Subsurface Exploration and Pavement Analysis
Proposed New Streets
Vida San Antonio, Phase 3, West-East & North-South
San Antonio, Texas

InTEC Project No. S261105
June 26, 2026

Southstar at Verano Developer, LLC
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June 26, 2026

Southstar at Verano Developer, LLC
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Attention: **Mr. Jim Vater**
Email: jim@southstartx.com

Re: Subsurface Exploration and Pavement Analysis
Proposed New Streets
Vida San Antonio, Phase 3, West-East & North-South
San Antonio, Texas

InTEC Project No. S261105

Ladies & Gentlemen:

Integrated Testing and Engineering Company of San Antonio (InTEC) has completed a **subsurface exploration and pavement thickness evaluation report** at the above referenced project site. The results of the exploration are presented in this 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 foundations explorations, and materials testing-quality control phase of construction, please call us.

Sincerely,
InTEC of San Antonio

STATE OF TEXAS
MURALI SUBRAMANIAM
102417
LICENSED
PROFESSIONAL ENGINEER
InTEC of SAN ANTONIO
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06/30/2026

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

EXECUTIVE SUMMARY

The soil conditions at the location of the **proposed new streets at Vida San Antonio, Phase 3, West-East & North-South in San Antonio, Texas** were obtained from **drilling six 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 primarily consist of dark brown clays, dark brown gravelly clays, brown sandy clays, dark brown sandy clays, tan sandy clays to gravelly clays, tan clayey gravel, tan sandy clays, and light tan marl with caliche and silty clay seams.

- Based on the results of the field exploration, laboratory testing, and engineering evaluation, the underlying clay soils are moderately to highly plastic. Potential vertical movements on the order of **2 to 3 ½ inches** are estimated under existing site conditions.

- Flexible pavement sections have been developed for the proposed Local and Collector streets based on a design CBR value of 3.0

- Cut and fill information was not available at the time of this evaluation. Accordingly, the pavement sections are based on the conservative assumption that the final pavement subgrade consists of clay soils. Pavement recommendations should be reviewed after street profiles and grading plans become available.

- If the final pavement subgrade differs significantly from the conditions encountered in the borings or from the assumptions used in this report, the recommendations should be reviewed by InTEC prior to construction.

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

- The long-term performance of the pavement system depends on proper drainage, moisture control, construction quality, and post-construction maintenance. Localized cracking and movement may still occur due to natural variations in subsurface conditions and moisture changes.

This summary is intended for general guidance only. Detailed descriptions, analyses, assumptions, and recommendations are provided in the body of this report and should be reviewed in their entirety. The conclusions and recommendations presented herein are based on the conditions encountered during this investigation. If site conditions, grading, or proposed improvements change, the recommendations should be reviewed 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 Type 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 repetitive or heavy truck traffic is anticipated, please contact InTEC for additional / revised pavement recommendations				

Summary Table B – Minimum Flexible Pavement Recommendations – CBR = 3.0**

Classification	Asphaltic Concrete Type D, Inches	Asphaltic Concrete Type B, Inches	Aggregate Base, Inches	Geogrid	Stabilized Subgrade, Inches	Structural Number
Local Type A (no bus traffic)	2.00	-	8.50	No	8*	2.55
	2.00	6.00	-	No	8*	3.40
Local Type A (with bus traffic)	3.00	-	12.50	No	8*	3.55
	3.00	-	10.50	Yes	8*	3.58
	3.00	6.00	-	No	8*	3.84
Local Type B	2.00	2.00	14.50	No	8*	4.43
	2.00	2.00	11.50	Yes	8*	4.40
	3.00	7.50	-	No	8*	4.51
Collector	2.00	2.00	16.50	No	8*	4.71
	2.00	2.00	14.00	Yes	8*	4.68
	3.00	8.00	-	No	8*	4.68

Design Notes

- Pavement sections are based on a **design CBR value of 3.0** and the design input parameters summarized in Summary Table A.
- Laboratory testing indicates the shallow clay soils are moderately to highly plastic. Potential vertical movement of approximately **2 to 3 ½ inches** is estimated at existing grade.
- Cut and fill information was not available at the time of this evaluation. Accordingly, the pavement sections are based on the conservative assumption that the final pavement subgrade consists of clay soils.
- The final pavement subgrade may consist of either clay or clayey sand, depending on the proposed grading. Street profiles and grading plans should be provided to InTEC so that the anticipated subgrade conditions and pavement recommendations can be refined, if appropriate.
- The recommended pavement sections are intended for the traffic classifications shown. If traffic loading or design parameters change, revised pavement recommendations should be obtained.
- Pavement performance depends on maintaining uniform support and minimizing moisture variations within the pavement support zone.

Subgrade and Fill Requirements:

- The final pavement subgrade shall be verified by InTEC during construction.
- Where the final pavement subgrade consists of clay (PI > 20), the upper 8 inches shall be stabilized.
- Where the final pavement subgrade consists of competent clayey sand or approved low-plasticity material (PI ≤ 20), subgrade stabilization is generally not required.

- Where fill is required to raise pavement grades:
  - Fill placed over competent clayey sand should have a Plasticity Index of 20 or less.
  - Fill placed over clay should provide engineering properties consistent with the design CBR assumptions used in this report.
  - **Where moderate- or high-plasticity clay fill is used beneath the pavement, placement of a thin layer of low-plasticity fill at the surface shall not eliminate the recommended subgrade stabilization requirements.**
- Where significant fill is proposed, InTEC should review the proposed fill material and final pavement subgrade conditions prior to construction.

Stabilization Requirements

- Lime stabilization is recommended. Cement may also be used to stabilize. If needed, cement series should be run to establish the application rate.
- Preliminary lime application rate: **6 percent** (approximately **37 lb/sy** for an 8-inch application depth).
- The material to be stabilized shall be tested for sulfate content prior to treatment. If sulfate concentrations exceed **3,000 ppm**, an alternate stabilization procedure shall be used.
- Field-mixed lime-stabilized subgrade shall achieve a minimum **unconfined compressive strength of 160 psi**.

Moisture Control

- During construction, water should not be allowed to infiltrate beneath the pavement structure.
- Aggregate base extending beyond the back of curb increases the potential for moisture intrusion beneath the pavement. A deeper curb section or compacted clay backfill against the curb is recommended to reduce water infiltration.
- Pavement distress commonly develops during home construction when construction traffic is combined with uncontrolled irrigation or rainfall beneath the pavement structure.

Materials

Geogrid

- One layer of geogrid meeting **City of San Antonio requirements**, TxDOT DMS 6240 Type 2 or better, shall be installed in accordance with the manufacturer's recommendations.

Aggregate Base

- TxDOT Item 247, Grade A, Type 2 aggregate base is recommended.

Asphalt

- Asphalt materials and construction shall comply with applicable City of San Antonio and/or Bexar County specifications.

Summary Table C – Summary of Pavement Materials

Pavement Section	Material	Stabilization or Treatment	Thickness	Installation
Subgrade	Clays	Stabilization (lime) Sulfate content should be tested prior to stabilization	As recommended in pavement options (8 inches)	As per applicable city or county guidelines
Base	TxDOT Item 247 A1-2	-	As recommended in pavement options (maximum of 6 inches per lift)	As per applicable city or county guidelines
Asphalt	Type B, D	-	As recommended in pavement options	As per applicable city or county guidelines
Geogrid	DMS 6240 Type 2 (City of SanAntonio)	-	One layer	As per manufacturer's recommendations

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 lift)	Item 107	As per construction specifications
Stabilized Subgrade	Item 108- lime	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

TABLE OF CONTENTS

INTRODUCTION

General

This report presents the results of our subsurface exploration and pavement evaluation for the proposed new streets at Vida San Antonio, Phase 3, West-East & North-South in San Antonio, Texas. The investigation was performed at the request of **Mr. Jim Vater** to evaluate the subsurface conditions and develop pavement design recommendations for the proposed development.

Purpose and Scope of Services

The purpose of this investigation was to evaluate the subsurface conditions at the site and provide geotechnical recommendations for pavement design and construction. The scope of services included:

1. Drilling and sampling six borings to depths of approximately 12 feet.
2. Evaluating subsurface soil conditions through field observations and penetration testing.
3. Observing groundwater conditions during drilling operations.
4. Performing laboratory testing, including moisture content, Atterberg limits, California Bearing Ratio (CBR), pH, lime series, and other tests as required to characterize the engineering properties of the soils.
5. Reviewing and evaluating the field and laboratory data, with modifications to the testing program as warranted by subsurface conditions encountered during the investigation.
6. Interpreting the subsurface conditions and developing engineering parameters for pavement design.
7. Estimating potential vertical movement of the near-surface soils.
8. Developing pavement design recommendations and construction guidelines.
9. Preparing this geotechnical engineering report for use by the project design team.

This investigation did not include evaluations of slope stability or environmental conditions, including the presence or absence of wetlands or hazardous materials in the soil, groundwater, surface water, or air. Any observations regarding unusual odors, colors, or other potentially suspect conditions made during the investigation are provided solely for the information of the Client and should not be interpreted as an environmental assessment.

Project Description

The proposed project consists of the construction of new Local Type A, Local Type B, and Collector streets within Vida San Antonio, Phase 3, West-East & North-South in San Antonio, Texas.

At the time of this evaluation:

- Street profiles, grading plans, and cut/fill information were not available. Accordingly, the pavement recommendations are based on the conservative assumption that the final pavement subgrade will consist primarily of clay and sandy clay soils having the engineering characteristics described in this report.

- Based on published geologic mapping and our experience from previous phases of this development, heavily cemented soils, caliche, chert, gravel, and isolated sandstone or marl may be encountered across the site.

- Aerial photographs, topographic mapping, geologic mapping, and the boring location plan are included in the Illustrations section of this report.

SUBSURFACE EXPLORATION

Scope

The subsurface exploration included a site reconnaissance, drilling and sampling of the borings, field penetration testing, and laboratory testing of selected soil samples to evaluate the engineering characteristics of the subsurface materials.

Six borings were drilled at selected locations within the proposed street alignments to depths of 12 feet below existing ground surface. Approximate boring locations are shown on the Boring Location Plan in the Illustrations section of this report. Boring locations were selected by the geotechnical engineer and established in the field by the drilling crew using conventional measuring methods.

Drilling and Sampling

The borings were advanced using a truck-mounted rotary drilling rig equipped with solid-stem augers. Representative soil samples were obtained using split-barrel sampling procedures. The recovered samples were identified by boring number and depth, sealed to minimize moisture loss, and transported to our laboratory for classification and testing.

Field Testing and Groundwater Observations

Standard Penetration Tests (SPT) were performed in selected borings in conjunction with split-barrel sampling. The measured penetration resistance provides information regarding the relative consistency, density, and engineering characteristics of the subsurface materials.

Groundwater was not encountered during drilling. Groundwater conditions may vary seasonally and may be influenced by rainfall, site drainage, and future construction activities. Consequently, the absence of groundwater during this investigation should not be interpreted as indicating that groundwater will not be encountered during construction.

Boring Logs

A field log was prepared for each boring documenting the drilling operations, sampling, soil descriptions, penetration test results, and groundwater observations. The boring logs also include the geotechnical engineer's interpretation of the subsurface conditions between sample intervals based on the information obtained during drilling.

Final boring logs are presented in the Illustrations section of this report. A legend describing the symbols and terminology used on the logs is also included.

LABORATORY TESTING PROGRAM

Purpose

Laboratory testing was performed on selected soil samples to determine the engineering properties of the subsurface materials and to provide design parameters for the pavement evaluation.

Laboratory Testing

Laboratory testing was performed in general accordance with the applicable ASTM standards summarized 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
pH	ASTM D 6276
Unconfined Compressive Strength	ASTM D 5102

Each sample was visually examined and classified by a geotechnical engineer. Representative specimens were tested to determine natural moisture content, Atterberg Limits, California Bearing Ratio (CBR), pH, and other engineering properties as required for this evaluation.

Presentation of Data

The laboratory test results are presented on the appropriate boring logs and in the applicable summary tables. The results were used to classify the soils generally in accordance with the Unified Soil Classification System (ASTM D2487) and to develop the geotechnical recommendations presented in this report.

