LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD. ON BEHALF OF KYNDWOOD MUD

INVITATION TO BIDDERS
CONSTRUCTION DOCUMENTS AND
TECHNICAL SPECIFICATIONS FOR
KYNDWOOD UNITS 2 & 2A

STREETS, DRAINAGE, WATER & WASTEWATER CONSTRUCTION

NEW BRAUNFELS, TEXAS

March 26, 2024

HMT ENGINEERS AND SURVEYING
290 S Castell Ave
STE. 100
New Braunfels, TX 78130
(830) 625-8555

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INVITATION TO BID

1. Project Identification

a. **Project Name:** Kyndwood Subdivision Units 2 & 2A
b. **Project Number:** 337.068, 337.079
c. **Project Location:** Located along I-35, north of Stolte Road, in Comal County within the city of New Braunfels ETJ, Texas.
d. **Owner:** Lennar Homes of Texas Land and Construction, LTD on Behalf of Kyndwood MUD
e. **Owner's Representative:**

Joseph T. Sandoval, P.E.
HMT Engineering & Surveying
290 S. Castell Avenue, Ste. 100
New Braunfels, Texas 78130
(830)625-8555
josephs@hmtnb.com

2. Pre-Bid Meeting

a. A non-mandatory pre-bid meeting will be held virtually at 3:00pm, local time, Thursday, 04/04/24 via Zoom.

3. Bid Opening

a. Bid Place
   i. Sealed bids will be received in the office of the Engineer:

Project Name: Kyndwood Subdivision Units 2 & 2A
ATTN: Joseph Sandoval, P.E.
c/o HMT Engineering & Surveying
290 S. Castell Avenue, Ste. 100
New Braunfels, Texas 78130
(830)625-8555

b. Bid Due Date: 04/11/2024 by 3:00pm local time.
c. Bids will be opened publicly.

4. Rejection

a. The Owner reserves the right to reject any or all bids and to waive any informalities or minor defects.
b. In case of the lack of clarity or ambiguity in prices, the Owner reserves the right to accept the most advantageous or reject the bid.
c. All bids received after the closing time designated above will be returned unopened.

5. Delivery of Proposals

a. It is the Bidder's responsibility to deliver the bid proposal at the proper time to the proper place. The mere fact that a bid proposal was dispatched will not be considered. The Bidder must have the bid proposal delivered as specified above in (3) Bid Opening.

6. Time of Completion

a. The work needs to be completed in 270 calendar days from the notice to proceed.

INSTRUCTIONS TO BIDDERS

IMPORTANT NOTICE: Bidder must read ALL Instructions. Failure to do so may result in a non-responsive Bid. Failure to do so does not release Bidder from the obligation to comply.

1. Submission of Bids

1.1 In accordance with the Plans and Specifications prepared by the ENGINEER, any Proposal received after the published time of the bid opening will be returned unopened.

1.2 The OWNER reserves the right to reject any or all Bids if the OWNER believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or other criteria established by OWNER.

1.3 Bids shall be submitted at the location and time indicated in the Invitation to Bidders and shall be enclosed in an opaque sealed envelope, marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and name and address of Bidder and accompanied by the Bid security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation “BID ENCLOSED” on the face of it. Bids which are not received by the time and at the location specified in the Bidding Documents, will be returned unopened to the Bidder.

1.4 By submitting a Bid, each Bidder agrees to fully and forever waive and release any claim (known or unknown) it has or may have against the OWNER, DEVELOPER, ARCHITECT and ENGINEER, and their respective attorneys, employees, consultants, representatives, agents, successors, assigns, officers, directors, and members arising under the statutes of Texas, tort, contract or otherwise; or out of or in connection with the: (i) administration, evaluation, or recommendation (or lack thereof) of any Bid; (ii) waiver of any requirements under the Bid Documents or the CONTRACT DOCUMENTS; (iii) acceptance or rejection of any bids; (iv) award of the Contract; and, (v) provision of references (positive or negative) in connection with any work performed by Bidder, and Bidder’s contractors and subcontractors in connection with the Project and the CONTRACT DOCUMENTS, to which Bidder hereby consents and authorizes.

1.5 All work must conform to Federal, State and local governmental rules and criteria.

1.6 The successful bidder will be required to enter into a Contract with the Owner, requiring full compliance and performance of the conditions of the proposal, plans and specifications as designed by HMT Engineers (Engineer) and reviewed by the NEW BRAUNFELS COMAL COUNTY, and/or other agencies as required, and agrees to commence work within ten (10) days after notification to begin. It is the intent of the owner to start construction as soon as possible.

1.7 Bidders are required to inspect the site and inform themselves of all conditions affecting the execution of the work to be performed. The filing of the "Proposal" shall constitute an admission by the bidder that he has carried out the foregoing stipulations to his entire satisfaction. Quantities included in the plans and proposals are estimated and are to be regarded as approximate only. The Owner reserves the right to vary the quantities, to construct all, or any part, or to delete any part or item of work that may be deemed advisable.

1.8 The most current editions of the City of New Braunfels Standard Specifications, Texas Department of Transportation Standard Specifications, Crystal Clear SUD, TCEQ, and NBU (NBU) shall be followed for all construction except as amended by the City of New Braunfels and/or Comal County.

1.9 Portions of this proposal may be deleted. Prices for all items must stand on their own.

1.10 Contractor to complete the material take-off for items bid lump sum to confirm the Engineer Quantities. Quantities shown are plan estimates only.

1.11 Direct all questions concerning this proposal to Joseph Sandoval with HMT Engineers at (830) 625-8555 or at josephs@hmtnb.com

1.12 Contractor is responsible for all Texas Commission on Environmental Quality (TCEQ) Storm Water Pollution Prevention Plan (SW3P) requirements, including but not limited to setting up, installing and maintaining the erosion and sedimentation controls as designed and shall inspect the controls every two weeks and after every significant rainfall (1/2 inch or greater) to ensure significant disturbance to the structure has not occurred. Sediment deposited after a significant rainfall shall be removed and placed in a designated soil disposal area. Contractor to maintain erosion control inspection reports as required by the TCEQ and provide Owner with one complete set of all SW3P inspection reports, including updates and modifications, prior to receiving final payment for the project.

1.13 Contractor must keep a copy of the Storm Water Pollution Prevention Plan (SW3P) on site and readily available for authorities.

1.14 Clearing and/or grading for the utility easements as well as removal of on-site deleterious material and trash shall be included in the base bid cost for site clearing and grading. Contractor is to clear entire project of all underbrush and undesirable vegetation. Contact Owner for extent and sequence of lot clearing and coordination with any applicable tree ordinance.

1.15 Excavated material that is free of organic matter and other deleterious substances may be disposed of on-site. No fill shall be placed within the flood plain without a Flood Plain Development Permit as applicable. Said material will be utilized as fill material for lots and easements as per the Grading Plan and compacted to meet 79G requirements with 95% Standard Density using ASTM 698 or TEX-114E. For fills greater than one (1) foot within building pad area, a 79G Letter will be required with testing complete per eight (8) inch lift. Testing to be paid by the Owner. Contractor shall get owners approval of test lab. Contractor shall pay re-testing due to failure of density requirements. All quantities are “In-place, tight” cubic yards.

1.16 Excavated material placed on lots shall have positive drainage to prevent any ponding of water, and provide a minimum final grade of 1.5% in all areas with the exception of building pads which shall have a minimum final grade of 1.0%.

1.17 Contractor shall submit a letter to Engineer after completion of final grading of utility easements, certifying that the grades on the utility easements are completed as per the grading plan.

1.18 Contractor shall be responsible for disposing of all waste materials off project site including, but not limited to, excess excavation not suitable for use as lot fill, concrete, trees, and any other material which is not part of the completed contract work. No separate pay item.

1.19 Street excavation includes cut in the parkways, as per design plans.

1.20 Contractor will protect existing utilities, structures, curb, fences and sidewalk during construction. Any damage will be repaired by the Contractor at no extra cost.

1.21 The streets are public. The Contractor must coordinate and schedule all testing required by the City of New Braunfels and/or Comal County.

1.22 The Contractor will be required to coordinate work with the Utility companies that will be installing electric, telephone and TV.

1.23 The Contractor is responsible for coordinating with Utility companies to mark existing buried utilities that may be affected by construction. The Contractor will be responsible to repair damaged utilities due to construction.

1.24 Contractor to notify New Braunfels and/or Comal County, NBU, CCSUD, AT&T, Time Warner Cable, and/or other appropriate Utility Providers prior to street (subgrade) and/or drain construction.

1.25 The Contractor shall coordinate with the Developer for placement of private conduit.

1.26 The Contractor is responsible for obtaining all final approvals and shall provide Engineer with street and grading "As-builts" at or before the final inspection. Copies of acceptance letters for such shall also be provided to Engineer, as applicable. One year warranty period shall begin at the date of the final acceptance letter as determined and provided by the City. Contractor is responsible for obtaining final approvals prior to the expiration of warranty period for City maintenance.

1.27 The Owner is to provide and pay for construction staking.

1.28 Water Tie-ins will not be measured and are considered subsidiary to other Water Improvement items.

1.29 Bid is due on or before 3:00 p.m. April 11, 2024. Please submit bid to HMT Engineering & Surveying, the office of the engineer Joseph Sandoval, P.E. (josephs@hmtnb.com).

2. Copies of the Bidding Documents

2.1 Complete sets of the Bidding Documents in the number and for the deposit sum of $100, if any, stated in the Invitation to Bidders may be obtained from the ENGINEER’s Office. Checks for the Plans and Specifications shall be made payable to HMT Engineering and Surveying, Inc.

2.2 Copies of Bidding Documents are made available only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

2.3 Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER nor ENGINEER assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.4 The Bidding Documents may include reports on the geotechnical, subsurface, physical or environmental conditions which contain information used by the ENGINEER and OWNER. Neither the ENGINEER nor OWNER are responsible for accuracy or completeness of any such information or data. Bidder shall have full responsibility for interpretation of the reports and use of the information for bidding and construction purposes.

3. Bid Security

3.1 No bid security required.

4. Contract Documents

Contract Documents include the Agreement, Addenda, all Conditions (General, Supplementary and Special), specifications and plans, the Bid Proposal, and any written modifications.

5. Defined Terms

Terms used in these Instructions to Bidders which are defined in the Standard General Conditions have the meanings assigned to them in the Standard General Conditions unless modified by the Supplementary and Special Conditions.

6. Bid Proposal Form

6.1 The Bid Proposal Form is included with the Bidding Documents; additional copies may be obtained from the ENGINEER.

6.2 All blanks on the Bid Proposal Form must be completed by printing in ink or by typewriter.

6.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

6.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature. Bids by limited partnerships must be executed by an authorized representative of the general partner on behalf of the general partner.

6.5 All names must be typed or printed in ink below the signature. The address (including County), telephone number, e-mail address (if available), and facsimile number for communications regarding the Bid must be shown.

6.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Proposal Form).

6.7 Evidence of authority to conduct business as an out-of-state corporation in the state where the Work is to be performed, shall be provided. State Contractor license number, if any, must also be shown.

7. Interpretations and Addenda

7.1 All questions about the meaning or intent of the Bidding Documents are to be directed to ENGINEER. As necessary, interpretations or clarifications will be issued by Addenda mailed or delivered to all parties having received the Bidding Documents. Questions received less than three days prior to the date for opening of Bids may not be answered. Verbal discussions and answers are not binding.

7.2 Addenda may also be issued to modify the Bidding Documents as deemed advisable by OWNER or ENGINEER.

8. Self Performing

As a condition of this Agreement, the CONTRACTOR is required to self perform at least 60 percent of the work (based on total contract price awarded, complete in place) with personnel directly employed by CONTRACTOR.

9. Subcontractors, Suppliers and Others

9.1 If the Special Conditions require the identity of certain Subcontractors, Suppliers and other persons and organizations (including those who are to furnish the principal items of material and equipment) to be submitted to OWNER prior to the Effective Date of the Agreement, apparent Successful Bidder, and any other Bidder so requested, shall within five days after the Bid opening, submit to OWNER a list of all such Subcontractors, Suppliers and other persons and organizations.

9.2 OWNER reserves the right to reject a proposed subcontractor or supplier at its sole discretion. OWNER may request apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price.

If apparent Successful Bidder declines to make any such substitution, OWNER may award the contract to another Bidder meeting the Bid requirements that proposes to use acceptable subcontractors, suppliers, and other persons and organizations. By declining to make requested substitutes, the apparent Successful Bidder will not sacrifice their Bid security.

9.3 No CONTRACTOR shall be required to employ any subcontractor, supplier, organization against whom CONTRACTOR has reasonable objection.

10. Examination of Contract Documents and Site

10.1 It is the responsibility of each Bidder before submitting a Bid:

10.1.1 To thoroughly examine the Contract Documents and other reports, tests, and drawings identified in the Bidding Documents and Special Conditions. Bidder is instructed to read <u>all</u> Bidding and Contract Documents before

completing the bid form. Bidder is advised that failure to read Contract Documents, including without limitation, the General, Supplementary and Special Conditions, does not relieve Bidder from compliance with these documents.

10.1.1.1 Copies of available reports, tests and drawings will be produced by OWNER for review by Bidder on request. OWNER and ENGINEER disclaim any responsibility for the accuracy, true location and extent of surface and subsurface investigations that have been prepared by others.

10.1.1.2 Bidder is responsible for any interpretation or conclusion drawn from any reports, tests, and drawings, or any such data, interpretations, opinions or information, and OWNER and ENGINEER disclaim any responsibility for such interpretations by Bidders, e.g., without limitation, projecting soil-bearing values, rock profiles, soil stability and the presence, level and extent of underground water or underground facilities.

10.1.1.3 Bidder will be responsible for considering how said reports, tests and drawings may relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs performing the Work in accordance with the Contract Documents.

10.1.2 To visit the site to become familiar with and satisfy Bidder as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work;

10.1.3 To consider Federal, State and local laws and regulations that may affect cost, progress, performance or furnishing of the Work;

10.1.4 To correlate Bidder's knowledge and observations of the site with the Contract Documents and such other related reports, tests and drawings;

10.1.5 To promptly notify ENGINEER of all conflicts, errors, ambiguities or discrepancies which Bidder has discovered in or between the Contract Documents and such other related documents.

10.2 On request, OWNER may provide each Bidder access to the site to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the site to its former conditions upon completion of such explorations, investigations, tests and studies.

11. Availability of Lands for Work, etc.

The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by CONTRACTOR in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by OWNER unless otherwise provided in the Contract Documents.

12. Substitute and "Or-Equal" Items

All Bids shall be based on work, materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" items. Although the Drawings or Specifications may state a substitute or "or-equal" item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, Bids shall not be based on any substitutions or as equal items. ENGINEER will not consider any application for substitute or as equal until after the Effective Date of the Agreement. The procedure for submission of any such application by CONTRACTOR and consideration by ENGINEER is set forth in the Standard General Conditions and may be supplemented in the Special Conditions.

13. Contract Time

The number of calendar days within which, or the dates by which, the Work is to be substantially completed and the Work is to achieve final completion are set forth in the Agreement and in the Special Conditions.

14. Economic Disincentive for Late Completion of Work

The CONTRACTOR and the OWNER agree that time is of the essence of this Contract. The CONTRACTOR and the OWNER agree that the Agreement is based on completion of the Work by CONTRACTOR in the time specified in the Agreement. CONTRACTOR and the OWNER agree that for each and every calendar day the work or any portion thereof shall remain uncompleted after the expiration of the time limit set in the Contract, or as extended under the provisions for Extension of Time in this Contract, CONTRACTOR shall be liable to OWNER for an economic disincentive in an amount specified in the Special Conditions for such calendar day. The OWNER shall have the option to deduct and withhold said amount from any monies that the OWNER owes the CONTRACTOR or to recover such amount from the CONTRACTOR or the Sureties on the CONTRACTOR's bond.

15. Modification and Withdrawal of Bids

15.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

15.2 If, within twenty-four hours after Bids are opened, any Bidder files a duly signed, written notice with OWNER and promptly thereafter demonstrates to the

reasonable satisfaction of OWNER that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work to be provided under the Contract Documents.

16. Opening of Bids

This is an open bid.

17. Bids to Remain Subject to Acceptance

17.1 All Bids will remain subject to acceptance for ninety (90) days after the day of the Bid opening, but OWNER may, in its sole discretion, release any Bid and return the Bid security prior to that date.

18. Award of Contract

18.1 If the contract is to be awarded, it will be awarded to the Successful Bidder as evaluated by OWNER. The Bid price shall include such amounts as the Bidder deems proper for overhead and profit.

18.2 Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words or figures will be resolved in favor of the words. In case of any ambiguity or lack of clarity in stating the prices in the Bid, OWNER reserves the right to consider the most advantageous construction thereof or reject the Bid.

18.3 OWNER reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, non-responsive, unbalanced or conditional Bids. OWNER also reserves the right to waive all irregularities and defects in the Bids and the bidding process, except time of submitting a Bid.

18.4 OWNER may conduct such investigations as OWNER deems necessary to assist in the evaluation of any bid and to establish the responsibility, qualifications and financial ability of bidders, proposed subcontractors, suppliers and other persons and organizations to perform and furnish the Work in accordance with the CONTRACT DOCUMENTS to OWNER's satisfaction. OWNER may require Bidders to submit bank references and financial statements in connection with bid evaluation.

18.5 OWNER may also consider Bidder's (or Bidder's officers', partners', directors', affiliates') (i) prior dealings with OWNER or with any entity responsible for payment to Bidder under this Contract and (ii) the amount, size, number, cost and completion-status of any projects that Bidder currently has underway (including, without limitation, projects underway with OWNER or with any entity responsible for payment to Bidder under this Contract), and the amount, nature and quality of the manpower, materials and equipment available to bidder.

18.6 By submitting a Bid, each Bidder agrees to fully and forever waive and release any claim (known or unknown) it has or may have against the OWNER, DEVELOPER, ARCHITECT and ENGINEER, and their respective attorneys, employees,

consultants, representatives, agents, successors, assigns, officers, directors, and members arising under the statutes of Texas, tort, contract or otherwise; or out of or in connection with the: (i) administration, evaluation, or recommendation (or lack thereof) or any BID; (ii) waiver of any requirements under the Bid Documents or the CONTRACT DOCUMENTS; (iii) acceptance or rejection of any bids; (iv) award of the Contract; and (v) provision of references (positive or negative) in connection with any work performed by Bidder, and Bidder's contractors and subcontractors in connection with the Project and the CONTRACT DOCUMENTS, to which Bidder hereby consents and authorizes.

18.7 If the contract is to be awarded, OWNER will give the Successful Bidder Notice of Award within ninety (90) days after the day of the Bid opening.

18.8 Contractor shall complete substantial construction within 230 days for each unit

19. Bonds

Standard General Conditions and the Special Conditions set forth OWNER's requirements, if any, as to Bonds. When the Successful Bidder delivers the executed Agreement to OWNER, it must be accompanied by the required payment and performance bonds.

20. Signing of Agreement

When OWNER gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within seven days thereafter CONTRACTOR shall sign and deliver the required number of counterparts of the Agreement and attached documents to OWNER with the required Bonds. Within ten days thereafter OWNER shall deliver one fully signed counterpart to CONTRACTOR.

21. Retainage

The amount of retainage is set forth in the Special Conditions.

22. Sales Tax

22.1 Applicable taxes, licenses, fees and other similar items are part of the cost of the work and it shall be CONTRACTOR's responsibility to familiarize itself with these costs and to observe and comply with the laws and regulations relating to the same. The prices, sums, rates and other charges set forth in the CONTRACTOR's bid shall cover and include all such costs.

22.2 The Special Conditions will indicate if OWNER is exempt from sales tax.

23. Insurance Requirements

CONTRACTOR shall maintain such insurance as specified in the Standard General, Supplementary, and Special Conditions.

24. Estimates of Quantities

Contractor is to perform an independent quantity take-off prior to signing the contract, to verify that the quantities given in the bid proposal are within three percent (3%) of the actual quantities required to complete the construction represented by the plans and specifications. If any quantity is found to be in error of more than three percent (3%), the Contractor shall notify the Engineer forty-eight (48) hours prior to signing the contract.

25. Statement of Qualifications

No statement of qualifications required.

26. Prevailing Wage Rate

Minimum wage rates, if applicable to this Contract, shall be specified in the Special Conditions.

BID PROPOSAL

Date:_____

Bid of _____
(Legal Name of Bidder – Company)

[ ] an individual proprietorship

[ ] a corporation organized and existing under the laws of _____

[ ] a partnership consisting of _____

_____

[ ] a joint venture

[ ] other _____

FOR:

Kyndwood Units 2 & 2A

STREETS, DRAINAGE, WATER & WASTEWATER CONSTRUCTION

TO:
LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD. ON BEHALF OF KYNDWOOD MUD
100 NE Loop 410, Suite 1155
San Antonio, TX 78232

PROPOSAL BIDDING SHEET

KYNDWOOD UNITS 2 & 2A

STREETS, DRAINAGE, WATER & WASTEWATER CONSTRUCTION

Gentlemen:

Pursuant to the foregoing Invitation and Instructions to Bidders, the undersigned bidder hereby proposes to do all the work for the unit prices bid to furnish all necessary superintendence, labor, machine, equipment, tools, materials, insurance and miscellaneous items, to complete all work according to the bids, as provided in the construction plan and contract documents for the **CONSTRUCTION OF KYNDWOOD UNITS 2 & 2A, STREETS, DRAINS, WATER AND WASTEWATER UTILITIES** and clean up the site to the satisfaction of the Owner/Engineer, and bind himself on acceptance of this proposal to execute a contract and bonds for completing said project within the time stated for the following prices, to wit:

BID PROPOSAL SCHEDULE
KYNDWOOD UNIT 2 & 2A

BIDDER'S NAME: _____

ADDRESS: _____

SIGNATURE AND TITLE: _____

DATE: _____

BID SUMMARY

1300.2550 GRADING IMPROVEMENTS	$	-
1300.2555 EROSION AND SEDIMENTATION CONTROL	$	-
1300.2750 SANITARY SEWER IMPROVEMENTS	$	-
1300.2850 WATER IMPROVEMENTS	$	-
1300.3000 DRAINAGE IMPROVEMENTS	$	-
1300.3316 STREET IMPROVEMENTS	$	-
1300.3475 MISCELLANEOUS IMPROVEMENTS	$	-
TOTAL BASE BID:	$	-

* Includes Bid Bond, Warranty Assignments or Bonds, Per City of New Braunfels, and CCSUD Requirements.

***** Contractor is to perform an independent quantity take-off prior to signing the contract, to verify that the quantities given in the bid proposal are within three percent (3%) of the actual quantities required to complete the construction represented by the plans and specifications. If any quantity is found to be in error of more than three percent (3%), the Contractor shall notify the Engineer forty-eight (48) hours prior to signing the contract.

***** Bids shall include all Unit Price costs as indicated by the Contract Documents and Bid Form. The bid price submitted by the Contractor shall be the sum of the unit prices times the estimated quantity of each item shown in the bid form. However, the Contractor shall guarantee himself of the accuracy of the quantities shown in the bid form. The quantities shown are estimates only and indicate only the magnitude of the project and a basis for bid comparison. Any discrepancies in quantity or work necessary to fulfill the intent of the plans shall be included, whether a bid item is included or not. Any work required for which a bid item is not shown shall be considered subsidiary to other work items.

** No separate payment shall be made for utility excavation. Excess material generated from excavation shall be processed and used to meet the fill requirements for the project or hauled off and disposed of by the constractor. Include costs in related bid items.

Bidders Initials _____

Date _____

BID PROPOSAL SUMMARY
KYNDWOOD UNIT 2 & 2A

3.25.24
Job No. 337.068 & 337.079

1300.2550 GRADING IMPROVEMENTS UNIT 2

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
1	Lot Excavation Unit 2	CY	18,836	$ -	$ -
2	Lot Embankment Unit 2	CY	13,329	$ -	$ -
1	Lot Excavation Unit 2A	CY	1,440	$ -	$ -
2	Lot Embankment Unit 2A	CY	722	$ -	$ -
				TOTAL COST	$ -

* **All final lot grading shall be compacted in accordance with notes on the Lot Grading Plan.**

* Contractor is to perform an independent quantity take-off prior to signing the contract, to verify that the quantities given in the bid proposal are within three percent (3%) of the actual quantities required to complete the construction represented by the plans and specifications. If any quantity is found to be in error of more than three percent (3%), the Contractor shall notify the Engineer forty-eight (48) hours prior to signing the contract.

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* Contractor to field verify and survey the existing site topography and submit information to engineer prior to submitting final bid for verification. No shrinkage or swelling factor is accounted for in the engineering excavation and embankment quantities. Contractor to adjust unit price as he deems necessary to account for shrinkage and swelling.

* All embankment areas shall be placed and compacted in accordance with the project specification. 79G letters will need to be provided for embankment in proposed and future residential lot areas.

Bidders Initials _____

Date _____

BID PROPOSAL SUMMARY
KYNDWOOD UNIT 2 & 2A

3.25.24
Job No. 337.068 & 337.079

1300.2555 EROSION AND SEDIMENTATION CONTROL

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
1	Stabilized Construction Entrance Unit 2	EA	2	$ -	$ -
2	Concrete Washout Pit Unit 2	EA	1	$ -	$ -
3	Silt Fence Unit 2	LF	5,768	$ -	$ -
4	Rock Berm Unit 2	LF	254	$ -	$ -
5	Rock Riprap Unit 2	SY	119	$ -	$ -
6	Curb Inlet Protection (Filter Dike) Unit 2	LF	60	$ -	$ -
7	Clearing and Grubbing Unit 2 Lots	AC	13	$ -	$ -
				UNIT 2 COST	$ -

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
1	Stabilized Construction Entrance Unit 2A	EA	1	$ -	$ -
2	Concrete Washout Pit Unit 2A	EA	1	$ -	$ -
3	Silt Fence Unit 2A	LF	1289	$ -	$ -
4	Rock Berm Unit 2A	LF	25	$ -	$ -
5	Curb Inlet Protection (Filter Dike) Unit 2A	LF	47	$ -	$ -
6	Clearing and Grubbing Unit 2A Lots	AC	2	$ -	$ -
				UNIT 2A COST	$ -
				TOTAL COST	$ -

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Bidders Initials _____
Date _____

BID PROPOSAL SUMMARY
KYNDWOOD UNIT 2 & 2A

3.25.24
Job No. 337.068 & 337.079

1300.2750 SANITARY SEWER IMPROVEMENTS

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
1	8" SDR Sanitary Sewer Pipe Unit 2	LF	2,250		
	8" SDR 26 D3034 (6'-8')	LF	1,359	$ -	$ -
	8" SDR 26 D3034 (8'-10')	LF	319	$ -	$ -
	8" SDR 26 D3034 (10'-12')	LF	120	$ -	$ -
	8" SDR 26 D3034 (12'-14')	LF	138	$ -	$ -
	8" SDR 26 D3034 (14'-16')	LF	138	$ -	$ -
	8" SDR 26 D3034 (16'-18')	LF	104	$ -	$ -
	8" SDR 26 D3034 (18'-20')	LF	12	$ -	$ -
	8" SDR 26 DD2241 (6'-8')	LF	60	$ -	$ -
2	6" Sanitary Sewer Lateral w/ Cleanout (Single) Long Unit 2	EA	2	$ -	$ -
3	6" Sanitary Sewer Lateral w/ Cleanout (Double) Long Unit 2	EA	27	$ -	$ -
4	6" Sanitary Sewer Lateral w/ Cleanout (Single) Short Unit 2	EA	5	$ -	$ -
5	6" Sanitary Sewer Lateral w/ Cleanout (Double) Short Unit 2	EA	22	$ -	$ -
6	Vertical Stacks Unit 2	VF	111	$ -	$ -
7	Vented Manholes Unit 2	EA	2	$ -	$ -
8	Standard Sanitary Sewer Manhole Unit 2	EA	5	$ -	$ -
9	Adjustment to Existing Standard Manhole Unit 2	EA	2	$ -	$ -
10	Trench Excavation Protection Unit 2	LF	2,250	$ -	$ -
11	Mandrel and Vacuum Testing Unit 2	LF	2,250	$ -	$ -
12	Tie Into Existing Manhole Unit 2	EA	2	$ -	$ -
13	TV / Video Sewer Line Unit 2	LF	2,250	$ -	$ -
				UNIT 2 COST	$ -

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
1	6" Sanitary Sewer Lateral w/ Cleanout (Double) Long Unit 2A	EA	6	$ -	$ -
2	6" Sanitary Sewer Lateral w/ Cleanout (Single) Short Unit 2A	EA	1	$ -	$ -
3	6" Sanitary Sewer Lateral w/ Cleanout (Double) Short Unit 2A	EA	4	$ -	$ -
4	Vertical Stacks Unit 2A	VF	28	$ -	$ -
5	Adjustment to Existing Standard Manhole Unit 2A	EA	3	$ -	$ -
				UNIT 2A COST	$ -
				TOTAL COST	$ -

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Bidders Initials _____

Date _____

BID PROPOSAL SUMMARY
KYNDWOOD UNIT 2 & 2A

3.25.24
Job No. 337.068 & 337.079

1300.2850 WATER IMPROVEMENTS

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
1	Trench Excavation Safety Protection Unit 2	LF	2926	$ -	$ -
2	8" C-900 PVC Pipe Unit 2	LF	2661	$ -	$ -
3	8" Ductile Iron Pipe Unit 2	LF	265	$ -	$ -
4	8" Gate Valve MJ w/box Unit 2	EA	23	$ -	$ -
5	Ductile Iron Fittings Unit 2	TON	0.9	$ -	$ -
6	2" Short Single Service with Casing and Meter Box Unit 2	EA	58	$ -	$ -
7	2" Long Single Service with Casing and Meter Box Unit 2	EA	11	$ -	$ -
8	2" Long Double Service with Casing and Meter Box Unit 2	EA	22	$ -	$ -
9	Fire Hydrant Assembly (with 6" Gate Valve) Unit 2	EA	5	$ -	$ -
10	2" Temporary Blow-off Assembly Unit 2	EA	2	$ -	$ -
11	Tie-in to Exsiting Main Unit 2	EA	3	$ -	$ -
11	Hydrostatic Testing Unit 2	EA	1	$ -	$ -
12	Machine Chlorination Unit 2	LF	2926	$ -	$ -
				UNIT 2 COST	$ -

