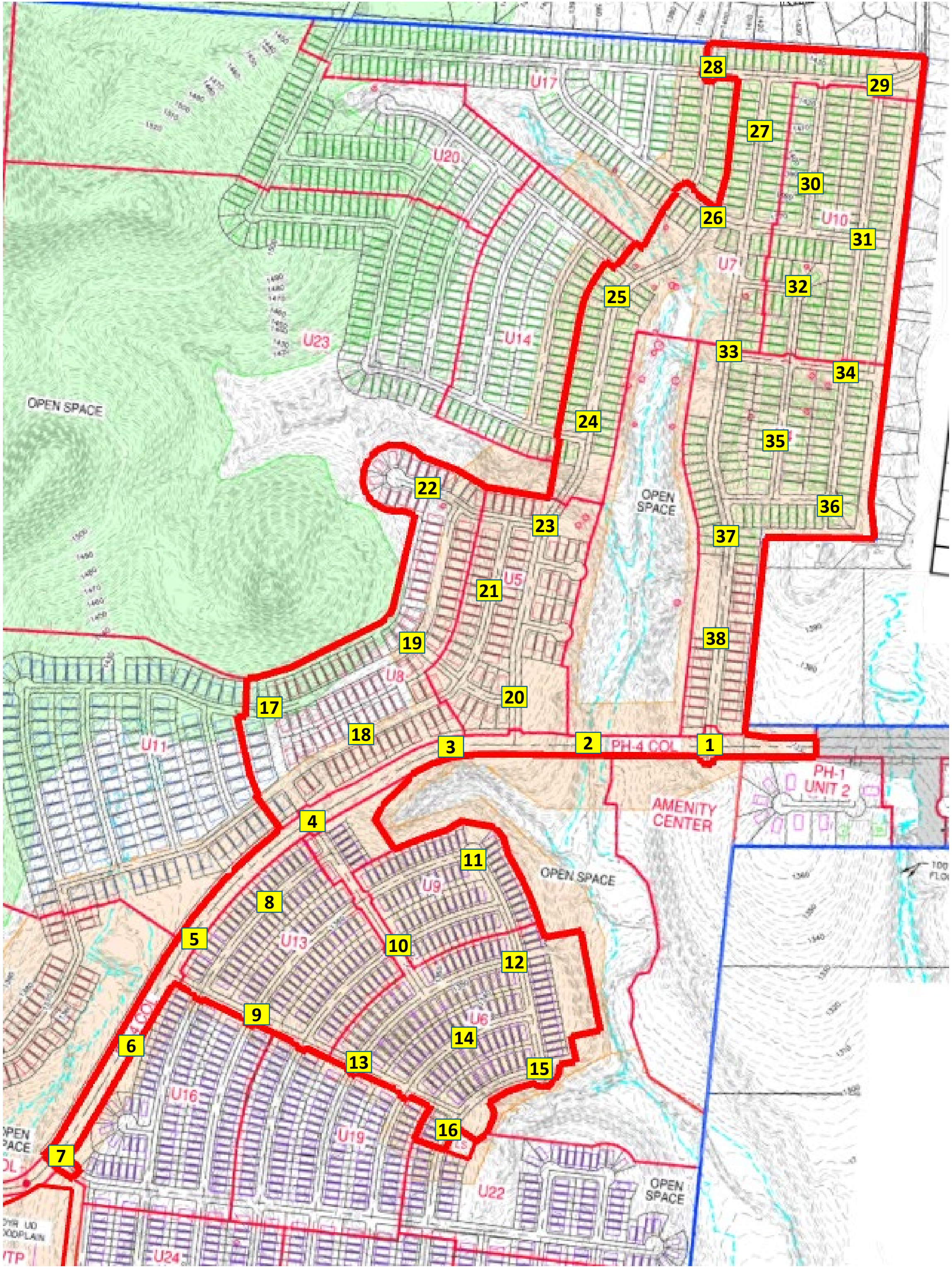
🟥	1	**Karst Zone 1** - Areas known to contain listed invertebrate karst species
🟨	2	**Karst Zone 2** - Areas having a high probability of containing suitable habitat for listed invertebrate karst species
🟪	3	**Karst Zone 3** - Areas that probably do not contain listed invertebrate karst species
🟩	4	**Karst Zone 4** - Areas which require further research but are generally equivalent to Zone 3, although they may include sections which could be classified as Zone 2 or Zone 5 as more information becomes available
⬜	5	**Karst Zone 5** - Areas which do not contain listed invertebrate karst species

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

Bexar County Karst Map

InTEC Project Number
S261012

Date:
01/21/2026



Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

Approximate Boring Locations

InTEC Project Number
S261012

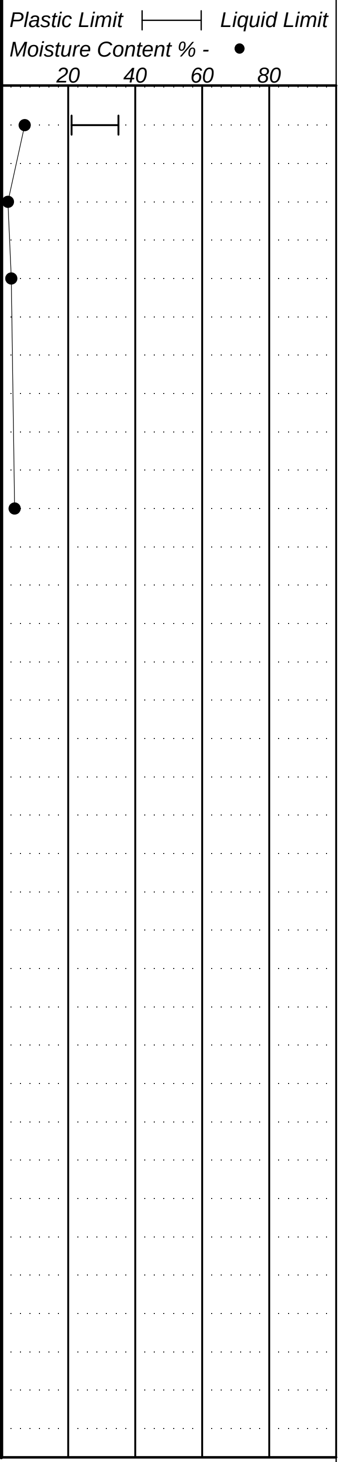
Date:
01/21/2026

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/16/2026

BORING NO. B-1

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				62/11"		35	14
		SS					50/3"			
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

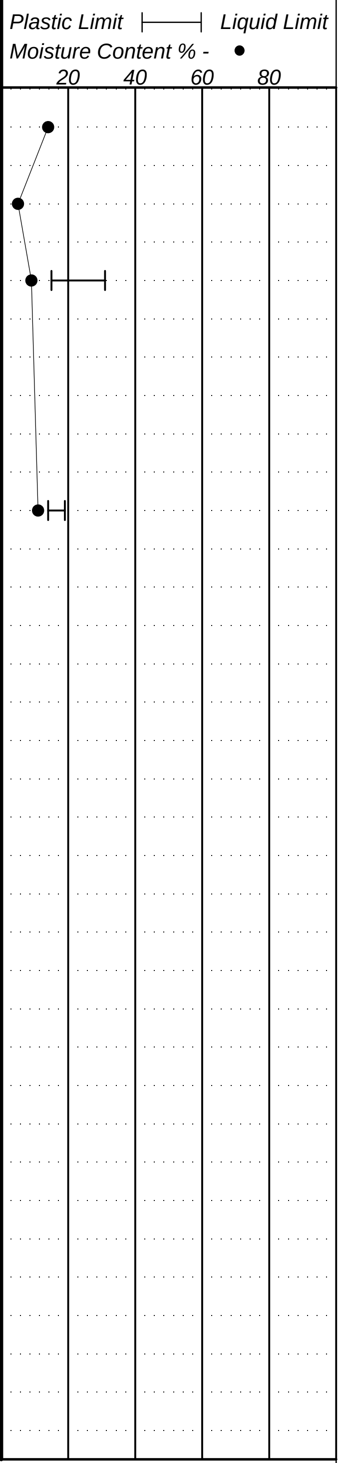
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/16/2026

BORING NO. B-2

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				50/8"			
		AU								
5		AU							31	16
10										
		AU							19	05
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

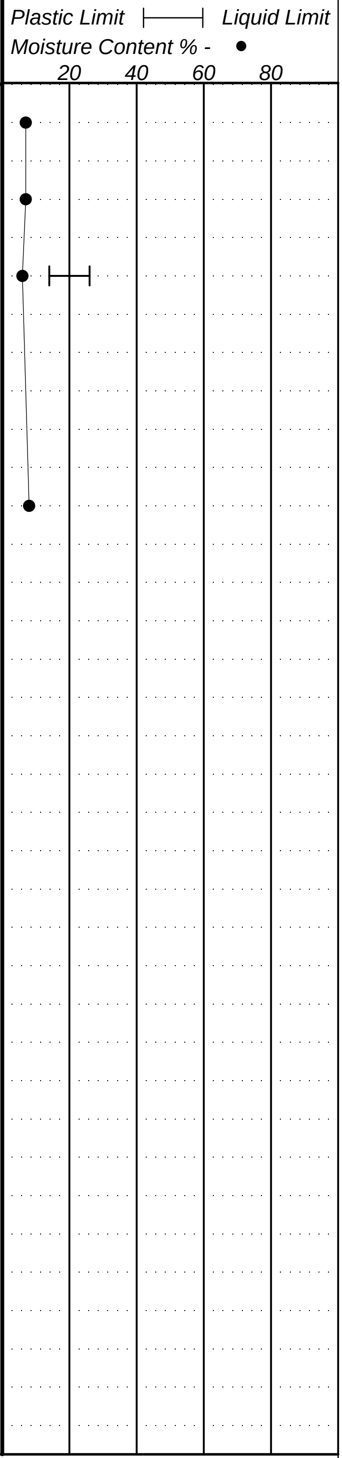
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/20/2026

BORING NO. B-3

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				41			
		SS					78/10"			
5		AU							26	12
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

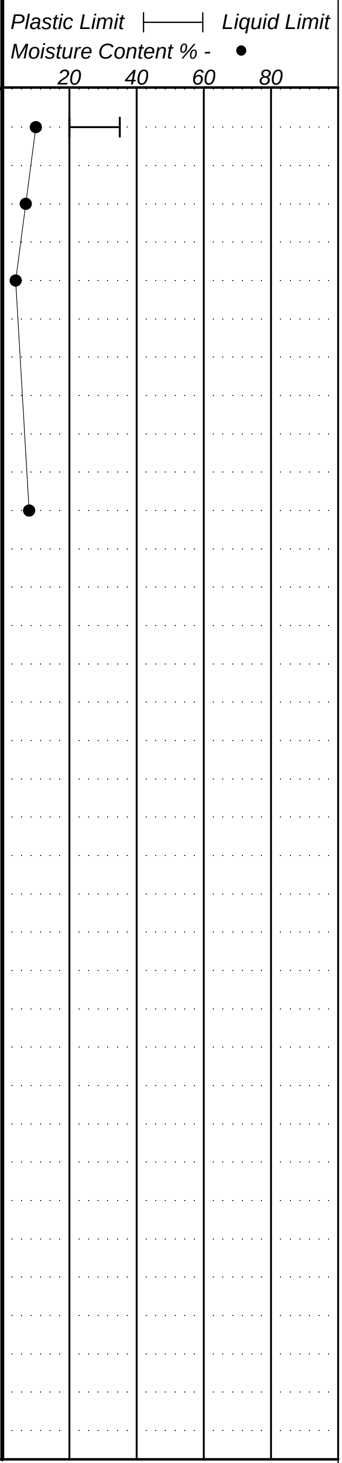
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/20/2026

BORING NO. B-4

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				56/10"		35	15
		AU								
5		SS					50/2"			
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

