

# L&G Engineering Laboratory

Construction Material Testing  
Geotechnical Engineering

April 30, 2015

Ms. Maria Lucio  
Hidalgo County Precinct No. 4  
1102 N. Doolittle  
Edinburg, Texas 78539

MAY 13 2015  
**RECEIVED**  
MAY 08 2015

BY: *M. Lucio*

**RE: Work Authorization No. 1 – Geotechnical Engineering Services for the “Hoehn Subdivision Sanitary Sewer Improvements Project” located in Hidalgo County Precinct No. 4**

Dear Ms. Lucio:

L&G Engineering has finalized all the Geotechnical Engineering Services for the Hoehn Subdivision Sanitary Sewer Improvements Project. There was no testing performed for unconfined compression. Therefore, the final invoice amount is **\$16,085.94** with a difference of **\$131.25** left on **PO #722426**. This submittal serves as our final deliverable for the project. This project is complete and a final invoice is included herein (please see attached invoice #9100 for Work Authorization #1).

If you have any questions or comments, please feel free to contact me at the L&G Engineering office at 956-565-0760. We hope that we have filled all of your Construction & Geotechnical Material Testing needs, and we look forward to working with you again in the near future.

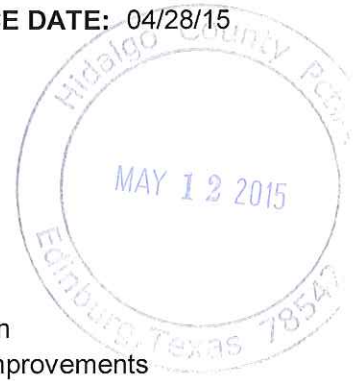
Respectfully Submitted,  
L&G Engineering

*Ricardo A. Gil*  
Ricardo A. Gil  
General Manager

Attachments

**L & G Consulting Engineers Inc**  
**2100 W. Expressway 83**  
**Mercedes, TX 78570**  
**(956) 565-9813 Fax (956) 565-9018**

**INVOICE #: 9100**  
**INVOICE DATE: 04/28/15**



**BILL TO: E130**  
Hidalgo County Pct. #4  
1102 N. Doolittle Rd.  
Edinburg, TX 74853-9

**JOB: G15008**  
Hoehn Subdivision  
Sanitary Sewer Improvements

Contract # C-14-330-09-09  
PO # 722426

DESCRIPTION	CONTRACT	PREVIOUS APPLICATIONS	CURRENT COMPLETED	TOTAL COMPLETED	% COMPL	BALANCE TO FINISH
Moisture Content	397.10		365.75 ✓	365.75	92.1	31.35
Atterberg Limits Det	1,354.22		1,354.22 ✓	1,354.22	100.0	
Materials Finer #200	1,129.99		1,129.99 ✓	1,129.99	100.0	
Unconfined Compressi	99.90				0.0	99.90
Tech/Soil-Log Boring	191.40		191.40 ✓	191.40	100.0	
Tech/Soils Logger	765.60		765.60 ✓	765.60	100.0	
Tech/Soils Logger 24	191.40		191.40 ✓	191.40	100.0	
Eng.Specialist-Soil	956.16		956.16 ✓	956.16	100.0	
Eng.Specialist-Borin	956.16		956.16 ✓	956.16	100.0	
Engineer (Prin)(Hr)	956.64		956.64 ✓	956.64	100.0	
Engineer (Staff)(Hr)	4,145.44		4,145.44 ✓	4,145.44	100.0	
CADD Technician (Hr)	244.32		244.32 ✓	244.32	100.0	
Vehicle Trip Char.Mi	330.00		330.00 ✓	330.00	100.0	
Mileage(Logger-Soil)	106.00		106.00 ✓	106.00	100.0	
Mileage(Logger-Soil)	26.50		26.50 ✓	26.50	100.0	
Admin/Clerical Rpt	188.56		188.56 ✓	188.56	100.0	
Soil Boring/Solid St	3,294.48		3,294.48 ✓	3,294.48	100.0	
Drill Rig Mobilizati	883.32		883.32 ✓	883.32	100.0	
<b>TOTALS:</b>	<b>16,217.19</b>	<b>0.00</b>	<b>16,085.94</b>	<b>16,085.94</b>	<b>99.2</b>	<b>131.25</b>

ORIGINAL CONTRACT SUM \$ 16,217.19  
CHANGE BY CHANGE ORDER \$ 0.00  
CONTRACT SUM TO DATE \$ 16,217.19  
TOTAL COMPLETED TO DATE \$ 16,085.94  
LESS PREVIOUS INVOICES \$ 0.00

PROJECT MANAGER'S SIGNATURE

CURRENT PAYMENT DUE \$ 16,085.94

## Rick Gil

---

**From:** Jesus Ozuna [jesus.ozuna@co.hidalgo.tx.us]  
**Sent:** Tuesday, March 10, 2015 3:29 PM  
**To:** Rick Gil  
**Cc:** Celia Almaguer; Veronica Lopez; Steve Cruz; Raul Sesin; Areanna E. Yzaguirre  
**Subject:** Notice to Proceed - Geotech Testing Hoehn Subdivision

Good Afternoon Ric,  
Attached please find the notice to proceed along with the purchase order for geo tech testing for Hoehn Subdivision Sanitary Sewer Improvement Project. Let me know if you have any questions regarding this matter.

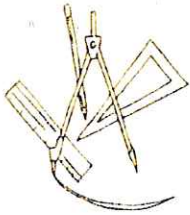
Thank you,

## Jesse Ozuna

Hidalgo County Pct. 4  
956.383.3112 (o)  
956.648.3493 (c)  
[jesse.ozuna@co.hidalgo.tx.us](mailto:jesse.ozuna@co.hidalgo.tx.us)



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# L&G Consulting Engineers, Inc.

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**GEOTECHNICAL INVESTIGATION  
FOR THE  
HOEHN SANITARY SEWER  
IMPROVEMENT PROJECT – LIFT STATION  
HIDALGO COUNTY, TEXAS**

**Prepared For:  
Hidalgo County Pct. No. 4**

**Prepared By:  
L&G Consulting Engineers, Inc.  
(L&G Engineering Laboratory – A Division of L&G)  
Mercedes, Texas 78570  
[Texas Registered Engineering Firm F-4105]**

**L&G Project No. GL15008  
April 27, 2015**



**David A. Saenz, P.E.  
Project Engineer**

*04/27/2015*

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## **INTRODUCTION**

**L&G Consulting Engineers, Inc. (L&G Engineering Laboratory – A Division of L&G (L&G))** was contracted by **Hidalgo County Precinct No 4. (HC Pct. 4)** to perform a subsurface geotechnical investigation for the proposed Hoehn Subdivision Trunk Line System & Lift Station in Hidalgo County, Texas; as part of the Hoehn Sanitary Sewer Improvement Project. This report addresses geotechnical soil parameters for a lateral earth pressure coefficient profile at the proposed lift station location, as well as boring logs, generalized site geology, evaluation of subsurface conditions, site location maps/figures and general overall construction recommendations.

## **GENERAL PROJECT OVERVIEW**

### **Project Description**

**L&G** is pleased to submit this document presenting our findings as the result of a subsurface geotechnical exploration performed at the request of **HC Pct. 4**. It is our understanding that the general project involves the construction of a sanitary sewer system for Hoehn Subdivision. It is further our understanding that the project involves the installation of a lift station of unspecified depth at the south-east corner of Hoehn Subdivision and an 8 inch force main that connects the proposed Hoehn Subdivision Sewer System to the existing local wastewater system at La Puerta Lift Station. No grading plans or structural loads for the structure was provided; thus all foundation and site improvement recommendations as provided in this report are based on the geotechnical properties of the soils and generalized assumptions as noted.

### **Scope and Limitations of Investigation**

This report has been prepared in general accordance with accepted geotechnical engineering practices for the subject project site and the anticipated construction. No specific warranty program or other special standards, except acceptable industry standards for the general South Texas area, were followed during the course of this investigation and analysis. This geotechnical report is intended for use by **HC Pct. 4**, and any direct representatives or affiliates. This geotechnical report may not contain sufficient information for purposes of other parties, or other uses in determining construction means and methods.

The strata, shown on the boring logs (included in Appendix B), represent the subsurface conditions at the boring locations at the time of our investigation. These strata designate approximate boundaries between subsurface materials; however, their actual transition may be gradual or may occur at varying depths. Variations may occur due to unexpected deposits of soft clays, silts or other undesirable soil material not detected through our investigation. It should be noted that the exploratory borings were performed within the limits of the proposed project as approved and agreed upon by all previously noted parties prior to the commencement of our field operations.

