ADDENDUM I

SUBJECT: Invitation for Bid #00165, Construction of Martinez IV CIP, Project 4, 24” Sanitary Sewer Line
Scheduled to Open: November 14, 2019 at 11:00 AM C.S.T.

FROM: Karen Smith, Purchasing Officer
ksmith@sara-tx.org

DATE: October 31, 2019

This notice shall serve as Addendum No. I - to the above referenced SOLICITATION

THE ABOVE-MENTIONED SOLICITATION IS HEREBY AMENDED AS follows:

A. ATTACHMENT A: Pre-bid Power Point Presentation Document
B. ATTACHMENT B: Geotechnical Investigation Report
C. ATTACHMENT C: Pre-bid Sign in Sheet
D. ATTACHMENT D: Revised Sheet 19
E. ATTACHMENT E: Revised Exhibit 1
F. UPDATED: Questions and Answers from pre-solicitation meeting and submitted via email.

On October 24, 2019 the San Antonio River Authority (River Authority) hosted a Pre-Submittal conference to provide information and clarification for the solicitation. Below is a list of questions that were asked at the pre-submittal conference and those submitted via email before the question submittal deadline. The River Authority’s official response to questions asked is as follows:

1.  Will the River Authority have their own inspector determining what gets salvaged and what doesn’t?

The River Authority will have a representative tag & designate the items to be salvaged. Reference Specification Item 00101 – Lift Station Decommissioning for salvage instructions.

2.  What will happen with the other instrument panels?

The River Authority will coordinate with the contractor to tag & designate all salvageable items. Reference Specification Item 00101 – Lift Station Decommissioning for salvage instructions.
3. The manhole details have fiberglass details, but you mentioned that they’d be concrete, do you have further detail for that?

The manholes will be concrete. The fiberglass manhole detail has been removed from Sheet 19.

4. All of the manholes have to use flowable fill?

Reference the manhole details on Sheets 18-20 of the plans and the River Authority project specifications for the amount of flowable fill backfill required. The fiberglass manhole detail has been removed from Sheet 19 of the Project Plans and flowable fill should not be based on that detail.

5. Does the River Authority do compaction testing?

No, all testing is the contractor’s responsibility.

6. Will staking be required by the contractor?

Yes, staking is the contractor’s responsibility and not provided by the River Authority.

7. The bore casing spacers are missing detail, will the River Authority require the contractor to grout plus the casing spacers?

Reference project specifications Item 406 (Jacking, Boring or Tunneling Pipe) for casing, grout and spacer information. Also, reference detail SD406 (Installation of Pipe in Bore) that has been added to Sheet 19 of the Project Plans.

8. Will the River Authority be using San Antonio Waster System (SAWS) specs?

Please reference the project specifications documents Table of Contents (Page 2 of 3) for the SAWS specifications that are to be used for the project.

9. Is there ground water in this area?

No ground water was encountered in the borings extracted from the field for the geotechnical report. The Geotechnical Investigation Report is attached to this addendum as Attachment B but is only to be used as informational, and not replied upon for bid calculations. Reference Article 12 of the Sample Contract Document (Page SC-3).

10. SARA does not require any minority participation?

There are no requirements set in this solicitation, although participation is encouraged. Reference Section 23 of the Main Document (Page 14 of 41).
11. **Is there any manifesting on this job in regard to the lift station?**

Once the River Authority’s tagged equipment has been salvaged & delivered to a designated location, the contractor should dispose of the remaining items responsibly. The sale of removed material is not allowed on site. Reference Specification Item 00101 – Lift Station Decommissioning for salvage and disposal instructions.

12. **The lift station is on gravel, will the River Authority require flowable fill?**

Reference Specification Item 00101 – Lift Station Decommissioning for wet well backfill requirements.

13. **Which pipe is required?**

The specified pipe for this project is C905 - DR 25, PS 165 PVC pipe, pigmented green for sanitary sewer use.

Please acknowledge addendum on Attachment F of the solicitation document when submitting a response.
#00165 – CONSTRUCTION OF MARTINEZ IV CIP, PROJECT 4 – 24” SANITARY SEWER LINE

PRE-BID MEETING
SCHEDULE OF EVENTS

• Solicitation Issued: 10/14/2019
• Pre-submittal conference 10/24/2019 at 9:00 AM CST
• Deadline for Submission of Questions: 10/28/2019 at 11:00 AM CST
• Deadline for Submission of Responses: 11/14/2019 before 11:00 AM CST
• Evaluate and rank initial results: 11/22/2019
• Completion of Negotiations: 12/6/2019
• Official Award: 12/18/2019
• Tentative NTP Date: 01/18/2020
• Tentative Substantial Completion: 11/16/2020
• Tentative Final Completion: 12/18/2020

* The River Authority reserves the right to change the dates indicated above
* 300 Calendar days assumed from NTP to Substantial Completion
Committed to Safe, Clean, Enjoyable Creeks and Rivers.
PROJECT HIGHLIGHTS

• GRAYTOWN LIFT STATION DECOMMISSIONING
• INSTALLATION OF APPROX. 5,106 LF OF C905 DR 25 (PS 165) PVC PIPE WITH GREEN SEWER PIGMENT
• INSTALLATION OF 17 CONCRETE MANHOLES
• VARIED EXCAVATION DEPTHS (APPROXIMATELY 10 LF-27 LF)
• PORTION OF PROPOSED SEWER LIES WITHIN 100-YEAR FLOODPLAIN
• WILL NEED TO CONNECT DOWNSTREAM TO A MANHOLE ADJACENT TO THE RECENTLY BUILT MILLICAN GROVE LIFT STATION
• CONSTRUCT SEWER LINE FROM DOWNSTREAM TO UPSTREAM END AND VERIFY CONNECTION ELEVATIONS
SWPPP