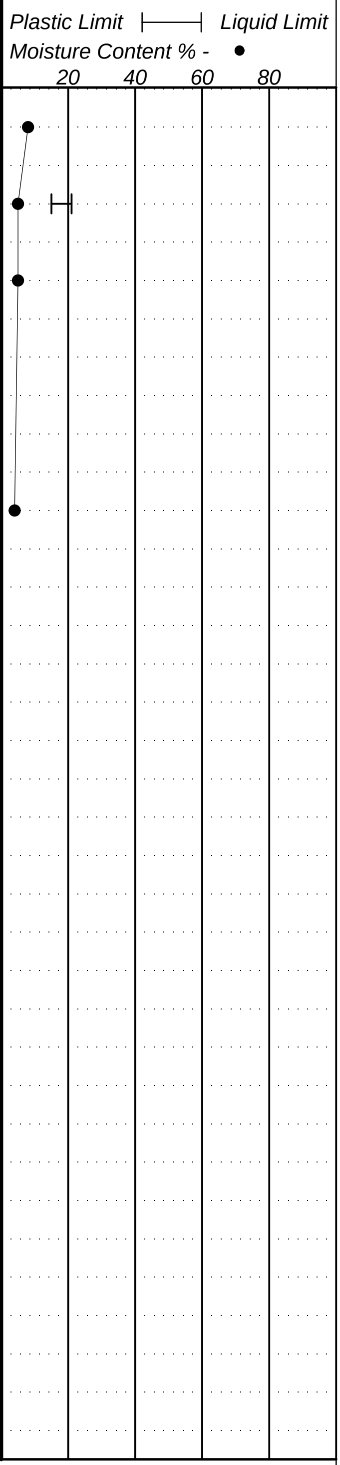
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/20/2026

BORING NO. B-5

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Tan Weathered Limestone to Light Tan Limestone -with Caliche and Gravel -with Clay Seams				50/7"			
		AU							21	06
5		AU								
10		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

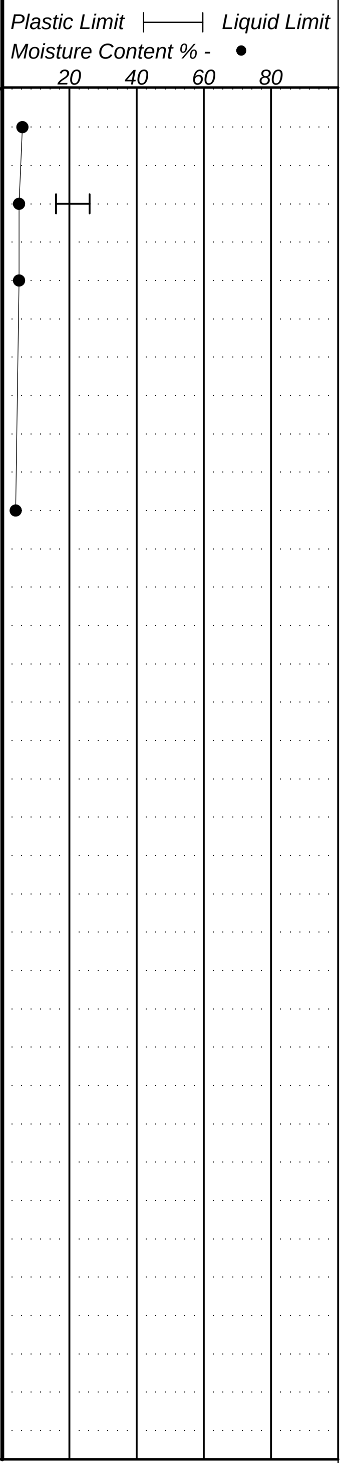
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/20/2026

BORING NO. B-6

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				68/10"			
		AU							26	10
5		AU								
		AU								



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

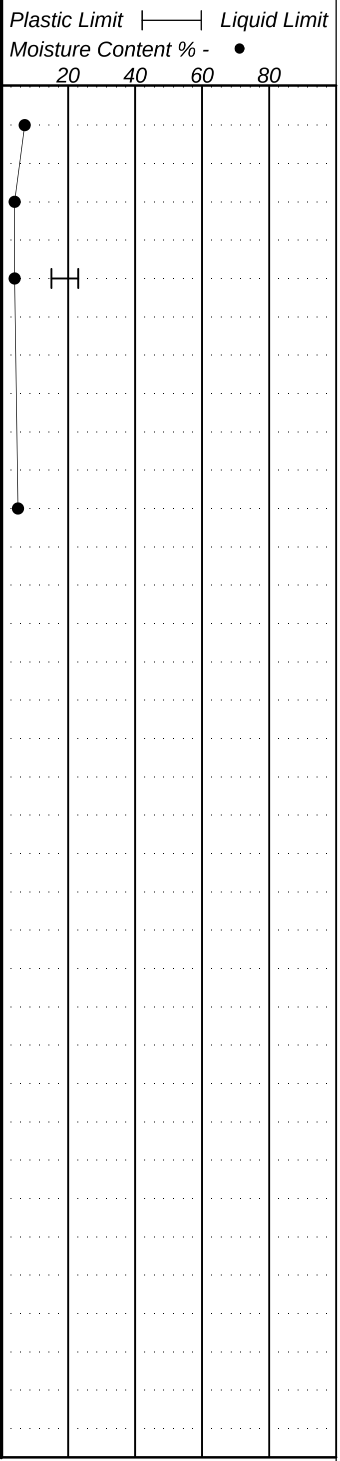
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/19/2026

BORING NO. B-7

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				70/10"			
		AU								
5		AU							23	08
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

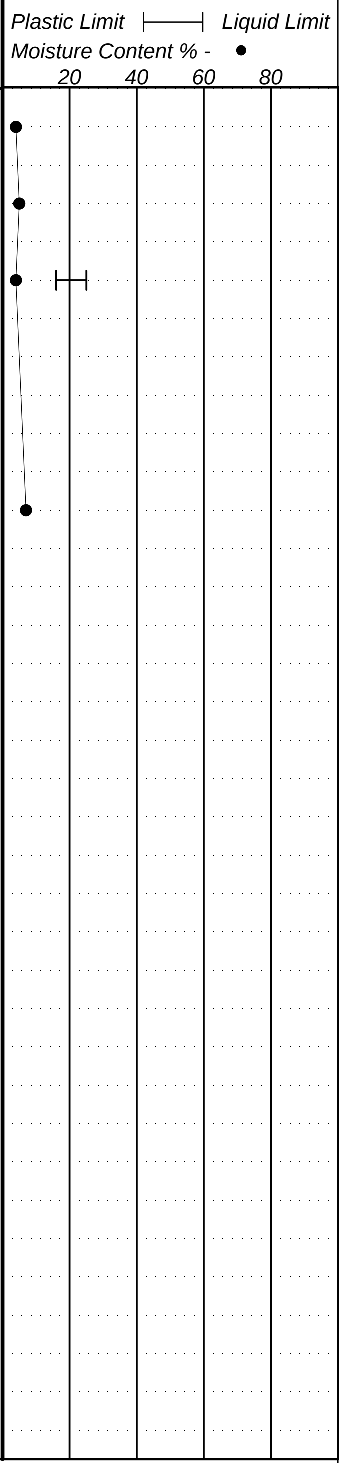
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/20/2026

BORING NO. B-8

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				50/8"			
		AU								
5		AU							25	09
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

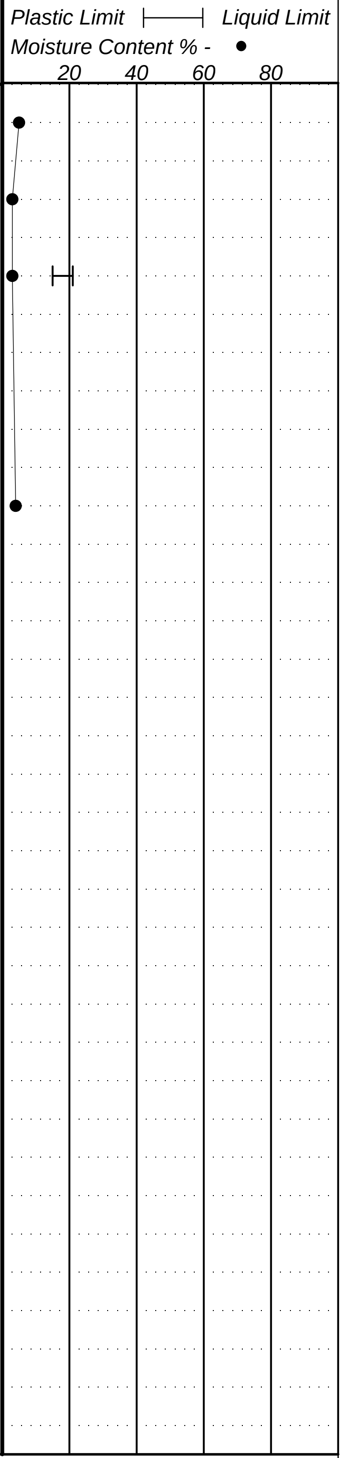
PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/23/2026

inTEC

BORING NO. B-9

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				58/9"			
		AU								
5		AU							21	06
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

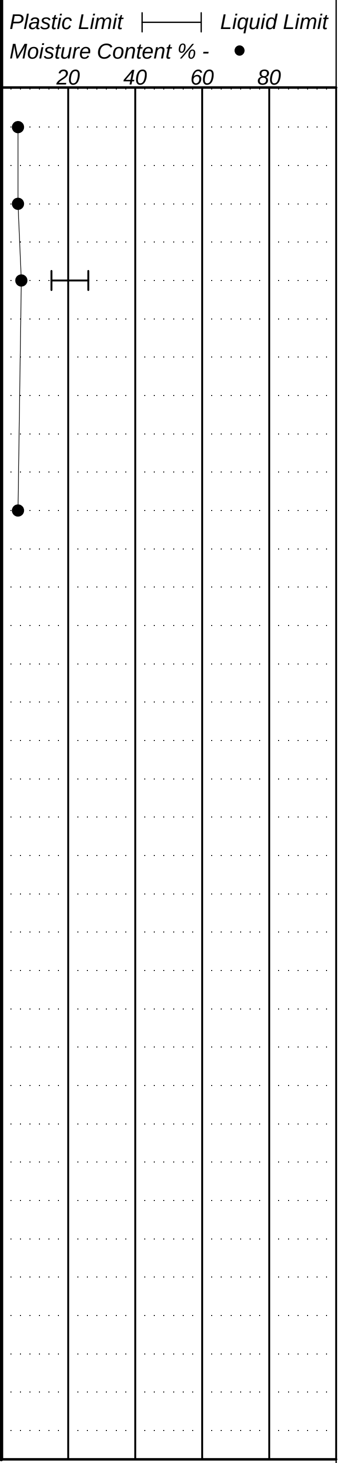
PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/27/2026

intEC

BORING NO. B-10

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0	▨		Dark Brown Clay							
	▦	SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				55/9"			
	▦	AU								
5	▦	AU							26	11
10	▦									
	▦	AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

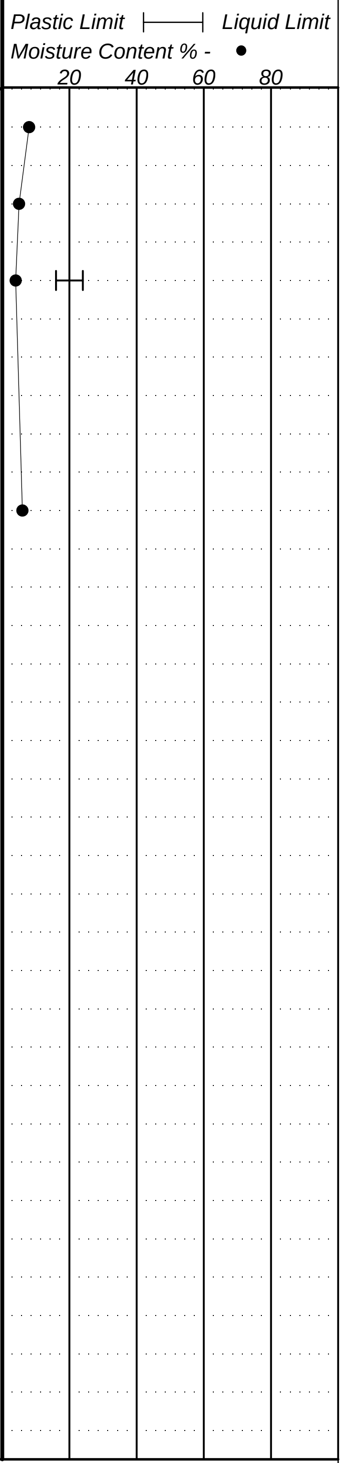
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/20/2026

