Colliers
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& Design

SEWER COLLECTION SYSTEM

TREVOR FIELDS TRACT, PHASE 1

LOCATION: 2,000 LF EAST OF THE INTERSECTION OF BABCOCK RD AND W HAUSMEN RD

PLAT NUMBER: 22-11800100

CED JOB NUMBER: 1065-13-03

DATE: APRIL 2024



PREPARED FOR:

BEAZER HOMES TEXAS, LP.
11467 HUEBNER ROAD, SUITE 225
SAN ANTONIO, TEXAS 78230

PREPARED BY:

CLAYTON LINNEY, P.E

COLLIERS ENGINEERING & DESIGN
3421 PAESANOS PKWY., STE. 200
SAN ANTONIO TEXAS 78231
MAIN: (210) 979-8444
COLLIERSENGINEERING.COM

KFW Engineers + Surveying is now Colliers Engineering & Design

3421 Paesanos Pkwy., Ste. 200 San Antonio Texas 78231
Main: (210) 979-8444

TBPLS Reg. 10194550 • TBPE Reg. F-14909 • TBPG 50617

Colliers
Engineering
& Design

April 9, 2024

TCEQ Region 13
14250 Judson Rd.
San Antonio, TX 78233-4480

Re: Trevor Fields Tract, Phase 1
Sewer Collection System

To Whom It May Concern,

Attached is one (1) digital copy of the Sewer Collection System for the above referenced project. This application has been prepared according to the guidelines set forth in 30 TAC Chapter 213, 30 TAC Chapter 17, and its current policies for development over the Edwards Aquifer Recharge Zone.

This Sewer Collection System application is for 5,649 linear feet of 8" SDR 26 sanitary sewer line. Please review the application for completeness and compliance with the applicable regulations for development over the Recharge Zone of the Edwards Aquifer. Upon acceptance, we request that written approval be provided to our office.

Thank you for your time and consideration in this matter. Should you have any questions or need further information please feel free to contact me.

Sincerely,
Colliers Engineering & Design,

Clayton Linney, P.E.
Department Manager

KFW Engineers + Surveying is now Colliers Engineering & Design

Accelerating success.

Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

The Edwards Aquifer Program staff conducts an administrative and technical review of all applications. The turnaround time for administrative review can be up to 30 days as outlined in 30 TAC 213.4(e). Generally administrative completeness is determined during the intake meeting or within a few days of receipt. The turnaround time for technical review of an administratively complete Edwards Aquifer application is 90 days as outlined in 30 TAC 213.4(e). Please know that the review and approval time is directly impacted by the quality and completeness of the initial application that is received. In order to conduct a timely review, it is imperative that the information provided in an Edwards Aquifer application include final plans, be accurate, complete, and in compliance with 30 TAC 213.

Administrative Review

1. Edwards Aquifer applications must be deemed administratively complete before a technical review can begin. To be considered administratively complete, the application must contain completed forms and attachments, provide the requested information, and meet all the site plan requirements. The submitted application and plan sheets should be final plans. Please submit one full-size set of plan sheets with the original application, and half-size sets with the additional copies.

   To ensure that all applicable documents are included in the application, the program has developed tools to guide you and web pages to provide all forms, checklists, and guidance. Please visit the below website for assistance: http://www.tceq.texas.gov/field/eapp.

2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.

3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.

4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.

   An appointment should be made to resubmit the application. The application is re-examined to ensure all deficiencies are resolved. The application will only be deemed administratively complete when all administrative deficiencies are addressed.

5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.

6. If the geologic assessment was completed before October 1, 2004 and the site contains "possibly sensitive" features, the assessment must be updated in accordance with the *Instructions to Geologists* (TCEQ-0585 Instructions).

Technical Review

1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.

2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be

clearly marked, features identified in the geologic assessment should be flagged, roadways marked and the alignment of the Sewage Collection System and manholes should be staked at the time the application is submitted. If the site is not marked the application may be returned.

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied **the application fee will be forfeited**.
4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

Mid-Review Modifications

It is important to have final site plans prior to beginning the permitting process with TCEQ to avoid delays.

Occasionally, circumstances arise where you may have significant design and/or site plan changes after your Edwards Aquifer application has been deemed administratively complete by TCEQ. This is considered a "Mid-Review Modification". Mid-Review Modifications may require redistribution of an application that includes the proposed modifications for public comment.

If you are proposing a Mid-Review Modification, two options are available:

- If the technical review has begun your application can be denied/withdrawn, your fees will be forfeited, and the plan will have to be resubmitted.
- TCEQ can continue the technical review of the application as it was submitted, and a modification application can be submitted at a later time.

If the application is denied/withdrawn, the resubmitted application will be subject to the administrative and technical review processes and will be treated as a new application. The application will be redistributed to the affected jurisdictions.

Please contact the regional office if you have questions. If your project is located in Williamson, Travis, or Hays County, contact TCEQ's Austin Regional Office at 512-339-2929. If your project is in Comal, Bexar, Medina, Uvalde, or Kinney County, contact TCEQ's San Antonio Regional Office at 210-490-3096

Please fill out all required fields below and submit with your application.

1. Regulated Entity Name: Trevor Fields Tract						**2. Regulated Entity No.:** N/A			
3. Customer Name: Beazer Homes Texas, LP.						**4. Customer No.:** 601723620			
5. Project Type: **(Please circle/check one)**	New ☑		Modification			Extension		Exception	
6. Plan Type: **(Please circle/check one)**	WPAP	CZP	SCS ☑	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: **(Please circle/check one)**	Residential		Non-residential ☑			**8. Site (acres):**			38.29
9. Application Fee:	$2,824.50		**10. Permanent BMP(s):**			N/A			
11. SCS (Linear Ft.):	5,649		**12. AST/UST (No. Tanks):**			N/A			
13. County:	Bexar		**14. Watershed:**			Leon Creek			

Application Distribution

Instructions: Use the table below to determine the number of applications required. One original and one copy of the application, plus additional copies (as needed) for each affected incorporated city, county, and groundwater conservation district are required. Linear projects or large projects, which cross into multiple jurisdictions, can require additional copies. Refer to the "Texas Groundwater Conservation Districts within the EAPP Boundaries" map found at:

http://www.tceq.texas.gov/assets/public/compliance/field_ops/eapp/EAPP%20GWCD%20map.pdf

For more detailed boundaries, please contact the conservation district directly.

Austin Region			
County:	**Hays**	**Travis**	**Williamson**
Original (1 req.)	___	___	___
Region (1 req.)	___	___	___
County(ies)	___	___	___
Groundwater Conservation District(s)	___Edwards Aquifer Authority ___Barton Springs/ Edwards Aquifer ___Hays Trinity ___Plum Creek	___Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	___Austin ___Buda ___Dripping Springs ___Kyle ___Mountain City ___San Marcos ___Wimberley ___Woodcreek	___Austin ___Bee Cave ___Pflugerville ___Rollingwood ___Round Rock ___Sunset Valley ___West Lake Hills	___Austin ___Cedar Park ___Florence ___Georgetown ___Jerrell ___Leander ___Liberty Hill ___Pflugerville ___Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	_X_	___	___	___	___
Region (1 req.)	_X_	___	___	___	___
County(ies)	_X_	___	___	___	___
Groundwater Conservation District(s)	_X_ Edwards Aquifer Authority ___Trinity-Glen Rose	___Edwards Aquifer Authority	___Kinney	___EAA ___Medina	___EAA ___Uvalde
City(ies) Jurisdiction	___Castle Hills ___Fair Oaks Ranch ___Helotes ___Hill Country Village ___Hollywood Park _X_San Antonio (SAWS) ___Shavano Park	___Bulverde ___Fair Oaks Ranch ___Garden Ridge ___New Braunfels ___Schertz	NA	___San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review.
CLAYTON LINNEY Print Name of Customer/Authorized Agent
Clayton Linney 4/10/2024 Signature of Customer/Authorized Agent Date

FOR TCEQ INTERNAL USE ONLY				
Date(s)Reviewed:		Date Administratively Complete:		
Received From:		Correct Number of Copies:		
Received By:		Distribution Date:		
EAPP File Number:		Complex:		
Admin. Review(s) (No.):		No. AR Rounds:		
Delinquent Fees (Y/N):		Review Time Spent:		
Lat./Long. Verified:		SOS Customer Verification:		
Agent Authorization Complete/Notarized (Y/N):		Fee Check:	Payable to TCEQ (Y/N):	
Core Data Form Complete (Y/N):			Signed (Y/N):	
Core Data Form Incomplete Nos.:			Less than 90 days old (Y/N):	

General Information Form

Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge and Transition Zones and Relating to 30 TAC §213.4(b) & §213.5(b)(2)(A), (B) Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **General Information Form** is hereby submitted for TCEQ review. The application was prepared by:

Print Name of Customer/Agent: Clayton Linney, P.E.

Date: 4/10/2024

Signature of Customer/Agent:



Project Information

1. Regulated Entity Name: Trevor Fields Tract
2. County: Bexar County
3. Stream Basin: Maverick Creek & Leon Creek
4. Groundwater Conservation District (If applicable): Edward Aquifer Authority
5. Edwards Aquifer Zone:

   ☒ Recharge Zone
   ☐ Transition Zone

6. Plan Type:

   ☐ WPAP
   ☒ SCS
   ☐ Modification
   ☐ AST
   ☐ UST
   ☐ Exception Request

7. Customer (Applicant):

   Contact Person: Calvin New
   Entity: Beazer Homes Texas, LP.
   Mailing Address: 11467 Huebner Road, Suite 225
   City, State: San Antonio, Texas Zip: 78230
   Telephone: (214) 769-0966 FAX: _____
   Email Address: william.new@beazer.com

8. Agent/Representative (If any):

   Contact Person: Clayton Linney, P.E.
   Entity: Colliers Engineering & Design
   Mailing Address: 3421 Paesanos Pkwy
   City, State: San Antonio, Texas Zip: 78231
   Telephone: (877) 627-3772 FAX: _____
   Email Address: Clayton.linney@collierseng.com

9. Project Location:

   ☒ The project site is located inside the city limits of San Antonio, Texas.
   ☐ The project site is located outside the city limits but inside the ETJ (extra-territorial jurisdiction) of _____.
   ☐ The project site is not located within any city's limits or ETJ.

10. ☒ The location of the project site is described below. The description provides sufficient detail and clarity so that the TCEQ's Regional staff can easily locate the project and site boundaries for a field investigation.

    Approximately 2,000 L.F. East of the intersection of Babcock Rd and W Hausman Rd.

11. ☒ **Attachment A – Road Map**. A road map showing directions to and the location of the project site is attached. The project location and site boundaries are clearly shown on the map.

12. ☒ **Attachment B - USGS / Edwards Recharge Zone Map**. A copy of the official 7 ½ minute USGS Quadrangle Map (Scale: 1" = 2000') of the Edwards Recharge Zone is attached. The map(s) clearly show:

    ☒ Project site boundaries.
    ☒ USGS Quadrangle Name(s).
    ☒ Boundaries of the Recharge Zone (and Transition Zone, if applicable).
    ☒ Drainage path from the project site to the boundary of the Recharge Zone.

13. ☒ **The TCEQ must be able to inspect the project site or the application will be returned**. Sufficient survey staking is provided on the project to allow TCEQ regional staff to locate the boundaries and alignment of the regulated activities and the geologic or manmade features noted in the Geologic Assessment.

    ☐ Survey staking will be completed by this date: _____

14. ☒ **Attachment C – Project Description**. Attached at the end of this form is a detailed narrative description of the proposed project. The project description is consistent throughout the application and contains, at a minimum, the following details:

- ☒ Area of the site
- ☒ Offsite areas
- ☒ Impervious cover
- ☒ Permanent BMP(s)
- ☒ Proposed site use
- ☒ Site history
- ☒ Previous development
- ☒ Area(s) to be demolished

15. Existing project site conditions are noted below:

- ☐ Existing commercial site
- ☐ Existing industrial site
- ☐ Existing residential site
- ☐ Existing paved and/or unpaved roads
- ☐ Undeveloped (Cleared)
- ☒ Undeveloped (Undisturbed/Uncleared)
- ☐ Other: _____

Prohibited Activities

16. ☒ I am aware that the following activities are prohibited on the Recharge Zone and are not proposed for this project:

(1) Waste disposal wells regulated under 30 TAC Chapter 331 of this title (relating to Underground Injection Control);

(2) New feedlot/concentrated animal feeding operations, as defined in 30 TAC §213.3;

(3) Land disposal of Class I wastes, as defined in 30 TAC §335.1;

(4) The use of sewage holding tanks as parts of organized collection systems; and

(5) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41(b), (c), and (d) of this title (relating to Types of Municipal Solid Waste Facilities).

(6) New municipal and industrial wastewater discharges into or adjacent to water in the state that would create additional pollutant loading.

17. ☒ I am aware that the following activities are prohibited on the Transition Zone and are not proposed for this project:

(1) Waste disposal wells regulated under 30 TAC Chapter 331 (relating to Underground Injection Control);

(2) Land disposal of Class I wastes, as defined in 30 TAC §335.1; and

(3) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41 (b), (c), and (d) of this title.

Administrative Information

18. The fee for the plan(s) is based on:

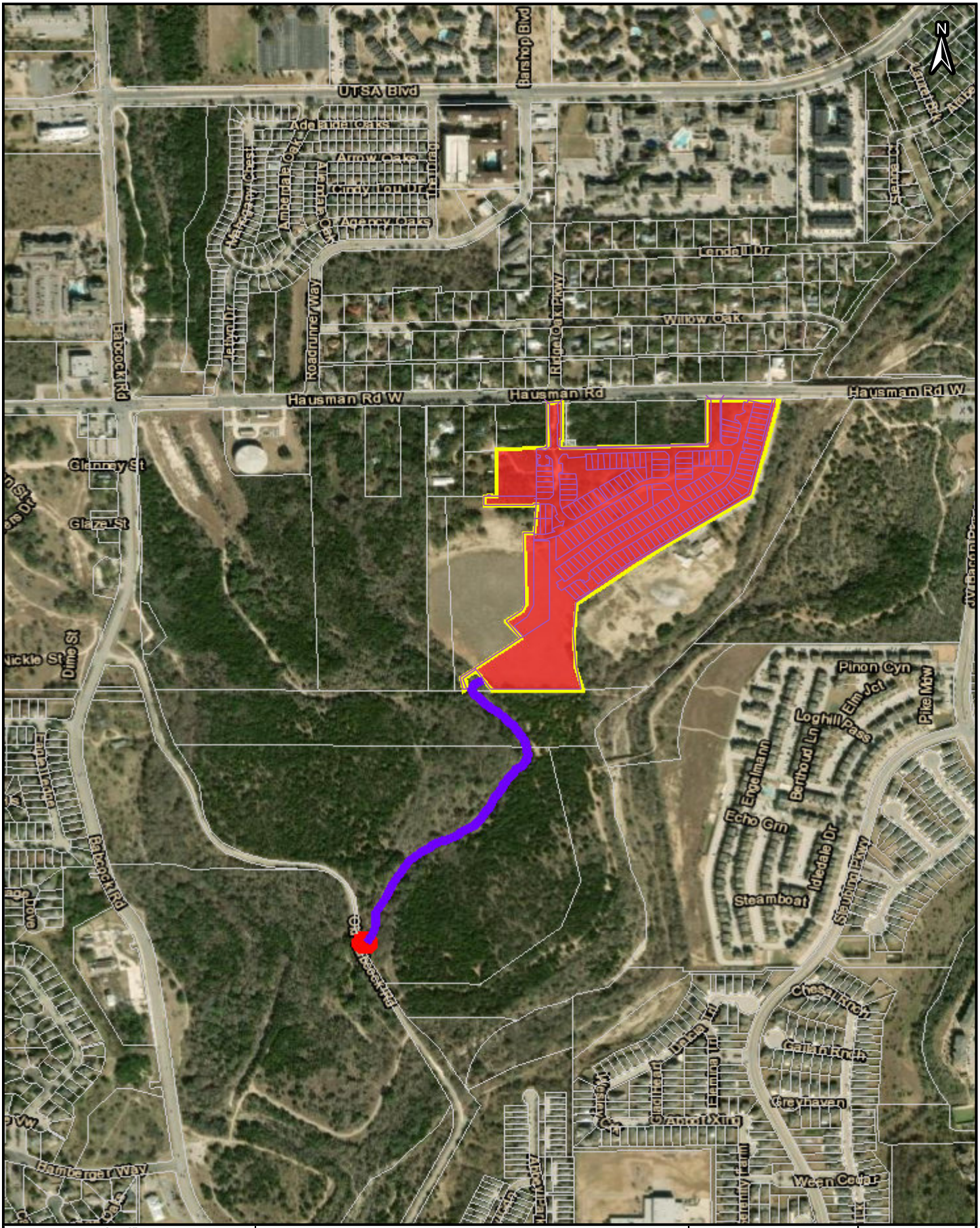
- ☐ For a Water Pollution Abatement Plan or Modification, the total acreage of the site where regulated activities will occur.
- ☒ For an Organized Sewage Collection System Plan or Modification, the total linear footage of all collection system lines.
- ☐ For a UST Facility Plan or Modification or an AST Facility Plan or Modification, the total number of tanks or piping systems.
- ☐ A request for an exception to any substantive portion of the regulations related to the protection of water quality.
- ☐ A request for an extension to a previously approved plan.

19. ☒ Application fees are due and payable at the time the application is filed. If the correct fee is not submitted, the TCEQ is not required to consider the application until the correct fee is submitted. Both the fee and the Edwards Aquifer Fee Form have been sent to the Commission's:

- ☐ TCEQ cashier
- ☐ Austin Regional Office (for projects in Hays, Travis, and Williamson Counties)
- ☒ San Antonio Regional Office (for projects in Bexar, Comal, Kinney, Medina, and Uvalde Counties)

20. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.

21. ☒ No person shall commence any regulated activity until the Edwards Aquifer Protection Plan(s) for the activity has been filed with and approved by the Executive Director.



San Antonio Office
3421 Paesanos Pkwy
San Antonio, TX
T: 877.627.3772
www.colliersengineering.com
TBPE Firm# F-14909
TBPLS Firm# 10194550

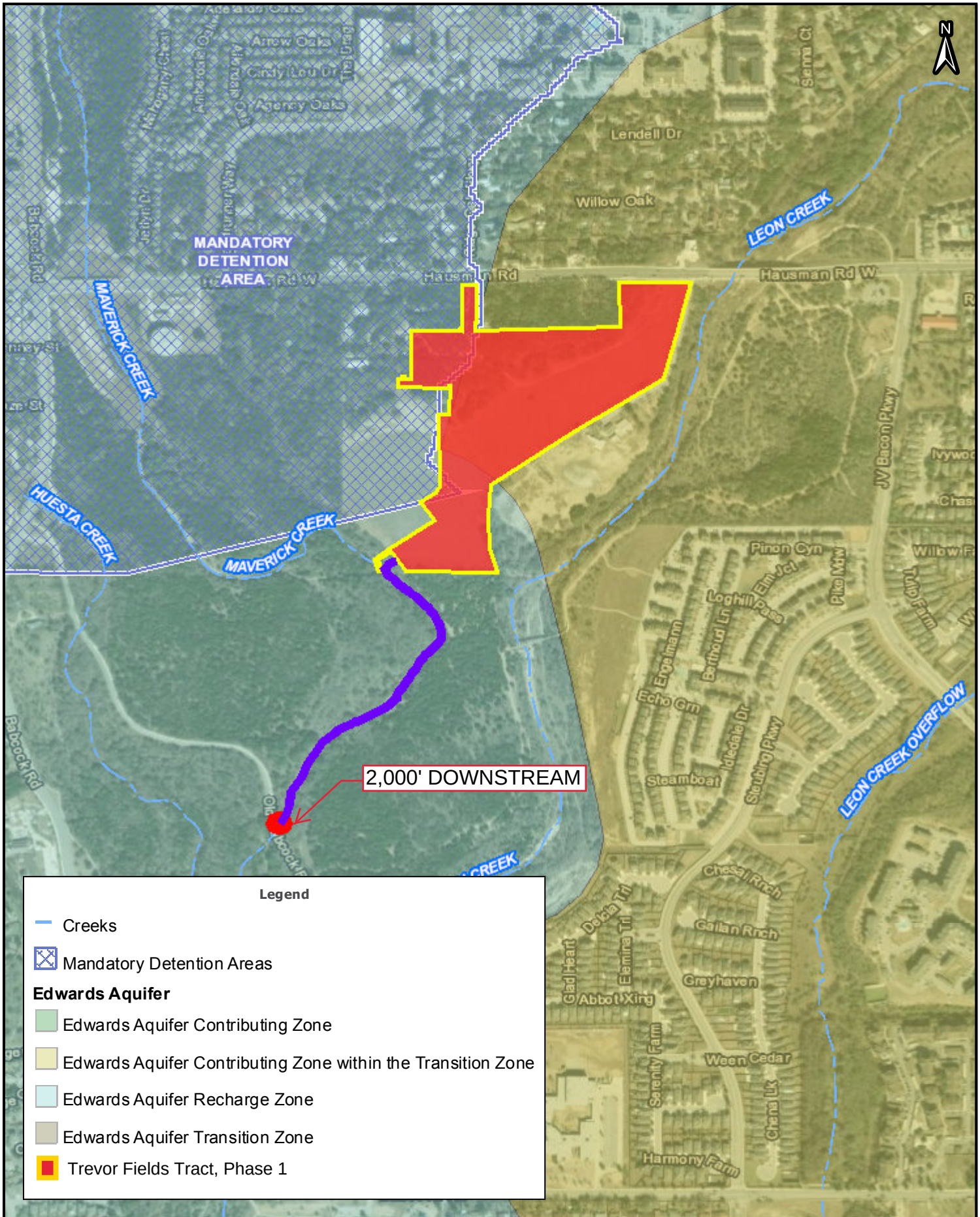
Colliers Engineering & Design

TREVOR FIELDS TRACT
SEWER COLLECTION SYSTEM
AERIAL & LOCATION MAP

Prj No.		1 " = 750 '
Designer: Initials		
March 2024	EX	

Date: Mar 07, 2024, 10:44:43 AM

THIS WAS PRODUCED FROM MATERIAL THAT WAS STORED &/OR TRANSMITTED ELECTRONICALLY & MAY HAVE BEEN INADVERTENTLY ALTERED. RELY ONLY ON FINAL HARDCOPY MATERIALS BEARING CONSULTANT'S ORIGINAL SIGNATURE & SEAL.



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San Antonio, TX
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www.colliersengineering.com
TBPE Firm# F-14909
TBPLS Firm# 10194550

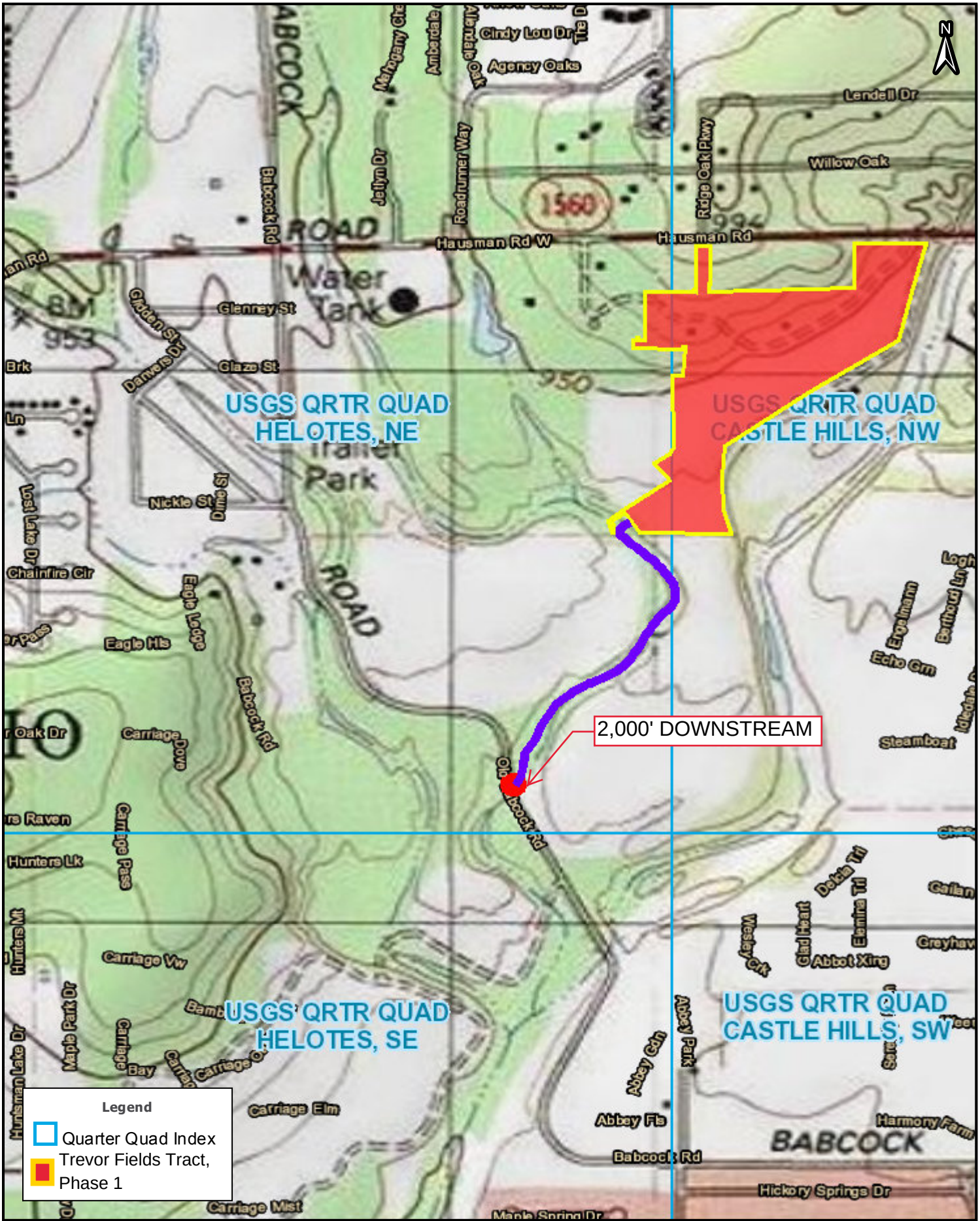
Colliers Engineering & Design

TREVOR FIELDS TRACT
SEWER COLLECTION SYSTEM
EDWARDS AQUIFER RECHARGE ZONE

Prj No.		1 " = 750 '
Designer: Initials		
March 2024	EX	

Date: Mar 07, 2024, 11:02:40 AM

THIS WAS PRODUCED FROM MATERIAL THAT WAS STORED &/OR TRANSMITTED ELECTRONICALLY & MAY HAVE BEEN INADVERTENTLY ALTERED. RELY ONLY ON FINAL HARDCOPY MATERIALS BEARING CONSULTANT'S ORIGINAL SIGNATURE & SEAL.