• ALL TEMPORARY SEDIMENT-CONTROL FENCE AND CONSTRUCTION EXITS NEED TO BE IN PLACE BEFORE BEGINNING CONSTRUCTION

• ENSURE SEDIMENT-CONTROL FENCING IS LOCATED WITHIN SARA EASEMENTS

• CONFIRM CORRECT PLACEMENT WITH SARA INSPECTOR & ENGINEER
100-YEAR FLOODPLAIN

• CONTROL OF GROUNDWATER / SURFACE WATER
• BEXAR COUNTY FLOODPLAIN REQUIREMENTS
• NO EQUIPMENT OR MATERIALS TO BE STAGED IN THE FLOODPLAIN
SITE ACCESS

• TXDOT & COSA TEMP. DRIVEWAY PERMITS
• SITE ACCESS AT END OF MILLCAN DRIVE
• BEGIN CONSTRUCTION AT MILLCAN GROVE LIFT STATION
CONSTRUCTION AREA (EASEMENTS)

• THE CONSTRUCTION AREA IS LIMITED TO THE 30 FOOT PERMANENT SANITARY SEWER EASEMENTS AND THE 50 FOOT TEMPORARY CONSTRUCTION EASEMENTS GIVEN FOR THIS PROJECT AS WELL AS THE ACCESS EASEMENT AT THE END OF MILICAN DRIVE

• DISTURBED AREAS TO BE HYDROMULCHED AND STABILIZED PRIOR TO SUBSTANTIAL COMPLETION

• DISTURBED AREAS TO BE VEGETATED AND APPROVED PRIOR TO FINAL COMPLETION. SARA INSPECTOR WILL NEED TO VERIFY COMPLIANCE WITH HYDROMULCH SPECIFICATION.
SEWER LINE TRENCHING/BORING & MANHOLES

• TWO DRIVEWAYS WILL NEED TO BE BORED (MILLICAN DRIVE AND NIETO DRIVE)
• VARIABLE DEPTH OF EXCAVATION (APPROXIMATELY 10 LF-27 LF)
• WILL NEED TO SUBMIT TRENCH EXCAVATION PLAN AND GAIN APPROVAL BY SARA ENGINEER PRIOR TO EXCAVATING
• SPACE VENTED MANHOLES ACCORDING TO PLANS
• GAS PIPELINE CROSSING (CITGO PIPELINES) – COORDINATE WORK WITH GAS COMPANY AT LEAST 48 HOURS IN ADVANCE OF EXCAVATION NEAR LINE (REFERENCE PLANS FOR CONTACT INFORMATION)
LIFT STATION DECOMMISSIONING SEQUENCE

• CONSTRUCT ENTIRETY OF 24 INCH SEWER LINE
• PASS ALL SARA INSPECTIONS AND TESTS
• CONNECT NEW LINE TO THE EXISTING LIFT STATION MANHOLE PRIOR TO DE-ENERGIZING LIFT STATION
• DE-ENERGIZE LIFT STATION
• SALVAGE GENERATOR, PUMPS, ETC. AND RETURN TO SARA
• CONFIRM WITH SARA THAT ALL NECESSARY ITEMS HAVE BEEN SALVAGED PRIOR TO DECOMMISSIONING LIFT STATION
• DECOMMISSIONING LIFT STATION AND RESTORE AREA TO A VEGETATED STATE WITH HYDROMULCH
VEGETATION

• 3 TREES TO BE REMOVED
• ALL SIGNIFICANT AND LARGER Sized TREES NOT BEING REMOVED WITHIN EASEMENTS ARE TO BE PROTECTED
• UNDERSTORY GROWTH IN FLOODPLAIN AREA WILL NEED TO BE CLEARED PRIOR TO EXCAVATION
• ALL DISTURBED AREAS TO BE SEEDED AND STABILIZED WITH HYDROMULCH
• TREE PERMIT CURRENTLY BEING PROCESSED BY SARA
QUESTIONS?
GEOTECHNICAL INVESTIGATION
MARTINEZ IV CIP – PROJECT 4 WASTEWATER
SAN ANTONIO, TEXAS

SAN ANTONIO RIVER AUTHORITY
SAN ANTONIO, TEXAS
San Antonio River Authority  
100 E. Guenther Street  
San Antonio, Texas 78283  

Attention: Mr. Joshua Spencer, P.E.

Geotechnical Investigation  
Martinez IV CIP – Project 4 Wastewater  
San Antonio, Texas

Dear Mr. Spencer,

Submitted herewith is our report on the Geotechnical Investigation for the above referenced project. Proposed construction will include approximately 4,200 linear feet of 24-inch gravity line to be constructed using open cut construction, except for two trenchless crossings along the I-10 frontage road in San Antonio, Texas. In brief, this report includes a plan of borings, boring logs with results of laboratory tests, and descriptions of subsurface conditions. Based on these findings, geotechnical recommendations are set forth for the utility installation.

Fugro USA Land, Inc. (Fugro) appreciates the opportunity to be of service to San Antonio River Authority. We look forward to future assignments.

Sincerely,

FUGRO USA LAND, INC.  
TBPE Firm Registration No. F-299

Yanfeng Li, Ph.D., P.E.  
Senior Geotechnical Engineer

Bryan E. Rose, P.E.  
Senior Project Manager

Distribution:  
San Antonio River Authority (Spencer)  
E-File
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INTRODUCTION

On August 8, 2019, Fugro USA Land, Inc. (Fugro) initiated the geotechnical investigation with the drilling of seven (7) borings for the proposed 24-inch gravity line for Martinez IV CIP Project 4 Wastewater line in San Antonio, Texas. The pipeline alignment is approximately 4,200 linear feet and will be installed primarily with open-cut excavation techniques. Trenchless techniques will be utilized in two (2) locations along the I-10 frontage road which will likely be completed using conventional jack and bore techniques. The project location is shown on the Vicinity Map, Plate 1.