BORING NO. B-11

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				50/4"			
		AU								
5		AU							24	08
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

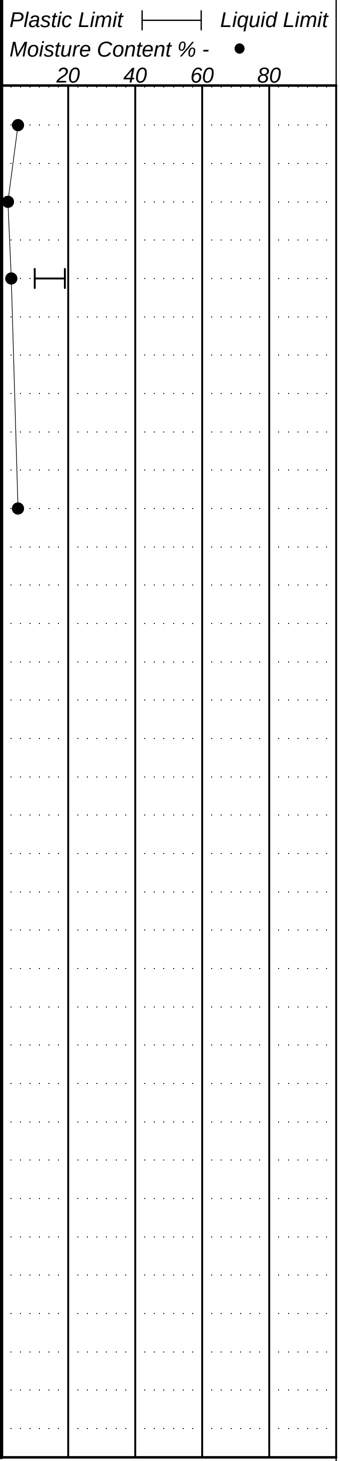
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/20/2026

BORING NO. B-12

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				50/8"			
		AU								
5		AU							19	09
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

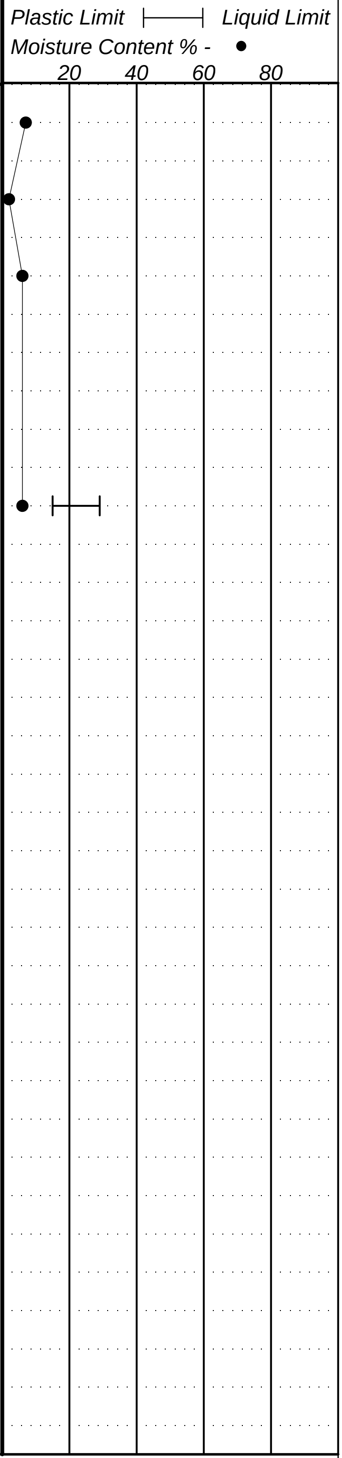
PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/23/2026

inTEC

BORING NO. B-13

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0										
		SS	Dark Brown Clay -with Gravel				62/11"			
			Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams							
		AU								
5		AU								
10										
		AU							29	14
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

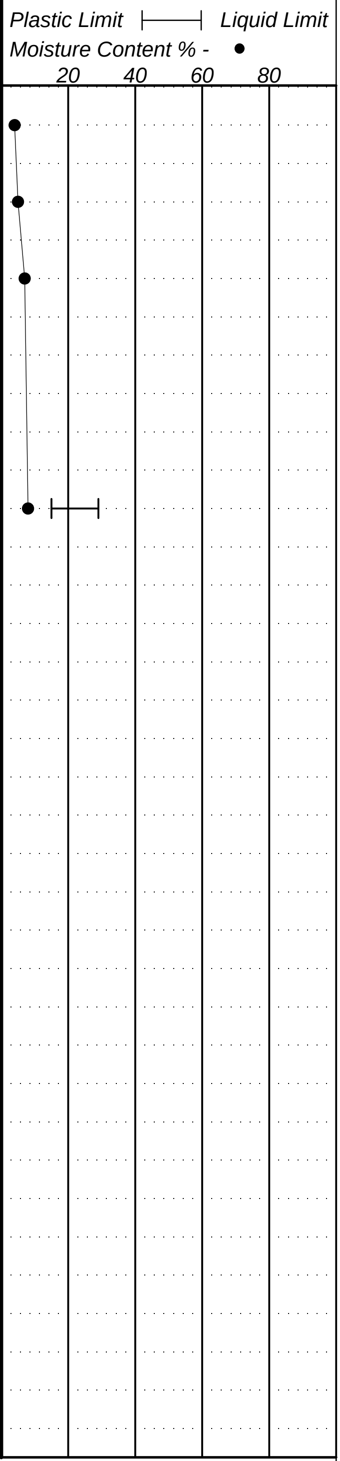
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/23/2026

BORING NO. B-14

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				56/10"			
		AU								
5		AU								
10										
		AU							29	14
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

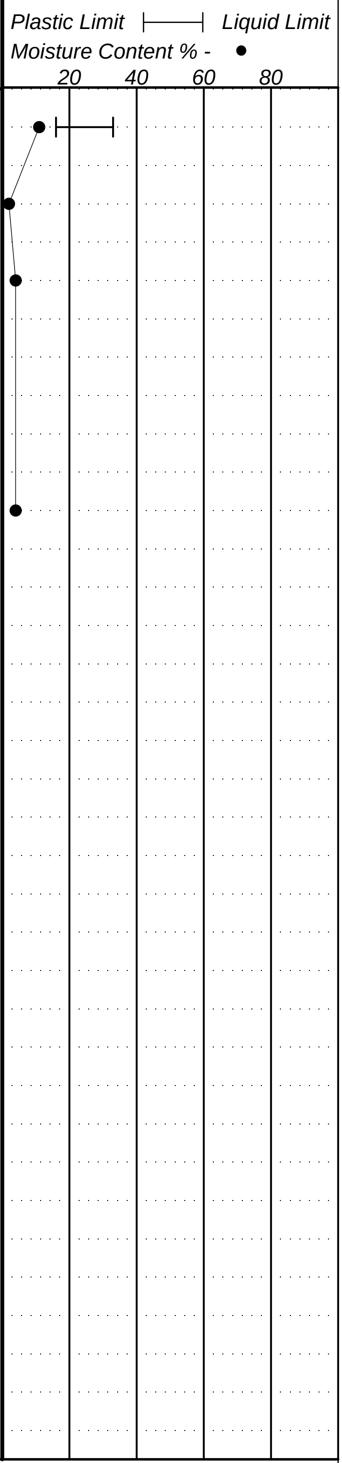
PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/20/2026

inTEC

BORING NO. B-15

DEPTH (feet)	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0		Dark Brown Clay							
	SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				51		33	17
	AU								
5	AU								
10									
	AU								
15									
20									
25									
30									
35									



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

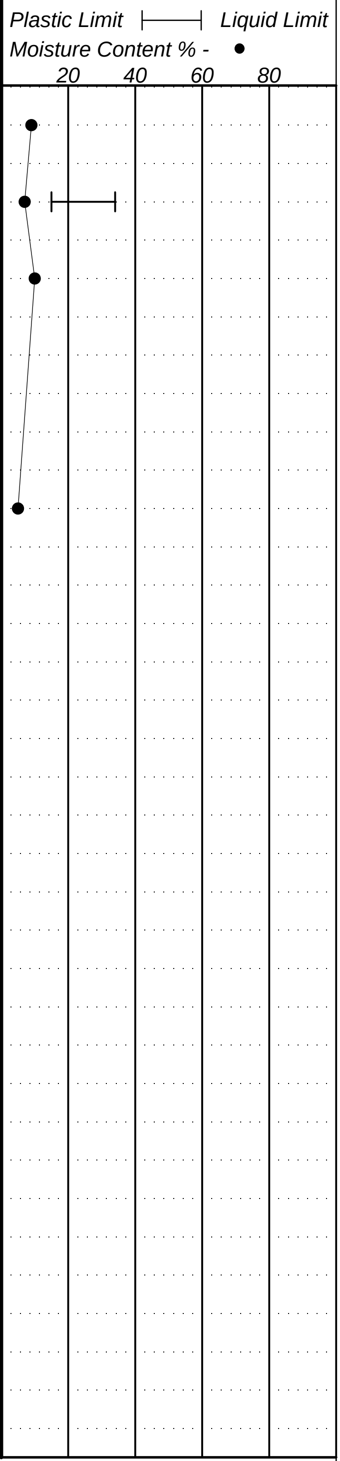
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/23/2026

BORING NO. B-16

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0	▨		Dark Brown Clay							
	▦	SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				31			
	▦	SS					70		34	19
5	▦	AU								
10	▦									
	▦	AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

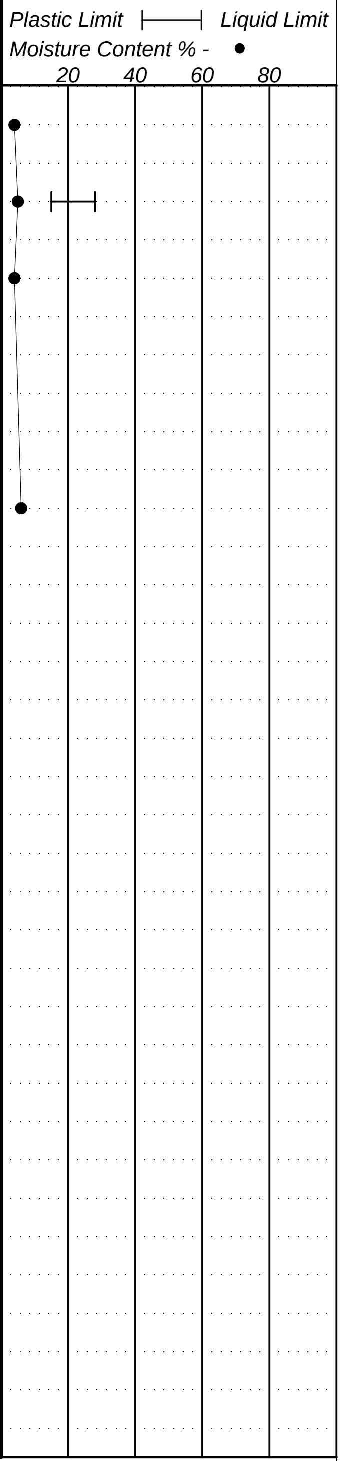
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/19/2026

BORING NO. B-17

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				60/10"			
		AU							28	13
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