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
1	Trench Excavation Safety Protection Unit 2A	LF	708	$ -	$ -
2	8" C-900 PVC Pipe Unit 2A	LF	708	$ -	$ -
3	8" Gate Valve MJ w/box Unit 2A	EA	4	$ -	$ -
4	Ductile Iron Fittings Unit 2A	TON	0.1	$ -	$ -
5	2" Short Single Service with Casing and Meter Box Unit 2A	EA	6	$ -	$ -
6	2" Long Double Service with Casing and Meter Box Unit 2A	EA	2	$ -	$ -
7	Fire Hydrant Assembly(with 6" Gate Valve) Unit 2A	EA	1	$ -	$ -
8	2" Temporary Flush Valve Unit 2A	EA	2	$ -	$ -
9	Tie-in to Existing Main Unit 2A	EA	1	$ -	$ -
10	Hydrostatic Testing Unit 2A	EA	1	$ -	$ -
11	Machine Chlorination Unit 2A	LF	708	$ -	$ -
				UNIT 2A COST	$ -
				TOTAL COST	$ -

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Bidders Initials _____

Date _____

BID PROPOSAL SUMMARY
KYNDWOOD UNIT 2 & 2A

3.25.24
Job No. 337.068 & 337.079

1300.3000 DRAINAGE IMPROVEMENTS

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
TOTAL DRAINAGE IMPROVEMENTS UNIT 2					
1	Drainage Excavation	CY	5861	$ -	$ -
2	Drainage Embankment	CY	34	$ -	$ -
3	Revegetation	SY	8,791	$ -	$ -
4	Clearing and Grubbing	SY	8,791	$ -	$ -
STORM LINE A UNIT 2					
1	25' Curb Inlet	EA	1	$ -	$ -
2	24" R.C.P.	LF	119	$ -	$ -
3	24" Sloping Concrete Headwall	EA	1	$ -	$ -
STORM LINE B UNIT 2					
1	10' Curb Inlet	EA	2	$ -	$ -
2	3'x2' Single Box Culvert	LF	79	$ -	$ -
3	4'x4' Junction Box	EA	1	$ -	$ -
CHANNEL 1 UNIT 2					
1	8" Rock Rip-Rap	SY	147	$ -	$ -
2	3'x2' Concrete S.E.T.	EA	1	$ -	$ -
3	4'x2' Concrete S.E.T.	EA	1	$ -	$ -
4	3'x2' Single Box Culvert	LF	40	$ -	$ -
5	4'x2' Single Box Culvert	LF	41	$ -	$ -
6	6'x6' Junction Box	EA	1	$ -	$ -
TEMPORARY CHANNEL UNIT 2					
1	8" Rock Rip-Rap	SY	120	$ -	$ -
2	12" Rock Rip-Rap	SY	56	$ -	$ -
				UNIT 2 COST	$ -

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
TOTAL DRAINAGE IMPROVEMENTS UNIT 2A					
1	Drainage Excavation	CY	482	$ -	$ -
2	Drainage Embankment	CY	11	$ -	$ -
3	Revegetation	SY	15602	$ -	$ -
4	Clearing and Grubbing	SY	15602	$ -	$ -
STORM SWALE A UNIT 2A					
1	25' Sidewalk Bridge	EA	1	$ -	$ -
3	Handrail	LF	104	$ -	$ -
8	6" Rock Rip-Rap	SY	34	$ -	$ -
8	10" Rock Rip-Rap	SY	13	$ -	$ -
STORM SWALE B UNIT 2A					
1	Sloped Headwall	EA	2	$ -	$ -
2	4'x2' Single Box Culvert	LF	77	$ -	$ -
8	8" Rock Rip-Rap	SY	28	$ -	$ -
STORM LINE C UNIT 2A					
1	10' Curb Inlet	EA	2	$ -	$ -
1	Sloped Headwall	EA	1	$ -	$ -
2	24" R.C.P.	LF	88	$ -	$ -
7	3'x3' Junction Box	EA	1	$ -	$ -
STORM LINE D UNIT 2A					
1	8'x6' M.B.C. Inlet	EA	2	$ -	$ -
8	8'x6' Mulriple Box Culvert	LF	257	$ -	$ -
3	Concrete Headwall/Wingwall	EA	2	$ -	$ -
8	24" Rock Rip-Rap	SY	42	$ -	$ -
Channel 1 UNIT 2A					
1	Class 1 Flexible Channel Liner	SY	209	$ -	$ -

UNIT 2A COST $ -

TOTAL COST $ -

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Bidders Initials _____

Date _____

BID PROPOSAL SUMMARY
KYNDWOOD UNIT 2 & 2A

3.25.24
Job No. 337.068 & 337.079

1300.3316 STREET IMPROVEMENTS

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
1	Street Excavation Unit 2	CY	11,164	$ -	$ -
2	Street Embankment Unit 2	CY	230	$ -	$ -
3	3" HMAC Type "D" with Prime Coat (Local) Unit 2	SY	9,552	$ -	$ -
4	12" Granular Base Course (Type "A") Unit 2	SY	11,942	$ -	$ -
5	Tensar Triax TX5 Geogrid Unit 2	SY	11,942	$ -	$ -
6	End of Road (Bollards and Markers) Unit 2	EA	5	$ -	$ -
7	Concrete Curb and Gutter Unit 2	LF	5,991	$ -	$ -
8	4' Sidewalk Unit 2	SY	2,689	$ -	$ -
9	Developer Sidewalk 4' Sidewalk Unit 2	SY	231	$ -	$ -
10	ADA Ramps Unit 2	EA	20	$ -	$ -
11	Header Curb Unit 2	LF	31	$ -	$ -
12	Fire Access Road Striping & Signage Unit 2	LS	1	$ -	$ -
13	One Course Surface Treatment Unit 2	SY	1,206	$ -	$ -
14	8" Granular Base Course (Type "A") Unit 2	SY	681	$ -	$ -
15	Fire Access Gate Unit 2	EA	1	$ -	$ -
16	Retaining Wall (4' maximum height) Unit 2	LF	2,185	$ -	$ -
17	Mail Box Pad Unit 2	EA	2	$ -	$ -
18	Signage Striping Unit 2	LS	1	$ -	$ -
19	R.O.W. Clearing and Grubbing Unit 2	SY	6,235	$ -	$ -
20	R.O.W. Revegetation Unit 2	SY	6,235	$ -	$ -
				UNIT 2 COST	$ -

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES	UNIT PRICES	COST
1	Street Excavation Unit 2A	CY	757	$ -	$ -
2	Street Embankment Unit 2A	CY	4000	$ -	$ -
3	3" HMAC Type "D" with Prime Coat (Local) Unit 2A	SY	2,222	$ -	$ -
4	12" Granular Base Course (Type "A") Unit 2A	SY	2,694	$ -	$ -
5	Tensar Triax TX5 Geogrid Unit 2A	SY	2,694	$ -	$ -
6	End of Road (Bollards and Markers) Unit 2A	EA	5	$ -	$ -
7	Concrete Curb and Gutter Unit 2A	LF	1,117	$ -	$ -
8	4' Sidewalk Unit 2A	SY	635	$ -	$ -
9	ADA Ramps Unit 2A	EA	4	$ -	$ -
10	Header Curb Unit 2A	LF	27	$ -	$ -
11	Signage Striping Unit 2A	LS	1	$ -	$ -
12	R.O.W. Clearing and Grubbing Unit 2A	SY	1,226	$ -	$ -
13	R.O.W. Revegetation Unit 2A	SY	1,226	$ -	$ -
				UNIT 2A COST	$ -
				TOTAL COST	$ -

* Prime coat shall be included in costs of related bid items

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** Street sections provided above are directly from the City of New Braunfels "One & Two Family Residential Local" detail. The Geotechnical Engineer has provided alternate options involving geogrid and lime stabilization that result in reduced base sections. Please note that even if instructed to use an alternate street section, that all requirements in the City of New Braunfels detail shall be met, including, but not limited to, the base being extended 1 foot beyond the back of curb with a 6" minimum thickness.

Bidders Initials _____

Date _____

BID PROPOSAL SUMMARY
KYNDWOOD UNIT 2 & 2A

3.25.24
Job No. 337.068 & 337.079

1300.3475 MISCELLANEOUS IMPROVEMENTS

NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITIES*	UNIT PRICES	COST
1	Dry Utilities Unit 2	LS	1	$ -	$ -
2	Dry Utilities Unit 2A	LS	1	$ -	$ -

TOTAL COST $ -

* Dry Utilities include transformer pads and electric conduit, it doesn't include telecom conduit.

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Bidders Initials _____
Date _____

BID PROPOSAL SUMMARY 3.25.24
KYNDWOOD UNIT 2 & 2A Job No. 337.068 & 337.079

ALTERNATE BID ITEMS

NO.	DESCRIPTION	UNIT OF MEASURE	UNIT PRICES
1	Haul Excess Material off Project Site* Unit 2	CY	$ -
2	Lime Treated Subgrade Unit 2	SY	$ -
3	4" PVC Conduit Unit 2	LF	$ -
4	6" PVC Conduit Unit 2	LF	$ -
5	8" PVC Conduit Unit 2	LF	$ -
1	Haul Excess Material off Project Site* Unit 2A	CY	$ -
2	Lime Treated Subgrade Unit 2A	SY	$ -
3	4" PVC Conduit Unit 2A	LF	$ -
4	6" PVC Conduit Unit 2A	LF	$ -
5	8" PVC Conduit Unit 2A	LF	$ -

* This item is for establishing that embankment onsite is cheaper than hauling off site. This is for MUD purposes.

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Bidders Initials _____

Date _____

KYNDWOOD UNITS 2 & 2A

STREETS, DRAINAGE, WATER & WASTEWATER CONSTRUCTION

ACKNOWLEDGMENT OF RECEIPT OF ADDENDUM

ADDENDUM NO. 1 _____
Signature Date

ADDENDUM NO. 2 _____
Signature Date

ADDENDUM NO. 3 _____
Signature Date

ADDENDUM NO. 4 _____
Signature Date

ADDENDUM NO. 5 _____
Signature Date

ADDENDUM NO. 6 _____
Signature Date

Lennar Homes of Texas Land and Construction, LTD. On Behalf of Kyndwood MUD

WORK AGREEMENT No. _____

TO LAND BASE MASTER TRADE PARTNER AGREEMENT No. _____

CONTRACTOR'S STATE LICENSE No: _____
SUBCONTRACTOR'S STATE LICENSE No: _____

REGIONAL OPERATIONS CENTER: Grove
DIVISION OFFICE: San Antonio
WORK DESCRIPTION: _____
OWNER: _____
CONSTRUCTION LENDER: _____
PROJECT NAME: Kyndwood Subdivision Units 2 & 2A Public Improvements.
WORK AGREEMENT AMOUNT: _____

This Work Agreement to the Land Base Master Trade Partner Agreement (the "Work Agreement") is entered into _____ by and between Lennar Homes of Texas Land & Construction, LTD (a Texas Limited Partnership) on behalf of Kyndwood MUD ("Contractor"), whose address is 100 NE Loop 410, Suite 1155, San Antonio Texas 78232, and telephone number is (830) 914-2000, and _____ _____ ("Subcontractor"), whose address is _____ , and telephone number is _____.

RECITALS

A. Contractor and Subcontractor entered into that certain Land Base Master Trade Partner Agreement on or about _____, Contract No. _____(the "Agreement"). As used herein, and except as hereby expressly provided, all capitalized words and phrases shall have the same meanings as defined in the Agreement.

B. Contractor desires to have Subcontractor perform work within the Project referenced above (the "Project") as set forth in Subcontractor's bid package for the Project, which was submitted to Contractor via Contractor's electronic bid system, and is hereby approved by Contractor and incorporated herein by reference (the "Work").

C. Contractor and Subcontractor desire to amend the Agreement as more particularly set forth herein.

TERMS AND CONDITIONS

NOW, THEREFORE, in consideration of the foregoing recitals, and the covenants and conditions contained herein, and for other good and valuable consideration, the receipt of which is hereby acknowledged, Contractor and Subcontractor hereby agree to amend the Agreement as follows:

1. Contractor's Scope of Work is set forth in Exhibit "A" hereto.

2. Pricing is established in the "Pricing Schedule (Basis of Contract and Progress Billing Sheet)" attached hereto as Exhibit "B".

3. The Project Location shall be as set forth in Exhibit "C" hereto.

4. The List of Sub-subcontractors shall be as set forth in Exhibit "D" hereto.

5. The Plans and Specifications for the Work shall be as set forth in Exhibit "E" hereto.

6. The Construction Schedule shall be as set forth in Exhibit "F" hereto.

7. Work approved for construction is set forth in Subcontractor's bid package for the Project described above.

8. Prior to commencing the Work, Subcontractor shall comply with all insurance requirements set forth in Schedule "4" to the Agreement which requirements are incorporated herein by this reference as though set forth herein, including, without limitation and if applicable, the "OCIP Addendum" if attached thereto. If the "Insurance Requirements" are added to or amended by this Work Agreement, they are set forth in the "Modified Insurance Requirements" attached hereto as Exhibit "G".

9. The Pricing Schedule attached hereto shall be effective on the date set forth above. Any changes to the Work, or the Pricing Schedule, shall become effective only upon execution by all parties hereto of an amendment to the Work Agreement (the "Amendment"). Subcontractor Rates and Rental Rates are as set forth in Exhibit "H" hereto.

10. Contractor may, from time to time, issue written notices to proceed/purchase order requests identifying specific locations on which the Work is to be performed ("Scheduling Notice", "Received Order", or "Notice to Proceed"). Contractor shall have no obligation to issue any Scheduling Notice(s) during the term of this Work Agreement. **THIS WORK AGREEMENT IS NOT AN AUTHORIZATION TO PROCEED WITH WORK, AND SHALL NOT BECOME EFFECTIVE WITH RESPECT TO THE WORK OF SUBCONTRACTOR UNLESS AND UNTIL CONTRACTOR ISSUES SCHEDULING NOTICE(S) TO SUBCONTRACTOR AUTHORIZING THE SPECIFIC WORK OF SUBCONTRACTOR TO BE PERFORMED, AND THIS WORK AGREEMENT SHALL BE BINDING ONLY AS TO THE WORK SO AUTHORIZED BY CONTRACTOR. SUBCONTRACTOR SHALL PERFORM NO WORK WITHOUT RECEIVING CONTRACTOR'S WRITTEN SCHEDULING NOTICE(S) FOR SUCH WORK. SUBCONTRACTOR AGREES TO COMMENCE SUCH WORK AS MAY BE AUTHORIZED BY CONTRACTOR BY MEANS OF EACH SCHEDULING NOTICE(S), AND SUCH SCHEDULING NOTICE(S) SHALL BE EFFECTIVE IMMEDIATELY UPON ISSUANCE BY CONTRACTOR WITHOUT NEED FOR FURTHER ACCEPTANCE THEREOF BY SUBCONTRACTOR.** If the Work authorized by a Scheduling Notice is not commenced on the date specified in the Scheduling Notice, Contractor may, in its sole discretion, declare such Scheduling Notice null and void. Contractor may, but shall not be obligated to, furnish Subcontractor with a progress schedule for all or any portion of the Work which, if furnished, may be amended from time to time by Contractor and shall be considered a part of this Work Agreement. Subcontractor acknowledges that neither this Work Agreement nor the issuance by Contractor of a progress schedule constitute any representation by Contractor that a minimum or specified number of Scheduling Notices will be issued. As to that portion of the Work covered by a Scheduling Notice, such schedule shall control over any other provision of this Work Agreement or progress schedule regarding time for performance.

Except to the extent the Agreement is supplemented by this Work Agreement or such other Work Agreements that may have been entered into by the parties hereto pursuant to the Agreement, the terms and conditions of the Agreement shall remain unmodified and in full force and effect. In the event of conflict between the terms and conditions of the Agreement and the terms and conditions of this Work Agreement, the terms and conditions of this Work Agreement shall prevail, but only with respect to the Work covered hereby.

[Signatures on following page]

IN WITNESS WHEREOF, the parties hereto have executed this Work Agreement as of the day and year first above written.

Lennar Homes of Texas Land & Construction, LTD (a Texas Limited Partnership) on behalf of Kyndwood MUD
"Contractor"

By: _____

Name: Brian Barron

Title: Division President .

By: _____

Name: _____
Title: _____

By: _____

License No.: _____

_____
"Subcontractor"

By: _____

Name: _____

Title: _____

By: _____

Name: _____
Title: _____

Fed. I.D. No.: _____
License No.: _____

Exhibits to Work Agreement

Exhibit “A” Scope of Work
Exhibit “B” Pricing Schedule (Basis of Contract and Progress Billing Sheet)
Exhibit “C” Project Location
Exhibit “D” List of Sub-subcontractors
Exhibit “E” Plans and Specifications
Exhibit “F” Construction Schedule
Exhibit “G” Modified Insurance Requirements / OCIP Exhibit (if applicable)
Exhibit “H” Subcontractor Rates and Rental Rates

EXHIBIT “A” TO WORK AGREEMENT
SCOPE OF WORK

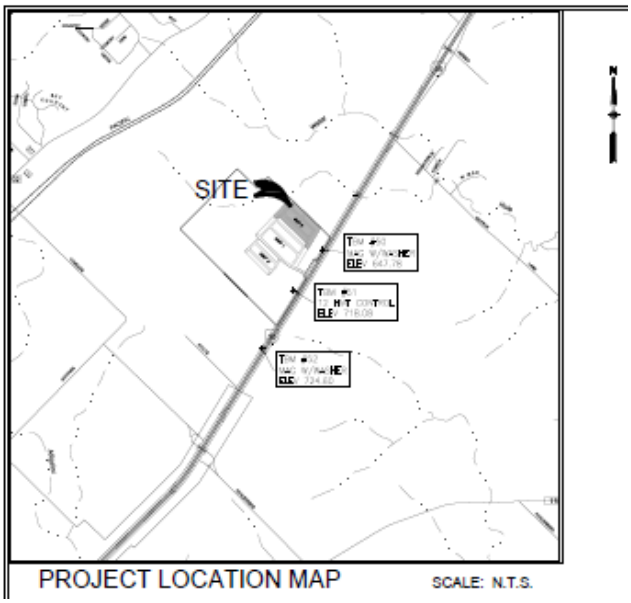
EXHIBIT “B” TO WORK AGREEMENT
PRICING SCHEDULE
(BASIS OF CONTRACT AND PROGRESS BILLING SHEET)

EXHIBIT "C" TO WORK AGREEMENT
PROJECT LOCATION

Real Property in New Braunfels ETJ, County of Comal, State of Texas described as follows:

FINAL PLAT ESTABLISHING
KYNDWOOD, UNIT 2

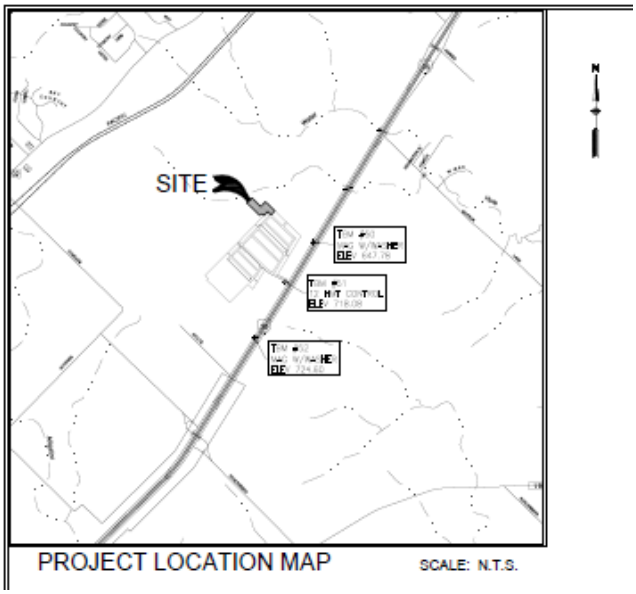
BEING A 18.075 ACRE TRACT OF LAND, SITUATED IN THE NANCY KENNER SURVEY NO. 2, ABSTRACT NO. 306, COMAL COUNTY, TEXAS. BEING A PORTION OF A CALLED 150.643 ACRE TRACT RECORDED IN DOCUMENT NO. 202306036543 OF OFFICIAL PUBLIC RECORDS, COMAL COUNTY, TEXAS.



PROJECT LOCATION MAP SCALE: N.T.S.

FINAL PLAT ESTABLISHING
KYNDWOOD, UNIT 2A

BEING A 4.537 ACRE TRACT OF LAND, SITUATED IN THE NANCY KENNER SURVEY NO. 2, ABSTRACT NO. 306, COMAL COUNTY, TEXAS. BEING A PORTION OF A CALLED 150.643 ACRE TRACT RECORDED IN DOCUMENT NO. 202306036543 OF OFFICIAL PUBLIC RECORDS, COMAL COUNTY, TEXAS.



PROJECT LOCATION MAP SCALE: N.T.S.

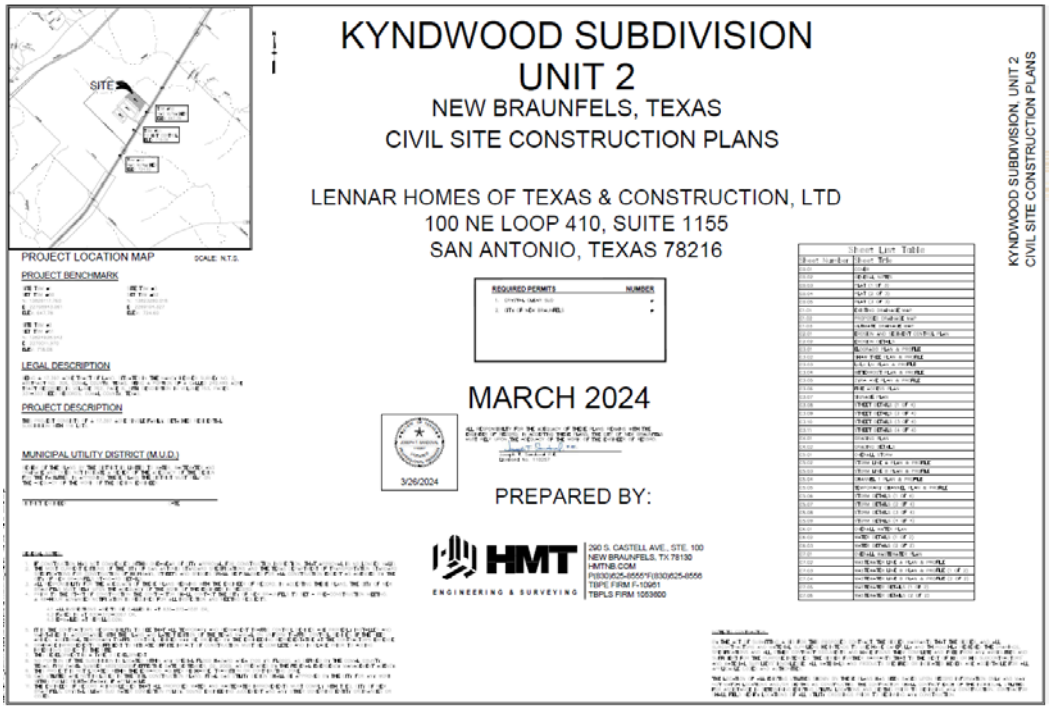
EXHIBIT “D” TO WORK AGREEMENT
LIST OF SUB-SUBCONTRACTORS

(Labor, Materials, Equipment, Supplies and/or Supervision)

List below the name and business address of each Sub-subcontractor approved by Contractor who will perform any portion of the Work under the Agreement. Also list the portion of the Work which will be done by such Sub-subcontractor. The listing of more than one Sub-subcontractor for each item of Work to be performed with the words "and/or" is not permitted.

WORK TO BE PERFORMED	% OF TOTAL CONTRACT	SUB-SUBCONTRACTOR'S NAME AND ADDRESS

EXHIBIT “E” TO WORK AGREEMENT
PLANS AND SPECIFICATIONS



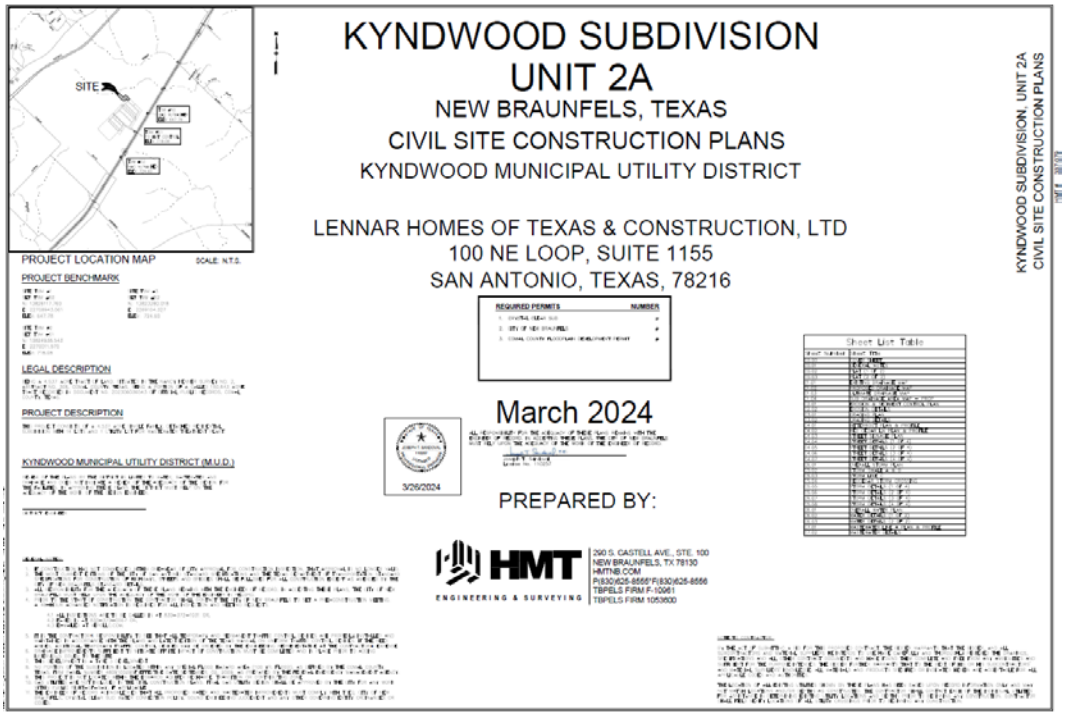


EXHIBIT “F” TO WORK AGREEMENT
CONSTRUCTION SCHEDULE

EXHIBIT “G” TO WORK AGREEMENT

MODIFIED INSURANCE REQUIREMENTS / OCIP EXHIBIT (if applicable)

EXHIBIT “H” TO WORK AGREEMENT
SUBCONTRACTOR RATES AND RENTAL RATES

In the event that additional work is undertaken which is not covered by the Agreement and Subcontractor elects to proceed on a "time and material" or cost plus basis, the rates provided below shall prevail. Rates shall include all labor and equipment to complete the Work. The rates shall be billing rates, with no further markups to be added, and all equipment shall include fuel, lubrication, operation and all maintenance. No overtime premium will be paid on equipment. Subcontractor’s performance of any such work on a "time and material" or cost plus basis shall be subject to the provisions of Section 11 of the Agreement.

SCHEDULE "2" TO MTPA (LAND) BASE AGREEMENT
NOTICE TO PROCEED/SCHEDULING NOTICE

Notice is hereby given by Contractor's Representative that on this _____day _____, **20**__, _ ("Subcontractor"), is directed to commence construction of Work pursuant to Work Agreement No. ____, under MTPA (Land) Base Agreement Contract No. SAN_____("Agreement").

Subcontractor has **270** working days from this date within which to complete the Work as set forth in the Agreement. Time is of the essence with respect to the Agreement and, accordingly, Subcontractor promises to complete the Work within the specified period of time or be liable for liquidated damages, as stipulated in the Agreement.
[Include clear description of work to be completed, plans w/ dates, reports etc.]

Agreed to and accepted this ___ **day of** _____**, 20**__**.**

_____

By: _____

Name: _____

Title: _____

Lennar homes of Texas Land Construction, LTD on behalf of Kyndwood MUD

_____

By: _____

Name: Brian Barron _____

Title: Division President _____

KYNDWOOD SUBDIVISION UNIT 2 & 2A STREETS, DRAINAGE, WATER AND WASTEWATER CONSTRUCTION IMPROVEMENTS

Technical Specifications

New Braunfels, Texas
March 2024

Joseph T. Sandoval, P.E.
March 27, 2024

Prepared by:

HMT
ENGINEERING & SURVEYING

290 S. Castell Avenue, Ste 100,
New Braunfels, TX 78130
(830) 625-8555
TBPELS FIRM F-10961
TBPELS FIRM 10153600

SECTION 1.04 - GENERAL

CITY OF NEW BRAUNFELS- KYNDWOOD UNIT 2 & 2A STREETS, DRAINAGE, WATER AND WASTEWATER IMPROVEMENTS

PART 1: GENERAL

1.01 SCOPE OF WORK

The work covered by these Specifications consists of furnishing all labor, equipment, machinery and materials and performing all operations in connection with the construction street and sidewalk improvements.

This work shall be awarded under one contract and shall include demolition; street full depth repairs, street mill, construction of concrete curbs, construction of concrete sidewalks, street overlay, and structures and appurtenances in accordance to the terms and conditions of the Contract Documents.

1.01 GOVERNING SPECIFICATIONS

Additional specifications to be included as part of these Contract Documents are as follows:

- City of New Braunfels
- TxDOT
- New Braunfels Utilities
- Crystal Clear SUD
- TCEQ

Any discrepancies between these specifications shall be resolved by the engineer prior to proceeding with construction.