AUTHORIZATION

The geotechnical investigation was authorized on July 9, 2019 by Ms. Suzanne B. Scott, General Manager of San Antonio River Authority with formal acceptance of our proposal dated May 16, 2019. The proposal outlines the scope of our services for the project.

PURPOSE AND SCOPE

The purpose of the investigation was to obtain adequate subsurface information to identify geotechnical and geologic conditions along the pipeline alignment, provide geotechnical recommendations for earthwork, and specifications for the utility installations. This was accomplished with a three-phase study including: 1) a field investigation for determining general subsurface conditions and obtaining representative samples for classification and testing, 2) a laboratory testing program to aid in the classification of subsurface strata and to establish engineering properties of the strata encountered, and 3) analyses of field and laboratory data to develop geotechnical design and construction recommendations.

Field sampling methods, laboratory testing procedures, soil classifications and strata descriptions were in general accordance with methods, procedures, and practices set forth by the American Society for Testing and Materials, Annual Book of ASTM Standards, latest edition, where applicable.

FIELD INVESTIGATION

The field investigation consisted of drilling seven (7) borings (designated B-01 through B-07) to a depth of 25 feet below existing ground surface. Boring locations were established in areas accessible to the drill rig and adjusted to avoid existing utilities along the pipeline alignment. Boring locations are shown on the Plan of Borings, Plate 2, and should be considered approximate.
Detailed descriptions of the subsurface strata encountered are presented on the Logs of Borings, Plates 3 through 9. Keys to Terms and Symbols used on the boring logs are set forth on Plates 10 and 11. Pocket penetration values in tons per square foot are shown on the Logs of Borings under the appropriate column. Boring elevations shown on the boring logs were obtained from Google Earth Professional and should be considered approximate. Latitude and longitude coordinates were obtained in the field at each boring location using a hand-held GPS device, accurate to about 3 horizontal meters, and are presented in the notes on the bottom of the boring logs. Groundwater notes made during drilling are also presented at the bottom of the logs.

The borings were drilled with a truck-mounted drill rig equipped with 1) continuous flight augers for advancing the holes dry and recovering disturbed samples (ASTM D 1452), 2) seamless push tubes for obtaining relatively undisturbed soil samples of cohesive strata (ASTM D 1587), 3) split-barrel samplers and drive-weight assembly for obtaining representative samples and measuring the penetration resistance (N-values) of non-cohesive soil strata (ASTM D 1586).

**LABORATORY TESTING**

The laboratory testing program included identification and classification testing of strata encountered in the subsurface. Soil classification tests, including Atterberg limit determinations (ASTM D 4318) and partial grain-size analyses (ASTM D 422), were conducted on representative samples of the soil strata. To determine compressive strength, unconfined compressive strength tests (ASTM D 2166) were conducted on selected intact clay samples. The classification and compressive tests included natural water content determinations (ASTM D 2216). The compression tests included unit dry weight determinations. The results of the tests are tabulated on the boring logs at sample recovery depths. Brief descriptions of the test procedures are provided in the following subsections.

**Natural Water Content (ASTM D 2216)**

Natural water content tests were performed on samples in which classification and/or strength tests were performed. Each sample was visually classified in the laboratory. Natural water contents are tabulated at sample depth on the boring logs.

**Atterberg Limits (ASTM D 4318)**

Atterberg limit tests are classification tests that determine the liquid limit and plastic limit of the soil fraction finer than the No. 40 sieve. The Atterberg limits are approximate water contents at which the soil tested behaves in a specified manner. The liquid limit is determined by measuring, in a standard device, the water content and number of blows required to close a specific width groove cut in a remolded soil sample a specified length. The plastic limit is determined by
measuring the water content when threads of soil ⅛-inch in diameter begin to crumble. The plasticity index, defined as the difference between the liquid and plastic limits, indicates the degree of plasticity or the magnitude of the water content over which the soil remains plastic. Liquid limit and plasticity index values are tabulated at sample depths on the boring logs.

Sieve Analysis (ASTM D 422)

Grain-size characteristics of the natural soils were investigated by the determination of the percent of soil passing the Nos. 4, 40 and 200 sieves. These tests were performed by washing or sieving material through the respective sieves. The results are tabulated at sample depth on the boring logs for the percent passing the Nos. 4 and 200 sieves.

Unconfined Compression Test of Cohesive Soil (ASTM D 2166)

In the unconfined compression test of cohesive soil, the specimen is sheared in compression without confinement and drainage at a constant rate of axial deformation between 0.5 to 2.0 percent strain per minute and to produce failure in a test time less than 15 minutes. The soil samples tested had diameters of about 2.8 inches and heights of about 5.6 inches. The measured applied load was recorded for selected increments of deformation. Results of these tests, including compressive strength, water content and unit dry weights, are tabulated on boring logs at specimen recovery depth.

Strata Descriptions

Descriptions of strata made in the field at the time the borings were drilled were modified in accordance with results of laboratory tests and visual examination in the laboratory. Recovered soil samples were examined and classified in general accordance with ASTM D 2487 and described as recommended in ASTM D 2488. Classifications of the soils and finalized descriptions of soil strata are shown on the logs of borings.

SITE AND SUBSURFACE CONDITIONS

Physiography

The proposed wastewater line will start approximately ½ mile east of the intersection of I-10 and Weichold Road and extend eastward along the I-10 frontage road for about 1/3 mile, then extend towards the southeast for about ½ mile. The alignment is located near a newly developed residential area, surrounded by ranch fields, trees, and commercial buildings. Salitrillo Creek flows in the north, generally parallel to the project alignment. Existing grade along the pipeline alignment ranges approximately from 605 to 585 feet.
Geology

According to published geologic mapping\(^2\) and the subsurface soil conditions encountered during this investigation, the alignment is underlain by clay of the Navarro Group. Navarro Group clays generally consist of the lower part of the formation and are composed of dominantly montmorillonitic, greenish-gray to brownish-gray clay, which weathers to a highly plastic clay. The clays can exhibit a high shrink/swell potential. The deeper unweathered portions of the Navarro consist of a gray clay shale.