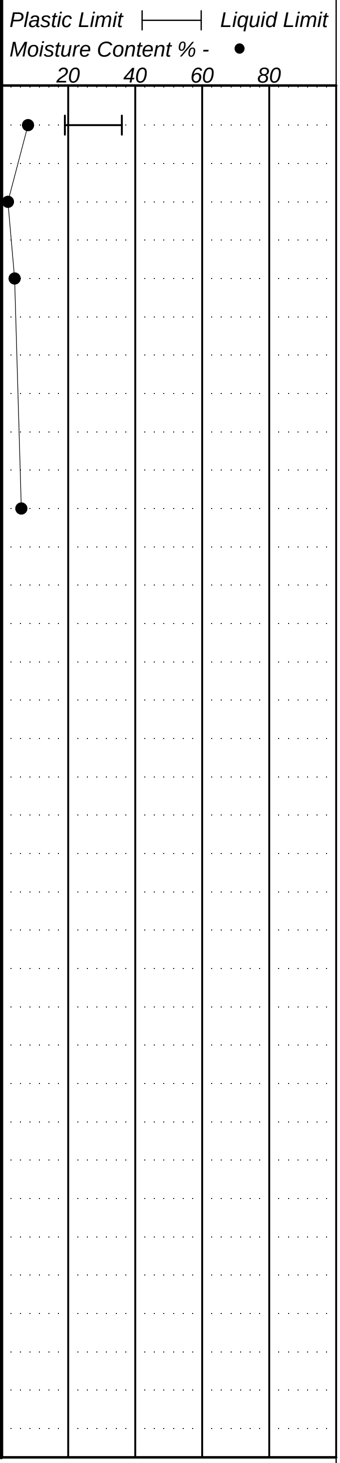
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/19/2026

BORING NO. B-18

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				42		36	17
		SS					50/2"			
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

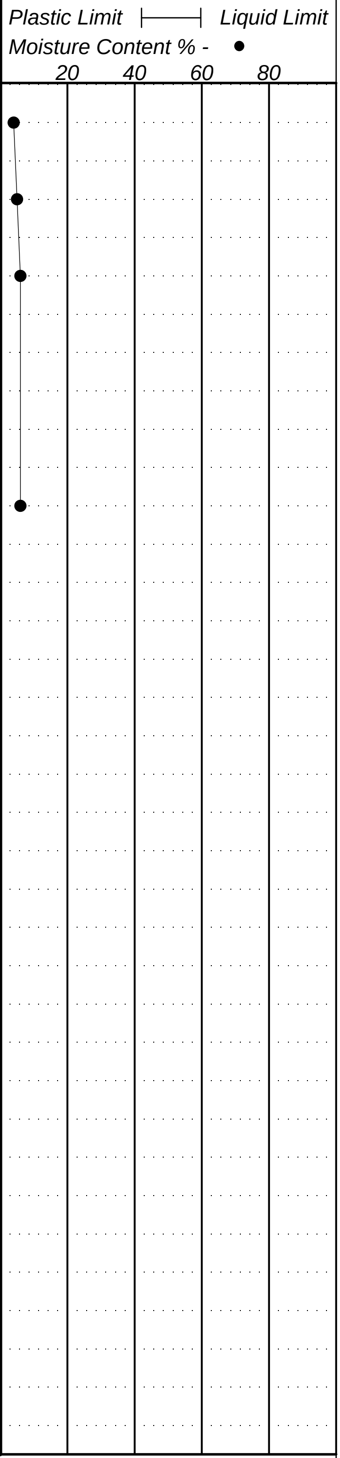
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/19/2026

BORING NO. B-19

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0	▦	SS	Light Tan to Tan Limestone -with Caliche and Gravel -with Marl Seams				50/4"			
	▦	AU								
5	▦	AU								
10	▦	AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

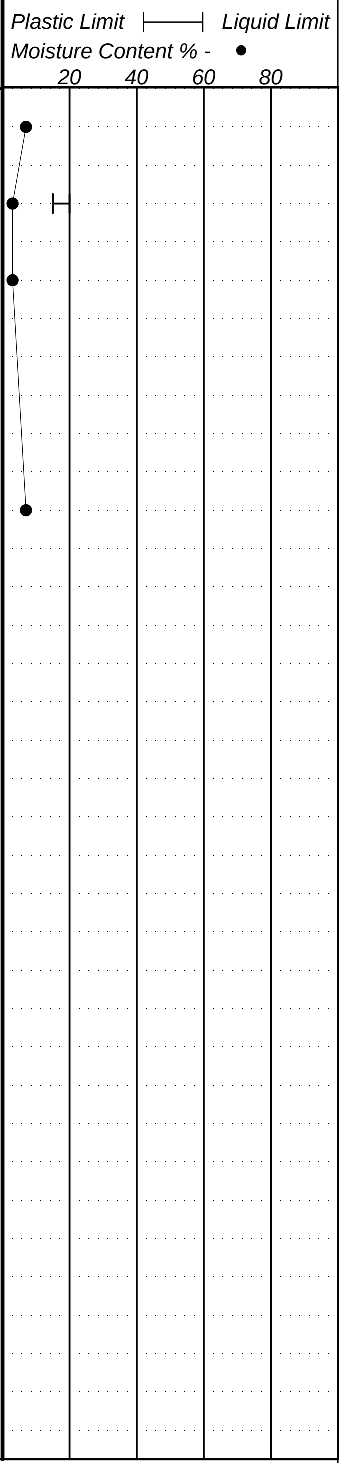
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/20/2026

BORING NO. B-20

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				58/10"			
		AU							20	05
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

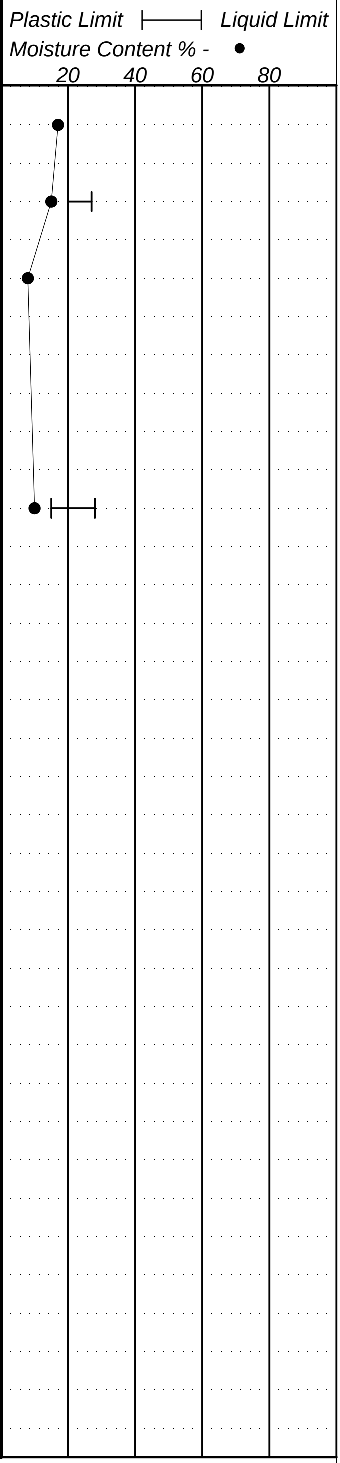
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/16/2026

BORING NO. B-21

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				19			
		SS					39		27	07
5		SS					50/8"			
10										
		AU							28	13
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

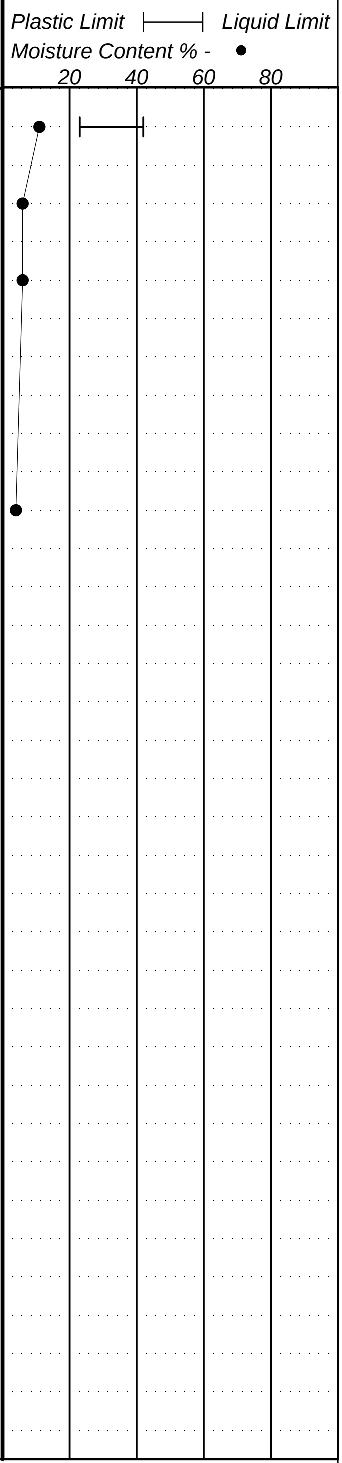
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/16/2026

BORING NO. B-22

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel				36		42	19
		SS					50/5"			
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

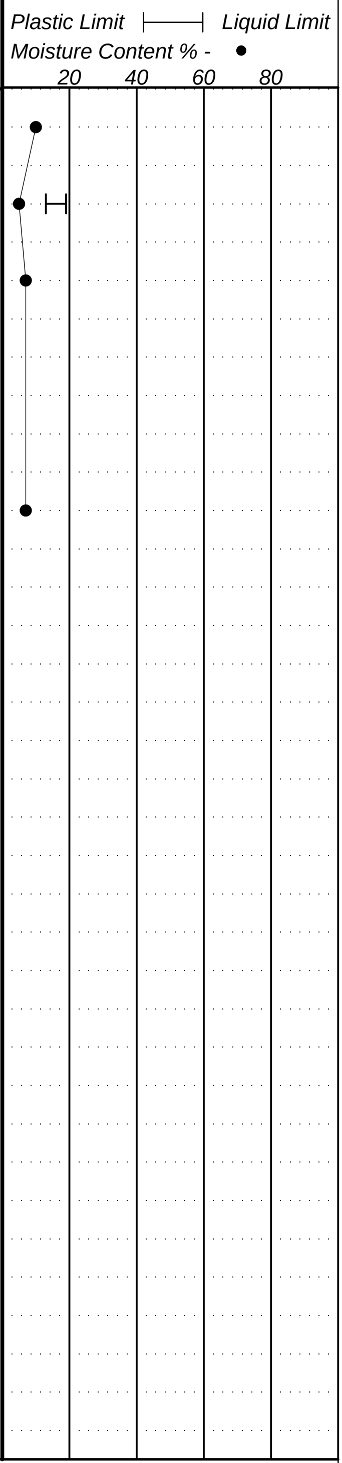
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/19/2026

BORING NO. B-23

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				50/8"			
		AU							19	06
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

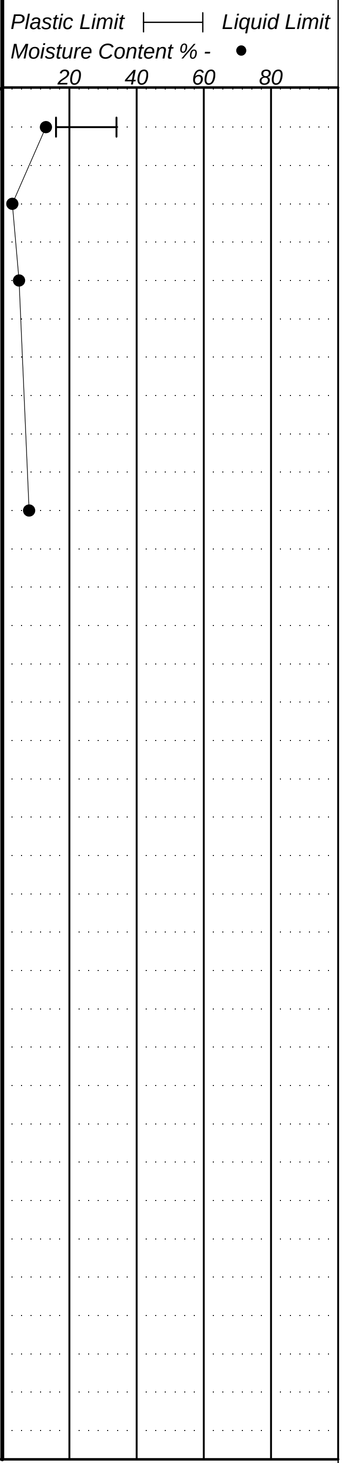
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/19/2026

BORING NO. B-24

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				58		34	18
		AU								
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

