Document 00900

ADDENDUM NO. 1

Date of Addendum: 11/25/2020

PROJECT NAME: MUNICIPAL PARK SANITARY SEWER EXTENSION

PROJECT NO: RFP # 2021-003

BID DATE: November 30, 2020.

FROM: City of Edinburg
Att: Lorena Fuentes, Purchasing Agent
415 W. University Drive
Edinburg, Texas 78539
Phone: (956) 388-1895

TO: **Prospective Bidders**

This Addendum forms a part of the Bidding Documents and will be incorporated into Contract Documents, as applicable. Insofar as the original Project Manual and Drawings are inconsistent, this Addendum governs. Acknowledge receipt of the Addendum by inserting its number in Document 00310 - Form of Proposal. **FAILURE TO DO SO MAY SUBJECT BIDDER TO DISQUALIFICATION.**

ADDENDUM NO. 1

1. Attached is a copy of the Municipal Park SS Extension Project Geotechnical Engineering Report.

CLARIFICATIONS

2. The spoils must be removed from the project site at the Contractor's own expense.

Digitally signed by Gerardo Carmona
Date: 2020.11.25 10:54:58 -06'00'

DATED: 11/25/2020

Name, P.E.

MEG GEOTECHNICAL ENGINEERING REPORT

PROPOSED
EDINBURG SANITARY SEWER LINE

EDINBURG, HIDALGO COUNTY, TEXAS

Geotechnical Engineering • Construction Materials Engineering & Testing
Environmental • Consulting • Forensics

GEOTECHNICAL ENGINEERING REPORT
FOUNDATION RECOMMENDATIONS
PROPOSED EDINBURG SANITARY SEWER LINE
EDINBURG, HIDALGO COUNTY, TEXAS

Prepared For
Gerardo Carmona Jr., P.E.
City of Edinburg

MEG Report No. 01-20-29191

November 13, 2020

MILLENNIUM ENGINEERS GROUP, INC.
TBPE FIRM NO. F-3913
5804 N. GUMWOOD AVENUE
PHARR, TEXAS 78577
TEL:956-702-8500
FAX:956-702-8140
WWW.MEGENGINEERS.COM

November 13, 2020

Gerardo Carmona Jr., P.E.
City of Edinburg
415 W. University Drive
Edinburg, TX 78541
(956)388-8211
gcarmona@cityofedinburg.com

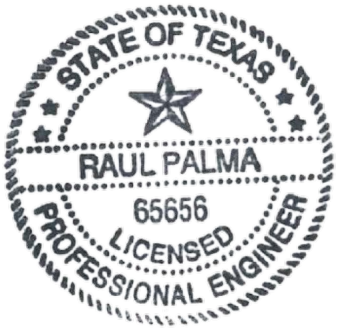
Subject: **Geotechnical Engineering Report**
MEG Report No. 01-20-29191
Foundation Recommendations
Proposed Edinburg Sanitary Sewer Line
Edinburg, Hidalgo County, Texas

Dear Mr. Carmona (CLIENT):

Millennium Engineers Group, Inc. is pleased to submit the enclosed geotechnical engineering report that was prepared for the above subject project. This report addresses the procedures and findings of our geotechnical engineering study. Our recommendations should be incorporated into the design and construction documents for the proposed development.

We want to emphasize the importance that all our recommendations presented in this report and/or addendums to this report be followed. We look forward to continuing our involvement in the project by providing construction monitoring in accordance with the report recommendations and materials testing services during construction. We strongly recommend that we be a part of the preconstruction meeting to address any specific issues that are pertinent to this project.

Thank you for the opportunity to be of service to you in this phase of the project and we would like the opportunity to assist you in the upcoming phases of the project. If you have any questions, please contact our office at the address, telephone, fax or electronic address listed below.



Cordially,
Millennium Engineers Group, Inc.
TBPE Firm No. F-3913

Raul Palma, P.E.
President

The seal appearing on this document was authorized by Raul Palma, P.E. 65656 on November 13, 2020. Alteration of a sealed document without proper notification to the responsible engineer is an offence under the Texas Engineering Practice Act

Cc: 1 Original and PDF Document

TABLE OF CONTENTS

APPENDIX

1.0 INTRODUCTION

Millennium Engineers Group, Inc. (MEG) has completed and is pleased to submit this document that presents our findings as a result of a geotechnical engineering study of this project to our client. The project site is located along Doolittle Road for approximately 1,200 feet from Texas Road to Curve Road in Edinburg, Hidalgo County, Texas. The project location is shown on the Project Location Map, found in the Appendix section of this report. This report briefly describes the procedures utilized during this study and presents our findings along with our recommendation, for foundation design and construction considerations.

Our scope of services for the project was outlined in MEG proposal No. 01-20-279G, dated October 29, 2020 and approved by Gerardo Carmona on October 30, 2020.

2.0 PROJECT DESCRIPTION

It is our understanding that the proposed site will accommodate the construction of a new sanitary sewer line. The site construction for the sanitary sewer line are to be subsurface of natural ground elevation.

3.0 SCOPE AND LIMITATIONS OF STUDY

This engineering report has been prepared in accordance with accepted geotechnical engineering practices currently exercised by geotechnical engineers in this area. No warranty, expressed or implied, is made or intended. This report is intended for the exclusive use by the client and client's authorized project team for use in preparing design and construction documents for this project only. This report may only be reproduced in its entirety for inclusion in construction documents. This report in its entirety shall not be reproduced or used for any other purposes without the written consent of our firm. This report may not contain sufficient information for purposes of other parties or other uses and is not intended for use in determining construction means and methods.

The recommendations presented in this report are based on data obtained from the soil borings drilled at this site and our understanding of the project information provided to us by our client and other project team members, and the assumption that site grading will result in only minor changes in the existing topography. Subsurface soil conditions have been observed and interpreted at the boring locations only.

This report may not reflect the actual variations of the subsurface conditions across the subject site. It is important to understand that variations may occur due to real geologic conditions or previous uses of the site. The nature and extent of variations across the subject site may not become evident until specific design locations are identified and/or construction commences. The construction process itself may also alter subsurface conditions. If variations appear evident at the time during the design phase and/or construction phase, we should be notified immediately to determine if our opinions, conclusions and recommendations need to be reevaluated. It may be necessary to perform additional field and laboratory tests and engineering analyses to establish the

engineering impact of such variations. These services are additional and are not a part of our project scope.

The engineering report was conducted for the proposed project site described in this report. The conclusions and recommendations contained in this report are not valid for any other project sites. If the project information described in this report is incorrect, is altered, or if new information becomes available, we should be retained to review and modify our recommendations. These services are additional and are not a part of our project scope.

Our scope of services was limited to the proposed work described in this report, and did not address other items or areas. The scope of our geotechnical engineering study does not include environmental assessment of the air, soil, rock or water conditions on or adjacent to the site. No environmental opinions are presented in this report. If the client is concerned with environmental risk at this project site, the client should perform an environmental site assessment.

If final grade elevations are significantly different from existing grades at the time of our field activities (more than plus or minus one (1) foot), our office should be informed about these changes. If desired, we will reexamine our analyses and make supplemental recommendations.