1.02 CONSTRUCTION SITE

During construction, the Contractor shall keep the site free and clean from all rubbish and debris and shall clean-up the site promptly when notified to do so by the Engineer.

The Contractor shall, at his own expense, maintain streets free from dust, mud, excess earth or debris which constitutes a nuisance or danger to the public using the thoroughfare or the occupants of adjacent properties.

Care shall be taken to prevent spillage on streets over which hauling is done, and any such spillage or debris deposited on streets, due to the contractor's operations, shall be immediately removed.

1.03 BACKWORK

The Contractor shall coordinate his operations in such a manner as to prevent the amount of clean-up and completion of back work from becoming excessive. Should such a condition exist, the Engineer may order all or portions of the work to cease and

refuse to allow any work to commence until the back work is done to the Engineer's satisfaction.

1.04 GRADING

The Contractor shall do such grading in the area adjacent to backfilled trenches and structures as may be necessary to leave the area in a neat and satisfactory condition approved by the Engineer.

1.05 INSPECTION OF WORK

The work covered under this Contract shall be inspected by the Engineer or the owner's authorized representative. The quality of material and the quality of installation of pipe and related equipment shall be to the satisfaction of the Inspector. It shall be the Contractor's responsibility for the construction methods and safety precautions in the undertaking of this Contract.

1.06 NOTIFICATION

The Engineer and Owner must be notified a minimum of 48-hours in advance of beginning construction.

1.07 CONSTRUCTION STAKING

The Engineer shall provide a minimum of one benchmark at each project site.

The Contractor shall provide his own construction staking. No additional payment shall be provided for construction staking. Related costs will be subsidiary to other payment items.

1.08 TESTING AND ACCEPTANCE OF IMPROVEMENTS

The Engineer and Owner representatives will be present at the testing of water and wastewater facilities. The Contractor will test all lines and be confident that the lines will be able to pass the test prior to calling the Engineer to observe the tests. No lines will be accepted by the Owner without the Engineer observing the tests and certifying to the lines passing the pressure tests as specified herein.

1.09 WORK IN FREEZING WEATHER

Portions of the work may continue as directed by the Engineer.

1.10 PROPERTY LINES AND MONUMENTS

The Contractor shall be responsible for the protection referred and resetting corner monuments if disturbed.

1.11 CONTRACTOR'S USE OF PREMISES

All proposed work is within existing Right of Way or easements. Should the contractor desire additional workspace, it will be the contractor's responsibility to procure said additional workspace.

1.12 TRADE NAMES

Except as specified otherwise, wherever in the Specifications an article or class of materials is designated by a trade name or by the name or catalog number of any marker, patentee, manufacturer, or dealer, such designated shall be taken as intending to mean and specify the articles described or another equal thereto in quality, finish, and serviceability for the purpose intended, as may be determined and judged by the Engineer in his sole discretion.

1.13 MATERIALS AND WORKMANSHIP

No material which has been used by the Contractor or any temporary purpose whatever is to be incorporated in the permanent structure without written consent of the Engineer. Where materials or equipment are specified by a trade or brand name, it is not the intention of the Owner to discriminate against an equal product of another manufacturer, but rather to set a definite standard of quality for performance, and to establish an equal basis for the evaluation of bids. Where the words "equivalent", "proper", or "equal to" are used, they shall be understood to mean that the item referred to shall be proper, the equivalent of, or equal to some engineer. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be in all cases fully equal to approved samples. Notwithstanding that the words "or equal to" or other such expressions may be used in the specifications in connection with a material, manufactured article or process, the material, article or prices specifically designated shall be used, unless a substitute shall be approved in writing by the Engineer, and the Engineer shall have the right to require the use of such specifically designated materials, article or process.

1.17 MEASUREMENT AND PAYMENT

No separate payment for work performed under this item. Include cost of the same in contract price for all items of which this work is a component.

END OF SECTION

SECTION 1.05 - SITE CONDITIONS

CITY OF NEW BRAUNFELS- KYNDWOOD UNIT 2 & 2A STREETS, DRAINAGE, WATER AND WASTEWATER IMPROVEMENTS

PART 1: GENERAL

1.01 SUBSURFACE INFORMATION

A. The Contractor shall be responsible for any subsurface explorations and tests he deems necessary.

1.02 SITE INVESTIGATION AND REPRESENTATION

A. The Contractor acknowledges that he has satisfied himself as to the nature and location of the work; the general and local conditions, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river/stream stages, or similar physical conditions at the site, the conformation and conditions of the ground; the character of equipment and facilities needed preliminary to and during the execution of the work and all other matters which can in any way affect the work or the cost thereof under the Contract.

B. The Contractor further acknowledges that he has satisfied himself as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site and from evaluating information derived from exploratory work that has been done by the Owner as presented in the geotechnical report, as well as from information presented herein as a part of these Contract Documents. Any failure by the Contractor to acquaint himself with all the available information will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work. Neither the Owner nor the Engineer assume responsibility for any conclusion or interpretation made by the Contractor on the basis of the information made available by the Owner or the Engineer.

C. Existing ground profiles shown on the Plans were plotted from field surveys.

1.03 RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

A. Known utilities and structures adjacent to or encountered in the work are shown on the Drawings. The locations shown are taken from existing records and the best information available from existing plans; however, it is expected that there may be some discrepancies and omissions in the locations and quantities of utilities and structures shown. Those shown are for the convenience of the Contractor only, and no responsibility is assumed by either the Owner or the Engineer for their accuracy or completeness.

B. Neither the Owner nor his officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the work.

C. The Contractor shall at all times provide unobstructed access to fire hydrants, underground conduit, manholes, and water or gas valve boxes.

D. Where the Contractor's operations could cause damage which might result in considerable expense, loss, and inconvenience when his operations are adjacent to or near railway, telegraph, telephone, television, power, oil, gas, water, sewer, irrigation, or other systems, no operations shall be commenced until the Contractor has made all arrangements necessary for the protection of these utilities and services.

E. The Contractor shall notify all utility offices that are affected by the construction operation at least 15 days in advance of commencing construction operations. The Contractor shall not expose any utility without first obtaining permission from the affected agency. Once permission has been granted, locate and, if necessary, expose and provide temporary support for all existing underground utilities in advance of operations.

F. The Contractor shall be solely and directly responsible to the Owners and operators of such utility properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage that may result from the construction operations under this Contract.

G. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental breakage due to construction operations, the Contractor shall promptly notify the proper authority and cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no event shall interruption of any water or utility service be allowed unless prior approval is granted by the owner of the utility.

H. The Contractor shall replace, at his own expense, any and all other existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract Documents.

I. Where existing utility lines or structures are so located as to physically conflict with permanent structures to be constructed under this Contract, the conflicting utility line or structure shall be permanently relocated. Such relocations shall be considered as required by their CONTRACT.

J. The Contractor shall give immediate notice to the Engineer, the Owner and the owner of the utility (where applicable) when a physical conflict is determined to exist. The actual relocation of a public utility will be accomplished by the owner of the utility at his expense unless otherwise specified in these Contract Documents. Any delays resulting from the required relocations of the utilities are the responsibility of the Contractor.

K. Where existing utility lines or structures are so located as to interfere with the Contractor's execution of the work, but do not physically conflict with completed manholes or other permanent structures to be constructed under this Contract, any modification, alteration, or relocation of interfering utility, either permanent or temporary, shall be accomplished at the expense of the Contractor.

L. The Contractor shall give immediate notice to the Engineer and the Owner of the utility when an interference is determined to exist and shall obtain approval to relocate such utility or to discontinue service therein from the Engineer and the owner of the utility. The

owner of the utility shall have the right to do all work required to discontinue, relocate, and replace interfering utilities and charge the Contractor for all costs thereof. When approved by the Engineer and the owner of the utility, all work required to discontinue, relocate, and replace interfering utilities may be done by, or arranged for, by the Contractor. All such discontinuance, relocation, and replacement shall be accomplished in accordance with all requirements of the owner of the utility.

1.04 INTERFERING STRUCTURES

A. Take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground. An attempt has been made to show major structures on the Plans. While the information has been compiled from the best available sources, it's completeness and accuracy cannot be guaranteed, and it is presented as a guide to avoid known possible difficulties.

B. Protect existing structures from damage, whether or not they lie within the right-of-way or the limits of the easements obtained by the Owner. Where existing structures must be removed to properly carry out the work, or are damaged during the work, they shall be restored at the Contractor's own expense to at least their original condition and to the satisfaction of the Engineer.

C. The Contractor may, with the approval of the Engineer and without additional compensation, remove and replace in a condition as good as or better than original, any small interfering structures such as fences and signposts that interfere with the Contractor's operations.

1.05 FIELD RELOCATION

During the progress of the work, minor relocations of the work may be necessary. Such relocations shall be made only by direction of the Engineer and the Owner. If existing structures are encountered that will prevent construction as shown, notify the Engineer before continuing with the work in order that the Engineer may make such field revisions as necessary to avoid conflict with the existing structures. If the Contractor shall fail to notify the Engineer when an existing structure is encountered and proceeds with the work despite this interference, he shall be responsible for any damage that may occur.

1.06 LAND MONUMENTS

The Contractor shall preserve or replace any existing Federal, State, County, City, and private land monuments encountered. All monument replacement by the Contractor shall be performed by a land surveyor licensed in the State of Texas.

1.07 PAYMENT

The work specified in this Section shall be considered incidental and payment will be included as part of the appropriate lump sum or unit prices specified in the Bid Form.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

END OF SECTION

SECTION 1.06- CONTRACTOR'S USE OF PREMISES

CITY OF NEW BRAUNFELS- KYNDWOOD UNIT 2 & 2A STREETS, DRAINAGE, WATER AND WASTEWATER IMPROVEMENTS

PART 1: GENERAL

1.01 DESCRIPTION

A. Contractor shall limit his use of the premises, for Work and for storage, to the areas designated on the Drawings, or approved by Owner.

B. Contractor shall submit to the Owner for approval a plan of operations, designating proposed areas of the property to be used for his operations, material storage, equipment storage, employee's parking, offices and shops. The area shall effect minimal interference with the present operations.

C. Contractor shall assume full responsibility for the protection and safekeeping of products under this Contract stored on the site.

D. Contractor shall move any stored Products, under Contractor's control, which interfere with operations of the Owner.

E. Contractor shall obtain and pay for the use of additional storage or work areas needed for operations.

F. Any damage to existing facilities, including contamination, which may be caused by Contractor's personnel, callers, visitors, materials or equipment, shall be repaired or corrected at the sole expense of the Contractor.

G. Any fence that is damaged or removed by the Contractor will be replaced at the Contractor's expense in like kind, and to the satisfaction of the Engineer and the Owner.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

END OF SECTION

SECTION 1.07 - CONTROL OF WORK

CITY OF NEW BRAUNFELS- KYNDWOOD UNIT 2 & 2A STREETS, DRAINAGE, WATER AND WASTEWATER IMPROVEMENTS

PART 1: GENERAL

1.01 PLANT

The Contractor shall furnish plans and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Proposal. If at any time such plan appears to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the plans and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such an order shall in no way relieve the Contractor of his obligations to secure the quality of work and rate of progress required.

1.02 PRIVATE LAND

The Contractor shall not enter or occupy private land outside of easements, except by written permission of the respective landowner.

1.03 PIPE LOCATIONS

Pipelines shall be located substantially as indicated on the Drawings, but the Engineer and the Owner reserve the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

1.04 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access during construction shall be removed when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the Excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of the open trench, prohibiting staking excavated material in the street, and requiring that the trench shall not remain open overnight.

B. The Contractor shall take precautions, such as fences and barricades, to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles that could be dangerous to the public shall be well lighted at night.

1.05 TEST PITS

Test pits for the purpose of locating underground pipelines or structures in advance of the construction shall be excavated and backfilled by the Contractor at the direction of the Engineer and the Owner. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer and the Owner.

1.06 MAINTENANCE OF TRAFFIC

A. Unless permission to close a street is received in writing from the proper authority, all excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the Engineer.

B. Detours around construction will be subject to the approval of the Owner and the Engineer. Where detours are permitted, the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While Traffic is detoured, the Contractor shall expedite construction operations and periods when traffic is being detoured will be strictly controlled by the Owner.

C. The Contractor shall take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. The Contractor shall be fully responsible for damage or injuries whether or not police protection has been provided.

1.07 CARE AND PROTECTION OF PROPERTY

The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in some other manner acceptable to the Engineer.

1.08 MAINTENANCE OF FLOW

The Contractor shall, at his own cost, provide for flow of sewers, drains and water courses interrupted during the progress of the work, and shall immediately cart away and remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer and the Owner well in advance of the interruption of any flow.

1.09 COOPERATION WITIN THIS CONTRACT

A. The Contractor shall cooperate with Subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling and fitting shall be carried out where required by the Contractor and his Subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

1.10 CLEANUP

During the course of the work, the contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations, and shall leave the entire site of the work in a neat and orderly condition.

1.11 PAYMENT

Payment for the work in this Section will be included as part of the total lump sum or appropriate unit prices stated in the Bid Form.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

END OF SECTION

SECTION 1.08 – SUBMITTALS

CITY OF NEW BRAUNFELS- KYNDWOOD UNIT 2 & 2A STREETS, DRAINAGE, WATER AND WASTEWATER IMPROVEMENTS

PART 1: GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: Shop Drawings, Product Data, Samples, Mock Ups, Construction Photographs, and Construction or Submittal Schedules. Detailed submittal requirements will be specified in the technical specifications sections.

B. All submittals shall be clearly identified by reference to Specification Section, Paragraph, Drawing No. or Detail as applicable. Submittals shall be clear and legible and of sufficient size for sufficient presentation of data.

1.02 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

A. Shop Drawings

1. Shop drawings as specified in individual work Sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shop work manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the Work.

2. All shop drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

3. The Contractor shall check all subcontractor's shop drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the Drawings and Specifications. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission thereof.

4. All details on shop drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted for approval.

B. Product Data

1. Product data as specified in individual Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliance and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring

diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing and printed product warranties, as applicable to the Work.

C. Samples

1. Samples specified in individual Sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the Work.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall review shop drawings, product data and samples, including those by subcontractors, prior to submission to determine and verify the following:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with the Specifications

B. Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor: "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements." Shop drawings and product data sheets 11-in X 17-in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Resident Project Representative a copy of each submittal transmittal sheet for shop drawings, product data and samples at the time of submittal of said drawings, product data and samples to the Engineer.

C. The Contractor shall utilize a 10-character submittal identification numbering system in the following manner:

1. The first character shall be a D, S, P, M, or R, which represents Shop/Working Drawing and other Product Data (D), Sample (S), Preliminary Submittal (P), Operating/Maintenance Manual (M), or Request for Information (R).

2. The next five digits shall be the applicable Specification Section Number.

3. The next three digits shall be the numbers 001-999 to sequentially number each initial separate item or drawing submitted under each specific Section number.

4. The last character shall be a letter, A-Z, indicating the submission, or resubmission of the same Drawing (i.e. A=1st submission, B=2nd submission, C=3d submission, etc.). A typical submittal number would be as follows:

D = 03300-008-B
D = Shop Drawing
03300 = Specification Section for Concrete
008 = The eighth initial submittal under this specification section
B = The second submission (first resubmission) of that particular shop drawing

D. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

E. The review and approval of shop drawings, samples or product data by the Engineer shall not relieve the Contractor from his/her responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefore.

F. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

G. Project work, materials, fabrication, and installation shall conform with approved shop drawings, applicable samples, and product data.

1.04 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.

B. Each submittal must also be submitted in electronic PDF format.

C. Each submittal, appropriately coded, will be returned within 30 working days following receipt of submittal by the Engineer.

D. Number of submittals required:

1. Shop Drawings as defined in Paragraph 1.02 A: Six copies. Two of these copies will be returned to the Contractor. If the Contractor desires more than two copies returned, they shall submit extra copies.

2. Product Data as defined in Paragraph 1.02 B: Three copies.

3. Samples: Submit the number stated in the respective Specification Sections.

E. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.

2. The Project title and number.

3. Contractor identification.

4. The names of:

   a. Contractor
   b. Supplier
   c. Manufacturer

5. Identification of the product, with the specification section number, page and paragraph(s).

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the Work or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.

9. Identification of deviations from Contract Documents.

10. Identification of revisions on resubmittals.

11. An 8-in X 3-in blank space for Contractor and Engineer stamps.

1.05 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

A. The review of shop drawings, data, and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed as:

1. permitting any departure from the Contract requirements;

2. relieving the Contractor of responsibility for any errors, including details, dimensions, and materials; and/or

3. approving departures from details furnished by the Engineer, except as otherwise provided herein.

B. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

D. Submittals will be returned to the Contractor under one of the following codes.

Code 1 — "APPROVED" is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.

Code 2 — "APPROVED AS NOTED". This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

Code 3 — "APPROVED AS NOTED/CONFIRM". This combination of codes is assigned when a confirmation of the notations and comments IS required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the confirmation.

Code 4 — "APPROVED AS NOTED/RESUBMIT". This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the package. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the resubmittal.

Code 5 — "NOT APPROVED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

Code 6 — "COMMENTS ATTACHED" is assigned where there are comments attached to the returned submittal which provide additional data to aid the Contractor.

Codes 1 through 5 designate the status of the reviewed submittal with Code 6 showing there has been an attachment of additional data.

E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type revision that is not in accordance to the Contract Documents as may be required by the Engineer.

F. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will

be considered "Not Approved" until resubmitted. The Engineer may at his/her option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

G. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven working days prior to release for manufacture.

H. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

1.06 DISTRIBUTION

A. Distribute reproductions of approved shop drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the Engineer. Number of copies shall be as directed by the Engineer but shall not exceed 6.

1.07 MOCK UPS

A. Mock Up units as specified in individual Sections, include but are not necessarily limited to, complete units of the standard of acceptance for that type of work to be used on the Project. Remove at the completion of the Work or when directed.

1.08 CONSTRUCTION PHOTOGRAPHS

A. The Contractor shall have an average of five color photographs per month made of the work during its progress and ten color photographs of the completed facilities. The photographs shall be of such views and taken at such times as the Engineer directs.

B. All photographic work shall be done by a qualified, established commercial photographer acceptable to the Engineer. Three prints of each photograph shall be furnished promptly to the Engineer, and each print shall have a glossy finish and be mounted in plastic sleeving on a substantial backing. The overall dimensions of each mounted print shall be 8 X 10-in with 1-1/4-in flexible binding margin on the long top side to permit storage in standard 3-ring binders.

C. The film negatives shall be retained in the files of the photographer until the completion of the project and shall then be turned over to the Owner.

D. Each photograph shall have attached to the backing a paper label, approximately 2-1/4-in wide by 1-3/4-in high containing thereon in neat lettering:

1. Contractor's name

2. Short Description of View

3. Photo No. and Date Taken

4. Photographer's Firm Name

1.09 GENERAL PROCEDURES FOR SUBMITTALS

A. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections, of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

END OF SECTION

SECTION 1.09 – CHANGE MANAGEMENT

CITY OF NEW BRAUNFELS- KYNDWOOD UNIT 2 & 2A STREETS, DRAINAGE, WATER AND WASTEWATER IMPROVEMENTS

PART 1: GENERAL

1.01 REQUESTS FOR CHANGE PROPOSAL

A. Construction Manager will initiate Modifications by issuing a Request for Change Proposal (RCP).

a. Construction Manager and Design Professional will prepare a description of proposed Modifications.

b. Construction Manager will issue the Request for Change Proposal form to Contractor. A number will be assigned to the Request for a Change Proposal when issued.

c. Return a Change Proposal in accordance with Paragraph 1.02 for evaluation by the OPT.

1.02 CHANGE PROPOSALS

A. Submit a Change Proposal (CP) to the Construction Manager for Contractor initiated changes in the Documents or in response to a Request for Change Proposal. Submit the Change Proposal and attach the forms provided by the Construction Manager.

1. Use the Change Proposal form provided by the Construction Manager.

2. Include with the Change Proposal:

a. A complete description of the proposed Modification if Contractor initiated or proposed changes to the Owners description of the proposed Modification.

b. The reason the Modification is requested, if not in response to a Request for a Change Proposal.

c. A detailed breakdown of the cost of the change if the Modification requires a change in Contract Price. The itemized breakdown is to include:

1) List of materials and equipment to be installed;
2) Man hours for labor by classification;
3) Equipment used in construction;
4) Consumable supplies, fuels, and materials;
5) Royalties and patent fees;
6) Bonds and insurance;
7) Overhead and profit;
8) Field office costs;
9) Home office cost; and
10) Other items of cost.

d. Provide the level of detail outlined in the paragraph above for each Subcontractor or Supplier actually performing the Work, if Work is to be provided by a Subcontractor or Supplier. Indicate appropriate Contractor mark ups for Work provided through Subcontractors and Suppliers. Provide the level of detail outlined in the paragraph above for self-performed Work.

e. Submit Change Proposals that comply with the General Conditions for Cost of Work.

f. Provide a revised schedule. Show the effect of the change on the Project Schedule and the Contract Times.

B. Submit a Change Proposal to the Construction Manager to request a Field Order.

C. A Change Proposal is required for all substitutions or deviations from the Contract Documents.

D. Request changes to products in accordance with Section 01008 "Submittals."

1.03 CONSTRUCTION MANAGER WILL EVALUATE THE REQUEST FOR A MODIFICATION

A. Construction Manager will issue a Modification per the General Conditions if the Change Proposal is acceptable to the Owner. Construction Manager will issue a Change Order or Contract Amendment for any changes in Contract Price or Contract Times.

1. Change Orders and Contract Amendments will be sent to the Contractor for execution with a copy to the Owner recommending approval. A Work Change Directive may be issued if Work needs to progress before the Change Order or Contract Amendment can be authorized by the Owner.

2. Work Change Directives, Change Orders, and Contract Amendments can only be approved by the Owner.

a. Work performed on the Change Proposal prior to receiving a Work Change Directive or approval of the Change Order or Contract Amendment is performed at the Contractor's risk.

b. No payment will be made for Work on Change Orders or Contract Amendments until approved by the Owner.

B. Contractor may be informed that the Change Proposal is not approved and construction is to proceed in accordance with the Contract Documents.

1.04 EQUAL NON-SPECIFIED PRODUCTS

A. The products of the listed manufacturers are to be furnished where the Specifications list several manufacturers and do not specifically list "or equal" or "or approved equal"

products. Use of any products other than those specifically listed is a substitution. Follow the procedures in Paragraph 1.05 for a substitution.

B. Contractor may submit other manufacturers' products that are in full compliance with the Specifications where Specifications list one or more manufacturers followed by the phrase "or equal" or "or approved equal."

1. Submit a Shop Drawing as required by Section 01008 "Submittals." to document that the proposed product is equal or superior to the specified product.

2. Prove that the product is equal. It is not the Owner's responsibility to prove the product is not equal.

a. Indicate on a point-by-point basis for each specified feature that the product is equal to the Contract Document requirements.

b. Make a direct comparison with the specified manufacturer's published data sheets and available information. Provide this printed material with the Shop Drawing.

c. The decision of the Design Professional regarding the acceptability of the proposed product is final.

3. Provide a certification that, in furnishing the proposed product as an equal, the Contractor:

a. Has thoroughly examined the proposed product and has determined that it is equal or superior in all respects to the product specified.

b. Has determined that the product will perform in the same manner and result in the same process as the specified product.

c. Will provide the same warranties and/or bonds as for the product specified.

d. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the product into the construction and will waive all claims for additional Work which may be necessary to incorporate the product into the Project which may subsequently become apparent.

d. Will maintain the same time schedule as for the specified product.

C. A Change Proposal is not required for any product that is in full compliance with the Contract Documents. If the product is not in full compliance, it may be offered as a Substitution.

1.05 SUBSTITUTIONS

A. Substitutions are defined as any product that the Contractor proposes to provide for the

Project in lieu of the specified product. Submit a Change Proposal per Paragraph 1.02 along with documents required for a Shop Drawing as required by Section 01008 “Submittals.” to request approval of a substitution.

B. Prove that the product is acceptable as a substitute. It is not the Design Professional’s responsibility to prove the product is not acceptable as a substitute.

1. Indicate on a point-by-point basis for each specified feature that the product is acceptable to meet the intent of the Contract Documents requirements.

2. Make a direct comparison with the specified Suppliers published data sheets and available information. Provide this printed material with the Shop Drawing.

3. The decision of the Design Professional regarding the acceptability of the proposed substitute product is final.

C. Provide a certification that, in making the substitution request, the Contractor:

1. Has determined that the substituted product will perform in substantially the same manner and result in the same ability to meet the specified performance as the specified product;

2. Will provide the same warranties and/or bonds for the substituted product as specified or as would be provided by the manufacturer of the specified product;

3. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the substituted product into the Project and will waive all claims for additional Work which may be necessary to incorporate the substituted product into the Project which may subsequently become apparent; and

4. Will maintain the same time schedule as for the specified product.

D. Pay for review of substitutions in accordance with Section 01008 “Submittals.”

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

END OF SECTION

SECTION 1.10 – APPLICATION FOR PAYMENT PROCEDURES

CITY OF NEW BRAUNFELS- KYNDWOOD UNIT 2 & 2A STREETS, DRAINAGE, WATER AND WASTEWATER IMPROVEMENTS

PART 1: GENERAL

1.01 SUMMARY

A. Submit Applications for Payment for completed Work and for materials and equipment in accordance with the General Conditions, the Special Conditions, the Agreement, and this Section. The Contract Price is to include costs for:

1. Providing the Work in accordance with the Contract Documents;

2. Installing Owner furnished equipment and materials, if any;

3. Providing Work for alternates and allowances, if any;

4. Providing Work for extra work items, if any and if authorized

5. Commissioning, startup, training, and initial maintenance and operation;

6. Acceptance testing at the manufacturer's facilities or at the Site;

7. All home office overhead costs and expenses, including profit made directly or indirectly from the Project;

8. Project management, contract administration, and field office and field operations staff including supervision, clerical support, and technology system support;

9. Professional services including design fees, legal fees, and other professional services;

10. Bonds and insurance;

11. Permits, licenses, patent fees, and royalties;

12. Taxes;

13. Providing all documentation and Samples required by the Contract Documents;

14. Facilities and equipment at the Site including:

a. Field offices, office furnishings, and all related office supplies, software, and equipment,

b. Storage facilities for Contractor's use and storage facilities for stored materials and equipment including spare parts storage,

c. Shops, physical plant, construction equipment, small tools, vehicles, and technology and telecommunications equipment,

d. Safety equipment and facilities to provide safe access and working conditions for workers and for others working at the Site,

e. Temporary facilities for power and communications,

f. Potable water and sanitation facilities, and

g. Mobilization and demobilization for all these facilities and equipment.

15. Products, materials, and equipment stored at the Site or other suitable location in accordance with 1.04 General Conditions.
16. Products, materials, and equipment permanently incorporated into the Project;
17. Temporary facilities for managing water including facilities for pumping, storage, and treatment as required for construction and protection of the environment;
18. Temporary facilities for managing environmental conditions and Constituents of Concern;
19. Temporary facilities such as sheeting, shoring, bracing, formwork, embankments, storage facilities, working areas, and other facilities required for construction of the Project;
20. Temporary and permanent facilities for protection of all overhead, surface, or underground structures or features;
21. Temporary and permanent facilities for removal, relocation, or replacement of any overhead, surface, or underground structures or features;
22. Products, materials, and equipment consumed during the construction of the Project;
23. Contractor labor and supervision to complete the Project including that provided through Subcontractors or Suppliers;
24. Correcting Defective Work during the Contract Times, during the Correction Period, or as required to meet any warranty provision of the Contract Documents;
25. Risk associated with weather and environmental conditions, startup, and initial operation of facilities including equipment, processes, and systems;
26. Contractor safety programs, including management, administration, and training;
27. Maintenance of facilities including equipment, processes, and systems until operation is transferred to Owner;
28. Warranties, extended or special warranties, or extended service agreements;
29. Cleanup and disposal of any and all surplus materials; and
30. Demobilization of all physical, temporary facilities not incorporated into the Project.

B. Include the cost not specifically set forth as an individual payment item but required to provide a complete and functional system in the Contract Price.

C. Provide written approval of the surety company providing performance and payment bonds for the Schedule of Values, Application for Payment form, and method of payment prior to submitting the first Application for Payment. Submit approval using the “Consent of Surety Company to Payment Procedures” form provided by the Construction Manager. Payment will not be made without this approval.

D. Construction Manager may withhold processing the Applications for Payment if any of the following processes or documentation is not up to date:

1. Progress Schedule

2. Project videos and photographs

3. Record Documents per Section 1.11- "Execution and Closeout Requirements" Subsection 1.09 "Record Documents"

1.02 SCHEDULE OF VALUES

A. Divide the Contract Price into an adequate number of line items to allow more accurate determination of the earned value for each line item when evaluating progress payments. Submit a detailed Schedule of Values for the Project at least 10 days prior to submitting the first Application for Payment using forms provided by the Construction Manager.

B. Do not apply for payment until the Schedule of Values has been approved by the Construction Manager.

C. Divide the cost associated with each line item in the Schedule of Values into installation and materials components.

1. Installation cost is to include all cost associated with the line item except materials cost.

2. Materials cost is the direct cost (as verified by invoice values) for products, materials, and equipment to be permanently incorporated into the Project associated with the line item.

3. Installation cost is to include all direct costs and a proportionate amount of the indirect costs for the Work associated with each line item. Include costs not specifically set forth as an individual payment item but required to provide a complete and functional system.

4. The sum of materials and installation costs for all line items must equal the Contract Price.

D. Use each unit price line item in the Agreement as a line item in the Schedule of Values. The sum of materials and installation costs for each line item for unit price contracts must equal the value of the line item in the Agreement. In addition to the installation cost described in Paragraph 1.02.C.3, installation costs for unit price items are to include costs for waste and overages.

1. Installation and materials cost may be left as a single installation component if:

a. Contractor does not intend to request payment for stored materials for that line item; or

b. Work in the line item will be completed within a single payment period.