Date: Mar 07, 2024, 10:51:27 AM

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San Antonio, TX
T: 877.627.3772
www.colliersengineering.com
TBPE Firm# F-14909
TBPLS Firm# 10194550

Colliers Engineering & Design

TREVOR FIELDS TRACT USGS

Prj No.		1 " = 750 '
Designer: Initials		
March 2024	EX	

THIS WAS PRODUCED FROM MATERIAL THAT WAS STORED &/OR TRANSMITTED ELECTRONICALLY & MAY HAVE BEEN INADVERTENTLY ALTERED. RELY ONLY ON FINAL HARDCOPY MATERIALS BEARING CONSULTANT'S ORIGINAL SIGNATURE & SEAL.

PROJECT DESCRIPTION

Trevor Fields Tract, Phase 1 is located approximately 2,000 LF East of the intersection of Babcock Rd and W Hausman Rd. The portion of Trevor Fields Tract, Phase 1 situated within the Edwards Aquifer Recharge Zone is 5.48 acres, and the remainder of phase 1 is 17.50 acres within the Contributing Zone within the Transition zone. The overall Trevor Fields development consists of 20.38 acres within the Edwards Aquifer Recharge Zone and 17.91 acres within the Contributing Zone within the Transition Zone. The overall development results in 38.29 acres to be considered within the Recharge Zone. Trevor Fields Tract proposes single family residential dwellings. The project site is located within the Leon watershed, and within both the Helotes and Castle Hills USGS quadrangle. The property lies within the City of San Antonio city limits. Trevor Fields Tract, Phase 1 is located partially within the Edwards Aquifer Recharge Zone and partially within the Transition Zone. A portion of the site contains the 100-YR floodplain per FEMA firm Panel# 48029C0210G & 48029C0230G.

The permit for this regulated activity includes the installation of a sewer main extension to provide sanitary sewer service for 158 single family units, and 2 unknown commercial properties (total of 102 EDUs) within the Edwards Aquifer recharge zone. The volume of wastewater to be produced by this development within the recharge zone at peak wet weather is approximately 62,237 GPD. The sewer main will consist of the entire sewer design proposed with Trevor Fields Tract, Phase 1. The wastewater will be treated by the Leon Creek Wastewater Treatment Plant.

The project site (50 ft. envelope around sewer line) is a total of 12.95 acres. The 8 inch sewer main will be SDR 26, and approximately 5,649 linear feet. Approximately 2.07 acres will be disturbed as a result of installing the sewer main. Silt fencing will be utilized as a temporary best management practice. The silt fence will not be removed until vegetation is established.

There will not be any storage regulated quantities of hazardous materials. San Antonio Water System (SAWS) is the water and sewer service provider for the tract.

Colliers Engineering & Design

Geologic Assessment

Pursuant to The Texas Commission on Environmental Quality Standard Practice

For "Geologic Assessments" (Title 30 Texas Administrative Code (TAC), Part 1, Chapter 213; Texas Water Code, §26.401; and Texas Occupations Code, Chapter 1002)

February 29, 2024

Trevor Fields Tract

Located at the intersection of Ridge Oak Parkway and West Hauman Road, San Antonio, Bexar County, Texas 78249

Colliers Engineering & Design Project Number: 23008042A

Prepared for:

Beazer Homes
11467 Huebner Road, Suite 225
San Antonio, TX 78230

Prepared by:

Roman C. Pineda
State of Texas, Professional Geoscientist
License No. 10083

Ezra C. Urigwe
State of Texas, Associate Geoscientist

Colliers Engineering & Design
3421 Paesanos Pkwy, Ste. 200
San Antonio, Texas 78231
Main: 210 979 8444
Colliersengineering.com

Project No. 23008042A

Colliers Engineering & Design

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References | **Attachment F**.....**11**

Geologic Assessment

Texas Commission on Environmental Quality

For Regulated Activities on The Edwards Aquifer Recharge/transition Zones and Relating to 30 TAC §213.5(b)(3), Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Print Name of Geologist: Roman C. Pineda, P.G.

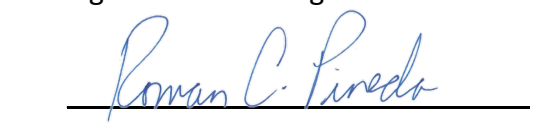
Telephone: (210) 979-8444

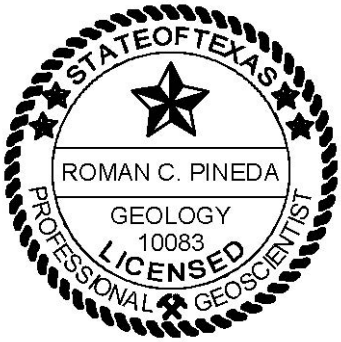
Fax: (210) 979-8441

Date: 2/29/2024

Representing: Colliers Engineering & Design, TBPE Firm #9513 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:





Regulated Entity Name: Trevor Fields Tract

Project Information

1. Date(s) Geologic Assessment was performed: January 18th, 2024
2. Type of Project:
   - ☐ WPAP
   - ☒ SCS
   - ☐ AST
   - ☐ UST
3. Location of Project:
   - ☒ Recharge Zone
   - ☐ Transition Zone
   - ☒ Contributing Zone within the Transition Zone

4. ☒ **Attachment A - Geologic Assessment Table**. Completed Geologic Assessment Table (Form TCEQ-0585-Table) is attached.

5. ☒ Soil cover on the project site is summarized in the table below and uses the SCS Hydrologic Soil Groups* (Urban Hydrology for Small Watersheds, Technical Release No. 55, Appendix A, Soil Conservation Service, 1986). If there is more than one soil type on the project site, show each soil type on the site Geologic Map or a separate soils map.

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness(feet)
Tinn and Frio Soils, 0 to 1 percent slopes (Tf)	D	2-5
Lewisville silty clay, 1 to 3 percent slopes (LvB)	B	0-4
Patrick Soils, 1 to 3 percent slopes (PaB)	B	0-3
Eckrant cobbly clay, 1 to 8 percent slopes (TaB)	D	0-3

** Soil Group Definitions (Abbreviated)*

A. Soils having a high infiltration rate when thoroughly wetted.

B. Soils having a moderate infiltration rate when thoroughly wetted.

C. Soils having a slow infiltration rate when thoroughly wetted.

D. Soils having a very slow infiltration rate when thoroughly wetted.

6. ☒ **Attachment B – Stratigraphic Column**. A stratigraphic column showing formations, members, and thicknesses is attached. The outcropping unit, if present, should be at the top of the stratigraphic column. Otherwise, the uppermost unit should be at the top of the stratigraphic column.

7. ☒ **Attachment C – Site Geology**. A narrative description of the site specific geology including any features identified in the Geologic Assessment Table, a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure(s), and karst characteristics is attached.

8. ☒ **Attachment D – Site Geologic Map(s)**. The Site Geologic Map must be the same scale as the applicant's Site Plan. The minimum scale is 1”: 400'

   Applicant's Site Plan Scale: 1" = 100'
   Site Geologic Map Scale: 1" = 100'
   Site Soils Map Scale (if more than 1 soil type): 1" = 500'

9. Method of collecting positional data:

   ☒ Global Positioning System (GPS) technology.
   ☐ Other method(s). Please describe method of data collection: _____

10. ☒ The project site and boundaries are clearly shown and labeled on the Site Geologic Map.

11. ☒ Surface geologic units are shown and labeled on the Site Geologic Map.

12. ☒ Geologic or manmade features were discovered on the project site during the field investigation. They are shown and labeled on the Site Geologic Map and are described in the attached Geologic Assessment Table.

    ☐ Geologic or manmade features were not discovered on the project site during the field investigation.

13. ☒ The Recharge Zone boundary is shown and labeled, if appropriate.

14. All known wells (test holes, water, oil, unplugged, capped and/or abandoned, etc.): If applicable, the information must agree with Item No. 20 of the WPAP Application Section.

    ☐ There are _____ (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.)
    ☐ The wells are not in use and have been properly abandoned.
    ☐ The wells are not in use and will be properly abandoned.
    ☐ The wells are in use and comply with 16 TAC Chapter 76.
    ☒ There are no wells or test holes of any kind known to exist on the project site.

Administrative Information

15. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: Trevor Fields Tract

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	**29.570764°**	**-98.624698°**	MB	30	Kbu	~4	~4	~5	-	0			N,X,F	5	35	35		X		Hillside
S-2	**29.567374°**	**-98.625988°**	MB	30	Kdr/Qt	100			-	0			C,O,F	15	45		45		X	Floodplain

* DATUM: NAD 83

2A TYPE	TYPE	2B POINTS
C	Cave	30
SC	Solution cavity	20
SF	Solution-enlarged fracture(s)	20
F	Fault	20
O	Other natural bedrock features	5
MB	Manmade feature in bedrock	30
SW	Swallow hole	30
SH	Sinkhole	20
CD	Non-karst closed depression	5
Z	Zone, clustered or aligned features	30

8A INFILLING	
N	None, exposed bedrock
C	Coarse - cobbles, breakdown, sand, gravel
O	Loose or soft mud or soil, organics, leaves, sticks, dark colors
F	Fines, compacted clay-rich sediment, soil profile, gray or red colors
V	Vegetation. Give details in narrative description
FS	Flowstone, cements, cave deposits
X	Other materials

12 TOPOGRAPHY
Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed

I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The information presented here complies with that document and is a true representation of the conditions observed in the field.
My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

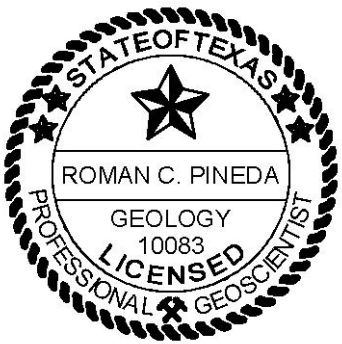
Roman C. Pineda

Date 2/29/2024

Sheet __1__ of __1__

Attachment A

TCEQ-0585-Table (Rev. 10-01-04)



Trevor Fields Tract

Stratigraphic Column

[Hydrogeologic subdivisions modified from Maclay and Small (1976); groups, formations and members modified from Rose (1972); lithology modified from Dunham (1962); and porosity type modified from
Choquette and Pray (1970); CU, confining unit; AQ, aquifer]

Hydrogeologic subdivision			Group, formation, or member			Hydrologic function	Thickness (feet)	Lithology	Field Identification	Cavern development	Porosity/permeability type
Quaternary	Pleistocene		Fluviatile terrace deposits			N/A	5 - 70	Sand, silt, clay, rounded to angular limestone in various proportions; siliceous, coarse; chert and dolomite	Alluvium; lithic sand and silt to sandy gravel	None	Generally porous, moderate to high permeability
Upper Cretaceous	Upper Confining Units		Eagle Ford Group			CU	30-50	Brown, flaggy shale and argillaceous limestone	Thin flagstones; petroliferous	None	Primary porosity lost/low permeability
			Buda Limestone			CU	40-50	Buff, light gray, dense mudstone	Limestone with calcite-filled veins	Minor surface karst	Low porosity/low permeability
			Del Rio Clay			CU	40-50	Blue-green to yellow-brown clay	Fossiliferous; Ilymatogyra arietina	None	None/primary upper confining unit
Lower Cretaceous	I	*Edwards Aquifer*	Georgetown Formation (Kgt)			Karst AQ; non-karst CU	2-20	Reddish-brown, gray to light tan marly limestone	Marker fossil; *Waconella wacoensis*	None	Low porosity/low permeability
	II		*Edwards Group*	*Person Formation (Kep)*	Cyclic and marine members, undivided	AQ	80-90	Mudstone to packstone; *miliolid* grainstone; chert	Thin graded cycles; massive beds to relatively thin beds; crossbeds	Many subsurface; might be associated with earlier karst development	Laterally extensive; both fabric and not fabric/water-yielding
	III				Leached and collapsed members, undivided	AQ	70-90	Crystalline limestone; mudstone to grainstone; chert; collapsed breccia	Bioturbated iron-stained beds separated by massive limestone beds; stromatolitic limestone	Extensive lateral development; large rooms	Majority not fabric/one of the most permeable
	IV				Regional dense member	cu	20-24	Dense, argillaceous mudstone	Wispy iron-oxide stains	Very few; only vertical fracture enlargement	Not fabric/low permeability; vertical barrier
	V			*Kainer Formation (Kek)*	Grainstone member	AQ	50-60	*Miliolid* grainstone; mudstone to wackestone; chert	White crossbedded grainstone	Few	Not fabric/recrystallization reduces permeability
	VI				Kirschberg evaporite member	AQ	50-60	Highly altered crystalline limestone; chalky mudstone; chert	Boxwork voids, with neospar and travertine frame	Probably extensive cave development	Majority fabric selective/one of the most permeable
	VII				Dolomite member	AQ	110-130	Mudstone to grainstone; crystalline limestone; chert	Massively bedded light gray, *Toucasia* abundant	Caves related to structure or bedding planes	Mostly not fabric; some bedding plane fabric/water-yielding
	VIII				Basal nodular member	Karst AQ; not karst CU	50-60	Shaly, nodular limestone mudstone and miliolid grainstone	Massive, nodular and mottled, *Exogyra texana*	Large lateral caves at surface; a few caves near Cibolo Creek	Fabric; stratigraphically controlled/large conduit now at surface; no permeability in subsurface

(Modified from Small and Hanson, 1994)

ATTACHMENT B

Geologic Assessment

Narrative Description of Site Geology

The overall potential for fluid migration to the Edwards Aquifer on the site does not exist. The site lies within the Buda Formation (Kbu), Del Rio clay formation (Kdr) and overlying Quaternary aged Fluviatile Terrace Deposits (Qt). The dominant trend for the site is N35°E, based on the average of the trends of faults within the surrounding area and from published maps (Stein & Ozuna, 1995). Stratigraphically, the Kbu, Kdr and Qt lie above the Georgetown Formation and Edwards Group with the Kbu and Kdr characterized as confining units.

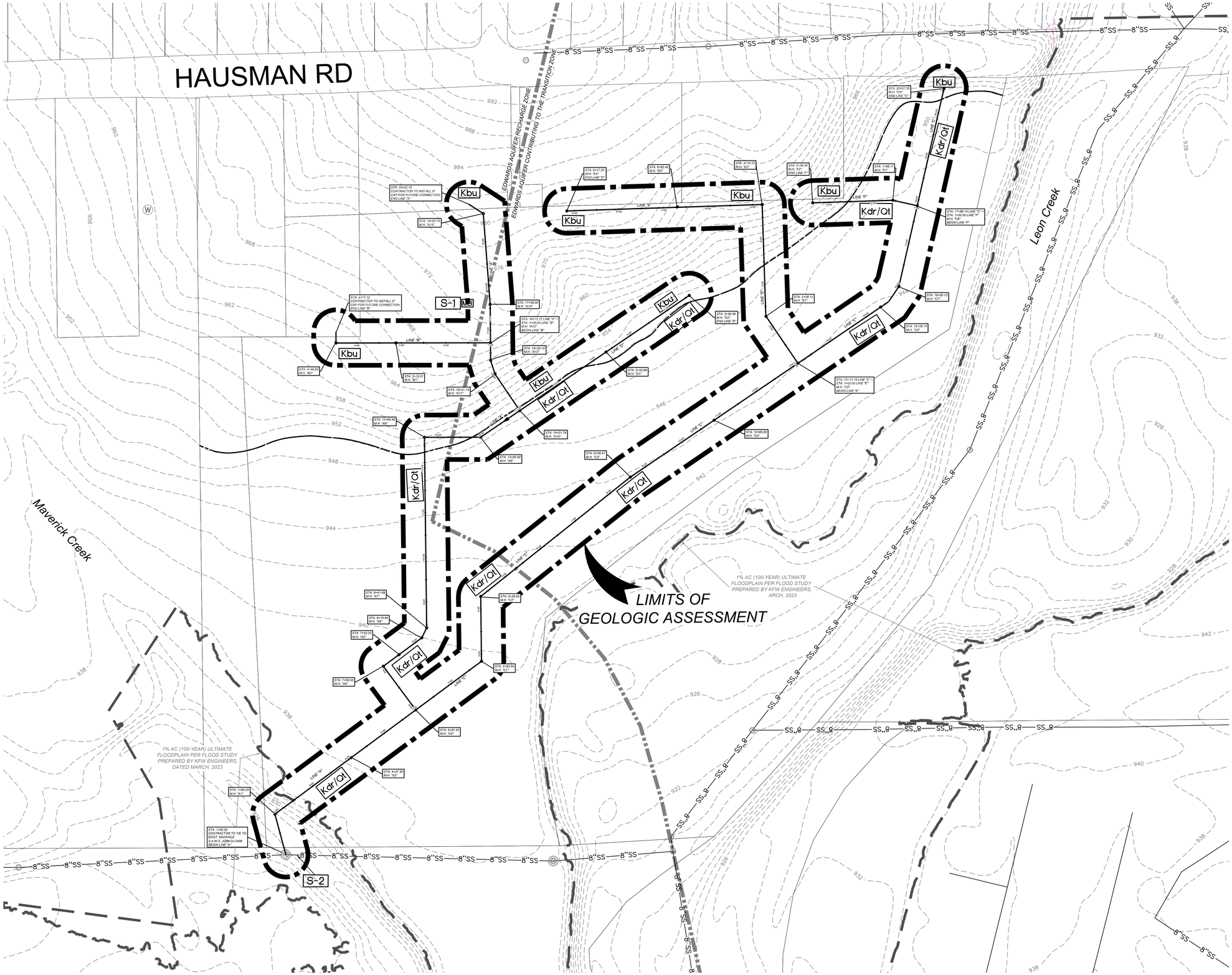
The Kbu is characterized by buff, light gray, dense mudstone. Karst development is restricted to minor surface karst in the Kbu. The Kdr is characterized blue green to yellow-brown waxy clay. No karst development occurs within the Del Rio Clay. The Qt is characterized as a mixture of light brown, reddish brown, gray or yellowish-brown sand, silt, clay, and gravels of various proportions. Karst development does not occur within the Qt. No caves or sinkholes were identified onsite.

Feature S-1

Feature is identified as a concrete septic system currently in-use. The concrete top of the septic system was exposed and measured approximately 4-ft in diameter. The depth of the septic system is estimated to be 4 to 5-ft below ground surface. Ponded liquid observed within the septic tank at the time of the site visit suggests evidence of fine infilling. Therefore, the probability for rapid infiltration is low.

Feature S-2

Feature is an existing 27” sanitary sewer line that is not located beneath pavement. The line has been trenched through bedrock and backfilled with a mix of fine and coarse material that may be more permeable than surrounding undisturbed areas. Therefore, the probability for rapid infiltration is intermediate.





LOCATION MAP

N.T.S.

SCALE : 1"=100'

0' 100' 200' 300'

LEGEND

Qt	FLUVIATILE TERRACE DEPOSITS
Kef	EAGLE FORD GROUP
Kbu	BUDA LIMESTONE
Kdr	DEL RIO CLAY
Kgt	GEORGETOWN LIMESTONE
Kek	KAINER FORMATION
Kep	PERSON FORMATION
Kgru	GLEN ROSE FORMATION
S-1	POTENTIAL RECHARGE FEATURE

DRAINAGE PATHWAY
CONTACT, LOCATED APPROXIMATELY
FAULT, LOCATED APPROXIMATELY (D,DOWNTHROWN SIDE;U,UPTHROWN SIDE)
FAULT EXISTANCEUNCERTAIN
POSSIBLE FAULT (AS LOCATED BY AERIAL PHOTOGRAPHS)
STRIKE AND DIP OF BEDDING
STRIKE AND DIP OF JOINTS
STRIKE OF VERTICAL JOINTS
CAVE
NON-KARST CLOSED DEPRESSION
SWALLOW HOLE /SINKHOLE
SOLUTION CAVITY
OTHER NATURAL BEDROCK FEATURES: VUGGY ROCK, REEF DEPOSITS
ZONE
MB MAN-MADE FEATURE IN BEDROCK
W WATER WELL
PROPOSED SANITARY SEWER LINE
EXISTING SANITARY SEWER LINE
50' SEWER ENVELOPE
PROPOSED MANHOLE
EXISTING MANHOLE
SITE

NOTE: THE GEOSCIENTIST SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR PURPOSES OF GEOLOGIC INFORMATION. ALL OTHER INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SIGNED AND SEALED CIVIL ENGINEERING DRAWINGS

SAN ANTONIO
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909 TBPLS Firm#: 10194550
Colliers Engineering & Design
www.colliersengineering.com

ISSUE DATE

REVISIONS

STATE OF TEXAS
ROMAN C. PINEDA
GEOLOGY
10083
LICENSED
PROFESSIONAL GEOSCIENTIST

TREVOR FIELDS TRACT
SAN ANTONIO, TEXAS
SITE GEOLOGIC MAP FOR WPAP

JOB NO. 23008042A
DATE: February 2024
DRAWN: EU CHECKED: RCP

ATTACHMENT

D

Date: Apr 02, 2024, 9:17am User ID: fthompson
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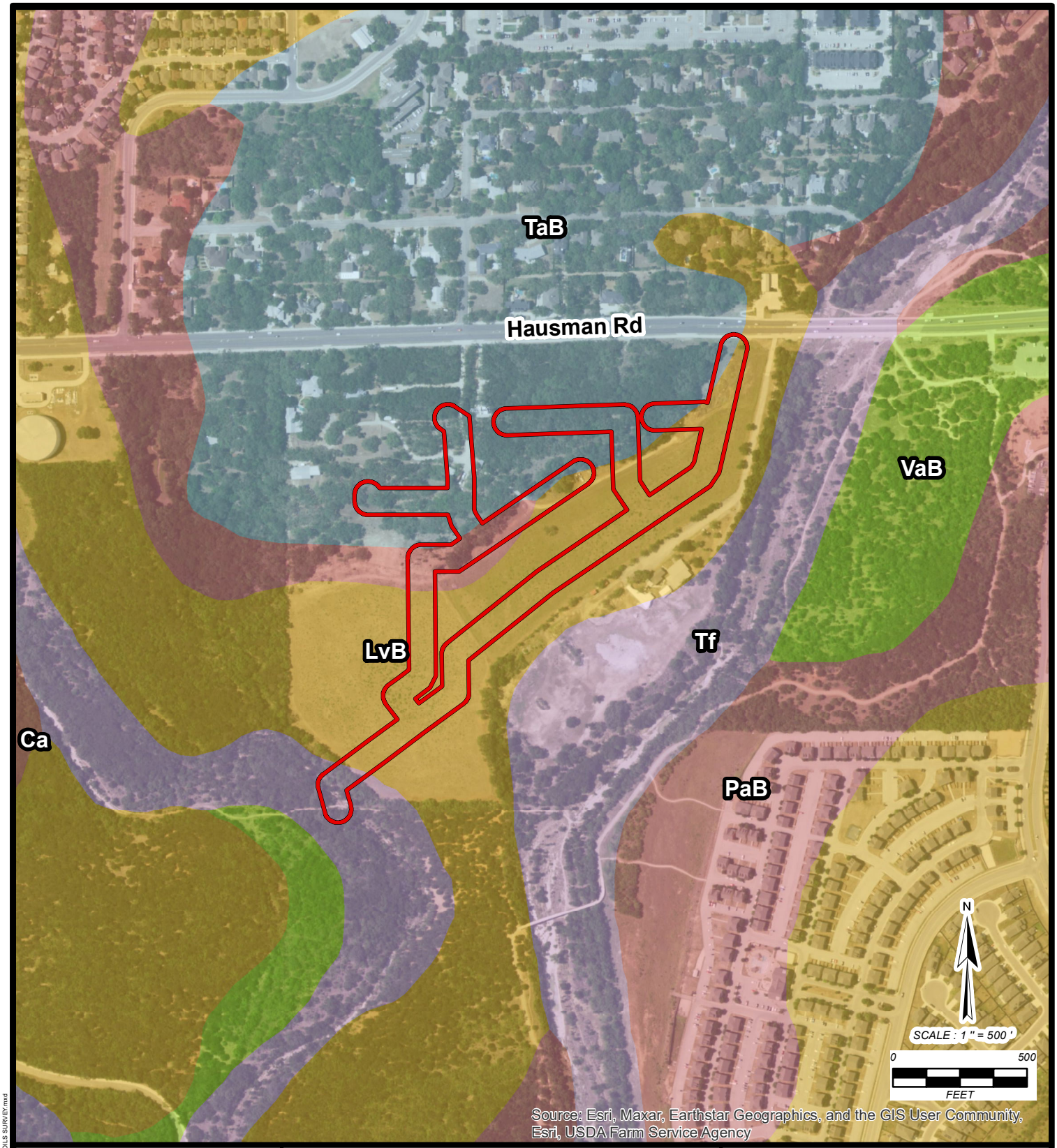

Prepared For:

Prepared By:

San Antonio Office
3421 Paesanos Pkwy #200
San Antonio, TX 78231
T: 210.979.8444
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Colliers Engineering & Design

USDA SOILS SURVEY MAP

TREVOR FIELDS TRACT

BEXAR COUNTY, TEXAS

GEOLOGIC ASSESSMENT

DATE	JOB NUMBER	DRAWN BY
February 2024	*23008042A*	*E.U.*

ATTACHMENT E

Subject Property

Bexar County Soils

- Anhalt clay, 0 to 2 percent slopes
- Eckrant cobbly clay, 1 to 8 percent slopes
- Eckrant very cobbly clay, 5 to 15 percent slopes
- Lewisville silty clay, 1 to 3 percent slopes
- Patrick soils, 1 to 3 percent slopes, rarely flooded
- Sunev loam, 1 to 3 percent slopes
- Tinn and Frio soils, 0 to 1 percent slopes, frequently flooded

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Colliers Engineering & Design

References | Attachment F

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Veni, George, and Associates, 1994, Geologic Controls in Cave Development and the Distribution of Cave Fauna in the San Antonio, Texas, Region: Report for the Texas Parks and Wildlife Department and U.S. Fish and Wildlife Service, 99 pp.