Site Stratigraphy and Engineering Properties

The subsurface conditions can best be understood by a thorough review of the boring logs presented on Plates 3 through 9. A brief discussion of the subsurface conditions encountered in the borings is provided in the following sections.

Generally, the project borings encountered surficial dark brown fat clay with sand material underlain by light brown to brown fat clay, further underlain by tan to light gray fat clay with sand.

The surficial clay was typically described as dark brown fat clay with sand and occasional roots and extended to depths of 4 to 8 feet below existing grade. Measured liquid limits ranged from 64 to 75, plasticity indices ranged from 40 to 52, and percent fines (material passing the No. 200 sieve) ranged from 83 to 87.

At Borings B-01 and B-02, light brown to brown clay was encountered beneath the surficial fat clay and extended to the depth of 8 feet and was described as fat clay with calcareous nodules. One measured liquid limit was 58, plasticity index was 39, and percent fines was 91.

Tan to light gray fat clay with ferrous deposits and gypsum seams was encountered underneath the dark brown to brown fat clay and extended to the termination dept of 25 feet below existing grade. Measured liquid limits ranged from 59 to 80, plasticity indices ranged from 39 to 53, and percent fines (material passing the No. 200 sieve) ranged from 68 to 94. Unconfined compressive of intact clay samples ranged from 1.1 to 6.8 tsf.

Groundwater Occurrence

As noted on the logs, groundwater was not encountered in the seven (7) borings during our field investigation. One should note that the direct groundwater observations reported herein are very short term and should not be interpreted as a “groundwater study”. The quantity of perched or transient groundwater is generally strongly influenced by antecedent rainfall conditions and the

proximity to nearby creeks and drainage ways. Groundwater quantities may be particularly severe in areas of faults especially following rain events. The contractor should be made aware of the possible presence of groundwater in excavations, which may be severe and in communication with surface waters following rain events.

**CONSTRUCTION CONSIDERATIONS**

The wastewater line will include about 4,200 linear feet of 24-inch diameter gravity line, at depths ranging primarily from 15 to 20 feet. The pipe will be installed primarily by conventional open-cut excavation techniques. Trenchless crossing techniques will be utilized in two locations along the I-10 frontage road. Recommendations for pipe bedding and trench backfill, and comments regarding excavation potential and temporary sloping are provided in the following sections.

**Pipe Bedding and Backfill Recommendations**

Successful installation of the wastewater line will depend on a number of factors including the available support from the surrounding soil and the type of bedding material used. The following is an excerpt from the City of San Antonio Standard Specifications for Construction, June 2008, Section 400.3.D for bedding. The bedding shall consist of “lean clay, gravel, clean sand, cement stabilized sand or other materials approved by the Engineer”.

**Trench Backfill**

Trench excavations may be backfilled with the excavated material provided the material is processed and placed in compliance with the following requirements:

1. Excavated trench material should be free of debris, clay lumps, excessive organics, and other deleterious material, and be screened to limit the maximum particle size to 3 inches.

2. Compact the backfill to 95% of the maximum dry density determined using TxDOT Test Method TEX-114-E for clayey soils. Compacted lift thicknesses should not be more than 6 inches. Water contents of the compacted backfill should be within 0 to +4% of optimum.

3. Density testing should be performed on the backfill after each horizontal lift and not by “potholing.” This requirement will necessitate protection for the density testing technician in trenches deeper than 5 feet by means of a trench safety system.
Temporary Trench Excavations, Support, and Groundwater

Based on proposed excavation depths of 15 to 20 feet, excavations will likely extend into stiff to hard fat clay material. Groundwater infiltration may be problematic if in potential communication with the nearby creek. If excessive groundwater is encountered during excavation, the geotechnical engineer should be contacted to document the condition and to provide alternatives for suitable groundwater control and pipe placement.

Trench safety is the sole responsibility of the contractor and he is required to retain the services of a licensed professional engineer to design his trench safety system to comply with applicable OSHA requirements.

Suggestions are set forth below in accordance with OSHA\(^3\) for classifying soil encountered in our investigation. It is stressed that these are suggestions only for preliminary planning based on worst case conditions, and the actual trench safety system design is the contractor’s responsibility.

<table>
<thead>
<tr>
<th>Soil/Rock Type</th>
<th>OSHA Classification</th>
<th>Recommended OSHA Slope</th>
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<tbody>
<tr>
<td>Clay (CH)</td>
<td>Type C</td>
<td>1.5H to 1V*</td>
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* If groundwater is encountered, flatter slopes or a dewatering plan will be required to maintain excavation safety. This flatter slope will control the sloping of the excavation and should be continued to the ground surface.

Geotechnical Conditions at Trenchless Crossings

Trenchless crossing is planned along the wastewater line alignment at two (2) locations along I-10 frontage road. The geotechnical conditions at the trenchless crossing locations are presented below.

**Trenchless Crossing along I-10.** Borings B-1 through B-03 were drilled at the proposed trenchless crossing locations along I-10 frontage road as shown on Plate 2. The boring data indicates the trenchless crossing will be performed within the light brown to tan and light gray fat clay with sand. The fat clay is stiff to very stiff, with calcareous nodules, ferrous stains and gypsum seams. Groundwater was not encountered at these three boring locations during field investigation.

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CONDITIONS

Since some variation was found in subsurface conditions at the boring locations, all parties involved should take notice that even more variation may be encountered between boring locations. Statements in the report as to subsurface variation over given areas are intended only as estimations from the data obtained at specific boring locations. The design and construction recommendations contained in this report supersede all previous verbal or written geotechnical recommendations provided by Fugro for this project.