4.0 FIELD EXPLORATION PROCEDURES

Subsurface conditions at the subject site were evaluated by three (3) 25-foot soil borings. The Borings were drilled at the locations shown on the Borings Location Map, found in the Appendix section of this report. This location is approximate and distances were measured using a measuring wheel, tape, angles, and/or pacing from existing references. The structural soil borings were drilled in general accordance with American Society of Testing Materials (ASTM) D 420 procedures.

As part of our sampling procedures, the samples were collected in general conformance with ASTM D 1586 procedures. Representative portions of the samples were sealed in containers to reduce moisture loss, identified, packaged, 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 geotechnical engineering properties of the strata were evaluated by a series of laboratory tests. The results of the laboratory and field-testing are tabulated on the boring logs and Summary of Soil Sample Analyses which are found in the Attachments section of this report.

Standard penetration test results are noted on the boring logs as blows per 12 inches of penetration. Two 6 inch increments are performed for each standard penetration test. The sum of the blows for the two 6 inch increments is considered the “standard penetration resistance value” or “N-value.” Where hard or very dense materials were encountered, the tests are terminated as follows: (1) when a total of 50 blows have been applied in any of the 6 inch increments, or (2) when a total of 100 blows have been applied, or (3) when there is no observed advance of the sampler in the application of 10

successive blows. The boring logs in the case of hard or very dense materials will be noted as follows: 50/3", where 50 is the number of blows applied in 3 inches of penetration, or 100/7½" where 100 is the number of blows applied in a total of 7 ½ inches of penetration, or 10/0", where 10 is the number of blows applied in 0 inches of penetration.

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.

5.0 GENERAL SITE CONDITIONS

5.1 Site Description

The project site is located along Doolittle Road for approximately 1,200 feet from Texas Road to Curve Road in Edinburg, Hidalgo County, Texas. The project location is shown on the Project Location Map, found in the Appendix section of this report. At the time of our field operations, the subject site can be described as an undeveloped tract of land. The general topography of the site is relatively flat sloping down to the west with a visually estimated vertical relief of less than 3 feet. Surface drainage is visually estimated to be poor to fair.

5.2 Site Geology

According to the Soil Survey of Hidalgo County, Texas, published by the United States Department of Agriculture – Soil Conservation Service, the project site appears to be located within the Hidalgo soil association.

- The Hidalgo series consist of deep, well drained, loamy soils and nearly level soils that are on convex uplands. These soils formed in calcareous loamy and clayey sediments. This soil is well drained, surface runoff is slow and permeability is moderate. The hazards of water erosion and soil blowing are slight. Slopes range from 0 to 5 percent. Areas are mostly broad and irregular in shape and range from 25 to more than 900 acres or more. The corresponding soil symbol is 28, Hidalgo sandy clay loam.

5.3 Subsurface Conditions

On the basis of our borings, two (2) generalized strata that possess similar physical and engineering characteristics can describe the subsurface stratigraphy at this site. Table 5.1 summarizes the approximate strata range in our boring logs. These were prepared by visual classification and were aided by laboratory analyses of selected soil samples. The lines designating the interfaces between strata on the boring logs represent approximate boundaries. Transitions between strata may be gradual details for each of the borings can be found on the boring logs in the appendix of this report.

Table 5.1. Approximate Subsurface Stratigraphy Depths.

Stratum	Range in Depth, ft[1]	Stratum Description[1]
I	0 – 8	lean CLAY with sand to sandy lean CLAY, dark brown to brown, dry to moist, soft to very stiff
II	8 – 25	fat CLAY to sandy fat CLAY, brown to light brown, moist, stiff to very stiff

Note 1: The stratum thickness and depths to strata interfaces are approximate. Our measurements are rounded off to the nearest foot increment and are referenced from ground surface at the time of our drilling activities. Subsurface conditions may vary between the boring locations.

5.4 Groundwater Conditions

The dry auger drilling technique was used to complete the soil borings in an attempt to observe the presence of subsurface water. During our drilling operations we encountered the groundwater table to be at approximately five (5) feet below natural ground elevation for short term conditions. Moisture content test exhibited high moisture content at a depth of four (4) feet below natural ground elevation. Table 5.2 summarizes the approximate groundwater and cave in depths measured in our explorations. It should be noted that the groundwater level measurements recorded are accurate only for the specific dates on which measurement were obtained and does not show fluctuations throughout the year.

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 activities.

Table 5.2. Approximate Groundwater and Cave-in Depths.

Boring No.	Depth to Subsurface Water, Ft[1]			Depth to Cave-In, Ft[1]		
	Time of Drilling	24 Hr. Reading	48 Hr. Reading	Time of Drilling	24 Hr. Reading	48 Hr. Reading
B-1	20	6	6	-	12	9
B-2	23	5	5	-	14	10
B-3	20	6	6	-	18	10

Note 1: Subsurface water levels and cave-in depths have been rounded to the nearest foot.

Based on the findings in our borings and on our experience in this region, we believe that groundwater seepage will be encountered during site earthwork activities. If groundwater seepage is encountered during site earthwork activities, it may be controlled using temporary earthen berms and/or conventional sump-and-pump dewatering methods.

6.0 LABORATORY TESTING ANALYSIS

6.1 General

The analyses presented in this report are applicable specifically to the proposed project. The data gathered from both the field and laboratory testing programs on soil samples obtained from the borings was utilized to establish geotechnical engineering parameters for the proposed project.

6.2 Moisture Content Testing

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 expressed as a percentage. The moisture contents for the samples obtained as part of our geotechnical study were performed in accordance with ASTM D2216. The results varied from six (6) percent to thirty-six (36) percent. The borings and corresponding soil samples exhibited dry to wet soil conditions. A list of all the moisture contents by corresponding depth can be found on the boring log.

6.3 Plasticity Index Testing

The Plasticity Index (PI) is known 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. 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. The plasticity index testing performed in accordance with ASTM D4318 shows the range in which a soil acts in a plastic state. Plasticity Index values for the soils samples performed for this report were found to have a value of seven (7) percent having a low plasticity to sixty-five (65) percent having a high plasticity.

6.4 Particle Size Analysis Testing (Determination of Fines Content)

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 Soil 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 cohesive soil with large amounts of fine sized grains in the soil composition having low seepage potential. Sieve analysis testing was performed in accordance with ASTM D1140. The % -200 soil values for the samples collected ranged from 54% passing (cohesive coarse grained materials such as sandy clay) to 90% passing (cohesive fine grained materials such as fat clays).

7.0 ENGINEERING ANALYSIS AND RECOMMENDATIONS

7.1 General

The analysis and recommendations presented in this report are applicable specifically to the proposed foundation structure. The data gathered from both the field and laboratory testing programs on soil samples obtained from the borings was utilized to establish geotechnical engineering parameters to develop recommendations for the proposed structure. The foundation system(s) considered in this report to provide support for the proposed structure must meet two independent criteria. One of the criteria is that the movement below the foundation structure due to compression (consolidation) or expansion (swell) of the underlying soils must be within tolerable limits. This criterion is addressed in the Soil Related Movements section of this report. The other criterion is that the dead and live loads must be distributed appropriately and the foundation structure designed with an acceptable factor of safety to minimize the potential for bearing capacity failure of the underlying soils.