The benchmarks of this geotechnical study are to:

- 1. Explore the general existing subsurface conditions at the site*
- 2. Evaluate the relevant engineering properties of the subsurface materials*

3. Provide design lateral earth pressure coefficients profile for the lift station location
4. Provide general recommendations for construction

## **EXISTING SURFACE AND SUB-SURFACE CONDITIONS**

### **Site Location / Description**

The project is located in Hidalgo County, Texas, between the McAllen and Edinburg city limits (See Figure 1 in [Appendix A](#)). The alignment of the proposed force main initiates at the south-east corner of Hoehn Subdivision at Hoehn Dr (approximately 0.25 miles south of FM 1925 (Monte Cristo Rd)) – runs south along Hoehn Dr to Rogers Rd – then west along Rogers Rd to Depot Rd – then south along Depot Rd to Russell Rd – then west along Russell Rd to the existing La Puerta Lift Station (located approximately 0.25 miles east of Rooth Rd) for a total approximate project length of 1.50 miles. The borings were drilled as close as possible to the locations reflected on Figure 2 in [Appendix A](#). Survey coordinates, were not provided by the Client; however, borings were field staked by the Client and estimated GPS coordinates were retrieved during investigation (coordinates noted on the boring logs in [Appendix B](#)). Boring locations were generally located in areas that were relatively clear.

### **Geology**

The Geologic Atlas of Texas, McAllen-Brownsville Sheet, dated 1976, indicates that the project sites are located primarily within *Windblown Deposits – Stabilized Sand Dune Deposits (Qds)* of the Holocene geological epoch (part of the Quaternary period) and the *Lissie Formation Undivided (Ql)* of the Pleistocene geological epoch (part of the Quaternary period) (noted in the vicinity of Boring B-03 only).

- The Windblown Deposits – Stabilized Sand Dune Deposits includes “*Strong relict eolian grain, sparse grass; includes active blowout areas with depressed relief, hummocky, locally becomes fresh-water marsh in wet season, and well-stabilized sand dunes with dense live-oak mottes and scrub; moderate to very high permeability, low to moderate water-holding capacity, low compressibility, low shrink-swell potential, good to fair drainage, high shear strength, low plasticity, shallow water table*”.
- The Lissie Formation Undivided includes “*Clay, silt, gravel, and caliche; gray to brown to pale yellow; gravel mainly siliceous, locally cemented by and interbedded with sandy caliche; caliche massive to nodular; surface characterized by many undrained circular to irregular depressions, by relict clay dunes, and by stabilized northwest-trending longitudinal dunes*”.

### **Soil Survey Description**

According to the Soil Survey of Hidalgo County, Texas, published by the United States Department of Agriculture (issued June 1981, soil maps current), the proposed project encompasses several soil map units along the alignment. The primary soil map units along the alignment and description of said units are as follows (in order from most to least prevalent):

- Soil Map Unit #28 – Hidalgo Sandy Clay Loam, 0 to 1 Percent Slopes – This unit consists of deep, nearly level soils on convex uplands. This unit is well drained and has a moderate available water capacity (about 7.8 inches). It is non-saline to very slightly saline (0.0 to 4.0 mmhos/cm) with no frequency of flooding or ponding. Permeability is moderate and surface runoff is slow. The typical profile for this soil is 0 to 17 inches: dark grayish brown sandy clay loam, 17 to 28 inches: brown sandy clay loam, 28 to 38 inches: pale brown clay loam, and 38 to 80 inches: very pale brown sandy clay loam. The unit is calcareous throughout.
- Soil Map Unit #3 – Brennan Fine Sandy Loam, 0 to 1 Percent Slopes – This unit consists of deep, nearly level formations on convex uplands. This unit is well drained and has a moderate available water capacity (about 8.5 inches). It is non-saline to very slightly saline (1.0 to 4.0 mmhos/cm) with no frequency of flooding or ponding. Permeability is moderate and surface runoff is medium. The typical profile for this soil is 0 to 13 inches: dark brown fine sandy loam, 13 to 47 inches: brown to pale brown sandy clay loam and 47 to 65 inches: very pale brown sandy clay loam.
- Soil Map Unit #25 – Hidalgo Fine Sandy Loam, 0 to 1 Percent Slopes – This unit consists of deep, nearly level soils on convex uplands. This unit is well drained and has a moderate available water capacity (about 7.8 inches). It is non-saline to very slightly saline (0.0 to 4.0 mmhos/cm) with no frequency of flooding or ponding. Permeability is moderate and surface runoff is slow. The typical profile for this soil is 0 to 15 inches: dark grayish brown fine sandy loam, 15 to 30 inches: brown sandy clay loam, 30 to 39 inches: pale brown sandy clay loam, and 39 to 72 inches: very pale brown sandy clay loam. The unit is calcareous throughout.

## **Rainfall**

The mean annual precipitation for this area of Hidalgo County is approximately 20-24 inches, as reported by the U.S. Department of Agriculture Soil Conservation Service. Our geotechnical investigation, performed March 17, 2015 (Borings B-03 & B-04) and April 14, 2015 (Borings B-01 & B-02), was conducted during a non-drought condition (none, as noted by the National Weather Service and U.S. Drought Monitor). The National Oceanic and Atmospheric Administration (NOAA) reports that significant rainfall observations (at least one inch) occurred the day prior to our exploration of borings B-01 and B-02. This rainfall event may have had effects on the groundwater levels or moisture content of surface soils witnessed at these boring locations. No other rainfall events were noted prior to or during our exploration of borings B-03 and B-04.

## **SITE INVESTIGATION**

### **Soil Borings and Laboratory Tests**

Subsurface conditions at the site were evaluated through four (4) borings (designated as B-#) drilled to various depths below existing natural ground as noted by the client at the proposed locations identified on preliminary plans and shown on Figure 2 of Appendix A. The soil borings were drilled and sampled in general accordance with American Society of Testing

Materials Procedures (ASTM) D1452 and D1586 using a truck mounted drilling rig (Simco 2800 HS (HT)) and solid stem augers.

As part of the sampling procedures, split barrel (spoon) and Standard Penetration Tests (SPT) were performed and recorded. Standard Penetration Test results are noted on the boring logs as blows per foot or twelve (12) inch increment. The sampler was advanced through three (3) consecutive six inch increments; however, the first six inch increment is considered the seating drive, which eliminates the effect of cuttings or disturbances on the test result. The sum of the blows for the last two six (6) inch increments is considered the “standard penetration resistance value” or “field N-value”. Where hard or very dense materials were encountered, the SPT was terminated and noted on the boring log when one of the following situations occurred:

1. *a total of 50 blows were applied on one six inch increment*
2. *a total of 100 blows were applied during the test*
3. *no observation of advancement of the sampler was detected during the application of ten (10) consecutive blows from the hammer*

Representative portions of the split barrel samples were identified, packaged, sealed in containers to reduce moisture loss, and transported to our laboratory for subsequent testing. In the laboratory, each sample was evaluated and visually classified by a member of our geotechnical engineering staff. The properties of each stratum were evaluated by a series of laboratory index tests. A summary of the laboratory data and their corresponding depths are presented on the boring logs. Samples will be retained in our laboratory for 30 days after submittal of this report. Other arrangements may be provided at the request of the Client to hold the samples through the construction process.

### Subsurface Stratigraphy

Based on the results of the field and laboratory sample analyses, the subsurface stratigraphy at the project location can be characterized as follows (Tables 1a – 1c):

Borings B-01 & B-02			
Description	*Approximate Depth Range (ft.)	Material Type	Consistency / Density
Stratum I	0 to 18.5	Clay w/ Sand, Sandy Clay, Clayey Sand <sup>1</sup>	Very Soft to Very Stiff / Loose to Medium Dense
Stratum II	18.5 to 25	Clayey Gravel <sup>2</sup>	Dense to Very Dense
<p>1. This stratum contained brown and grayish brown lean clay w/ sand (CL), sandy lean clay (CL) and clayey sand (SC) with low to moderately high plasticity indices (ranging from 10 to 37). These soils contained approximately 46 to 76% fine soil particle contents (clays &amp; silts). Soil samples showed evidence of calcareous nodules. SPT N-values ranged from 2 to 39 blows per foot. Samples were noted as dry to wet.</p>			
<p>2. This stratum contained gray clayey gravel (GC) with moderate to moderately high plasticity indices (ranging from 16 to 26). These soils contained approximately 24 to 34% fine soil particle contents (clays &amp; silts). SPT N-values ranged from 38 blows per foot to 20 blows per 4 inches. Samples were noted as wet.</p>			