The professional services that form the basis for this report have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in the same locality. No warranty, express or implied, is made as the professional advice set forth. Fugro's scope of work does not include the investigation, detection, or design related to the presence of any biological pollutants. The term 'biological pollutants' includes, but is not limited to, mold, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

The results, conclusions, and recommendations contained in this report are directed at, and intended to be utilized within, the scope of work contained in the proposal letter executed by Fugro USA Land, Inc. and client. This report is not intended to be used for any other purposes. Fugro USA Land, Inc. makes no claim or representation concerning any activity or condition falling outside the specified purposes to which this report is directed, said purposes being specifically limited to the scope of work as defined in said agreement. Inquiries as to said scope of work or concerning any activity or condition not specifically contained therein should be directed to Fugro USA Land, Inc. for a determination and, if necessary, further investigation.
PLATES
**STRATUM DESCRIPTION**

<table>
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<tr>
<th>SYMBOL</th>
<th>DEPTH, FT</th>
<th>SAMPLES</th>
<th>POCKET PEN, tsf</th>
<th>PASSING NO. 4 SIEVE, %</th>
<th>PLASTICITY INDEX (PI), %</th>
<th>LIQUID LIMIT, %</th>
<th>PASSING NO. 200 SIEVE, %</th>
<th>WATER CONTENT, %</th>
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<td>P = 1.5</td>
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**NOTES:**
1) Drilling Rig Model: Truck-Mounted CME 55  
   Driller: Jose Vargas  
   Logger: Gus Boehme
2) Borings was dry augered to termination at 25-ft depth.
3) Groundwater was not encountered during time of drilling.
4) Approximate GPS Coordinates:
   29.47010°N, 98.27523°W
5) Ground surface elevation was estimated from Google Earth Professional and should be considered approximate.
**STRATUM DESCRIPTION**

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DEPTH, FT</th>
<th>PASSING NO. 4 SIEVE, %</th>
<th>LIQUID LIMIT, %</th>
<th>PLASTICITY INDEX (PI), %</th>
<th>WATER CONTENT, %</th>
<th>UNIT DRY WEIGHT, PCF</th>
<th>COMPRRESSIVE STRENGTH TUF</th>
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<td>593.0</td>
<td>4.0</td>
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<td>- w/ few fine, angular gravel from 2 to 4 feet.</td>
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<td>P = 4.5+</td>
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<td>18</td>
<td>58</td>
<td>39</td>
<td>100</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>- w/ occasional calcareous nodules at 6 feet.</td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>26</td>
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<tr>
<td>Tan and light gray FAT CLAY with sand (CH), dry, very stiff, few fine sand, w/ occasional ferrous deposits and gypsum seams throughout.</td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td></td>
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</table>

**NOTES:**
1) Drilling Rig Model: Truck-Mounted CME 55  
   Driller: Jose Vargas  
   Logger: Gus Boehme
2) Borings was dry augered to termination at 25-ft depth.
3) Groundwater was not encountered during time of drilling.
4) Approximate GPS Coordinates:  
   29.471242°N, 98.271752°W
5) Ground surface elevation was estimated from Google Earth Professional and should be considered approximate.

**Completion Depth:** 25.0

**Date Drilled:** 8-9-19 to 8-9-19

**Water Level / Seepage:** See Notes

**Upon Completion:** See Notes
<table>
<thead>
<tr>
<th>DEPTH, FT</th>
<th>SYMBOL</th>
<th>SAMPLIES</th>
<th>POCKET PEN, tbf</th>
<th>PASSING NO.4 SIEVE, %</th>
<th>LIQUID LIMIT, %</th>
<th>PLASTICITY INDEX (PI), %</th>
<th>PASSING NO.200 SIEVE, %</th>
<th>UNIT DRY WEIGHT, PCF</th>
<th>COMPRRESSIVE STRENGTH</th>
<th>WATER CONTENT, %</th>
<th>LAYER ELEV./ DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>P = 4.5+</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>15</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
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<tr>
<td>35</td>
<td>P = 1.5</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**STRATUM DESCRIPTION**

- Dark brown FAT CLAY with sand (CH), dry, hard, few finesand, w/ occasional roots throughout.
- w/ few fine, angular gravel from 2 to 4 feet.
- Tan and light gray FAT CLAY (CH), dry, very stiff to hard, trace sand.
- hard below 8 feet.
- Tan and light gray FAT CLAY (CH), dry, stiff, trace sand, w/ occasional ferrous deposits and gypsum seams throughout.
- blocky at 14 feet.
- blocky at 14 feet.

**NOTES:**

1) Drilling Rig Model: Truck-Mounted CME 55
   Driller: Jose Vargas
   Logger: Gus Boehme
2) Borings was dry augered to termination at 25-ft depth.
3) Groundwater was not encountered during time of drilling.
4) Approximate GPS Coordinates:
   29.4719°N, 98.27020°W
5) Ground surface elevation was estimated from Google Earth Professional and should be considered approximate.

**LOG OF BORING NO. B-03**

**DATE DRILLED:** 8-9-19 to 8-9-19

**WATER LEVEL / SEEPAGE:** See Notes

**UPON COMPLETION:** See Notes

**COMPLETION DEPTH:** 25.0

**PLATE 5**
### Dark Brown Fat Clay (CH)
- Dry, hard, few sand, with occasional roots throughout.
- With few fine, angular gravel from 1 to 2 feet.

### Tan and Light Gray Fat Clay (CH)
- Dry, hard, few fine, rounded gravel, trace sand, with occasional gypsum seams.

### Tan and Light Gray Fat Clay with Sand (CH)
- Dry, very stiff to hard, few fine sand, with occasional ferrous deposits and gypsum seams throughout.

### Log Notes:
1. Drilling Rig Model: Truck-Mounted CME 55
2. Driller: Jose Vargas
3. Logger: Alfred Covarrubias
4. Borings were dry augered to termination at 25-ft depth.
5. Groundwater was not encountered during time of drilling.
6. Approximate GPS Coordinates: 29.47170°N, 98.26885°W
7. Ground surface elevation was estimated from Google Earth Professional and should be considered approximate.