Geotechnical and structural engineers in this general area consider soil movements or Potential Vertical Rise (PVR) of approximately one (1) inch or less to be within acceptable structural design tolerances for most structures but may be different depending on structure use and the desired performance of the foundation. Therefore, movements of the underlying soils are not eliminated and thus one should expect a slab foundation structure to exhibit differential vertical movements. However, structural engineers design slab foundations for the expected magnitude of soil movements without failure of the structure. More stringent soil movement criteria may be established but the owner should consider the exponential increase in cost required to design and construct a structure for such soil movements. Data obtained in this study indicate that the soils at this site have strength characteristics capable of supporting the foundation and structure if designed appropriately. Stratum I is composed of lean clay with sand to sandy lean clay and has a moderate potential to exhibit volumetric changes (contraction and expansion). Stratum II is composed of fat clay to sandy fat clay with sand and has a high potential to exhibit volumetric changes. The potential for soil volumetric changes is dependent on variations in moisture contents of the underlying soils. Based on this data, this site is suitable for a slab foundation provided the subgrade is modified in accordance with the recommendations established in this report to reduce the potential for these soil volumetric changes.

7.2 Soil-Related Movements

The anticipated ground movements due to swelling of the underlying soils at this site were estimated for slab foundation construction using the Texas Department of Transportation (TxDOT) procedures of test method TEX-124-E for determining Potential Vertical Rise (PVR). A PVR value of one and three quarters (1 3/4) inches was estimated for the stratigraphic conditions encountered in our subsurface borings. A surcharge of 1 pound per square inch for the concrete slab, an active zone of 15 feet, and dry subsurface moisture conditions were assumed in estimating the above PVR values.

7.3 Excavation, Sloping and Benching Considerations

The soils encountered in the borings can easily be excavated using conventional earthwork equipment. No major hard soil and/or rock units were encountered in the borings through completion depth. In the case that excavations occur through granular soil or submerged soils it will be necessary to either slope the excavation sidewalls or provide temporary bracing to control excavation wall instability.

The side slopes of excavations through the overburden soils should be made in such a manner to provide for their stability during construction. Pipe lines or other facilities which are constructed prior to or during the currently proposed construction and which require excavation should be protected from loss of end bearing or lateral support.

Temporary construction slopes and/or permanent embankment slopes should be protected from surface runoff water. Site grading should be designed to allow drainage at planned areas where erosion protection is provided instead of allowing surface water to flow down unprotected slopes.

Permanent slopes at the site should be as flat as practical to reduce creep and occurrence of shallow slides. The following slope angles are recommended as maximums. The presented angles refer to the total height of a slope. Site improvement should be maintained away from the top of the slope to reduce the possibility of damage due to creep or shallow slides.

Table 8-2. Slopes Angles Requirements

Height (ft.)	Horizontal to vertical
0 – 3	1:1
3 – 6	2:1
6 – 9	3:1
>9	4:1

The contractor or persons doing the trenching should adhere to the current Occupational Health and Safety Administration (OSHA) guidelines on trench excavation safety and protection measures. Other industry standards may be applicable. The collection of specific geotechnical data and development of a plan for trench safety, sloping, benching or various types of temporary shoring, is beyond the scope of this study.

8.0 PROJECT REVIEW AND QUALITY CONTROL

Each project site is unique and it is important that the appropriate design data, construction drawings, specifications, change orders and related documents be reviewed by the respective design and construction professionals participating in this project. The performance of foundations, construction building pads and/or parking areas for this project will depend on correct interpretation of our geotechnical engineering report and proper compliance of and adherence to our geotechnical recommendations and to the construction drawings and specifications.

It is important that **MEG** be provided the opportunity to review the final design and construction documents to check that our geotechnical recommendations are properly interpreted and incorporated in the design and construction documents. We cannot be responsible for misinterpretations of our geotechnical recommendations if we have not had the opportunity to review these documents. This review is an additional service and not part of our project scope.

MEG should be retained to provide construction materials testing and observation services during all phases of the construction process of this project. As the Geotechnical Engineer of Record, it is important to let our technical personnel provide these services to make certain that our recommendations are interpreted properly and to ensure that actual field conditions are those described in our geotechnical report. Since our personnel are familiar with this project, **MEG**'s participation during the construction phase of this project would help mitigate any problems resulting from variations or anomalies in subsurface conditions, which are among the most prevalent on construction projects and often lead to delays, changes, costs overruns, and disputes. If the client does not follow all of our recommendations presented in this report and/or addendums to this report, the client assumes the responsibility and liability of such actions and will hold our firm harmless and without responsibility and liability for client's actions.

A construction testing frequency plan and budget needs to be developed for the required construction materials engineering and testing services for this project. Before construction, we recommend that **MEG**, the project design team members and the project general contractor meet and jointly develop the testing plan and budget, as well as review the testing specifications as it pertains to this project. **A failure to implement a complete testing plan will negate the recommendations provided in this report.**

MEG looks forward to the opportunity to provide continued support on this project.

APPENDIX A
CUSTOM SOIL RESOURCE REPORT

MEG ENGINEERS Strong Leaders!
Geotechnical | Environmental | Testing

5840 N. Gumwood Avenue ■ Pharr, Texas 78577 ■ Tel: 956-702-8500 ■ Fax: 956-702-8140

Soil Map—Hidalgo County, Texas
(01-20-29191 proposed Edinburg Sanitary Sewer Line)

Map Scale: 1:2,230 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hidalgo County, Texas
Survey Area Data: Version 19, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