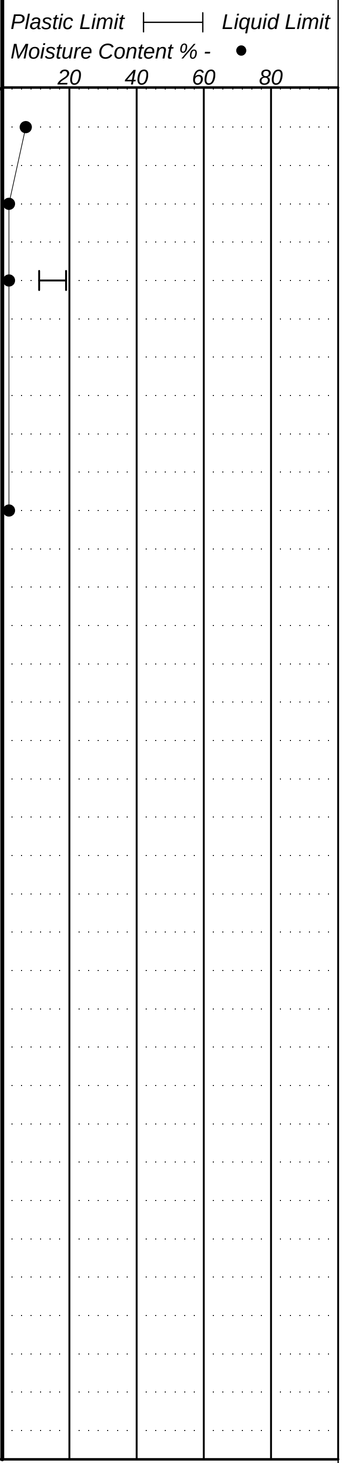
PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/19/2026

inTEC

BORING NO. B-25

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche				64			
		AU								
5		AU							19	08
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

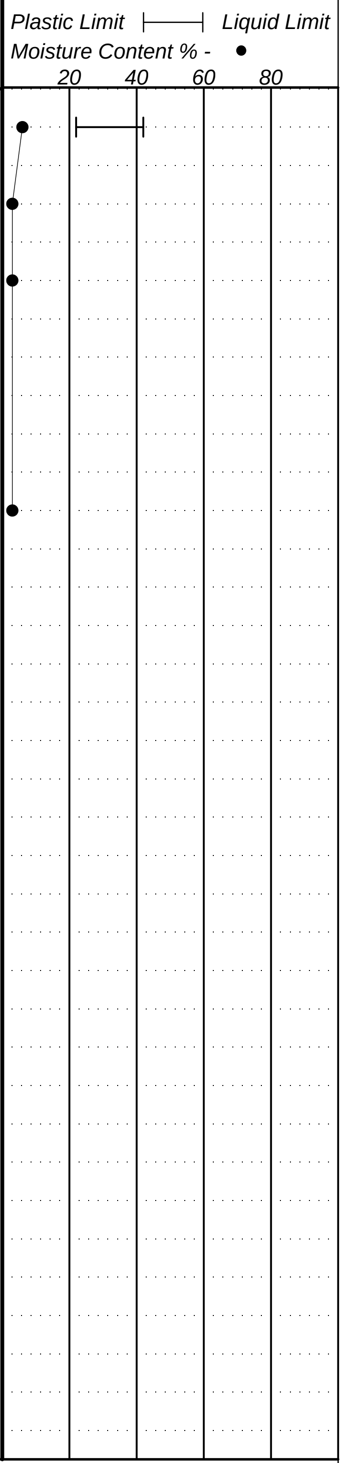
PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/17/2026

inTEC

BORING NO. B-26

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche				50/5"		42	20
		AU								
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

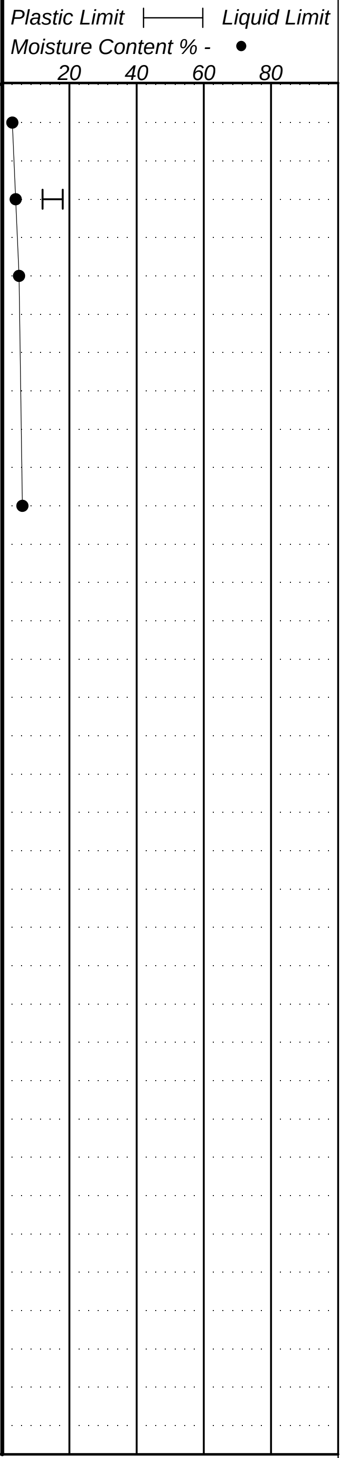
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/17/2026

BORING NO. B-27

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche				50/6"			
		AU							18	06
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

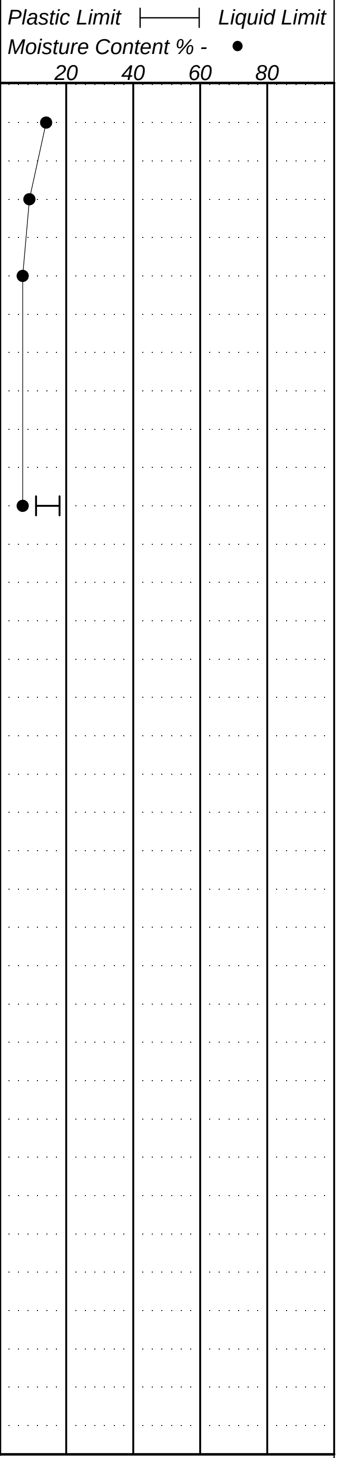
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/17/2026

BORING NO. B-28

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan to Tan Marl -with Caliche -with Limestone Seams				34			
		SS					52			
5		AU								
10										
		AU							18	07
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

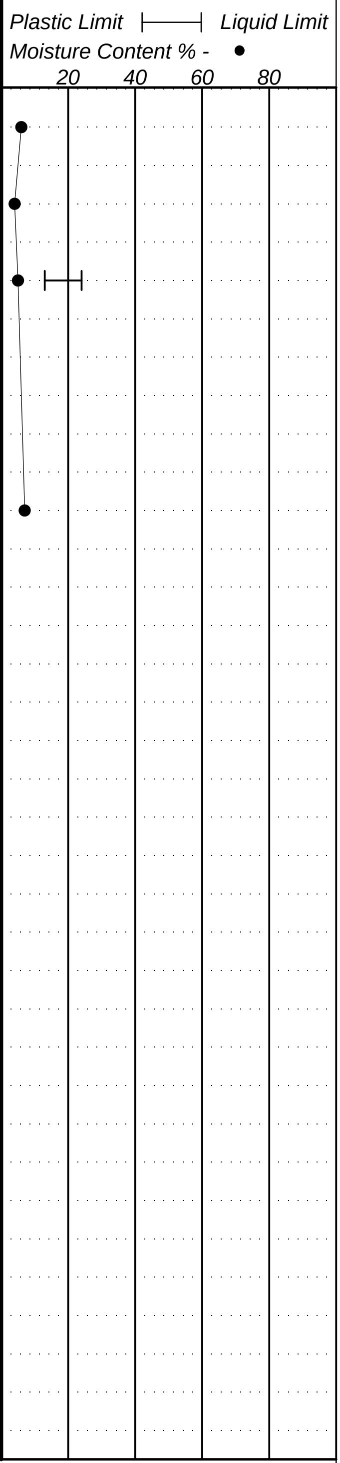
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/17/2026

BORING NO. B-29

DEPTH (feet)	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0		Dark Brown Clay							
	SS	Light Tan Marl to Limestone -with Caliche				50/6"			
	AU								
5	AU							24	11
10									
	AU								
15									
20									
25									
30									
35									



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

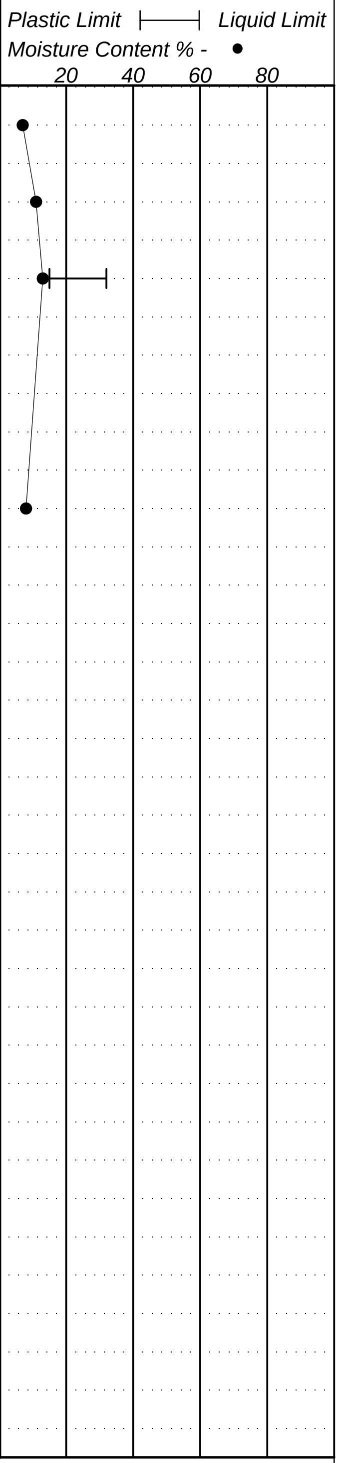
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/17/2026

BORING NO. B-30

DEPTH (feet)	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0		Dark Brown Clay							
	SS	Light Tan to Tan Marl -with Caliche -with Limestone Seams				30			
	SS					42			
5	AU							32	17
10									
	AU								
15									
20									
25									
30									
35									



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

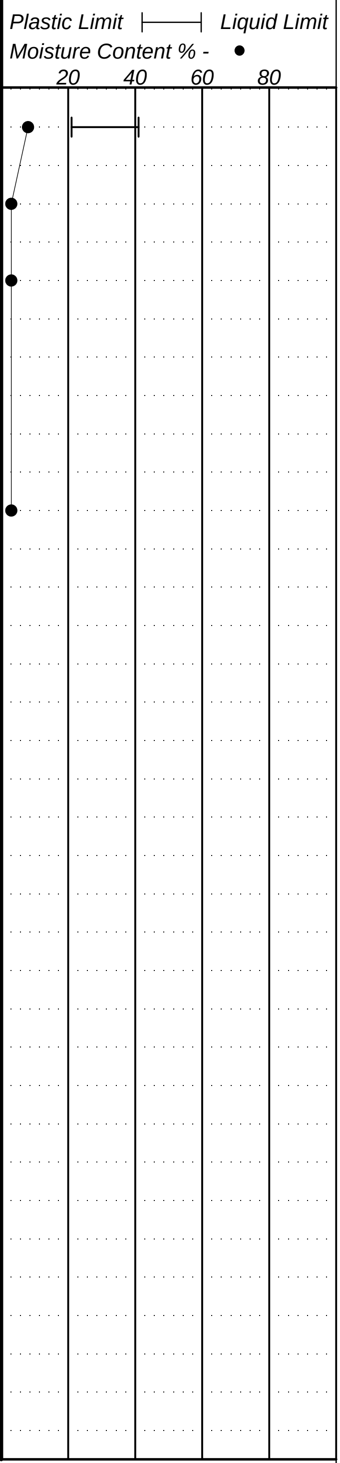
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/18/2026