**Table 1a – Existing Soil Strata & Description**

*\*all depths are referenced from existing natural ground*

Boring B-03			
Description	*Approximate Depth Range (ft.)	Material Type	Consistency / Density
Stratum I	0 to 6.5	Sandy Clay <sup>1</sup>	Very Soft to Soft
Stratum II	6.5 to 23.5	Clay w/ Sand <sup>2</sup>	Medium Stiff to Hard
Stratum III	23.5 to 33.5	Clayey Sand <sup>3</sup>	Very Dense
Stratum IV	33.5 to 40	Sandy Clay <sup>4</sup>	Hard
<p>1. This stratum contained dark brown Sandy Lean Clay (CL) with moderate plasticity indices (ranging from 20 to 24). These soils contained approximately 58% fine soil particle contents (clays &amp; silts). Soil samples showed evidence of calcareous nodules. SPT N-values ranged from 2 to 7 blows per foot. Samples were noted as dry to moist.</p>			
<p>2. This stratum contained grayish brown and reddish brown fat clay with sand (CH) with moderately high plasticity limits indices (PI= 40). These soils contained approximately 72 to 90% fine soil particle contents (clays &amp; silts). SPT N-values ranged from 21 blows per foot to 100 blows per six inches. Samples were noted as wet.</p>			
<p>3. This stratum contained reddish tan clayey sand (SC) with moderately high plasticity indices (PI= 38). These soils contained approximately 49% fine soil particle contents (clays &amp; silts). SPT N-values ranged from 100 blows per five inches to 100 blows per one inch. Samples were noted as wet.</p>			
<p>4. This stratum contained reddish tan lean sandy lean clay (CL) with moderate plasticity indices (PI= 17). These soils contained approximately 63% fine soil particle contents (clays &amp; silts). SPT N-values ranged from 100 blows per four inches to 100 blows per three inches. Samples were noted as wet.</p>			

**Table 1b – Existing Soil Strata & Description**

*\*all depths are referenced from existing natural ground*

Boring B-04			
Description	*Approximate Depth Range (ft.)	Material Type	Consistency / Density
Stratum I	0 to 4.5	Sandy Clay <sup>1</sup>	Soft to Medium Stiff
Stratum II	4.5 to 8.5	Clay w/ Sand <sup>2</sup>	Stiff to Very Stiff
Stratum III	8.5 to 20	Sandy Clay, Clay w/ Sand <sup>3</sup>	Hard
<p>1. This stratum contained dark brown Sandy Lean Clay (CL) with moderately low plasticity indices (PI= 13). These soils contained approximately 51% fine soil particle contents (clays &amp; silts). Soil samples showed evidence of calcareous nodules. SPT N-values ranged from 4 to 17 blows per foot. Samples were noted as dry to moist.</p>			
<p>2. This stratum contained brown fat clay with sand (CH), with moderately high plasticity limits indices (PI= 38). These soils contained approximately 71% fine soil particle contents (clays &amp; silts). SPT N-values ranged from 15 to 26 blows per foot. Samples were noted as wet.</p>			
<p>3. This stratum contained brown sandy clay with moderate to high plasticity indices (ranging from 10 to 42). These soils contained approximately 66 to 70% fine soil particle contents (clays &amp; silts). SPT N-values ranged from 38 blows per foot to 100 blows per zero inches. Samples were noted as wet. Fat clay with sand was found from 18.5 to 20 feet in depth.</p>			

**Table 1c – Existing Soil Strata & Description**

*\*all depths are referenced from existing natural ground*

It should be noted, the Soil Strata and Description illustrated in Table 1, is a typical summarized representation of the site stratigraphy. The lines designating the interfaces between strata on the boring logs represent approximate boundaries. Transitions between strata may be gradual and may occur at varying depths.

### **Water Strikes**

The solid auger and mud rotary drilling techniques were used to complete soil borings in accordance with ASTM procedure D1452. Water strikes were encountered during the drilling operations at approximately 3.5 to 5 feet below top of existing natural ground at borings B-01 to B-03 (El. = +90 to +93.5 ft) and at approximately 14 feet below top of existing natural ground at boring B-04 (El. = +95 ft). Water strikes are noted on the boring logs in Appendix B.

It should be noted that fluctuations in groundwater levels are influenced by variations in rainfall and surface water run-off from season to season. The construction process itself may also cause variations in the groundwater level. If the subsurface water elevation is critical to the construction process the Contractor should check the subsurface water conditions just prior to construction excavation using piezometer wells.

## **GEOTECHNICAL BORING ANALYSIS**

### **Moisture Content**

The moisture content of a soil is defined as the ratio of the weight of the water in the sample to the dry weight of the soil sample. The moisture contents for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D2216. The results varied from fifteen (15) percent to seventy (70) percent. The variance in percentages within a given exploratory boring can be attributed to a multitude of issues including, range in depth, distance between samples, location of groundwater table and seasonal moisture zone. The variation could also be caused by differences in soil classifications, as some soils such as loose gravels and sands are made up of larger particles and thus exhibit more voids as a soil structure (higher capability to hold water than fine grained soils). Finer grained denser soils, though, due to high impermeability, may also exhibit high moisture contents in certain instances due to the slower movement of water through the soil structure. A list of all the moisture contents by corresponding depth can be found on the boring logs.

### **Plasticity Index**

The Plasticity Index (PI) is defined as the difference between the liquid limit and the plastic limit of a soil. These limits are commonly referred to as the Atterberg limits, which describe the consistency of soils with respect to their varying moisture contents. The liquid limit is defined as the moisture content at which soil begins to transition from a plastic to a liquid state and begins to behave as a liquid material by beginning to flow. The plastic limit refers to the water content of a soil at the point of transition from a semisolid to a plastic state where soil starts to exhibit plastic behavior. A soils behavior can be divided into four basic states: liquid, plastic, semisolid and solid. The plasticity index shows the range in which a soil acts in a plastic state. Experience has shown that the more plastic a soil is the more expansive and compressive it will act. The

plasticity indices for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D4318. PI values for the boring performed for this report ranged from ten (10) (Low plasticity sandy lean clays) to forty two (42) (High plasticity clays).

### Particle Size Analysis (Determination of Fines Content)

The standard grain size analysis is used to determine the relative proportions of different grain sizes as they are distributed along a range of different sized sieves. The minus 200 sieve analysis is used commonly as a tool for soil classification and identification using the Unified Soils Classification System. Results for this test are reported as a percentage of soil passing the No. 200 sieve, which has openings 0.075mm wide. This test is also used to determine the suitability of soil for construction purposes and to estimate probable seepage through soils. Generally a % - 200 greater than 50% indicates a non-granular cohesive soil with large amounts of fines in the soil composition. The particle size analyses for the samples obtained as part of our geotechnical exploration were performed in compliance with ASTM procedure D1140. The % -200 values for the samples collected range from 24% to 90%.

## GEOTECHNICAL ENGINEERING ANALYSES

The proposed project, as previously discussed in “Project Description,” includes the installation of a concrete box or pipe installed vertically into the ground through open caisson methods to an unspecified depth below natural ground at which point a bottom bearing surface plug will be installed (no plans provided by Client – assumed construction method and details). As a portion of this geotechnical report, L&G was tasked with investigating the general subsurface conditions of the site soils at the lift station location.

### Shear Strength Profile, Lateral Earth Pressure Coefficients & Effective Unit Weights

Shear strength profile, lateral earth pressure coefficients and unit weight profiles were established from the field and laboratory testing performed on the samples recovered during the completion of the exploratory boring at the south-east corner of Hoehn Subdivision (Boring B-1). The “at-rest”, “active” and “passive” coefficients ( $k_0$ ,  $k_a$  and  $k_p$ ) were derived using Rankine’s theories of lateral earth pressures and drained (long term) soil parameters. Tables 2 & 3 show the tabular representations of the lateral earth pressures and unit weight profile at the proposed lift station location (based on Boring B-01).