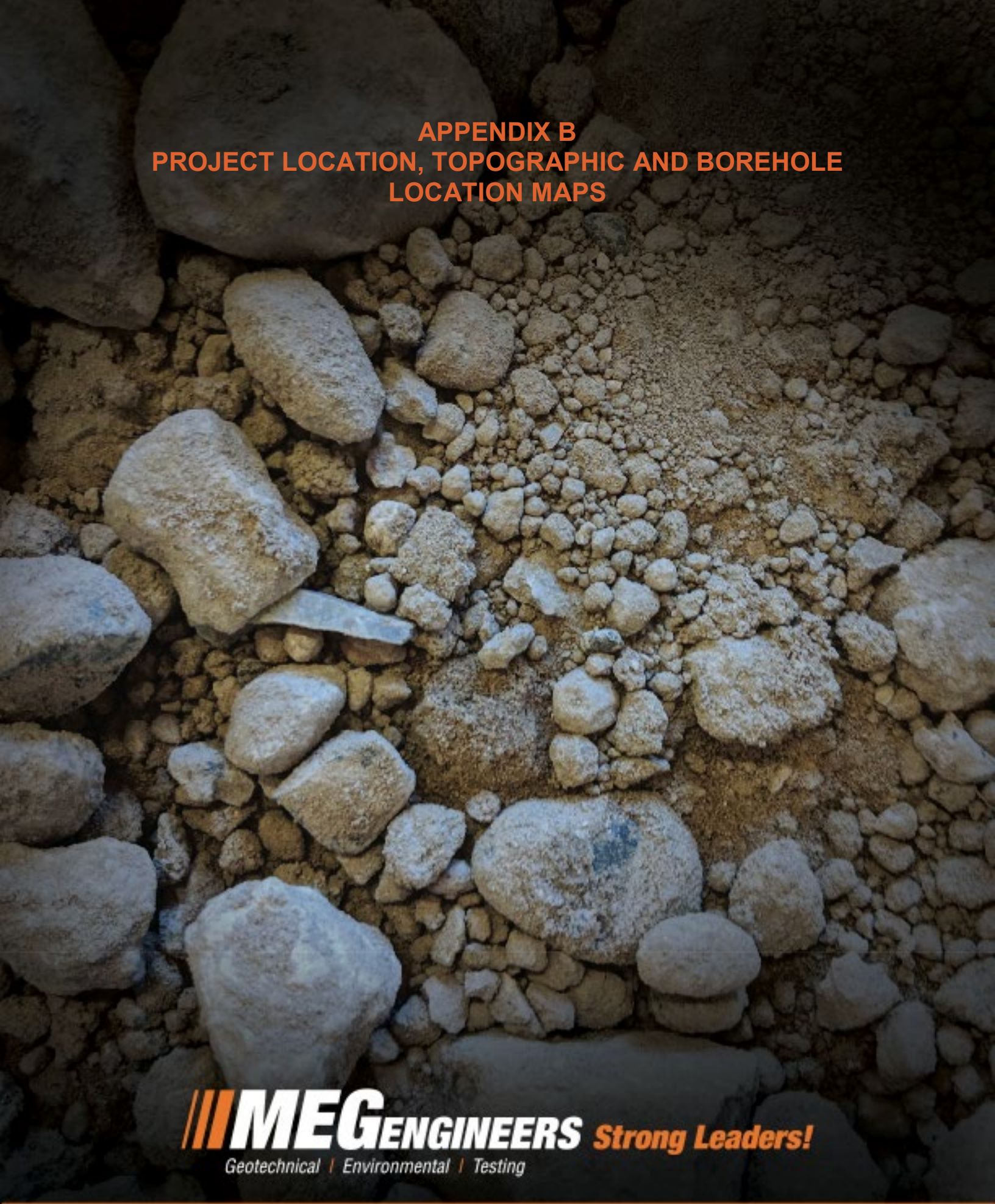
Date(s) aerial images were photographed: Sep 20, 2015—Nov 5, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
28	Hidalgo sandy clay loam, 0 to 1 percent slopes	6.3	100.0%
Totals for Area of Interest		**6.3**	**100.0%**

APPENDIX B
PROJECT LOCATION, TOPOGRAPHIC AND BOREHOLE LOCATION MAPS



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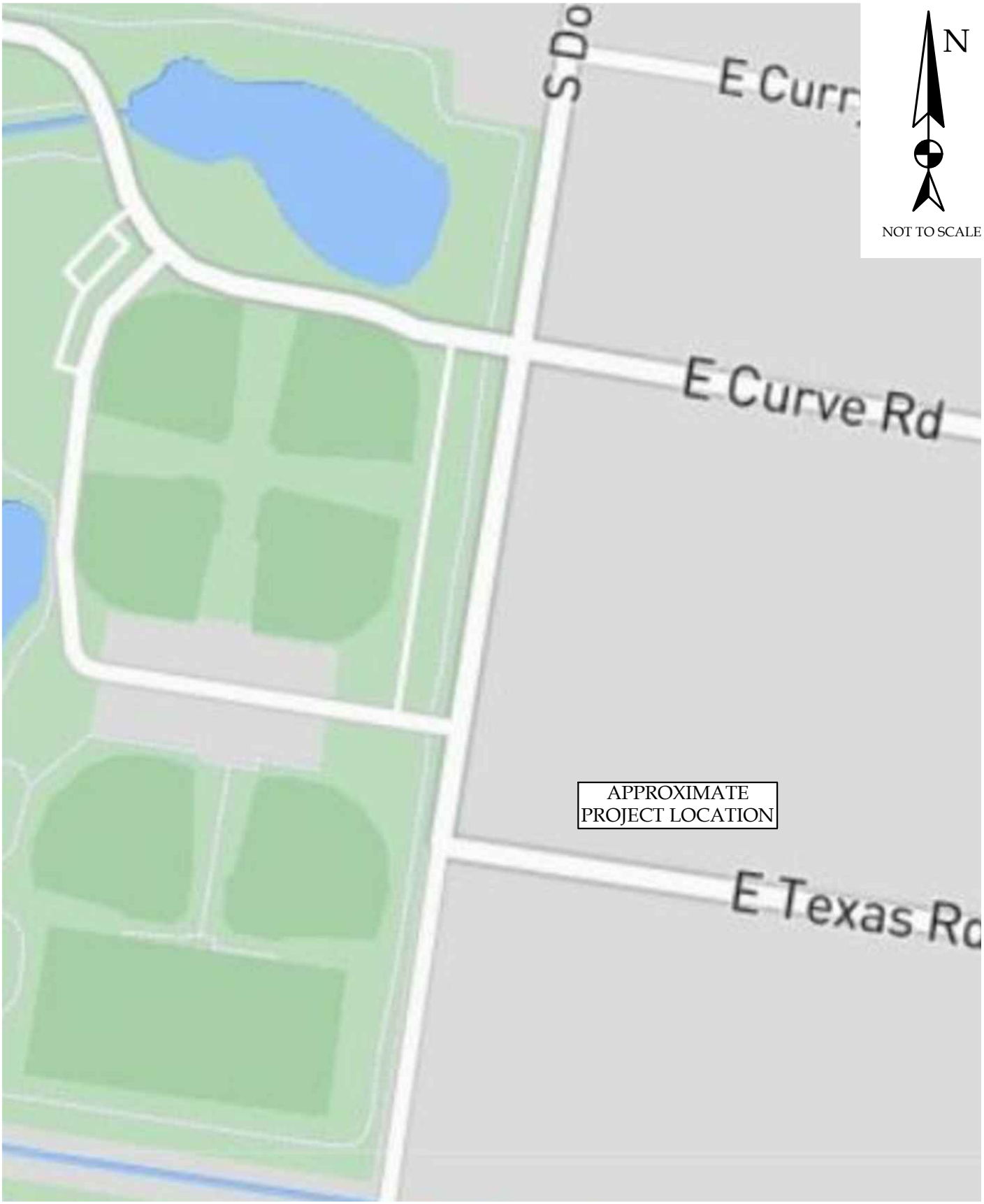