BORING NO. B-31

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche				50/5"		41	20
		AU								
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

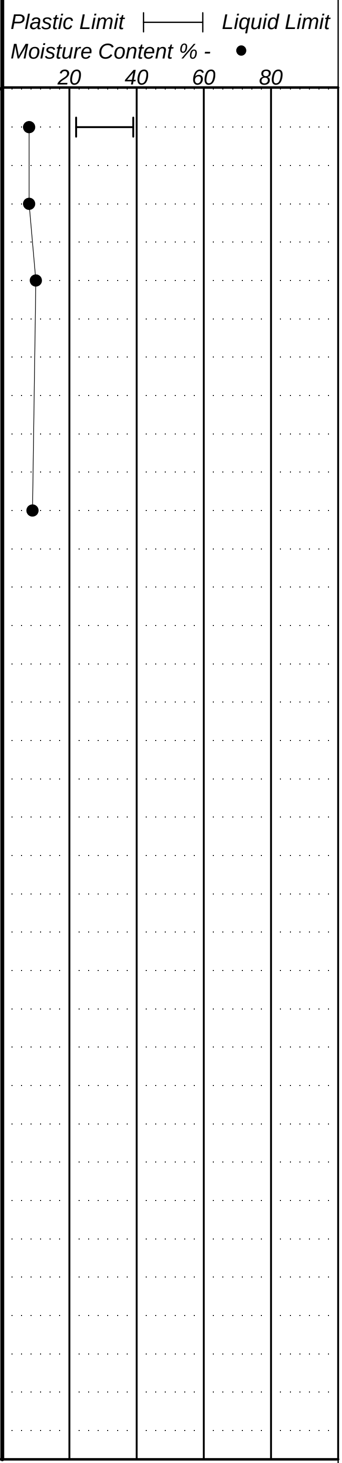
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/17/2026

BORING NO. B-32

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl -with Caliche -with Limestone Seams				62		39	17
		AU								
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

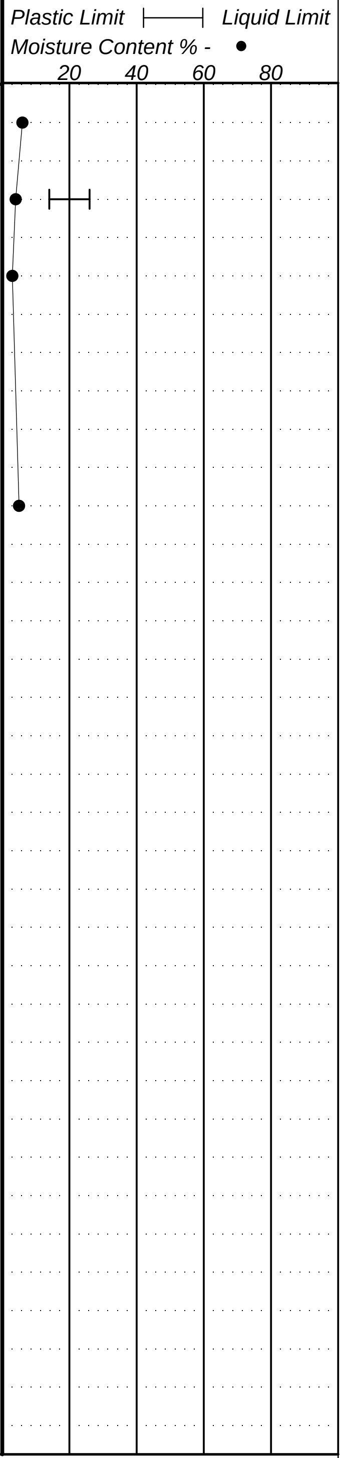
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/17/2026

BORING NO. B-33

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche				55			
		AU							26	12
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

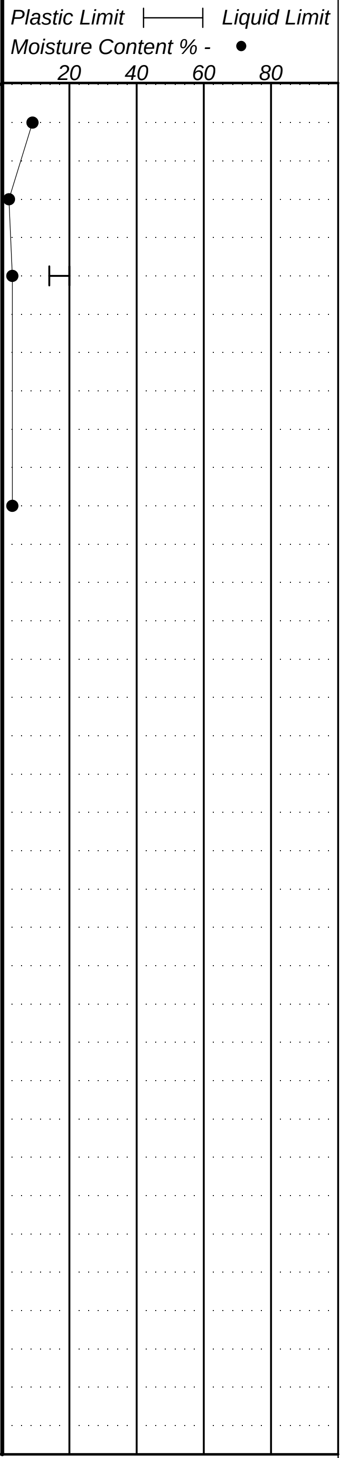
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch** **PROJECT NO:** **S261012**
LOCATION: San Antonio, Texas **DATE:** 02/18/2026
CLIENT: Lennar Homes

BORING NO. B-34

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche				60/11"			
		AU								
5		AU							20	06
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

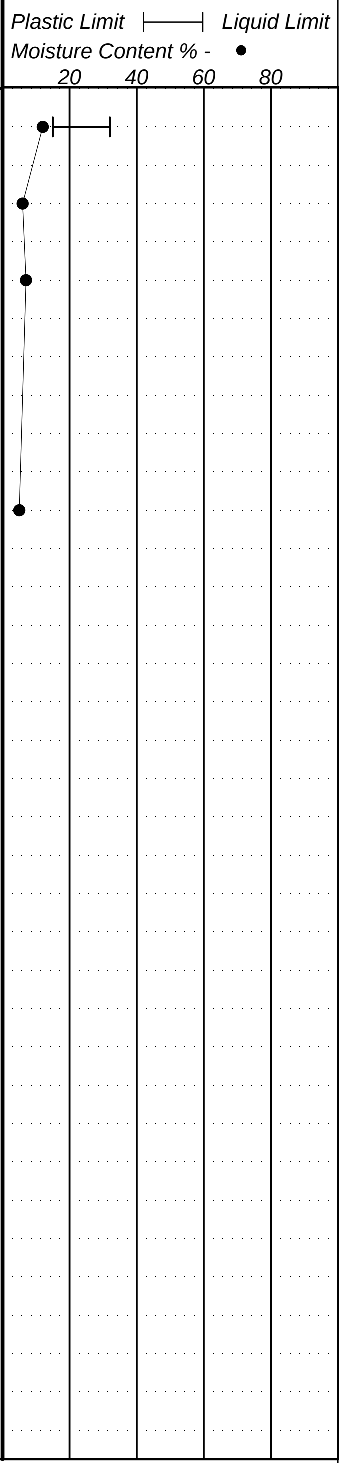
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/18/2026

BORING NO. B-35

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche				54/10"		32	17
		AU								
5		AU								
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

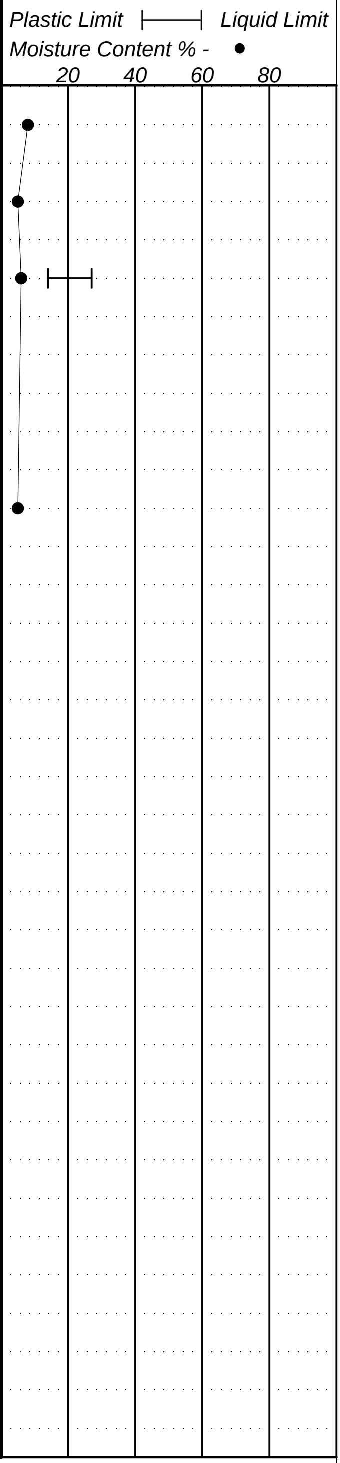
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/27/2026

BORING NO. B-36

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				44			
		AU								
5		AU							27	13
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

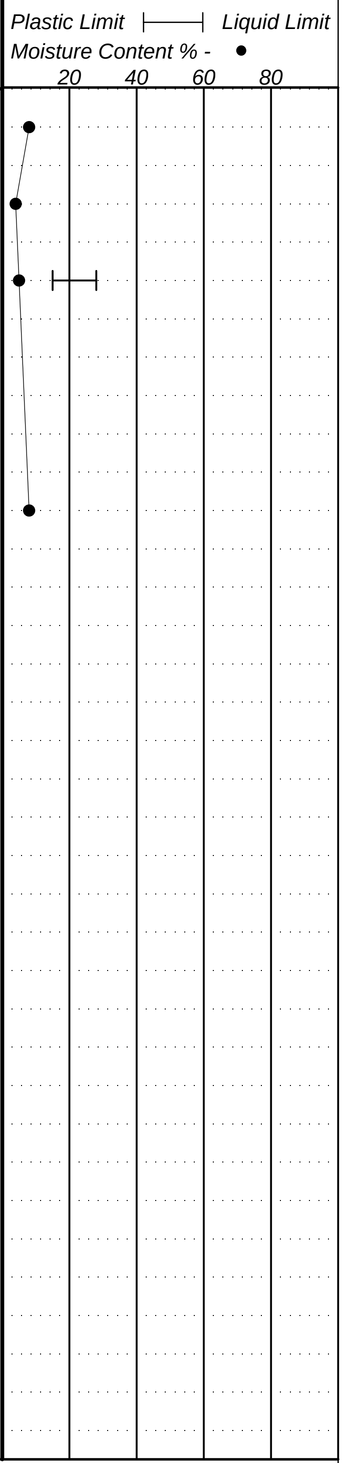
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/16/2026

BORING NO. B-37

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				61			
		AU								
5		AU							28	13
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