### Completion Depth:
- 25.0 ft

### Date Drilled:
- 8-19-19 to 8-19-19

### Water Level / Seepage:
- See Notes

### Upon Completion:
- See Notes

### Key:
- N = Standard Penetration Test, bpf
- P = Pocket Penetrometer, tsf
- U = Unconfined
- Q = Unconsolidated Undrained Triaxial

### Table Data:

<table>
<thead>
<tr>
<th>Layer</th>
<th>Elevation</th>
<th>Water Content, %</th>
<th>Liquid Limit, %</th>
<th>Plasticity Index (PI), %</th>
<th>Passing No. 4 Sieve, %</th>
<th>Passing No. 200 Sieve, %</th>
<th>Unit Dry Weight,pcf</th>
<th>Compressive Strength, psi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>580.0</td>
<td>18</td>
<td>66</td>
<td>46</td>
<td>100</td>
<td>87</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>574.0</td>
<td>15</td>
<td>110</td>
<td>6.8(U)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>559.0</td>
<td>29</td>
<td>73</td>
<td>41</td>
<td>100</td>
<td>77</td>
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<td></td>
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</tbody>
</table>
### STRATUM DESCRIPTION

- Dark brown FAT CLAY with sand (CH), dry, hard, few fine sand, w/ occasional roots throughout.

- Light brown to tan and light gray FAT CLAY (CH), dry, very stiff, few fine sand increasing with depth, blocky, w/ occasional ferrous deposits and gypsum seams throughout.

### LOG OF BORING NO. B-05

**Martinez IV CIP**
**Project 4 Wastewater**
**San Antonio, Texas**
**PROJECT NO. 04.30191021**

**DATE DRILLED:** 8-19-19 to 8-19-19

**WATER LEVEL / SEEPAGE:** See Notes

**UPON COMPLETION:** See Notes

**COMPLETION DEPTH:** 25.0

**KEY:**
- N = Standard Penetration Test, bpf
- P = Pocket Penetrometer, tsf
- U = Unconfined
- Q = Unconsolidated Undrained Triaxial

---

<table>
<thead>
<tr>
<th>LAYER ELEV./ DEPTH</th>
<th>WATER CONTENT, %</th>
<th>LIQUID LIMIT, %</th>
<th>PLASTICITY INDEX (PI), %</th>
<th>PASSING NO. 4 SIEVE, %</th>
<th>PASSING NO. 200 SIEVE, %</th>
<th>UNIT DRY WEIGHT, PCF</th>
<th>COMPRESSIVE STRENGTH, TUF</th>
</tr>
</thead>
<tbody>
<tr>
<td>578.0</td>
<td>20</td>
<td>66</td>
<td>45</td>
<td>100</td>
<td>90</td>
<td></td>
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<tr>
<td>561.0</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>98</td>
<td>2.1(U)</td>
</tr>
</tbody>
</table>

**NOTES:**
1) Drilling Rig Model: Truck-Mounted CME 55
   Driller: Jose Vargas
   Logger: Alfred Covarrubias
2) Borings was dry augered to termination at 25-ft depth.
3) Groundwater was not encountered during time of drilling.
4) Approximate GPS Coordinates:
   29.47116°N, 98.26739°W
5) Ground surface elevation was estimated from Google Earth Professional and should be considered approximate.
**Log of Boring No. B-06**

**Martinez IV CIP**

**Project 4 Wastewater**

**San Antonio, Texas**

**Project No. 04.30191021**

---

**Stratum Description**

- **Depth, Ft:**
  - 5
  - 10
  - 15
  - 20
  - 25
  - 30
  - 35

- **Sample:**
  - P = 4.5+
  - P = 4.5+
  - P = 4.5+
  - P = 4.5+
  - P = 4.5+
  - P = 4.5+
  - P = 4.0
  - P = 3.5

- **Symbol:**
  - Pocket Pen
  - Pocket Pen (L)

- **Stratum Description:**
  - Dark brown FAT CLAY with sand (CH), dry, hard, few sand, w/ occasional roots throughout.
  - - w/ few fine, angular gravel from 2 to 4 feet.
  - Tan and light gray FAT CLAY with sand (CH), dry, hard, few fine, rounded gravel, few fine sand, blocky, w/ ferrous nodules.
  - - w/ calcareous nodules at 8 feet.
  - Tan and light gray FAT CLAY with sand (CH), dry, stiff to very stiff, few fine sand, blocky, w/ occasional ferrous deposits and gypsum seams throughout.

- **Layer Elev. / Depth:**
  - 579.0 / 6.0
  - 575.0 / 10.0
  - 560.0 / 25.0

- **Notes:**
  - 1) Drilling Rig Model: Truck-Mounted CME 55
    Driller: Jose Vargas
    Logger: Alfred Covarrubias
  - 2) Borings was dry augered to termination at 25-ft depth.
  - 3) Groundwater was not encountered during time of drilling.
  - 4) Approximate GPS Coordinates:
    29.47033°N, 98.26701°W
  - 5) Ground surface elevation was estimated from Google Earth Professional and should be considered approximate.