PROJECT SITE LOCATION MAP

PROPOSED
EDINBURG SANITARY SEWER LINE

EDINBURG, HIDALGO COUNTY, TEXAS

MILLENNIUM ENGINEERS GROUP, INC.
5804 N. GUMWOOD AVENUE
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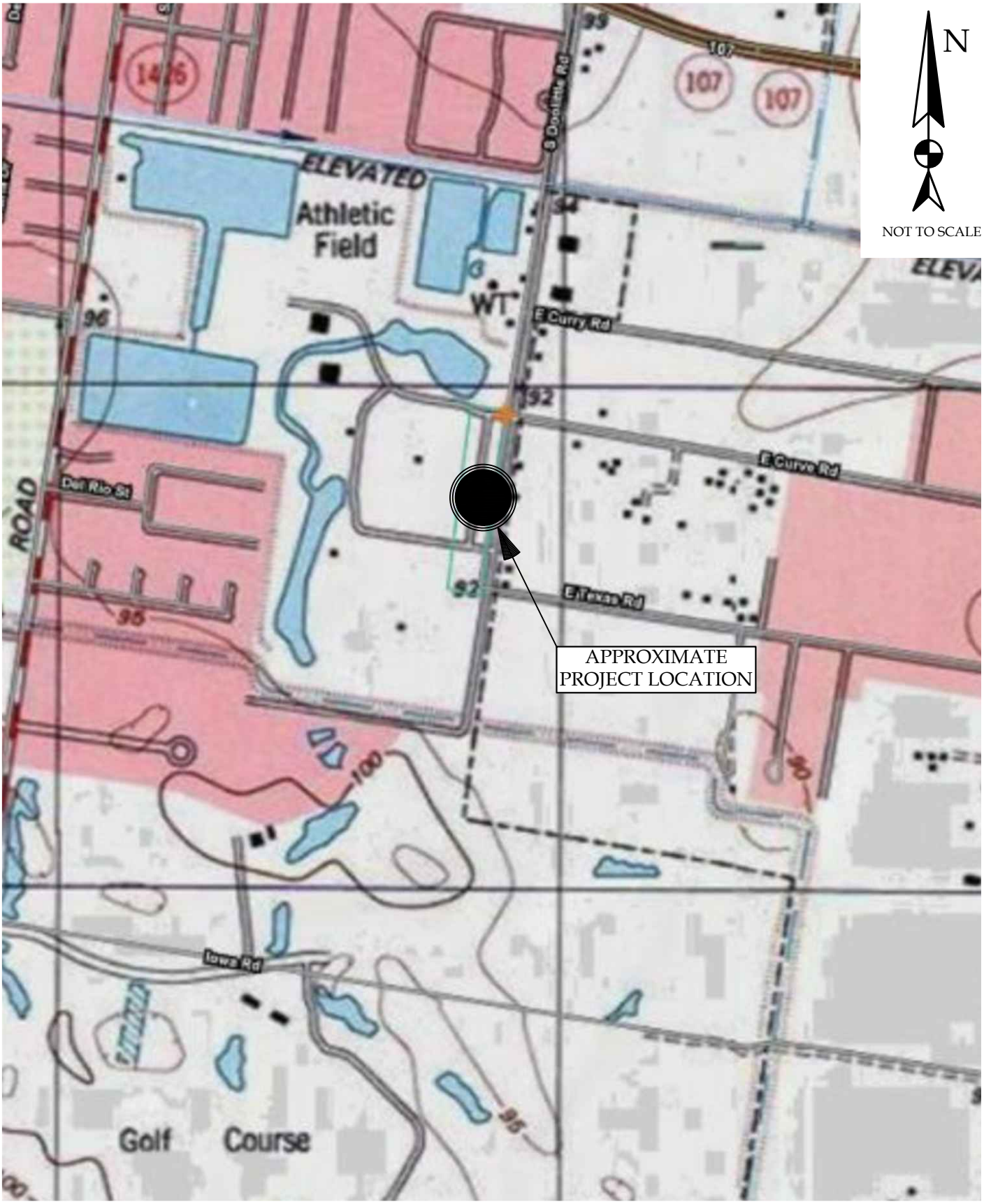
TEL: 956-702-8500
FAX: 956-702-8140

MEG PROJECT: 01-20-29198 / DATE: 11/9/2020 / APPROVED BY: A. PALMA / DRAWN BY: S. MARTINEZ



PROJECT TOPOGRAPHY MAP

PROPOSED
EDINBURG SANITARY SEWER LINE

EDINBURG, HIDALGO COUNTY, TEXAS

MILLENNIUM ENGINEERS GROUP, INC.
5804 N. GUMWOOD AVENUE
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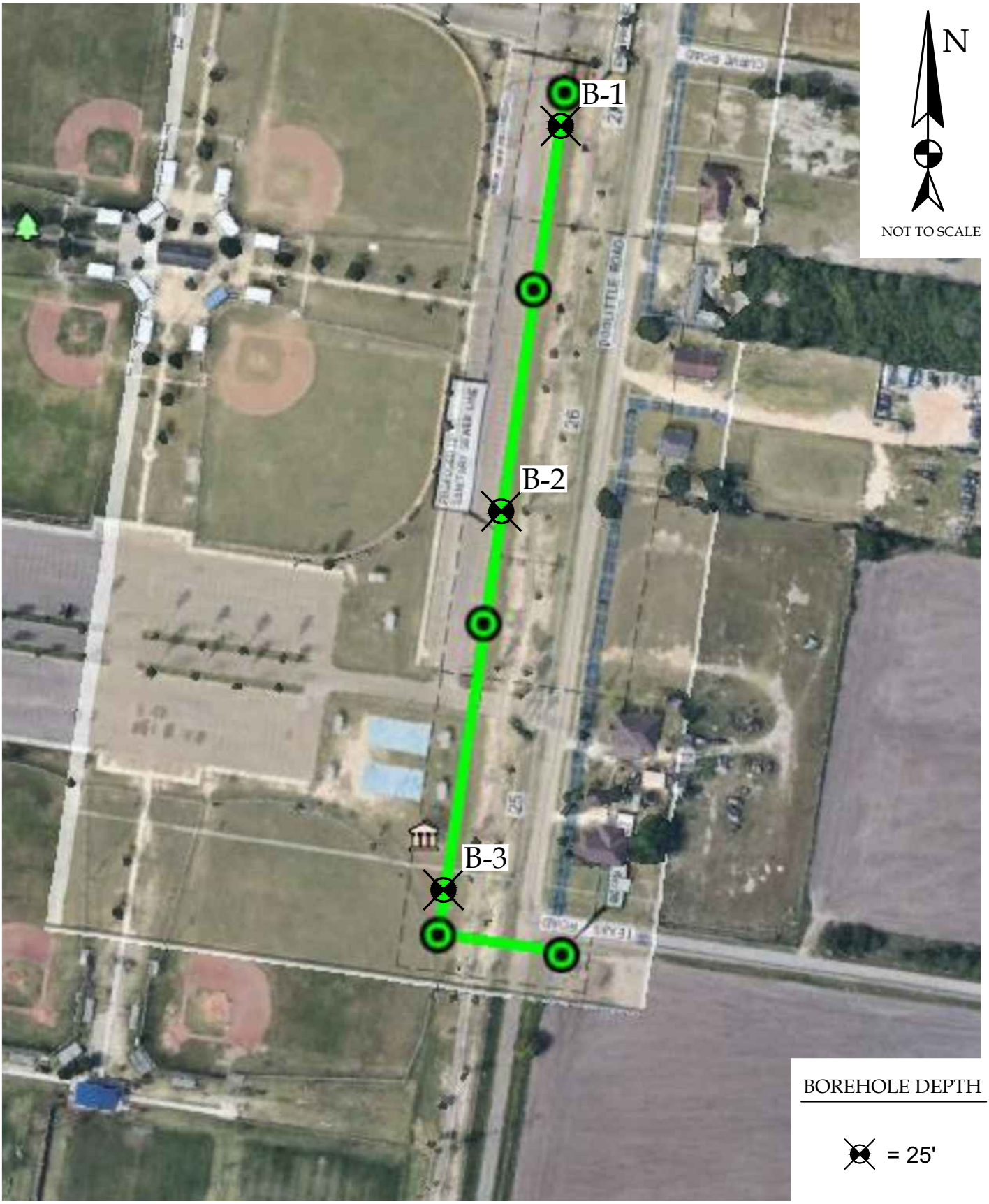
TEL: 956-702-8500
FAX: 956-702-8140