GENERAL SUBSURFACE CONDITIONS

Soil Stratigraphy

The subsurface conditions encountered during this investigation generally consist of dark brown clays, dark brown gravelly clays, brown sandy clays, dark brown sandy clays, tan sandy clays to gravelly clays, tan clayey gravel, tan sandy clays, and light tan marl. Based on the borings, the site generally consists of two to three geologic strata having similar engineering characteristics. The approximate stratification and laboratory test results are presented on the Boring Logs in the Illustrations section of this report.

The underlying soils exhibit **Liquid Limit values ranging from 24 to 57** and **Plasticity Index values ranging from 10 to 38**. Standard Penetration Test (SPT) values ranged from **08 to greater than 50 blows per foot**, indicating a wide range of soil consistency and weathering conditions.

The generalized subsurface profile is intended to describe the predominant conditions encountered during this investigation. Actual subsurface conditions may vary between boring locations and during construction. If conditions encountered differ significantly from those described herein, InTEC should be notified so that the recommendations presented in this report may be reviewed.

Groundwater Observations

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

Groundwater conditions may vary seasonally and are influenced by rainfall, site drainage, grading activities, and changes in land use. Because this investigation represents only a short-term observation, groundwater may be encountered during construction even though it was not observed during drilling. In addition, temporary perched water may develop above relatively low-permeability soil layers following periods of rainfall.

PAVEMENTS ON EXPANSIVE SOIL

General

Expansive clay soils are common throughout Central and South Texas and are one of the primary geotechnical considerations affecting pavement performance. These soils undergo volume changes as their moisture content changes, swelling when wetted and shrinking upon drying. Differential soil movements may contribute to pavement cracking, distortion, loss of support, and increased maintenance requirements.

The pavement recommendations presented in this report are intended to reduce the effects of expansive soil movements by providing adequate pavement support and appropriate subgrade preparation. However, no practical pavement design can completely eliminate movements associated with expansive soils.

Site Conditions

Laboratory testing indicates that the underlying clay soils are moderately to highly plastic. Estimated potential vertical movements at existing grade are approximately **2 to 3 ½ inches**.

Because street profiles and grading information were not available during this investigation, the pavement sections were developed assuming a conservative clay subgrade having a design CBR of 3.0. Final pavement subgrade conditions should be verified during construction and the recommendations reviewed if significant deviations from the assumed conditions are encountered.

Factors Affecting Pavement Performance

Long-term pavement performance is influenced by numerous factors beyond pavement thickness, including:

- grading and earthwork operations;
- moisture variations within the active zone;
- drainage and surface runoff;
- utility trench construction and backfill quality;
- construction quality and compaction;
- landscaping and irrigation practices;

- long-term maintenance.

Proper drainage, moisture control, and construction practices are essential to achieving satisfactory pavement performance.

See Appendix A for additional discussion regarding expansive soils and factors affecting pavement performance.

DESIGN ENGINEERING ANALYSIS

Pavement Design Considerations

The pavement recommendations presented in this report are based on the results of the field exploration, laboratory testing, and the project information available at the time of this evaluation. The following conditions are considered significant to pavement design and long-term pavement performance:

1. The site is underlain by moderately to highly plastic clay soils. The engineering characteristics of these materials differ significantly with respect to strength, compressibility, and moisture-induced volume change.

2. The recommended pavement sections are based on the anticipated pavement subgrade soils represented by a design CBR value of 3.0.

3. Street profiles, grading plans, and utility layouts were not available during this investigation. Consequently, the final pavement support conditions cannot be fully evaluated at this time. Depending on the proposed grading, the final pavement subgrade may consist of clay, or compacted fill.

4. Groundwater was not encountered during drilling. However, groundwater and moisture conditions may vary seasonally and may be influenced by rainfall, grading activities, drainage patterns, irrigation, and utility leakage.

Factors Affecting Long-Term Pavement Performance

The long-term performance of the proposed pavements will depend on considerably more than the structural capacity of the recommended pavement section. The engineering characteristics of the pavement support zone will be influenced by the combination of natural soils, grading operations, utility construction, and moisture conditions that exist following development.

Based on the borings, both expansive clay soils and clayey sand are present beneath the site. During construction, these materials may be excavated, mixed, or covered by compacted fill. In addition, the pavement support zone will likely contain utility trenches for sanitary sewer, water, storm drainage (where applicable), and individual service connections. Each of these features introduces materials having different engineering properties, moisture characteristics, and long-term performance.

Consequently, the completed pavement will likely be supported by a composite soil profile consisting of varying combinations of native clay, marl, compacted fill, and utility trench backfill rather than a single uniform material. Differential movement should therefore be anticipated to some degree over the service life of the pavement.

The recommendations presented in this report are intended to reduce the magnitude of anticipated movements by providing appropriate pavement sections, subgrade preparation, and construction guidelines. However, no practical pavement design can completely eliminate differential movement where multiple soil types, fill materials, utility trenches, and moisture variations exist beneath the pavement. Significant reduction of movement would require treatment or modification of a much larger portion of the pavement support zone than is typically practical or economically feasible for residential street construction.

Accordingly, satisfactory pavement performance depends not only on the recommended pavement section but also on proper earthwork operations, utility trench construction, compaction, drainage, moisture control, and construction quality throughout development.

PAVEMENT GUIDELINES

General

The proposed pavement areas include Local and Collector streets. The following recommendations are provided as guidelines for pavement design and should be used in conjunction with the construction recommendations presented later in this report.

The recommendations are based on:

- applicable City of San Antonio design criteria;
- the subsurface conditions encountered during this investigation;
- laboratory testing performed on representative soil samples;
- InTEC's experience with similar soil conditions throughout Central and South Texas; and
- the assumption that proper drainage and moisture control will be maintained during construction and throughout the service life of the pavement.

Pavement Design

The recommended pavement sections provide sufficient structural thickness to distribute traffic loads to the underlying subgrade without exceeding its support capacity. The pavement designs are based primarily on the strength characteristics of the supporting soils, represented by the design CBR value, and are not intended to eliminate movements associated with expansive soils.

Accordingly, pavements that are structurally adequate may still experience cracking, distortion, or localized settlement resulting from shrink-swell movements, differential support conditions, utility trench construction, or moisture variations within the pavement support zone.

If traffic loading, street classification, or design parameters differ from those used in this evaluation, InTEC should be contacted to provide revised pavement recommendations.

Performance Considerations

Field observations indicate that long-term pavement performance is influenced by considerably more than pavement thickness alone. The following factors have consistently been observed to significantly affect pavement performance:

- Earthwork operations, including cut and fill, often have a greater influence on pavement performance than the natural soil profile encountered during the subsurface investigation.
- Utility trench backfill quality often has a greater influence on pavement performance than the pavement section itself.
- Pavements supported by relatively uniform subgrade conditions generally perform better than pavements underlain by alternating clay, marl, compacted fill, and utility trench backfill.
- The majority of pavement distress observed over expansive soils results from changes in subgrade moisture conditions or prolonged saturation of the base layer, which reduce subgrade support and contribute to differential movement.
- Pavements constructed with minimum longitudinal grades of approximately one percent or greater generally perform better because improved drainage reduces surface ponding and moisture infiltration.
- Pavements constructed without underlying utility trenches generally perform better because trench backfill often creates preferential moisture pathways and localized zones of differential support.
- Pavements constructed slightly above adjacent lots generally perform better due to improved drainage and reduced edge moisture infiltration from landscaping and irrigation.
- Any design or construction practice that minimizes surface, edge, or subsurface moisture infiltration into the pavement structure will improve long-term pavement performance.

Alligator Cracking

Alligator cracking is commonly associated with localized loss of pavement support. A layer of aggregate base is typically placed beneath concrete curbs and can provide a pathway for water infiltration, particularly through curb joints, pavement cracks, or adjacent landscaped areas. Construction traffic acting on softened support conditions frequently accelerates this type of distress.

Embedding the curb a minimum of 6 inches into the compacted subgrade helps reduce edge infiltration. Where appropriate, perimeter drainage measures such as French drains may further reduce moisture accumulation adjacent to the pavement. Localized alligator cracking may also result from weak or inadequately compacted subgrade or utility trench backfill.

Longitudinal Cracking

In expansive clay areas, asphalt pavements commonly develop longitudinal cracks approximately 1 to 4 feet inside the pavement edge. These cracks are primarily caused by differential shrinkage and swelling of the underlying soils resulting from moisture variations near the pavement edge.

Reducing moisture fluctuations beneath the pavement through proper drainage, moisture barriers, edge sealing, sidewalks, or other moisture-control measures can reduce the potential for longitudinal and reflective cracking.

Periodic Maintenance

Pavements constructed over expansive soils require periodic maintenance throughout their service life.

Recommended maintenance includes:

- sealing pavement cracks promptly to minimize moisture infiltration;
- maintaining positive drainage away from the pavement;
- preventing prolonged ponding adjacent to pavement edges; and
- repairing localized failures before they expand into larger distressed areas.

Pavement Sections

Flexible pavement sections are recommended for the proposed Local and Collector streets.

Because street profiles and grading information were not available during this investigation, the pavement sections are based on the conservative assumption that the final pavement subgrade consists of clay soils having a design CBR value of **3.0**. Once grading information becomes available, InTEC should review the proposed street profiles to determine whether portions of the project may be supported on competent marl or other materials that warrant revised pavement recommendations.

Minimum recommended pavement sections are presented in **Summary Table B (Table No. 2)**. The design input parameters used for the pavement calculations are summarized in **Summary Table A (Table No. 3)**.

Table No. 2 – Minimum Flexible Pavement Recommendations – CBR = 3.0**

Classification	Asphaltic Concrete Type D, Inches	Asphaltic Concrete Type B, Inches	Aggregate Base, Inches	Geogrid	Stabilized Subgrade, Inches	Structural Number
Local Type A (no bus traffic)	2.00	-	8.50	No	8*	2.55
	2.00	6.00	-	No	8*	3.40
Local Type A (with bus traffic)	3.00	-	12.50	No	8*	3.55
	3.00	-	10.50	Yes	8*	3.58
	3.00	6.00	-	No	8*	3.84
Local Type B	2.00	2.00	14.50	No	8*	4.43
	2.00	2.00	11.50	Yes	8*	4.40
	3.00	7.50	-	No	8*	4.51
Collector	2.00	2.00	16.50	No	8*	4.71
	2.00	2.00	14.00	Yes	8*	4.68
	3.00	8.00	-	No	8*	4.68

Design Notes

- Pavement sections are based on a **design CBR value of 3.0** and the design input parameters summarized in Summary Table A.
- Laboratory testing indicates the shallow clay soils are moderately to highly plastic. Potential vertical movement of approximately **2 to 3 ½ inches** is estimated at existing grade.
- Cut and fill information was not available at the time of this evaluation. Accordingly, the pavement sections are based on the conservative assumption that the final pavement subgrade consists of clay soils.
- The final pavement subgrade may consist of either clay or clayey sand, depending on the proposed grading. Street profiles and grading plans should be provided to InTEC so that the anticipated subgrade conditions and pavement recommendations can be refined, if appropriate.
- The recommended pavement sections are intended for the traffic classifications shown. If traffic loading or design parameters change, revised pavement recommendations should be obtained.
- Pavement performance depends on maintaining uniform support and minimizing moisture variations within the pavement support zone.

Subgrade and Fill Requirements:

- The final pavement subgrade shall be verified by InTEC during construction.
- Where the final pavement subgrade consists of clay (PI > 20), the upper 8 inches shall be stabilized.

- Where the final pavement subgrade consists of competent clayey sand or approved low-plasticity material (PI ≤ 20), subgrade stabilization is generally not required.

- Where fill is required to raise pavement grades:

    - Fill placed over competent clayey sand should have a Plasticity Index of 20 or less.

    - Fill placed over clay should provide engineering properties consistent with the design CBR assumptions used in this report.

    - **Where moderate- or high-plasticity clay fill is used beneath the pavement, placement of a thin layer of low-plasticity fill at the surface shall not eliminate the recommended subgrade stabilization requirements.**

- Where significant fill is proposed, InTEC should review the proposed fill material and final pavement subgrade conditions prior to construction.