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Organized Sewage Collection System Application

Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(c), Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

Regulated Entity Name: Trevor Fields Tract

1. ☒ **Attachment A – SCS Engineering Design Report**. This Engineering Design Report is provided to fulfill the requirements of 30 TAC Chapter 217, including 217.10 of Subchapter A, §§217.51 – 217.70 of Subchapter C, and Subchapter D as applicable, and is required to be submitted with this SCS Application Form.

Customer Information

2. The entity and contact person responsible for providing the required engineering certification of testing for this sewage collection system upon completion (including private service connections) and every five years thereafter to the appropriate TCEQ region office pursuant to 30 TAC §213.5(c) is:

   Contact Person: Calvin New
   Entity: Beazer Homes Texas, LP.
   Mailing Address: 11467 Huebner Road, Suite 225
   City, State: San Antonio, Texas Zip: 78230
   Telephone: (214) 769-0966 Fax:_____
   Email Address: William.new@beazer.com
   The appropriate regional office must be informed of any changes in this information within 30 days of the change.

3. The engineer responsible for the design of this sewage collection system is:

   Contact Person: Clayton Linney
   Texas Licensed Professional Engineer's Number: 111543
   Entity: Colliers Engineering & Design
   Mailing Address: 3421 Paesanos Pkwy, Suite 200
   City, State:San Antonio, Texas Zip: 78231
   Telephone:(877) 627-3772 Fax:_____
   Email Address:Clayton.Linney@collierseng.com

Project Information

4. Anticipated type of development to be served (estimated future population to be served, plus adequate allowance for institutional and commercial flows):

- ☐ Residential: Number of single-family lots: _____
- ☒ Multi-family: Number of residential units: 158
- ☒ Commercial
- ☐ Industrial
- ☐ Off-site system (not associated with any development)
- ☐ Other: _____

5. The character and volume of wastewater is shown below:

78% Domestic	39,500 gallons/day
22% Commercial	11,250gallons/day
__% Commingled	_____ gallons/day

Total gallons/day: 50,750

6. Existing and anticipated infiltration/inflow is 11,487 gallons/day. This will be addressed by: A low pressure air test conforming to the procedures as described in ASTM C828, ASTM C924, ASTM F1417, or other appropriate procedure with the exception of the testing times will be conducted on all gravity collection pipe. The testing times shall conform to the TCEQ design criteria for sewer systems, 30 TAC 217.57. Manholes will be tested in accordance with 30 TAC 217.58..

7. A Water Pollution Abatement Plan (WPAP) is required for construction of any associated commercial, industrial or residential project located on the Recharge Zone.

- ☐ The WPAP application for this development was approved by letter dated_____. A copy of the approval letter is attached.
- ☐ The WPAP application for this development was submitted to the TCEQ on_____, but has not been approved.
- ☒ A WPAP application is required for an associated project, but it has not been submitted.
- ☐ There is no associated project requiring a WPAP application.

8. Pipe description:

Table 1 - Pipe Description

Pipe Diameter(Inches)	*Linear Feet (1)*	*Pipe Material (2)*	*Specifications (3)*
8	5,649	SDR 26	ASTM D2241, 3139(160PSI)

Pipe Diameter(Inches)	*Linear Feet (1)*	*Pipe Material (2)*	*Specifications (3)*

Total Linear Feet: 5,649

(1) Linear feet - Include stub-outs and double service connections. Do not include private service laterals.
(2) Pipe Material - If PVC, state SDR value.
(3) Specifications - ASTM / ANSI / AWWA specification and class numbers should be included.

9. The sewage collection system will convey the wastewater to the Leon Creek (name) Treatment Plant. The treatment facility is:

☒ Existing
☐ Proposed

10. All components of this sewage collection system will comply with:

☒ The City of San Antonio standard specifications.
☐ Other. Specifications are attached.

11. ☒ No force main(s) and/or lift station(s) are associated with this sewage collection system.

☐ A force main(s) and/or lift station(s) is associated with this sewage collection system and the **Lift Station/Force Main System Application** form (TCEQ-0624) is included with this application.

Alignment

12. ☒ There are no deviations from uniform grade in this sewage collection system without manholes and with open cut construction.

13. ☒ There are no deviations from straight alignment in this sewage collection system without manholes.

☐ **Attachment B - Justification and Calculations for Deviation in Straight Alignment without Manholes**. A justification for deviations from straight alignment in this sewage collection system without manholes with documentation from pipe manufacturer allowing pipe curvature is attached.

☐ For curved sewer lines, all curved sewer line notes (TCEQ-0596) are included on the construction plans for the wastewater collection system.

Manholes and Cleanouts

14. ☒ Manholes or clean-outs exist at the end of each sewer line(s). These locations are listed below: (Please attach additional sheet if necessary)

Table 2 - Manholes and Cleanouts

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
A	Of	1+00.00	Existing Manhole

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
A	Of	1+94.25	Manhole "A1"
A	Of	4+07.30	Manhole "A2"
A	Of	6+51.36	Manhole "A3"
A	Of	7+73.36	Manhole "A4"
A	Of	8+16.65	Manhole "A5"
A	Of	8+41.69	Manhole "A6"
A	Of	12+69.49	Manhole "A7"
A	Of	13+95.50	Manhole "A8"
A	Of	15+01.79	Manhole "A9"
A	Of	16+01.14	Manhole "A10"
A	Of	16+33.10	Manhole "A11"
A	Of	16+72.72	Manhole "A12"
A	Of	17+59.00	Manhole "A13"
A	Of	19+63.15	Manhole "A14"
B	Of	3+12.01	Manhole "B1"
B	Of	4+46.60	Manhole "B2"
C	Of	2+19.71	Manhole "C1"
C	Of	3+65.10	Manhole "C2"
C	Of	7+94.63	Manhole "C3"
C	Of	10+21.97	Manhole "C4"
C	Of	12+49.31	Manhole "C5"
C	Of	14+95.31	Manhole "C6"
C	Of	15+36.30	Manhole "C7"
C	Of	17+22.31	Manhole "C8"
C	Of	19+93.52	Manhole "C9"
D	Of	3+33.88	Manhole "D1"
D	Of	5+28.59	Manhole "D2"
E	Of	2+28.12	Manhole "E1"
E	Of	4+64.70	Manhole "E2"

E	Of	6+68.45	Manhole "E3"
E	Of	9+03.20	Manhole "E4"
F	Of	1+56.11	Manhole "F1"
F	Of	3+01.78	Manhole "F2"
F	Of	3+43.76	Manhole "F3"

15. ☐ Manholes are installed at all Points of Curvature and Points of Termination of a sewer line.

16. ☒ The maximum spacing between manholes on this project for each pipe diameter is no greater than:

Pipe Diameter (inches)	Max. Manhole Spacing (feet)
6 - 15	500
16 - 30	800
36 - 48	1000
≥54	2000

☐ **Attachment C – Justification for Variance from Maximum Manhole Spacing**. The maximum spacing between manholes on this project (for each pipe diameter used) is greater than listed in the table above. A justification for any variance from the maximum spacing is attached, and must include a letter from the entity which will operate and maintain the system stating that it has the capability to maintain lines with manhole spacing greater than the allowed spacing.

17. ☐ All manholes will be monolithic, cast-in-place concrete.

☒ The use of pre-cast manholes is requested for this project. The manufacturer's specifications and construction drawings, showing the method of sealing the joints, are attached.

Site Plan Requirements

Items 18 - 25 must be included on the Site Plan.

18. ☒ The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = 100'.

19. ☒ The Site Plan must include the sewage collection system general layout, including manholes with station numbers, and sewer pipe stub outs (if any). Site plan must be

overlain by topographic contour lines, using a contour interval of not greater than ten feet and showing the area within both the five-year floodplain and the 100-year floodplain of any drainage way.

20. Lateral stub-outs:

☒ The location of all lateral stub-outs are shown and labeled.
☐ No lateral stub-outs will be installed during the construction of this sewer collection system.

21. Location of existing and proposed water lines:

☒ The entire water distribution system for this project is shown and labeled.
☐ If not shown on the Site Plan, a Utility Plan is provided showing the entire water and sewer systems.
☐ There will be no water lines associated with this project.

22. 100-year floodplain:

☐ After construction is complete, no part of this project will be in or cross a 100-year floodplain, either naturally occurring or manmade. (Do not include streets or concrete-lined channels constructed above of sewer lines.)
☒ After construction is complete, all sections located within the 100-year floodplain will have water-tight manholes. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Table 3 - 100-Year Floodplain

Line	*Sheet*	*Station*
A	1.3 of	1+00.00 to 4+07.30
	of	to
	of	to
	of	to

23. 5-year floodplain:

☐ After construction is complete, no part of this project will be in or cross a 5-year floodplain, either naturally occurring or man-made. (Do not include streets or concrete-lined channels constructed above sewer lines.)
☒ After construction is complete, all sections located within the 5-year floodplain will be encased in concrete or capped with concrete. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Table 4 - 5-Year Floodplain

Line	*Sheet*	*Station*
A	1.3 of	1+00.00 to 1+94.25
	of	to

Line	*Sheet*	*Station*
	of	to
	of	to

24. ☒ Legal boundaries of the site are shown.

25. ☒ The ***final plans and technical specifications*** are submitted for the TCEQ's review. Each sheet of the construction plans and specifications are dated, signed, and sealed by the Texas Licensed Professional Engineer responsible for the design on each sheet.

Items 26 - 33 must be included on the Plan and Profile sheets.

26. ☒ All existing or proposed water line crossings and any parallel water lines within 9 feet of sewer lines are listed in the table below. These lines must have the type of pressure rated pipe to be installed shown on the plan and profile sheets. Any request for a variance from the required pressure rated piping at crossings must include a variance approval from 30 TAC Chapter 290.

☐ There will be no water line crossings.
☐ There will be no water lines within 9 feet of proposed sewer lines.

Table 5 - Water Line Crossings

Line	*Station or Closest Point*	*Crossing or Parallel*	*Horizontal Separation Distance*	*Vertical Separation Distance*
A	16+56.72	MAIN CROSSING		3.85
A	19+43.18	MAIN CROSSING		2.86
D	1+16.00	MAIN CROSSING		3.50
E	1+16.00	MAIN CROSSING		2.73
E	4+48.70	MAIN CROSSING		4.05
E	4+52.70	MAIN CROSSING		3.84
F	1+16.00	MAIN CROSSING		2.43
F	2+65.72	MAIN CROSSING		3.43

27. Vented Manholes:

☐ **No part** of this sewer line is within the 100-year floodplain and vented manholes are not required by 30 TAC Chapter 217.
☐ **A portion** of this sewer line is within the 100-year floodplain and vented manholes will be provided at less than 1500 foot intervals. These water-tight manholes are listed in the table below and labeled on the appropriate profile sheets.
☐ **A portion** of this sewer line is within the 100-year floodplain and an alternative means of venting shall be provided at less than 1500 feet intervals. A description of the alternative means is described on the following page.
☒ **A portion** of this sewer line is within the 100-year floodplain; however, there is no

interval longer than 1500 feet located within. No vented manholes will be used.

Table 6 - Vented Manholes

Line	*Manhole*	*Station*	*Sheet*

28. Drop manholes:

☒ There are no drop manholes associated with this project.
☐ Sewer lines which enter new or existing manholes or "manhole structures" higher than 24 inches above the manhole invert are listed in the table below and labeled on the appropriate profile sheets. These lines meet the requirements of 30 TAC §217.55(l)(2)(H).

Table 7 - Drop Manholes

Line	*Manhole*	*Station*	*Sheet*

29. Sewer line stub-outs (For proposed extensions):

☒ The placement and markings of all sewer line stub-outs are shown and labeled.
☐ No sewer line stub-outs are to be installed during the construction of this sewage collection system.

30. Lateral stub-outs (For proposed private service connections):

☒ The placement and markings of all lateral stub-outs are shown and labeled.
☐ No lateral stub-outs are to be installed during the construction of this sewage collection system.

31. Minimum flow velocity (From Appendix A)

☒ Assuming pipes are flowing full; all slopes are designed to produce flows equal to or greater than 2.0 feet per second for this system/line.

32. Maximum flow velocity/slopes (From Appendix A)

☒ Assuming pipes are flowing full, all slopes are designed to produce maximum flows of less than or equal to 10 feet per second for this system/line.

☐ **Attachment D – Calculations for Slopes for Flows Greater Than 10.0 Feet per Second.** Assuming pipes are flowing full, some slopes produce flows which are greater than 10 feet per second. These locations are listed in the table below. Calculations are attached.

Table 8 - Flows Greater Than 10 Feet per Second

Line	*Profile Sheet*	*Station to Station*	*FPS*	*% Slope*	*Erosion/Shock Protection*

33. Assuming pipes are flowing full, where flows are ≥ 10 feet per second, the provisions noted below have been made to protect against pipe displacement by erosion and/or shock under 30 TAC §217.53(l)(2)(B).

☐ Concrete encasement shown on appropriate Plan and Profile sheets for the locations listed in the table above.

☐ Steel-reinforced, anchored concrete baffles/retards placed every 50 feet shown on appropriate Plan and Profile sheets for the locations listed in the table above.

☒ N/A

Administrative Information

34. ☒ The final plans and technical specifications are submitted for TCEQ review. Each sheet of the construction plans and specifications are dated, signed, and sealed by the Texas Licensed Professional Engineer responsible for the design on each sheet.

35. ☒ Standard details are shown on the detail sheets, which are dated, signed, and sealed by the Texas Licensed Professional Engineer, as listed in the table below:

Table 9 - Standard Details

Standard Details	*Shown on Sheet*
Lateral stub-out marking **[Required]**	1.7 & 8.7
Manhole, showing inverts comply with 30 TAC §217.55(l)(2) **[Required]**	1.6 & 8.6
Alternate method of joining lateral to existing SCS line for potential future connections **[Required]**	1.7 & 8.7
Typical trench cross-sections **[Required]**	1.6 & 8.6
Bolted manholes **[Required]**	1.6 & 8.6
Sewer Service lateral standard details **[Required]**	1.7 & 8.7
Clean-out at end of line **[Required, if used]**	N/A of

Standard Details	*Shown on Sheet*
Baffles or concrete encasement for shock/erosion protection **[Required, if flow velocity of any section of pipe >10 fps]**	N/A of
Detail showing Wastewater Line/Water Line Crossing **[Required, if crossings are proposed]**	1.1-1.4 & 8.0-8.4
Mandrel detail or specifications showing compliance with 30 TAC §217.57(b) and (c) **[Required, if Flexible Pipe is used]**	N/A of
Drop manholes **[Required, if a pipe entering a manhole is more than 24 inches above manhole invert]**	N/A of

36. ☒ All organized sewage collection system general construction notes (TCEQ-0596) are included on the construction plans for this sewage collection system.

37. ☒ All proposed sewer lines will be sufficiently surveyed/staked to allow an assessment prior to TCEQ executive director approval. If the alignments of the proposed sewer lines are not walkable on that date, the application will be deemed incomplete and returned.

☐ Survey staking was completed on this date: _____

38. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.

39. ☒ Any modification of this SCS application will require TCEQ approval, prior to construction, and may require submission of a revised application, with appropriate fees.

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Organized Sewage Collection System Application** is hereby submitted for TCEQ review and executive director approval. The system was designed in accordance with the requirements of 30 TAC §213.5(c) and 30 TAC §217 and prepared by:

Print Name of Licensed Professional Engineer: Clayton Linney, P.E.

Date: 4/10/2024

Place engineer's seal here:



Signature of Licensed Professional Engineer:

Clayton Linney

Appendix A-Flow Velocity Table

Flow Velocity (Flowing Full) All gravity sewer lines on the Edwards Aquifer Recharge Zone shall be designed and constructed with hydraulic slopes sufficient to give a velocity when flowing full of not less than 2.0 feet per second, and not greater than 10 feet per second. The grades shown in the following table are based on Manning's formula and an n factor of 0.013 and shall be the minimum and maximum acceptable slopes unless provisions are made otherwise.

Table 10 - Slope Velocity

Pipe Diameter(Inches)	*% Slope required for minimum flow velocity of 2.0 fps*	*% Slope which produces flow velocity of 10.0 fps*
6	0.50	12.35
8	0.33	8.40
10	0.25	6.23
12	0.20	4.88
15	0.15	3.62
18	0.11	2.83
21	0.09	2.30
24	0.08	1.93
27	0.06	1.65
30	0.055	1.43
33	0.05	1.26
36	0.045	1.12
39	0.04	1.01
>39	*	*

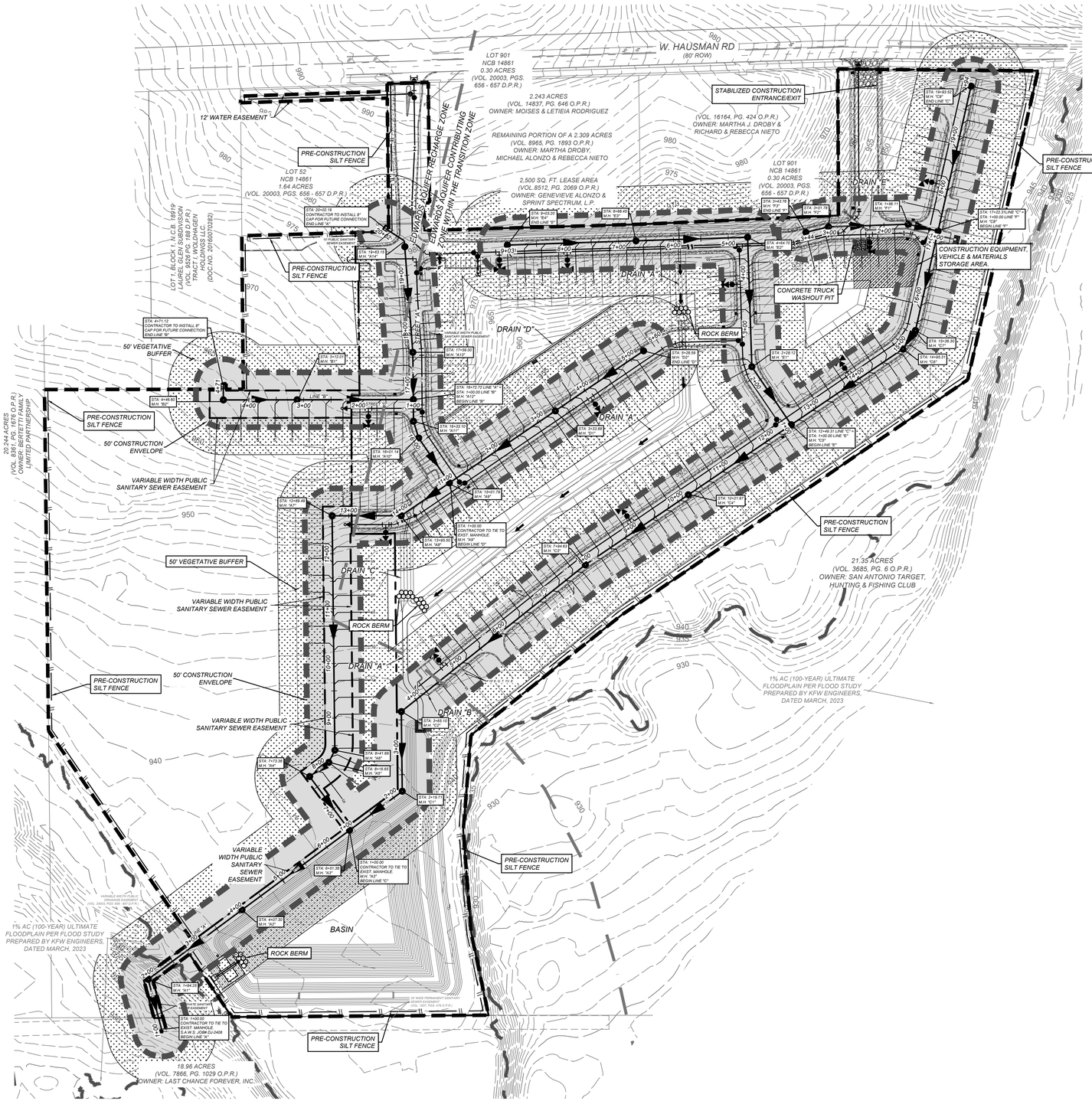
**For lines larger than 39 inches in diameter, the slope may be determined by Manning's formula (as shown below) to maintain a minimum velocity greater than 2.0 feet per second when flowing full and a maximum velocity less than 10 feet per second when flowing full.*

$$v = \frac{1.49}{n} \times R_h^{0.67} \times \sqrt{S}$$

Figure 1 - Manning's Formula

Where:

v = velocity (ft/sec)
n = Manning's roughness coefficient (0.013)
Rh = hydraulic radius (ft)
S = slope (ft/ft)