Stratum	Classification (USCS Class)	*Depth Range (ft)	Elevation (ft MSL)	**Eff. Unit Wt. $\gamma_e$ (lb/ft <sup>3</sup> )
I	CL	0 to 13.5	+97 to +83.5	120/57.6
II	CL	13.5 to 18.5	+83.5 to +78.5	57.6
III	GC	18.5 to 25	+78.5 to +72	67.6

**Table 2 –Unit Weights of Existing Strata**

*\*all depths are referenced from existing natural ground at boring locates*

*\*\*Effective Unit Weight reflects Submerged Unit Weight (Total Weight - Weight of Water) below Elevation +93.5, where the Unit Weight of Water = 62.4 lb/ft<sup>3</sup>*

Stratum	Shear Strength Profile				Lateral Earth Pressure Coefficients		
	Short-Term		Long-Term		Active	At-Rest	Passive
	C (lb/ft <sup>2</sup> )	φ	C' (lb/ft <sup>2</sup> )	φ'	K <sub>a</sub>	K <sub>0</sub>	K <sub>p</sub>
I	375	0°	50	30°	0.333	0.500	3.000
II	2600	0°	50	28.5°	0.353	0.523	2.825
III	0	36°	0	36°	0.259	0.412	3.851

**Table 3 – Shear Strength Profile & Lateral Earth Pressure Coefficients**

## **GENERAL CONSTRUCTION CONSIDERATIONS**

### **Excavation Recommendations**

L&G recommends general notes be placed on the final contract documents (plan set and/or general notes) notifying the potential Contractor of the presence of a high water table elevation (noted approximately 3.5 to 5 feet in depth below natural ground (El. = +90 to +93.5 ft) at borings B-01 to B-03, and approximately 14 feet in depth below natural ground (El. = +95ft) at boring B-04) and very soft to soft soils (especially prevalent in the upper 10 feet of depth). It should be noted, soil types and moisture conditions such as those noted during geotechnical exploration typically prove difficult in terms of maintaining stable cuts. It will be important to case off the water table (through the construction method) to be able to install the bottom basin slab at bearing grade on competent subgrade material (see Bottom Basin Slab Recommendations).

Excavation for the proposed Trunk Lines (Sanitary Sewer and Force Main) and Lift Stations should be extended to the lines and grades as shown on the plans, details, and working drawings. Excavations up to five (5) feet deep may utilize vertical cuts if the soils allow for a stable trench, however, slopes, benching, bracing or other approved methods are recommended to maintain the stability and safety of these shallow excavations. Trenches deeper than five (5) feet shall utilize Trench Excavation Protection and Temporary Special Shoring (in accordance with Texas Department of Transportation (TxDOT) 2014 Standard Specification for the Construction and Maintenance of Highways, Streets, and Bridges, Items 402 and 403) which includes sloped cuts, benches, shields, support systems or other approved methods that provide sufficient protection in accordance with Occupational Health and Safety Administration (OSHA) Standards and Interpretations, 29 CFR 1926, Subpart P, “Excavations”.

Several areas along the proposed alignment pose potential excavation and trench safety issues based on the presence of soft to very soft soils and noted high water table elevations. Other shoring techniques such as a metal shoring system (trench box) or heavy bracing system are recommended and may be necessary to maintain stability in the trench walls. Special attention should be paid to excavations and pipe installations within the areas of Borings B-01 through B-03, based on very soft and wet soil conditions throughout the borings. These conditions have a strong possibility to affect stability of excavations and bedding. The Contractor should be made aware that these locations may require additional special techniques to maintain the integrity of the excavation and provide a stable platform for the pipe installation.

### **Site Drainage & Dewatering Recommendations**

Drainage is one of the most important aspects to be addressed to ensure the successful performance of any foundation. Positive surface drainage should be implemented prior to, during, and maintained after construction to prevent water ponding at or adjacent to the proposed facilities. We advise that construction drainage programs be implemented to assist with standing waters from precipitation, general surface runoff or other moisture intrusion. It is recommended that the site design include site drainage features to channel runoff away from the proposed site location.

Based on the presence of water within the shallow subsurface soils of this site (as noted in Excavation Recommendations) we recommend an open caisson method of installation/construction for the proposed lift station structure with special emphasis on sealing off the water table. If additional water table stabilization is needed, we recommend simple dewatering be utilized as a first step (including sump pits and pumps). If simple techniques are found to be insufficient, a more detailed dewatering method may be required such as a point well or pumping well system. If the pipe flowline or bedding areas cannot be de-watered, stabilizing material (lean concrete or cement stabilized fill) may be used to establish a working platform. If utilized, these materials should meet the requirements of TxDOT 2014 Standard Specifications, Items 400 and 401.

#### **Bottom Basin Slab Recommendations**

Slab on grade areas designated as Bottom Basin Slabs (bottom slabs of the proposed wet well structures at the lift stations), should be excavated to plan elevation and should bear on competent subgrade material. If bottom grade surfaces prove too wet and difficult, a stabilizing material may be used to establish a working platform (lean concrete or cement stabilized fill). If utilized, we recommend these materials meet the requirements of TxDOT 2014 Standard Specifications, Items 400 and 401.

#### **Trunk Line Backfill Material & Placement Recommendations**

If native soils (excavated project site soils) are utilized as backfill for the Trunk Line System (must be allowed in the Contract Documents and/or approved by the Project Engineer), they shall meet the following requirements:

1. The soils shall be free of organic material, topsoil, debris, or other deleterious material that cannot be properly compacted.
2. Soils classified as OH, OL and PT, under the USCS are not considered suitable for use as select fill materials.

Backfill shall be placed in lifts not to exceed 8 inches loose (6 inches compacted) and compacted to a minimum 95 percent of the maximum dry density as determined in accordance with ASTM D698. The water content of the select backfill shall be maintained within the range of optimum moisture to three (3) percentage points above the optimum moisture content until the fill is permanently covered. The fill should be properly compacted in accordance with these recommendations and tested for compaction as specified.

## Structural Fill Recommendations

Materials used for **Structural Fill** shall meet the following requirements:

1. Soils classified as Base Material meeting the requirements of TxDOT 2014 Specification Item 247 Type E, Grade 4 - Caliche (see Table 4 for specifications/requirements) or Item 247 Type A, Grade 1 - Limestone (see Table 5 for specifications/requirements).
2. L&G recommends additional quality control of all **Structural Fill** materials as they are placed and compacted to ensure that they meet the requirements specified.

**Structural Fill** shall be compacted to a minimum 98 percent of the maximum dry density as determined by the ASTM D698 at moisture contents ranging between minus two (-2) and plus two (+2) percentage points of the optimum moisture content. **Structural Fill** shall be placed in loose lifts not to exceed 8 inches (6 inches compacted). The fill should be properly compacted in accordance with these recommendations and tested for compaction as specified.

Retained on Square Sieve	Percent Retained
2"	0
1/2"	20-60
No. 4	40-75
No. 40	70-90
Plasticity Index, max	15
Wet Ball PI, max	15
Wet Ball Mill, % max	50

**Table 4 – Structural Fill - Type E Grade 4 Specifications**

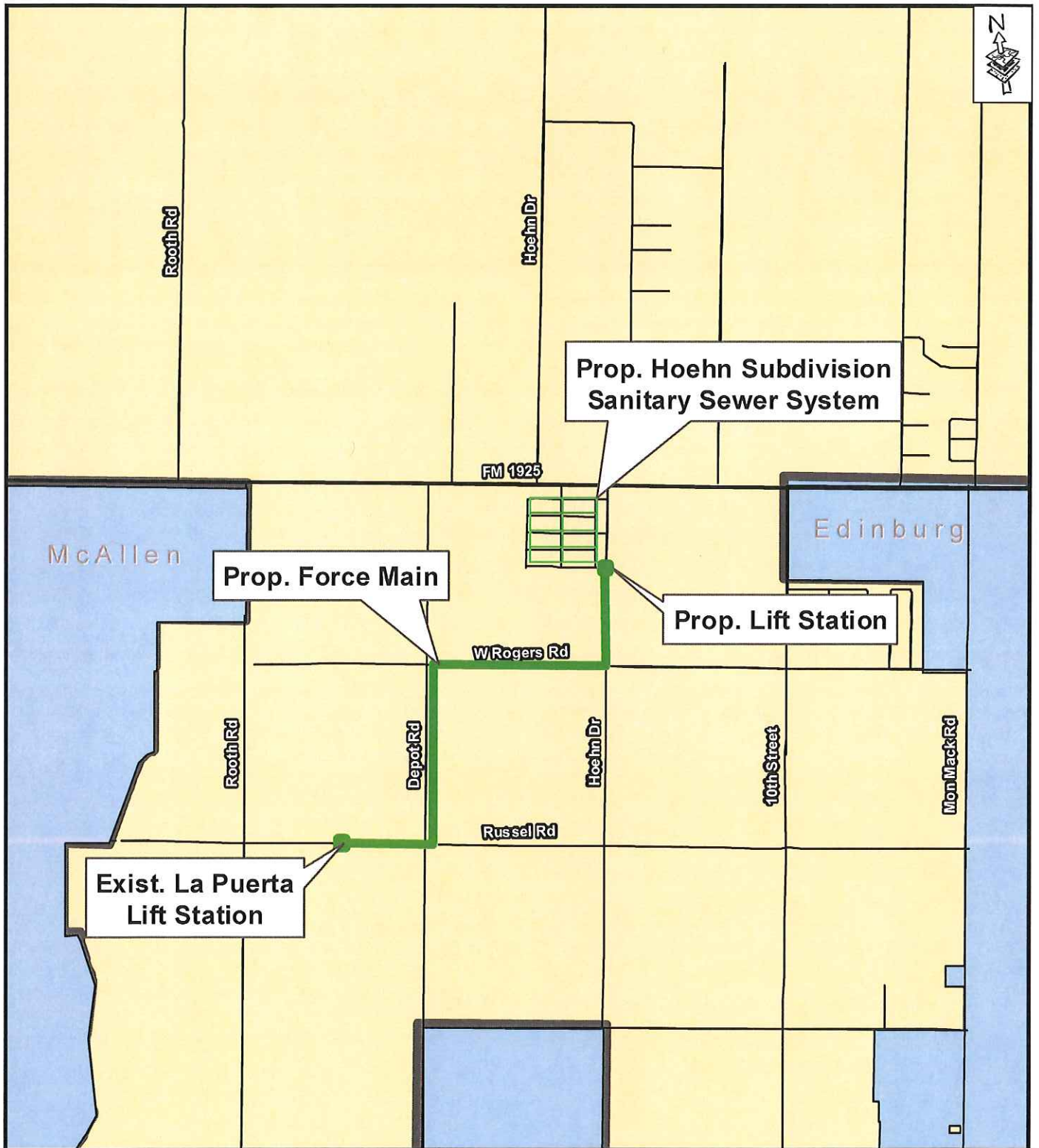
Retained on Square Sieve	Percent Retained
2-1/2"	0
1-3/4"	0-10
7/8"	10-35
3/8"	30-65
No. 4	45-75
No. 40	65-90
Liquid Limit, % max	40
Plasticity Index, % max	10
Wet Ball Mill, % max	40