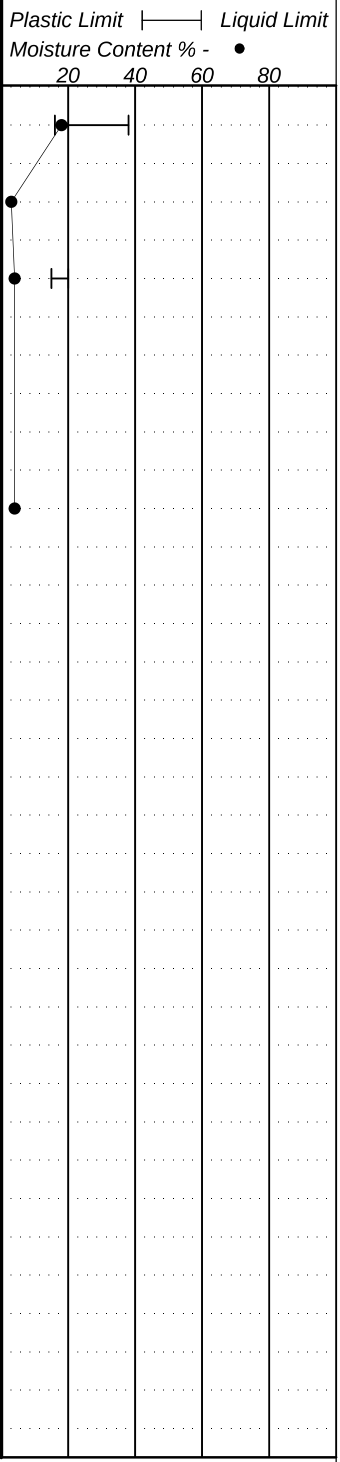
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Guajolote Ranch**
LOCATION: San Antonio, Texas
CLIENT: Lennar Homes

PROJECT NO: **S261012**
DATE: 02/16/2026

BORING NO. B-38

DEPTH (feet)	SYMBOL	SAMPLES	SOIL DESCRIPTION	% MINUS 200 SIEVE	UNIT DRY WT IN PCF	S.S. BY P.P	BLOWS PER FOOT	SHEAR STRENGTH TSF	LIQUID LIMIT	PLASTICITY INDEX
0			Dark Brown Clay							
		SS	Light Tan Marl to Limestone -with Caliche and Gravel -with Clay Seams				58		38	22
		AU								
5		AU							20	05
10										
		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

S.S by P.P - Shear Strength in TSF
by Hand Penetrometer

S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample

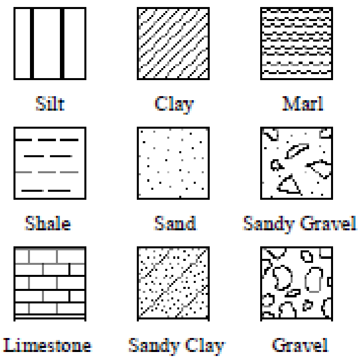
HA - Hand Auger
AU - Auger Sample

KEY TO CLASSIFICATIONS AND SYMBOLS

Soil Fractions

Component	Size Range
Boulders	Greater than 12"
Cobbles	3" - 12"
Gravel	3" - #4 (4.76mm)
Coarse	3" - ¾"
Fine	¾" - #4
Sand	#4 - #200 (0.074mm)
Coarse	#4 - #10 (2.00mm)
Medium	#10 - #40 (0.42mm)
Fine	#40 - #200 (0.074mm)
Silt and Clay	Less than #200

Soil or Rock Types
(Shown in symbols column)
(Predominate Soil Types Shown Heavy)



TERMS DESCRIBING SOIL CONSISTENCY

Description (Cohesive Soils)	Unconfined Compression TSF	Blows/Ft. Std. Penetration Test	Description (Cohesionless Soils	Blows/Ft. Std. Penetration Tests
Very Soft	0.25	<2	Very Loose	0 – 4
Soft	0.25 – 0.50	2 – 4	Loose	4 – 10
Firm	0.50 – 1.00	4 – 8	Medium Dense	10 – 30
Stiff	1.00 – 2.00	8 – 15	Dense	30 – 50
Very Stiff	2.00 – 4.00	15 – 30	Very Dense	50
Hard	>4.00	>30		

SOIL STRUCTURE

Calcareous	Containing deposits of calcium carbonate; generally nodular.
Slickenside	Having inclined planes of weakness that are slick and glossy in appearance.
Laminated	Composed of thin layers of varying color and texture.
Fissured	Containing shrinkage cracks frequently filled with fine sand or silt. Usually more or less vertical.
Interbedded	Composed of alternate layers of different soil types.
Jointed	Consisting of hair cracks that fall apart as soon as the confining pressure is removed.
Varved	Consisting of alternate thin layers of sand, silt or clay formed by variations in sedimentations during the various seasons of the year, of often exhibiting contrasting colors when partially dried. Each layer is generally less than ½" in thickness.
Stratified	Composed of, or arranged in layers (usually 1 inch or more)
Well-graded	Having a wide range of grain sizes and substantial amount of all intermediate particle sizes.
Poorly or Gap-graded	Having a range of sizes with some intermediate sizes missing.
Uniformly-graded	Predominantly of one grain size.

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

InTEC Project Number
S261012

Date:
01/21/2026

Calculations

Design CBR = 5.0

Subsurface Exploration and Pavement Analysis Proposed New Streets Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector San Antonio, Texas	InTEC Project Number **S261012**	Date: 03/05/2026

Asphalt Pavement

Design Analysis

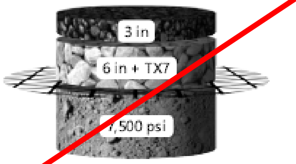
Tensar

Design		**Reference**	
Project		**Location**	
Customer		**Designer**	Murali Subramaniam
Company	InTEC	**Date**	January 18, 2023

Results

Stabilized

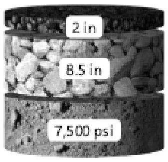
1,204,200 ESALs



	Thickness	Coeff.	SN
~~HMA layer 1~~	~~3 in~~	~~0.420~~	~~1.260~~
~~Aggregate base (TX7)~~	~~6 in~~	~~0.296~~	~~1.776~~
~~Structural number (SN)~~			~~3.036~~

Unstabilized

104,500 ESALs



	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
Aggregate base	8.5 in	0.140	1.190
Structural number (SN)			2.070

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
100,000	7,500 psi	70%	0.45	4.2	2

This report was prepared using Tensar+ (2.7.7)

Limitations of this Report

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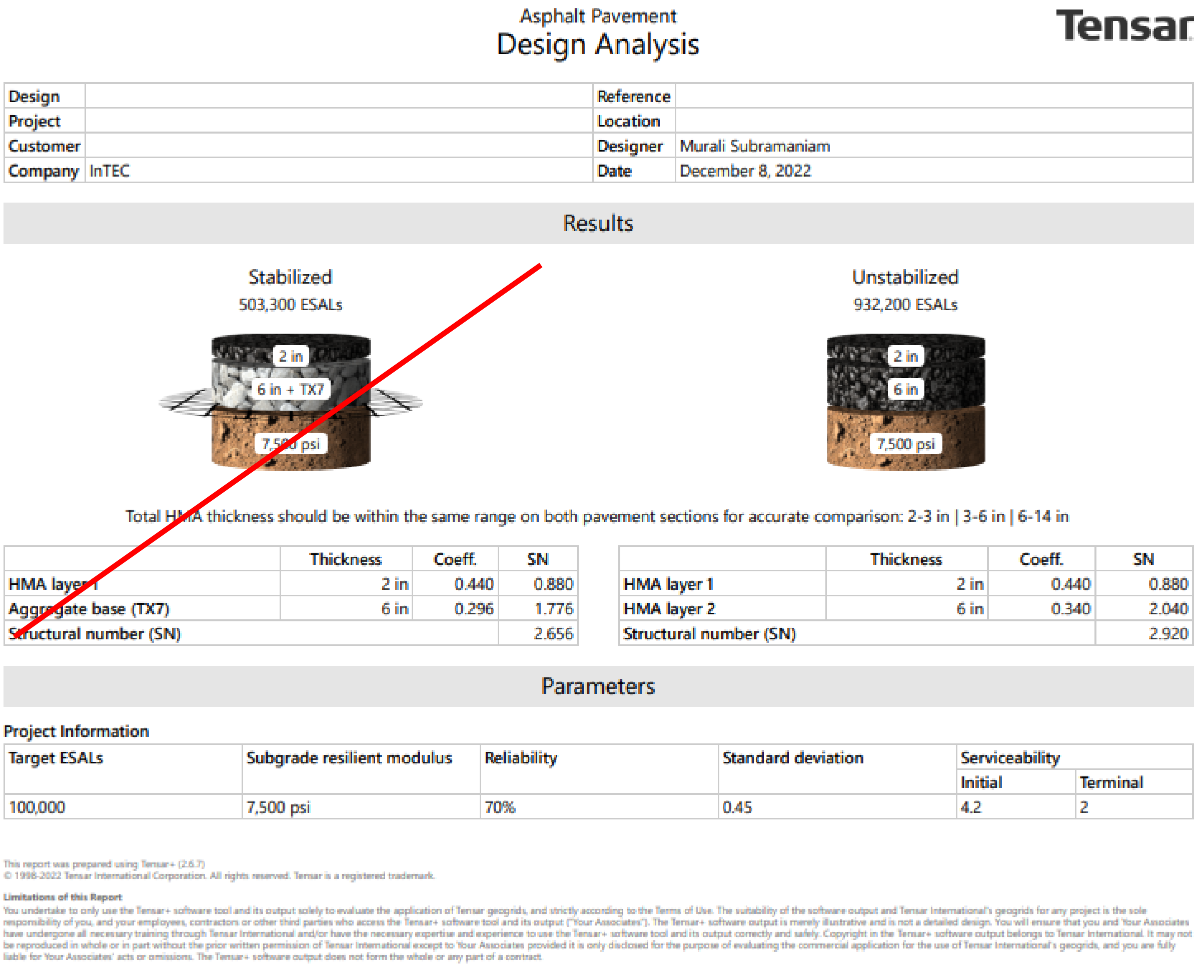
Subsurface Exploration and Pavement Analysis Proposed New Streets Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector San Antonio, Texas	**Local A – without Bus Traffic**
	InTEC Project Number **S261012**
	Date: 03/05/2026



Asphalt Pavement

Design Analysis

Tensar

Design		**Reference**	
Project		**Location**	
Customer		**Designer**	Murali Subramaniam
Company	InTEC	**Date**	December 8, 2022

Results

Stabilized

503,300 ESALs

Unstabilized

932,200 ESALs

Total HMA thickness should be within the same range on both pavement sections for accurate comparison: 2-3 in | 3-6 in | 6-14 in

	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
Aggregate base (TX7)	6 in	0.296	1.776
Structural number (SN)			2.656

	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
HMA layer 2	6 in	0.340	2.040
Structural number (SN)			2.920

Parameters

Project Information

Target ESALs	**Subgrade resilient modulus**	**Reliability**	**Standard deviation**	**Serviceability**	
				Initial	**Terminal**
100,000	7,500 psi	70%	0.45	4.2	2

This report was prepared using Tensar+ (2.6.7)

Limitations of this Report

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Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

Local A – without Bus Traffic

InTEC Project Number
S261012

Date:
03/05/2026

Asphalt Pavement

Design Analysis

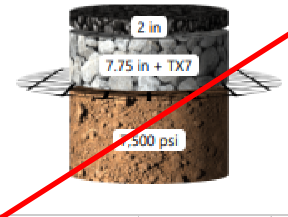
Tensar

Design		**Reference**	
Project		**Location**	
Customer		**Designer**	Murali Subramaniam
Company	InTEC	**Date**	December 10, 2022

Results

Stabilized

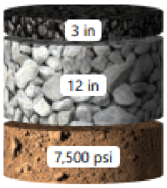
1,047,800 ESALs



	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
Aggregate base (TX7)	7.75 in	0.270	2.092
Structural number (SN)			2.972

Unstabilized

1,113,200 ESALs



	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
Aggregate base	12 in	0.140	1.680
Structural number (SN)			3.000

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
1,000,000	7,500 psi	70%	0.45	4.2	2

This report was prepared using Tensar+ (2.6.7)

Limitations of this Report

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Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9,
10, 13, and Phase 4 Collector
San Antonio, Texas

Local A – with Bus Traffic

InTEC Project Number
S261012

Date:
03/05/2026

Asphalt Pavement

Design Analysis

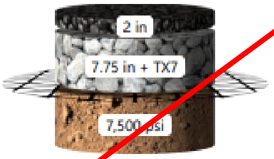
Tensar

Design		**Reference**	
Project		**Location**	
Customer		**Designer**	Murali Subramaniam
Company	InTEC	**Date**	December 10, 2022