W. HAUSMAN RD
(80' ROW)
LOT 901
NCB 14861
0.30 ACRES
(VOL. 20003, PGS. 656 - 657 D.P.R.)
2.243 ACRES
(VOL. 14837, PG. 646 O.P.R.)
OWNER: MOISES & LETIEIA RODRIGUEZ
REMAINING PORTION OF A 2.309 ACRES
(VOL. 8965, PG. 1893 O.P.R.)
OWNER: MARTHA DROBY,
MICHAEL ALONZO & REBECCA NIETO
2,500 SQ. FT. LEASE AREA
(VOL 8512, PG. 2069 O.P.R.)
OWNER: GENEVIEVE ALONZO &
SPRINT SPECTRUM, L.P.
(VOL. 16164, PG. 424 O.P.R.)
OWNER: MARTHA J. DROBY &
RICHARD & REBECCA NIETO
LOT 901
NCB 14861
0.30 ACRES
(VOL. 20003, PGS. 656 - 657 D.P.R.)
LOT 52
NCB 14861
1.64 ACRES
(VOL. 20003, PGS. 656 - 657 D.P.R.)
LOT 1, BLOCK 1, N.C.B. 18919
JAMES E. CLAY ELEMENTARY
(VOL. 9526 PG. 188 D.P.R.)
TRACT I, WOLDHAGEN
(VOL. 20001, PG. 2282 D.P.R.)
(DOC.NO. 20160270282)
20.244 ACRES
(VOL. 8361, PG. 1976 O.P.R.)
OWNER: SAN ANTONIO
LIMITED PARTNERSHIP
21.35 ACRES
(VOL. 3685, PG. 6 O.P.R.)
OWNER: SAN ANTONIO TARGET,
HUNTING & FISHING CLUB
18.96 ACRES
(VOL. 7866, PG. 1029 O.P.R.)
OWNER: LAST CHANCE FOREVER, INC.
1% AC (100-YEAR) ULTIMATE FLOODPLAIN PER FLOOD STUDY PREPARED BY KFW ENGINEERS, DATED MARCH, 2023
EDWARDS AQUIFER RECHARGE ZONE
EDWARDS AQUIFER CONTRIBUTING ZONE WITHIN THE TRANSITION ZONE
12' WATER EASEMENT
PRE-CONSTRUCTION SILT FENCE
STABILIZED CONSTRUCTION ENTRANCE/EXIT
CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA
CONCRETE TRUCK WASHOUT PIT
ROCK BERM
50' VEGETATIVE BUFFER
50' CONSTRUCTION ENVELOPE
VARIABLE WIDTH PUBLIC SANITARY SEWER EASEMENT
DRAIN "A"
DRAIN "B"
DRAIN "C"
DRAIN "D"
DRAIN "E"
BASIN
LINE "A"
LINE "B"
LINE "C"
LINE "D"
LINE "E"
LINE "F"
LINE "G"
LINE "H"
LINE "I"
LINE "J"
LINE "K"
LINE "L"
LINE "M"
LINE "N"
LINE "O"
LINE "P"
LINE "Q"
LINE "R"
LINE "S"
LINE "T"
LINE "U"
LINE "V"
LINE "W"
LINE "X"
LINE "Y"
LINE "Z"
STA: 0+00.00 CONTRACTOR TO TIE TO EXIST. MANHOLE. S.A.W.S. JOB# DJ-2406 BEGIN LINE "A"
STA: 1+00.00 CONTRACTOR TO TIE TO EXIST. MANHOLE. M.H. "A5" BEGIN LINE "C"
STA: 4+71.12 CONTRACTOR TO INSTALL 8" CAP FOR FUTURE CONNECTION END LINE "B"
STA: 20+42.70 CONTRACTOR TO INSTALL 8" CAP FOR FUTURE CONNECTION END LINE "A"
STA: 18+72.72 LINE "A" & STA: 14+00.00 LINE "B" M.H. "A13" BEGIN LINE "B"
STA: 17+22.31 LINE "C" & STA: 14+00.00 LINE "B" M.H. "C6" BEGIN LINE "B"
STA: 12+49.31 LINE "C" & STA: 14+00.00 LINE "B" M.H. "C6" BEGIN LINE "C"
STA: 19+02.52 M.H. "C9" END LINE "C"
STA: 0+28.59 M.H. "D5" END LINE "D"
STA: 1+56.11 M.H. "F1"
STA: 3+01.70 M.H. "F2"
STA: 3+43.78 M.H. "F3" END LINE "E"
STA: 4+44.71 M.H. "E2"
STA: 0+03.20 M.H. "E4" BEGIN LINE "E"
STA: 0+03.19 M.H. "A14"
STA: 0+03.15 M.H. "A15"
STA: 0+33.50 M.H. "D1"
STA: 1+00.00 CONTRACTOR TO TIE TO EXIST. MANHOLE M.H. "A6" BEGIN LINE "D"
STA: 0+07.30 M.H. "A3"
STA: 0+01.35 M.H. "A3"
STA: 1+00.00 CONTRACTOR TO TIE TO EXIST. MANHOLE M.H. "A4" BEGIN LINE "E"
STA: 1+94.62 M.H. "C5"
STA: 2+28.71 M.H. "E1"
STA: 3+33.50 M.H. "D1"
STA: 4+45.80 M.H. "B2"
STA: 4+71.12 M.H. "B1"
STA: 5+19.06 M.H. "A14"
STA: 6+33.15 M.H. "A13"
STA: 7+00.00 CONTRACTOR TO TIE TO EXIST. MANHOLE. M.H. "A8" BEGIN LINE "D"
STA: 7+00.00 CONTRACTOR TO TIE TO EXIST. MANHOLE. M.H. "A9" BEGIN LINE "A"
STA: 7+00.00 CONTRACTOR TO TIE TO EXIST. MANHOLE. M.H. "A10" BEGIN LINE "A"
STA: 7+00.00 CONTRACTOR TO TIE TO EXIST. MANHOLE. M.H. "A11" BEGIN LINE "A"
STA: 7+00.00 CONTRACTOR TO TIE TO EXIST. MANHOLE. M.H.

TREVOR FIELDS PUBLIC SANITARY SEWER

CITY OF SAN ANTONIO

PUBLIC SANITARY SEWER IMPROVEMENTS

GENERAL SEWER NOTES (REVISED JULY 2017)

1. All materials and construction procedures within the scope of this contract shall be approved by the San Antonio Water System (SAWS) and comply with the Plans, Specifications, General Conditions and with the following as applicable:

- *A. Current Texas Commission on Environmental Quality (TCEQ) "Design Criteria for Domestic Waste water System", Texas Administrative Code (TAC) Title 30 Part 1 Chapter 217 and "Public Drinking Water", TAC Title 30 Part 1 Chapter 290.*
- *B. Current TXDOT "Standard Specifications for Construction of Highways, Streets and Drainage".*
- *C. Current "San Antonio Water System Standard Specifications for Water and Sanitary Sewer Construction"*
- *D. Current City of San Antonio "Standard Specifications for Public Works Construction".*
- *E. Current City of San Antonio "Utility Excavation Criteria Manual" (UECM).*

2. The contractor shall not proceed with any pipe installation work until they obtain a copy of the approved Counter Permit or General Construction Permit (GCP) from the consultant and has been notified by SAWS Construction I nspection Division to proceed with the work and has arranged a meeting with the inspector and consultant for the work requirements. Work completed by the contractor without an approved Counter Permit and/or a GCP will be subject to removal and replacement at the expense of the contractors and/or the developer.

3. The Contractor shall obtain the SAWS Standard Details from the SAWS website, http://www.saws.org/business_center/specs. Unless otherwise noted within the design plans.

4. The Contractor is to make arrangements with the SAWS Construction Inspection Division at (210) 233-2973, on notification procedures that will be used to notify affected home residents and/or property owners 48 hours prior to beginning any work.

5. Location and depth of existing utilities and service laterals shown on the plans are understood to be approximate. Actual locations and depths must be field verified by the Contractor at least 1 week prior to construction. It shall be the Contractor's responsibility to locate utility service lines as required for construction and to protect them during construction at no cost to SAWS.

6. The Contractor shall verify the exact location of underground utilities and drainage structures at least 1-2 weeks prior to construction whether shown on plans or not. Please allow up to 7 business days for locates requesting pipe location markers on SAWS facilities. The following contact information are supplied for verification purposes:

SAWS Utility Locates: http://www.saws.org/Service/Locates
COSA Drainage (210) 207-0724 or (210) 207-6026
COSA Traffic Signal Operations (210) 206-8480
COSA Traffic Signal Damages (210) 207-3951
Texas State Wide One Call Locator 1-800-545-6005 or 811

7. The Contractor shall be responsible for restoring existing fences, curbs, streets, driveways, sidewalks, landscaping and structures to its original or better condition if damages are made as a result of the project's construction.

8. All work in Texas Department of Transportation (TxDOT) and/or Bexar County right-of-way shall be done in accordance with respective construction specifications and permit requirements.

9. The Contractor shall comply with City of San Antonio or other governing municipality's tree ordinances when excavating near trees.

10. The Contractor shall not place any waste materials in the 100-year Flood Plain without first obtaining an approved Flood Plain Permit.

11. Holiday Work: Contractors will not be allowed to perform SAWS work on SAWS recognized holidays. Request should be sent to constworkreq@saws.org. Weekend Work: Contractors are required to notify the SAWS Inspection Construction Department 48 hours in advance to request weekend work. Request should be sent to constworkreq@saws.org. Any and all SAWS utility work installed without holiday/weekend approval will be subject to be uncovered for proper inspection.

12. Compaction note (Item 804): The contractor shall be responsible for meeting the compaction requirements on all trench backfill and for paying for the tests performed by a third party. Compaction tests will be done at one location point randomly selected, or as indicated by the SAWS Inspector and/or the test administrator, per each 12-inch loose lift per 400 linear feet at a minimum. This project will not be accepted and finalized by SAWS without this requirement being met and verified by providing all necessary documented test results.

13. A copy of all testing reports shall be forwarded to SAWS Construction Inspection Division.

Sewer Notes:

1. The Contractor is responsible for ensuring that no Sanitary Sewer Overflow (SSO) occurs as a result of their work. All contractor personnel responsible for SSO prevention and control shall be trained on proper response. Should an SSO occur, the contractor shall:

- *A. Identify the soruce of the SSO and notify SAWS Emergency Operations Center (EOC) immediately at (210) 233-2014. Provide the address of the spill and an estimated volume or flow.*
- *B. Attempt to eliminate the source of the SSO*
- *C. Contain sewage from the SSO to the extent of preventing a possible contamination of waterways.*
- *D. Clean up spill site (return contained sewage to the collection system if possible) and properly dispose of contaminated soil/materials.*
- *E. Clean the affected sewer mains and remove any debris.*
- *F. Meet all post-SSO requirements as per the EPA Consent Decree, including line cleaning and televising the affected sewer mains (at SAWS direction) within 24 hours.*

Should the Contractor fail to address an SSO immediately and to SAWS satisfaction, they will be responsible for all cost incurred by SAWS, including any fines from EPA, TCEQ and/or any other Federal, State or Local Agencies.

No separate measurement or payment shall be made for this work. All work shall be done according to guidelines set by TCEQ and SAWS.

2. If bypass pumping is required, the Contractor shall perform such work in accordance with SAWS Standard Specification for Water and Sanitary Sewer Construction, Item No. 864, "Bypass Pumping".

3. Prior to tie-ins, any shutdowns of existing force mains of any size must be coordinated with the SAWS Construction Inspection Division at (210) 233-2973 at least one week in advance of the shutdown. The Contractor must also provide a sequence of work as related to the tie-ins: this is at no additional cost to SAWS or the project and it is the responsibility of the Contractor sequence the work accordingly.

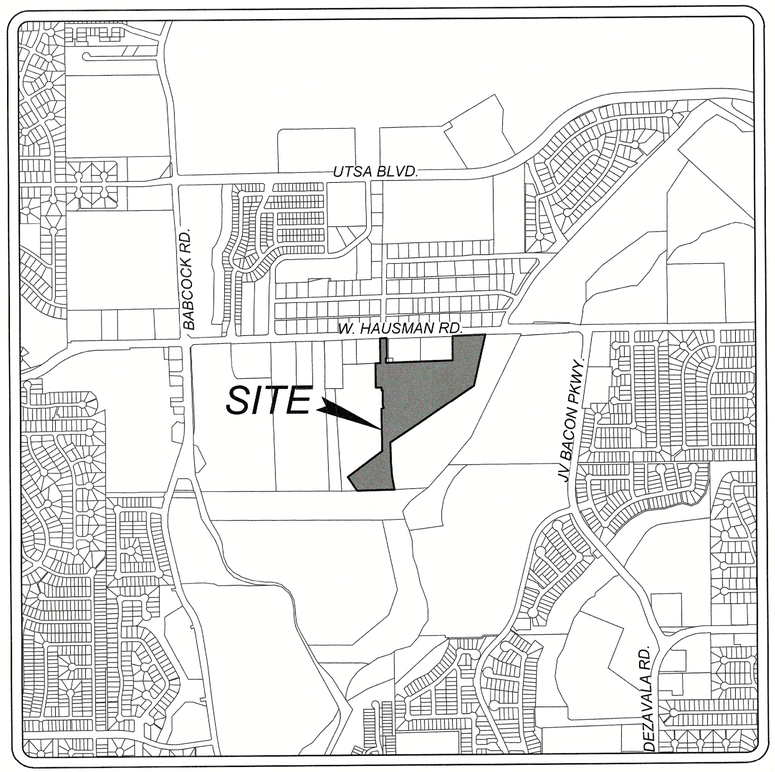
4. Sewer pipe where water line crosses shall be 160 psi and meet the requirements of ASTM D2241, TAC 217.53 and TCEQ 290.44(Ee)(4)(B). Contractor shall center a 20' joint of 160 psi pressure rated PVC at the proposed water crossing.

5. ELEVATIONS POSTED FOR TOP OF MANHOLES ARE FOR REFERENCE ONLY. It shall be the responsibility of the Contractor to make allowances and adjustments for top of manholes to match the finished grade of the project's improvements. (NSPI).

6. Spills, Overflows, or Discharges of Wastewater: All Spills, overflows, or discharges of wastewater, recycled water, petroleum products, or chemicals must be reported immediately to the SAWS Inspector assigned to the Counter Permit or GEneral Construction Permit (GCP). This requirement applies to every spill, overflow, or discharge regardless of size.

7. Manhole and all pipe testing (including the TV inspection) must be performed and passed prior to Final Field Acceptance by SAWS Construction Inspection Division, as per SAWS Specifications For Water and Sanitary Sewer Construction.

8. All PVC pipe over 14 feet of cover shall be extra strength with minimum pipe stiffness of 115 psi.



LOCATION MAP
NOT-TO-SCALE

INDEX

DESCRIPTION	SHEET NUMBER
SANITARY SEWER COVER SHEET	1.0
OVERALL SANITARY SEWER (SHT 1 OF 2)	1.1
OVERALL SANITARY SEWER (SHT 2 OF 2)	1.2
LINE "A" PLAN & PROFILE (SHT 1 OF 2)	1.3
LINE "A" (SHT 2 OF 2) & LINE "B" PLAN & PROFILE	1.4
SANITARY SEWER PLAN NOTES	1.5
SANITARY SEWER DETAIL (SHT 1 OF 2)	1.6
SANITARY SEWER DETAIL (SHT 2 OF 2)	1.7

DEVELOPER'S NAME: BEAZER HOMES
DEVELOPER'S ADDRESS: 11467 HUEBNER ROAD, SUITE 225
CITY: SAN ANTONIO STATE: TX ZIP: 78230
PHONE#: FAX#: TOTAL ACREAGE: AC.
SAWS BLOCK MAP#: 118630, 118632, 120630, 120632 TOTAL EDU'S:
TOTAL LINEAR FOOTAGE OF PIPE: 487.52 L.F. ~ SDR 26 PVC PLAT NO.:
NUMBER OF LOTS: SAWS JOB#:

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Colliers Engineering & Design
www.colliersengineering.com

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Formerly Known as KFW ENGINEERS + SURVEYING

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ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Texas 811 Texas One-Call System, Inc. Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
CLAYTON J. LINNEY
111543
LICENSED PROFESSIONAL ENGINEER
3/5/2024

CLAYTON J. LINNEY
TEXAS LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: 111543
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909 · TBPLS Firm#: 10194550

TREVOR FIELDS, UNIT 1
STREET, DRAINAGE, WATER,SANITARY SEWER & UTILITY IMPROVEMENTS
FOR
MOSAIC LAND DEVLOPMENT

CITY OF SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER:	DRAWING NAME:
1065-13-03	CVOS10651303

SHEET TITLE:
SANITARY SEWER COVER SHEET

SHEET NUMBER:
1.0

By: PTHOMPSON
Dwf:DRAWINGS\1065-13-03.dwg\1.0 SANITARY SEWER COVER SHEET

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

COMPACTION NOTE:

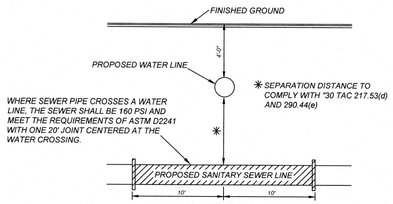
THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

CAUTION!!: THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

MANHOLE NOTE:
ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.

NOTE:

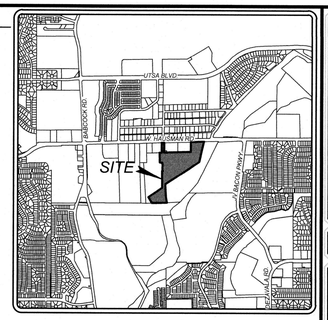
1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (S.A.W.S.) STANDARD SPECIFICATION.
2. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 1.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.
3. SEE THIS SHEET FOR BENCHMARK INFORMATION.
4. PIPE TYPE DESIGNATIONS ARE SDR 26.
5. SEE THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.
6. ALL MANHOLES SHALL HAVE CONCRETE RING ENCASEMENT AND A WATER TIGHT RING AND COVER.



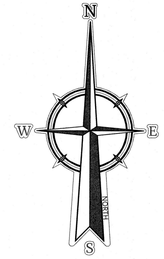
TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

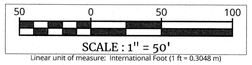
LEGEND

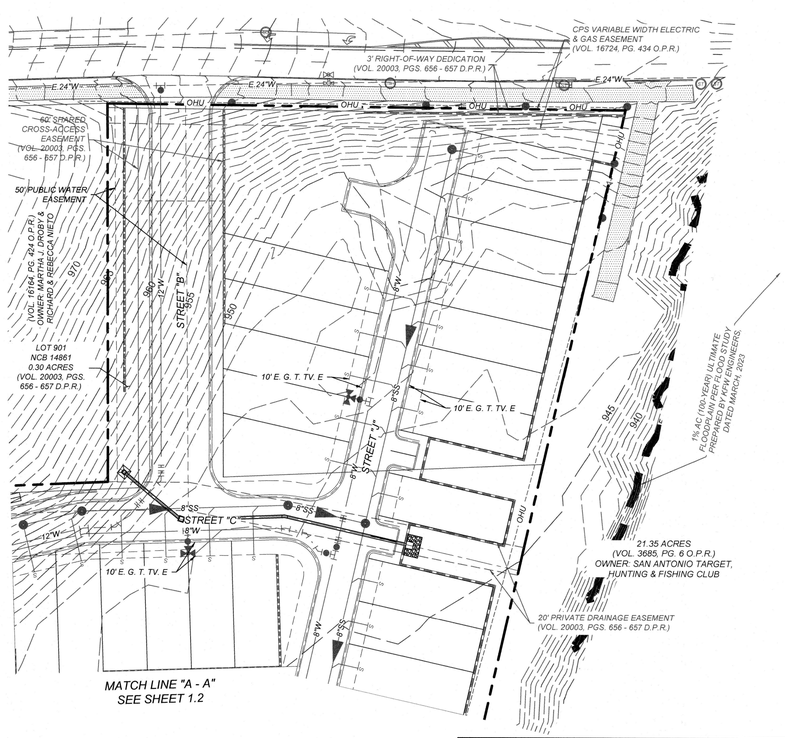
PROPOSED WATER MAIN	=	W
PROPOSED WATER SERVICE & METER BOX	=	W
PROPOSED WATER 3/4" IRRIGATION SERVICE & METER BOX	=	W
PROPOSED FIRE HYDRANT	=	
PROPOSED WATER VALVE	=	
PROPOSED SANITARY SEWER MAIN	=	SS
PROPOSED SANITARY SEWER MANHOLE	=	
PROPOSED SANITARY SEWER LATERAL	=	SS
PROPOSED ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT	=	E. G. T. TV. E
EXISTING WATER MAIN	=	E.W
EXISTING FIRE HYDRANT	=	
EXISTING WATER VALVE	=	
EXISTING SANITARY SEWER MAIN	=	E.SS
EXISTING SANITARY SEWER MANHOLE	=	
EXISTING OVERHEAD ELECTRIC W/POWER POLE	=	OHE
EXISTING GUY WIRE/OVERHEAD ELECTRIC	=	OHE



LOCATION MAP
NOT-TO-SCALE







DEVELOPER'S NAME: BEAZER HOMES			
DEVELOPER'S ADDRESS: 11467 HUEBNER ROAD, SUITE 225			
CITY: SAN ANTONIO	STATE: TX	ZIP: 78230	
PHONE#:	FAX#:	TOTAL ACREAGE: AC.	
SAWS BLOCK MAP#: 118630, 118632, 120630, 120632		TOTAL EDU'S:	
TOTAL LINEAR FOOTAGE OF PIPE: 487.52 L.F. ~ SDR 26 PVC		PLAT NO.:	
NUMBER OF LOTS:	SAWS JOB#:		

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FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DESCRIPTION	DRAWN BY

STATE OF TEXAS
CLAYTON J. LINNEY
111543
LICENSED PROFESSIONAL ENGINEER
4/10/2024

CLAYTON J. LINNEY
TEXAS LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: 111543
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909 - TBPLS Firm#: 10194550

TREVOR FIELDS, UNIT 1
STREET, DRAINAGE, WATER,SANITARY SEWER & UTILITY IMPROVEMENTS
FOR
MOSAIC LAND DEVLOPMENT

CITY OF SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER:	DRAWING NAME:
1065-13-03	OS10651303

SHEET TITLE:
OVERALL SANITARY SEWER (SHT 1 OF 2)

SHEET NUMBER:
1.1

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

S:\SAT\SHARED\1065\13-03\Civil\1 CAD\1 MASTER\1-03-1 FIELDS UNIT 1 OVERALL SANITARY SEWER.DWG

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGNER/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

COMPACTION NOTE:

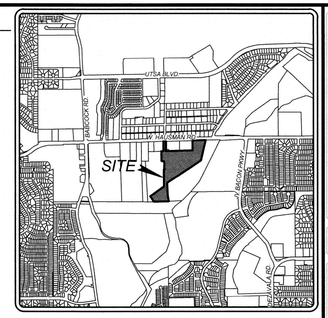
THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

CAUTION!!: THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

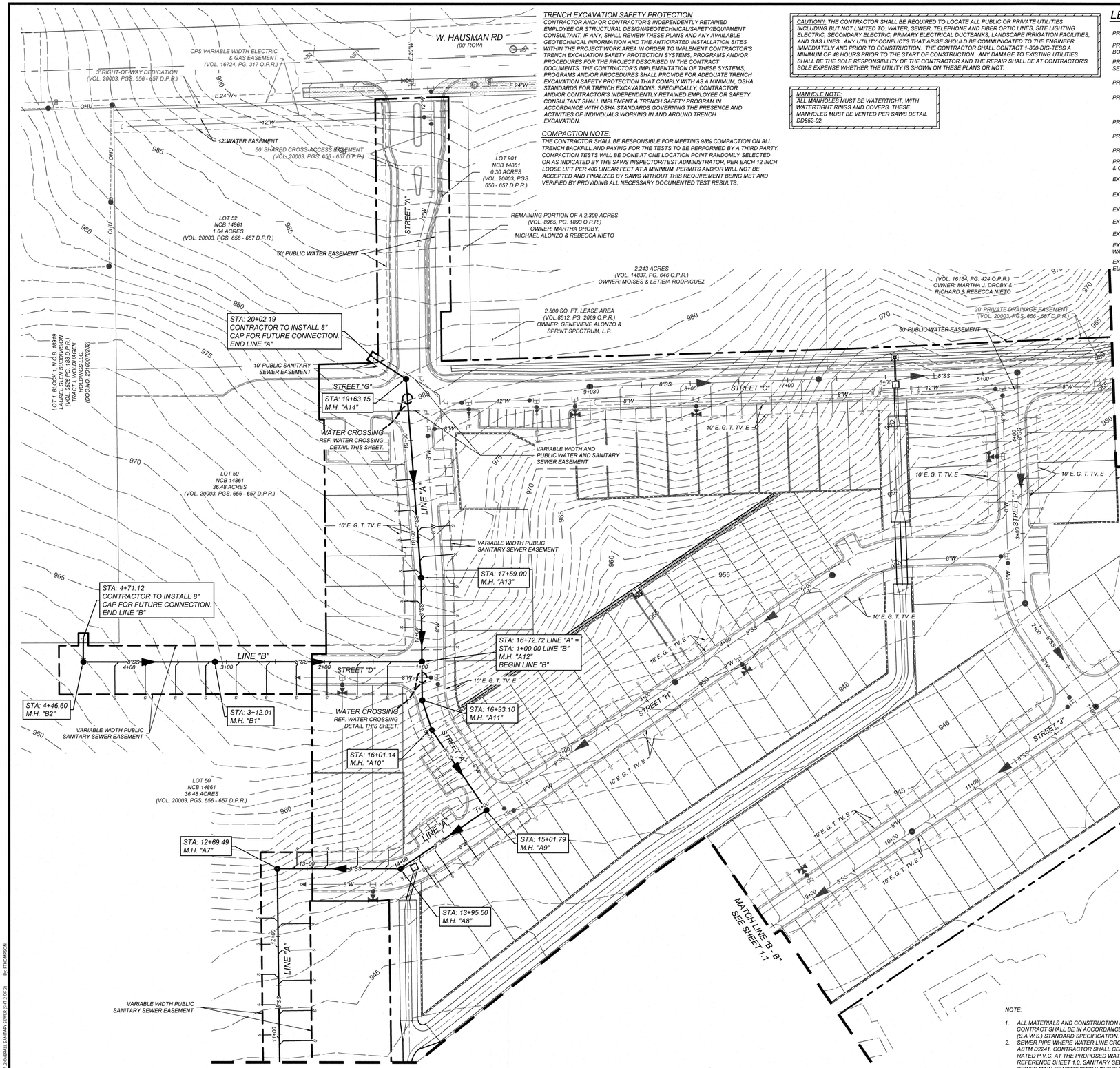
MANHOLE NOTE:
ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.