2. Provide adequate detail to allow a more accurate determination of the earned value for installation costs, expressed as a decimal fraction of Work completed, for each line item.

3. Installation cost line items may not exceed $50,000.00. Items that are not subdivided into smaller units may only be included in the Application for Payment when Work on the entire unit is complete.

4. Lump sum items may be divided into an estimated number of units to estimate earned value. The estimated number of units times the cost per unit must equal the lump sum amount for that line item.

5. Include Contractor's overhead and profit in the installation costs each line item in proportion to the value of the line item to the Contract Price.

6. Include cost not specifically set forth as an individual payment item but required to provide a complete and functional system in the Contract Price for each item.

7. Line items may be used to establish the value of Work to be added or deleted from the Project.

E. Include a breakdown of both mobilization and demobilization costs in the Schedule of Values. The total cost for both mobilization and demobilization may not exceed 5 percent of the total Contract Price. Payment for mobilization and demobilization will be based on the earned value of Work completed. Payment for these costs will only be made for Work completed for the following:

1. Bonds and insurance;

2. Transportation and setup for equipment;

3. Transportation and/or erection of all field offices, sheds, and storage facilities;

4. Salaries for preparation of documents required before the first Application for Payment; and

5. Salaries for field personnel directly related to the mobilization of the Project.

1.03 SCHEDULE OF ANTICIPATED PAYMENTS

A. Submit a schedule of the anticipated Application for Payments showing the anticipated application numbers, submission dates, and the amount to be requested for each Application for Payment on the form provided by the Construction Manager.

B. Update the schedule of anticipated payments as necessary to provide a reasonably accurate indication of the funds required to make payments each month to the Contractor

for Work performed.

1.04 ALTERNATES, ALLOWANCES, AND EXTRA WORK ITEMS

A. Include line items and amounts for specified alternate Work and allowances for Work in the Agreement, if any.

B. Include line items and amounts for Extra Work items in the Agreement, if any.

1.05 RETAINAGE AND SET-OFFS

A. Retainage will be withheld from each Application for Payment per the Agreement.

B. Reduce payments for set-offs per the General Conditions as directed by the Construction Manager.

1.06 PROCEDURES FOR SUBMITTING AN APPLICATION FOR PAYMENT

A. Submit a draft Application for Payment to the Construction Manager each month at least 20 days before the date established in the Agreement for Owner to make progress payments. Do not submit Applications for Payment more often than monthly. Review the draft Application for Payment with the Construction Manager to determine concurrence with:

1. Values requested for materials and equipment, stored or incorporated into the Project as documented by invoices;

2. The earned value for installation costs for each line item in the Application for Payment form expressed as a percent complete for that line item;

3. The quantity of Work completed for each unit price item;

4. Amount of retainage to be held; and

5. Set-offs included in the Application for Payment.

B. Submit Applications for Payment to the Construction Manager after agreement has been reached on the draft Application for Payment with the Construction Manager.

C. Provide all information requested in the Application for Payment form. Do not leave any blanks incomplete. If information is not applicable, enter “N/A” in the space provided.

1. Number each application sequentially and include the dates for the application period.

2. Complete the “Contract Time Summary” section on the Application for Payment form. If the Final Completion date shows the Project is more than 30 days behind

schedule, revise the Schedule of Anticipated Payments to correspond to the updated schedule required.

3. Complete the "Summary of Earned Value and Set-offs" section on the Application for Payment form. Show the total amounts for earned value of original Contract performed, earned value for Work on approved Contract Amendments and Change Orders, retainage and set-offs.

4. Sign and date the Contractor's Certification on the Application for Payment form that all Work, including materials, covered by this Application for Payment have been completed or delivered and stored in accordance with the Contract Documents, that all amounts have been paid for Work, materials, and equipment for which previous Payment has been made by the Owner, and that the current payment amount shown in this Application for Payment is now due.

5. Include "Attachment A - Tabulation of Earned Value of Original Contract Performed" to show the value of materials stored and successfully incorporated into the Project and the earned value for installation of the Work for each line item in the Application for Payment for Work. Attachment A includes Work on the original Contract Price and on approved Contract Amendments and Change Orders.

6. Include "Attachment B - Tabulation of Values for Materials and Equipment" to track invoices used to support amounts requested as materials in Attachment A. Enter materials to show the amount of the invoice assigned to each item in Attachment A if an invoice includes materials used on several line items.

7. Include "Attachment C - Summary of Set-offs" to document set-offs made per the Contract Documents. Show each set-off as it is applied. Show a corresponding line item to reduce the set-off amount if a payment held by a set-off is released for payment.

8. Include "Attachment D - Retainage Calculation" to show method for calculating retainage. The amount of retainage with respect to progress payments is stipulated in the Agreement. Any request for a reduction in retainage must be accompanied by a Consent of Surety to Reduction or Partial Release of Retainage.

9. Include "Attachment E - EVA Calculation" and the EVA Chart showing the anticipated and actual total earned value of fees, Work, and materials. Create a graphic representation (curve) of the anticipated progress on the Project each month. Compare the anticipated cumulative total earned value of fees, Work, and materials to the actual total earned value of fees, Work, and materials to determine performance on budget and schedule. Adjust the table and curve to incorporate Modifications.

D. Submit attachments in Portable Document Format (PDF).

1. Generate attachments to the Application for Payment using the Excel spreadsheet provided by the Construction Manager.

2. Submit PDF documents with adequate resolution to allow documents to be printed in
a format equivalent to the document original. Documents are to be scalable to allow printing on standard 8.5”x11” or 11”x17” paper.

1.07 ADJUSTMENTS TO THE SCHEDULE OF VALUES IN THE APPLICATION FOR PAYMENT

A. Submit a Change Proposal to request any changes to the Schedule of Values incorporated into the Application for Payment once approved. A Field Order will be issued by the Construction Manager to modify the Application for Payment form if approved.

B. Payment for materials and equipment shown in the Application for Payment will be made for the total of associated invoice amounts, up to the value shown for materials in the Application for Payment for that line item.

1. If the total amount for invoices for materials and equipment for a line item are less than the amount shown for the materials component of that line item in the Application for Payment, and it can be demonstrated that no additional materials or equipment are required to complete Work described in that item, the difference between the total invoice for materials and equipment and the materials component for that line item can be added to the installation component of that Work item.

2. Costs for material and equipment in excess of the value shown in the Schedule of Values may not be paid for under other line items.

1.08 CONSTRUCTION MANAGER’S RESPONSIBILITY

A. Construction Manager will review each draft Application for Payment with Contractor to reach an agreement on the amount to be recommended to Owner for payment. Contractor is to revise the Application for Payment to incorporate changes, if any, resulting from this review process.

B. Construction Manager will review the Application for Payment to determine that the Application for Payment has been properly submitted and is in accordance with the agreed to draft Application for Payment.

C. Construction Manager will either recommend payment of the Application for Payment to Owner or notify the Contractor of the reasons for not recommending payment. Contractor may make necessary corrections and resubmit the Application for Payment. Construction Manager will review resubmitted Application for Payment and reject or recommend payment of the Application for Payment to Owner as appropriate.

D. Construction Manager’s recommendation of the Application for Payment constitutes a representation that based on its experience and the information available:

1. The Work has progressed to the point indicated;

2. The quality of the Work is generally in accordance with the Contract Documents; and

3. Requirements prerequisite to payment have been met.

E. This representation is subject to:

1. Further evaluation of the Work as a functioning whole;

2. The results of subsequent tests called for in the Contract Documents; or

3. Any other qualifications stated in the recommendation.

F. Construction Manager does not represent by recommending payment that:

1. Inspections made to check the quality or the quantity of the Work as it was performed were exhaustive or extended to every aspect of the Work in progress; or

2. Other matters or issues that might entitle Contractor to additional compensation or entitle Owner to withhold payment to Contractor exist.

G. Neither Construction Manager's review of Contractor's Work for the purposes of recommending payments nor Construction Manager's recommendation of payment imposes responsibility on the Construction Manager or Owner:

1. To supervise, direct, or control the Work;

2. For the means, methods, techniques, sequences, or procedures of construction, or safety precautions and programs;

3. For Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;

4. To make examinations to ascertain how or for what purposes Contractor has used the monies paid on account of the Contract Price; or

5. To determine that title to the Work, materials, or equipment has passed to Owner free and clear of Liens.

1.09 FINAL APPLICATION FOR PAYMENT

A. Include adjustments to the Contract Price in the final Application for Payment for:

1. Approved Change Orders and Contract Amendments;

2. Allowances not previously adjusted by Change Order;

3. Deductions for Defective Work that have been accepted by the Owner;

4. Penalties and bonuses;

5. Deduction for all final set-offs; and

6. Other adjustments if needed.

B. Construction Manager will prepare a final Change Order reflecting the approved adjustments to the Contract Price which have not been covered by previously approved Change Orders and, if necessary, to reconcile estimated unit price quantities with actual quantities.

C. Submit the final Application for Payment per the General Conditions, including the final Change Order. Provide the following with the final Application for Payment:

1. Evidence of payment or release of Liens on the forms provided by the Construction Manager and as required by the General Conditions.

2. Consent from surety to final payment.

D. Final payment will also require additional procedures and documentation per Section 1.11 "Execution and Closeout."

1.10 PAYMENT BY OWNER

A. Owner is to pay the amount recommended for monthly payments within 30 days after receipt of the Construction Manager's recommended Application for Payment.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

END OF SECTION

SECTION 1.11 – EXECUTION AND CLOSEOUT REQUIREMENTS

CITY OF NEW BRAUNFELS- KYNDWOOD UNIT 2 & 2A STREETS, DRAINAGE, WATER AND WASTEWATER IMPROVEMENTS

PART 1: GENERAL

1.01 SUMMARY

A. Comply with requirements of the General Conditions and specified administrative procedures in closing out the Contract.

1.02 DOCUMENTATION

A. Submit affidavits and releases on forms provided by the Construction Manager.

1.03 SUBSTANTIAL COMPLETION

A. The following requirements must be met for the Project or a designated portion of the Work to be Substantially Complete per the General Conditions:

1. Work must be fully functional and able to operate in accordance with the Contract Documents without special or extraordinary efforts on the part of the Owner.

B. Conduct inspections with superintendent, Subcontractors, and Suppliers for the Work or a designated portion of the Work prior to calling for a Substantial Completion inspection by the OPT. Create a list of deficiencies in the Work that must be completed for the Project to qualify for Substantial Completion. Review the list with the Construction Manager or the designated member of the OPT. The Construction Manager or the designated member of the OPT may assist the Contractor with this effort; however, it is the Contractor's responsibility to create and manage this list of deficiencies until corrections are made.

C. Correct the identified deficiencies prior to calling for a Substantial Completion inspection.

D. Notify the Construction Manager that the Work or a designated portion of the Work is Substantially Complete per the General Conditions. Include a list of the items remaining to be completed or corrected before the Project will be considered for Final Completion.

E. OPT will visit the Site to observe the Work within a reasonable time after notification is received to determine the status of the Project.

F. Construction Manager will notify the Contractor that the Work is either Substantially Complete or that additional Work must be performed before the Project will be considered Substantially Complete.

1. Construction Manager will notify the Contractor of items that must be completed before the Project will be considered Substantially Complete.

2. Correct the noted deficiencies in the Work.

3. Notify the Construction Manager when the items of Work in the Construction Manager's notice have been completed.

4. OPT will revisit the Site and repeat the process.

5. Construction Manager will issue a Certificate of Substantial Completion to the Contractor when the OPT considers the Project to be Substantially Complete. The certificate will include a tentative list of items to be corrected before Final Payment will be recommended.

6. Review the list and notify the Construction Manager of any objections to items on the list within 10 days after receiving the Certificate of Substantial Completion.

1.04 TRANSFER OF UTILITIES

A. Transfer utilities to the Owner when the Certificate of Substantial Completion has been issued.

B. Submit final meter

1.05 CLOSEOUT REQUIREMENTS

A. Provide the following before Final Completion:

1. Record Documents per this document, Section 1.09 "Record Documents";

2. Keys and keying schedule;

3. Warranties, bonds, and service agreements;

4. Equipment Installation Reports;

5. Shop Drawings, Product Data, operation and maintenance manuals, and other documentation required by the Contract Documents;

6. Specified spare parts and special tools;

7. Certificates of occupancy, operating certificates, or other similar releases required to allow the Owner unrestricted use of the Work and access to services and utilities;

8. Evidence of continuing insurance and bond coverage as required by the Contract Documents; and

9. Final videos and photographs

1.06 WARRANTIES, BONDS, AND SERVICES AGREEMENTS

A. Provide warranties, bonds, and service agreements required by the individual Sections of the Specifications.

B. The date for the start of warranties, bonds, and service agreements is established per the General Conditions.

C. Compile warranties, bonds, and service agreements and review these documents for compliance with the Contract Documents.

1. Each document is to be signed by the respective Supplier or Subcontractor.

2. Each document is to include:

a. The product or Work item description;

b. The firm name, with the name of the principal, address, and telephone number;

c. Scope of warranty, bond, or services agreement;

d. Date, duration, and expiration date for each warranty bond and service agreement;

e. Procedures to be followed in the event of a failure; and

f. Specific instances that might invalidate the warranty or bond.

D. Submit digital copies of the documents to the Construction Manager for review.

E. Submit warranties, bonds, and services agreements within 10 days after equipment or components placed in service.

1.07 FINAL COMPLETION

A. Conduct inspections with Superintendent, Subcontractors, and Suppliers prior to calling for a Final Completion inspection by the OPT. Create a list of deficiencies in the Work that must be completed for the Project to qualify for the Final Completion inspection. Review the list with the Construction Manager or the designated member of the OPT. The Construction Manager or the designated member of the OPT may assist the Contractor with this effort; however, it is the Contractor's responsibility to create and manage this list of deficiencies until corrections are made.

B. Identify, list, and correct deficiencies prior to calling for a Final Completion inspection. The Project at the call for Final Completion represents the Contractor's interpretation of a project completed in conformance with the Contract Documents and reflects the Contractor's representation of a quality project meeting the Owner's expectations.

C. Notify the Construction Manager when:

1. Work has been completed and complies with the Contract Documents;

2. Equipment and systems have been tested per the Contract Documents and are fully operational;

3. Final operation and maintenance manuals have been provided to the Owner and all operator training has been completed;

4. Specified spare parts and special tools have been provided;

5. Work is complete and ready for final inspection;

6. Final documentation for all outstanding Modifications and Claims (other than those listed on the Certificate of Final Completion) have been processed and are ready for incorporation into the final Application for Payment; and

7. Closeout requirements in Paragraph [1.05] have been completed.

D. OPT will visit the Site to determine if the Project is complete and ready for final payment within a reasonable time after the notice is received.

E. Construction Manager will notify the Contractor that the Project is complete or will notify the Contractor that Work is Defective.

F. Take immediate steps to correct Defective Work. Notify the Construction Manager when Defective Work has corrected. OPT will visit the Site to determine if the Project is complete and the Work is acceptable. Construction Manager will issue a Certificate of Final Completion to the Contractor when the Project is complete or will notify the Contractor that Work is Defective.

G. Submit the request for final payment with closeout documentation described in Paragraph 1.06 if notified that the Project is complete and the Work is acceptable.

1.08 REINSPECTION FEES

A. Owner may impose a set-off against the Application for Payment in accordance with the General Conditions to compensate the OPT for additional visits to the Project if additional work is required.

1.09 RECORD DOCUMENTS

A. Maintain one complete set of printed Record Documents at the Site including:

1. Drawings;

2. Specifications;

3. Addenda;

4. Modifications;

5. Product Data and approved Shop Drawings;

6. Construction photographs;

7. Test Reports;

8. Clarifications and other information provided in Request for Information responses; And

9. Reference standards.

B. Store printed Record Documents and Samples in the Contractor's field office.

1. Record Documents are to remain separate from documents used for construction.

2. Provide files and racks for the storage of Record Documents.

3. Provide a secure storage space for the storage of Samples.

4. Maintain Record Documents in clean, dry, legible conditions, and in good order.

5. Make Record Documents and Samples available at all times for inspection by the OPT.

C. Maintain an electronic record of Specifications and Addenda to identify products provided in PDF format.

1. Reference the Product Data number, Shop Drawing number, and O&M manual number for each product and item of equipment furnished or installed.

2. Reference Modifications by type and number for all changes.

D. Maintain an electronic record of Drawings in PDF format.

1. Reference the Product Data number, Shop Drawing number, and O&M manual number for each product and item of equipment furnished or installed.

2. Reference Modifications by type and number for all changes.

3. Record information as construction is being performed. Do not conceal any Work until the required information is recorded.

4. Mark drawings to record actual construction.

a. Depths of various elements of the foundation in relation to finished first floor datum or the top of walls.

b. Horizontal and vertical locations of underground utilities and appurtenances constructed, and existing utilities encountered during construction.

c. Location of utilities and appurtenances concealed in the Work. Refer measurements to permanent structures on the surface. Include the following equipment:

1) Piping;
2) Ductwork;
3) Equipment and control devices requiring periodic maintenance or repair;
4) Valves, unions, traps, and tanks;
5) Services entrance;
6) Feeders; and
7) Outlets.

d. Changes of dimension and detail.

e. Changes by Modifications.

f. Information in Requests for Information or included in the Decision Register.

g. Details not on the original Drawings. Include field verified dimensions and clarifications, interpretations, and additional information issued in response to Requests for Information.

5. Mark Drawings with the following colors:

a. Highlight references to other documents, including Modifications in blue.

b. Highlight mark ups for new or revised Work (lines added) in yellow.

c. Highlight items deleted or not installed (lines to be removed) in red.

d. Highlight items constructed per the Contract Documents in green.

6. Submit Record Documents to Construction Manager for review and acceptance 30 days prior to Final Completion of the Project.

E. Applications for Payment will not be recommended for payment if Record Documents are found to be incomplete or not in order. Final payment will not be recommended without complete Record Documents.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

END OF SECTION

GEOTECHNICAL ENGINEERING REPORT

Ladshaw Subdivision

Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Prepared for:

Lennar
San Antonio, Texas

Prepared by:
TTL, Inc.
San Antonio, Texas

Project No. 00200901740.00
January 21, 2021

17215 Jones Maltsberger Rd.
Suite 101
San Antonio, TX 78247
210.888.6100
www.TTLUSA.com

January 21, 2021

Mr. Richard Mott, P.E.
Director of Land Development
Lennar
1922 Dry Creek Way, Suite 101
San Antonio, TX 78259

O: 210.403.6282
E: Richard.Mott@Lennar.com

RE: Geotechnical Engineering Report
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas
TTL Project No.00200901740.00

Dear Mr. Mott:

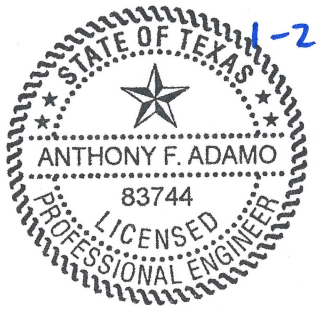
TTL, Inc. (*TTL*) is pleased to submit this Geotechnical Engineering Report providing final pavement section designs for the above-referenced project. If you have any questions regarding our report, or if additional services are needed, please do not hesitate to contact us.

The enclosed report contains a brief description of the site conditions and our understanding of the project. The final pavement section design recommendations contained within this report are based on our understanding of the proposed development, the results of our field exploration and laboratory tests, and our experience with similar projects.

We appreciate the opportunity to provide these Geotechnical Services for your project and look forward to continuing participation during the design and construction phases of this project.

Respectfully submitted,
TTL, Inc.

June M. Potter, P.E.
Project Professional



1-21-21

Anthony F. Adamo, P.E.
Principal Engineer

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APPENDIX B (REFERENCE MATERIALS)

Exploration Procedures
Laboratory Procedures

1.0 PROJECT INFORMATION

1.1 Project Description

Item	Description
Project Location	The project site is located in the northeast quadrant of the intersection of Interstate Highway 35 and Stolte Road in New Braunfels, Comal County, Texas. The Site Location Plan is provided in Appendix A.
Proposed Development	Based on an exhibit prepared by HMT Engineering & Surveying, we understand this subdivision will consist of approximately 180 acres of land to be developed as a residential subdivision. A portion of the land between the subdivision and the IH-35 frontage will be developed as commercial real estate and will not be a part of this subdivision. At this time, the number of lots, streets, and street locations are not known. Exhibit 2, the Boring Location Plan in Appendix A, illustrates the layout of the planned subdivision.
Proposed Construction	The development will consist of single-story and two (2) story single family residences and will be supported using monolithic slab and grade beam foundations. The streets comprising the subdivision may consist of One & Two Family Residential and Residential Collector streets. The street pavement sections shall be designed as required by the City of New Braunfels design criteria.
Pavements	The pavements constructed as a part of this project will consist of flexible pavements only.
Maximum Loads	Loads were not provided to TTL as a part of this project.

If the above information is not correct, please contact us so that we can make the necessary modifications to this document and our evaluation and recommendations, if needed.

1.2 Authorization

This Project was authorized by Mr. Richard Mott with Lennar by acceptance of our Agreement for Services, No. P00200901740.00, dated November 29, 2020.

2.0 EXPLORATION FINDINGS

2.1 Site Conditions

Item	Description
Existing Conditions	The site is relatively undeveloped land that appears to have been used for agricultural purposes. There are several structures along an unpaved road leading from IH-35 frontage to the center of the proposed subdivision, based on imagery obtained from Google Earth.
Existing topography	Topographic information was not provided to TTL at the preparation of this report.

2.2 Site Geology

We reviewed the Geologic Atlas of Texas to determine the geologic setting of the project site and surrounding area. Our review indicated the Project Site is located over the Pecan Gap Chalk

(Kpg) of Cretaceous geologic age. This formation generally consists of chalk and chalky marl that weathers into a moderately deep soil. Within the project area, this soil is typically expansive. The Pecan Gap Chalk is typically about 100 to 400 feet in thickness.

2.3 Subsurface Stratigraphy

Subsurface conditions within the limits of the project were evaluated by drilling thirty (30) exploratory borings at the approximate locations shown on the Boring Location Plan in Appendix A. Samples obtained during our field exploration were transported to our laboratory where they were reviewed by geotechnical engineering personnel. Representative samples were selected and tested to determine pertinent engineering properties and characteristics for use in our evaluation of the project site. Based on the information developed during our field exploration and laboratory testing, we have determined the stratigraphy of the site is generally as shown on the logs of boring included in Appendix A.

The boring logs presented in Appendix A represent our interpretation of the subsurface conditions at each individual boring location. Our interpretation is based on tests and observations performed during drilling operations, visual examination of the soil samples by a geotechnical engineer, and laboratory tests conducted on the retrieved soil samples. The USCS classifications shown on the boring logs represent classifications based on either visual examination, laboratory testing, or both. The lines designating the interfaces between various strata on the boring logs represent the approximate strata boundary. The transition between strata may be more gradual than shown, especially where indicated by a broken line. All data should only be considered accurate at the exact boring location as subsurface variations may occur between boring locations.

2.4 Subsurface Water Conditions

Subsurface water was not detected either during or upon completion of our exploratory borings. Upon completion of subsurface water observations, the boreholes were backfilled with the spoils generated during drilling operations.

Subsurface water is generally encountered as a ‘true’ or permanent continuous water source that is generally present year-round or as a discontinuous, isolated “‘perched”’ or temporary water source that is temporary. Permanent subsurface water is generally present year-round, which may or may not be influenced by seasonal changes in climate, precipitation, vegetation, surface runoff, water levels in nearby water bodies, and other factors. The subsurface water level below the site may fluctuate up or down in response to such changes and may be at different levels than indicated on the exploration logs at times after the exploration. Temporary subsurface water generally develops as a result of seasonal and climatic conditions. The contractor should check for subsurface water before commencement of excavation activities.

3.0 GEOTECHNICAL CONSIDERATIONS

The following geotechnical considerations have been prepared based on the information developed during this Project, our experience with similar projects, and our knowledge of sites with similar surface and subsurface conditions.

3.1 Expansive Soils

The expansive potential of a given soil profile may be characterized using the Potential Vertical Rise (PVR) methodology as described in the Texas Department of Transportation (TxDOT) Method TEX-124-E. This methodology is used to estimate how much a given point located on the ground surface may move due to volumetric changes in the soil resulting from fluctuations in soil moisture content. Based on our laboratory test results, the estimated PVR of this site ranges from about one (1) inch to about three and three-quarter (3¾) inches in its present condition. **These estimated PVR values indicate the soils at this site are moderately to highly expansive.**

3.2 Corrosion Considerations

According to the 2015 IBC, concrete that is exposed to sulfate-containing solutions should be selected for sulfate resistance in accordance with ACI 318. To evaluate if sulfate exposure was a concern at this site, laboratory testing was conducted on soil samples recovered during the field exploration to assess the risk of sulfate attack at the site. The soil samples were submitted to an analytical lab to determine the sulfate content. The results of the laboratory tests are presented in the following table.

Summary of Laboratory Testing			
Boring No.	**Sample Depth (ft.)**	**Sulfate (ppm)**	**ACI 318-14 Exposure Class**
B-1	½ - 2	96	S0
B-2	½ - 2	74	S0
B-8	2½ - 4	285	S0
B-10	2½ - 4	488	S0
B-12	2½ - 4	1,610	S1
B-15	½ - 2	168	S0
B-18	½ - 2	< 20	S0
B-20	½ - 2	30	S0
B-25	½ - 2	131	S0
B-27	½ - 2	52	S0
B-30	4½ - 6	51	S0

The sulfate test results indicate that the sulfate exposure level is Class S0 to S1, which infers that sulfate exposure to concrete may be an issue. Therefore, we suggest that Type II cement should be used with a minimum 28-day design compressive strength (f'c) of 4,000 psi and a maximum water to cement ratio of 0.50. Selection of an appropriate mix design based on the anticipated sulfate content of the soil at this site is the responsibility of the project structural engineer.

4.0 EARTHWORK RECOMMENDATIONS

4.1 Subgrade Preparation and Stabilization

The intended performance of earth supported elements such as foundations and utilities are contingent upon following the earthwork recommendations and guidelines outlined in this section. Earthwork activities on the project should be observed and evaluated by TTL personnel. The evaluation of earthwork should include observation and testing of all fill and backfill soils placed at the site, along with subgrade preparation beneath the residential structures, pavements, and other areas to receive fill materials.

If possible, site development should be performed during seasonably dry weather (typically May through October), and excavation and site preparation should not be performed during or immediately following periods of heavy precipitation or freezing temperatures. Positive surface drainage should be maintained during grading operations and construction to prevent water from ponding on the surface. Surface water run-off from off-site areas should be diverted around the site using berms or ditches. The surface can be rolled smooth to enhance drainage if precipitation is expected but should then be scarified prior to resuming fill placement operations. Subgrades damaged by construction equipment should be promptly repaired to avoid further degradation in adjacent areas and water ponding. Our geoprofessional should provide recommendations for treatment if the subgrade materials become wet, dry, or frozen. When work activities are interrupted by heavy rainfall, fill operations should not be resumed until the moisture content and density of the previously placed fill materials are as recommended in this report. The following earthwork recommendations must be performed prior to pavement and utility construction.

4.1.1 Stripping

Subgrade preparation should begin with stripping the existing vegetation and any otherwise unsuitable materials from planned construction areas.

- Stripping should extend at least three (3) feet (horizontal) beyond the construction limits or to the property lines, whichever is less. Due to the tree and brush vegetation at the site, the stripping depth may need to be at least 12 to 18 inches to completely grub and remove the roots.
- Organic-laden strippings including root masses and loose topsoil should be removed from the site or disposed of at designated on-site areas located outside the limits of current or future development.

4.1.2 Proof-rolling

After stripping and excavating to the design subgrade elevation, the stability of exposed subgrades in areas to receive fill should be evaluated by proof-rolling. The stability of subgrades exposed by cutting to final grades should also be evaluated by proof-rolling.

- Perform proof-rolling with a rubber-tired vehicle having a gross vehicle weight of at least 20 tons (such as a loaded tandem-axle dump truck, or similar size/weight construction equipment).
- Proof-rolling equipment should make multiple closely-spaced overlapping passes in perpendicular directions over the subgrade at a walking pace.
- The subgrade should be relatively smooth and free of wheel ruts, sheepsfoot roller dimples, loose clods of soil, or loose gravel, and the subgrade should not be desiccated, cracked, wet, or frozen.
- A TTL geotechnical engineer or their representative should observe the proof-rolling to identify, document, and mark areas of unstable subgrade response, such as pumping, rutting, or shoving, if any.

4.1.3 Subgrade Stabilization

Unstable subgrades should be stabilized as recommended below.

- Undercut soft, weak, and unstable soils by excavating below subgrade level to expose stable soils. The excavated soil can be used to restore the excavation subgrade, provided that the soils are relatively free and clean of deleterious material or materials exceeding three (3) inches in maximum dimension. The excavated soil, or imported fill soil, shall be placed in maximum 6-inch compacted lifts. Each lift of soil shall be moisture conditioned between optimum and plus four (+4) percentage points of the optimum moisture content and compacted to at least 95 percent of the maximum dry density determined in accordance with the Standard compaction effort (ASTM D 698). If undercutting deeper than about three (3) feet is needed, contact TTL.
- Soil subgrade areas requiring fill placement should be scarified to a depth of about eight (8) inches and moisture conditioned between optimum and plus four (+4) percentage points of the optimum moisture content. The moisture conditioned subgrade should then be compacted to at least 95 percent of the maximum dry density determined in accordance with ASTM D 698. The subgrade should be moisture conditioned just prior to fill placement so the subgrade maintains its compaction moisture levels and does not dry out.
- On-site soils (general fill), Select Fill or Granular Select Fill soil should be placed to achieve the desired elevation as described in Section 4.2 of this report.