Stabilization Requirements

- Lime stabilization is recommended. Cement may also be used to stabilize. If needed, cement series should be run to establish the application rate.
- Preliminary lime application rate: **6 percent** (approximately **37 lb/sy** for an 8-inch application depth).
- The material to be stabilized shall be tested for sulfate content prior to treatment. If sulfate concentrations exceed **3,000 ppm**, an alternate stabilization procedure shall be used.
- Field-mixed lime-stabilized subgrade shall achieve a minimum **unconfined compressive strength of 160 psi**.

Moisture Control

- During construction, water should not be allowed to infiltrate beneath the pavement structure.
- Aggregate base extending beyond the back of curb increases the potential for moisture intrusion beneath the pavement. A deeper curb section or compacted clay backfill against the curb is recommended to reduce water infiltration.
- Pavement distress commonly develops during home construction when construction traffic is combined with uncontrolled irrigation or rainfall beneath the pavement structure.

Materials

Geogrid

- One layer of geogrid meeting **City of San Antonio requirements**, TxDOT DMS 6240 Type 2 or better, shall be installed in accordance with the manufacturer's recommendations.

Aggregate Base

- TxDOT Item 247, Grade A, Type 2 aggregate base is recommended.

Asphalt

- Asphalt materials and construction shall comply with applicable City of San Antonio and/or Bexar County specifications.

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

	Local Type A (no bus traffic)	**Local Type A** (with bus traffic)	**Local Type 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 repetitive or heavy truck traffic is anticipated, please contact InTEC for additional / revised pavement recommendations				

CONSTRUCTION GUIDELINES

Construction Monitoring

The following recommendations supplement applicable City of San Antonio, Bexar County, and TxDOT specifications and should be incorporated into the project quality control program.

The long-term performance of the pavement depends on the final pavement support conditions established during construction, including the supporting soils, fill materials, utility trench backfill, drainage, and moisture control.

InTEC should be notified prior to construction so that earthwork, subgrade preparation, pavement construction, and quality control testing can be coordinated.

Site Preparation

Vegetation, organic material, existing pavement, and other unsuitable materials shall be removed from pavement areas. The exposed subgrade shall be proof-rolled and evaluated by InTEC prior to placement of fill, stabilization, or base materials.

Soft, unstable, or pumping areas shall be undercut, replaced with approved material, and recompacted.

Prepared subgrade should be protected from drying, excessive wetting, construction traffic, and disturbance until covered by subsequent pavement layers.

Temporary drainage shall be maintained throughout construction to prevent ponding and deterioration of the prepared subgrade.

Proof Rolling

Proof rolling shall be performed using a 25-ton pneumatic roller (approximately 90 psi tire pressure) or other equipment approved by the geotechnical engineer.

- Proof rolling shall be observed by InTEC.
- Soft or unstable areas shall be undercut and repaired.
- Repaired areas shall be proof rolled and tested prior to placement of subsequent pavement layers.

Fill Placement

Approved fill shall be placed in uniform lifts not exceeding 8 inches (loose) and compacted in accordance with the recommendations presented herein.

Where cut and fill operations are performed, the final pavement support conditions should be reviewed by InTEC. Fill materials shall be compatible with the design assumptions used for the pavement recommendations.

Where fill depths exceed approximately 4 feet, the potential for long-term settlement should be evaluated.

Expansive Clay Fill (PI > 20)

- Compact to at least 95 percent of the maximum dry density (ASTM D698).
- Moisture condition between optimum and +3 percent of optimum.
- These criteria apply throughout the fill depth to reduce post-construction shrink-swell movements.

Low-Plasticity Fill (PI ≤ 20)

- Fill depths up to 10 feet: compact to at least 98 percent of maximum dry density.
- Fill depths greater than 10 feet: compact to at least 100 percent of maximum dry density within ±2 percent of optimum moisture.

General fill shall be placed in lifts not exceeding 8 inches (loose). Culvert crossings and deep backfill areas should receive the same level of compaction control to minimize post-construction settlement.

Subgrade Stabilization

Where required, lime stabilization shall be performed in accordance with the recommendations presented in this report.

Prior to stabilization:

- verify sulfate concentrations;
- confirm application rates;

- verify mixing depth; and
- verify moisture conditioning.

Field-mixed stabilized subgrade shall achieve the specified minimum unconfined compressive strength.

Lime should not be mixed into excessively wet and stabilization operations should be suspended during periods of significant rainfall.

Aggregate Base

Aggregate base shall conform to TxDOT Item 247, Grade A, Type 2 (or governing agency requirements).

The base shall be placed on an approved subgrade, moisture conditioned near optimum, and compacted to the required density before asphalt placement.

Construction traffic should be minimized on completed base wherever practical.

Asphaltic Concrete

Asphalt materials and construction shall comply with applicable City of San Antonio, Bexar County, and TxDOT specifications.

Proper placement temperature, lift thickness, compaction, and joint construction should be maintained throughout paving operations.

Surface drainage should be established immediately following paving to minimize moisture infiltration beneath the pavement.

Perimeter Drainage

Positive drainage shall be maintained adjacent to all pavement areas.

Curbs extending at least 6 inches into the compacted subgrade are recommended to reduce edge infiltration. Flexible sealant should be placed at asphalt-to-concrete interfaces.

Where significant grade transitions or chronic moisture conditions exist, subsurface drainage systems should be considered to intercept infiltrating water before it reaches the pavement support zone.

Groundwater and Moisture Control

Groundwater was not encountered during drilling; however, seepage and perched water may be encountered during construction, particularly following rainfall.

Prepared subgrade and base materials shall not be allowed to become saturated.

Standing water shall be removed, affected areas allowed to dry, and the subgrade or base re-evaluated prior to paving.

Construction Slopes

Temporary excavations, fill slopes, and permanent slopes should comply with applicable safety requirements and provide positive drainage.

Permanent slopes should generally not exceed 3H:1V unless supported by project-specific engineering analyses.

Culvert Crossings and Rigid Concrete Appurtenances

Areas adjacent to culverts, concrete swales, inlets, headwalls, and other rigid concrete structures are common locations for localized pavement distress. Differential settlement of culvert backfill, differences in support stiffness, and moisture infiltration along asphalt-to-concrete interfaces frequently contribute to reflective cracking and localized pavement deformation.

Accordingly:

- Compaction of culvert backfill should receive special attention during construction.
- Asphalt-to-concrete interfaces should be sealed to minimize moisture infiltration.
- Localized cracking adjacent to culverts and other rigid concrete structures should be anticipated and repaired as part of normal pavement maintenance.

Construction Monitoring and Quality Control

Construction monitoring should include verification of:

- site preparation;
- proof rolling;
- fill placement and compaction;
- subgrade stabilization;
- aggregate base placement;
- asphalt paving; and
- moisture conditions throughout construction.

Compaction testing should be performed in accordance with project specifications and governing agency requirements. Areas failing to satisfy the specified criteria shall be reworked and retested before additional construction proceeds.

Construction After Rainfall

Following significant rainfall events, previously approved subgrade and base materials should be re-evaluated prior to paving.

Rainfall may soften, erode, or otherwise disturb pavement support layers, particularly near pavement edges, utility trenches, and low areas.

Areas exhibiting pumping, rutting, erosion, or softening shall be repaired, recompacted, and approved by InTEC before construction resumes.

DRAINAGE AND MAINTENANCE

Proper drainage and long-term moisture management are essential to satisfactory pavement performance, particularly where expansive clay soils are present. The objective of drainage is not simply to remove surface water but to minimize moisture variations within the pavement support soils. Changes in moisture conditions beneath the pavement may result in differential movement, edge distress, cracking, and reduced pavement support.

Surface Drainage

Surface drainage should be maintained so that rainfall and irrigation water are rapidly removed from pavement surfaces and adjacent areas.

- Pavements should be constructed with positive drainage to prevent ponding.
- Depressions that retain water should be corrected promptly.
- Surface runoff should be directed away from pavement edges wherever practical.
- Drainage patterns established during construction should not be altered in a manner that allows water to collect adjacent to the pavement.

Edge Protection

Moisture infiltration commonly occurs along pavement edges where asphalt interfaces with concrete curbs, driveways, sidewalks, or landscaped areas.

To reduce moisture infiltration:

- curbs should extend into the compacted subgrade in accordance with project requirements;
- asphalt-to-concrete interfaces should be properly sealed;
- positive grading should be maintained behind curbs; and
- prolonged ponding adjacent to pavement edges should be avoided.

Particular attention should be given to transition zones, including utility crossings, culverts, pavement edges, and areas adjacent to rigid concrete structures, as these locations are more susceptible to moisture intrusion and localized pavement distress.

Utility Trenches

Utility trenches often become preferential pathways for water movement beneath pavements and are common locations for localized settlement and cracking.

Accordingly:

- utility trench backfill should be compacted in accordance with the requirements of the governing agency;
- utility trenches should be protected from excessive water infiltration during construction; and
- localized settlement should be repaired promptly to minimize progressive pavement deterioration.

Long-Term Maintenance

Routine maintenance is an essential component of long-term pavement performance.

Recommended maintenance includes:

- maintaining positive surface drainage;
- inspecting pavement surfaces periodically for cracking;
- sealing cracks to minimize moisture infiltration;
- maintaining drainage facilities in proper working condition;
- avoiding excessive irrigation adjacent to pavement edges; and
- repairing localized pavement distress before deterioration becomes widespread.
- The recommendations presented in this report assume that proper drainage and routine maintenance will be provided throughout the service life of the pavement. Alteration of drainage patterns, prolonged ponding, excessive irrigation, leaking utilities, or inadequate maintenance may significantly increase pavement movements and reduce pavement service life.

LIMITATIONS

The analyses and recommendations presented in this report are based on information obtained from **six borings** drilled at the project site, laboratory testing performed on selected soil samples, and the project information available at the time of this evaluation. Subsurface conditions may vary between boring locations and may change over time. Consequently, conditions encountered during construction may differ from those described in this report.

The pavement recommendations are based on the subsurface conditions encountered during this investigation and the design assumptions described herein. Because street profiles, grading plans, and utility layouts were not available at the time of this evaluation, the recommendations should be reviewed after these become available and verified during construction. If conditions encountered during construction differ significantly from those assumed in this report, InTEC should be notified promptly so that the recommendations can be evaluated and revised, if necessary.

The engineering characteristics of the final pavement support conditions will be influenced not only by the natural subsurface soils but also by grading operations, fill placement, utility trench construction, drainage, and construction quality. Consequently, satisfactory pavement performance depends upon proper implementation of the recommendations presented herein together with appropriate construction practices and long-term maintenance.

The data, analyses, and interpretations presented in this report represent the professional judgment of InTEC based on limited subsurface exploration and the information available at the time of this investigation. They should not be interpreted as an exact representation of all subsurface conditions across the site.

This report is not intended to establish construction means, methods, sequencing, equipment selection, or contractor scheduling. Use of this report for bidding, cost estimating, or purposes other than those specifically stated herein is at the sole risk of the user.

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

- proposed grading or pavement design is modified;
- drainage patterns or site use are changed;

- significant cut or fill operations differ from those assumed during this evaluation;
- utility layouts or construction methods differ substantially from those anticipated; or
- a substantial period of time elapses between the field exploration and construction.

The findings, conclusions, and recommendations presented in this report are consistent with the standard of care ordinarily exercised by geotechnical engineers practicing under similar conditions in this region. No other warranty, either express or implied, is intended or should be inferred.

This report has been prepared exclusively for **Southstar at Verano Developer, LLC** for pavement thickness evaluation for the **proposed new streets at Vida San Antonio, Phase 3, West-East & North-South in San Antonio, Texas.** It should not be relied upon by others for purposes other than those specifically described herein without written authorization from InTEC.

APPENDIX A - PAVEMENTS ON EXPANSIVE SOILS

General

Expansive clay soils are common throughout Central and South Texas and represent one of the primary geotechnical factors influencing long-term pavement performance. These soils undergo volume changes in response to changes in moisture content, swelling as they become wetter and shrinking as they dry. Differential movements associated with these moisture changes can contribute to pavement cracking, distortion, loss of support, and increased maintenance requirements.