LEGEND

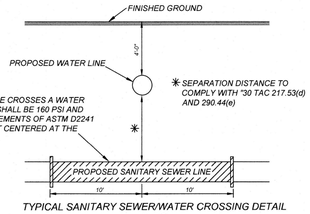
- PROPOSED WATER MAIN = W
- PROPOSED WATER SERVICE & METER BOX = W
- PROPOSED WATER 3/4" IRRIGATION SERVICE & METER BOX = 3/4"W
- PROPOSED FIRE HYDRANT
- PROPOSED WATER VALVE
- PROPOSED SANITARY SEWER MAIN = SS
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER LATERAL = 6"SS
- PROPOSED ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT = E. G. T. TV. E
- EXISTING WATER MAIN = E.W
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING SANITARY SEWER MAIN = E.SS
- EXISTING SANITARY SEWER MANHOLE
- EXISTING OVERHEAD ELECTRIC W/POWER POLE = OHE
- EXISTING GUY WIRE/OVERHEAD ELECTRIC = OHE



LOCATION MAP
NOT-TO-SCALE



50 0 50 100
SCALE : 1" = 50'
Linear unit of measure: International Foot (1 ft = 0.3048 m)



TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

NOTE:

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (S.A.W.S.) STANDARD SPECIFICATION.
2. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 1.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.
3. SEE THIS SHEET FOR BENCHMARK INFORMATION.
4. PIPE TYPE DESIGNATIONS ARE SDR 26.
5. SEE THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.
6. ALL MANHOLES SHALL HAVE CONCRETE RING ENCASEMENT AND A WATER TIGHT RING AND COVER.

DEVELOPER'S NAME: BEAZER HOMES
DEVELOPER'S ADDRESS: 11467 HUEBNER ROAD, SUITE 225
CITY: SAN ANTONIO STATE: TX ZIP: 78230
PHONE#: FAX#: TOTAL ACREAGE: AC.
SAWS BLOCK MAP#: 118630, 118632, 120630, 120632 TOTAL EDU'S:
TOTAL LINEAR FOOTAGE OF PIPE: 487.52 L.F. ~ SDR 26 PVC PLAT NO.:
NUMBER OF LOTS: SAWS JOB#:

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FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
CLAYTON J. LINNEY
111543
LICENSED PROFESSIONAL ENGINEER
4/10/2024

CLAYTON J. LINNEY
TEXAS LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: 111543
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909 - TBPLS Firm#: 10194550

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STREET, DRAINAGE, WATER,SANITARY SEWER & UTILITY IMPROVEMENTS FOR
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TBPE Firm#: F-14909
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER: 1065-13-03
DRAWING NAME: OS10651303

SHEET TITLE: OVERALL SANITARY SEWER (SHT 2 OF 2)

SHEET NUMBER: 1.2

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

O:\SEWER\2015\01303.dwg\1.2 OVERALL SANITARY SEWER (SHT 2 OF 2) By: THOMPSON

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

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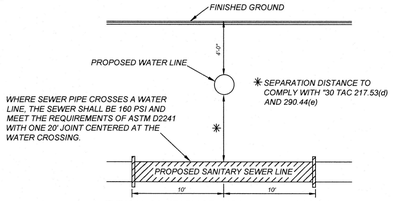
MANHOLE NOTE:
ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.

NOTE:

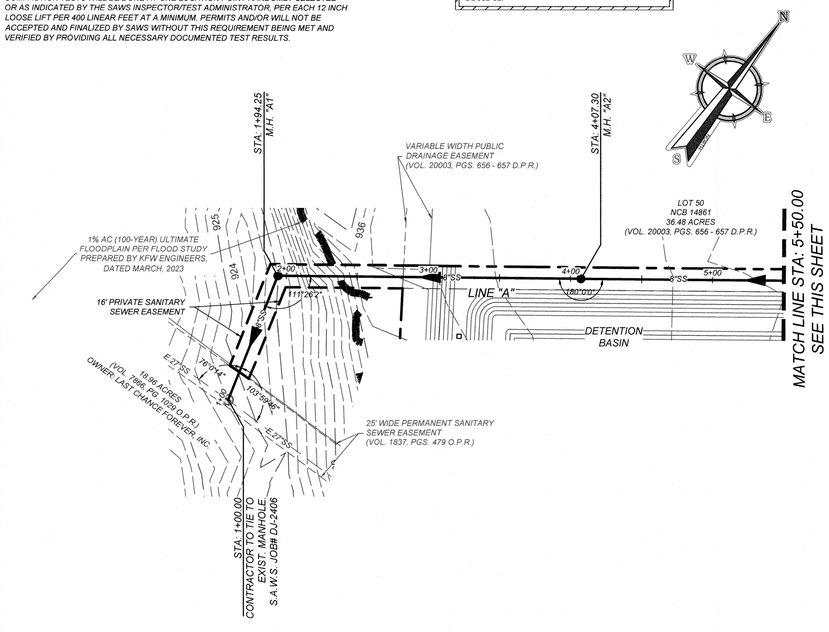
1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (S.A.W.S.) STANDARD SPECIFICATION.
2. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET ---, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.
3. SEE THIS SHEET FOR BENCHMARK INFORMATION.
4. PIPE TYPE DESIGNATIONS ARE SDR 26.
5. SEE THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.
6. ALL MANHOLES SHALL HAVE CONCRETE RING ENCASEMENT AND A WATER TIGHT RING AND COVER.

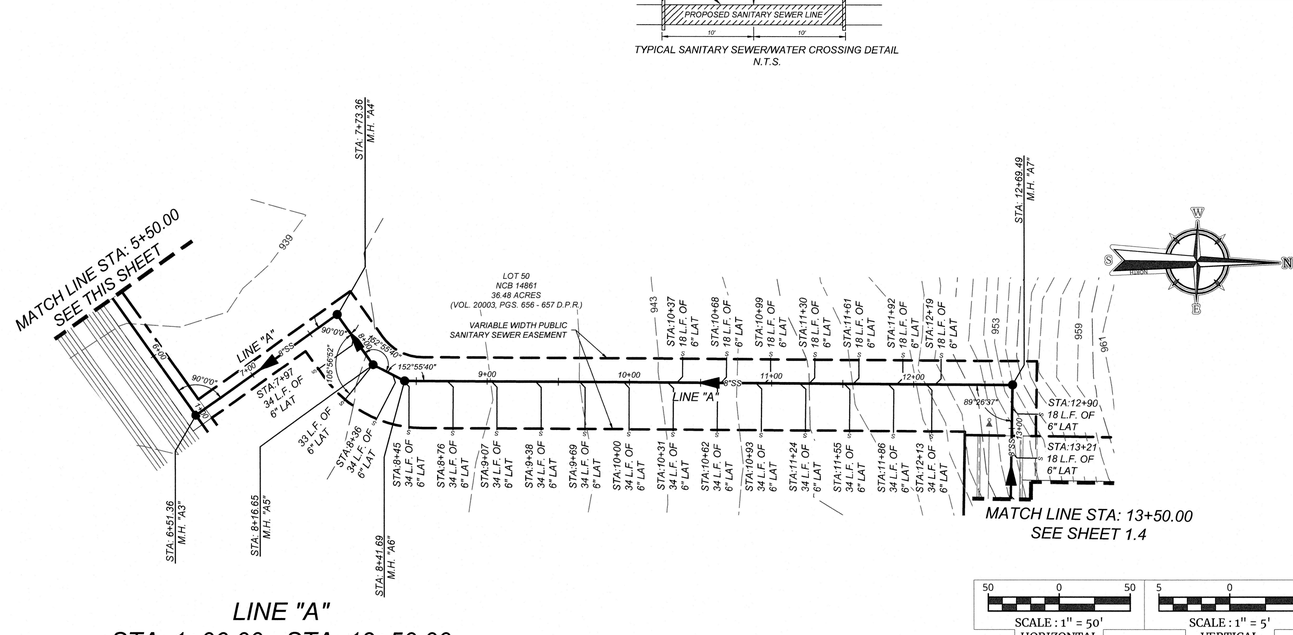


WHERE SEWER PIPE CROSSES A WATER LINE, THE SEWER SHALL BE 160 PSI AND MEET THE REQUIREMENTS OF ASTM D2241 WITH ONE 20' JOINT CENTERED AT THE WATER CROSSING.

TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

DEVELOPER'S NAME: BEAZER HOMES	
DEVELOPER'S ADDRESS: 11467 HUEBNER ROAD, SUITE 225	
CITY: SAN ANTONIO	STATE: TX ZIP: 78230
PHONE#:	FAX#: TOTAL ACREAGE: AC.
SAWS BLOCK MAP#: 118630, 118632, 120630, 120632	TOTAL EDU'S:
TOTAL LINEAR FOOTAGE OF PIPE: 487.52 L.F. ~ SDR 26 PVC	PLAT NO.:
NUMBER OF LOTS:	SAWS JOB#:



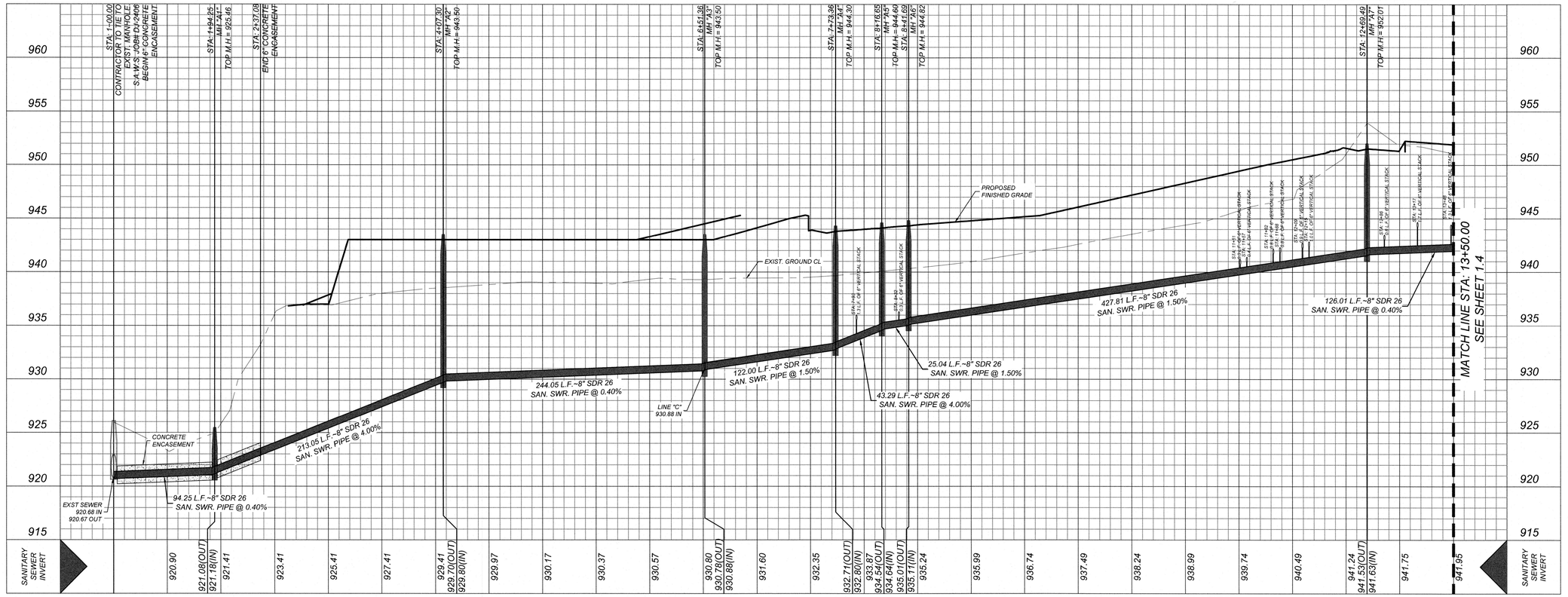


LINE "A"
STA: 1+00.00 - STA: 13+50.00

SCALE : 1" = 50'
HORIZONTAL

SCALE : 1" = 5'
VERTICAL

Linear unit of measure: International Foot (1 ft = 0.3048 m)



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REV	DATE	DRAWN BY	DESCRIPTION

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CLAYTON J. LINNEY
111543
LICENSED PROFESSIONAL ENGINEER
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STREET, DRAINAGE, WATER,SANITARY SEWER & UTILITY IMPROVEMENTS
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CITY OF SAN ANTONIO
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TBPE Firm#: F-14909
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER:	DRAWING NAME:
1065-13-03	SS10651303

SHEET TITLE:
LINE "A" PLAN & PROFILE (SHT 1 OF 2)

SHEET NUMBER:
1.3

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

C:\USERS\MERCEDES\10651303\dwg\1.3 LINE "A" PLAN & PROFILE (SHT 1 OF 2).dwg By: ETHOMPSON

TRENCH EXCAVATION SAFETY PROTECTION

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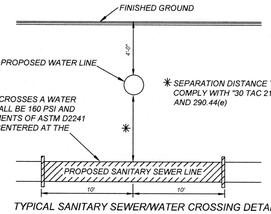
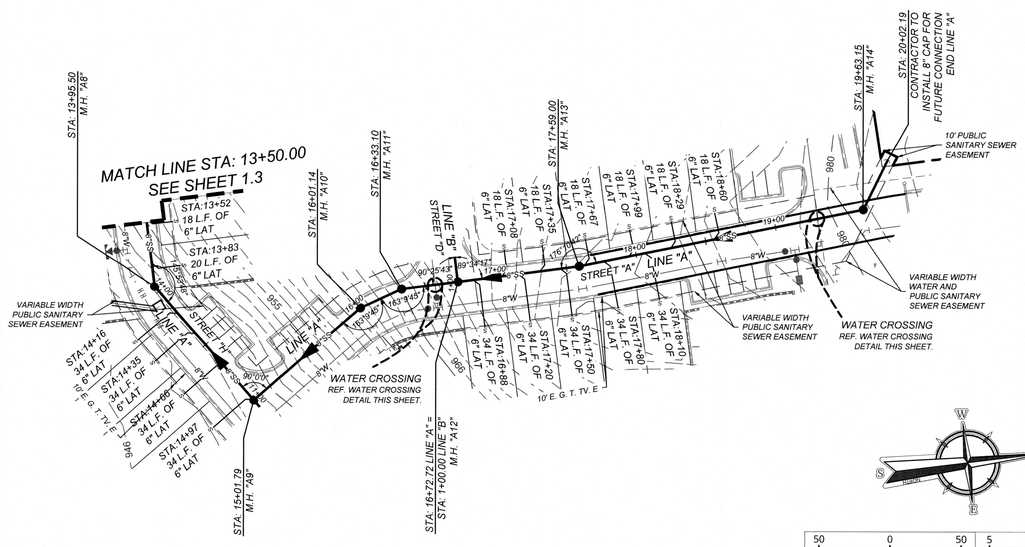
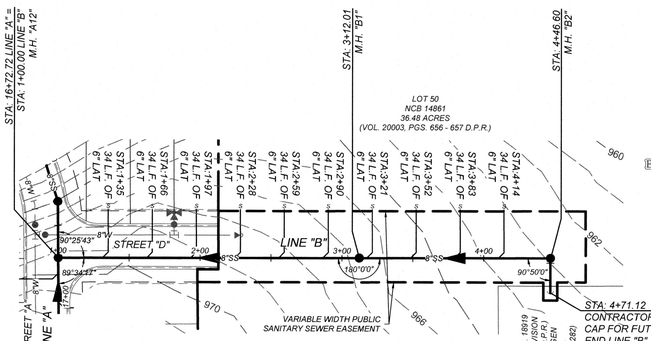


TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

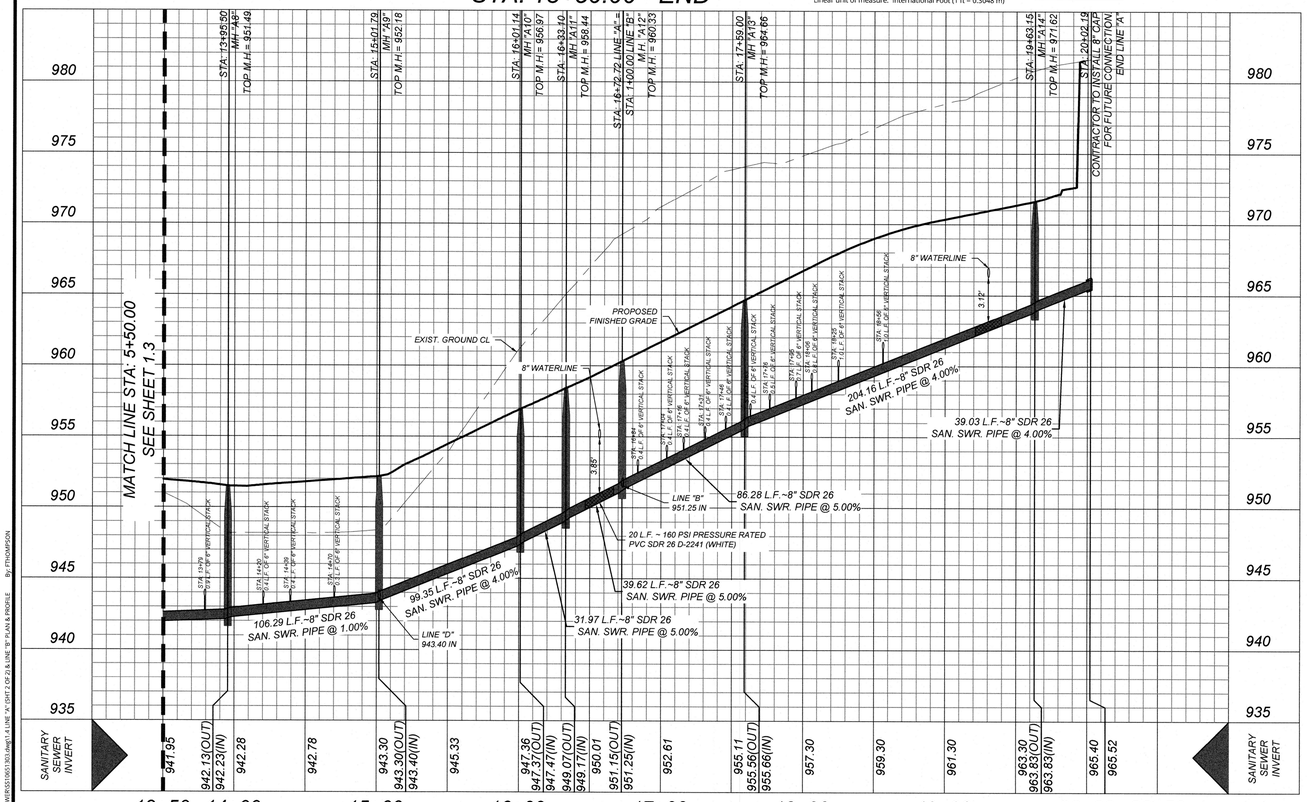
DEVELOPER'S NAME: BEAZER HOMES			
DEVELOPER'S ADDRESS: 11467 HUEBNER ROAD, SUITE 225			
CITY: SAN ANTONIO	STATE: TX	ZIP: 78230	
PHONE#:	FAX#:	TOTAL ACREAGE: AC.	
SAWS BLOCK MAP#: 118630, 118632, 120630, 120632		TOTAL EDU'S:	
TOTAL LINEAR FOOTAGE OF PIPE: 487.52 L.F. ~ SDR 26 PVC		PLAT NO.:	
NUMBER OF LOTS:	SAWS JOB#:		





SCALE : 1" = 50' HORIZONTAL
SCALE : 1" = 5' VERTICAL
Linear unit of measure: International Foot (1 ft = 0.3048 m)

LINE "A"
STA: 13+50.00 - END



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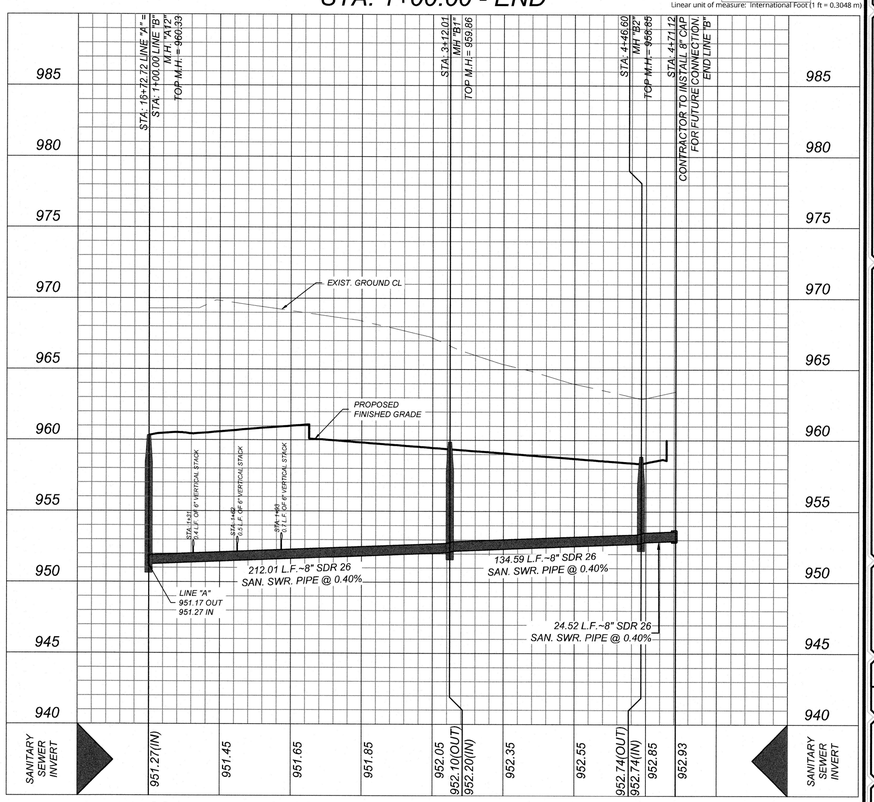

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REV.	DATE	DESCRIPTION	DRAWN BY

STATE OF TEXAS
CLAYTON J. LINNEY
111543
LICENSED PROFESSIONAL ENGINEER
4/10/2024

CLAYTON J. LINNEY
TEXAS LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: 111543
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909 TBPLS Firm#: 10194550

TREVOR FIELDS, UNIT 1
STREET, DRAINAGE, WATER,SANITARY SEWER & UTILITY IMPROVEMENTS FOR
MOSAIC LAND DEVLOPMENT

CITY OF SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
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TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL
PROJECT NUMBER: 1065-13-03	DRAWING NAME: S510651303		

SHEET TITLE: LINE "A" (SHT 2 OF 2) & LINE "B" PLAN & PROFILE

SHEET NUMBER: 1.4

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

C:\CIVIL\PROJECTS\1065-13-03\dwg\1.4 LINE "A" (SHT 2 OF 2) & LINE "B" PLAN & PROFILE By: JTHOMPSON

Texas Commission on Environmental Quality
Organized Sewage Collection System
General Construction Notes
TCEQ-0596 (Rev. July 15, 2015)

Edwards Aquifer Protection Program Construction Notes – Legal Disclaimer

The following/listed "construction notes" are intended to be advisory in nature only and do not constitute an approval or conditional approval by the Executive Director, nor do they constitute a comprehensive listing of rules or conditions to be followed during construction. Further actions may be required to achieve compliance with TCEQ regulations found in Title 30, Texas Administrative Code, Chapters 213 and 217, as well as local ordinances and regulations providing for the protection of water quality. Additionally, nothing contained in the following/listed "construction notes" restricts the powers of the Executive Director, the commission or any other governmental entity to prevent, correct, or curtail activities that result or may result in pollution of the Edwards Aquifer or hydrologically connected surface waters. The holder of any Edwards Aquifer Protection Plan containing "construction notes" is still responsible for compliance with Title 30, Texas Administrative Code, Chapters 213 or any other applicable TCEQ regulation, as well as all conditions of an Edwards Aquifer Protection Plan through all phases of plan implementation. Failure to comply with any condition of the Executive Director's approval, whether or not in contradiction of any "construction notes," is a violation of TCEQ regulations and any violation is subject to administrative rules, orders, and penalties as provided under Title 30, Texas Administrative Code § 213.10 (relating to Enforcement). Such violations may also be subject to civil penalties and injunction. The following/listed "construction notes" in no way represent an approved exception by the Executive Director to any part of Title 30 Texas Administrative Code, Chapters 213 and 217, or any other TCEQ applicable regulation.