4.1.4 Pond Area

The area of the existing pond should be drained (if water is present) and the soils within the pond be mucked out down to stable soils. Muck from the pond should be removed from the site or disposed of at designated on-site areas located outside the limits of current or future development. On-site soils (i.e., general fill) or select fill meeting the specifications provided in Section 4.2 of this report should then be placed to match the desired final grade. **It is likely that the excavation**

required to reach stable soils will result in excavation depths greater than 5 feet. Even with proper compaction, it is likely that fill soils placed within this excavation will experience settlement over time. As a result, residential foundations, pavements, and/or utilities may be adversely affected by that settlement. Once final grades are determined and the pond is mucked out, an evaluation should be undertaken to determine the most appropriate approach for backfilling the excavation to ensure that any structures or other facilities constructed over the area perform as intended.

4.2 Compacted Fill Materials

Compacted fill materials may consist of general or select fill depending upon its intended use. The general fill material may consist of onsite soils or select fill materials. General fill material should possess good compaction characteristics that will provide uniform support for pavements or other facilities not extremely sensitive to moments. Select fill materials are typically selected for specific engineering characteristics and performance criteria. These characteristics and criteria are typically dependent on the requirements of the structures or other facilities they are intended to support.

General and select fill materials should be clean and free of any vegetation, roots, organic materials, trash or garbage, construction debris, or other deleterious materials. These materials should contain stones no larger than three (3) inches in maximum dimension. The following table provides more specific requirements for general and select fill materials.

Material Type	Characteristics	Compaction Procedures	Compaction Control [1, 2]
GENERAL FILL	Shall consist of CH, CL, SC, GC, SW, or GW as defined by ASTM D 2487. Plasticity Index: Not more than 35. Maximum allowable organic content: 3 percent by weight. **This fill material type shall not be used in areas where select fill materials are specified. It is not the intent of this material to control differential soil movements and it shall not be used in areas where control of soil movements is required.**	Maximum loose lift thickness: 8 inches. Compaction requirement: Compaction should be at least 95 percent of the standard Proctor (ASTM D 698) maximum dry density for fill bodies less than 5 feet in thickness. Compaction should be at least 95 percent of the modified Proctor (ASTM D 1557) maximum dry density for fill bodies 5 feet or greater in thickness. Moisture content at time of compaction: within plus to minus 3 percent of the material's optimum moisture content.	General Fill Areas: One field test for every 10,000 square feet per lift, with a minimum of two tests per lift. Utility Trenches (in areas where Select Fill is not required): One field density test per every 100 linear feet, per lift.

Material Type	Characteristics	Compaction Procedures	Compaction Control [1, 2]
SELECT LEAN CLAY FILL (COMPACTED FILL)	Maximum particle size: 3 inches. Maximum gravel and oversize particle content: 15 percent retained on a ¾-inch sieve. At least 70 percent of total material (by weight) passing the No. 200 sieve Maximum allowable organic content: 3 percent by weight, but large roots are not allowed. Liquid Limit: Not more than 40. Plasticity Index: Between 8 and 15. Designation as a CL in accordance with the Unified Soil Classification System (USCS).	Maximum loose lift thickness: 8 inches with compacted thickness of about 6 inches. Compaction requirement: Compaction should be to at least 95 percent of the standard Proctor maximum (ASTM D 698) dry density for non-roadway areas and TEX-114-E for roadway areas. Moisture content at time of compaction: within minus 2 to plus 3 percent of the material's optimum moisture content.	Building Area: One field density test every 5,000 square feet per lift, with a minimum of two tests per lift. Pavement Areas and Slopes: One field density test every 10,000 square feet per lift, with a minimum of two tests per lift. Utility Trenches: One field density test per structure or one test per every 100 linear feet, per lift.
SELECT GRANULAR FILL (COMPACTED FILL)	Crushed stone (limestone) meeting Type A, Grades 1, 2, or 3; Crushed or uncrushed gravel meeting Type B, Grades 1, 2, or 3; Crushed concrete meeting Type D, Grades 1, 2, or 3; of the 2014 TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges. Designation as a GC or GM in accordance with the USCS Clayey gravel (may locally be referred to as "pit-run" material) or caliche having no particle sizes greater than 3 inches in any dimension, at least 50 percent of total material retained on the No. 200 sieve, a Liquid Limit (LL) no greater than 40, and a PI between 7 and 20. Designation as a GC in accordance with the USCS. Commercial Grade Base (may locally be referred to as "three-quarters to dust" material) that is produced by some local/regional quarries having nothing retained on the 2 inch sieve, at least 60 percent retained on the No. 40 sieve, at least 80 percent retained on the No. 200 sieve, an LL no greater than 30, and a PI of 7 or less. Designation as a GM in accordance with the USCS.	Maximum loose lift thickness: 8 inches. Compaction requirement: Compaction should be to at least 98 percent of the TEX-113-E dry density. Moisture content at time of compaction: within minus 2 to plus 3 percent of the material's optimum moisture content.	Building Area: One field density test every 5,000 square feet per lift, with a minimum of two tests per lift. Pavement Areas and Slopes: One field density test every 10,000 square feet per lift, with a minimum of two tests per lift. Utility Trenches: One field density test per structure or one test per every 100 linear feet, per lift.

[1]For preliminary planning only. Our technician/engineer should determine the actual test frequency.
[2] In addition, the fill must be stable under the influence of compaction equipment. Heavy construction traffic should not be allowed to travel on compacted fill areas, except on designated haul roads, to reduce the potential for damaging a previously compacted fill subgrade

If grading occurs during wet, cool weather, when drying soils is more difficult and time-consuming, the grading contractor may have difficulty achieving suitable moisture conditions for proper compaction of soil fill.

The surface of any filled area can experience settlement due to compression of the underlying soils, and sometimes additional settlement results from consolidation of thick soil fills due to their own self-weight. For this project, we expect settlements of fills will occur over the course of several years after completion of fill placement due to the nature of the on-site soils. If thicker fills are constructed, settlements could continue for longer periods of time after completion of fill placement, which could adversely affect utilities, structures, or pavements supported by the fill.

4.3 Excavation Conditions

4.3.1 Temporary Slopes and OSHA Soil Types

The Occupational Safety and Health Administration (OSHA) Safety and Health Standards (29 CFR Part 1926) require that excavations be constructed in accordance with the current OSHA guidelines. The contractor is **solely** responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. To that end, the contractor's 'responsible person' as defined in 29 CFR Part 1926 should evaluate the required excavations and the soils exposed by those excavations and determine appropriate means as part of the contractor's safety procedures.

OSHA requires that excavations in excess of five (5) feet be shored or appropriately sloped. Currently available and practiced methods for achieving excavation stability include sloping, benching, shoring, and the use of trench shields. In excavations that are less than 20 feet deep, OSHA addresses maximum allowable slopes on Table as reproduced below.

Soil or Rock Type	Maximum Allowable Slopes (H:V)[1] for Excavations Less Than 20 Feet Deep[2]	
Stable Rock	Vertical	90°
Type A[3]	¾:1	53°
Type B	1:1	45°
Type C	1½:1	34°

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
2. Slopes or benching for excavations that exceed 20 feet shall be designed by a licensed professional engineer.
3. For Type A soils, a short-term maximum allowable slope of ½:1 (63°) is allowed in excavations that are 12 feet deep or less. For excavations deeper than 12 feet, the short-term allowable slope shown above applies. OSHA defines short-term as a period of 24 hours or less.

Based on the results of our field and laboratory testing, it is our opinion that the FAT CLAY (CH) and LEAN CLAY (CL) soils encountered in our soil borings may be considered as Type B soils. If those clay soils become saturated or submerged, they should be downgraded to Type C soils. The Clayey Gravel (GC) may be considered as Type C soils. We have provided this information solely as a service to our client. The actual OSHA regulations should be consulted prior to any excavations that would be subject to OSHA regulations. TTL does not assume responsibility for any construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

4.3.2 Anticipated Excavation Conditions

The near-surface soils (i.e., upper five (5) feet) observed at the boring locations are FAT and LEAN CLAY soil materials and have a stiff to hard consistency and CLAYEY GRAVEL have a

density of loose to medium dense. Generally, soils penetrated by geotechnical drilling equipment such as those encountered at this site can be removed with conventional earthmoving equipment.

4.3.3 Drainage During Construction

Water should not be allowed to collect in foundation excavations, on foundation surfaces, or on prepared subgrades within the construction area during construction. Excavated areas should be sloped toward designated drainage points to facilitate removal of any collected rainwater, subsurface water, or surface runoff. Positive surface drainage at the site should be provided to reduce infiltration of surface water into subgrades and fill bodies during construction and promote prompt removal of water from the project site.

4.4 Long-Term Drainage Considerations

Long-term drainage conditions can have a significant impact on the performance of structures, pavements, utilities, and other ancillary facilities on a project site. We recommend that site drainage be developed such that long-term ponding does not occur except in areas specifically designed for such purposes. When establishing final grades, the design team should be reminded that in expansive clay environments, it is common for ground surface movements to occur that could potentially cause reversal of site drainage patterns and unwanted ponding of surface water. We recommend that sufficient slope of the ground surface should be maintained around pavements and other ancillary facilities to ensure long-term positive drainage.

5.0 INFRASTRUCTURE RECOMMENDATIONS

5.1 Landscape Considerations

We realize landscaping is vital to the aesthetics of any project and is generally typical for residential construction. The owner and design team should be made aware that placing large bushes and trees adjacent to the structures and pavements may contribute to future distress. Vegetation placed in landscape beds adjacent to the structure should be limited to plants and shrubs that will not exceed a mature height of about three (3) to four (4) feet. Large bushes and trees that will generally exceed these heights should be planted at a reasonable distance away from structures and pavements so their canopy or “drip line” does not extend over the structure when the tree reaches maturity.

Watering of vegetation should be performed in a timely and controlled manner and in sufficient quantity to maintain healthy vegetative cover. Excessive watering should be avoided as excessive irrigation of landscaped areas adjacent to, near or up gradient from foundations and pavements can lead to water migration into building pads and base sections. This migration could cause moisture fluctuations in the underlying clay subgrade which could result in excessive soil movements and loss of subgrade strength.

5.2 Pavement Design Considerations

Based on our experience and the City of New Braunfels guidelines, the following design parameters were used for design of the pavement section:

	One and Two Family Residential Local Parking Both Sides	Residential Collector Parking Both Sides
Reliability, %	70	90
Initial Serviceability Index, p_o	4.2	4.2
Terminal Serviceability Index, p_t	2.0	2.0
Standard Deviation, S_o	0.45	0.45
Design Life, years	20	20
Minimum HMAC Thickness, inches	2	2
Minimum Base Thickness, inches	10	14.5
Minimum Required ESAL	58,000	127,000

Soil bulk samples were collected to determine the California Bearing Ratio (CBR) value to be used for our pavement design recommendations. The locations at which the CBR bulk samples were taken are indicated on the Boring Location Plan in Appendix A. We performed CBR tests at three compaction levels (i.e. 90%, 95% and 100% for a total of three (4 CBR tests) on each sample location. Based on laboratory test results, CBR values of about 3.2, 2.5, 7.7, and 7.7 percent were obtained for the existing untreated subgrade compacted to at least 95 percent of the maximum dry density determined in accordance with ASTM D 698. TTL recommends that a CBR value of 2.0 percent be used to represent the pavement subgrade conditions at this site. There are a number of published correlations relating CBR to the Resilient Modulus (M_R). In our report, we used a M_R (psi) = 2555 $(CBR)^{0.64}$, to convert CBR to MR.

Lime Series testing was performed on the bulk samples collected for this project as well. The results of the two (2) sets of Lime Series tests are provided in Appendix A. Based on the results of those tests, we anticipate that six (6) percent lime (by weight) will be required for this project. However, it should be noted that, upon completion of the grading operations at the site, the index properties of the subgrade soils should be checked to determine whether or not the results of the Lime Series tests included in Appendix A are still applicable. This is because mass grading operations may have removed lower PI material to expose higher PI material or higher PI fill may have been placed over lower PI materials.

5.2.1 Pavement Section Recommendations

Following are the recommended pavement sections for One and Two Family Residential Local Parking Both Side and Residential Collector Parking Both Side.

Flexible Pavement System			
Component	One and Two Family Residential Local		
	Pavement Material Thickness, inches		
Hot Mixed Asphaltic Concrete	2 inches	2 inches	1½ inches
Prime Coat	Yes	Yes	Yes
Granular Base Course (Type A, Grade 1 or 2)	10 inches	7 inches	6 inches
Tensar TriAx TX5 Geogrid	---	---	Yes
Lime Treated Subgrade	---	6 inches	---
Required Structural Number	2.27	2.27	2.27
Calculated Structural Number	2.28	2.34	2.44
Calculated Traffic (ESALs)	63,700	77,700	64,300

Flexible Pavement System			
Component	Residential Collector		
	Pavement Material Thickness, inches		
Hot Mixed Asphaltic Concrete	2½ inches	2½ inches	2½ inches
Prime Coat	Yes	Yes	Yes
Granular Base Course (Type A, Grade 1 or 2)	13 inches	10 inches	8 inches
Tensar TriAx TX5 Geogrid	---	---	Yes
Lime Treated Subgrade	---	6 inches	---
Required Structural Number	2.89	2.89	2.89
Calculated Structural Number	2.92	2.98	2.89
Calculated Traffic (ESALs)	135,900	155,300	127,000

5.2.2 General Guidelines for Pavements

All pavement design and construction shall conform to the latest edition of City of New Braunfels guidelines. Proper perimeter drainage is very important and should be provided so infiltration of surface water from unpaved areas surrounding the pavements is minimized.

Curbs shall be designed in accordance with City of New Braunfels guidelines. It is important that proper perimeter drainage be provided so that infiltration of surface water from unpaved areas surrounding the pavement is reduced, or if this is not possible, curbs should extend through the base and into the clay subgrade for a depth of at least six (6) inches. A crack sealant compatible to both asphalt and concrete should be provided at all concrete-asphalt interfaces. Base must extend one (1) foot beyond back of curb.

Pavement design methods are intended to provide structural sections with adequate thickness over a particular subgrade such that wheel loads are reduced to a level the subgrade can support.

The support characteristics of the subgrade for pavement design do not account for shrink/swell movements of an expansive clayey subgrade. Thus, the pavement may be adequate from a structural standpoint, yet still experience cracking and deformation due to shrink/swell related movement of the subgrade. It is, therefore, important to minimize moisture changes in the subgrade to reduce shrink/swell movements.

On most projects, rough site grading is accomplished relatively early in the construction phase. However, as construction proceeds, excavations are made into these areas; dry weather may desiccate some areas; rainfall and surface water saturate some areas; heavy traffic from concrete and other delivery vehicles disturbs the subgrade; and many surface irregularities are filled in with loose soils to improve trafficability temporarily. As a result, the pavement subgrade should be carefully evaluated as the time for pavement construction approaches. This is particularly important in and around utility trench cuts.

Thorough proofrolling of pavement areas using appropriate construction equipment weighing at least 20 tons should be performed no more than 24 hours prior to surface paving. Any problematic areas should be reworked and compacted at that time.

Long-term pavement performance will be dependent upon several factors, including maintaining subgrade moisture levels and providing for preventive maintenance. The following recommendations should be considered at a minimum:

- Maintain and promote proper surface drainage away from pavement edges;
- Consider appropriate edge drainage systems;
- Install drainage in areas anticipated for frequent wetting (e.g. landscape beds, discharge area, collection areas, etc.);
- Place joint sealant and seal cracks immediately;
- Seal all landscaped areas in, or adjacent to pavements, to minimize or prevent moisture migration to subgrade soils;
- Placing compacted, low permeability backfill against the exterior side of curb and gutter; and,
- Extending the base of the curb and gutter system through the pavement base material and at least 6 inches into lime treated subgrade soils.

Preventive maintenance should be planned and provided for through an on-going pavement management program. These activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. This consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance, additional engineering observation is recommended to determine the type and extent of preventive maintenance.

5.2.3 Drainage Adjacent to Pavements

The performance of the pavement system will not only be dependent upon the quality of construction but also upon the stability of the moisture content of the soils and base underlying the pavement surface. Proper drainage along or adjacent to the pavement edge or curbs is very important and should be provided so infiltration of surface water from unpaved areas surrounding the pavement is minimized. The Project Civil Engineer should design final grades so that there is positive drainage away from the pavement/curb edge. Also, surface slopes for asphaltic concrete pavement areas should be no flatter than two (2) percent to reduce the potential for ponding of water on the asphaltic concrete surface. The importance of proper runoff and drainage cannot be overemphasized and should be thoroughly considered by the Project Civil Engineer. Post construction accumulation or ponding of surface runoff near structures must be avoided.

Since water penetration usually results in degradation of the pavement section with time as vehicular traffic traverses the affected area, we recommend that the curbs extend vertically through the aggregate base course, lime stabilized layer and at least six (6) inches into the pavement subgrade.

5.2.4 Pavement Section Materials

All pavement materials shall conform to the latest edition of City of New Braunfels design and construction guidelines. Presented below are selection and preparation guidelines for various materials that may be used to construct the pavement sections. Submittals should be made for each pavement material. The submittals should be reviewed by TTL and any appropriate members of the Project Team. The submittals should provide test information necessary to verify full compliance with the recommended or specified material properties.

Hot Mix Asphaltic Concrete Surface - The paving mixture and construction methods shall conform to Item 340, “Hot Mix Asphaltic Concrete, Type D” of the Standard Specifications by TxDOT. The mix should be compacted between 91 and 95 percent of the maximum theoretical density as measured by TEX-227-F. The asphalt cement content by percent of total mixture weight should fall within a tolerance of ±0.3 percent asphalt cement from the specific mix. In addition, the mix should be designed so 75 to 85 percent of the voids in the mineral aggregate (VMA) are filled with asphalt cement. The asphalt cement grades should conform to the table shown below.

<table>
<tr><th colspan="4">Asphalt Cement Grades</th></tr>
<tr><th rowspan="2">Street Classifications</th><th colspan="3">Minimum PG Asphalt Cement Grade</th></tr>
<tr><th>Surface Courses</th><th>Binder and Level up courses</th><th>Base Courses</th></tr>
<tr><td>Arterials</td><td>PG 76-22</td><td rowspan="2">PG 70-22</td><td rowspan="3">PG 64-22</td></tr>
<tr><td>Residential Collector Streets</td><td>PG 70-22</td></tr>
<tr><td>Residential Local Streets</td><td>PG 64-22</td><td>PG 64-22</td></tr>
</table>

Aggregates known to be prone to stripping should not be used in the hot mix. If such aggregates are used measures should be taken to mitigate this concern. The mix should have at least 70 percent strength retention when tested in accordance with TEX-531-C.

Pavement specimens, which shall be either cores or sections of asphaltic pavement, will be tested according to Test Method TEX-207-F. The nuclear-density gauge or other methods which correlate satisfactorily with results obtained from Project pavement specimens may be used when approved by the Engineer. Unless otherwise shown on the plans, the Contractor shall be responsible for obtaining the required pavement specimens at their expense and in a manner and at locations selected by the Engineer.

Prime Coat - The prime coat should consist of sealing the base with an oil such as MC-30 or AE-P asphalt cement. The prime coat should be applied at a rate not to exceed 0.35 gallons per square yard with materials which meet TxDOT Item 300. The prime coat will help to minimize penetration of rainfall and other moisture that penetrates the base.

Granular Base Material - Base material may be composed of crushed limestone base meeting all of the requirements of 2014 TxDOT Item 247, Type A, Grade 1 or 2; and should have no more than 15 percent of the material passing the No. 200 sieve. The base should be compacted to at least 95 percent of the maximum dry density determined in accordance with test method TEX-113-E at moisture contents ranging between -2 and +3 percentage points of the optimum moisture content.

Lime Treatment - The subgrade shall be treated with hydrated lime in accordance with TxDOT Item 260. We anticipate that approximately four (4) percent hydrated lime will be required (approximately 35 pounds per square yard). The optimum hydrated lime content should result in a soil-lime mixture with a pH of at least 12.4 when tested in accordance with ASTM C 977, Appendix XI.

The hydrated lime should initially be blended with a mixing device such as a pulvermixer. After sufficient moisture conditioning, the treated soil mixture shall be compacted to at least 95 percent of the maximum dry density as determined in accordance with the Standard effort (ASTM D 698) at moisture contents from optimum to +4 percentage points of the optimum moisture content. If the in-place gradation requirements can be achieved during initial mixing, the remixing after the curing period can be eliminated.

Details regarding subgrade preparation are presented in Pavement Earthwork Section below.

5.2.5 Pavement Earthwork

The intended performance of street is contingent upon following the earthwork recommendations and guidelines outlined in this section. Earthwork activities on the Project should be observed and evaluated by *TTL* personnel. The evaluation of earthwork should include observation and testing of all fill and backfill soils placed at the Site, subgrade preparation beneath the streets.

The clay soils across the site have a high potential to undergo expansion and contraction with fluctuations in their moisture content. Expansion and contraction of the clay subgrade can lead to cracking and undulating/corrugation in the pavement and curbs. Remedial methods to address this issue include: removing the expansive soils and replacing them with a non-expansive cohesive soil; chemical injection of the expansive soils; a combination of moisture conditioning, lime or cement treatment and installation of a vertical moisture barrier; other subgrade preparation methods are also available. If additional earthwork preparation methods will be used or evaluated, please contact us. The following earthwork recommendations must be performed prior to pavement construction.

- Strip vegetation, loose topsoil, existing pavements, vegetation and any otherwise unsuitable materials from the pavement area. The pavement area is defined as the area that extends at least three (3) feet (horizontal) beyond the perimeter of the proposed pavement and any adjacent flatwork (sidewalks).
- Perform cut and fill to accommodate the design pavement subgrade elevation (also referenced as the bottom of the base course). On-site soils can be used for grade adjustments in fill areas. Refer to the Section 4.2 of this report for requirements for the placement of on-site soils and select fill materials.
- After achieving the required excavation depth, and before placing any fill, the exposed excavation subgrade should be proof-rolled with at least a 20-ton roller, or equivalent equipment, to evidence any weak yielding zones. A technical representative of our firm should be present to observe the proof-rolling operations. If any weak yielding zones are present, they should be over-excavated, both vertically and horizontally, until competent soils are exposed. The excavated soil can be used to restore the excavation subgrade, provided that the soils are relatively free and clean of deleterious material or materials exceeding three (3) inches in maximum dimension. The excavated soil or imported fill soil shall be placed in maximum 6-inch compacted lifts. Each lift of soil shall be moisture conditioned and compacted as described in the Section 4.2.

6.0 STRUCTURAL RECOMMENDATIONS

6.1 Seismic Design Parameters

Presented below are the seismic design criteria for the project site and immediate area.

Description	Value
2018 International Building Code Site Classification (IBC)[1]	D[2]
Site Latitude	29.76407°
Site Longitude	-98.04998°
Maximum Considered Earthquake 0.2 second Design Spectral Response Acceleration (S_{DS})	0.055 g
Maximum Considered Earthquake 1.0 second Design Spectral Response Acceleration (S_{D1})	0.044g

	Description	Value
1	As per the requirements of Section R301.2.2.1.1 in the 2018 IRC and Section 1613.3.2 in the 2018 IBC, the site class definition was determined using SPT N-values in conjunction with Table 20.3-1 of the ASCE 7. The Spectral Acceleration values were determined using publicly available information provided on the United States Geological Survey (USGS) website. The above criteria can be used to determine the Seismic Design Category using Table R301.2.2.1.1 in the 2015 IRC.	
2	Note: Chapter 20 of ASCE 7 requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. The boring extended to a maximum depth of ***15 feet***, and this seismic site class definition considers that similar soils continue below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.	

6.2 Shallow Foundations

Please note that the foundation design recommendations and construction guidelines provided in this section are ***preliminary*** and shall *only* be used for planning and budgeting purposes. The recommendations and construction guidelines shall not be used for final foundation design.

6.2.1 Preliminary Monolithic Slab and Beam Foundation Recommendations

Slab foundations should be designed such that if the subsoils expand or contract, the entire slab foundation would move as one unit. ***Please note that such a foundation system does not eliminate potential foundation movement due to expansion or contraction of the subsoils. As stated previously, the subsoils may yield a PVR ranging from 1 inch to about 3¾ inches, thus foundation movement of approximately 1 inch to about 3¾ inches should be expected.*** Should this range of potential foundation movement exceed the desired performance, earthwork operations may be required to reduce the PVR of subsoils. TTL can provide these recommendations once a desired PVR is provided to us.

The foundation system would consist of perimeter and interior concrete foundation beams poured monolithic with the slab. Based on subsurface conditions encountered at the site, without accounting for any cuts or fills, design parameters for this foundation type are provided below. The foundation parameters are provided for the observed soil conditions and are presented in the following table.

EXISTING CONDITIONS – Preliminary Parameters				
PTI Method; 3rd Edition[1,3,4,5]				
Vertical Moisture Barrier Depth (ft)[6,7]:	<2½	2½	3	3½
Edge Moisture Variation Distance (e_m):				
Center Lift (ft):	6.1	5.6	5.3	5.0
Edge Lift (ft):	3.2	2.2	2.2	2.0
Maximum Unrestrained Differential Soil Movement or Swell (y_m):				
Center Lift (in):	2.1	1.6	1.5	1.3
Edge Lift (in):	3.3	2.2	1.9	1.7
Coefficient of Slab-Subgrade Friction (μ):	0.75	0.75	0.75	0.75

EXISTING CONDITIONS – Preliminary Parameters				
PTI Method; 3rd Edition[1,3,4,5]				
Net Allowable Bearing Pressures[2]:				
Total Load Conditions (psf):	1500	1500	1500	1500
Dead Load Plus Gravity Live Load Conditions (psf):	1000	1000	1000	1000
Maximum Allowable Deflection Ratio of Foundation Beam:	1/360	1/360	1/360	1/360

Notes Applicable to the PTI Slab Foundation Design:

1	Design parameters based on preparing the subgrade and constructing a residential pad as recommended in **EARTHWORK RECOMMENDATIONS SECTION 4.0** of this report.
2	Includes a factor of safety (FS) of at least 2 for total load conditions and at least 3 for dead load plus gravity live load conditions.
3	If the floor slab of the foundation is to be covered with wood, vinyl tile, carpet, or other moisture sensitive or impervious coverings, a vapor barrier should be placed beneath concrete slab foundations or concrete floor slabs if they are bearing directly on the ground. The designer should be familiar with the American Concrete Institute (ACI) 302 for procedures and cautions about the use and placement of a vapor barrier.
4	The width of foundation beams should not be less than 10 inches. The minimum bearing depth below the adjacent ground surface (also referred to as "final grade") should not be less than ***24 inches*** for perimeter and interior foundation beams. These foundation dimension recommendations are for the proper development of bearing capacity for the foundations and to reduce the potential for water to migrate beneath the foundation. These recommendations are not based on structural considerations of the applicable design method. Actual foundation depths and widths may need to be greater than the minimum recommended herein for structural considerations, which should be properly evaluated and designed by the Structural or Foundation Engineer.
5	This is essentially an empirical design method and the recommended design parameters are based on our understanding of the proposed project, our interpretation of the information and data collected as a part of this study, our area experience, and the criteria published in the PTI design manual.
6	According to the PTI 3rd Edition, a vertical barrier must extend at least ***24 inches*** below the adjacent ground surface to be considered as having any significant effect. Foundation beams bearing less than 30 inches below the adjacent ground surface ("final grade") are not considered a vertical moisture barrier.
7	According to the PTI 3rd Edition, once the foundation plan has been determined, the Shape Factor (SF) shall be calculated. If the SF exceeds 24, the designer should contact us to discuss additional geotechnical engineering recommendations to reduce the y_m and e_m values to recommended values.

At the time of the field exploration the site had not been cleared of vegetation and mass grading had not been conducted. Therefore, our recommendations for PTI design are based on the subsoil conditions that we encountered during our drilling operations at the Site and at existing grade.

6.2.2 Shallow Foundation Construction Considerations

Excavations for shallow foundations and grade beams shall be neat excavated with a smooth-mouthed bucket. If a toothed bucket is used, excavation with this bucket should be stopped 6

inches above the final foundation bearing surface and the excavation completed with a smooth-mouthed bucket or by hand labor. Debris in the bottom of the excavations should be removed prior to steel placement. If neat excavation is not possible, the foundation should be overexcavated and formed. All loose materials should be removed from the overexcavated areas and filled with lean concrete or flowable fill as described in ACI 229R.

Reinforcing steel should be placed and the foundation constructed as quickly as possible to avoid exposure of the foundation bottoms to wetting and drying. The excavations should be sloped sufficiently to create internal sumps for runoff collection and removal of water. If surface runoff or subsurface water seepage in excess of 1 inch accumulates at the bottom of the excavation, it should be collected and removed so that ponding water does not adversely affect the quality of the bearing surfaces. Special care should be taken to protect exposed bearing surfaces from disturbance or drying out prior to the placement of concrete.

6.3 Settlement of Grade Supported Foundations

Total settlement of grade supported foundations designed and constructed as recommended in this report is expected to be about 1 inch or less. The settlement of the foundations is expected to be elastic in nature with most of the observed settlement occurring during construction. Differential settlement approaching ½ to ¾ of the total foundation settlement should be expected to occur between load bearing foundation elements. The settlement response of grade supported foundations is impacted more by the quality of construction than by soil-structure interaction. The improper installation of foundation elements can result in differential settlements that are greater than we have estimated.

7.0 LIMITATIONS

This geotechnical engineering report has been prepared for the exclusive use of our Client for specific application to this Project. This geotechnical engineering report has been prepared in accordance with generally accepted geotechnical engineering practices using that level of care and skill ordinarily exercised by licensed members of the engineering profession currently practicing under similar conditions in the same locale. No warranties, express or implied, are intended or made.

TTL understands that this geotechnical engineering report will be used by the Client and various individuals and firms' designers and contractors involved with the preliminary design of the Project. TTL should be invited to attend Project meetings (in person or teleconferencing) or be contacted in writing to address applicable issues relating to the geotechnical engineering aspects of the Project. The information provided in this report is intended for planning purposes only and should not be used for final design considerations.