The recommendations presented in this report are intended to reduce the effects of expansive soil movements by providing adequate pavement support and appropriate subgrade preparation. However, no practical pavement design can completely eliminate movements associated with expansive soils. Long-term pavement performance depends on the interaction of the subsurface soils, earthwork operations, drainage, construction quality, and post-construction maintenance.

Shrink-Swell Behavior

The volume change behavior of expansive soils is governed primarily by changes in moisture content within the active zone. As water enters the soil profile, expansive clay minerals absorb water and the soil increases in volume. Conversely, as the soil dries, moisture is lost and the soil contracts.

The magnitude of movement depends on several factors, including:

- soil mineralogy and plasticity;
- initial moisture condition;
- magnitude of moisture variation;
- thickness of the active zone;
- surcharge loading; and
- environmental conditions.

Laboratory index properties such as the Liquid Limit, Plasticity Index, and shrink-swell testing provide an indication of the relative expansion potential; however, the actual field performance is strongly influenced by moisture changes occurring after construction.

Earthwork and Grading

Earthwork operations frequently have a greater influence on long-term pavement performance than the laboratory properties of the natural soils. Excavation, fill placement, borrow material selection, utility trench construction, and compaction practices modify the pavement support zone and directly influence pavement behavior.

The final pavement support conditions may differ significantly from the natural soil profile encountered during the subsurface investigation. Consequently, pavement performance depends not only on the design recommendations presented in this report but also on proper earthwork construction and verification during construction.

Where fill is placed beneath proposed pavements, the engineering characteristics of the completed fill mass should be considered in evaluating pavement support conditions. The behavior of the pavement system is governed by the overall support zone rather than solely by the characteristics of the uppermost lift.

Transition Zones

One of the most common locations for localized pavement distress is at **transition zones**, where the pavement support conditions change abruptly. These locations typically have different engineering properties, stiffness, moisture characteristics, or settlement potential than the surrounding pavement support materials.

Examples include:

- transitions between cut and fill;
- transitions between clay and marl;
- utility trenches and service line crossings;
- culvert crossings and storm drainage structures;
- concrete swales, inlets, and other rigid concrete appurtenances;
- pavement adjacent to curbs and curb returns; and
- areas where different fill materials have been placed.

These transition zones frequently experience greater differential movement than adjacent pavement areas and, consequently, are more susceptible to localized settlement, reflective cracking, longitudinal cracking, and moisture-related distress.

Although proper construction practices can reduce the magnitude of these movements, they cannot completely eliminate the differences in engineering behavior between adjacent materials. Accordingly, localized pavement distress should be anticipated at transition zones, and these areas typically require greater construction attention and more frequent maintenance during the service life of the pavement.

Moisture Variation

Moisture variations within the pavement support zone are among the most significant factors affecting pavement performance.

Moisture changes may result from:

- seasonal wetting and drying cycles;
- surface ponding;
- inadequate drainage;
- irrigation;
- leaking utilities;
- utility trenches;
- changes in grading; and
- adjacent landscaping.

Although pavement surfaces reduce direct infiltration, water frequently enters the pavement structure through joints, cracks, pavement edges, utility trenches, and disturbed areas. Once beneath the pavement, changes in moisture content may produce differential swelling or shrinkage of the supporting soils.

Proper drainage should be maintained throughout construction and the service life of the pavement.

Utility Trenches

Utility installations are commonly located beneath streets and typically require excavation and backfilling using a combination of granular bedding, select backfill, and compacted native materials.

Utility trenches may influence pavement performance by:

- creating zones having engineering properties different from the surrounding soils;
- providing preferential pathways for water migration;
- concentrating moisture beneath the pavement; and
- producing settlement if the trench backfill is inadequately compacted.

Careful construction, compaction, and moisture control of utility trench backfill are essential for satisfactory long-term pavement performance.

Vegetation and Drainage

Existing vegetation, particularly mature trees, may significantly influence subsurface moisture conditions prior to construction through moisture extraction from the soil profile.

Following construction, irrigation systems, landscaping, altered drainage patterns, and new vegetation may also affect moisture conditions beneath the pavement. Proper grading and positive drainage should be maintained to minimize excessive moisture fluctuations within the pavement support zone.

Construction Quality

The long-term performance of a pavement system depends on much more than the pavement thickness alone. Construction quality plays a critical role in achieving the intended pavement performance.

Important construction considerations include:

- proper proof rolling of the subgrade;
- identification and correction of unstable areas;
- proper placement and compaction of fill;
- verification of subgrade stabilization;

- proper placement and compaction of aggregate base;
- control of moisture during construction; and
- preventing water infiltration beneath the pavement structure.

Verification during construction provides an opportunity to confirm that the assumptions used in the pavement design remain valid.

Pavement Performance During Home Construction

For residential developments, the period between pavement construction and completion of the homes is often the most critical stage in the pavement's service life. **The greatest risk of pavement distress frequently occurs during home construction rather than after the subdivision is occupied.** During this period, pavement distress commonly results from a combination of construction activities and moisture variations rather than deficiencies in the pavement design itself.

Factors contributing to pavement distress during home construction include:

- repetitive heavy construction traffic that exceeds the anticipated residential traffic loading;
- rainfall, irrigation, and construction water infiltrating beneath the pavement structure;
- incomplete drainage systems and unfinished lot grading;
- curb openings and disturbed pavement edges that allow water to infiltrate beneath the pavement;
- disturbed shoulders adjacent to the pavement that promote moisture infiltration;
- utility installations, repairs, and trench backfilling within or adjacent to the pavement; and
- incomplete landscaping and erosion control measures that allow uncontrolled surface runoff.

Water entering beneath the pavement through pavement edges, utility trenches, disturbed shoulders, or other construction-related openings may soften the supporting soils and contribute to differential swelling, loss of support, and localized pavement distress. The combination of reduced subgrade support and repeated construction traffic can accelerate pavement deterioration before the streets are placed into normal residential service.

Accordingly, protecting the pavement during home construction is as important as proper pavement design. Maintaining positive drainage, minimizing water infiltration beneath the pavement, promptly repairing utility trenches, properly compacting disturbed areas, and controlling construction traffic can significantly improve long-term pavement performance. **Because pavement distress caused during home construction may not become fully visible until after the subdivision is occupied, preventing moisture intrusion and protecting the pavement throughout construction are essential to long-term pavement performance.**

Long-Term Performance

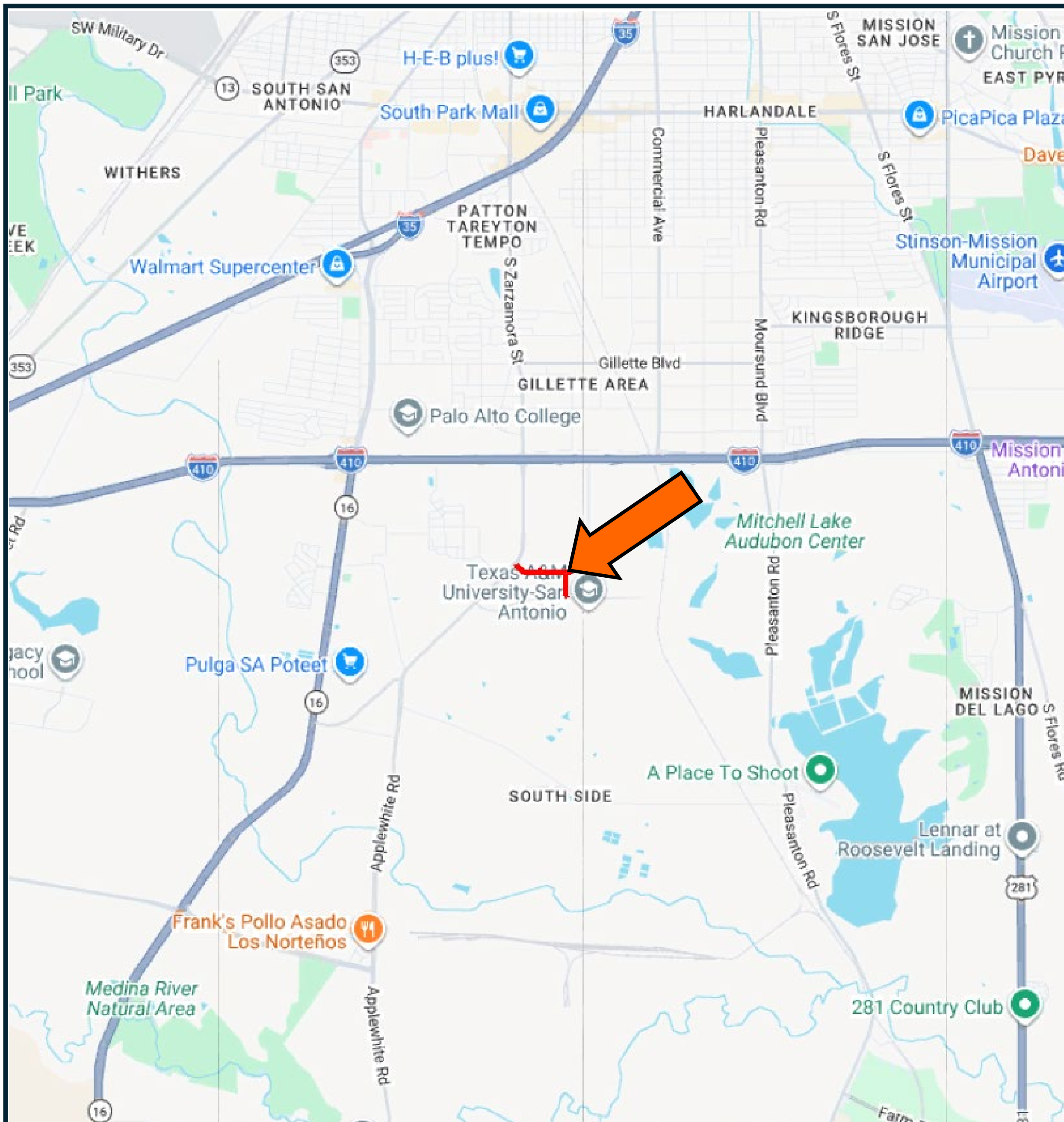
The recommendations presented in this report are based on the subsurface conditions encountered during this investigation and accepted geotechnical engineering practice. Pavement performance is influenced by numerous interacting factors, including subsurface conditions, earthwork, drainage, construction quality, traffic loading, utility installations, and long-term maintenance.

When properly designed, constructed, and maintained, the recommended pavement sections are expected to provide satisfactory performance. Nevertheless, some cracking, differential movement, and maintenance should be anticipated over the service life of the pavement due to the natural variability of subsurface conditions and moisture-related soil movements.