1. This Organized Sewage Collection System (SCS) must be constructed in accordance with 30 Texas Administrative Code (TAC) §213.5(c), the Texas Commission on Environmental Quality's (TCEQ) Edwards Aquifer Rules and any local government standard specifications.

2. All contractors conducting regulated activities associated with this proposed regulated project must be provided with copies of the SCS plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors must be required to keep on-site copies of the plan and the approval letter.

3. A written notice of construction must be submitted to the presiding TCEQ regional office at least 48 hours prior to the start of any regulated activities. This notice must include:
- the name of the approved project;
- the activity start date; and
- the contact information of the prime contractor.

4. Any modification to the activities described in the referenced SCS application following the date of approval may require the submittal of an SCS application to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval.

5. Prior to beginning any construction activity, all temporary erosion and sedimentation (E&S) control measures must be properly installed and maintained in accordance with the manufacturers specifications. These controls must remain in place until the disturbed areas have been permanently stabilized.

6. If any sensitive features are discovered during the wastewater line trenching activities, all regulated activities near the sensitive feature must be suspended immediately. The applicant must immediately notify the appropriate regional office of the TCEQ of the feature discovered. A geologist's assessment of the location and extent of the feature discovered must be reported to that regional office in writing and the applicant must submit a plan for ensuring the structural integrity of the sewer line or for modifying the proposed collection system alignment around the feature. The regulated activities near the sensitive feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards Aquifer from any potentially adverse impacts to water quality while maintaining the structural integrity of the line.

7. Sewer lines located within or crossing the 5-year floodplain of a drainage way will be protected from inundation and stream velocities which could cause erosion and scouring of backfill. The trench must be capped with concrete to prevent scouring of backfill, or the sewer lines must be encased in concrete. All concrete shall have a minimum thickness of 6 inches.

8. Blasting procedures for protection of existing sewer lines and other utilities will be in accordance with the National Fire Protection Association criteria. Sand is not allowed as bedding or backfill in trenches that have been blasted. If any existing sewer lines are damaged, the lines must be repaired and retested.

9. All manholes constructed or rehabilitated on this project must have watertight size on size resilient connectors allowing for differential settlement. If manholes are constructed within the 100-year floodplain, the cover must have a gasket and be bolted to the ring. Where gasketed manhole covers are required for more than three manholes in sequence or for more than 1500 feet, alternate means of venting will be provided. Bricks are not an acceptable construction material for any portion of the manhole.
The diameter of the manholes must be a minimum of four feet and the manhole for entry must have a minimum clear opening diameter of 30 inches. These dimensions and other details showing compliance with the commission's rules concerning manholes and sewer line/manhole inverts described in 30 TAC §217.55 are included on SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS.
It is suggested that entrance into manholes in excess of four feet deep be accomplished by means of a portable ladder. The inclusion of steps in a manhole is prohibited.

10. Where water lines and new sewer line are installed with a separation distance closer than nine feet (i.e., water lines crossing wastewater lines, water lines paralleling wastewater lines, or water lines next to manholes) the installation must meet the requirements of 30 TAC §217.53(d) (Pipe Design) and 30 TAC §290.44(e) (Water Distribution).

11. Where sewers lines deviate from straight alignment and uniform grade all curvature of sewer pipe must be achieved by the following procedure which is recommended by the pipe manufacturer: .
If pipe flexure is proposed, the following method of preventing deflection of the joint must be used: N/A.
Specific care must be taken to ensure that the joint is placed in the center of the trench and properly bedded in accordance with 30 TAC §217.54.

12. New sewage collection system lines must be constructed with stub outs for the connection of anticipated extensions. The location of such stub outs must be marked on the ground such that their location can be easily determined at the time of connection of the extensions. Such stub outs must be manufactured wyes or tees that are compatible in size and material with both the sewer line and the extension. At the time of original construction, new stub-outs must be constructed sufficiently to extend beyond the end of the street pavement. All stub-outs must be sealed with a manufactured cap to prevent leakage. Extensions that were not anticipated at the time of original construction or that are to be connected to an existing sewer line not furnished with stub outs must be connected using a manufactured saddle and in accordance with accepted plumbing techniques.
If no stub-out is present an alternate method of joining laterals is shown in the detail on SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS. (For potential future laterals).
The private service lateral stub-outs must be installed as shown on the plan and profile sheets on Plan Sheet 1.3 to 1.4 and marked after backfilling as shown in the detail on PSAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS.

13. Trenching, bedding and backfill must conform with 30 TAC §217.54. The bedding and backfill for flexible pipe must comply with the standards of ASTM D-2321, Classes IA, IB, II or III. Rigid pipe bedding must comply with the requirements of ASTM C 12 (ANSI A 106.2) classes A, B or C.

14. Sewer lines must be tested from manhole to manhole. When a new sewer line is connected to an existing stub or clean-out, it must be tested from existing manhole to new manhole. If a stub or clean-out is used at the end of the proposed sewer line, no private service attachments may be connected between the last manhole and the cleanout unless it can be certified as conforming with the provisions of 30 TAC §213.5(c)(3)(E).

15. All sewer lines must be tested in accordance with 30 TAC §217.57. The engineer must retain copies of all test results which must be made available to the executive director upon request. The engineer must certify in writing that all wastewater lines have passed all required testing to the appropriate regional office within 30 days of test completion and prior to use of the new collection system. Testing method will be:
(a) For a collection system pipe that will transport wastewater by gravity flow, the design must specify an infiltration and exfiltration test or a low-pressure air test. A test must conform to the following requirements:
(1) Low Pressure Air Test.
(A) A low pressure air test must follow the procedures described in American Society For Testing And Materials (ASTM) C-828, ASTM C- 924, or ASTM F-1417 or other procedure approved by the executive director, except as to testing times as required in Table C.3 in subparagraph (C) of this paragraph or Equation C.3 in subparagraph (B)(ii) of this paragraph.
(B) For sections of collection system pipe less than 36 inch average inside diameter, the following procedure must apply, unless a pipe is to be tested as required by paragraph (2) of this subsection.
(i) A pipe must be pressurized to 3.5 pounds per square inch (psi) greater than the pressure exerted by groundwater above the pipe.
(ii) Once the pressure is stabilized, the minimum time allowable for the pressure to drop from 3.5 psi gauge to 2.5 psi gauge is computed from the following equation:

Equation C.3

Where: $T = \frac{0.085xDxK}{Q}$

T = time for pressure to drop 1.0 pound per square inch gauge in seconds
K = 0.000419 X D X L, but not less than 1.0
D = average inside pipe diameter in inches
L = length of line of same size being tested, in feet
Q = rate of loss, 0.0015 cubic feet per minute per square foot internal surface
(C) Since a K value of less than 1.0 may not be used, the minimum testing time for each pipe diameter is shown in the following Table C.3:

PIPE DIAMETER (INCHES)	MINIMUM TIME (SECONDS)	LENGTH FOR MINIMUM (FEET)	TIME FOR LONGER LENGTH (SECONDS/FOOT)
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369
33	1870	72	25.856

(D) An owner may stop a test if no pressure loss has occurred during the first 25% of the calculated testing time.
(E) If any pressure loss or leakage has occurred during the first 25% of a testing period, then the test must continue for the entire test duration as outlined above or until failure.
(F) Wastewater collection system pipes with a 27 inch or larger average inside diameter may be air tested at each joint instead of following the procedure outlined in this section.
(G) A testing procedure for pipe with an inside diameter greater than 33 inches must be approved by the executive director.
(2) Infiltration/Exfiltration Test.
(A) The total exfiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch of diameter per mile of pipe per 24 hours at a minimum test head of 2.0 feet above the crown of a pipe at an upstream manhole.
(B) An owner shall use an infiltration test in lieu of an exfiltration test when pipes are installed below the groundwater level.
(C) The total exfiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch diameter per mile of pipe per 24 hours at a minimum test head of two feet above the crown of a pipe at an upstream manhole, or at least two feet above existing groundwater level, whichever is greater.
(D) For construction within a 25-year flood plain, the infiltration or exfiltration must not exceed 10 gallons per inch diameter per mile of pipe per 24 hours at the same minimum test head as in subparagraph (C) of this paragraph.
(E) If the quantity of infiltration or exfiltration exceeds the maximum quantity specified, an owner shall undertake remedial action in order to reducethe infiltration or exfiltration to an amount within the limits specified. An owner shall retest a pipe following a remediation action.
(b) If a gravity collection pipe is composed of flexible pipe, deflection testing is also required. The following procedures must be followed:
(1) For a collection pipe with inside diameter less than 27 inches, deflection measurement requires a rigid mandrel.
(A) Mandrel Sizing.
(i) A rigid mandrel must have an outside diameter (OD) not less than 95% of the base inside diameter (ID) or average ID of a pipe, as specified in the appropriate standard by the ASTMs, American Water Works Association, UNI-BELL, or American National Standards Institute, or any related appendix.
(ii) If a mandrel sizing diameter is not specified in the appropriate standard, the mandrel must have an OD equal to 95% of the ID of a pipe. In this case, the ID of the pipe, for the purpose of determining the OD of the mandrel, must equal be the average outside diameter minus two minimum wall thicknesses for OD controlled pipe and the average inside diameter for ID controlled pipe.
(iii) All dimensions must meet the appropriate standard.
(B) Mandrel Design.
(i) A rigid mandrel must be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed.
(ii) A mandrel must have nine or more odd number of runners or legs.
(iii) A barrel section length must equal at least 75% of the inside diameter of a pipe.
(iv) Each size mandrel must use a separate proving ring.
(C) Method Options.
(i) An adjustable or flexible mandrel is prohibited.
(ii) A test may not use television inspection as a substitute for a deflection test.
(iii) If requested, the executive director may approve the use of a deflectometer or a mandrel with removable legs or runners on a case-by-case basis.
(2) For a gravity collection system pipe with an inside diameter 27 inches and greater, other test methods may be used to determine vertical deflection.
(3) A deflection test method must be accurate to within plus or minus 0.2% deflection.
(4) An owner shall not conduct a deflection test until at least 30 days after the final backfill.
(5) Gravity collection system pipe deflection must not exceed five percent (5%).
(6) If a pipe section fails a deflection test, an owner shall correct the problem and conduct a second test after the final backfill has been in place at least 30 days.

16. All manholes must be tested to meet or exceed the requirements of 30 TAC §217.58.
(a) All manholes must pass a leakage test.
(b) An owner shall test each manhole (after assembly and backfilling) for leakage, separate and independent of the collection system pipes, by hydrostatic exfiltration testing, vacuum testing, or other method approved by the executive director.
(1) Hydrostatic Testing.
(A) The maximum leakage for hydrostatic testing or any alternative test methods is 0.025 gallons per foot diameter per foot of manhole depth per hour.
(B) To perform a hydrostatic exfiltration test, an owner shall seal all wastewater pipes coming into a manhole with an internal pipe plug, fill the manhole with water, and maintain the test for at least one hour.
(C) A test for concrete manholes may use a 24-hour wetting period before testing to allow saturation of the concrete.
(2) Vacuum Testing.
(A) To perform a vacuum test, an owner shall plug all lift holes and exterior joints with a non-shrink grout and plug all pipes entering a manhole.
(B) No grout must be placed in horizontal joints before testing.
(C) Stub-outs, manhole boots, and pipe plugs must be secured to prevent movement while a vacuum is drawn.
(D) An owner shall use a minimum 60 inch/lb torque wrench to tighten the external clamps that secure a test cover to the top of a manhole.
(E) A test head must be placed at the inside of the top of a cone section, and the seal inflated in accordance with the manufacturer's recommendations.
(F) There must be a vacuum of 10 inches of mercury inside a manhole to perform a valid test.
(G) A test does not begin until after the vacuum pump is off.
(H) A manhole passes the test if after 2.0 minutes and with all valves closed, the vacuum is at least 9.0 inches of mercury.

17. All private service laterals must be inspected and certified in accordance with 30 TAC §213.5(c)(3)(I). After installation of and, prior to covering and connecting a private service lateral to an existing organized sewage collection system, a Texas Licensed Professional Engineer, Texas Registered Sanitarian, or appropriate city inspector must visually inspect the private service lateral and the connection to the sewage collection system, and certify that it is constructed in conformity with the applicable provisions of this section. The owner of the collection system must maintain such certifications for five years and forward copies to the appropriate regional office upon request. Connections may only be made to an approved sewage collection system.

Austin Regional Office
12100 Park 35 Circle, Building A
Austin, Texas 78753-1808
Phone (512) 339-2929
Fax (512) 339-3795

San Antonio Regional Office
14250 Judson Road
San Antonio, Texas 78233-4480
Phone (210) 490-3096
Fax (210) 545-4329

THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

I. WHERE A SEWER MAIN CROSSES OVER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE (9) FEET, ALL PORTIONS OF THE SEWER MAIN WITHIN NINE (9) FEET OF THE WATER LINE SHALL BE CONSTRUCTED USING 150 PSI PRESSURE RATED DUCTILE IRON, CAST IRON OR PVC PIPE AND JOINED WITH EQUALLY PRESSURE RATED PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL. A SECTION OF 150 PSI PRESSURE RATED PIPE AT LEAST EIGHTEEN (18) FEET IN LENGTH MAY BE CENTERED ON THE WATER MAIN IN LIEU OF PIPE CONNECTION REQUIREMENTS. (NO SEPARATE PAY ITEM.)

II. WHERE A SEMI-RIGID OR RIGID SEWER MAIN CROSSES UNDER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE FEET BUT GREATER THAN TWO FEET, THE INITIAL BACKFILL SHALL BE CEMENT STABILIZED SAND (TWO OR MORE BAGS OF CEMENT PER CUBIC YARD OF SAND) FOR ALL SECTIONS OF THE SEWER WITHIN NINE FEET OF THE WATER MAIN.

III. WHERE A SEWER MAIN CROSSES UNDER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN TWO FEET, THE SEWER MAIN SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC WITH A MINIMUM PRESSURE RATING OF 150 PSI WITHIN NINE FEET OF THE WATER MAIN. SHALL HAVE A SEGMENT OF SEWER PIPE CENTERED ON THE WATER MAIN, SHALL BE PLACED NO CLOSER THAN SIX INCHES BETWEEN OUTER DIAMETERS, AND SHALL BE JOINED WITH PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL. A SECTION CENTERED ON THE WATER MAIN IN LIEU OF PIPE CONNECTION REQUIREMENTS. (NO SEPARATE PAY ITEM)

IV. WHERE A SEWER MAIN PARALLELS A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE FEET, THE SEWER MAIN SHALL BE BELOW THE WATER MAIN, SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC WITH A MINIMUM PRESSURE RATING OF 150 PSI FOR BOTH PIPE AND JOINTS FOR A DISTANCE OF NINE FEET BEYOND THE POINT OF CONFLICT, SHALL MAINTAIN A MINIMUM SEPARATION DISTANCE BETWEEN OUTER DIAMETERS OF TWO FEET VERTICALLY AND FOUR FEET HORIZONTALLY, AND SHALL BE JOINED WITH PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL.

V. SANITARY SEWER MANHOLES SHALL NOT BE INSTALLED ANY CLOSER THAN NINE FEET TO WATER MAINS.

30 TAC 217.58 "TESTING REQUIREMENTS FOR MANHOLES"

(a) All manholes must pass a leakage test.

(b) An owner shall test each manhole (after assembly and backfilling) for leakage, separate and independent of the collection system pipes, by hydrostatic exfiltration testing, vacuum testing, or other method approved by the executive director.

(1) Hydrostatic Testing.

(A) The maximum leakage for hydrostatic testing or any alternative test methods is 0.025 gallons per foot of manhole depth per hour.

(B) To perform a hydrostatic exfiltration test, an owner shall seal all wastewater pipes coming into a manhole with an internal pipe plug, fill the manhole with water, and maintain the test for at least one hour.

(C) A test for concrete manholes may use a 24-hour wetting period before testing to allow saturation of the concrete.

(2) Vacuum Testing.

(A) To perform a vacuum test, an owner shall plug all lift holes and exterior joints with a non-shrink grout and plug all pipes entering a manhole.

(B) No grout must be placed in horizontal joints before testing.

(C) Stub-outs, manhole boots, and pipe plugs must be secured to prevent movement while a vacuum is drawn.

(D) An owner shall use a minimum 60 inch/lb torque wrench to tighten the external clamps that secure a test cover to the top of a manhole.

(E) A test head must be placed at the inside of the top of a cone section, and the seal inflated in accordance with the manufacturer's recommendations.

(F) There must be a vacuum of 10 inches of mercury inside a manhole to perform a valid test.

(G) A test does not begin until after the vacuum pump is off.

(H) A manhole passes the test if after 2.0 minutes and with all valves closed, the vacuum is at least 9.0 inches of mercury.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

30 TAC 217.54 "PIPE BEDDING AND TRENCH REQUIREMENTS"

A. Pipe Embedment
1. A rigid pipe must be laid with the adequate bedding, haunching, and initial backfill to support the anticipated load. The bedding classes that are allowed are A, B, or C, as described in American Society for Testing and Materials (ASTM) C 12, American National Standards Institute (ANSI) A 106.2,Water Environment Federation Manual of Practice No. 9 or American Society of Civil Engineers (ASCE) MOP 37.
2. A flexible pipe must be laid with the adequate bedding, haunching, and initial backfill to support the anticipated load. The bedding classes that are allowed are IA, IB, II, or III, as described in ASTM D-2321 or ANSI K65.171.
3. Debris, large clods, or stones that are greater than six inches in diameter, organic matter, or other unstable materials are prohibited as bedding, haunching, or initial backfill.
4. Backfill must not disturb the alignment of a collection system pipe.
5. If trenching encounters significant fracture, fault zones, caves, or solutional modification to the rock strata, an owner must halt construction until an engineer prepares a written report detailing how construction will accommodate these site conditions.

B. Compaction
1. Compaction of an embedment envelope must meet the manufacturer's recommendations for the collection system pipe used in a project.
2. Compaction of an embedment envelope must provide the modulus of soil reaction for the bedding material necessary to ensure a wastewater collection system pipe's structural integrity as required by §217.53 of this title (relating to Pipe Design).
3. The placement of the backfill above a pipe must not affect the structural integrity of a pipe.

C. Envelope Size
1. A minimum clearance of 6.0 inches below and on each side of the bell of all pipes to the trench walls and floor is required.
2. The embedment material used for haunching and initial backfill must be installed to a minimum depth of 12 inches above the crown of a pipe.

D. Trench Width
1. The width of a trench must allow a pipe to be laid and jointed properly and must allow the backfill to be placed and compacted as needed.
2. The maximum and minimum trench width needed for safety and a pipe's structural integrity must be included in the report.
3. The width of a trench must be sufficient to properly and safely place and compact haunching materials.
4. The space between a pipe and a trench wall must be wider than the compaction equipment used in the pipe zone.

DEVELOPER'S NAME: BEAZER HOMES
DEVELOPER'S ADDRESS: 11467 HUEBNER ROAD, SUITE 225
CITY: SAN ANTONIO STATE: TX ZIP: 78230
PHONE#: FAX#: TOTAL ACREAGE: AC.
SAWS BLOCK MAP#: 118630, 118632, 120630, 120632 TOTAL EDU'S:
TOTAL LINEAR FOOTAGE OF PIPE: 487.52 L.F. ~ SDR 26 PVC PLAT NO.:
NUMBER OF LOTS: SAWS JOB#:

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
CLAYTON J. LINNEY
111543
LICENSED PROFESSIONAL ENGINEER
3/5/2024

CLAYTON J. LINNEY
TEXAS LICENSED PROFESSIONAL ENGINEER
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TREVOR FIELDS, UNIT 1
STREET, DRAINAGE, WATER,SANITARY SEWER & UTILITY IMPROVEMENTS
FOR
MOSAIC LAND DEVLOPMENT

CITY OF SAN ANTONIO
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TBPE Firm#: F-14909
TBPLS Firm#: 10194550

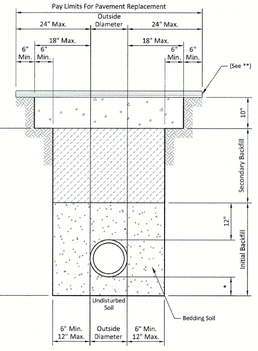
SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER: 1065-13-03
DRAWING NAME: DTS510651303

SHEET TITLE:
SANITARY SEWER PLAN NOTES

SHEET NUMBER:
1.5

C:\DATA\PROJECTS\1065\13\1.3sht\13 SANITARY SEWER PLAN NOTES - By: THOMPSON



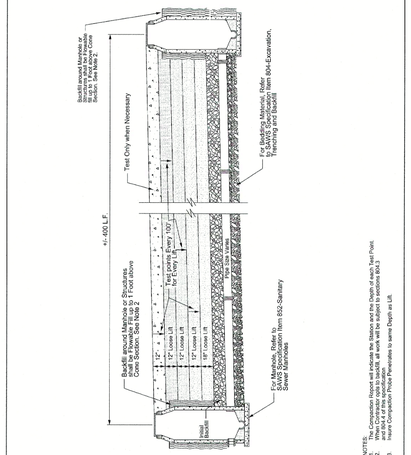
The Existing Material at the Bearing Level shall be Removed and Replaced to a Minimum Depth of 6-Inches or ⅛ of the Outside Diameter of the Pipe, whichever is greater, with Bedding Material.

In Areas of over Excavation, Encasement shall extend from Trench Wall.
Pay Limits shall not Exceed 12" Max. as shown on Detail. Additional Encasement shall be Incidental.

* Sewer Gravel 6" Min. or ⅛ O.D. of the Pipe, whichever is greater.
** Minimum 2" HMAC Type "D" for Trench Repair in Local/Residential Streets.
** Minimum 3" HMAC Type "C" for Trench Repair in Collector/Arterial Streets.

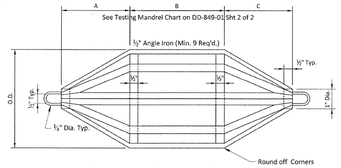
- Hot Mix Asphalt Concrete (HMAC)
- Asphalt Treated Base (A.T.B.)