MEG PROJECT: 01-20-29198 / DATE: 11/9/2020 / APPROVED BY: A. PALMA / DRAWN BY: S. MARTINEZ



PROJECT BOREHOLE LOCATION MAP

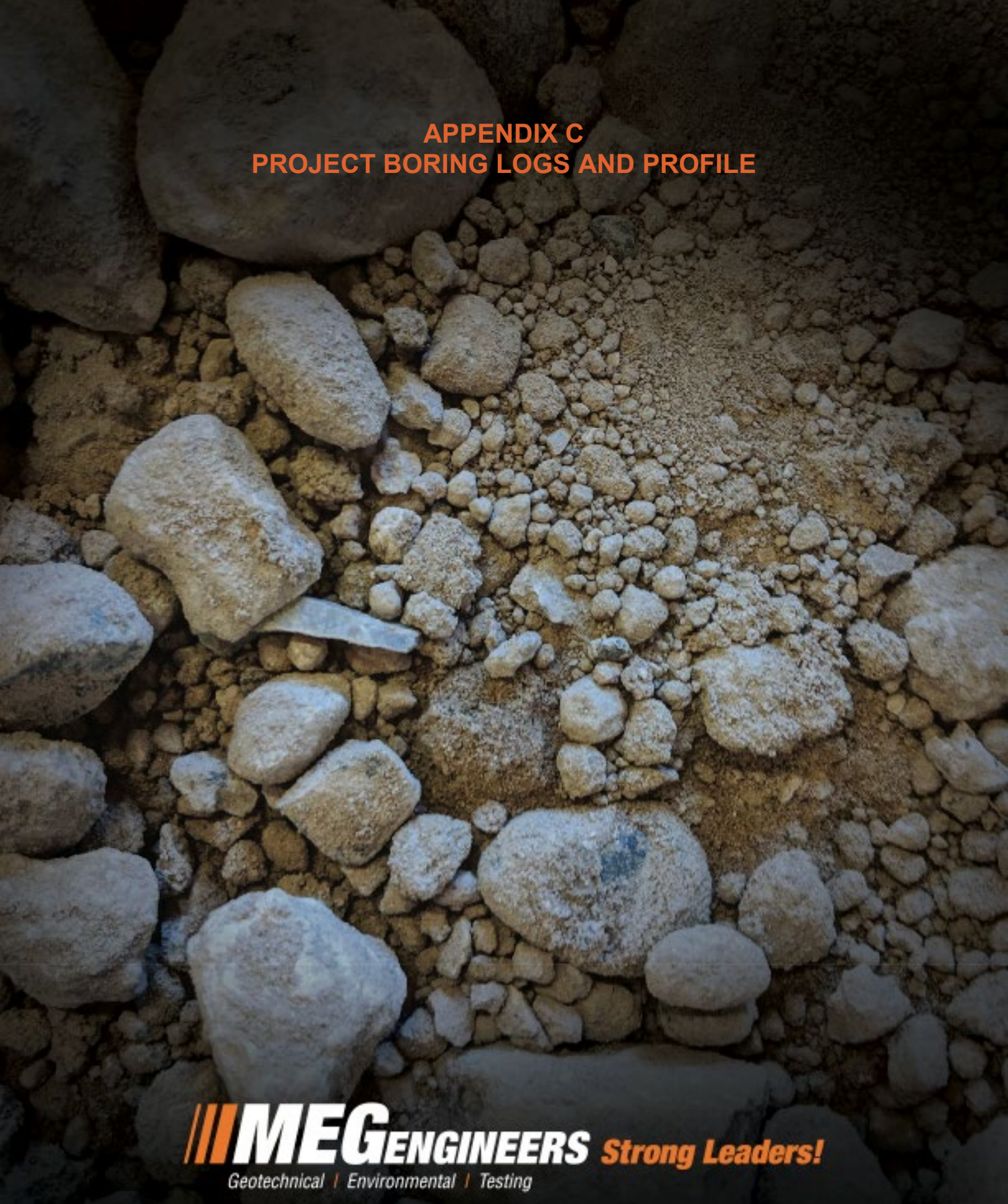
PROPOSED
EDINBURG SANITARY SEWER LINE

EDINBURG, HIDALGO COUNTY, TEXAS

MILLENNIUM ENGINEERS GROUP, INC.
5804 N. GUMWOOD AVENUE
PHARR, TEXAS 78577
WWW.MEGENGINEERS.COM
TEL: 956-702-8500
FAX: 956-702-8140

MEG PROJECT: 01-20-29198 / DATE: 11/9/2020 / APPROVED BY: A. PALMA / DRAWN BY: S. MARTINEZ

APPENDIX C
PROJECT BORING LOGS AND PROFILE



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5840 N. Gumwood Avenue ■ Pharr, Texas 78577 ■ Tel: 956-702-8500 ■ Fax: 956-702-8140

Project: **Proposed Edinburg Sanitary Sewer Line**
Project Location: **Edinburg, Hidalgo County, Texas**
Project Number: **01-20-29191**

Log of Boring B-1
Sheet 1 of 1

Date(s) Drilled **10/31/2020**	Logged By **J. Uriestegui**	Checked By **Raul Palma**
Drilling Method **SFA**	Drill Bit Size/Type **4" soil bit**	Total Depth of Borehole **25 feet bgs**
Drill Rig Type **Simco 2800**	Drilling Contractor **MEG Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **20 feet ATD**	Sampling Method(s) **SPT**	Hammer Data **140 lb., 30 in. drop, auto trip**
Borehole Backfill **Subgrade Cuttings**	Location **See Boring Location Map**	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	LL, %	PI, %	Percent Fines	REMARKS AND OTHER TESTS
	0				CL		sandy lean CLAY, dark brown to brown, dry to moist, med. stiff to very stiff					
	1		1	16				12	43	23	65	
	2											
	3		2	7				21			66	
	4											
	5		3	8				25	38	20		
	6											
	7		4	17				19				
	8				CH		fat CLAY, brown to light brown, moist, stiff to very stiff					
	9		5	15				18				
	10											
	11											
	12											
	13											
	14		6	19				22	54	31		
	15											
	16											
	17											
	18											
	19		7	11				20	54	35		▽ ATD
	20											
	21											
	22											
	23											
	24		8	28				24			87	
	25						Bore Termination					
	26											
	27											
	28											
	29											
	30											
	31											
	32											
	33											
	34											
	35											