**Table 5 – Structural Fill - Type A Grade 1 Specifications**

## REFERENCES

1. Jacobs, Jerry L., 1981, "Soil Survey of Hidalgo County, Texas", Washington, D.C.
2. Bureau of Economic Geology, 1976, "Geologic Atlas of Texas, McAllen-Brownsville Datasheet", Austin, TX.
3. TxDOT, 2014, "Standard Specification for the Construction and Maintenance of Highways, Streets, and Bridges", Austin, TX.
4. TxDOT, 2005, "100-E, Soils & Aggregates Test Procedures", Austin, TX.
5. American Society of Testing Materials, Volume 04.08, Soil and Rock (I): D420- D5779 March 2003.
6. TxDOT, 2012, "Geotechnical Manual", Austin, TX.
7. United States Army Corps of Engineers, "Bearing Capacity of Soils", EM 1110-1-1905
8. United Facilities Criteria (UFC), "Soils & Geology Procedures for Foundation Design of Building and Other Structures", UFC 3-220-03FA, (January 2004).
9. Das, Braja M., "Principles of Foundation Engineering, 6<sup>th</sup> Edition", July 2006.

## **APPENDIX A – FIGURES**



**Figure 1**  
**Hoehn Sanitary**  
**Sewer Improvement**  
**Location Map**

**Legend**

- Project Location
- City Limits
- Counties
- Roads

2,000  
 Feet  
 1 inch = 2,000 feet



Hoehn Subdivision  
Sanitary Sewer System

Prop. Lift Station

Prop. Force Main

Exist. La Puerta  
Lift Station

Ivory St  
B-3 B-02 B-01

Rogers Rd

Depot Rd

Russel Rd

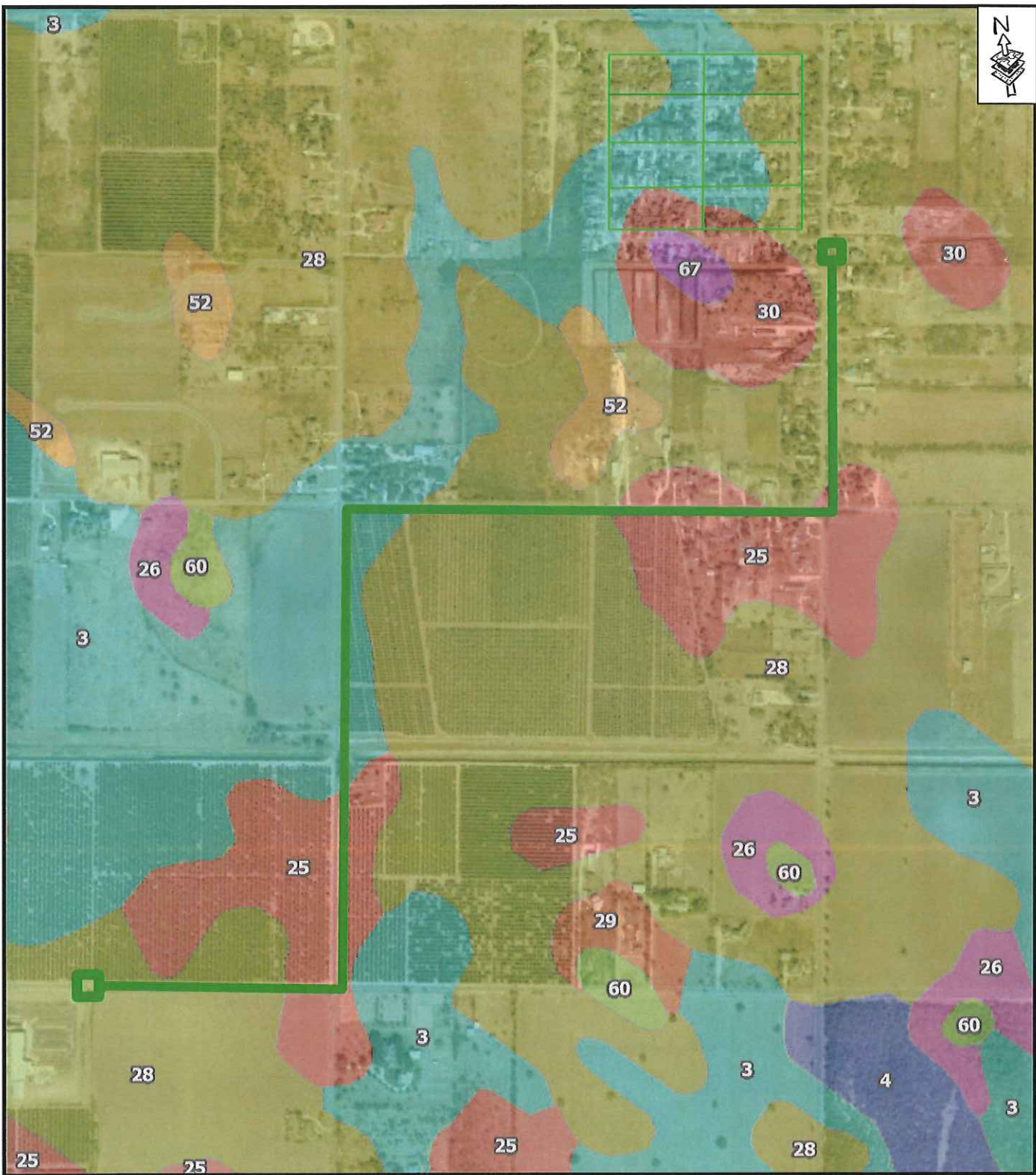
B-4

**Figure 2**  
**Hoehn Sanitary**  
**Sewer Improvements**  
**Boring Map**

**Legend**




-  Bore Locations
-  Project Location


750  
Feet  
1 inch = 750 feet