This geotechnical engineering report is based upon the information provided to us by the Client and various other individuals and entities associated with the Project, along with the field exploration, laboratory testing, and engineering analyses and evaluations performed by TTL as

described in this report. The Client and readers of this geotechnical engineering report should realize that subsurface variations and anomalies may exist across the site which may not be revealed by our field exploration. Furthermore, the Client and readers should realize that site conditions can change due to the modifying effects of seasonal and climatic conditions and conditions at times after our exploration may be different than reported herein.

The nature and extent of such site or subsurface variations may not become evident until construction commences or is in progress. If site and subsurface anomalies or variations exist or develop, TTL should be contacted immediately so that the situation can be properly evaluated and, if necessary, addressed with provide applicable recommendations.

Unless stated otherwise in this report or in the contract documents between TTL and Client, our scope of services for this Project did not include, either specifically or by implication, any environmental or biological assessment of the site or buildings, or any identification or prevention of pollutants, hazardous materials or conditions at the site or within buildings. If the Client is concerned about the potential for such contamination or pollution, TTL should be contacted to provide a scope of additional services to address the environmental concerns. In addition, TTL is not responsible for permitting, site safety, excavation support, and dewatering requirements.

Should the nature, design, or location of the Project, as outlined in this geotechnical engineering report be modified, the geotechnical engineering recommendations and guidelines provided in this document will not be considered valid unless TTL is authorized to review the changes and either verifies or modifies the applicable Project changes in writing.

Additional information about the use and limitations of a geotechnical report is provided within the Geoprofessional Business Association document included at the end of this report.

Important Information about This

Geotechnical-Engineering Report

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

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

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

Understand the Geotechnical-Engineering Services Provided for this Report

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

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

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

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

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

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

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

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

Read this Report in Full

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

You Need to Inform Your Geotechnical Engineer About Change

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

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

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

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

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

This Report's Recommendations Are Confirmation-Dependent

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

This Report Could Be Misinterpreted

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

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

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

Give Constructors a Complete Report and Guidance

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

Read Responsibility Provisions Closely

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

Geoenvironmental Concerns Are Not Covered

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

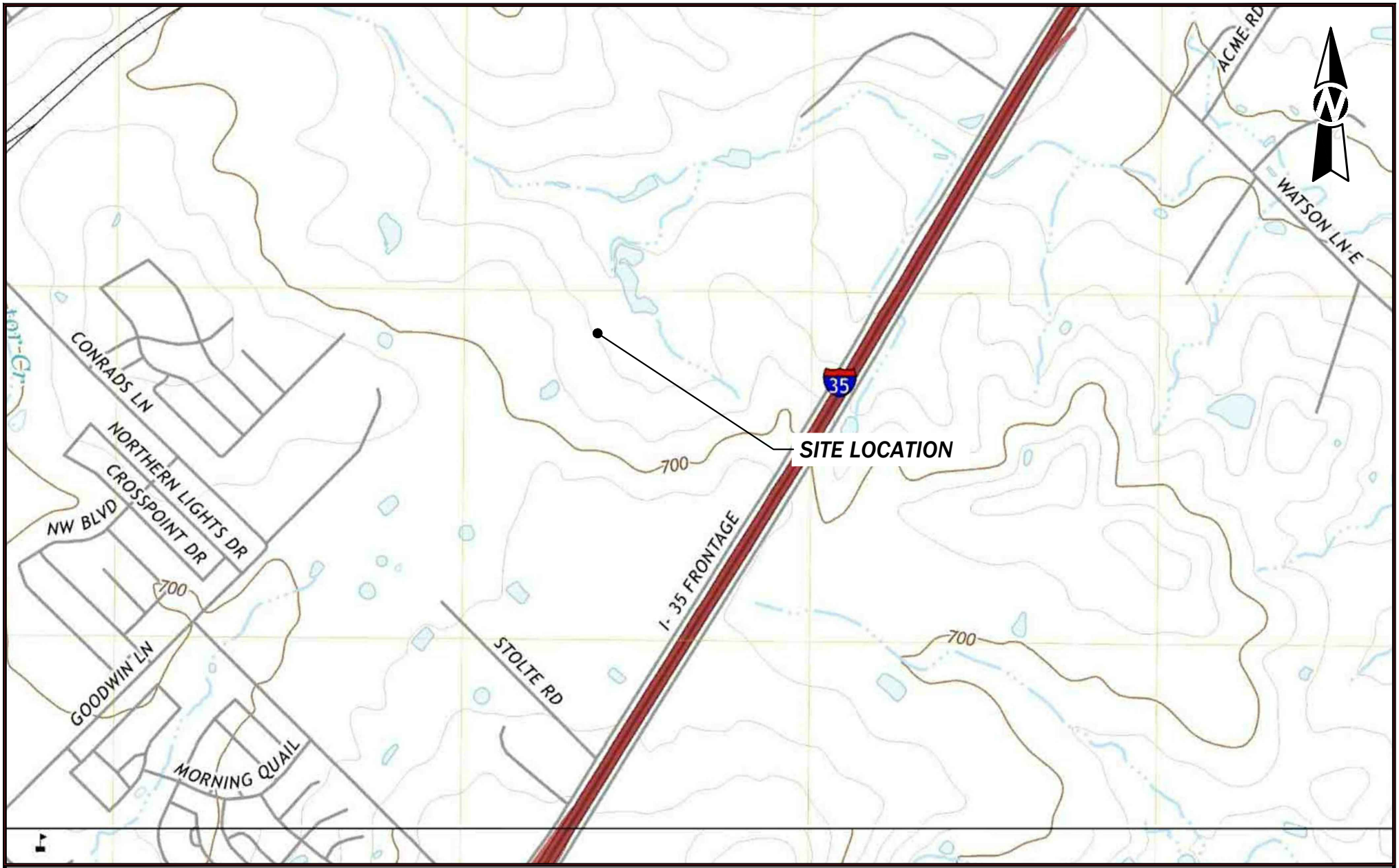
Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

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

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX A
ILLUSTRATIONS



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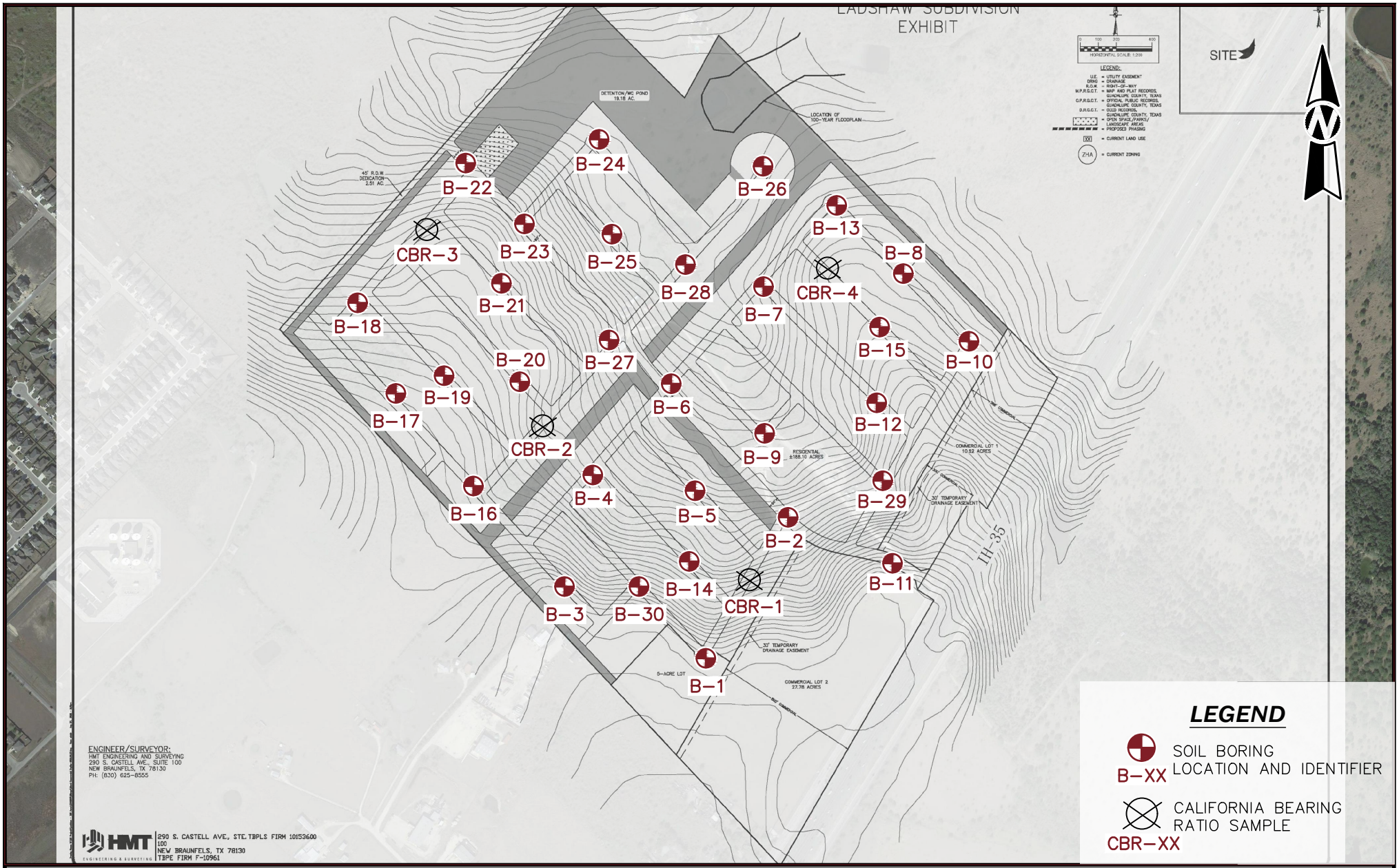
210.888.6100 | www.ttlusa.com
TBPE Firm Registration No. F-12622 | TBPG Firm Registration No. 50456

LADSHAW SUBDIVISION

INTERSTATE HIGHWAY 35 near STOLTE ROAD
NEW BRAUNFELS, COMAL COUNTY, TEXAS

Drawn By:	EG
Checked By:	AB
Date:	11/16/2020
Proj. No.:	00200901740.00
File Name:	Exhibits.dwg

EXHIBIT 1
SITE LOCATION MAP



ENGINEER/SURVEYOR:
HMT ENGINEERING AND SURVEYING
290 S. CASTELL AVE., SUITE 100
NEW BRAUNFELS, TX 78130
PH: (830) 625-8555

HMT ENGINEERING & SURVEYING
290 S. CASTELL AVE., STE. 100
NEW BRAUNFELS, TX 78130
TBPLS FIRM 10153600
TBPE FIRM F-10961

LADSHAW SUBDIVISION

INTERSTATE HIGHWAY 35 near STOLTE ROAD
NEW BRAUNFELS, COMAL COUNTY, TEXAS

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Drawn By:	EG
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File Name:	Exhibits.dwg

EXHIBIT 2
BORING LOCATION PLAN

SOIL LEGEND

FINE- AND COARSE-GRAINED SOIL INFORMATION

FINE-GRAINED SOILS (SILTS AND CLAYS)

SPT N-Value	Consistency	Estimated Q_u (TSF)
0 - 1	Very Soft	0 - 0.25
2 - 4	Soft	0.25 - 0.5
5 - 8	Firm	0.5 - 1.0
9 - 15	Stiff	1.0 - 2.0
16 - 30	Very Stiff	2.0 - 4.0
31+	Hard	4.0+

Q_u = Unconfined Compression Strength

COARSE-GRAINED SOILS (SANDS AND GRAVELS)

SPT N-Value	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
51+	Very Dense

PARTICLE SIZE

Name	Size (US Std. Sieve)
Boulders	>300 mm (>12 in.)
Cobbles	75 mm to 300 mm (3 - 12 in.)
Coarse Gravel	19 mm to 75 mm (3/4 - 3 in.)
Fine Gravel	4.75 mm to 19 mm (#4 - 3/4 in.)
Coarse Sand	2 mm to 4.75 mm (#10 - #4)
Medium Sand	0.425 mm to 2 mm (#40 - #10)
Fine Sand	0.075 mm to 0.425 mm (#200 - #40)
Silts and Clays	< 0.075 mm (< #200)

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Terms	Percent of Dry Weight
"Trace"	< 15
"With"	15 - 30
Modifier	> 30

RELATIVE PROPORTIONS OF CLAYS AND SILTS

Descriptive Terms	Percent of Dry Weight
"Trace"	< 5
"With"	5 - 12
Modifier	> 12

CRITERIA FOR DESCRIBING MOISTURE CONDITION

Description	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp, but no visible water
Wet	Visible free water, usually soil is below water table

CRITERIA FOR DESCRIBING CEMENTATION

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

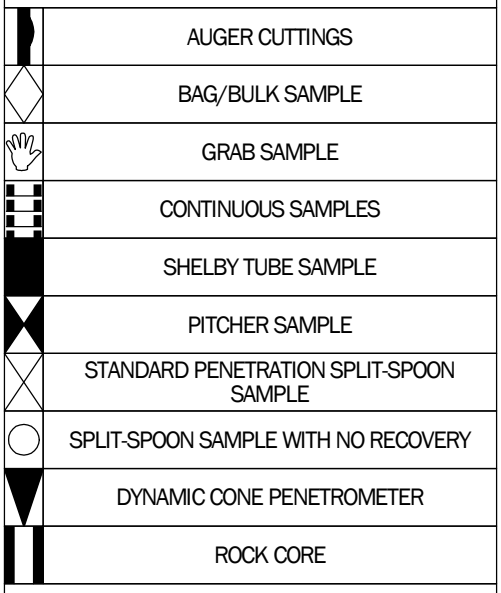
CRITERIA FOR DESCRIBING STRUCTURE

Description	Criteria
Stratified	Alternating layers of varying material or color with layers at least 6 mm thick; note the thickness
Laminated	Alternating layers of varying material or color with the layers less than 6 mm thick; note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

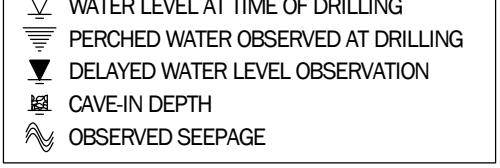
ABBREVIATIONS AND ACRONYMS

WOH	Weight of Hammer	N-Value	Sum of the blows for last two 6-in increments of SPT
WOR	Weight of Rod		
Ref.	Refusal	NA	Not Applicable or Not Available
ATD	At Time of Drilling	OD	Outside Diameter
DCP	Dynamic Cone Penetrometer	PPV	Pocket Penetrometer Value
Elev.	Elevation	SFA	Solid Flight Auger
ft.	feet	SH	Shelby Tube Sampler
HSA	Hollow Stem Auger	SS	Split-Spoon Sampler
ID	Inside Diameter	SPT	Standard Penetration Test
in.	inches	USCS	Unified Soil Classification System
lbs	pounds		

SAMPLERS AND DRILLING METHODS



WATER LEVEL SYMBOLS



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UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

COARSE GRAINED SOILS (>50% of the material is larger than the #200 sieve)	GRAVELS (>50% of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu > 4 Cc = 1-3	GW	Well-graded gravels, gravel-sand mixtures with trace or no fines
			Cu < 4 and/or Cc < 1 Cc > 3	GP	Poorly-graded gravels, gravel-sand mixtures with trace or no fines
		GRAVEL WITH 5% TO 12% FINES	Cu > 4 Cc = 1-3	GW-GM	Well-graded gravels, gravel-sand mixtures with silt fines
				GW-GC	Well-graded gravels, gravel-sand mixtures with clay fines
			Cu < 4 and/or Cc < 1 Cc > 3	GP-GM	Poorly-graded gravels, gravel-sand mixtures with silt fines
				GP-GC	Poorly-graded gravels, gravel-sand mixtures with clay fines
		GRAVEL WITH MORE THAN 12% FINES		GM	Silty gravels, gravel-silt-sand mixtures
				GC	Clayey gravels, gravel-sand-clay mixtures
				GC-GM	Clayey gravels, gravel-sand-clay-silt mixtures
	SANDS (>50% of coarse fraction is smaller than the #4 sieve)	CLEAN SAND WITH <5% FINES	Cu > 6 Cc = 1-3	SW	Well-graded sands, sand-gravel mixtures with trace or no fines
			Cu < 6 and/or Cc < 1 Cc > 3	SP	Poorly-graded sands, sand-gravel mixtures with trace or no fines
		SAND WITH 5% TO 12% FINES	Cu > 6 Cc = 1-3	SW-SM	Well-graded sands, sand-gravel mixtures with silt fines
				SW-SC	Well-graded sands, sand-gravel mixtures with clay fines
			Cu < 6 and/or Cc < 1 Cc > 3	SP-SM	Poorly-graded sands, sand-gravel mixtures with silt fines
				SP-SC	Poorly-graded sands, sand-gravel mixtures with clay fines
		SAND WITH MORE THAN 12% FINES		SM	Silty sands, sand-gravel-silt mixtures
				SC	Clayey sands, sand-gravel-clay mixtures
				SC-SM	Clayey sands, sand-gravel-clay-silt mixtures
FINE GRAINED SOILS (>50% of material is smaller than the #200 sieve)		SILTS & CLAYS (Liquid Limit less than 50)		ML	Inorganic silts with low plasticity
				CL	Inorganic clays of low plasticity, gravelly or sandy clays, silty clays, lean clays
				CL-ML	Inorganic clay-silts of low plasticity, gravelly clays, sandy clays, silty clays, lean clays
				OL	Organic silts and organic silty clays of low plasticity
		SILTS & CLAYS (Liquid Limit more than 50)		MH	Inorgatinc silts of high plasticity, elastic silts
				CH	Inorganic clays of high plasticity, fat clays
				OH	Organic clays and organic silts of high plasticity

USCS - HIGHLY ORGANIC SOILS

Primarily organic matter, dark in color, organic odor

PT	Peat, humus, swamp soils with high organic contents

OTHER MATERIALS

- BITUMINOUS CONCRETE (ASPHALT)
- CONCRETE
- CRUSHED STONE/AGGREGATE BASE
- TOPSOIL
- FILL
- UNDIFFERENTIATED ALLUVIUM
- UNDIFFERENTIATED OVERBURDEN
- BOULDERS AND COBBLES

UNIFORMITY COEFFICIENT

$$C_u = D_{60}/D_{10}$$

COEFFICIENT OF CURVATURE

$$C_C = (D_{30})^2/(D_{60} \times D_{10})$$

Where:

D_{60} = grain diameter at 60% passing

D_{30} = grain diameter at 30% passing

D_{10} = grain diameter at 10% passing

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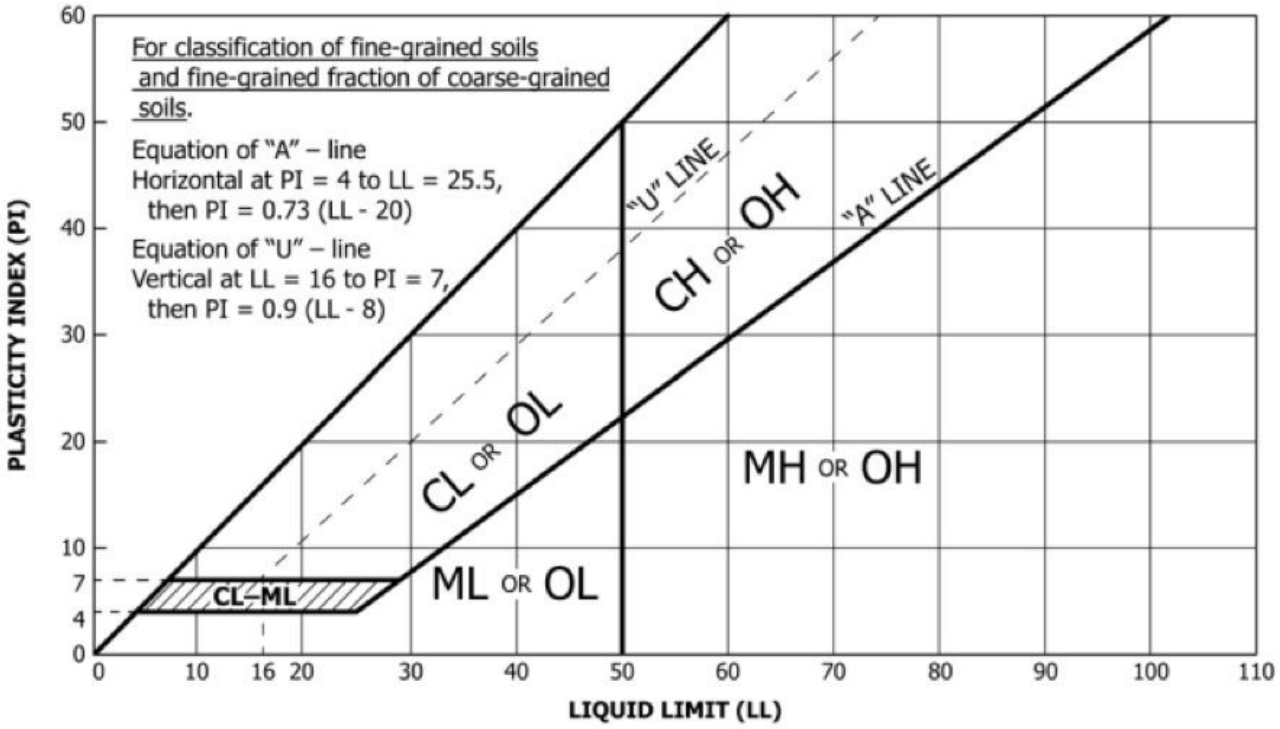
PLASTICITY CHART FOR USCS CLASSIFICATION OF FINE-GRAINED SOILS



IMPORTANT NOTES ON TEST BORING RECORDS

1) The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.

2) Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown. Solid lines are used to indicate a change in the material type, particularly a change in the USCS classification. Dashed lines are used to separate two materials that have the same material type, but that differ with respect to two or more other characteristics (e.g. color, consistency).

3) No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.

4) Logs represent general soil and rock conditions observed at the point of exploration on the date indicated.

5) In general, Unified Soil Classification System (USCS) designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.

6) Fine-grained soils that plot within the hatched area on the Plasticity Chart, and coarse-grained soils with between 5% and 12% passing the #200 sieve require dual USCS symbols as presented on the previous page.

7) If the sampler is not able to be driven at least 6 inches, then 50/X" indicates that the sampler advanced X inches when struck 50 times with a 140-pound hammer falling 30 inches.

8) If the sampler is driven at least 6 inches, but cannot be driven either of the subsequent two 6-inch increments, then either 50/X" or the sum of the second 6-inch increment plus 50/X" for the third 6-inch increment will be indicated.
Example 1: Recorded SPT blow counts are 16 - 50/4", the SPT N-value will be shown as N = 50/4"
Example 2: Recorded SPT blow counts are 18 - 25 - 50/2", the SPT N-value will be shown as N = 75/8"

Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-01

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/9/2020*
Logged by:	*E. Hausler*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05344 Latitude: 29.7583*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; firm to stiff, dark gray (CH)		1 - 2 - 3 N = 5			20	70	28	42					
					3 - 5 - 5 N = 10			18								
	5		- tan and gray, with calcareous pockets between 4½ and 6 feet		3 - 5 - 7 N = 12			14	64	24	40					94.7
			CLAYEY GRAVEL WITH SAND; very dense to dense, tan and gray, calcareous (GC)		15 - 33 - 46 N = 79			7								31.8
			- % retained on #4 sieve at 6½ feet: 39.4%		26 - 27 - 13 N = 40			5								
	10															
			FAT CLAY; very stiff, tan and gray (CH)		5 - 7 - 9 N = 16			19	64	21	43					94.9
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-02

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05153 Latitude: 29.760089*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			LEAN CLAY WITH SAND AND GRAVEL; firm, dark gray, calcaerous (CL)		4 - 4 - 4 N = 8			14								
			SANDY FAT CLAY; sitff, gray (CH)		4 - 4 - 6 N = 10			13	69	24	45					69.3
			FAT CLAY; very stiff to stiff, dark brown and brown (CH)		8 - 13 - 15 N = 28			13								
	5		- tan below 6½ feet		6 - 10 - 12 N = 22			15	70	22	48					98.2
					5 - 9 - 10 N = 19			16								
	10				3 - 6 - 9 N = 15			17								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road

New Braunfels, Comal County, Texas

Log of B-03

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/9/2020*
Logged by:	*E. Hausler*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05584 Latitude: 29.75907*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" / 2nd 6" / 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; soft to firm, dark gray (CH) - with gravel to 2 feet		2 - 2 - 2 N = 4			14								
					3 - 4 - 4 N = 8			14	54	23	31					94.8
	5		LEAN CLAY; stiff to very stiff, tan and light gray, calcareous (CL)		3 - 5 - 5 N = 10			10	43	16	27					95.2
					3 - 6 - 11 N = 17			14								
			FAT CLAY; stiff, tan and light gray (CL)		14 - 6 - 6 N = 12			19	59	20	39					
	10															
					4 - 6 - 8 N = 14			13								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-04

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/13/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.055357 Latitude: 29.761012*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: N-VALUE BLOWS/FT (1st 6" 2nd 6" 3rd 6")	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LL	PL	PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; firm to very stiff, brown (CH)													
					3 - 4 - 3 N = 7			12	61	23	38					93.8
					3 - 4 - 5 N = 9			12								
	5		- tan between 4½ and 6 feet		4 - 6 - 8 N = 14			14	63	21	42					
			- tan and gray between 6½ and 8 feet		4 - 5 - 7 N = 12			18								
			- reddish-yellow between 8½ and 10 feet		4 - 7 - 9 N = 16			15								
	10															
			- tan and light gray below 13½ feet		5 - 7 - 10 N = 17			18	71	23	48					
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-05

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.054186 Latitude: 29.761346*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: N-VALUE BLOWS/FT (1st 6" / 2nd 6" / 3rd 6")	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; firm, dark gray (CH)													
					3 - 4 - 4 N = 8			12	63	29	34					91.3
			- gray, calcareous between 2½ and 6 feet - stiff below 2½ feet		4 - 5 - 7 N = 12			11								
	5				3 - 6 - 8 N = 14			14								
			- tan, with calcareous pockets between 6½ and 8 feet		3 - 6 - 7 N = 13			15	73	25	48					
			- tan and gray below 8½ feet		4 - 5 - 7 N = 12			18								
	10															
					5 - 7 - 8 N = 15			19	65	32	33					
	15		Boring terminated at 15 feet.													

Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-06

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.054024 Latitude: 29.762392*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY WITH GRAVEL; firm, dark gray (CH)		4 - 3 - 4 N = 7			13								
					3 - 3 - 3 N = 6			13	59	27	32					94.5
			LEAN CLAY; stiff to hard, tan, calcareous (CL)													
	5				3 - 7 - 8 N = 15			12								
			- tan and gray below 6½ feet		8 - 28 - 32 N = 60			11	49	18	31					
					15 - 30 - 33 N = 63			12								
	10															
					17 - 26 - 31 N = 57			14								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-07

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.052396 Latitude: 29.763855*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" / 2nd 6" / 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			LEAN CLAY; stiff to very stiff, tan, calcareous (CL)													
					5 - 5 - 6 N = 11			8	37	21	16					93.9
					8 - 9 - 10 N = 19			8								
			FAT CLAY; very stiff, tan and gray (CH)													
	5				8 - 10 - 12 N = 22			13								
					6 - 9 - 12 N = 21			14	54	19	35					
					5 - 8 - 10 N = 18			17								
	10															
					4 - 8 - 11 N = 19			19								
	15		Boring terminated at 15 feet.													

Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-08

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.049983 Latitude: 29.764069*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: N-VALUE BLOWS/FT (1st 6" 2nd 6" 3rd 6")	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; firm to stiff, gray and very dark gray (CH)													
					3 - 2 - 3 N = 5			14	64	28	36					93.6
					3 - 5 - 7 N = 12			13								
	5		- very stiff between 4½ and 6 feet - tan below 4½ feet		5 - 8 - 14 N = 22			15	67	23	44					99.1
			- with gypsum below 6½ feet		5 - 6 - 8 N = 14			19								
					4 - 5 - 7 N = 12			21								
	10															
					4 - 5 - 8 N = 13			24								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road

New Braunfels, Comal County, Texas

Log of B-09

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/9/2020*
Logged by:	*E. Hausler*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05228 Latitude: 29.76175*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			LEAN CLAY; stiff, dark gray (CL)		7 - 6 - 6 N = 12			6	30	16	14					
			GRAVELLY FAT CLAY WITH SAND; very stiff, gray and tan (CH) - % retained on #4 sieve at 2½ feet: 28.2%		8 - 10 - 7 N = 17			18								52.0
			FAT CLAY; firm to very stiff, gray and tan (CH)		3 - 3 - 5 N = 8			16	63	26	37					81.5
	5		- tan below 6½ feet		3 - 5 - 5 N = 10			18								
					4 - 6 - 8 N = 14			17	70	23	47					97.9
	10															
					4 - 9 - 12 N = 21			17								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-10

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.048825 Latitude: 29.763051*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	BORE/CORE DATA: P: TONS/SQFT	BORE/CORE DATA: RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	ATTERBERG LIMITS (%): PLASTIC LIMIT PL	ATTERBERG LIMITS (%): PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
	0		FAT CLAY; stiff to very stiff, gray (CH)													
					3 - 4 - 6 N = 10			14	61	22	39					93.7
					3 - 7 - 9 N = 16			12								
	5		- tan and light gray below 4½ feet		4 - 7 - 11 N = 18			14	69	21	48					
					5 - 6 - 9 N = 15			15								
					4 - 7 - 7 N = 14			17	68	20	48					
	10															
					4 - 7 - 8 N = 15			20								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-11

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/9/2020*
Logged by:	*E. Hausler*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05016 Latitude: 29.75968*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: N-VALUE BLOWS/FT (1st 6" / 2nd 6" / 3rd 6")	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
	0		FAT CLAY; stiff, brown, with calcareous pockets (CH)		4 - 5 - 7 N = 12			13	76	25	51					94.2
			LEAN CLAY; stiff to very stiff, tan, with calcareous pockets (CL)		5 - 5 - 6 N = 11			8								
	5				4 - 8 - 11 N = 19			9	34	16	18					
			FAT CLAY; very stiff, tan and light gray (CH)		7 - 9 - 12 N = 21			15								
					4 - 8 - 10 N = 18			16	62	20	42					
	10															
					5 - 8 - 10 N = 18			20								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road

New Braunfels, Comal County, Texas

Log of B-12

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.050427 Latitude: 29.762163*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; stiff to very stiff, brown (CH)		4 - 4 - 5 N = 9			17	56	23	33					97.7
			- brown and tan between 2½ and 4 feet		4 - 7 - 9 N = 16			11								
	5		- tan and gray below 4½ feet		3 - 7 - 7 N = 14			16	67	23	44					
					4 - 6 - 8 N = 14			16								
					5 - 7 - 9 N = 16			15	67	24	43					
	10															
			- with gypsum below 13½ feet		4 - 8 - 10 N = 18			15								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-13

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05116 Latitude: 29.765108*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			LEAN CLAY; stiff to very stiff, brown (CL)		4 - 5 - 5 N = 10			9								
					5 - 7 - 11 N = 18			7	40	19	21					97.6
			FAT CLAY; very stiff to stiff, tan and light gray (CH)		7 - 13 - 17 N = 30			9								
	5				4 - 8 - 11 N = 19			15	56	22	34					
			- tan below 8½ feet		5 - 8 - 10 N = 18			16								
	10															
					4 - 4 - 8 N = 12			19	66	25	41					
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-14

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.053619 Latitude: 29.759423*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: N-VALUE BLOWS/FT (1st 6" 2nd 6" 3rd 6")	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
	0		FAT CLAY; stiff to very stiff, dark gray (CH)													
					4 - 5 - 6 N = 11			13	64	26	38					86.0
					4 - 6 - 8 N = 14			14								
	5		- dark gray and brown between 4½ and 6 feet		5 - 7 - 10 N = 17			14								
			LEAN CLAY; very stiff to hard, tan and light gray, with calcareous pockets (CL)		14 - 13 - 17 N = 30			7	47	15	32					
					4 - 14 - 18 N = 32			9								
	10															
			FAT CLAY; very stiff, tan and light gray (CH)		5 - 8 - 12 N = 20			17	64	25	39					
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-15

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.050372 Latitude: 29.76322*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: N-VALUE BLOWS/FT (1st 6" 2nd 6" 3rd 6")	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; firm to very stiff, gray to tan and gray (CH)													
					4 - 3 - 5 N = 8			13	65	31	34					
					4 - 4 - 5 N = 9			14								
	5		- with gypsum below 4½ feet		4 - 8 - 12 N = 20			12	67	23	44					97.3
			- tan below 6½ feet		5 - 7 - 10 N = 17			16								
					6 - 8 - 8 N = 16			16	70	28	42					96.1
	10															
					6 - 7 - 11 N = 18			18								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-16

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/13/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.057465 Latitude: 29.760876*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" / 2nd 6" / 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY WITH SAND; stiff to very stiff, dark gray (CH)		4 - 5 - 5 N = 10			20	56	22	34					81.5
			- gray between 2½ and 4 feet		3 - 4 - 5 N = 9			12								
	5				5 - 7 - 10 N = 17			9	68	29	39					
			- tan and light gray below 6½ feet		3 - 6 - 8 N = 14			13								
					4 - 7 - 9 N = 16			15	71	25	46					
	10															
					4 - 9 - 11 N = 20			17								
	15		Boring terminated at 15 feet.													

Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-17

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/13/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.058957 Latitude: 29.76226*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; stiff to very stiff, dark gray (CH)		4 - 4 - 7 N = 11			20	56	28	28					90.5
			- dark gray and light brown between 2½ and 4 feet		4 - 4 - 6 N = 10			11								
	5		- light brown with calcareous pockets between 4½ and 6 feet		6 - 7 - 7 N = 14			10	55	18	37					97.3
			- tan and light gray below 6½ feet		3 - 6 - 8 N = 14			15								
					4 - 8 - 10 N = 18			19	72	26	46					
	10															
					6 - 7 - 9 N = 16			17								
	15		Boring terminated at 15 feet.													

Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road

New Braunfels, Comal County, Texas

Log of B-18

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/13/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.059455 Latitude: 29.76363*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; firm to very stiff, dark gray (CH)													
					3 - 3 - 4 N = 7			20								
					3 - 4 - 4 N = 8			16	73	27	46					92.4
	5		- dark gray and brown between 4½ and 6 feet		3 - 5 - 7 N = 12			18								
			- tan, with gypsum below 6½ feet		5 - 8 - 8 N = 16			19	79	26	53					
					5 - 8 - 9 N = 17			16								
	10															
					6 - 9 - 12 N = 21			13								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road

New Braunfels, Comal County, Texas

Log of B-19

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/13/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05796 Latitude: 29.762507*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" / 2nd 6" / 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; stiff to very stiff, dark gray (CH)		3 - 4 - 5 N = 9			13	62	26	36					89.7
			- gray and brown between 2½ and 4 feet		3 - 4 - 5 N = 9			14								
	5		- tan between 4½ and 6 feet		5 - 9 - 10 N = 19			17	74	27	47					97.8
			- tan and light gray below 6½ feet		4 - 5 - 8 N = 13			17								
					4 - 7 - 9 N = 16			20	67	24	43					
	10															
			- with gypsum below 13½ feet		4 - 7 - 9 N = 16			11								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road

New Braunfels, Comal County, Texas

Log of B-20

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*	Remarks: Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.
Driller:	*S. Drash*	Date Drilled:	*10/13/2020*	
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*	
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*	
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.056656 Latitude: 29.76245*	
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*	▼ Delayed Water Level: *N/A*
		▨ Cave-In at Time of Drilling:	*N/A*	Delayed Water Observation Date: *N/A*

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" / 2nd 6" / 3rd 6" / N-VALUE BLOWS/FT	P: TONS/SQFT	RQD / % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT (LL)	PLASTIC LIMIT (PL)	PLASTICITY INDEX (PI)	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			CLAYEY GRAVEL; loose to medium dense, dark brown (CH)													
			- % retained on #4 sieve at ½ feet: 54.6%		4 - 3 - 7 N = 10			7								31.7
					7 - 8 - 7 N = 15			12								
			LEAN CLAY; stiff, tan and light gray, with calcareous pockets (CL)													
	5				6 - 8 - 7 N = 15			17	40	18	22					
			FAT CLAY; stiff to very stiff, tan and light gray (CH)													
					3 - 6 - 8 N = 14			16								
					4 - 6 - 7 N = 13			17	55	22	33					
	10															
					5 - 9 - 11 N = 20			15								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-21

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/13/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.056974 Latitude: 29.763918*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" / 2nd 6" / 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; firm to stiff, gray (CH)		3 - 4 - 3 N = 7			12	53	24	29					93.3
			- gray and brown between 2½ and 4 feet		4 - 4 - 6 N = 10			14	52	20	32					
			LEAN CLAY; very stiff, tan (CL)													
	5				6 - 12 - 15 N = 27			18								
					9 - 13 - 13 N = 26			17	45	20	25					
					9 - 14 - 13 N = 27			17								
	10															
					9 - 12 - 14 N = 26			7								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-22

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/13/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.057565 Latitude: 29.765737*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			LEAN CLAY; very stiff, gray, with calcareous pockets (CL)		7 - 8 - 9 N = 17			10	42	19	23					94.6
			- tan below 2½ feet		8 - 13 - 16 N = 29			10								
	5				9 - 13 - 14 N = 27			19	45	19	26					
			FAT CLAY; very stiff, tan and light gray (CH)		8 - 9 - 8 N = 17			20								
			- stiff between 8½ and 15 feet		3 - 7 - 8 N = 15			20	55	23	32					
	10															
					6 - 7 - 11 N = 18			20								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road

New Braunfels, Comal County, Texas

Log of B-23

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/13/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.056557 Latitude: 29.764796*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; firm to stiff, dark brown (CH)		2 - 3 - 5 N = 8			11	52	24	28					97.0
			- brown between 2½ and 4 feet		4 - 6 - 6 N = 12			11								
			LEAN CLAY; stiff to hard, light brown (CL)													
	5				4 - 7 - 8 N = 15			10	41	17	24					
			- tan between 6½ and 8 feet		6 - 11 - 13 N = 24			14								
			- tan and gray below 8½ feet		6 - 14 - 19 N = 33			15	43	18	25					
	10															
					9 - 14 - 17 N = 31			17								
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road

New Braunfels, Comal County, Texas

Log of B-24

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/9/2020*
Logged by:	*E. Hausler*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05517 Latitude: 29.766*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; stiff to very stiff, dark gray (CH)													
					5 - 5 - 8 N = 13			12								
					4 - 8 - 10 N = 18			12	56	22	34					91.2
	5		- with gravel between 4½ and 10 feet		5 - 11 - 14 N = 25			13								
					5 - 8 - 9 N = 17			12	53	19	34					
			- tan and gray, calcareous between 8½ and 10 feet		4 - 7 - 9 N = 16			15								
	10															
			- hard, tan and light gray below 13½ feet		9 - 15 - 18 N = 33			15	58	20	38					
	15		Boring terminated at 15 feet.													

Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-25

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/9/2020*
Logged by:	*E. Hausler*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05511 Latitude: 29.76452*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: N-VALUE BLOWS/FT (1st 6" 2nd 6" 3rd 6")	BORE/CORE DATA: P: TONS/SQFT	BORE/CORE DATA: RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	ATTERBERG LIMITS (%): PLASTIC LIMIT PL	ATTERBERG LIMITS (%): PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			LEAN CLAY; firm to very stiff, gray (CL)		5 - 4 - 4 N = 8			13								
					15 - 17 - 12 N = 29			9	47	23	24					95.5
	5		- calcareous between 4½ and 8 feet		5 - 9 - 11 N = 20			9								
			FAT CLAY; stiff to very stiff, light brown (CH)		6 - 7 - 9 N = 16			13	53	18	35					
			- tan below 8½ feet		4 - 5 - 7 N = 12			17								
	10															
					8 - 7 - 12 N = 19			18	60	20	40					97.6
	15		Boring terminated at 15 feet.													

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Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road

New Braunfels, Comal County, Texas

Log of B-26

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/9/2020*
Logged by:	*E. Hausler*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05243 Latitude: 29.76573*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" / 2nd 6" / 3rd 6" / N-VALUE BLOWS/FT	P: TONS/SQFT	RQD / % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; firm to stiff, gray (CH)		3 - 3 - 3 N = 6			13								
					3 - 4 - 6 N = 10			22	58	28	30					95.7
			CLAYEY GRAVEL; medium dense, tan (GC)													
	5				7 - 11 - 13 N = 24			10								
			FAT CLAY; very stiff, tan and light gray (CH)													
					8 - 11 - 13 N = 24			15	55	20	35					
			- hard, tan between 8½ and 10 feet													
					7 - 16 - 15 N = 31			15	61	21	40					
	10															
			- tan and light gray below 139 feet													
					9 - 12 - 18 N = 30			18								
	15		Boring terminated at 15 feet.													

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Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-27

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/13/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.053765 Latitude: 29.764197*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: N-VALUE BLOWS/FT (1st 6" 2nd 6" 3rd 6")	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
	0		CLAYEY GRAVEL; loose, gray, calcareous (GC)		5 - 4 - 4 N = 8			9								
			LEAN CLAY; stiff, light brown, calcareous (CL)		3 - 5 - 5 N = 10			8	35	18	17					97.7
	5				5 - 7 - 7 N = 14			11								
			FAT CLAY; very stiff, tan and light gray (CH)		4 - 8 - 10 N = 18			16	58	21	37					
					5 - 8 - 12 N = 20			17								
	10															
			LEAN CLAY; hard, tan and light gray (CL)		8 - 13 - 21 N = 34			15	46	21	25					
	15		Boring terminated at 15 feet.													

Lennar
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Interstate Highway 35 near Stolte Road
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Log of B-28

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/12/2020*
Logged by:	*E. Garcia*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.050373 Latitude: 29.760924*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			FAT CLAY; stiff to very stiff, dark brown (CH)		4 - 5 - 7 N = 12			14								
					4 - 9 - 9 N = 18			12	51	24	27					96.6
	5		- light brown below 4½ feet		7 - 10 - 13 N = 23			10								
					8 - 12 - 15 N = 27			13	50	19	31					
					4 - 8 - 10 N = 18			16								
	10															
					4 - 7 - 9 N = 16			22								
	15		Boring terminated at 15 feet.													

R:\GINT\TTL\PROJECTS\2020\00200901740 -- LADSHAW SUBDIVISION.GPJ 12/15/20 Report:AEP-GEOTECH LOG - LAT LONG

Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road

New Braunfels, Comal County, Texas

Log of B-29

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/9/2020*
Logged by:	*E. Hausler*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05053 Latitude: 29.761*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			GRAVELLY LEAN CLAY WITH SAND; very stiff, gray (CL)		9 - 9 - 10 N = 19			6								59.3
			FAT CLAY; stiff to very stiff, brown (CH)		6 - 7 - 7 N = 14			10	62	26	36					90.2
	5				6 - 11 - 16 N = 27			14								
			- tan and light gray below 6½ feet		5 - 7 - 10 N = 17			17	68	23	45					98.1
			- tan below 8½ feet		5 - 7 - 11 N = 18			16								
	10															
					7 - 9 - 15 N = 24			19	73	22	51					
	15		Boring terminated at 15 feet.													

R:\GINT\TTL\PROJECTS\2020\00200901740 -- LADSHAW SUBDIVISION.GPJ 12/15/20 Report:AEP-GEOTECH LOG - LAT LONG

Lennar
Ladshaw Subdivision
Interstate Highway 35 near Stolte Road
New Braunfels, Comal County, Texas

Log of B-30

Drilling Co.:	*Eagle Drilling*	**TTL** Project No.:	*00200901740.00*
Driller:	*S. Drash*	Date Drilled:	*10/9/2020*
Logged by:	*E. Hausler*	Boring Depth:	*15 feet*
Equipment:	*Mobile B-47*	Boring Elevation:	*Ground Surface*
Hammer Type:	*Automatic*	Coordinates:	*Longitude: -98.05441 Latitude: 29.75919*
Drilling Method:	*Solid Flight Auger w/SPT Sampling*	▽ Water Level at Time of Drilling:	*Not Encount.*
		▨ Cave-In at Time of Drilling:	*N/A*
		▼ Delayed Water Level:	*N/A*
		Delayed Water Observation Date:	*N/A*

Remarks:
Subsurface water was not encountered during drilling. The borehole was backfilled with soil cuttings after drilling activities were completed.

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIALS DESCRIPTION	SAMPLE DATA: TYPE	BORE/CORE DATA: 1st 6" 2nd 6" 3rd 6" N-VALUE BLOWS/FT	P: TONS/SQFT	RQD % REC	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%): LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY (psf)	SHEAR STRENGTH (psf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	% PASSING #200 SIEVE
			CLAYEY GRAVEL; medium dense, dark gray (GC)		11 - 13 - 12 N = 25			7								23.1
			LEAN CLAY; stiff, light brown, calcareous (CL)		4 - 6 - 8 N = 14			8								
	5				5 - 6 - 9 N = 15			10	47	18	29					
			FAT CLAY; very stiff, tan and light gray (CH)		3 - 7 - 12 N = 19			12								
					6 - 12 - 11 N = 23			18	61	25	36					
	10															
					5 - 11 - 12 N = 23			17								
	15		Boring terminated at 15 feet.													

Boring	Depth	USCS	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	Maximum Size (mm)	% Passing #200 % Silt % Clay (If hydrometer data available)	D50 (mm)
B-01	0.5 - 2	---	20	70	28	42	---	---	---	---	---
B-01	4.5 - 6	CH	14	64	24	40	0.0	0.0	0.075	94.7	---
B-01	6.5 - 8	---	7	---	---	---	39.4	28.8	38.1	31.8	1.031
B-01	13.5 - 15	CH	19	64	21	43	0.0	0.0	0.075	94.9	---
B-02	2.5 - 4	CH	13	69	24	45	0.0	0.0	0.075	69.3	---
B-02	6.5 - 8	CH	15	70	22	48	0.0	0.0	0.075	98.2	---
B-03	2.5 - 4	CH	14	54	23	31	0.0	0.0	0.075	94.8	---
B-03	4.5 - 6	CL	10	43	16	27	0.0	0.0	0.075	95.2	---
B-03	8.5 - 10	---	19	59	20	39	---	---	---	---	---
B-04	0.5 - 2	CH	12	61	23	38	0.0	0.0	0.075	93.8	---
B-04	4.5 - 6	---	14	63	21	42	---	---	---	---	---
B-04	13.5 - 15	---	18	71	23	48	---	---	---	---	---
B-05	0.5 - 2	CH	12	63	29	34	0.0	0.0	0.075	91.3	---
B-05	6.5 - 8	---	15	73	25	48	---	---	---	---	---
B-05	13.5 - 15	---	19	65	32	33	---	---	---	---	---
B-06	2.5 - 4	CH	13	59	27	32	0.0	0.0	0.075	94.5	---
B-06	6.5 - 8	---	11	49	18	31	---	---	---	---	---
B-07	0.5 - 2	CL	8	37	21	16	0.0	0.0	0.075	93.9	---
B-07	6.5 - 8	---	14	54	19	35	---	---	---	---	---
B-08	0.5 - 2	CH	14	64	28	36	0.0	0.0	0.075	93.6	---
B-08	4.5 - 6	CH	15	67	23	44	0.0	0.0	0.075	99.1	---
B-09	0.5 - 2	---	6	30	16	14	---	---	---	---	---
B-09	2.5 - 4	---	18	---	---	---	28.2	19.8	38.1	52.0	---
B-09	4.5 - 6	CH	16	63	26	37	0.0	0.0	0.075	81.5	---
B-09	8.5 - 10	CH	17	70	23	47	0.0	0.0	0.075	97.9	---
B-10	0.5 - 2	CH	14	61	22	39	0.0	0.0	0.075	93.7	---
B-10	4.5 - 6	---	14	69	21	48	---	---	---	---	---
B-10	8.5 - 10	---	17	68	20	48	---	---	---	---	---
B-11	0.5 - 2	CH	13	76	25	51	0.0	0.0	0.075	94.2	---
B-11	4.5 - 6	---	9	34	16	18	---	---	---	---	---
B-11	8.5 - 10	---	16	62	20	42	---	---	---	---	---
B-12	0.5 - 2	CH	17	56	23	33	0.0	0.0	0.075	97.7	---
B-12	4.5 - 6	---	16	67	23	44	---	---	---	---	---
B-12	8.5 - 10	---	15	67	24	43	---	---	---	---	---
B-13	2.5 - 4	CL	7	40	19	21	0.0	0.0	0.075	97.6	---
B-13	6.5 - 8	---	15	56	22	34	---	---	---	---	---
B-13	13.5 - 15	---	19	66	25	41	---	---	---	---	---
B-14	0.5 - 2	CH	13	64	26	38	0.0	0.0	0.075	86.0	---
B-14	6.5 - 8	---	7	47	15	32	---	---	---	---	---
B-14	13.5 - 15	---	17	64	25	39	---	---	---	---	---
B-15	0.5 - 2	---	13	65	31	34	---	---	---	---	---
B-15	4.5 - 6	CH	12	67	23	44	0.0	0.0	0.075	97.3	---

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Summary of Laboratory Test Results

Client: Lennar
Project: Ladshaw Subdivision
Location: New Braunfels, Comal County, Texas
Project Number: 00200901740.00

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Boring	Depth	USCS	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	Maximum Size (mm)	% Passing #200 % Silt % Clay (If hydrometer data available)	D50 (mm)
B-15	8.5 - 10	CH	16	70	28	42	0.0	0.0	0.075	96.1	---
B-16	0.5 - 2	CH	20	56	22	34	0.0	0.0	0.075	81.5	---
B-16	4.5 - 6	---	9	68	29	39	---	---	---	---	---
B-16	8.5 - 10	---	15	71	25	46	---	---	---	---	---
B-17	0.5 - 2	CH	20	56	28	28	0.0	0.0	0.075	90.5	---
B-17	4.5 - 6	CH	10	55	18	37	0.0	0.0	0.075	97.3	---
B-17	8.5 - 10	---	19	72	26	46	---	---	---	---	---
B-18	2.5 - 4	CH	16	73	27	46	0.0	0.0	0.075	92.4	---
B-18	6.5 - 8	---	19	79	26	53	---	---	---	---	---
B-19	0.5 - 2	CH	13	62	26	36	0.0	0.0	0.075	89.7	---
B-19	4.5 - 6	CH	17	74	27	47	0.0	0.0	0.075	97.8	---
B-19	8.5 - 10	---	20	67	24	43	---	---	---	---	---
B-20	0.5 - 2	---	7	---	---	---	54.6	13.7	38.1	31.7	5.654
B-20	4.5 - 6	---	17	40	18	22	---	---	---	---	---
B-20	8.5 - 10	---	17	55	22	33	---	---	---	---	---
B-21	0.5 - 2	CH	12	53	24	29	0.0	0.0	0.075	93.3	---
B-21	2.5 - 4	---	14	52	20	32	---	---	---	---	---
B-21	6.5 - 8	---	17	45	20	25	---	---	---	---	---
B-22	0.5 - 2	CL	10	42	19	23	0.0	0.0	0.075	94.6	---
B-22	4.5 - 6	---	19	45	19	26	---	---	---	---	---
B-22	8.5 - 10	---	20	55	23	32	---	---	---	---	---
B-23	0.5 - 2	CH	11	52	24	28	0.0	0.0	0.075	97.0	---
B-23	4.5 - 6	---	10	41	17	24	---	---	---	---	---
B-23	8.5 - 10	---	15	43	18	25	---	---	---	---	---
B-24	2.5 - 4	CH	12	56	22	34	0.0	0.0	0.075	91.2	---
B-24	6.5 - 8	---	12	53	19	34	---	---	---	---	---
B-24	13.5 - 15	---	15	58	20	38	---	---	---	---	---
B-25	2.5 - 4	CL	9	47	23	24	0.0	0.0	0.075	95.5	---
B-25	6.5 - 8	---	13	53	18	35	---	---	---	---	---
B-25	13.5 - 15	CH	18	60	20	40	0.0	0.0	0.075	97.6	---
B-26	2.5 - 4	CH	22	58	28	30	0.0	0.0	0.075	95.7	---
B-26	6.5 - 8	---	15	55	20	35	---	---	---	---	---
B-26	8.5 - 10	---	15	61	21	40	---	---	---	---	---
B-27	2.5 - 4	CL	8	35	18	17	0.0	0.0	0.075	97.7	---
B-27	6.5 - 8	---	16	58	21	37	---	---	---	---	---
B-27	13.5 - 15	---	15	46	21	25	---	---	---	---	---
B-28	2.5 - 4	CH	12	51	24	27	0.0	0.0	0.075	96.6	---
B-28	6.5 - 8	---	13	50	19	31	---	---	---	---	---
B-29	0.5 - 2	---	6	---	---	---	0.0	0.0	0.075	59.3	---
B-29	2.5 - 4	CH	10	62	26	36	0.0	0.0	0.075	90.2	---
B-29	6.5 - 8	CH	17	68	23	45	0.0	0.0	0.075	98.1	---
B-29	13.5 - 15	---	19	73	22	51	---	---	---	---	---

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Summary of Laboratory Test Results

Client: Lennar
Project: Ladshaw Subdivision
Location: New Braunfels, Comal County, Texas
Project Number: 00200901740.00

Boring	Depth	USCS	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	Maximum Size (mm)	% Passing #200 (% Silt / % Clay (If hydrometer data available))	D50 (mm)
B-30	0.5 - 2	---	7	---	---	---	0.0	0.0	0.075	23.1	---
B-30	4.5 - 6	---	10	47	18	29	---	---	---	---	---
B-30	8.5 - 10	---	18	61	25	36	---	---	---	---	---

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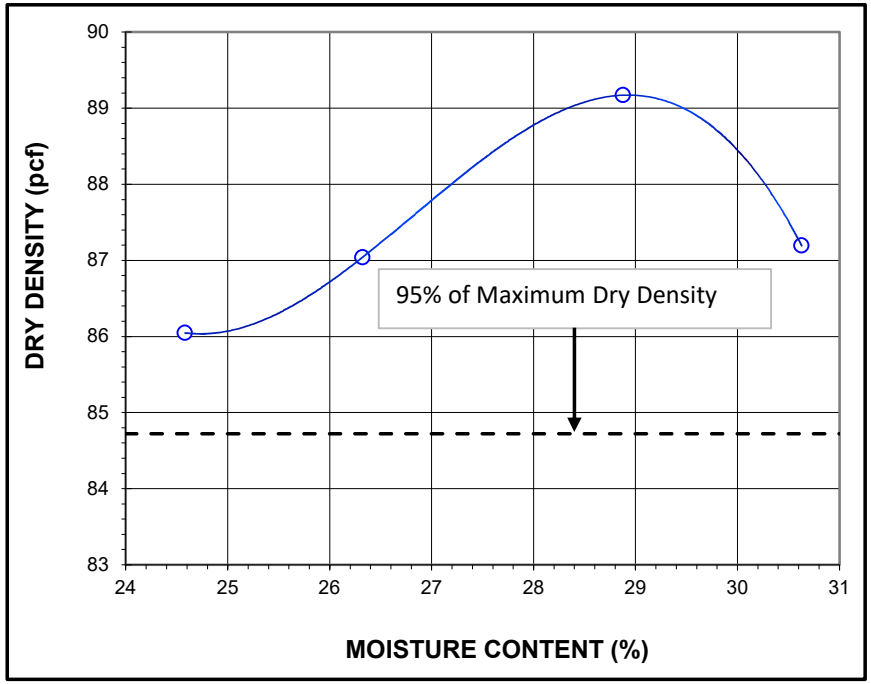
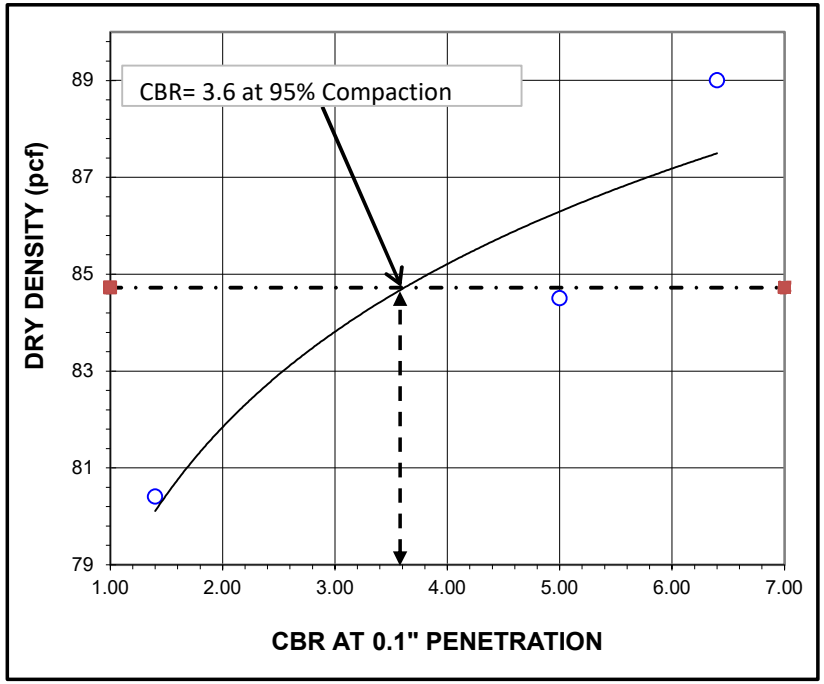
Summary of Laboratory Test Results

Client: Lennar
Project: Ladshaw Subdivision
Location: New Braunfels, Comal County, Texas
Project Number: 00200901740.00





CBR Sample Location: 29.759476°, -98.052668°
Sample Depth: Between 0 and 5 feet below existing ground surface

Sample: **CBR Sample No. 1**
Proctor Test Method: Standard Proctor (ASTM D-698)
CBR Test Method: California Bearing Ration (ASTM D-1883)
Material: FAT CLAY (CH), Dark Brown

Optimum Moisture Content: 28.7 %
Maximum Dry Unit Weight: 89.18 pcf
% Passing # 200 Sieve 95.9 %
Atterberg Limits: LL= 67; PL = 22, PI = 45