Project: **Proposed Edinburg Sanitary Sewer Line**
Project Location: **Edinburg, Hidalgo County, Texas**
Project Number: **01-20-29191**

Log of Boring B-2
Sheet 1 of 1

Date(s) Drilled **10/31/2020**	Logged By **J. Uriestegui**	Checked By **Raul Palma**
Drilling Method **SFA**	Drill Bit Size/Type **4" soil bit**	Total Depth of Borehole **25 feet bgs**
Drill Rig Type **Simco 2800**	Drilling Contractor **MEG Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **23 feet ATD**	Sampling Method(s) **SPT**	Hammer Data **140 lb., 30 in. drop, auto trip**
Borehole Backfill **Subgrade Cuttings**	Location **See Boring Location Map**	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	LL, %	PI, %	Percent Fines	REMARKS AND OTHER TESTS
	0				CL		sandy lean CLAY to lean CLAY w/sand, dark brown to brown, dry to moist, soft to very stiff					
	1		1	19				12	36	18	60	
	2											
	3		2	4				28	41	19		
	4											
	5		3	6				20				
	6											
	7		4	21				21			83	
	8				CH		fat CLAY to sandy fat CLAY, brown to light brown, moist, stiff to very stiff					
	9		5	26				21				
	10											
	11											
	12											
	13											
	14		6	19				22	56	34		
	15											
	16											
	17											
	18											
	19		7	13				21			66	
	20											
	21											
	22											
	23											▽ ATD
	24		8	27				27	73	46		
	25						Bore Termination					
	26											
	27											
	28											
	29											
	30											
	31											
	32											
	33											
	34											
	35											

Project: **Proposed Edinburg Sanitary Sewer Line**
Project Location: **Edinburg, Hidalgo County, Texas**
Project Number: **01-20-29191**

Log of Boring B-3
Sheet 1 of 1

Date(s) Drilled **10/31/2020**	Logged By **J. Uriestegui**	Checked By **Raul Palma**
Drilling Method **SFA**	Drill Bit Size/Type **4" soil bit**	Total Depth of Borehole **25 feet bgs**
Drill Rig Type **Simco 2800**	Drilling Contractor **MEG Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **20 feet ATD**	Sampling Method(s) **SPT**	Hammer Data **140 lb., 30 in. drop, auto trip**
Borehole Backfill **Subgrade Cuttings**	Location **See Boring Location Map**	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	LL, %	PI, %	Percent Fines	REMARKS AND OTHER TESTS
	0				CL		lean CLAY w/sand, dark brown to brown, moist, soft to stiff					
	1		1	7				16	31	16		
	2											
	3		2	3				26				
	4											
	5		3	5				22			75	
	6											
	7		4	14				20				
	8				CH		fat CLAY to fat CLAY w/sand, brown to light brown, moist, stiff to very stiff					
	9		5	13				20	50	31	78	
	10											
	11											
	12											
	13											
	14		6	21				22	56	35		
	15											
	16											
	17											
	18											
	19		7	10				22				
	20											▽ ATD
	21											
	22											
	23											
	24		8	24				23	60	38	89	
	25						Bore Termination					
	26											
	27											
	28											
	29											
	30											
	31											
	32											
	33											
	34											
	35											

Project: **Proposed Edinburg Sanitary Sewer Line**
Project Location: **Edinburg, Hidalgo County, Texas**
Project Number: **01-20-29191**

Key to Log of Boring

Sheet 1 of 1

1 Elevation (feet)	2 Depth (feet)	3 Sample Type	4 Sample Number	5 Sampling Resistance, blows/ft	6 Material Type	7 Graphic Log	8 MATERIAL DESCRIPTION	9 Water Content, %	10 LL, %	11 PI, %	12 Percent Fines	13 REMARKS AND OTHER TESTS

COLUMN DESCRIPTIONS

1. Elevation (feet): Elevation (MSL, feet).
2. Depth (feet): Depth in feet below the ground surface.
3. Sample Type: Type of soil sample collected at the depth interval shown.
4. Sample Number: Sample identification number.
5. Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
6. Material Type: Type of material encountered.
7. Graphic Log: Graphic depiction of the subsurface material encountered.
8. MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
9. Water Content, %: Water content of the soil sample, expressed as percentage of dry weight of sample.
10. LL, %: Liquid Limit, expressed as a water content.
11. PI, %: Plasticity Index, expressed as a water content.
12. Percent Fines: The percent fines (soil passing the No. 200 Sieve) in the sample. WA indicates a Wash Sieve, SA indicates a Sieve Analysis.
13. REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

MATERIAL GRAPHIC SYMBOLS

Fat CLAY, CLAY w/SAND, SANDY CLAY (CH)

Lean CLAY, CLAY w/SAND, SANDY CLAY (CL)

TYPICAL SAMPLER GRAPHIC SYMBOLS

Auger sampler
Bulk Sample
3-inch-OD California w/ brass rings
CME Sampler
Grab Sample
2.5-inch-OD Modified California w/ brass liners
Pitcher Sample
2-inch-OD unlined split spoon (SPT)
Shelby Tube (Thin-walled, fixed head)