Illustration Section

Description	Plate No.
Vicinity Map	Plate 1A
Aerial Map	Plate 1B
Topographic Map	Plate 1C
Geologic Map	Plate 1D
Soil Map	Plate 1E
Approximate Boring Locations	Plate 1F
Boring Logs	Plates 2 – 7
Keys to Classifications and Symbols	Plate 8
Calculations	Plates 9 – 221
Information on Geotechnical Report	Appendix

Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	InTEC Project Number **S261105**	Date: 04/21/2026

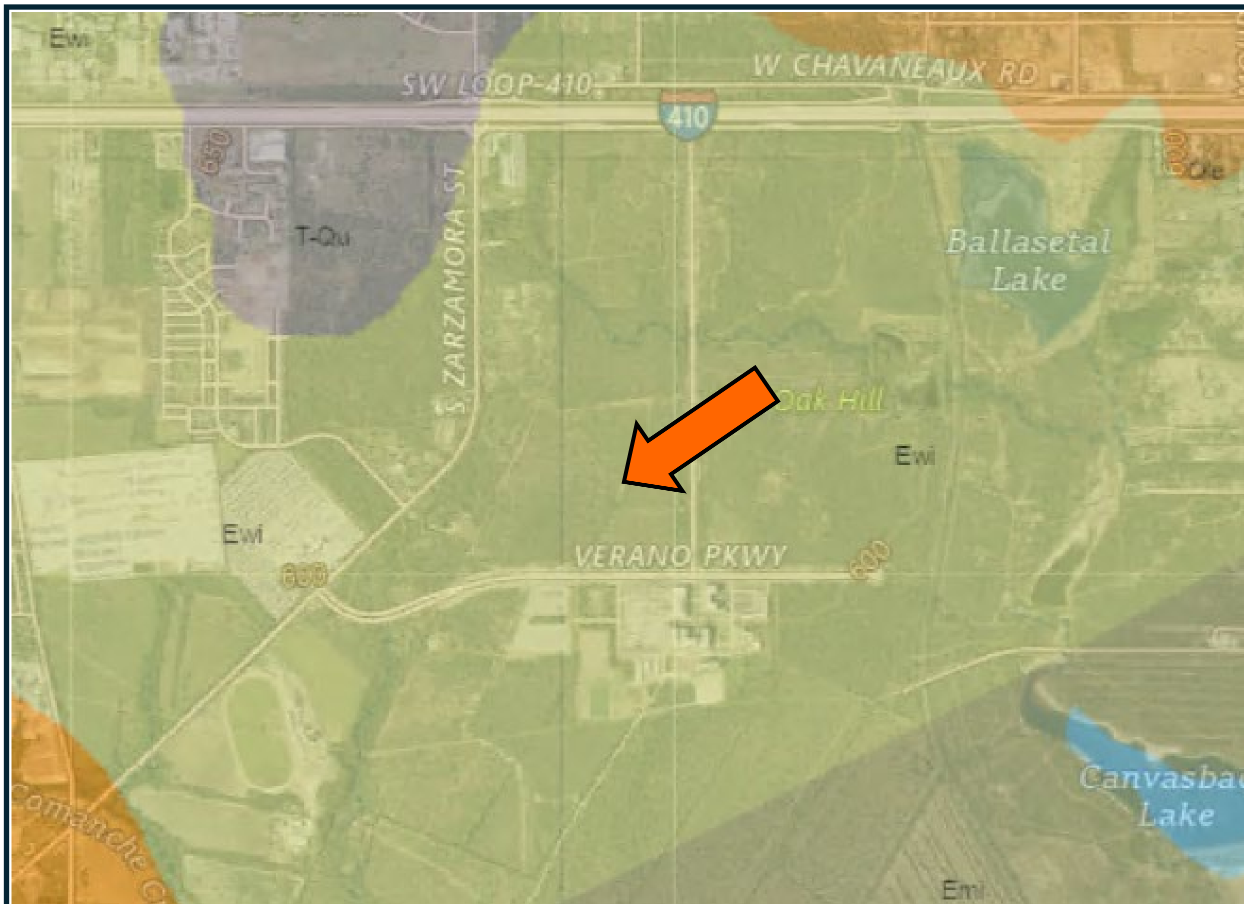


Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Vicinity Map**	
	InTEC Project Number **S261105**	Date: 04/21/2026

Integrated Testing and Engineering Company of San Antonio, L.P. Plate No. 1A

Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Aerial Map – Approximate Location**	
	InTEC Project Number **S261105**	Date: 04/21/2026

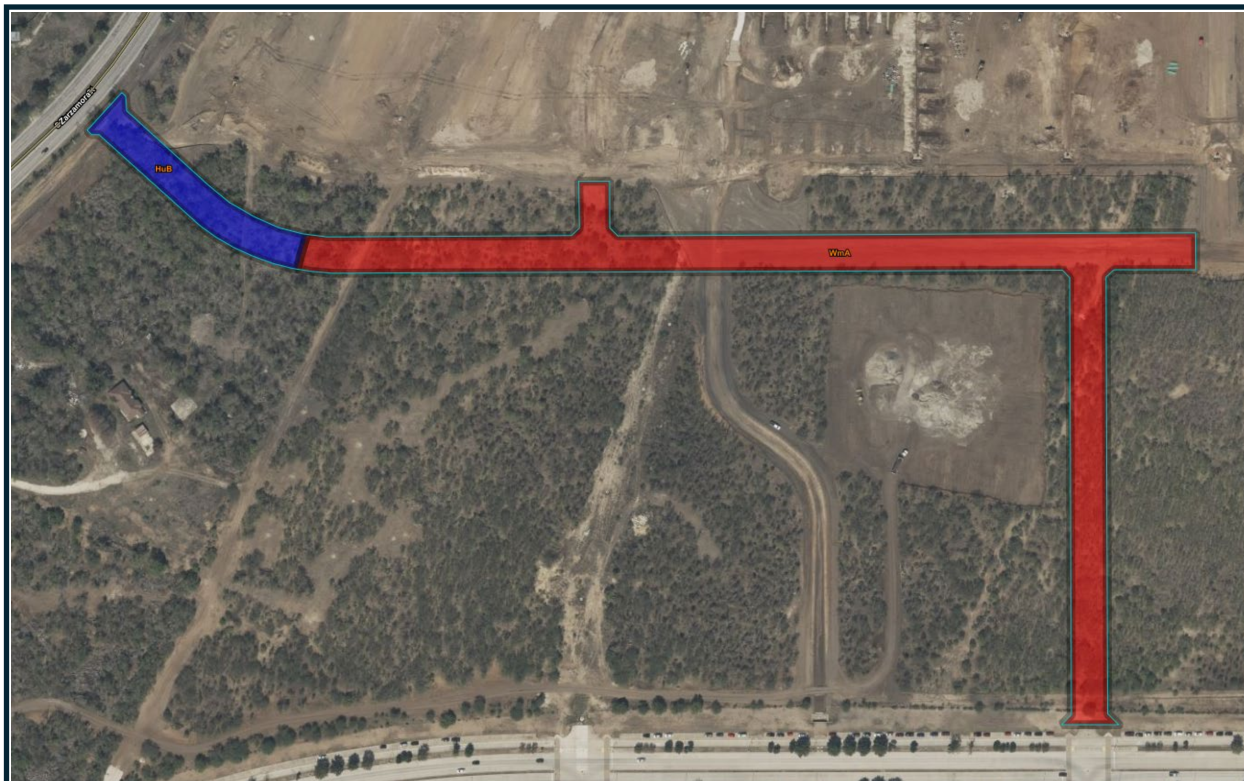
Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Topographic Map – Approximate Location**	
	InTEC Project Number **S261105**	Date: 04/21/2026



Ewi – Wilcox Group

mostly mudstone with varying amounts of sandstone and lignite; in uppermost and lowermost parts commonly glauconitic; mudstone. massive to thin bedded, some silt and very fine sand laminae, pale brown to yellowish brown in upper part, medium to dark gray, weathering yellowish gray in lower part; sandstone in upper part, medium to fine grained, light gray to pale yellowish brown, in lower part very fine grained, yellowish brown to moderate brown, lignite mostly near middle; lower boundary not readily mappable because of gradation into Midway Group (contact taken from sources shown on Index to Geologic Mapping): thickness about 440-1200 feet

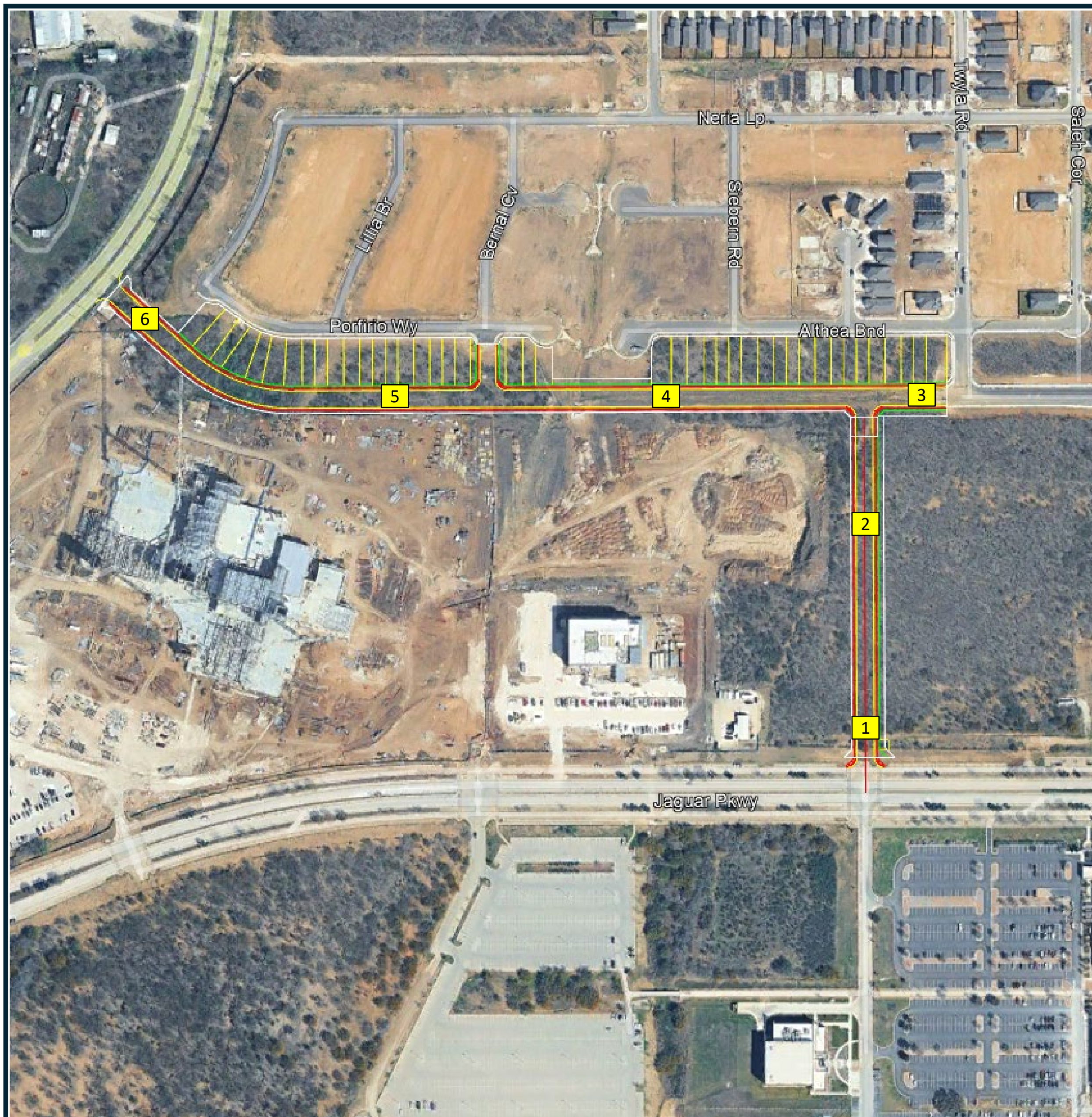
Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Geologic Map – Approximate Location**	
	InTEC Project Number **S261105**	Date: 04/21/2026



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
HuB—Houston Black gravelly clay, 1 to 3 percent slopes														
Houston black	80	D	0-6	Gravelly clay	CH, GC	A-7-6	0- 0- 0	0- 3- 4	65-69- 73	46-57- 73	41-55- 73	35-48- 66	63-70 -76	38-44-49
			6-70	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	98-98- 100	96-96- 100	85-92- 100	74-81- 90	58-70 -76	38-44-49
			70-80	Clay, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	94-96- 100	86-92- 100	74-88- 100	65-78- 95	61-71 -75	37-45-50
WmA—Willacy loam, 0 to 1 percent slopes														
Willacy	100	B	0-15	Loam	SC-SM, SC, SM	A-2-4, A-4	0- 0- 0	0- 0- 0	100-100- 100	100-100- 100	95-98- 100	30-38- 45	20-25 -30	3-7 -10
			15-62	Sandy clay loam, fine sandy loam	CL-ML, SC-SM, CL, SC	A-4, A-6	0- 0- 0	0- 0- 0	95-98- 100	90-95- 100	90-95- 100	36-51- 65	25-33 -40	6-13-20

Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Soil Map – Approximate Location**
	InTEC Project Number **S261105** / Date: 04/21/2026