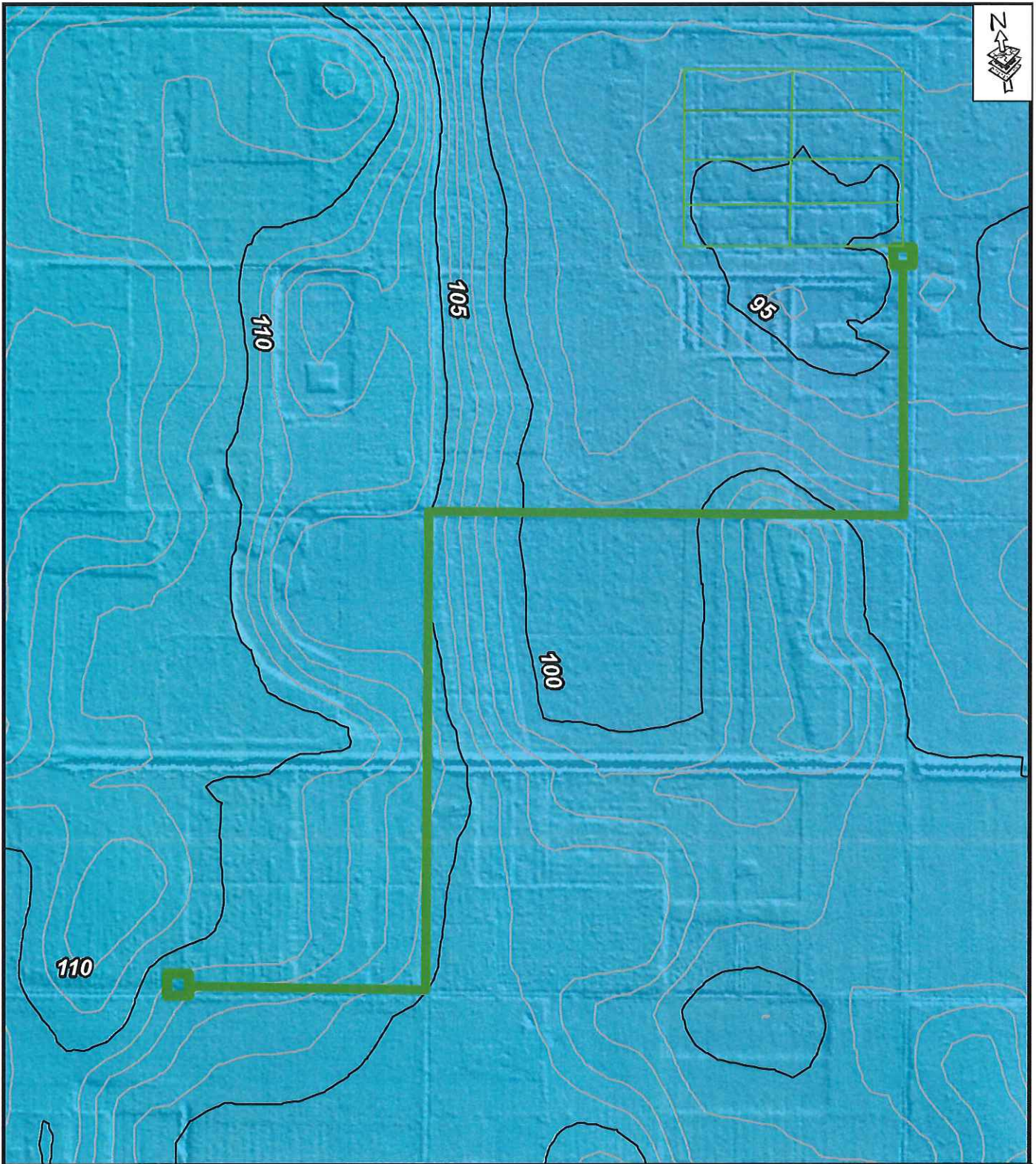
**Figure 3**  
**Hoehn Sanitary**  
**Sewer Improvements**  
**Soil Classification Map**  
 USDA SOIL CONSERVATION  
 SERVICE

**Legend**

-  Project Location
-  3 - Brennan Fine Sandy Loam
-  25 - Hidalgo Fine Sandy Loam
-  28 - Hidalgo Sandy Clay Loam

750  
 Feet  
 1 inch = 750 feet

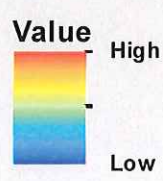




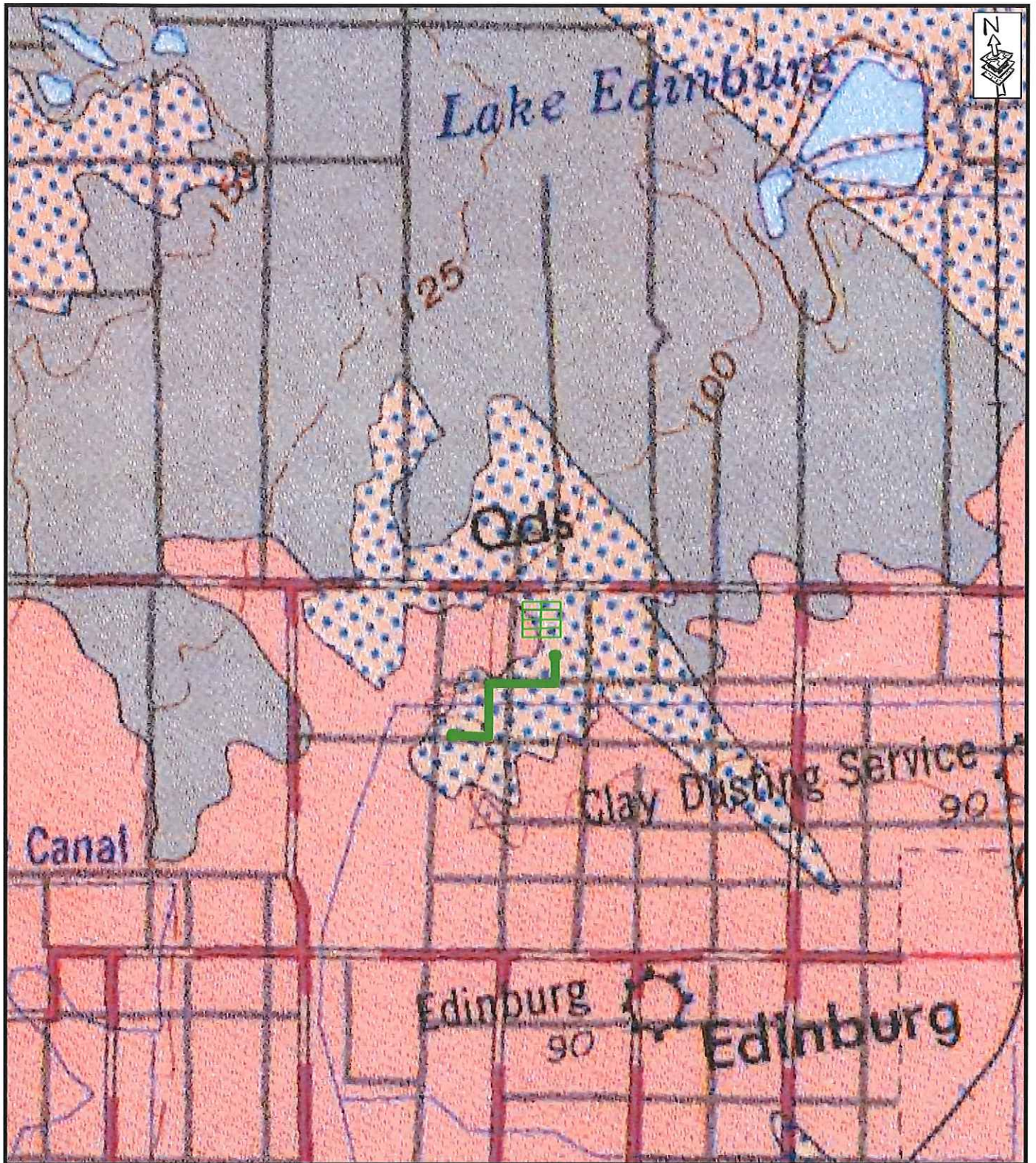
**Figure 4**  
**Hoehn Sanitary**  
**Sewer Improvements**  
**Digital Elevation Map**

**Legend**

-  Project Location
-  1 ft Contours
-  5 ft Contours
-  10 ft Contours



750  
 Feet  
 1 inch = 750 feet



**Figure 5**

Hoehn Sanitary  
Sewer Improvements

Geologic Atlas of Texas

**Legend**



Windblown Deposits  
(Stabilized Sand Dune Deposits)

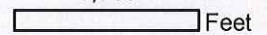


Lissie Formations Undivided



Project Location

5,000



1 inch = 5,000 feet



**APPENDIX B – BORING LOG**

CLIENT Hidalgo Co. Pct. 4

PROJECT NAME Hoehn Sanitary Sewer Improvement

PROJECT NUMBER GL15008

PROJECT LOCATION Hidalgo County

**LITHOLOGIC SYMBOLS**  
*(Unified Soil Classification System)*



CH: USCS High Plasticity Clay



CL: USCS Low Plasticity Clay



GC: USCS Clayey Gravel



SC: USCS Clayey Sand

**SAMPLER SYMBOLS**



Standard Penetration Test

**WELL CONSTRUCTION SYMBOLS**

**ABBREVIATIONS**

LL - LIQUID LIMIT (%)  
 PI - PLASTIC INDEX (%)  
 W - MOISTURE CONTENT (%)  
 DD - DRY DENSITY (PCF)  
 NP - NON PLASTIC  
 -200 - PERCENT PASSING NO. 200 SIEVE  
 PP - POCKET PENETROMETER (TSF)