OTHER GRAPHIC SYMBOLS

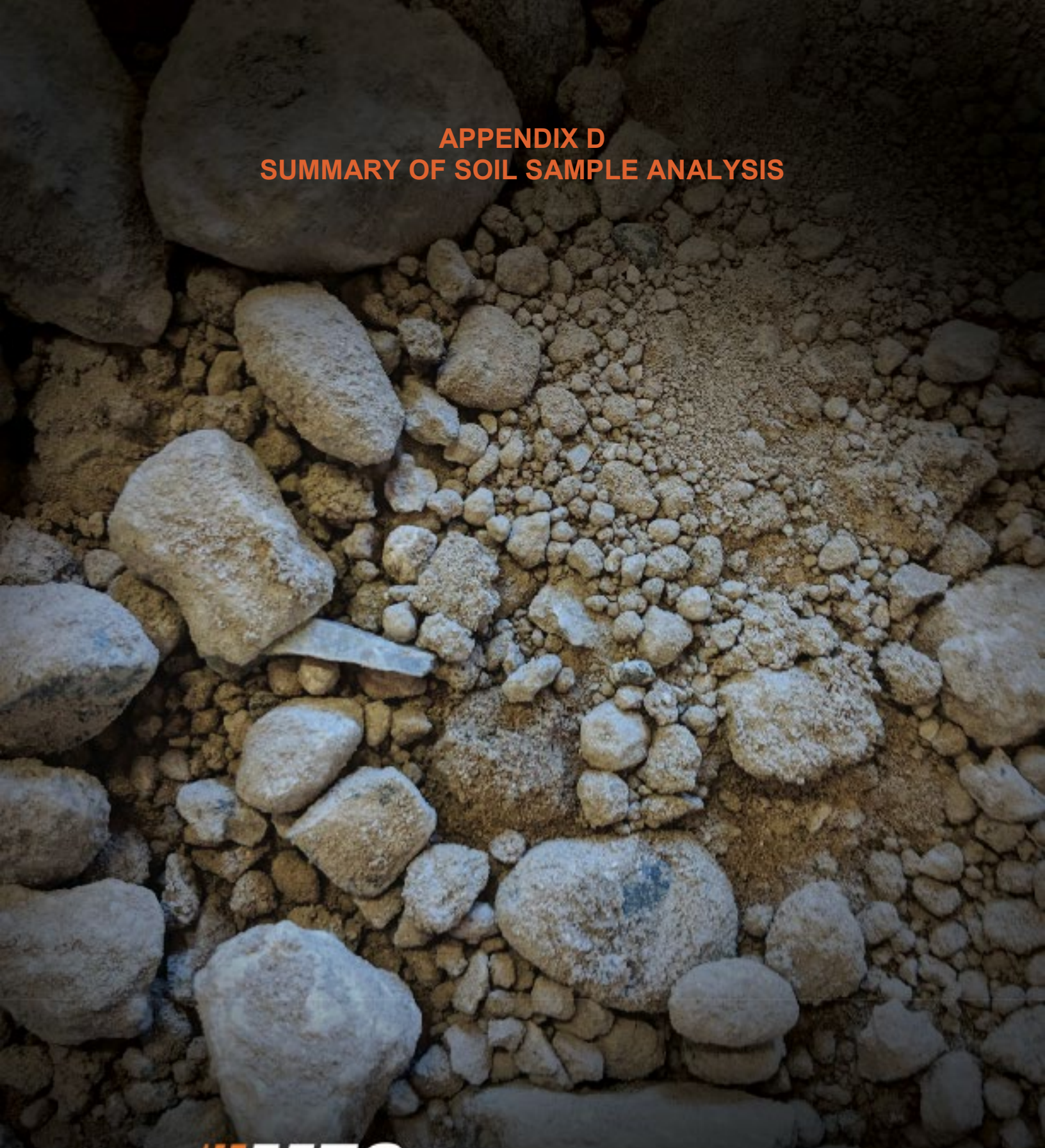
Water level (at time of drilling, ATD)
Water level (after waiting)
Minor change in material properties within a stratum
Inferred/gradational contact between strata
Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

Figure B-1

APPENDIX D
SUMMARY OF SOIL SAMPLE ANALYSIS



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Summary of Soil Sample Analyses

Project Name: Proposed Edinburg Sanitary Sewer Line

Sample Depth (ft)	Blows Per (ft)	Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index	-200% Sieve	Shear Strength (tsf)	Dry Unit Weight (pcf)	USCS
.5 - 2	16	12	43	20	23	65			CL
2.5 - 4	7	21				66			
4.5 - 6	8	25	38	18	20				CL
6.5 - 8	17	19							
8.5 - 10	15	18							
13.5 - 15	19	22	54	23	31				CH
18.5 - 20	11	20	54	19	35				CH
23.5 - 25	28	24				87			
.5 - 2	19	12	36	18	18	60			CL
2.5 - 4	4	28	41	21	19				CL
4.5 - 6	6	20							
6.5 - 8	21	21				83			
8.5 - 10	26	21							
13.5 - 15	19	22	56	22	34				CH
18.5 - 20	13	21				66			
23.5 - 25	27	27	73	27	46				CH
.5 - 2	7	16	31	16	16				CL
2.5 - 4	3	26							
4.5 - 6	5	22				75			
6.5 - 8	14	20							
8.5 - 10	13	20	50	19	31	78			CH
13.5 - 15	21	22	56	21	35				CH
18.5 - 20	10	22							
23.5 - 25	24	23	60	22	38	86			CH

APPENDIX E
LABORATORY AND FIELD PROCEDURES

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Laboratory and Field Test Procedures

Soil Classification Per ASTM D2487-93:

This soil-testing standard was used for classifying soils according to the Unified Soil Classification System. The soil classifications of the earth materials encountered are as noted in the attached boring logs.

Soil Water Content Per ASTM D2216-92:

This test determines the water content of soil or rock expressed as a percentage of the solid mass of the soil. The test results are listed under **MC** in the attached boring logs.

Soil Liquid Limit Per ASTM D4318-93:

The soil Liquid Limit identifies the upper limit soil water content at which the soil changes from a moldable (plastic) physical state to a liquid state. The Liquid Limit water content is expressed as a percentage of the solid mass of the soil. The test results are listed under **LL** in the attached boring logs.

Soil Plastic Limit Per ASTM D4318-93:

The soil Plastic Limit identifies lower limit soil water content at which the soil changes from a moldable (plastic) physical state to a non-moldable (semi-solid) physical state. The Plastic Limit water content is expressed as a percentage of the solid mass of the soil. The test results are listed under **PL** in the attached boring logs.

Plasticity Index Per ASTM D4318-93:

This is the numeric difference between the Liquid Limit and Plastic Limit. This index also defines the range of water content over which the soil-water system acts as a moldable (plastic) material. Higher Plasticity Index (PI) values indicate that the soil has a greater ability to change in soil volume or shrink and swell with lower or higher water contents, respectively. The test results are listed under **PI** in the attached boring logs.

Standard Penetration Test (SPT) and Split Spoon Sampler (SS) per ASTM D 1586:

This is the standard test method for both the penetration test and split-barrel (spoon) sampling of soils. This sampling method is used for soils or rock too hard for sampling using Shelby Tubes. The method involves penetration of a split spoon sampler into the soil or rock through successive blows of a 140-pound hammer in a prescribed manner.

Blow Counts (N) per ASTM D 1586:

This is the number of blows required to drive a Split Spoon Sampler by means of a 140 pound hammer for a distance of 12 inches in accordance with the variables stated in the test procedures.

Shelby Tube (ST) per ASTM D 1587:

This procedure is for using a thin-walled metal tube to recover relatively undisturbed soil samples suitable for laboratory tests of physical properties.

Dry Density (DD) per ASTM D 2937:

This procedure is for the determination of in-place density of soil. The test results are measured in pounds per cubic foot, pcf.

Unconfined Compression Test (Uc) per ASTM D 2166:

This test method covers the determination of the unconfined compressive strength of cohesive soil in the undisturbed, remolded, or compacted condition, using strain-controlled application of the axial load.

Minus No. 200 Sieve per ASTM D 1140:

This test method covers determination of the amount of material finer than a Number 200 sieve by washing. The results are stated as a percent of the total dry weight of the sample.

Pocket Penetrometer (PP):

This test method is an accepted modification of ASTM D 1558 test method for establishing the moisture-penetration resistance relationships of fine-grained soils. The test results are measured in tons per square foot, tsf. The strength values provided by this method should be considered qualitatively.

Rock Quality Designation (RQD):

The measure of the quality of a rock mass defined by adding intact rock core pieces greater than four inches in length by the total length of core advance.

Recovery Ratio (REC):

The Recovery Ratio is equal to the total length of core recovered divided by the total length of core advance.

Boring Logs:

This is a summary of the above-described information at each boring location.