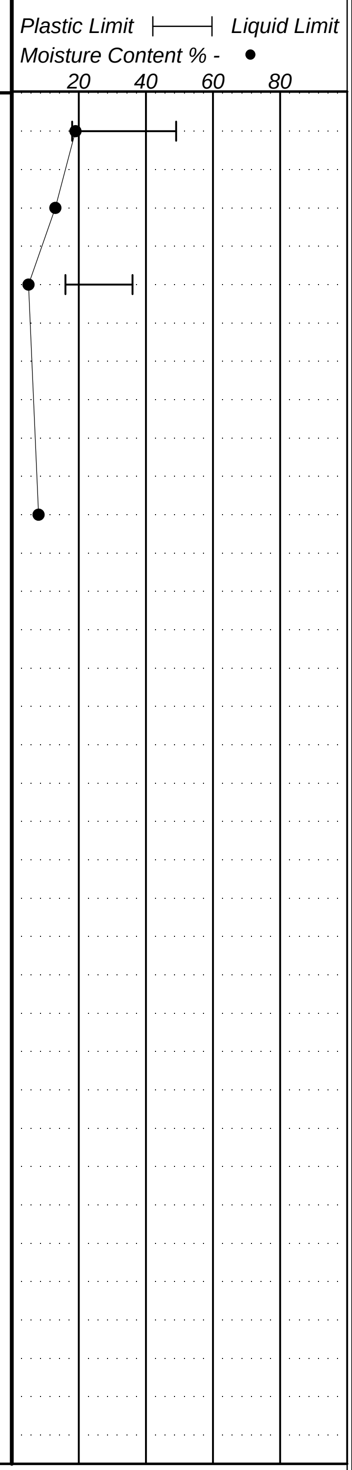


Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Approximate Boring Locations**
	InTEC Project Number **S261105** / Date: 04/21/2026

PROJECT: **Vida San Antonio, Phase 3, W-E & N-S** **PROJECT NO:** **S261105**
LOCATION: San Antonio, Texas **DATE:** 05/13/2026
CLIENT: Southstar At Verano Developer, LLC

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		SS	Dark Brown Clay				16		49	31
		SS	Tan Sandy Clay to Gravelly Clay -with Chert				24			
5		SS					61		36	20
10		AU	Light Tan Marl -with Caliche -with Silty Clay Seams							
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: **Vida San Antonio, Phase 3, W-E & N-S**
PROJECT NO: **S261105**
LOCATION: San Antonio, Texas
DATE: 05/13/2026
CLIENT: Southstar At Verano Developer, LLC

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		SS	Brown Sandy Clay				11			
		SS	Tan Sandy Clay -with Caliche -with Chert and Gravel				24		35	20
5		AU								
10		AU								
15										
20										
25										
30										
35										

Plastic Limit ├──┤ *Liquid Limit*
Moisture Content % - ●
20 40 60 80

Notes:

Ground Water Observed: No

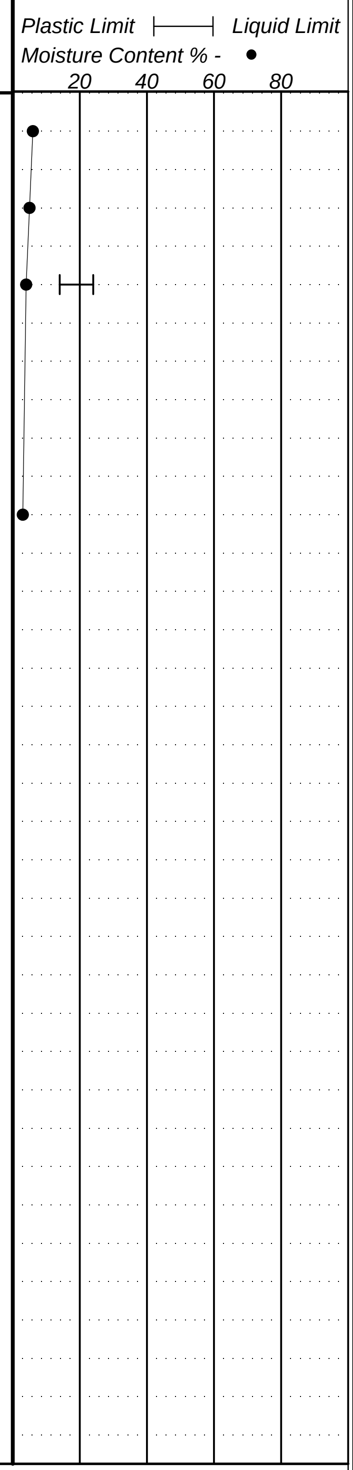
Completion Depth (ft): 12

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: **Vida San Antonio, Phase 3, W-E & N-S** **PROJECT NO:** **S261105**
LOCATION: San Antonio, Texas **DATE:** 05/13/2026
CLIENT: Southstar At Verano Developer, LLC

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		SS	Dark Brown Sandy Clay				21			
		AU	Tan Sandy Clay -with Caliche and Gravel							
5		AU							24	10
10		AU								
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

Completion Depth (ft): 12

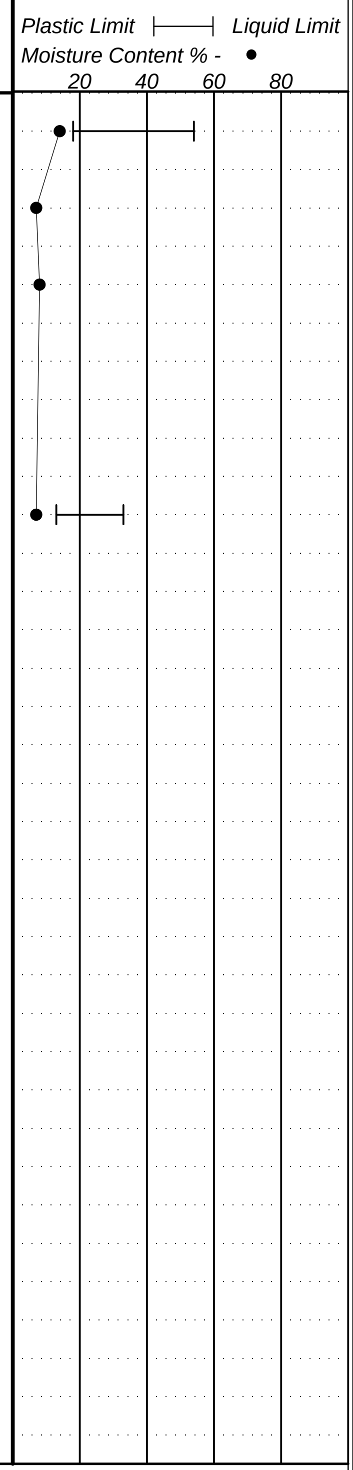
S.S by P.P - Shear Strength in TSF by Hand Penetrometer
S.S. - Split Spoon Sample
S.T. - Shelby Tube Sample
HA - Hand Auger
AU - Auger Sample

PROJECT: **Vida San Antonio, Phase 3, W-E & N-S** **PROJECT NO:** **S261105**
LOCATION: San Antonio, Texas **DATE:** 05/13/2026
CLIENT: Southstar At Verano Developer, LLC

intEC

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		SS	Dark Brown Sandy Clay				21		54	36
		AU	Tan Sandy Clay -with Caliche							
5		AU								
10		AU							33	20
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

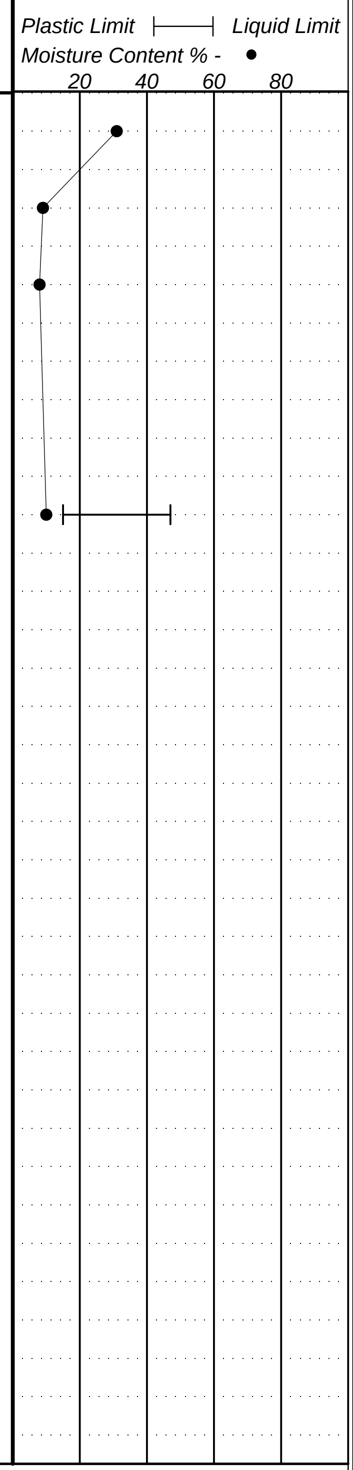
Completion Depth (ft): 12

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: **Vida San Antonio, Phase 3, W-E & N-S** **PROJECT NO:** **S261105**
LOCATION: San Antonio, Texas **DATE:** 05/18/2026
CLIENT: Southstar At Verano Developer, LLC

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		SS	Dark Brown Sandy Clay				10			
		SS	Tan Sandy Clay -with Caliche -with Silty Clay Seams				21			
5		AU								
10		AU							47	32
15										
20										
25										
30										
35										



Notes:

Ground Water Observed: No

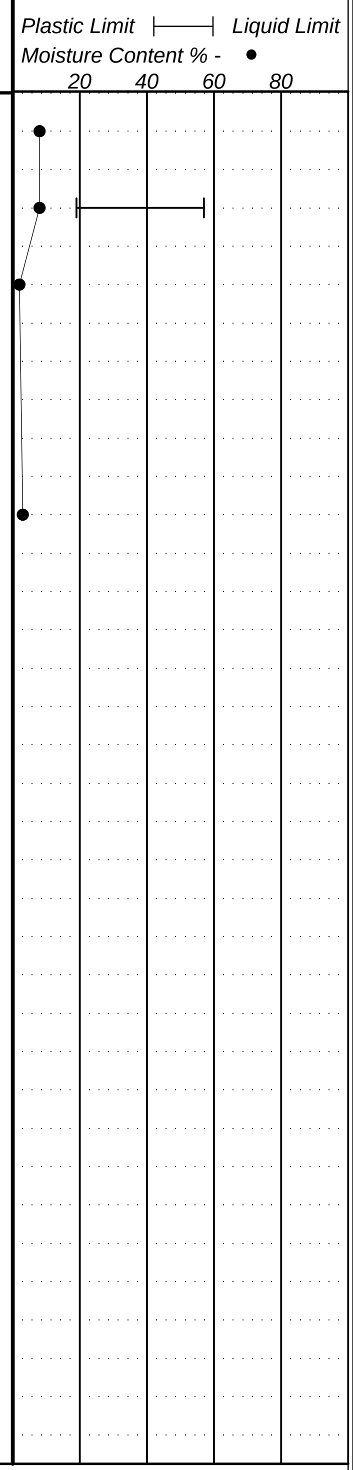
Completion Depth (ft): 12

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: **Vida San Antonio, Phase 3, W-E & N-S** **PROJECT NO:** **S261105**
LOCATION: San Antonio, Texas **DATE:** 05/18/2026
CLIENT: Southstar At Verano Developer, LLC

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		SS	Fill: Brown Clay and Gravel				08			
		AU	Dark Brown Gravelly Clay -with Caliche						57	38
5		AU	Tan Clayey Gravel -with Caliche -with Chert							
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

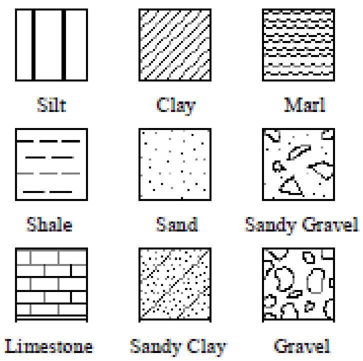
KEY TO CLASSIFICATIONS AND SYMBOLS

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.