TV - TORVANE  
 PID - PHOTOIONIZATION DETECTOR  
 UC - UNCONFINED COMPRESSION  
 ppm - PARTS PER MILLION  
 Water Level at Time Drilling, or as Shown  
 Water Level at End of Drilling, or as Shown  
 Water Level After 24 Hours, or as Shown

CLIENT Hidalgo Co. Pct. 4 PROJECT NAME Hoehn Sanitary Sewer Improvement  
 PROJECT NUMBER GL15008 PROJECT LOCATION Hidalgo County  
 DATE STARTED 4/14/15 COMPLETED 4/14/15 GROUND ELEVATION 97 ft HOLE SIZE 4 inches  
 DRILLING CONTRACTOR L&G Engineering Laboratory GROUND WATER LEVELS:  
 DRILLING METHOD Solid Stem Auger  $\nabla$  AT TIME OF DRILLING 3.50 ft / Elev 93.50 ft  
 LOGGED BY H. Salinas CHECKED BY David A. Saenz, P.E. AT END OF DRILLING ---  
 NOTES GPS 26°20'29.30" N, 98°12'45.40" W (Approx. Elev.) AFTER DRILLING ---

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 4/27/15 16:22 - L:\GINT\PROJECTS\PRECINCT 4 - HOEHN SANITARY SEWER IMPROVEMENTS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
3.50	$\nabla$	(CL) Sandy Lean Clay, Brown, w/ Calcareous Nodules, Very Soft to Medium Stiff, Moist to Wet	SPT 1		3-2-3 (5)			25				60
4.50			SPT 2		3-2-1 (3)			18	29	15	14	
5.50			SPT 3		1-1-1 (2)			24				57
6.50			SPT 4		1-1-2 (3)			23	36	17	19	
10.00		(CL) Lean Clay w/ Sand, Brown, w/ Calcareous Nodules, Medium Stiff to Very Stiff, Wet	SPT 5		4-6-1 (7)			28				76
15.00			SPT 6		9-10-14 (24)			26	49	24	25	
20.00		(GC) Clayey Gravel, Fat, Gray, Sized 1/8 in (Sub-Angular), Dense to Very Dense, Wet	SPT 7		15-17-21 (38)			30				28
25.00			SPT 8		25-50/6"			27	50	24	26	24

Bottom of borehole at 25.0 feet.

CLIENT Hidalgo Co. Pct. 4 PROJECT NAME Hoehn Sanitary Sewer Improvement  
 PROJECT NUMBER GL15008 PROJECT LOCATION Hidalgo County  
 DATE STARTED 4/14/15 COMPLETED 4/14/15 GROUND ELEVATION 95 ft HOLE SIZE 4 inches  
 DRILLING CONTRACTOR L&G Engineering Laboratory GROUND WATER LEVELS:  
 DRILLING METHOD Solid Stem Auger  $\nabla$  AT TIME OF DRILLING 4.50 ft / Elev 90.50 ft  
 LOGGED BY H. Salinas CHECKED BY David A. Saenz, P.E. AT END OF DRILLING ---  
 NOTES GPS 26°20'31.50" N, 98°12'47.00" W (Approx. Elev.) AFTER DRILLING ---

GEOTECH.BH.COLUMNS - GINT STD US.LAB.GDT - 4/27/15 16:22 - L:\GINT\PROJECTS\PRECINCT 4 - HOEHN SANITARY SEWER IMPROVEMENTS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
0-4.5		(CL) Sandy Lean Clay, Grayish Brown, w/ Calcareous Nodules, Very Soft to Soft, Moist to Wet	SPT 1		1-2-2 (4)			25	39	29	10	
4.5-5	$\nabla$		SPT 2		1-1-1 (2)			27				56
5-6			SPT 3		1-1-1 (2)			29	30	15	15	
6-9		(SC) Clayey Sand, Fat, Gray, w/ Calcareous Nodules, Loose, Wet	SPT 4		1-1-8 (9)			23				48
9-11			SPT 5		11-15-2 (17)			22	58	21	37	
11-15			SPT 6		18-20-19 (39)			22				46
15-20		(SC) Clayey Sand, Lean, Grayish Brown, w/ Calcareous Nodules, Medium Dense, Wet	SPT 7		22-24-21 (45)			32	48	25	23	
20-21		(GC) Clayey Gravel, Lean, Gray, Sized 1/8 in (Sub-Angular), Very Dense, Wet	SPT 8		50/6"			33				34
21-24			SPT 9		50/4"			18	45	29	16	

Bottom of borehole at 24.0 feet.

CLIENT Hidalgo Co. Pct. 4 PROJECT NAME Hoehn Sanitary Sewer Improvement  
 PROJECT NUMBER GL15008 PROJECT LOCATION Hidalgo County  
 DATE STARTED 3/17/15 COMPLETED 3/17/15 GROUND ELEVATION 95 ft HOLE SIZE 4 inches  
 DRILLING CONTRACTOR L&G Engineering Laboratory GROUND WATER LEVELS:  
 DRILLING METHOD Solid Stem Auger  $\nabla$  AT TIME OF DRILLING 5.00 ft / Elev 90.00 ft  
 LOGGED BY H. Salinas CHECKED BY David A. Saenz, P.E. AT END OF DRILLING ---  
 NOTES GPS 26°14'12.00" N, 98°12'9.90" W (Approx. Elev.) AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (ROD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	ATTERBERG LIMITS				FINES CONTENT (%)
								MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
0 - 5		(CL) Sandy Lean Clay, Dark Brown to Brown, w/ Calcareous Nodules, Very Soft to Soft, Moist to Wet	SPT 1		4-3-4 (7)			19	35	15	20	
5	$\nabla$		SPT 2		1-1-1 (2)			25				58
5 - 10		(CH) Fat Clay w/ Sand, Grayish Brown, w/ Calcareous Nodules, w/ Black Mottles, Very Stiff to Hard, Wet	SPT 3		1-2-3 (5)			28	40	16	24	
10 - 15			SPT 4		3-5-16 (21)			26				72
15 - 20		(CH) Fat Clay, Reddish Tan, w/ Calcareous Nodules, w/ Claystone Fragments, Hard, Wet	SPT 5		13-18-21 (39)			28	61	21	40	
20 - 25			SPT 6		17-26-31 (57)			30				90
25 - 30		(SC) Clayey Sand, Fat, Reddish Tan, w/ Calcareous Nodules, w/ Claystone Fragments, Very Dense, Wet	SPT 7		50/6"			36	60	28	32	
30 - 35			SPT 8		50/5"			27				49
35 - 40		(CL) Sandy Lean Clay, Reddish Tan, w/ Calcareous Nodules, w/ Claystone Fragments, Hard, Wet	SPT 9		50/1"			31	65	27	38	
40			SPT 10		50/4"			26				63
40 - 40			SPT 11		50/3"			18	44	27	17	

Bottom of borehole at 40.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 4/27/15 16:22 - L:\GINT\PROJECTS\PRECINCT 4 - HOEHN SANITARY SEWER IMPROVEMENTS.GPJ