---

**Completion Depth:** 25.0

**Date Drilled:** 8-19-19 to 8-19-19

**Water Level / Seepage:** See Notes

**Upon Completion:** See Notes

---

**Key:**

- N = Standard Penetration Test, bpf
- P = Pocket Penetrometer, tsf
- U = Unconfined
- Q = Unconsolidated Undrained Triaxial
**LOG OF BORING NO. B-07**

**Martinez IV CIP**

**Project 4 Wastewater**

**San Antonio, Texas**

**PROJECT NO. 04.30191021**

---

**STRATUM DESCRIPTION**

<table>
<thead>
<tr>
<th>DEPTH, FT</th>
<th>SYMBOL</th>
<th>LAYER ELEV./DEPTH</th>
<th>WATER CONTENT, %</th>
<th>LIQUID LIMIT, %</th>
<th>PLASTICITY INDEX (PI), %</th>
<th>PASSING NO. 4 SIEVE, %</th>
<th>PASSING NO. 200 SIEVE, %</th>
<th>UNIT DRY WEIGHT, PCF</th>
<th>COMPRRESSIVE STRENGTH</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>P = 4.5+</td>
<td>580.0</td>
<td>16</td>
<td>64</td>
<td>40</td>
<td>99</td>
<td>83</td>
<td>4.5+</td>
<td>4.5+</td>
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<tr>
<td>10</td>
<td>P = 4.5+</td>
<td>576.0</td>
<td>5</td>
<td>6.0</td>
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</table>

**NOTES:**

1) Drilling Rig Model: Truck-Mounted CME 55
   Driller: Jose Vargas
   Logger: Alfred Covarrubias
2) Borings was dry augered to termination at 25-ft depth.
3) Groundwater was not encountered during time of drilling.
4) Approximate GPS Coordinates:
   29.46910°N, 98.26780°W
5) Ground surface elevation was estimated from Google Earth Professional and should be considered approximate.

---

**COMPLETION DEPTH:** 25.0

**DATE DRILLED:** 8-19-19 to 8-19-19

**WATER LEVEL / SEEPAGE:** See Notes

**UPON COMPLETION:** See Notes

**KEY:**

- N = Standard Penetration Test, bpf
- P = Pocket Penetrometer, tsf
- U = Unconfined
- Q = Unconsolidated Undrained Triaxial
**TERMS & SYMBOLS USED ON BORING LOGS FOR SOIL**

### SOIL TYPES

| CH, Fat Clay | SP, Poorly-Graded Sand | GP, Poorly-Graded Gravel |
| CL, Lean Clay | SC, Clayey Sand | GC, Clayey Gravel |
| ML, Silt | SM, Silty Sand | GM, Silty Gravel |
| Fill, Unclassified | SW, Well-Graded Sand | GW, Well-Graded Gravel |

### SAMPLER TYPES

- Seamless Push Tube
- Core
- Standard Penetration Test
- Auger
- THD Cone Penetrometer Test
- Auger Sample

### SOIL GRAIN SIZE

<table>
<thead>
<tr>
<th>BOULDERS</th>
<th>COBBLES</th>
<th>GRAVEL</th>
<th>SAND</th>
<th>SILT</th>
<th>CLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>3&quot;</td>
<td>3/4&quot;</td>
<td>4</td>
<td>10</td>
<td>40</td>
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</tbody>
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### STRENGTH OF COHESIVE SOILS

<table>
<thead>
<tr>
<th>CONSISTENCY</th>
<th>COMPRESSION STRENGTH Tons Per Sq. Ft.</th>
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<tbody>
<tr>
<td>Very Soft</td>
<td>Less Than 0.25</td>
</tr>
<tr>
<td>Soft</td>
<td>0.25 to 0.50</td>
</tr>
<tr>
<td>Firm</td>
<td>0.50 to 1.00</td>
</tr>
<tr>
<td>Stiff</td>
<td>1.00 to 2.00</td>
</tr>
<tr>
<td>Very Stiff</td>
<td>2.00 to 4.00</td>
</tr>
<tr>
<td>Hard</td>
<td>Greater Than 4.00</td>
</tr>
</tbody>
</table>

### DENSITY OF GRANULAR SOILS

<table>
<thead>
<tr>
<th>NUMBER OF BLOWS PER FT., N</th>
<th>RELATIVE DENSITY</th>
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<tr>
<td>0-4</td>
<td>Very Loose</td>
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<td>4-10</td>
<td>Loose</td>
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<tr>
<td>10-30</td>
<td>Medium</td>
</tr>
<tr>
<td>30-50</td>
<td>Dense</td>
</tr>
<tr>
<td>Over 50</td>
<td>Very Dense</td>
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### ASTM D 2488 TABLE 7: Criteria for Describing Structure

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

### ASTM D 2488 Note 15 Criteria for Describing Percentages of Gravel, Sand and Fines

<table>
<thead>
<tr>
<th>Description</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace</td>
<td>Particles are present but estimated to be less than 5 %</td>
</tr>
<tr>
<td>Few</td>
<td>5 to 10 %</td>
</tr>
<tr>
<td>Little</td>
<td>15 to 25 %</td>
</tr>
<tr>
<td>Some</td>
<td>30 to 45 %</td>
</tr>
<tr>
<td>Mostly</td>
<td>50 to 100 %</td>
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</table>

### Criteria for Describing Inclusions

<table>
<thead>
<tr>
<th>Description</th>
<th>Criteria</th>
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<tbody>
<tr>
<td>Parting</td>
<td>Inclusion &lt;1/8&quot; thick extending through sample</td>
</tr>
<tr>
<td>Seam</td>
<td>Inclusion 1/8&quot; to 3&quot; thick extending through sample</td>
</tr>
<tr>
<td>Layer</td>
<td>Inclusion &gt;3&quot; thick extending through sample</td>
</tr>
</tbody>
</table>

---

## TERMS & SYMBOLS USED ON BORING LOGS FOR ROCK

### ROCK TYPES

<table>
<thead>
<tr>
<th>LIMESTONE</th>
<th>DOLOMITE</th>
<th>SANDSTONE</th>
</tr>
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<tbody>
<tr>
<td>HIGHLY WEATHERED LIMESTONE</td>
<td>DOLOMITE</td>
<td>SHALE</td>
</tr>
<tr>
<td>DOLOMITIC LIMESTONE</td>
<td>GRANITE</td>
<td>CLAYSHALE</td>
</tr>
</tbody>
</table>

### HARDNESS

- **Friable**: Crumbles under hand pressure
- **Low Hardness**: Can be carved with a knife
- **Moderately Hard**: Can be scratched easily with a knife
- **Hard**: Can be scratched with a knife with difficulty

### SOLUTION & VOID CONDITIONS

- **Void**: Interstice; a general term for pore space or other opening in rock.
- **Cavities**: Small solutional concavities.
- **Vuggy**: Containing small cavities, usually lined with a mineral of different composition from that of the surrounding rock.
- **Vesicular**: Containing numerous small, unlined cavities, formed by expansion of gas bubbles or steam during solidification of the rock.
- **Porous**: Containing pore, interstices, or other openings which may or may not interconnect.
- **Cavernous**: Containing cavities or caverns, sometimes quite large. Most frequent in limestones and dolomites.