Results

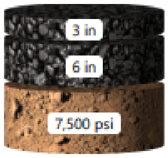
Stabilized

1,047,800 ESALs



Unstabilized

2,363,700 ESALs



Total HMA thickness should be within the same range on both pavement sections for accurate comparison: 2-3 in | 3-6 in | 6-14 in

	Thickness	Coeff.	SN
HMA layer 1	2 in	0.440	0.880
Aggregate base (TX7)	7.75 in	0.270	2.092
Structural number (SN)			2.972

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
HMA layer 2	6 in	0.340	2.040
Structural number (SN)			3.360

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
1,000,000	7,500 psi	70%	0.45	4.2	2

This report was prepared using Tensar+ (2.6.7)

Limitations of this Report

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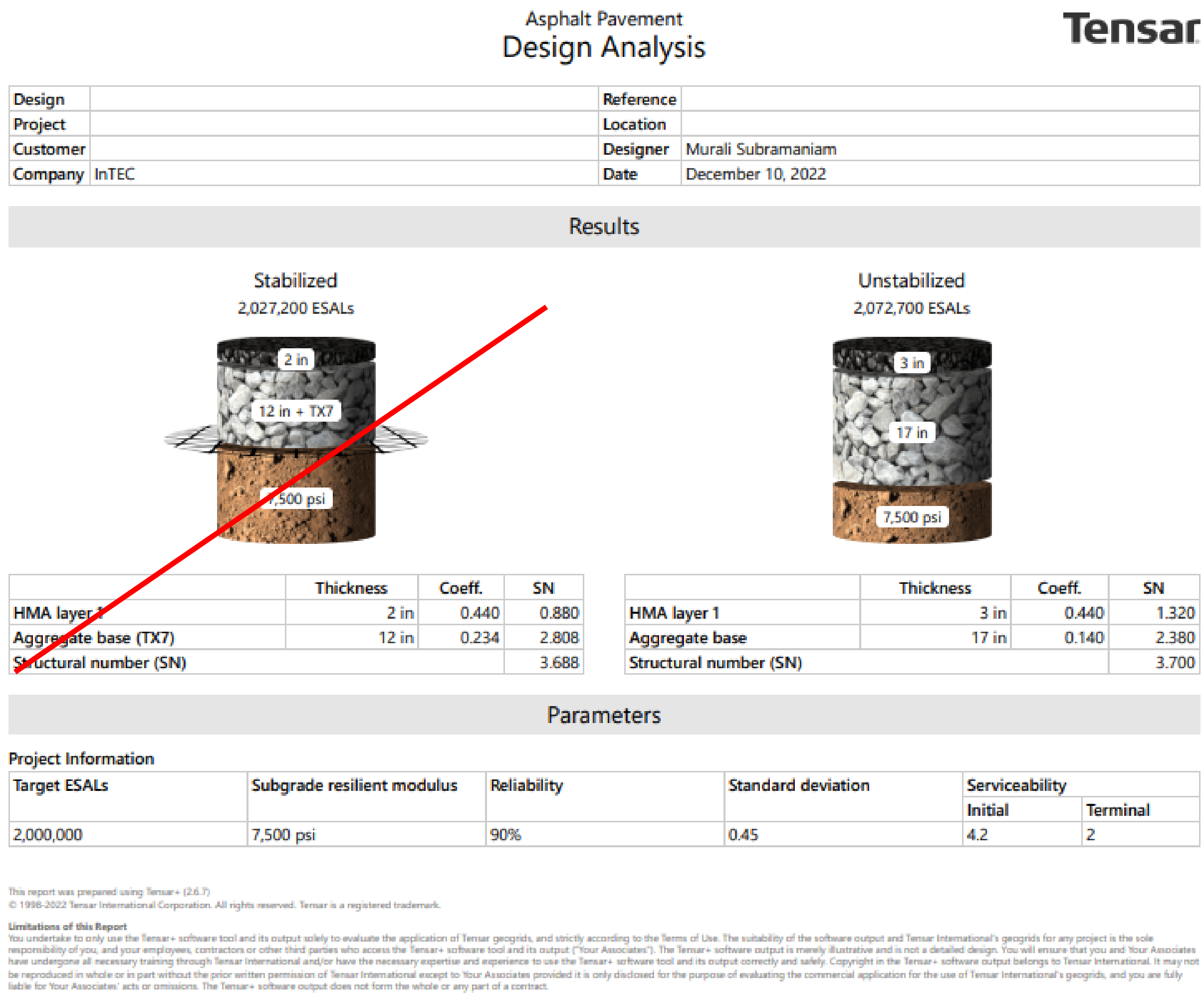
Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

Local A – with Bus Traffic

InTEC Project Number
S261012

Date:
03/05/2026



Asphalt Pavement

Design Analysis

Tensar

Design		**Reference**	
Project		**Location**	
Customer		**Designer**	Murali Subramaniam
Company	InTEC	**Date**	December 10, 2022

Results

Stabilized

2,027,200 ESALs

Unstabilized

2,072,700 ESALs

	Thickness	Coeff.	SN
~~HMA layer 1~~	2 in	0.440	0.880
~~Aggregate base (TX7)~~	12 in	0.234	2.808
~~Structural number (SN)~~			3.688

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
Aggregate base	17 in	0.140	2.380
Structural number (SN)			3.700

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
2,000,000	7,500 psi	90%	0.45	4.2	2

This report was prepared using Tensar+ (2.6.7)

Limitations of this Report

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Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

Local B

InTEC Project Number
S261012

Date:
03/05/2026

Asphalt Pavement

Design Analysis

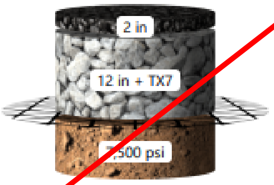
Tensar

Design		**Reference**	
Project		**Location**	
Customer		**Designer**	Murali Subramaniam
Company	InTEC	**Date**	December 10, 2022

Results

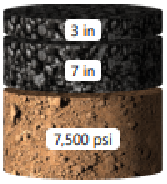
Stabilized

2,027,200 ESALs



Unstabilized

2,072,700 ESALs



Total HMA thickness should be within the same range on both pavement sections for accurate comparison: 2-3 in | 3-6 in | 6-14 in

	Thickness	Coeff.	SN
~~HMA layer 1~~	2 in	0.440	0.880
~~Aggregate base (TX7)~~	12 in	0.234	2.808
~~Structural number (SN)~~			3.688

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
HMA layer 3	7 in	0.340	2.380
Structural number (SN)			3.700

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
2,000,000	7,500 psi	90%	0.45	4.2	2

This report was prepared using Tensar+ (2.6.7)

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

Local B

InTEC Project Number
S261012

Date:
03/05/2026

Asphalt Pavement

Design Analysis

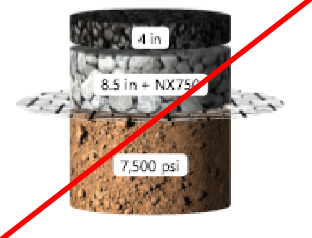
Tensar

Design		Reference	
Project		Location	
Customer		Designer	Murali Subramaniam
Company	InTEC	Date	June 9, 2023

Results

Stabilized

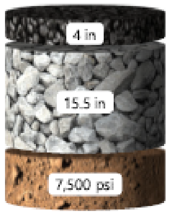
2,069,400 ESALs



	Thickness	Coeff.	SN
HMA layer 1	4 in	0.420	1.680
Aggregate base (NX750)	8.5 in	0.262	2.227
Structural number (SN)			3.907

Unstabilized

2,147,300 ESALs



	Thickness	Coeff.	SN
HMA layer 1	4 in	0.440	1.760
Aggregate base	15.5 in	0.140	2.170
Structural number (SN)			3.930

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
2,000,000	7,500 psi	90%	0.45	4.2	2.5

This report was prepared using Tensar+ (2.82)

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

Collector

InTEC Project Number
S261012

Date:
03/05/2026

Asphalt Pavement

Design Analysis

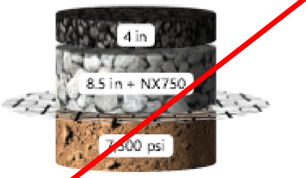
Tensar

Design		**Reference**	
Project		**Location**	
Customer		**Designer**	Murali Subramaniam
Company	InTEC	**Date**	June 9, 2023

Results

Stabilized

2,069,400 ESALs



Unstabilized

2,557,700 ESALs

Total HMA thickness should be within the same range on both pavement sections for accurate comparison: 2-3 in | 3-6 in | 6-14 in

	Thickness	Coeff.	SN
HMA layer 1	4 in	0.420	1.680
Aggregate base (NX750)	8.5 in	0.262	2.227
Structural number (SN)			3.907

	Thickness	Coeff.	SN
HMA layer 1	3 in	0.440	1.320
HMA layer 2	8 in	0.340	2.720
Structural number (SN)			4.040

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
2,000,000	7,500 psi	90%	0.45	4.2	2.5

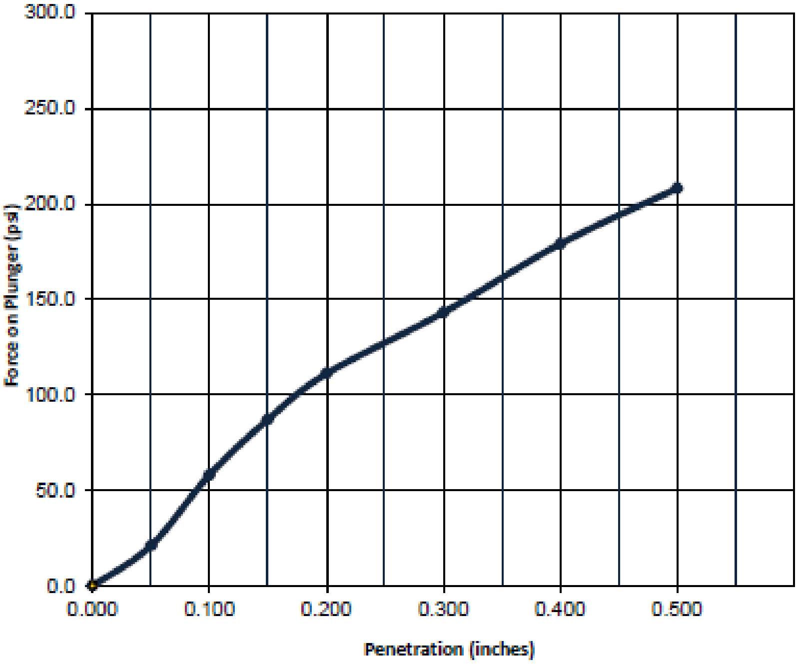
This report was prepared using Tensar+ (2.8.2)

Subsurface Exploration and Pavement Analysis Proposed New Streets Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector San Antonio, Texas	**Collector**	
	InTEC Project Number **S261012**	Date: 03/05/2026

InTEC of San Antonio

ASTM D-1883 California Bearing Ratio Test Report

Load Penetration Curve



CBR Results

Results	A	B	C	D	Average
0.1 in Pen.	5.8				
0.2 in Pen.	7.4				
Moisture (%)	13.20				
Density (pcf)	122.50				
Final Moisture (%)	21.30				
Final Density (pcf)	104.60				

		Sample Location	
Project Number	S261012		
Project Name	Guajolote Ranch	Specimen A	Vicinity of B-3
Date	3/2/2026		
Client	Lennar	Specimen C	
		Specimen D	
Job Ref.		Liquid Limit:	32.0
Sample Num.		Plastic Limit:	15.0
Remarks	Brown Clay, Marl, Caliche, Gravel		

Subsurface Exploration and Pavement Analysis
Proposed New Streets
Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector
San Antonio, Texas

CBR Test Results

InTEC Project Number
S261012

Date:
03/05/2026

Appendix

Subsurface Exploration and Pavement Analysis Proposed New Streets Guajolote Ranch Subdivision, Units 4, 5, 6, 7, 9, 10, 13, and Phase 4 Collector San Antonio, Texas	InTEC Project Number **S261012**	Date: 03/05/2026

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* *responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

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