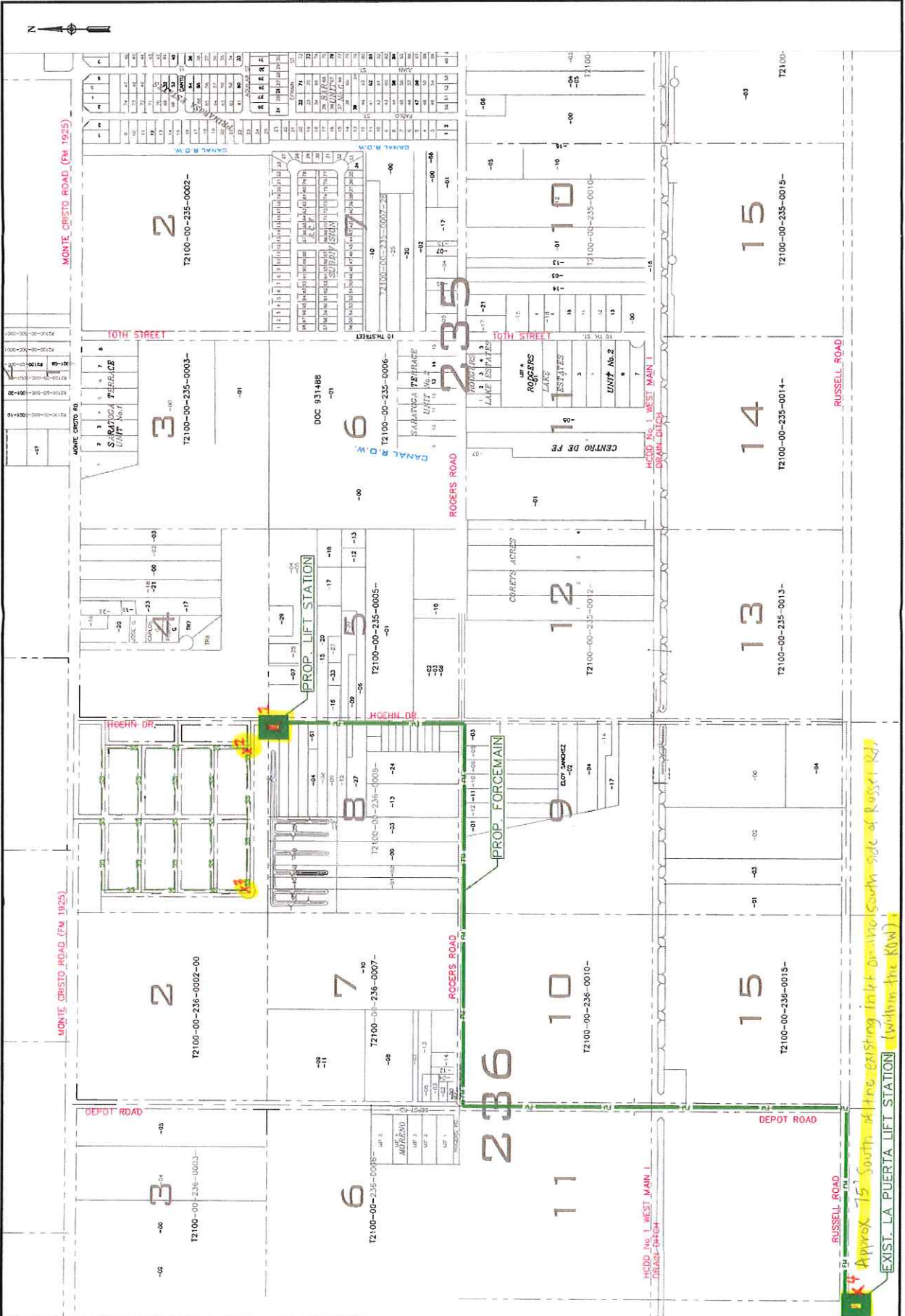
CLIENT Hidalgo Co. Pct. 4 PROJECT NAME Hoehn Sanitary Sewer Improvement  
 PROJECT NUMBER GL15008 PROJECT LOCATION Hidalgo County  
 DATE STARTED 3/17/15 COMPLETED 3/17/15 GROUND ELEVATION 109 ft HOLE SIZE 4 inches  
 DRILLING CONTRACTOR L&G Engineering Laboratory GROUND WATER LEVELS:  
 DRILLING METHOD Solid Stem Auger  $\nabla$  AT TIME OF DRILLING 14.00 ft / Elev 95.00 ft  
 LOGGED BY H. Salinas CHECKED BY David A. Saenz, P.E. AT END OF DRILLING ---  
 NOTES GPS 26°19'56.34" N, 98°13'34.70" W (Approx. Elev.) AFTER DRILLING ---

GEOTECH.BH COLUMNS - GINT STD US LAB.GDT - 4/27/15 16:22 - L:\GINT\PROJECTS\PRECINCT 4 - HOEHN SANITARY SEWER IMPROVEMENTS.GPJ

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
0-1		(CL) Sandy Lean Clay, Dark Brown, w/ Calcareous Nodules, Medium Stiff, Dry	SPT 1		6-9-8 (17)			15				54
1-2		(CL) Sandy Lean Clay, Dark Brown, w/ Calcareous Nodules, Soft, Dry	SPT 2		2-2-2 (4)			20	28	15	13	
2-3		(CH) Fat Clay w/ Sand, Brown, Stiff to Very Stiff, Dry	SPT 3		3-6-9 (15)			23				71
3-4			SPT 4		6-11-15 (26)			27	57	22	35	
4-5		(CL) Sandy Lean Clay, Brown, Hard, Moist to Wet	SPT 5		13-19-19 (38)			31				66
5-6												
6-7			SPT 6		25-30-50 (80)			34	36	26	10	
7-8												
8-9			SPT 7		50/6"			70	74	32	42	70

Bottom of borehole at 20.0 feet.

**APPENDIX C – PLANS (PROVIDED BY CLIENT)**



Approx 15' South of line existing to left of parcel south side of Russell Rd  
 EXIST. LA PUERTA LIFT STATION (within the ROW)



## County of Hidalgo Pct. 4

Joseph Palacios Commissioner  
1051 N. Doolittle Road  
Edinburg Texas 78542-0337

### NOTICE TO PROCEED

Contract # C-14-330-09-09

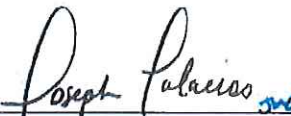
Date: **March 10, 2015**  
Project Name: **Hoehn Subdivision Sanitary Sewer Improvements**  
Location: **Hidalgo County Pct. #4**

This is to inform you that, **L&G Consulting Engineers, Inc.** of 2100 W. Expressway 83, Mercedes, TX 78570

May proceed with the scope of services as outlined in Contract # **C-14-330-09-09** **Geotechnical Engineering Services for the "Hoehn Subdivision Sanitary Sewer Improvement Project" located in Hidalgo County Precinct 4.**

Purchase Order **#722426** has been issued for this project.

Should you have any questions please call our office at 383-3112.

  
\_\_\_\_\_  
Joseph Palacios  
Commissioner Pct. #4



# Purchase Order COUNTY OF HIDALGO

PO# 722426

DATE: 03/09/15

PAGE NO: 1 OF 1

PO TYPE:

VENDOR: 280046

REQ: 00273073

PHONE: (956) 565-9813

Fax: (956) 565-6746

EMAIL:

SHIP TO: HIDALGO CO. PCT 4

1051 N. DOOLITTLE  
EDINBURG TX 78542

L & G CONSULTING ENGINEERS, INC.  
2100 W. EXPRESSWAY 83  
MERCEDDES TX 78570

CONTACT:

SITE: COMMISSIONER, PRECINCT 4

CONTRACT NO: C-14-330-09-09

SPECIAL INSTRUCTIONS: Pct. 4 Req # 316

### VENDOR NOTES

1. Do not add to, or alter this Purchase Order. This Order is not renewable.
2. TAX EXEMPTION: This Purchase Order may be accepted in lieu of Exemption Certificate.
3. This Order is also placed F.O.B. Destination. Vendor must repay all shipping costs.
4. Invoice with Purchase Order singly. Original invoices are required customer copy may be accepted. Out number must appear on all invoices, bills of lading, and packages.
5. Payment will be made only for bona fide and full completed orders, unless otherwise attached.

QTY	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
		DO NOT DUPLICATE ORDER		
		C-14-330-09-09		
		WA #1- Hoehn Subdivision Sanitary Sewer Improvements Approved CC 12/16/14 (AI-47818, consent)		
1.00	EACH	CC Work Authorization No. 1- Geotechnical Engineering Services for the "Hoehn Subdivision Sanitary Sewer Improvements Project" located in Hidalgo County Precinct No. Four (4)	16,217.19	16,217.19
		TOTAL:		16,217.19
		REPORT ROAD HAZARDS 1-866-HCR-SAFE OR 1-866-427-7233		
		***** For Hidalgo County use only		
		5-1100-452-00-124-149-0-843		16,217.19

Authorized by: \_\_\_\_\_

*Martha Salazar*

PO Number 722426 Vendor No 280046  
 PO Date 03-09-2015 Vendor Name L & G CONSULTING ENGINEERS, INC.  
 Requisition No 00273073 Address 2100 W. EXPRESSWAY 83  
 Owner VLOPEZ MERCEDES, TX 78570  
 PO Type

PO Total 16,217.19  
 Payment Total

Detail		Header		Payment Info		Journals	
Line No	Ordered	Quantity Received	Canceled	Description	Unit Price	Amount	
1	1			Work Authorization No. 1- Geotechnical Engineering Services for	16,217.190	16,217.19	
<b>Total</b>						<b>16,217.19</b>	
Account Number	Description			Amount	Amount Lig		
5-1100-452-00-124-149-0-843	PCT4 LIFT STATION-SCCRC-AID TO NONGOV'T			16,217.19	.00		

Liquidate PO

0.\*  
 365.75+  
 1,354.22+  
 1,129.99+  
 191.40+  
 765.60+  
 191.40+  
 956.16+  
 956.16+  
 956.64+  
 4,145.44+  
 244.32+  
 330.00+  
 106.00+  
 26.50+  
 188.56+  
 3,294.48+  
 883.32+  
 16,085.94\*

0.\*  
 16,217.19+  
 16,085.94-  
 Available 131.25\*  
 NO longer to be used