### WEATHERING GRADES OF ROCKMASS

<table>
<thead>
<tr>
<th>TERM</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Slightly</td>
<td>Discoloration indicates weathering of rock material and discontinuity surfaces.</td>
</tr>
<tr>
<td>Moderately</td>
<td>Less than half of the rock material is decomposed or disintegrated to a soil disintegrated to a soil.</td>
</tr>
<tr>
<td>Highly</td>
<td>More than half of the rock material is decomposed or disintegrated to a soil.</td>
</tr>
<tr>
<td>Completely</td>
<td>All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.</td>
</tr>
<tr>
<td>Residual Soil</td>
<td>All rock material is converted to soil. The mass structure and material fabric are destroyed.</td>
</tr>
</tbody>
</table>

### BEDDING THICKNESS

<table>
<thead>
<tr>
<th>SPACING</th>
<th>INCLINATION</th>
<th>SURFACES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Close &lt;2”</td>
<td>Horizontal 0 - 5</td>
<td>Slickensided - Polished, grooved</td>
</tr>
<tr>
<td>Close 2” - 12”</td>
<td>Shallow 5 - 35</td>
<td>Smooth - Planar</td>
</tr>
<tr>
<td>Medium Close 12” - 3’</td>
<td>Moderate 35 - 65</td>
<td>Irregular - Undulating or granular</td>
</tr>
<tr>
<td>Wide &gt;3’</td>
<td>Steepley 65 - 85</td>
<td>Rough - Jagged or pitted</td>
</tr>
<tr>
<td></td>
<td>Vertical 85 - 90</td>
<td></td>
</tr>
</tbody>
</table>

### REFERENCES:

# Pre-Solicitation Sign In Sheet
San Antonio River Authority
**#00165 Martinez 4, Project 4, 24" Sanitary Sewerline Construction**
October 24, 2019 at 9:00 AM CT

<table>
<thead>
<tr>
<th>#</th>
<th>Name</th>
<th>Organization</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Emily Hansen</td>
<td>SARA</td>
<td>312-340-605</td>
<td><a href="mailto:emhansen@scru-tx.org">emhansen@scru-tx.org</a></td>
</tr>
<tr>
<td>2</td>
<td>Sandy Yturri</td>
<td>SARA</td>
<td>302-364-8</td>
<td><a href="mailto:jmyturri@sara-tx.org">jmyturri@sara-tx.org</a></td>
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<td>3</td>
<td>John Spencer</td>
<td>SARA</td>
<td>302-723-7</td>
<td><a href="mailto:jsperen@sara-tx.org">jsperen@sara-tx.org</a></td>
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<td>4</td>
<td>Matt Callan</td>
<td>SS Louis</td>
<td>210-380-1927</td>
<td><a href="mailto:peterose@sslouis.com">peterose@sslouis.com</a></td>
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<td>5</td>
<td>Jared Jenkins</td>
<td>SS Louis</td>
<td>210-340-9998</td>
<td><a href="mailto:roser@sslouis.com">roser@sslouis.com</a></td>
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<td>6</td>
<td>TEO Zamora</td>
<td>D Guerka Construction</td>
<td>210-608-2532</td>
<td><a href="mailto:tzoamora@deguerkaconstruction.com">tzoamora@deguerkaconstruction.com</a></td>
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<td>Barry Smith</td>
<td>SPAWGlass</td>
<td>210-850-3020</td>
<td><a href="mailto:barry.smith@spawglass.com">barry.smith@spawglass.com</a></td>
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<td>8</td>
<td>Hector Ramirez</td>
<td>Watters Engineering</td>
<td>210-667-2300</td>
<td><a href="mailto:hector.ramirez@watters-eng.com">hector.ramirez@watters-eng.com</a></td>
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Please print legibly.
SAN ANTONIO RIVER AUTHORITY
100 E. GUENTHER STREET
SAN ANTONIO, TEXAS 78283-9980

Top Slab
Precast Bedded On 6" Crushed Stone
Precast Base W/Steel
Reinforcement Per Astm C 478
Recessed "O" Ring Astm C443
Steel Reinforcement Astm C 478
Precast Section With
Cast In Place Or
Placed On Top Of Manhole
Manhole Ring Encasement
For Shallow Manholes
Class "B" Concrete

Notes:
1. Fittings Shall Be Paid For by Separate Item
   Joint restrainers Shall be Approved as Specified
   in Standard Material Specification Item No. 880
2. Casing Insulators In Accordance To
   Standard Material Specification No. 800
3. Contractor Shall Determine Entry and Exit Pit
   Pit Locations Not shown.

Max Pipe Size Od
Manhole Dia
5" 6" 7" 8" 9" 10"
0'-6" 45'-6" 45'-6" 45'-6" 45'-6" 45'-6"

1" Runners As Required

SIZES 4' THRU 12'
SIZES 14' THRU 36'

Infi-Shield Uni-Band
6" Gator Wrap

PRECAST MANHOLE ON PRECAST BASE PLAN

Note: Pipe Trench And Bedding
Material Must Also Meet Any
Requirements Of Pipe Manufacturer
And Awwa C-301 Specs.

MANHOLE RING ENCASEMENT DETAIL

Infi-Shield Uni-Band Manhole
Sealing. Flintkote Or Equal
As Approved And As
Directed By The Engineer
(1/8" Thickness, Min.)