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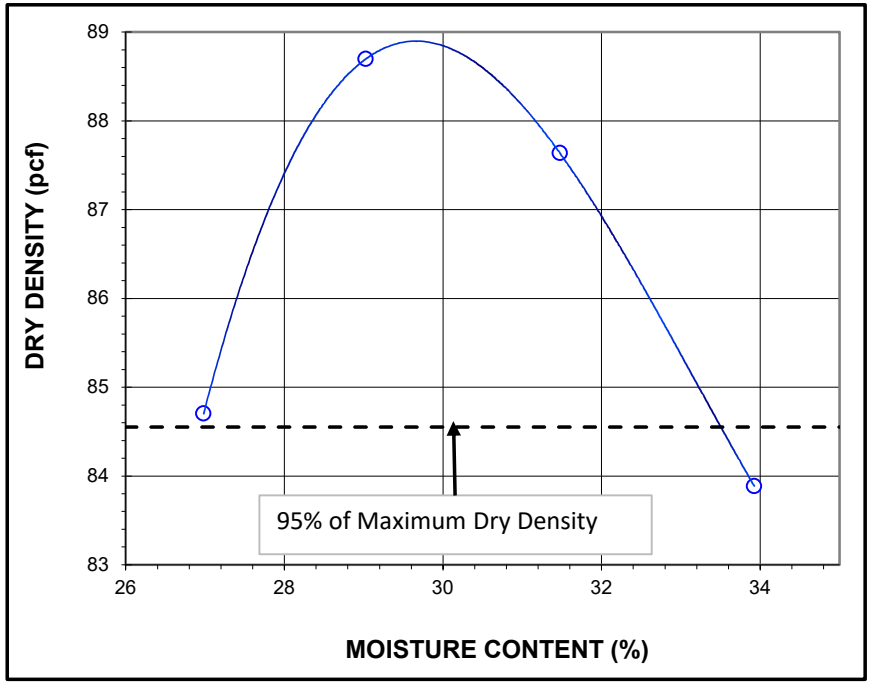
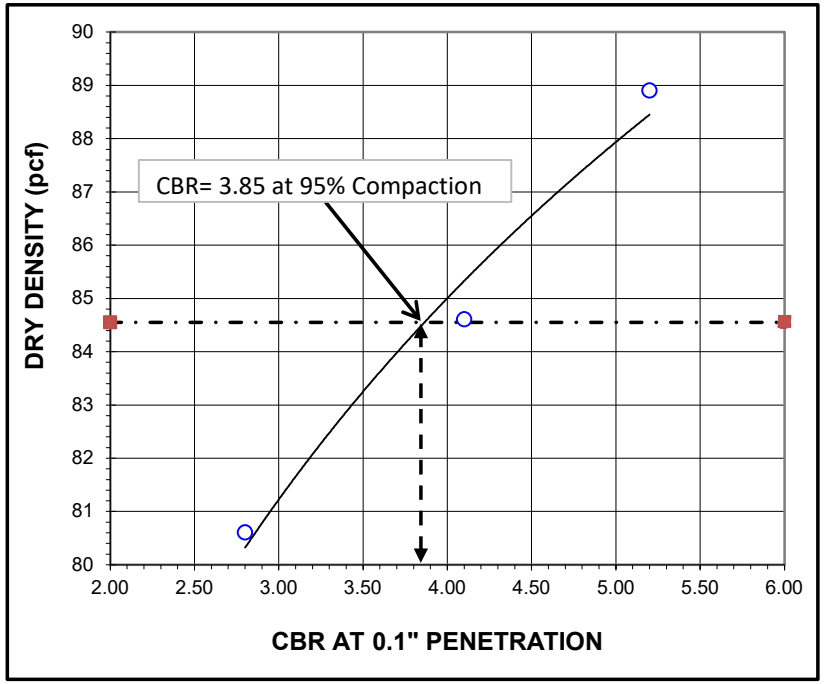
LADSHAW SUBDIVISION
INTERSTATE HIGHWAY 35 NEAR STOLTE ROAD

NEW BRAUNFELS, COMAL COUNTY, TEXAS

Drawn By: RB
Checked By: AB
Proj No:00200901740.00
File Name

CBR PLOT





Sample: **CBR Sample No. 2**
Proctor Test Method: Standard Proctor (ASTM D-698)
CBR Test Method: California Bearing Ration (ASTM D-1883)
Material: FAT CLAY (CH), Dark Brown

CBR Sample Location: 29.761722°,-98.056207°
Sample Depth: Between 0 and 5 feet below existing ground surface
Optimum Moisture Content: 29.7 %
Maximum Dry Unit Weight: 89 pcf
% Passing # 200 Sieve 90 %
Atterberg Limits: LL= 73; PL = 19, PI = 54

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NEW BRAUNFELS, COMAL COUNTY, TEXAS

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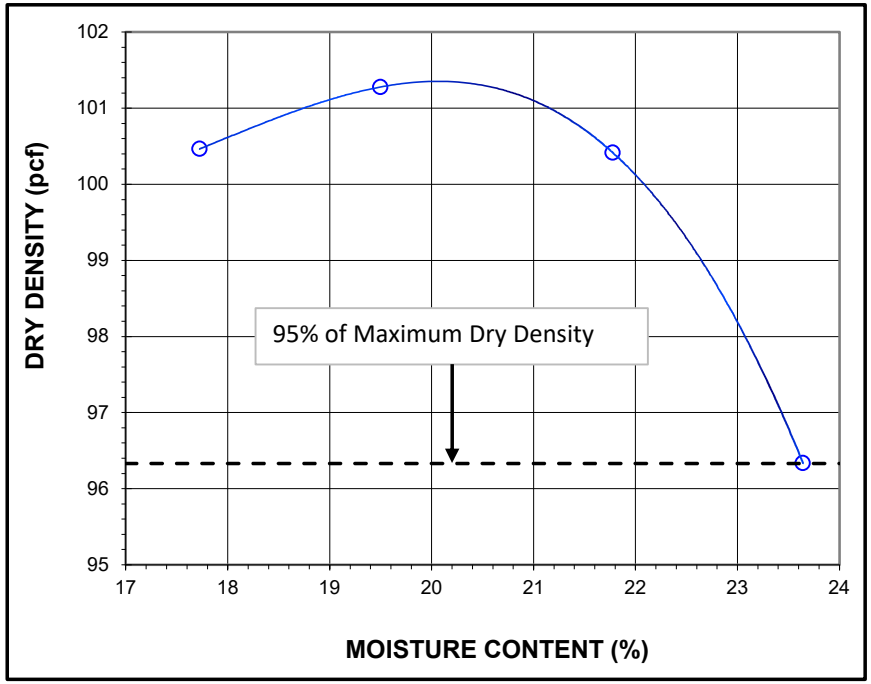
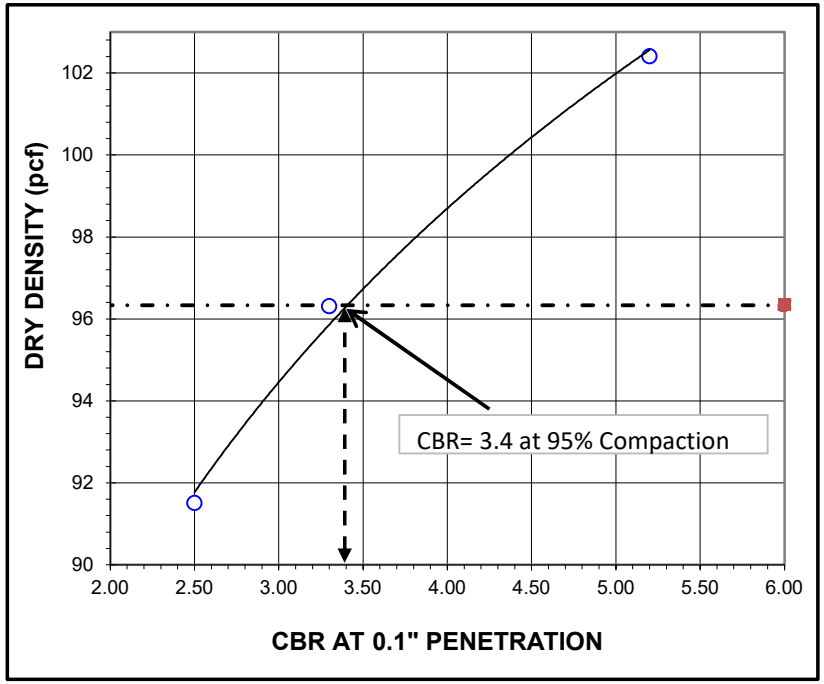
Proj No:00200901740.00
File Name

CBR PLOT





Sample: **CBR Sample No. 3**
Proctor Test Method: Standard Proctor (ASTM D-698)
CBR Test Method: California Bearing Ration (ASTM D-1883)
Material: FAT CLAY (CH), Dark Brown

CBR Sample Location: 29.764712°,-98.058255°
Sample Depth: Between 0 and 5 feet below existing ground surface
Optimum Moisture Content: 20.2 %
Corrected Maximum Dry Unit Weight: 101.4 pcf
% Passing # 200 Sieve 98.4 %
Atterberg Limits: LL= 53; PL = 23, PI = 30

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NEW BRAUNFELS, COMAL COUNTY, TEXAS

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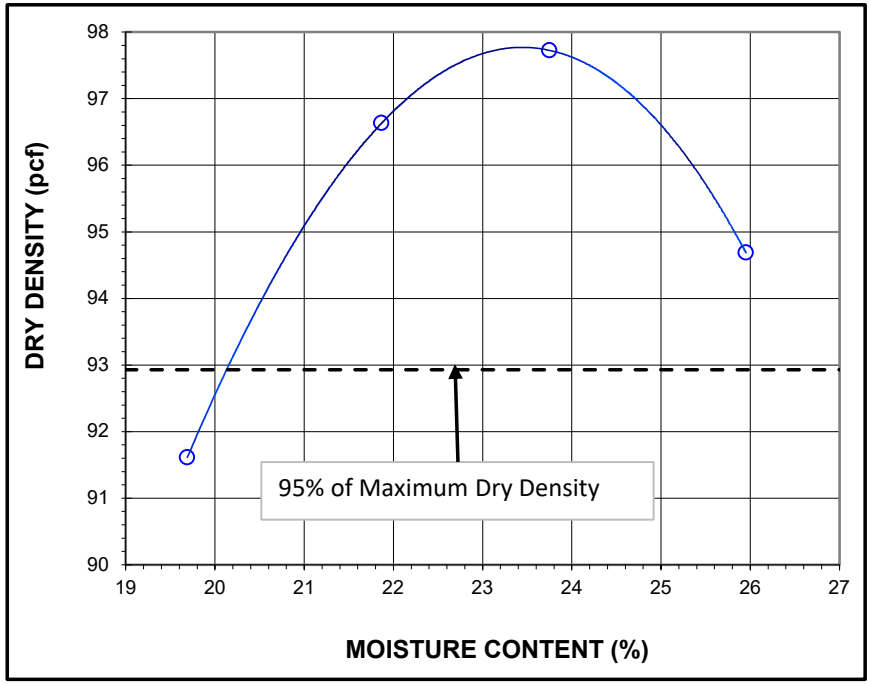
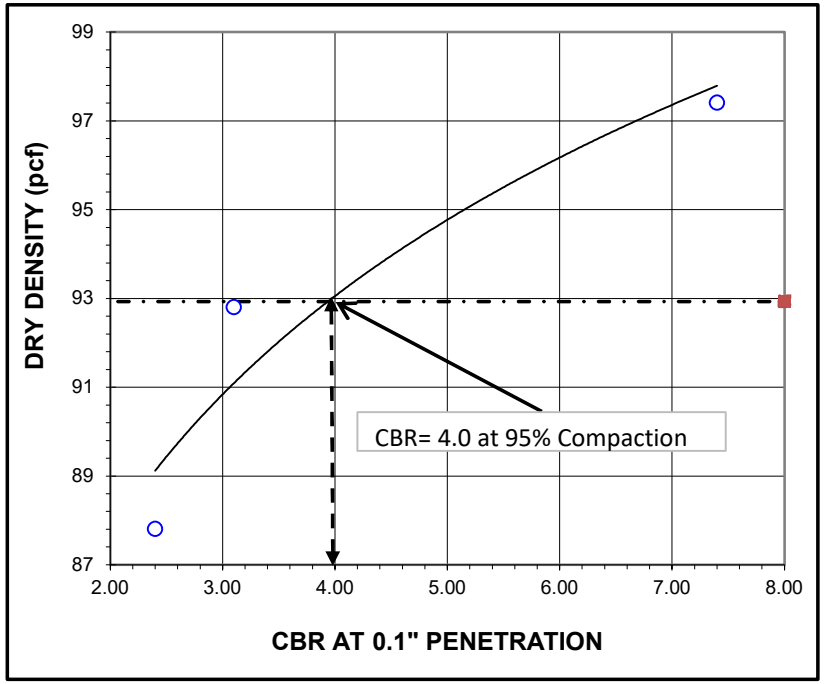
Proj No:00200901740.00
File Name

CBR PLOT





CBR Sample Location: 29.764100°,-98.051298°
Sample Depth: Between 0 and 5 feet below existing ground surface

Sample: **CBR Sample No. 4**
Proctor Test Method: Standard Proctor (ASTM D-698)
CBR Test Method: California Bearing Ration (ASTM D-1883)
Material: FAT CLAY (CH), Dark Brown

Moisture Content: 23.4 %
Maximum Dry Unit Weight: 97.82 pcf
% Passing # 200 Sieve 98 %
Atterberg Limits: LL= 57; PL = 19, PI = 38

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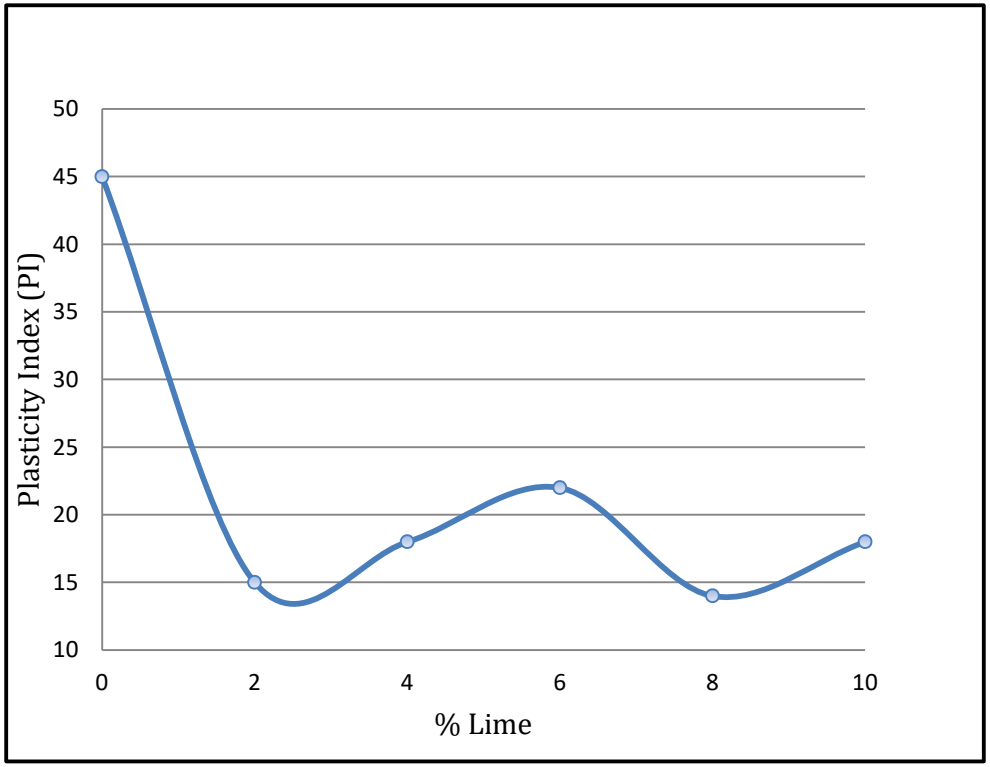
NEW BRAUNFELS, COMAL COUNTY, TEXAS

Drawn By: RB
Checked By: AB
Proj No:00200901740.00
File Name

CBR PLOT



% Lime	Plasticity	pH	LL	PL
0	45	7.99	67	22
2	15	12.32	54	39
4	18	12.4	56	38
6	22	12.42	59	37
8	14	12.48	55	41
10	18	12.51	55	37

Test Location:	**CBR Sample No. 1**
Material:	FAT CLAY (CH), Dark Brown
Test Method:	TxDOT Item 260, Lime Treatment
Test Method:	ASTM C 977, Appendix XI; pH:Lime Saturation Content
CBR Sample Location:	29.759476°, -98.052668°

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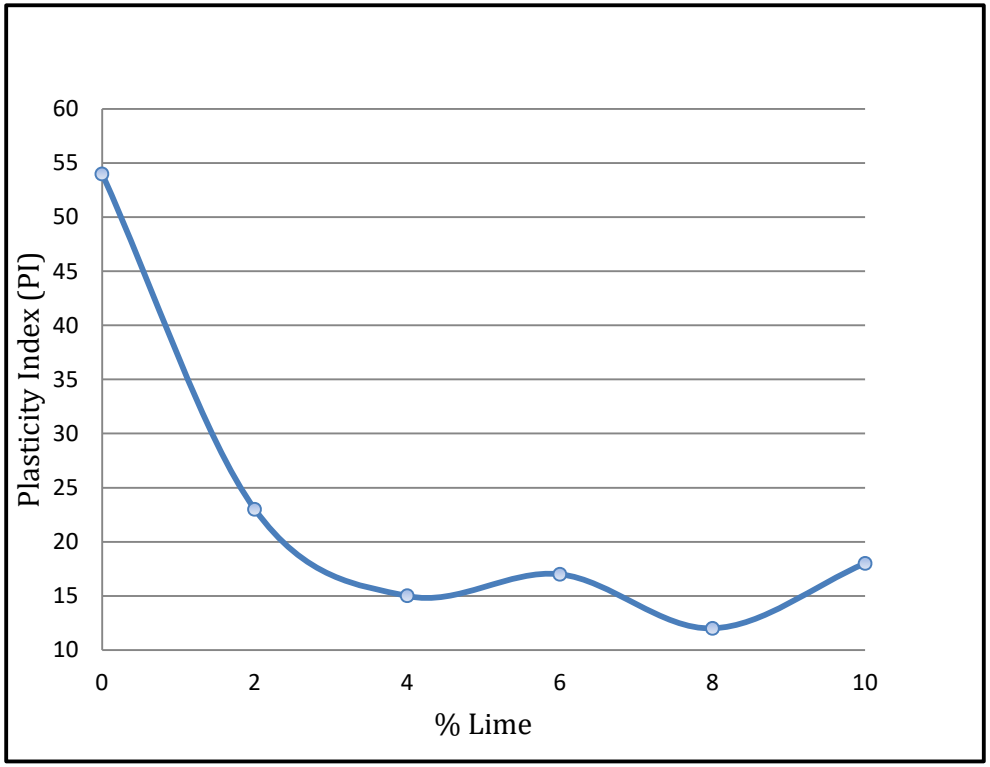
LADSHAW SUBDIVISION
INTERSTATE HIGHWAY 35 NEAR STOLTE ROAD

NEW BRAUNFELS, COMAL COUNTY, TEXAS

Drawn By: RB
Checked By: AB
Proj No:00200901740.00
File Name

LIME SERIES



% Lime	Plasticity	pH	LL	PL
0	54	8.85	73	19
2	23	12.37	61	38
4	15	12.4	58	43
6	17	12.48	56	39
8	12	12.48	54	42
10	18	12.5	56	38

Test Location:	**CBR Sample No. 2**
Material:	FAT CLAY (CH), Dark Brown
Test Method:	TxDOT Item 260, Lime Treatment
Test Method:	ASTM C 977, Appendix XI; pH:Lime Saturation Content
CBR Sample Location:	29.761722°,-98.056207°

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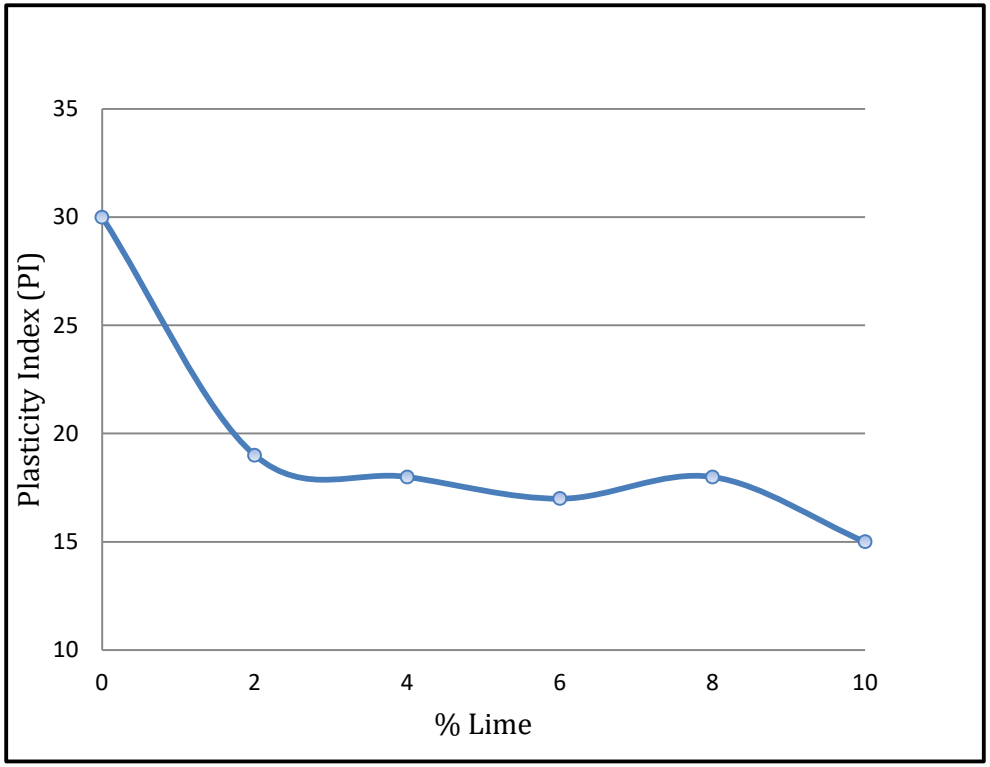
LADSHAW SUBDIVISION
INTERSTATE HIGHWAY 35 NEAR STOLTE ROAD

NEW BRAUNFELS, COMAL COUNTY, TEXAS

Drawn By: RB
Checked By: AB
Proj No:00200901740.00
File Name

LIME SERIES



% Lime	Plasticity	pH	LL	PL
0	30	9.38	53	23
2	19	12.4	43	24
4	18	12.44	43	25
6	17	12.45	43	26
8	18	12.46	44	26
10	15	12.53	42	27

Test Location:	**CBR Sample No. 3**
Material:	FAT CLAY (CH), Dark Brown
Test Method:	TxDOT Item 260, Lime Treatment
Test Method:	ASTM C 977, Appendix XI; pH:Lime Saturation Content
CBR Sample Location:	29.764712°,-98.058255°

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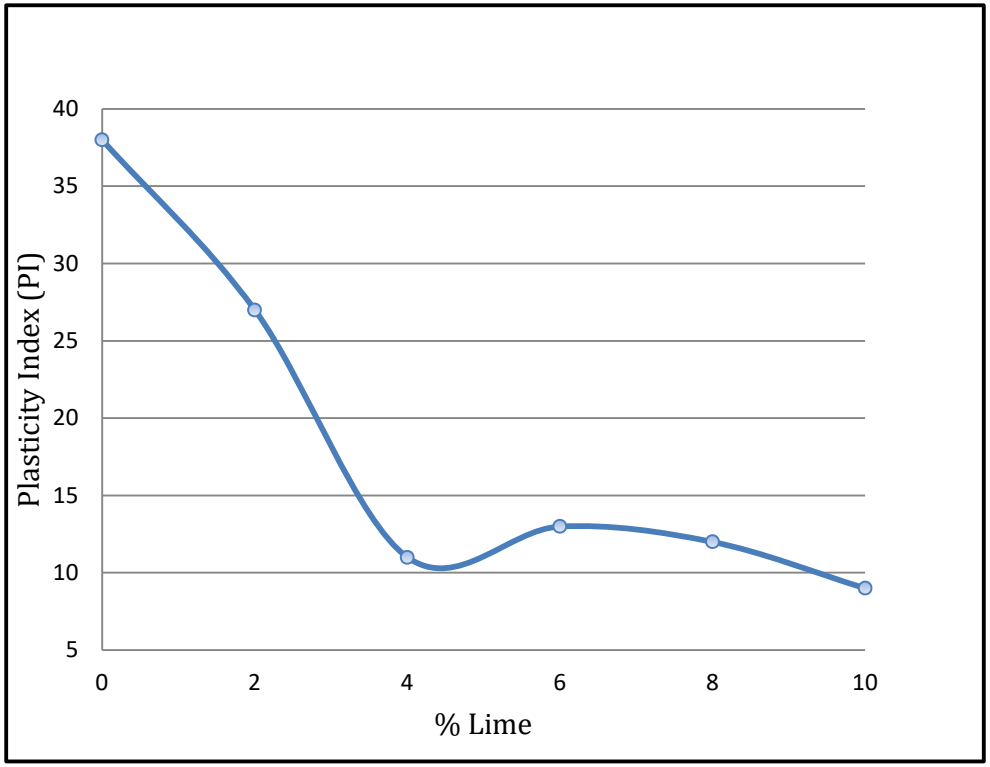

% Lime	Plasticity	pH	LL	PL
0	38	9.25	57	19
2	27	12.38	51	24
4	11	12.45	48	37
6	13	12.5	47	34
8	12	12.54	45	33
10	9	12.62	44	35

Test Location: **CBR Sample No. 4**
Material: FAT CLAY (CH), Dark Brown
Test Method: TxDOT Item 260, Lime Treatment
Test Method: ASTM C 977, Appendix XI; pH:Lime Saturation Content
CBR Sample Location: 29.764100°,-98.051298°

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APPENDIX B
REFERENCE MATERIALS

EXPLORATION PROCEDURES

General

Various drill equipment and procedures are used to obtain soil or rock specimens during geotechnical engineering exploration activities. The drill equipment typically consists of fuel powered machinery that is mounted on a flat-bed truck or an all-terrain vehicle. The ground surface conditions at the site generally determine the type of vehicle to use.

Borings can be drilled either dry or wet. The drilling technique depends on the type of subsurface materials (clays, sands, silts, gravels, rock) encountered and whether or not subsurface water is present during the drilling operations. Sometimes a combination of both techniques is implemented.

The dry method can generally be employed when subsurface water or granular soils are not present. The dry method generally consists of advancing the augers without the use of water or drilling fluids. Air can be employed as necessary to remove cuttings from the borehole or cool the drilling bits during some drilling applications. The wet rotary process is generally used when subsurface water, rock or granular soils are present. The wet rotary process utilizes water or drilling fluids to advance the augers, remove cuttings from the borehole, and cool the drilling bits during drilling.

Sampling

Various sampling devices are available to recover soil or rock specimens during the geotechnical exploration program. The type of sampling apparatus to employ depends on the subsurface materials (clays, sands, silts, gravels, rock) encountered and on their consistency or strength. Most commonly used samplers are Shelby tubes, split-spoons or split-barrels, and NX core barrels. Depending on the subsurface conditions, sampling apparatus such as the Pitcher barrel, Osterberg sampler, Dennison barrel, or California sampler are sometimes used. The procedures for using and sampling subsurface materials with most of these samplers are described in detail by the American Society for Testing and Materials (ASTM). Sampling is generally performed on a two (2) foot continuous interval to a depth of about ten (10) feet, followed by five (5) foot intervals between the depths of about ten (10) to 50 feet, and on ten (10) foot intervals thereafter to the termination depth of the borings. However, sampling intervals may change depending on the project scope and actual subsurface conditions encountered.

If cohesive soils (clays and some silts) are present during drilling, samples are retrieved by using the Shelby tube sampler (ASTM D 1587) or the split-barrel sampler (ASTM D 1586). The Shelby tube is used to recover “virtually” undisturbed soil specimens that can be returned to the laboratory for strength and compressibility testing. The Shelby tube is a three (3) inch nominal diameter, thin-walled tube that is advanced hydraulically into the soil by a single stroke of the drill equipment.

The split-barrel sampler is used when performing the Standard Penetration Test (SPT). The recovered sample is considered to be a “disturbed” specimen due to the SPT procedure. The split-barrel is advanced into the soil by driving the sampler with blows from a 140-pound hammer free falling 30 inches. The SPT procedure is performed to evaluate the strength or competency of the material being sampled. This evaluation is based on the material sampled, depth of the sample, and the number of blows required to obtain full penetration of the split-barrel sampler. This blow count or penetration resistance is referred to as the “N” value.

The split-barrel is typically used when cohesionless soils (sands, silts, gravels) are encountered or when good quality cohesive soils cannot be recovered with the Shelby tube sampler. The SPT procedure can be employed when rock or cemented zones are encountered. However, the split-barrel may not penetrate the rock or cemented zone if the layer is extremely hard, thus resulting in no sample recovery.

When rock or cemented zones are present, and depending on the type of project and engineering testing required, rock coring may be implemented to recover specimens of the particular layer. Typically, an NX double tube core barrel (ASTM D 2113) is used.

Logging

During the drilling activities, one of our geologists or engineering technicians is present to make sure that the appropriate sampling techniques are employed and to extrude or remove all materials from the samplers. The samples are then visually classified by our field representative who records the information on a field boring log. Our field representative may perform pocket penetrometer, hand torvane, or field vane tests on the subsurface materials recovered from the Shelby tube samplers. If the SPT procedure is employed, our field representative will record the N values or blow counts that are germane to that particular field test. If rock coring is utilized, our field representative will calculate the percent recovery and Rock Quality Designation (RQD). The test data for all the field tests will be noted on the appropriate field boring log. Upon completion of the logging activities and field testing of the recovered soil or rock samples, representative portions of the specimens were placed in appropriately wrapped and sealed containers to preserve their natural moisture condition and to minimize disturbance during handling and transporting to our laboratory for additional testing.

When subsurface water is observed during the drilling and sampling operations, drilling will be temporarily delayed so the subsurface water level can be monitored for a period of at least 15 to 30 minutes. Depending on the rise of the subsurface water in the borehole and project requirements, subsurface water measurements may be monitored for periods of 24 hours or more. Generally, observation wells or piezometers are installed in the completed boreholes to monitor subsurface water levels for periods longer than 24 hours.

Following completion of drilling, sampling, and subsurface water monitoring, all boreholes are backfilled with soil cuttings from the completed borings unless the client requests or local

ordinance requires special backfilling requirements. If there are not enough soil cuttings available, clean sand will be used to backfill the completed boreholes.

Details concerning the subsurface conditions are provided on each individual boring log presented in this Appendix. The terms and symbols used on each boring log are defined in the Legend Sheet which is also presented in this Appendix.

LABORATORY TESTING PROCEDURES

Classification, and Index Testing

The recovered soil samples were classified in the laboratory by a geoprofessional using the USCS as a guide. Samples were tested for the following properties in general accordance with the applicable ASTM standards:

- Moisture content (ASTM D2216).
- Atterberg Limits (ASTM D4318).
- Percent material passing the No. 200 sieve (ASTM D1140).
- Grain size Analysis (ASTM D 6913).

Results of tests for moisture content, Atterberg Limits, percent material passing the No. 200 sieve are presented on individual boring logs and on the lab summary sheet in Appendix A.