Calculations

Design CBR = 3.0

Tensar

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 70	Initial Serviceability	= 4.2
Standard Normal Deviate	= -.524	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

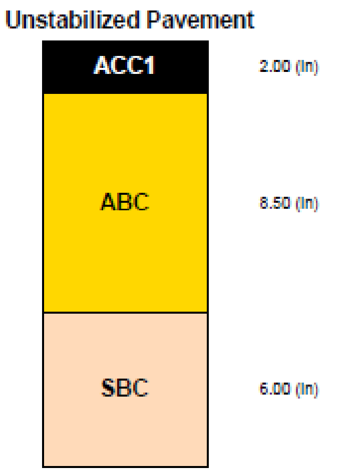
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.140	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

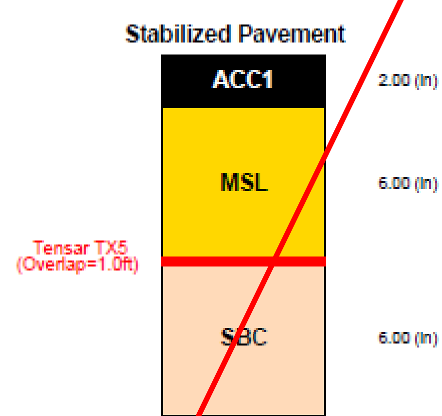
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 4,500 (psi)
Structural Number = 2.550
Calculated Traffic (ESALs) = 118,000

Stabilized Pavement



Subgrade Modulus = 4,500 (psi)
Structural Number = 2.910
Calculated Traffic (ESALs) = 279,000

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Local A – without Bus Traffic**	
	InTEC Project Number **S261105**	Date: 04/01/2026

Tensar.

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 70	Initial Serviceability	= 4.2
Standard Normal Deviate	= -.524	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

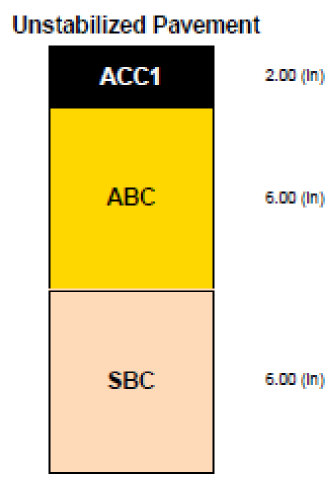
D50 <= 27mm (Base course)

Unstabilized Section Material Properties

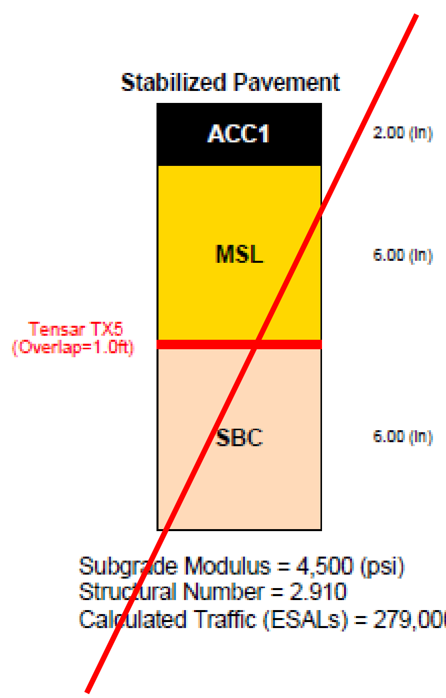
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.340	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0



Subgrade Modulus = 4,500 (psi)
Structural Number = 3.400
Calculated Traffic (ESALs) = 782,000



Subgrade Modulus = 4,500 (psi)
Structural Number = 2.910
Calculated Traffic (ESALs) = 279,000

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Local A – without Bus Traffic**	
	InTEC Project Number **S261105**	Date: 04/01/2026

Tensar

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 70	Initial Serviceability	= 4.2
Standard Normal Deviate	= -.524	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

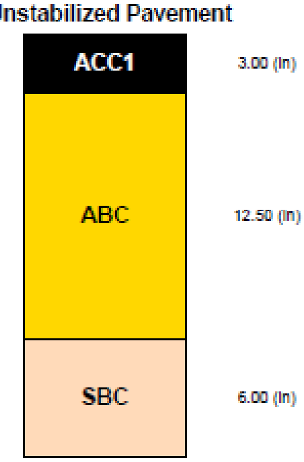
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.140	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

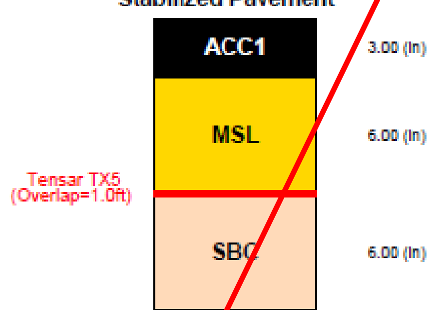
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 4,500 (psi)
Structural Number = 3.550
Calculated Traffic (ESALs) = 1,047,000

Stabilized Pavement



Subgrade Modulus = 4,500 (psi)
Structural Number = 3.330
Calculated Traffic (ESALs) = 680,000

LIMITATIONS OF THE REPORT

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Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Local A – with Bus Traffic**	
	InTEC Project Number **S261105**	Date: 04/01/2026

Tensar

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 70	Initial Serviceability	= 4.2
Standard Normal Deviate	= -.524	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

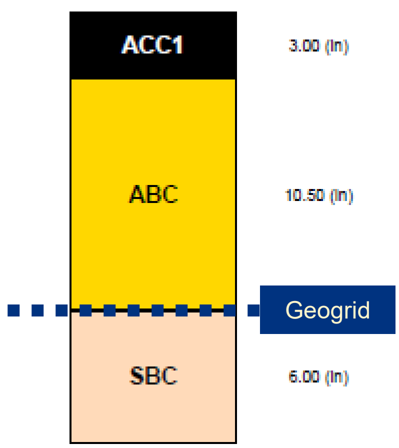
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.170	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

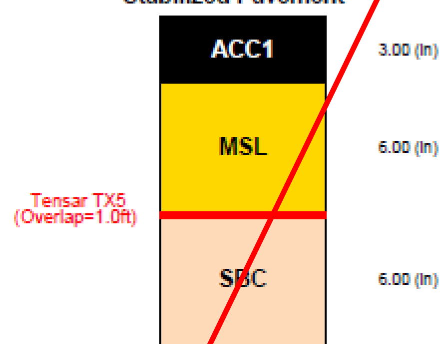
Unstabilized Pavement



Subgrade Modulus = 4,500 (psi)
Structural Number = 3.585
Calculated Traffic (ESALs) = 1,119,000

Geogrid option calculated with adjusted structural coefficient value of 0.17.

Stabilized Pavement



Subgrade Modulus = 4,500 (psi)
Structural Number = 3.330
Calculated Traffic (ESALs) = 680,000

LIMITATIONS OF THE REPORT

The designs, illustrations, information and other content included in this report are necessarily general and conceptual in nature, and do not constitute engineering advice or any design intended for actual construction. Specific design recommendations can be provided as the project develops.

Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Local A – with Bus Traffic**	
	InTEC Project Number **S261105**	Date: 04/01/2026

Tensar

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 70	Initial Serviceability	= 4.2
Standard Normal Deviate	= -.524	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

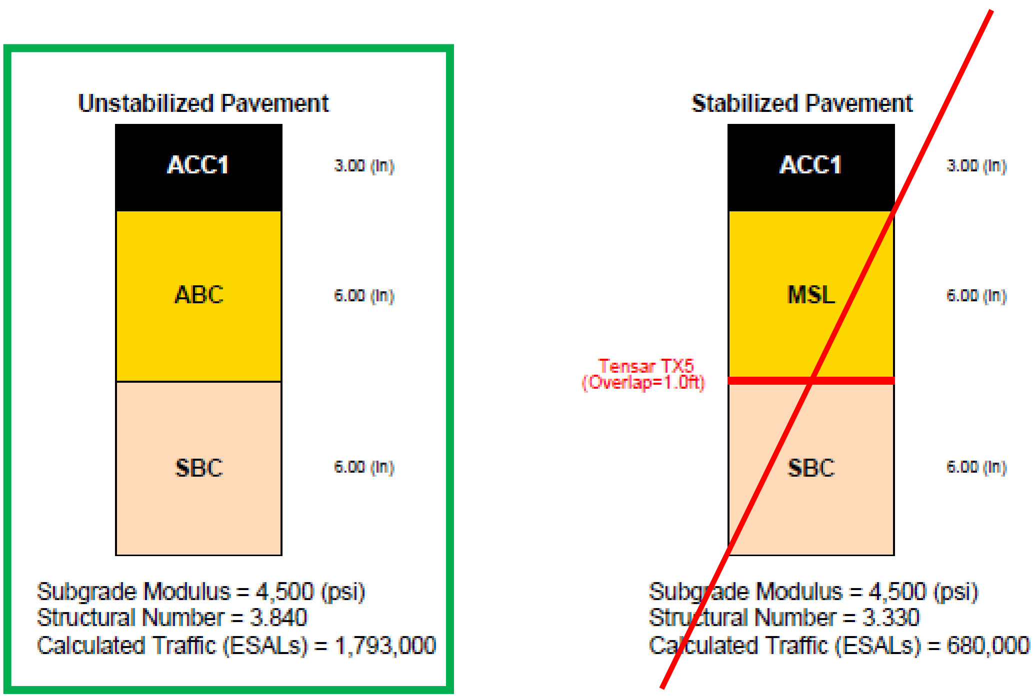
D50 <= 27mm (Base course)

Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.340	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0



LIMITATIONS OF THE REPORT

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Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Local A – with Bus Traffic**	
	InTEC Project Number **S261105**	Date: 04/01/2026

Asphalt Pavement

Design Analysis

Tensar
A Division of CMC

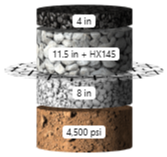
Design		**Reference**	
Project		**Location**	
Customer		**Designer**	Murali Subramaniam
Company	InTEC	**Date**	June 30, 2026

Method of analysis

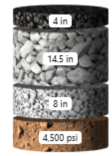
The calculation method used to create this Tensar software output is the design method for flexible pavements given in the AASHTO Guide for Design of Pavement Structures 1993. The enhancement of performance due to the inclusion of Tensar geogrids in the stabilised layer is derived empirically from full scale pavement tests and trafficking trials carried out by independent authorities.

Results

Stabilized
2,135,100 ESALs



Unstabilized
2,238,200 ESALs



	Thickness	Coeff.	SN
HMA layer 1	4 in	0.440	1.760
Aggregate base (HX145)	11.5 in	0.174	2.001
Subbase	8 in	0.080	0.640
Structural number (SN)			4.401

	Thickness	Coeff.	SN
HMA layer 1	4 in	0.440	1.760
Aggregate base	14.5 in	0.140	2.030
Subbase	8 in	0.080	0.640
Structural number (SN)			4.430

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
2,000,000	4,500 psi	90%	0.45	4.2	2

This report was prepared using Tensar+ (2.22.6)

Limitations of this Report

You undertake to only use the Tensar+ software tool and its output solely to evaluate the application of Tensar geogrids, and strictly according to the Terms of Use. The suitability of the software output and Tensar International's geogrids for any project is the sole responsibility of you, and your employees, contractors or other third parties who access the Tensar+ software tool and its output ("Your Associates"). The Tensar+ software output is merely illustrative and is not a detailed design. You will ensure that you and Your Associates have undergone all necessary training through Tensar International and/or have the necessary expertise and experience to use the Tensar+ software tool and its output correctly and safely. Copyright in the Tensar+ software output belongs to Tensar International. It may not be reproduced in whole or in part without the prior written permission of Tensar International except to Your Associates provided it is only disclosed for the purpose of evaluating the commercial application for the use of Tensar International's geogrids, and you are fully liable for Your Associates' acts or omissions. The Tensar+ software output does not form the whole or any part of a contract.

Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Local B**	
	InTEC Project Number **S261105**	Date: 04/01/2026

Tensar

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 90	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.282	Terminal Serviceability	= 2.0
Standard Deviation	= 0.45	Change in Serviceability	= 2.2

Aggregate fill shall conform to following requirement:

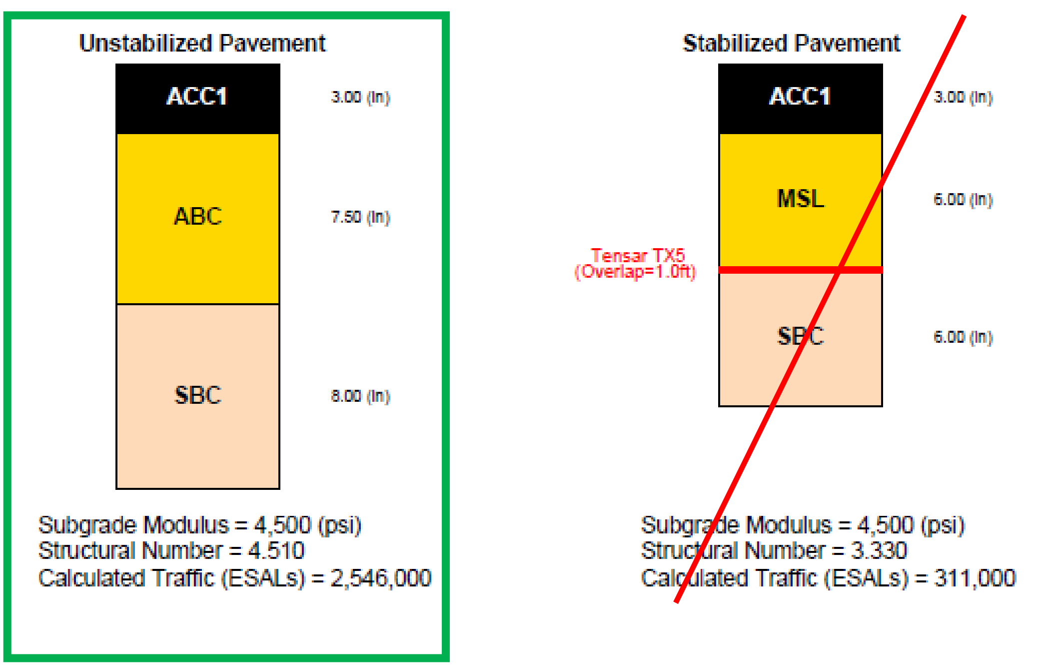
D50 <= 27mm (Base course)

Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.340	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0



LIMITATIONS OF THE REPORT

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Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Local B**	
	InTEC Project Number **S261105**	Date: 04/01/2026

Asphalt Pavement

Design Analysis

Tensar
A Division of CMC

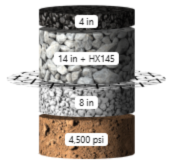
Design		**Reference**	
Project		**Location**	
Customer		**Designer**	Murali Subramaniam
Company	InTEC	**Date**	June 30, 2026

Method of analysis

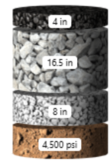
The calculation method used to create this Tensar software output is the design method for flexible pavements given in the AASHTO Guide for Design of Pavement Structures 1993. The enhancement of performance due to the inclusion of Tensar geogrids in the stabilised layer is derived empirically from full scale pavement tests and trafficking trials carried out by independent authorities.

Results

Stabilized
2,059,600 ESALs



Unstabilized
2,144,700 ESALs



	Thickness	Coeff.	SN
HMA layer 1	4 in	0.440	1.760
Aggregate base (HX145)	14 in	0.163	2.282
Subbase	8 in	0.080	0.640
Structural number (SN)			4.682

	Thickness	Coeff.	SN
HMA layer 1	4 in	0.440	1.760
Aggregate base	16.5 in	0.140	2.310
Subbase	8 in	0.080	0.640
Structural number (SN)			4.710

Parameters

Project Information

Target ESALs	Subgrade resilient modulus	Reliability	Standard deviation	Serviceability	
				Initial	Terminal
2,000,000	4,500 psi	90%	0.45	4.2	2.5

This report was prepared using Tensar+ (2.22.6)

Limitations of this Report

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Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Collector**	
	InTEC Project Number **S261105**	Date: 04/01/2026

SpectraPave4 PRO™
Pavement Optimization Design Analysis

Design Parameters for AASHTO (1993) Equation

Reliability (%)	= 90	Initial Serviceability	= 4.2
Standard Normal Deviate	= -1.282	Terminal Serviceability	= 2.5
Standard Deviation	= 0.45	Change in Serviceability	= 1.7

Aggregate fill shall conform to following requirement:

D50 <= 27mm (Base course)

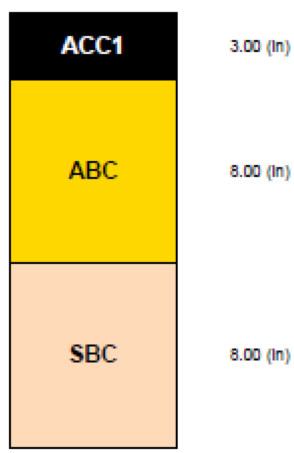
Unstabilized Section Material Properties

Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.440	N/A
ABC	Aggregate Base Course	20	0.340	1.0
SBC	Subbase Course	16	0.080	1.0

Stabilized Section Material Properties

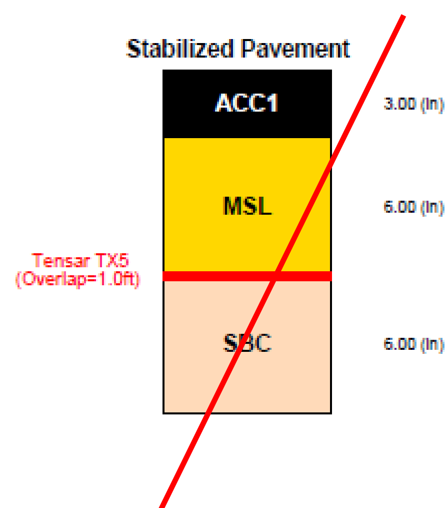
Layer	Description	Cost ($/ton)	Layer coefficient	Drainage factor
ACC1	Asphalt Wearing Course	70	0.420	N/A
MSL	Mechanically Stabilized Base Cour	20	0.265	1.0
SBC	Subbase Course	16	0.080	1.0

Unstabilized Pavement



Subgrade Modulus = 4,500 (psi)
Structural Number = 4.680
Calculated Traffic (ESALs) = 2,054,000

Stabilized Pavement



Subgrade Modulus = 4,500 (psi)
Structural Number = 3.330
Calculated Traffic (ESALs) = 236,000

LIMITATIONS OF THE REPORT

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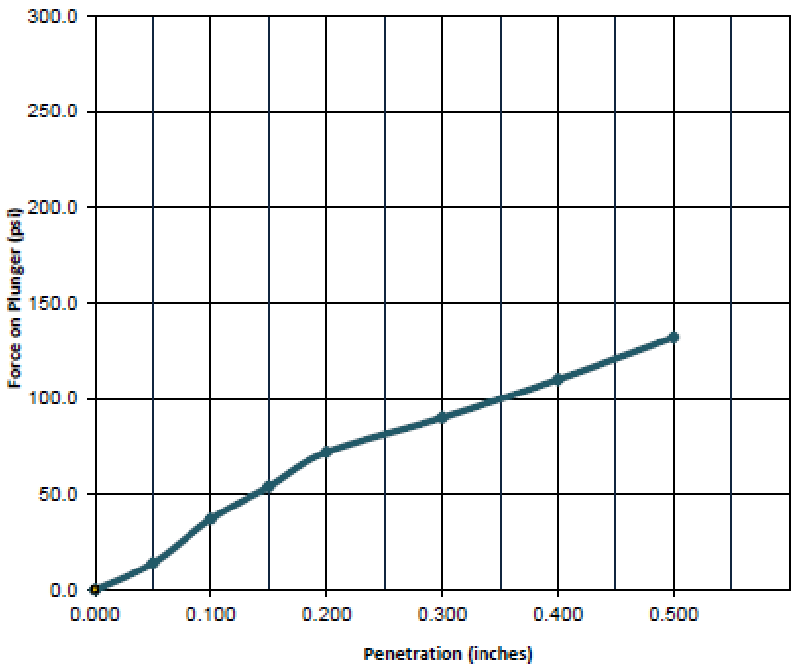
Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Collector**	
	InTEC Project Number **S261105**	Date: 04/01/2026

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.	3.7				
0.2 in Pen.	4.8				
Moisture (%)	15.30				
Density (pcf)	108.30				
Final Moisture (%)	22.70				
Final Density (pcf)	93.60				

Project Number	S251105	**Sample Location**	
Project Name	Vida, Phase 3, W-E & N-S	Specimen A	Vicinity of B-5
Date	6/25/2026		
Client	Southstar	Specimen C	
		Specimen D	
Job Ref.		Liquid Limit:	55.0
Sample Num.		Plastic Limit:	17.0
Remarks	Brown Sandy Clay		

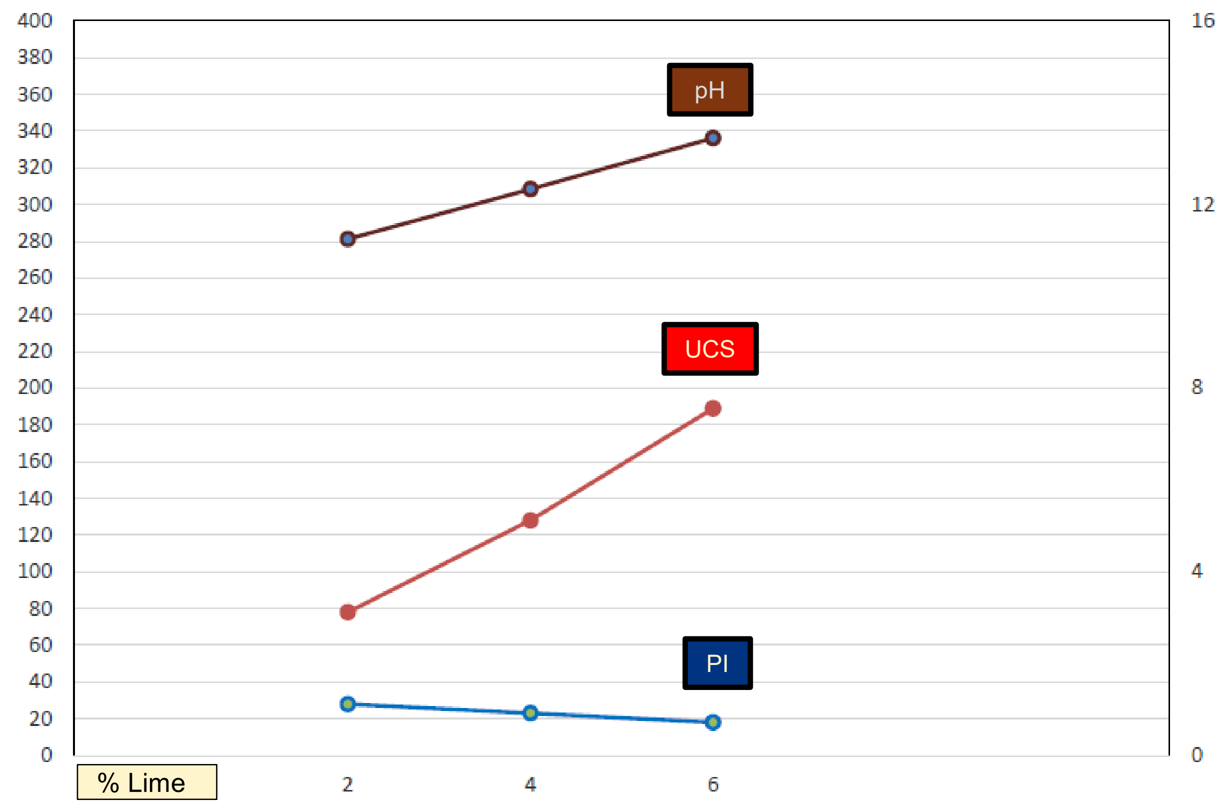
Subsurface Exploration and Pavement Analysis
Proposed New Streets
Vida San Antonio, Phase 3, West-East & North-South
San Antonio, Texas

CBR Test Results

InTEC Project Number
S261105

Date:
04/01/2026

Lime Series Curves



Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	**Lime Series**	
	InTEC Project Number **S261105**	Date: 04/01/2026

Appendix

Subsurface Exploration and Pavement Analysis Proposed New Streets Vida San Antonio, Phase 3, West-East & North-South San Antonio, Texas	InTEC Project Number **S261105**	Date: 04/01/2026

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 <u>not</u> 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 <u>Not</u> 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 <u>not</u> 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 <u>not</u> building-envelope or mold specialists.***

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