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	SANITARY SEWER PIPE LAID IN TRENCH	MARCH 2008	AUG 2019
		DD-804-01	SHEET 1 OF 1

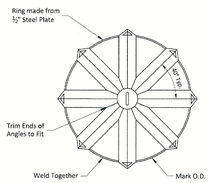


NOTES:
1. The Compaction Report will indicate the Station and the Depth of each Test Point, and a Key Map will be Provided Indicating the Test Locations.
2. Test Locations will Alternate to same Depth as Lift.
3.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TRENCH COMPACTION DETAIL	MARCH 2018	AUG 2019
		DD 804-02	SHEET 1 OF 1



SIDE OR TOP VIEW



END VIEW

Note:
All Mandrels must be Approved by SAWS Construction Inspection Dept. and Stamped before Use.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	GO, NO GO DEFLECTION TESTING MANDREL	MARCH 2008	December 2019
		DD-849-01	SHEET 1 OF 2

SIZE	A	B*	MANDREL O.D. PVC (SDR -26)	RING O.D. PVC (SDR -26)
6"	4.0"	4.5"	5.50	4.79
8"	5.5"	6"	7.37	6.66
10"	7.0"	7.5"	9.21	8.50
12"	8.0"	9"	10.96	10.25
15"	10.0"	11"	13.42	12.71
18"	12.0"	13.5"	———	———
21"	14.0"	16"	———	———
24"	16.0"	18"	———	———
27"	18.0"	20"	———	———

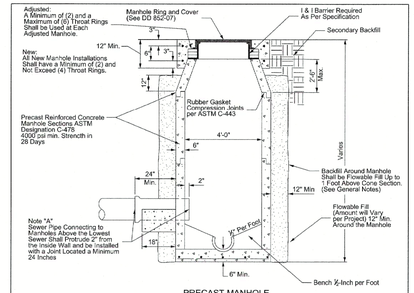
*Minimum Length

CHART

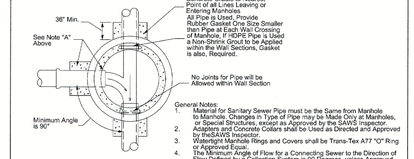
Notes:
PVC Pipes and Fittings 6" to 15" in Diameter shall Conform to ASTM D-2241
PVC Pipes and Fittings 18" to 27" in Diameter shall Conform to ASTM F-679

This information is provided as a reference. All deflection testing shall be done in accordance with TCEQ Capter 217.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	GO, NO GO DEFLECTION TESTING MANDREL CHART	MARCH 2008	December 2019
		DD-849-01	SHEET 2 OF 2



PRECAST MANHOLE



General Notes:
1. Material for Sanitary Sewer Pipe must be the Same from Manhole to Manhole, Changes in Type of Pipe may be Made Only at Manholes, or Special Structures, except as Approved by the SAWS Inspector.
2. Reinforced Concrete Collars shall be Used as Directed and Approved by SAWS Inspector.
3. Watertight Manhole Rings and Covers shall be Trans-Tex A77 "O" Ring or Approved Equal.
4. The Minimum Angle of Flow for a Connecting Sewer to the Direction of Flow Defined by a Collection System is 90 Degrees, unless Approved by the Engineer.

PRECAST MANHOLE

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	STANDARD PRECAST MANHOLE	MAY 2013	AUG 2019
		DD-852-01	SHEET 1 OF 2

MONOLITHIC MANHOLE

General Notes:
1. Material for Sanitary Sewer Pipe Must be the Same from Manhole to Manhole, Changes in Type of Pipe May be Made only at Manholes, or Special Structures, Except as Approved by the Project Engineer.
2. Adaptors and Concrete Collars shall be used as approved by the SAWS Project Engineer.
3. Watertight Manhole Rings and Covers shall be Trans-Tex A77 "O" Ring or Approved Equal.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	STANDARD MONOLITHIC MANHOLE	MARCH 2008	AUG 2019
		DD 852-01	SHEET 2 OF 2

SIP Industries

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	30" MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 2019
		DD 852-07	SHEET 1 OF 5

ERGO Assembly

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 2019
		DD 852-07	SHEET 2 OF 5

ERGO XL Assembly

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 2019
		DD 852-07	SHEET 3 OF 5

NEENAH FOUNDRY

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 2019
		DD 852-07	SHEET 4 OF 5

NEENAH FOUNDRY

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 2019
		DD 852-07	SHEET 5 OF 5

NOTE: Price for Drop Fittings and Encasement to be Included with the Price of Manhole.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	DROP MANHOLE DETAIL	MARCH 2008	AUG 2019
		DD-852-08	SHEET 1 OF 1

FOR NEW DEVELOPMENT:
CLEAN-OUTS MAY NOT BE PLACED IN PAVED AREAS I.E. SIDEWALKS, DRIVEWAYS, OR PARKING LOTS, AND MUST BE LOCATED A MINIMUM OF 6" FROM ALL PAVED AREAS.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CLEANOUT DETAIL	MARCH 2008	AUG 2019
		DD-854-02	SHEET 1 OF 3

FOR NEW DEVELOPMENT:
CLEAN-OUTS MAY NOT BE PLACED IN PAVED AREAS I.E. SIDEWALKS, DRIVEWAYS, OR PARKING LOTS, AND MUST BE LOCATED A MINIMUM OF 6" FROM ALL PAVED AREAS.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CLEANOUT DETAIL	MARCH 2008	AUG 2019
		DD-854-02	SHEET 2 OF 3

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REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
CLAYTON J. LINNEY
111543
LICENSED PROFESSIONAL ENGINEER
3/5/2024

CLAYTON J. LINNEY
TEXAS LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: 111543
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909 - TBPLS Firm#: 10194550

TREVOR FIELDS, UNIT 1
STREET, DRAINAGE, WATER,SANITARY SEWER & UTILITY IMPROVEMENTS
FOR
MOSAIC LAND DEVLOPMENT

CITY OF SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL
PROJECT NUMBER: 1065-13-03		DRAWING NAME: DTSS10651303	

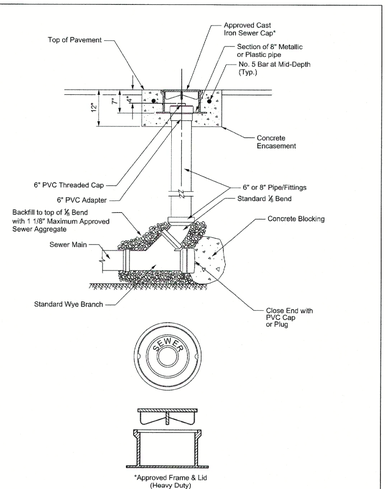
SHEET TITLE:
SANITARY SEWER DETAIL (SHT 1 OF 2)

SHEET NUMBER: 1.6

DEVELOPER'S NAME: BEAZER HOMES
DEVELOPER'S ADDRESS: 11467 HUEBNER ROAD, SUITE 225
CITY: SAN ANTONIO STATE: TX ZIP: 78230
PHONE#: FAX#: TOTAL ACREAGE: AC.
SAWS BLOCK MAP#: 118630, 118632, 120630, 120632 TOTAL EDU'S:
TOTAL LINEAR FOOTAGE OF PIPE: 487.52 L.F. ~ SDR 26 PVC PLAT NO.:
NUMBER OF LOTS: SAWS JOB#:

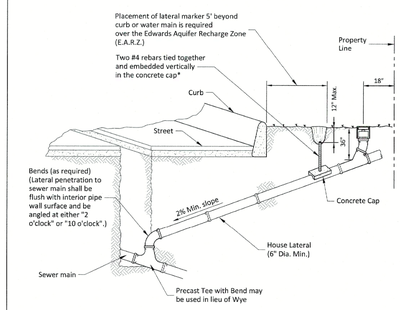
NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

CivilSAWSROOTS\1065\13\03.dwg\1.5 SANITARY SEWER DETAIL (SHT 1 OF 2) By: PTHOMPSON



Note: Depending upon the type of service that an 8 inch lateral (on a dead end main) is providing, a standard manhole in lieu of this cleanout may be required. Consult with the SAWS Inspector.

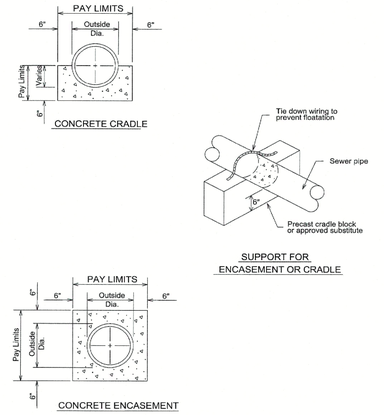
PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CLEANOUT DETAIL (ON DEAD-END MAIN)	APPROVED	REVISED
		MARCH 2008	AUG 2019
		DD-854-02	SHEET 3 OF 3



HOUSE LATERAL DETAIL

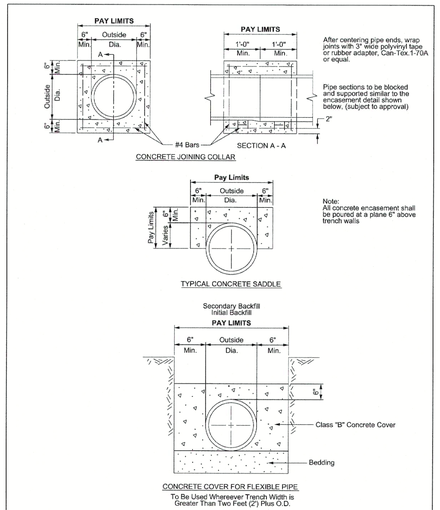
Note:
A minimum of 3' of cover to subgrade is necessary, otherwise concrete encasement will be required.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	HOUSE LATERAL DETAIL (IN THE E.A.R.Z.)	APPROVED	REVISED
		March 2008	December 2018
		DD-854-EARZ	SHEET 1 OF 1



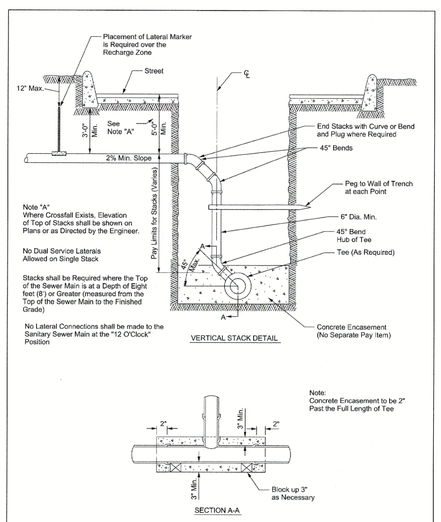
Notes:
1) All concrete encasement shall be poured at a plane 6" above the pipe between excavated trench walls.
2) All sewer pipe with less than 3' of cover to subgrade shall be concrete encased.
3) All Force mains shall be provided with thrust blocks, where changes in direction occur, at Tees, Bends, Crosses, changes in size, stops, or as directed by SAWS.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CONCRETE ENCASEMENT DETAILS	APPROVED	REVISED
		March 2008	AUG 2019
		DD-858-01	SHEET 1 OF 1



To Be Used Wherever Trench Width is Greater Than Two Feet (2') Plus O.D.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CONCRETE DETAILS	APPROVED	REVISED
		MARCH 2008	AUG 2019
		DD 858-02	SHEET 1 OF 1



PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL VERTICAL STACK DETAIL	APPROVED	REVISED
		MARCH 2008	AUG 2019
		DD 860-01	SHEET 1 OF 1

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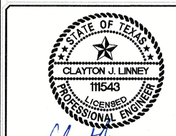
REV.	DATE	DRAWN BY	DESCRIPTION



CLAYTON J. LINNEY
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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER:	DRAWING NAME:
1065-13-03	DTS510651303

SHEET TITLE:
SANITARY SEWER DETAIL (SHT 2 OF 2)

SHEET NUMBER:
1.7

DEVELOPER'S NAME: BEAZER HOMES
DEVELOPER'S ADDRESS: 11467 HUEBNER ROAD, SUITE 225
CITY: SAN ANTONIO STATE: TX ZIP: 78230
PHONE#: FAX#: TOTAL ACREAGE: AC.
SAWS BLOCK MAP#: 118630, 118632, 120630, 120632 TOTAL EDU'S:
TOTAL LINEAR FOOTAGE OF PIPE: 487.52 L.F. - SDR 26 PVC PLAT NO.:
NUMBER OF LOTS: SAWS JOB#:

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

O:\SUBDIVISIONS\1065\1303\dwg\1-7 SANITARY SEWER DETAIL (SHT 2 OF 2).dwg By: JTHOMPSON

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

COMPACTION NOTE:

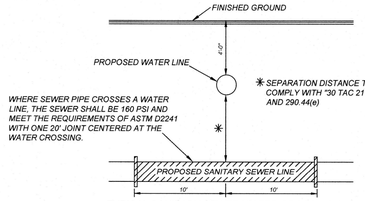
THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

CAUTION!!: THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

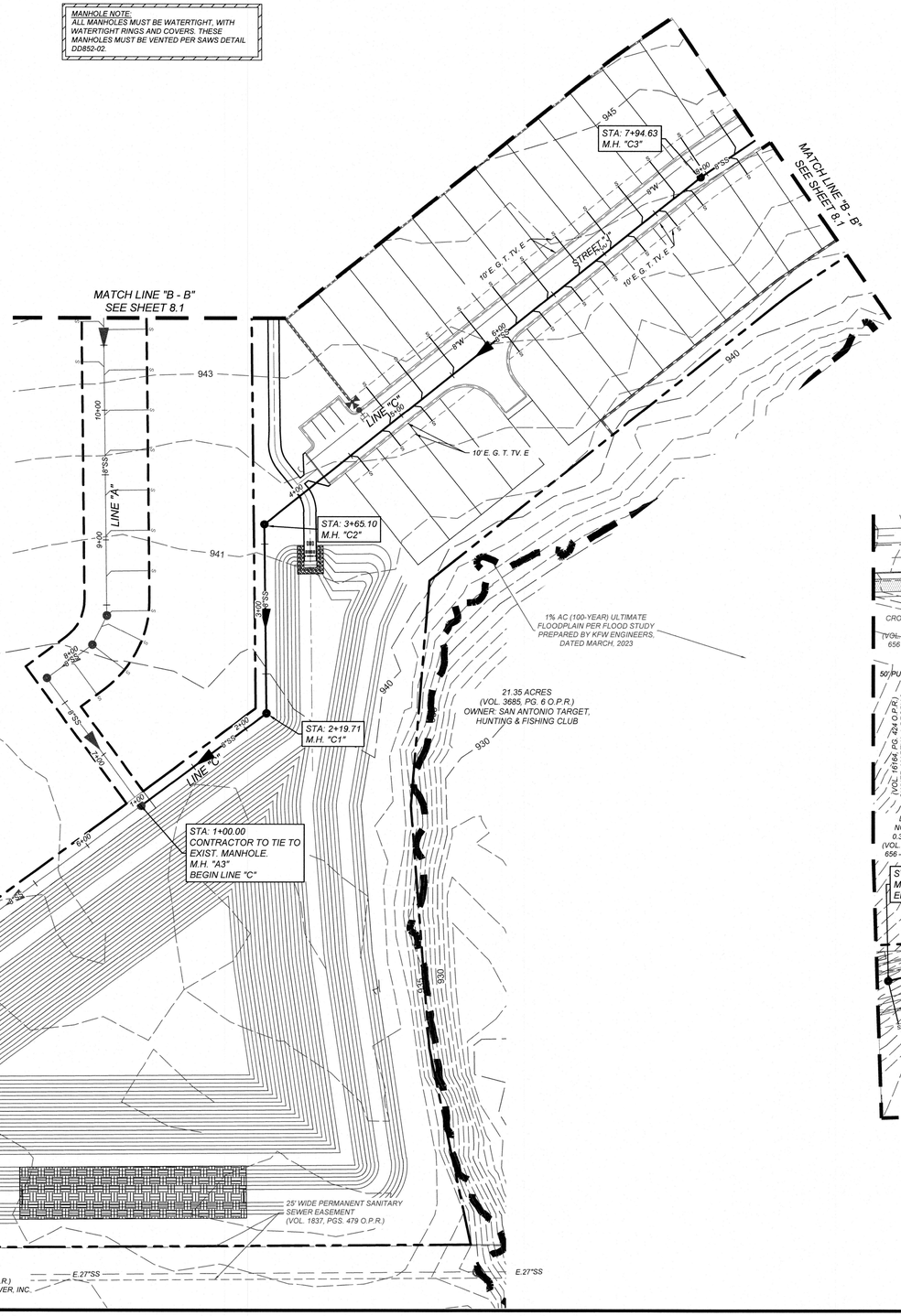
MANHOLE NOTE:
ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.

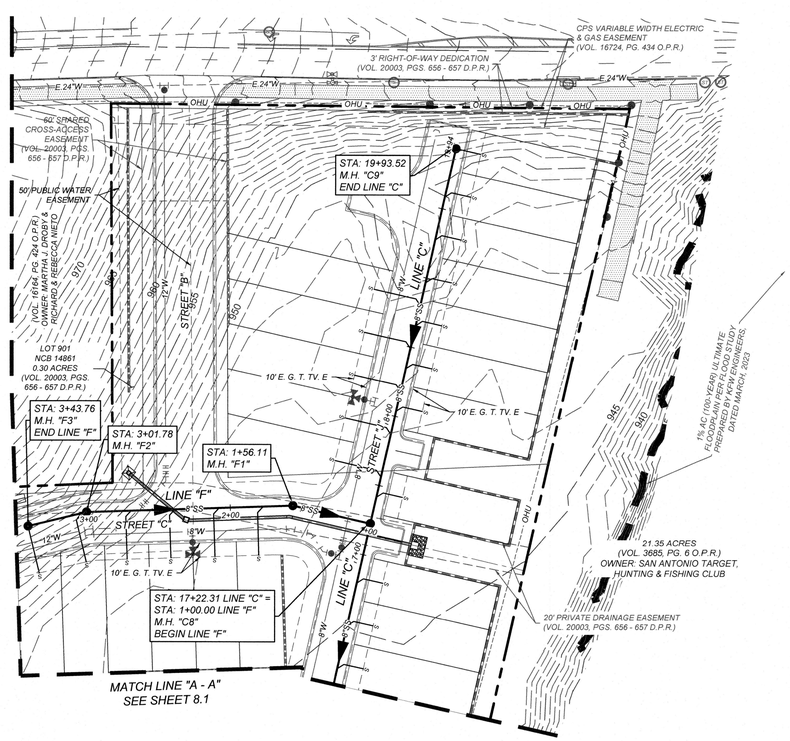
NOTE:

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (S.A.W.S.) STANDARD SPECIFICATION.
2. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 1.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.
3. SEE THIS SHEET FOR BENCHMARK INFORMATION.
4. PIPE TYPE DESIGNATIONS ARE SDR 26.
5. SEE THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.
6. ALL MANHOLES SHALL HAVE CONCRETE RING ENCASEMENT AND A WATER TIGHT RING AND COVER.



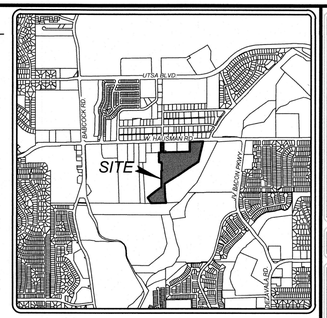
TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.



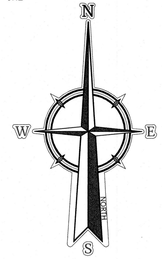


LEGEND

PROPOSED WATER MAIN	=	W
PROPOSED WATER SERVICE & METER BOX	=	W M
PROPOSED WATER 3/4" IRRIGATION SERVICE & METER BOX	=	W IRR
PROPOSED FIRE HYDRANT	=	
PROPOSED WATER VALVE	=	
PROPOSED SANITARY SEWER MAIN	=	SS
PROPOSED SANITARY SEWER MANHOLE	=	
PROPOSED SANITARY SEWER LATERAL	=	
PROPOSED ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT	=	E. G. T. TV. E
EXISTING WATER MAIN	=	E.W
EXISTING FIRE HYDRANT	=	
EXISTING WATER VALVE	=	
EXISTING SANITARY SEWER MAIN	=	E.SS
EXISTING SANITARY SEWER MANHOLE	=	
EXISTING OVERHEAD ELECTRIC W/POWER POLE	=	OHE
EXISTING GUY WIRE/OVERHEAD ELECTRIC	=	OHE



LOCATION MAP
NOT-TO-SCALE



50 0 50 100
SCALE : 1" = 50'
Linear unit of measure: International Foot (1 ft = 0.3048 m)

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REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
CLAYTON J. LINNEY
111543
LICENSED PROFESSIONAL ENGINEER
4/10/2024

CLAYTON J. LINNEY
TEXAS LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: 111543
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909 · TBPLS Firm#: 10194550

TREVOR FIELDS, UNIT 1
STREET, DRAINAGE, WATER,SANITARY SEWER & UTILITY IMPROVEMENTS
FOR
MOSAIC LAND DEVLOPMENT

CITY OF SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER:	DRAWING NAME:
1065-13-03	OS10651303

SHEET TITLE:
OVERALL SANITARY SEWER PLAN (SHT 1 OF 2)

SHEET NUMBER:
8.0

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

G:\UES\WWR\10651303\Sheets\8.0 By:ETHOMPSON

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

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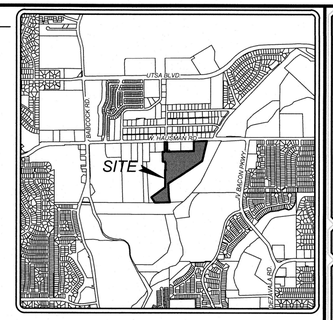
LEGEND

- PROPOSED WATER MAIN = W
- PROPOSED WATER SERVICE & METER BOX = W
- PROPOSED WATER 3/4" IRRIGATION SERVICE & METER BOX = IRRW
- PROPOSED FIRE HYDRANT
- PROPOSED WATER VALVE
- PROPOSED SANITARY SEWER MAIN = SS
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER LATERAL = SS
- PROPOSED ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT = E. G. T. TV. E
- EXISTING WATER MAIN = E.W
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING SANITARY SEWER MAIN = E.SS
- EXISTING SANITARY SEWER MANHOLE
- EXISTING OVERHEAD ELECTRIC W/POWER POLE = OHE
- EXISTING GUY WIRE/OVERHEAD ELECTRIC = OHE



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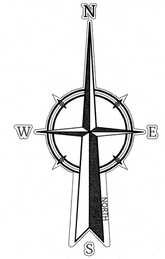
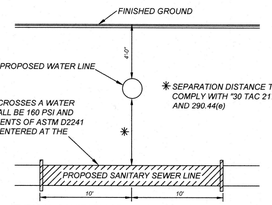
3. SEE THIS SHEET FOR BENCHMARK INFORMATION.
4. PIPE TYPE DESIGNATIONS ARE SDR 26.
5. SEE THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.
6. ALL MANHOLES SHALL HAVE CONCRETE RING ENCASEMENT AND A WATER TIGHT RING AND COVER.



SCALE : 1" = 50'
Linear unit of measure: International Foot (1 ft = 0.3048 m)

W. HAUSMAN RD (80' ROW)
CPS VARIABLE WIDTH ELECTRIC & GAS EASEMENT (VOL. 16724, PG. 317 O.P.R.)
3' RIGHT-OF-WAY DEDICATION (VOL. 20003, PGS. 656 - 657 D.P.R.)
E.20'W
E.24'W
12'W
12' WATER EASEMENT
60' SHARED CROSS-ACCESS EASEMENT (VOL. 20003, PGS. 656 - 657 D.P.R.)
OHU
LOT 901 NCB 14861 0.30 ACRES (VOL. 20003, PGS. 656 - 657 D.P.R.)
REMAINING PORTION OF A 2.309 ACRES (VOL. 8965, PG. 1893 O.P.R.) OWNER: MARTHA DROBY, MICHAEL ALONZO & REBECCA NIETO
STREET "A"
LOT 52 NCB 14861 1.64 ACRES (VOL. 20003, PGS. 656 - 657 D.P.R.)
50' PUBLIC WATER EASEMENT
2.243 ACRES (VOL. 14837, PG. 646 O.P.R.) OWNER: MOISES & LETIEIA RODRIGUEZ
(VOL. 16164, PG. 424 O.P.R.) OWNER: MARTHA J. DROBY & RICHARD & REBECCA NIETO
2,500 SQ. FT. LEASE AREA (VOL.8512, PG. 2069 O.P.R.) OWNER: GENEVIEVE ALONZO & SPRINT SPECTRUM, L.P.
20' PRIVATE DRAINAGE EASEMENT (VOL. 20003, PGS. 656 - 657 D.P.R.)
LOT 1, BLOCK 1, N.C.B. 18919 LAUREL GLEN SUBDIVISION (VOL. 9656, PG. 180 D.P.R.) TRACT I, WOLDHAGEN HOLDINGS LLC (DOC.NO. 20160070282)
STA: 9+03.20 M.H. "E4" END LINE "E"
STA: 6+68.45 M.H. "E3"
STA: 4+64.70 M.H. "E2"
LINE "E"
STREET "G"
STREET "C"
WATER CROSSING REF. WATER CROSSING DETAIL THIS SHEET.
8"SS
8"W
10' E. G. T. TV. E
LOT 50 NCB 14861 36.48 ACRES (VOL. 20003, PGS. 656 - 657 D.P.R.)
VARIABLE WIDTH PUBLIC SANITARY SEWER EASEMENT
STA: 5+28.59 M.H. "D2" END LINE "D"
STA: 2+28.12 M.H. "E1"
STA: 15+36.30 M.H. "C7"
STA: 14+95.31 M.H. "C6"
LINE "D"
LINE "C"
STREET "D"
STREET "H"
STREET "A"
STREET "J"
STA: 3+33.88 M.H. "D1"
STA: 12+49.31 LINE "C" = STA: 1+00.00 LINE "E" M.H. "C5" BEGIN LINE "E"
STA: 1+00.00 CONTRACTOR TO TIE TO EXST. MANHOLE. M.H. "A9" BEGIN LINE "D"
STA: 10+21.97 M.H. "C4"
21.35 ACRES (VOL. 3685, PG. 6 O.P.R.) OWNER: SAN ANTONIO TARGET, HUNTING & FISHING CLUB
MATCH LINE "A - A" SEE SHEET 8.0
MATCH LINE "B - B" SEE SHEET 8.0
MATCH LINE "B - B" SEE SHEET 8.0



WHERE SEWER PIPE CROSSES A WATER LINE, THE SEWER SHALL BE 160 PSI AND MEET THE REQUIREMENTS OF ASTM D2241 WITH ONE 20' JOINT CENTERED AT THE WATER CROSSING.

TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

Colliers Engineering & Design
www.colliersengineering.com

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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER: 1065-13-03
DRAWING NAME: OS10651303

SHEET TITLE: OVERALL SANITARY SEWER PLAN (SHT 2 OF 2)

SHEET NUMBER: 8.1

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

G:\DRAWINGS\1065\1303\dwg\8.1 By: PTHOMPSON

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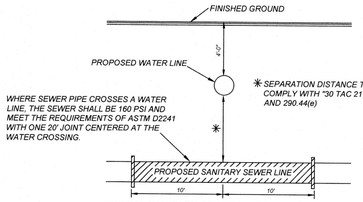
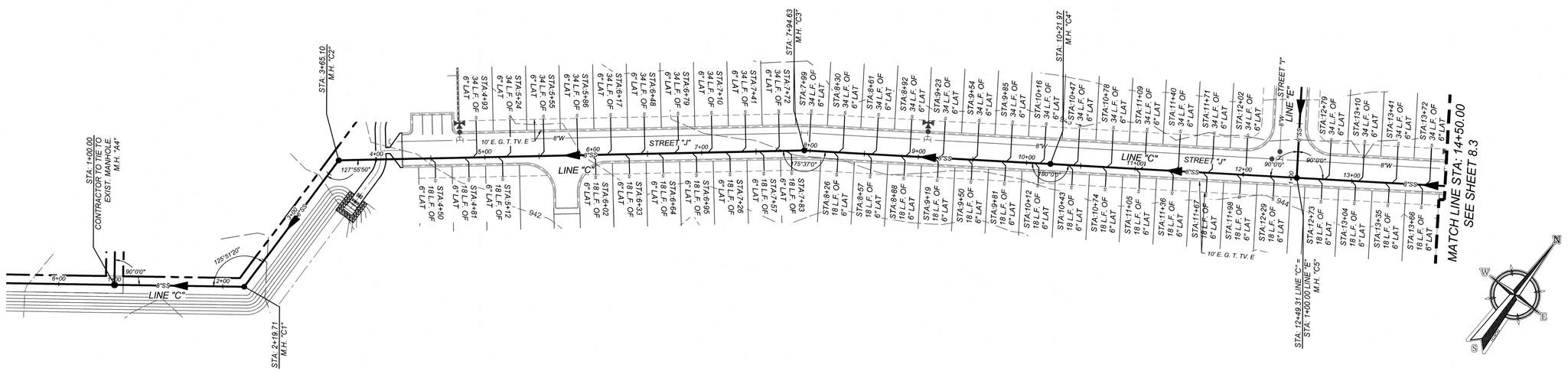
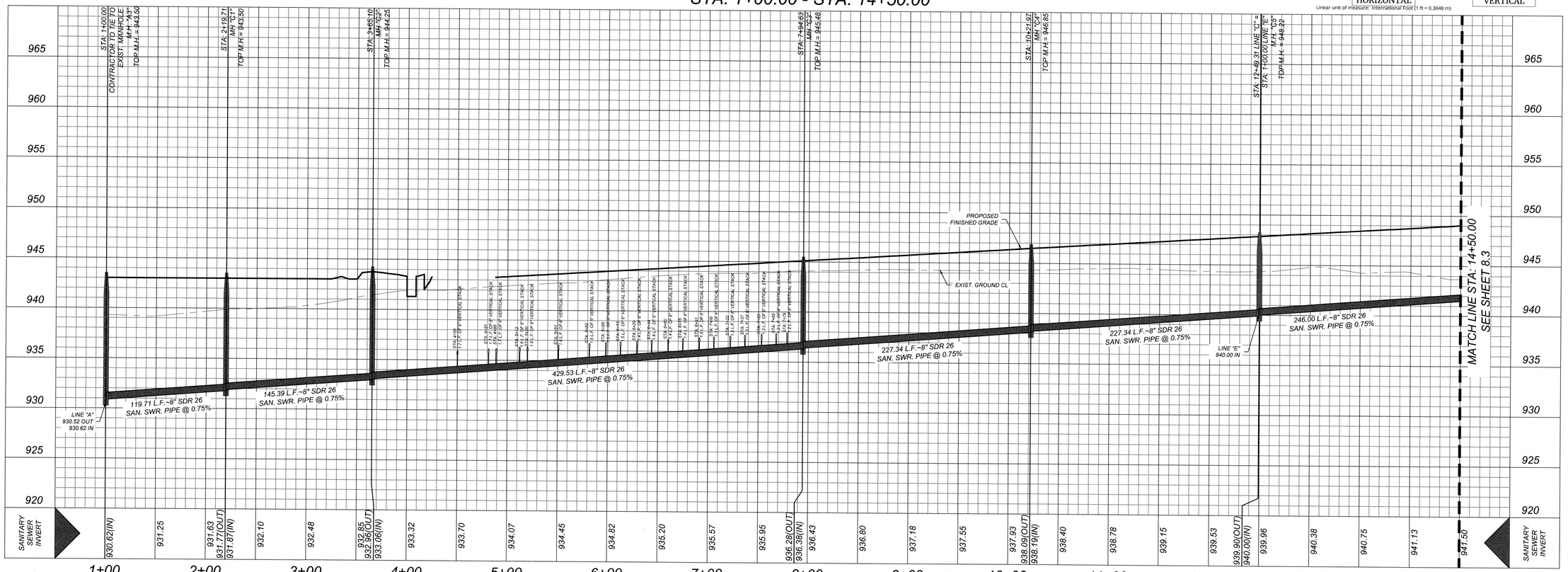


TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.



LINE "C"
STA: 1+00.00 - STA: 14+50.00

SCALE : 1" = 50' HORIZONTAL
SCALE : 1" = 5' VERTICAL
Linear unit of measure: International Foot (1 ft = 0.3048 m)



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SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER:	DRAWING NAME:
1065-13-03	SS10651303

SHEET TITLE:
LINE "C" PLAN & PROFILE (SHT 1 OF 2)

SHEET NUMBER:
8.2

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

O:\ESERVER\SS10651303\dwg\8.2 LINE "C" PLAN & PROFILE (SHT 1 OF 2) By: ETHOMPSON

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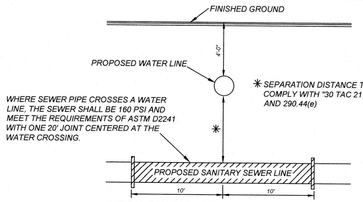
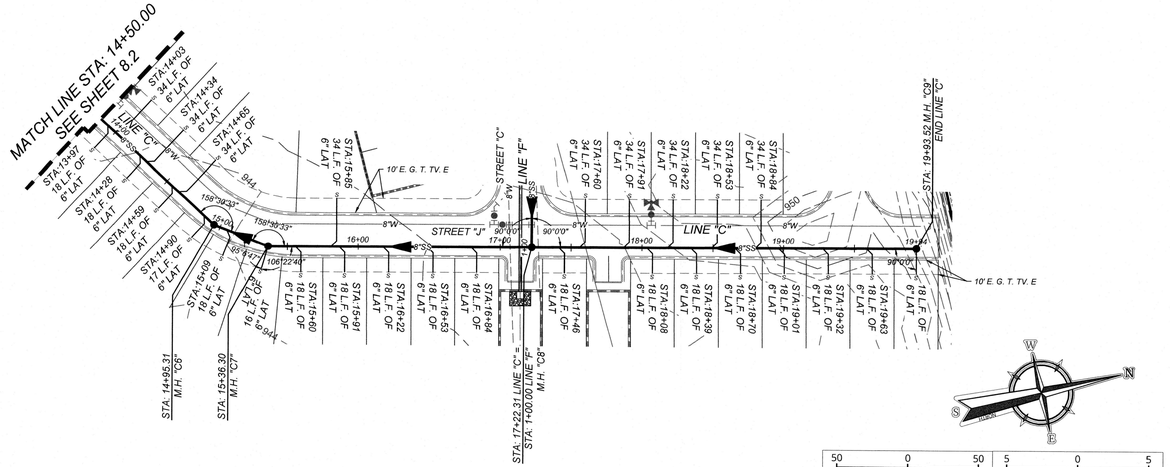
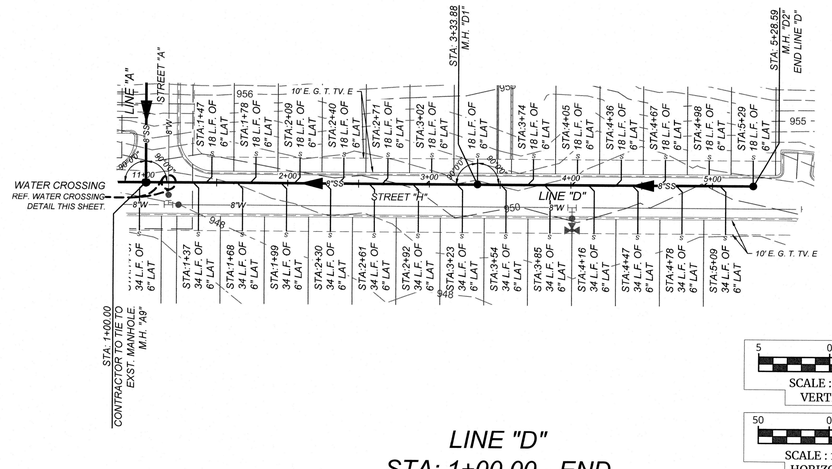


TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

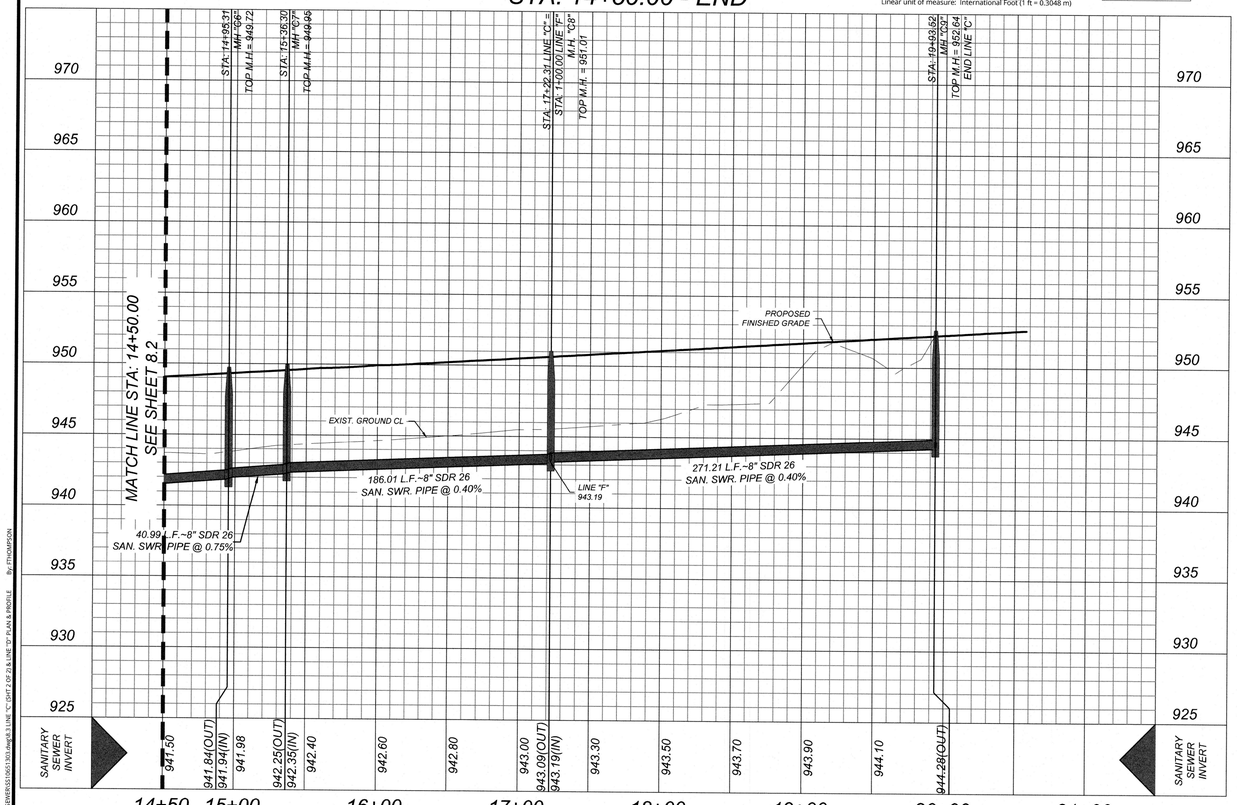
DEVELOPER'S NAME: BEAZER HOMES
DEVELOPER'S ADDRESS: 11467 HUEBNER ROAD, SUITE 225
CITY: SAN ANTONIO STATE: TX ZIP: 78230
PHONE#: FAX#: TOTAL ACREAGE: AC.
SAWS BLOCK MAP#: 118630, 118632, 120630, 120632 TOTAL EDU'S:
TOTAL LINEAR FOOTAGE OF PIPE: 487.52 L.F. ~ SDR 26 PVC PLAT NO.:
NUMBER OF LOTS: SAWS JOB#:



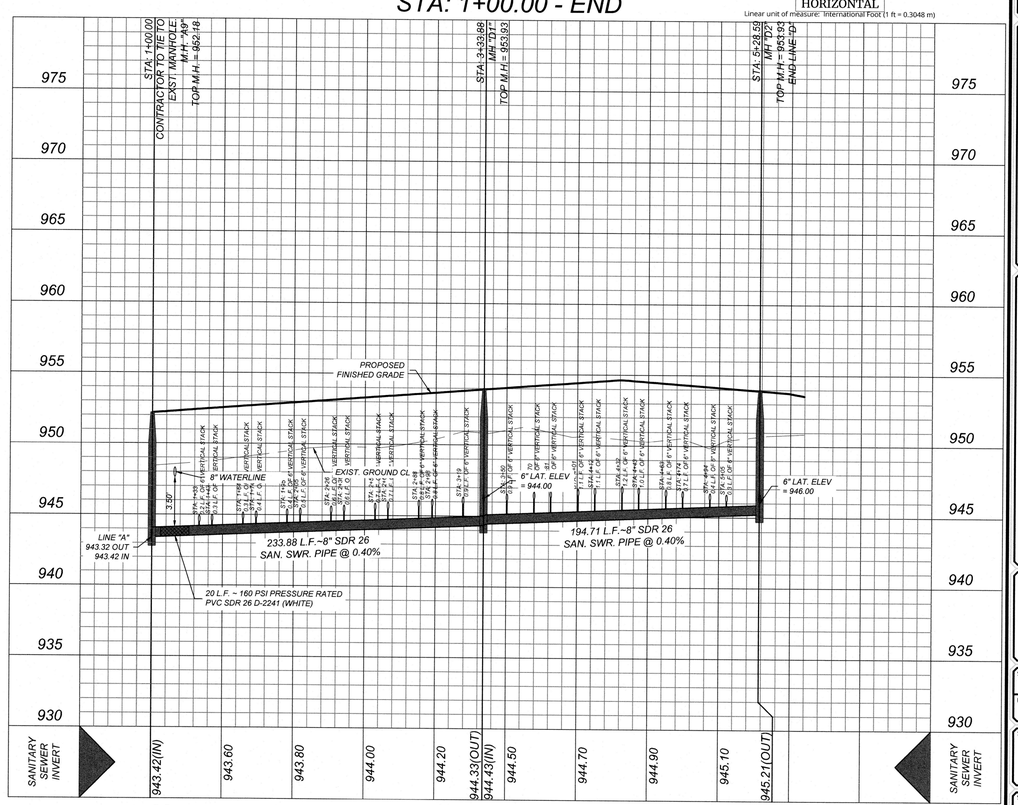


Linear unit of measure: International Foot (1 ft = 0.3048 m)

LINE "C"
STA: 14+50.00 - END



LINE "D"
STA: 1+00.00 - END



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Formerly Known as KFW Engineers

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FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DESCRIPTION	DRAWN BY

STATE OF TEXAS
CLAYTON J. LINNEY
111543
LICENSED PROFESSIONAL ENGINEER
4/10/2024

CLAYTON J. LINNEY
TEXAS LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: 111543
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909 · TBPLS Firm#: 10194550

TREVOR FIELDS, UNIT 1
STREET, DRAINAGE, WATER,SANITARY SEWER & UTILITY IMPROVEMENTS
FOR
MOSAIC LAND DEVLOPMENT

CITY OF SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER:	DRAWING NAME:
1065-13-03	SS10651303

SHEET TITLE:
LINE "C" (SHT 2 OF 2) & LINE "D" PLAN & PROFILE

SHEET NUMBER:
8.3

C:\HS\DRIVERS\SS10651303\Land\8.3 LINE "C" (SHT 2 OF 2) & LINE "D" PLAN & PROFILE By: ETHOMPSON

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

COMPACTION NOTE:

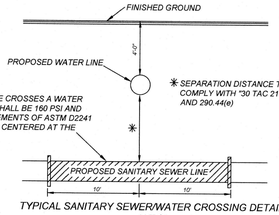
THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAVING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

CAUTION!!: THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

MANHOLE NOTE:
ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.

NOTE:

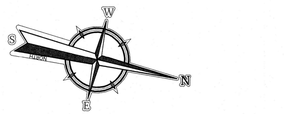
1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (S.A.W.S.) STANDARD SPECIFICATION.
2. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM).
   REFERENCE SHEET ---, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.
3. SEE THIS SHEET FOR BENCHMARK INFORMATION.
4. PIPE TYPE DESIGNATIONS ARE SDR 26.
5. SEE THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.
6. ALL MANHOLES SHALL HAVE CONCRETE RING ENCASEMENT AND A WATER TIGHT RING AND COVER.

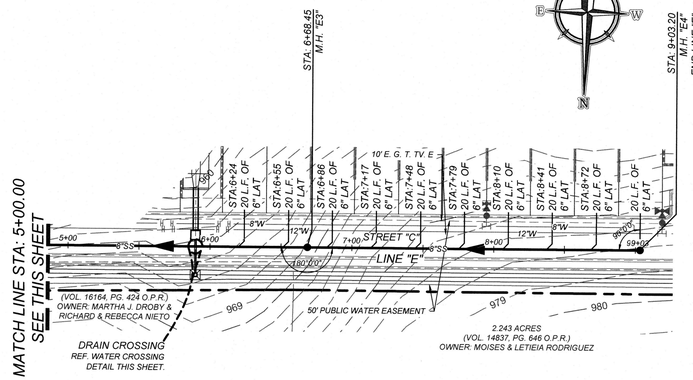


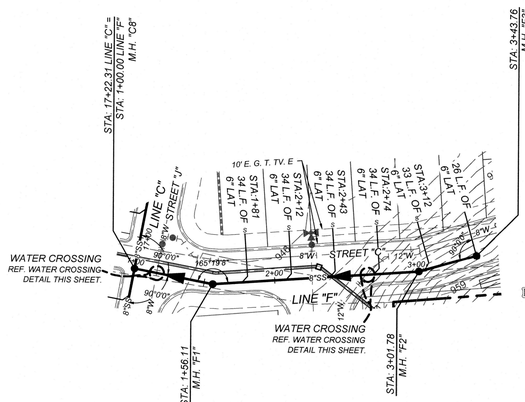
WHERE SEWER PIPE CROSSES A WATER LINE, THE SEWER SHALL BE 160 PSI AND MEET THE REQUIREMENTS OF ASTM D2241 WITH ONE 20' JOINT CENTERED AT THE WATER CROSSING.

TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

DEVELOPER'S NAME: BEAZER HOMES	
DEVELOPER'S ADDRESS: 11467 HUEBNER ROAD, SUITE 225	
CITY: SAN ANTONIO	STATE: TX ZIP: 78230
PHONE#:	FAX#: TOTAL ACREAGE: AC.
SAWS BLOCK MAP#: 118630, 118632, 120630, 120632	TOTAL EDU'S:
TOTAL LINEAR FOOTAGE OF PIPE: 487.52 L.F. ~ SDR 26 PVC	PLAT NO.:
NUMBER OF LOTS:	SAWS JOB#:







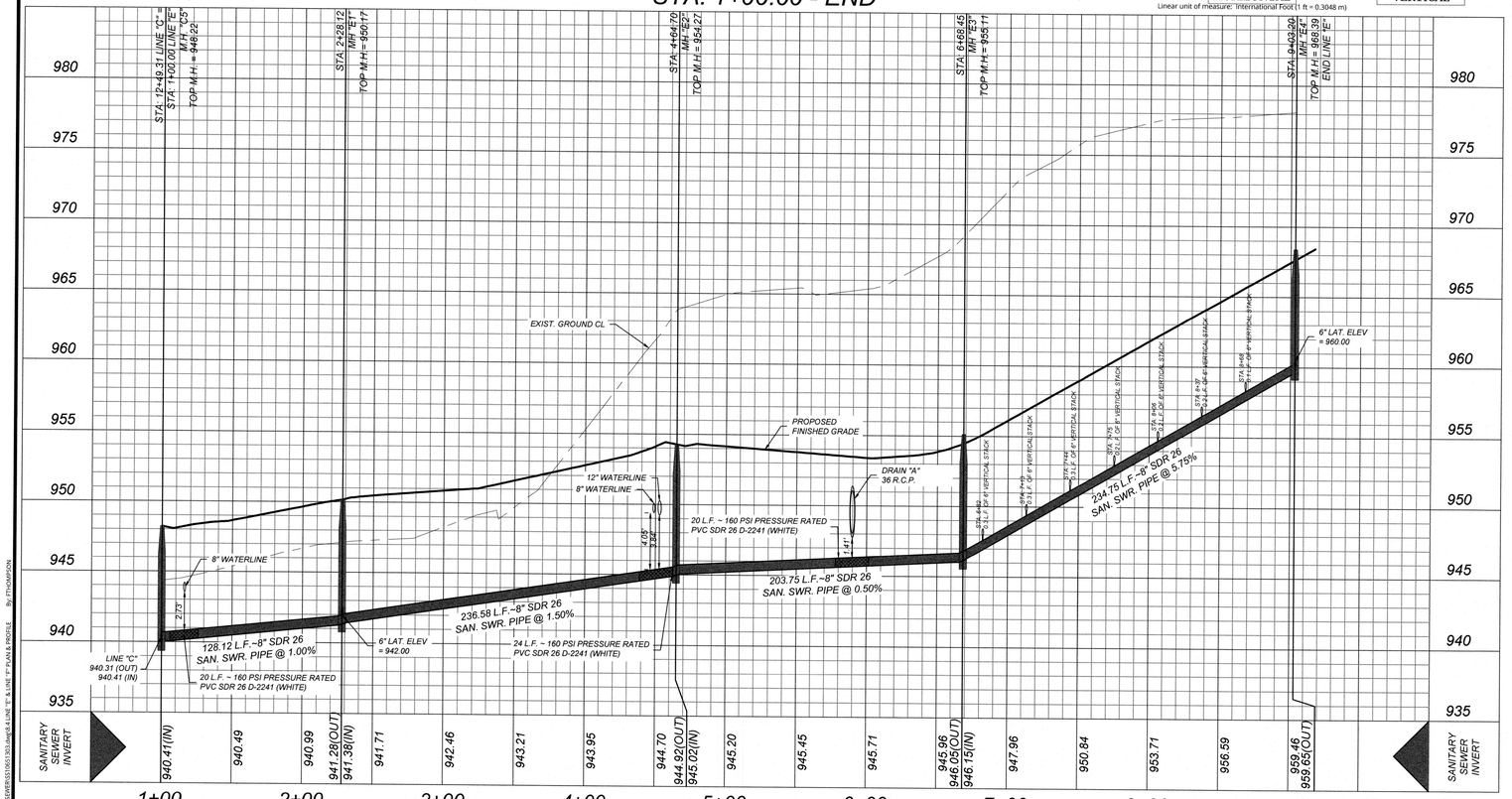


5 0 5
SCALE : 1" = 5'
VERTICAL

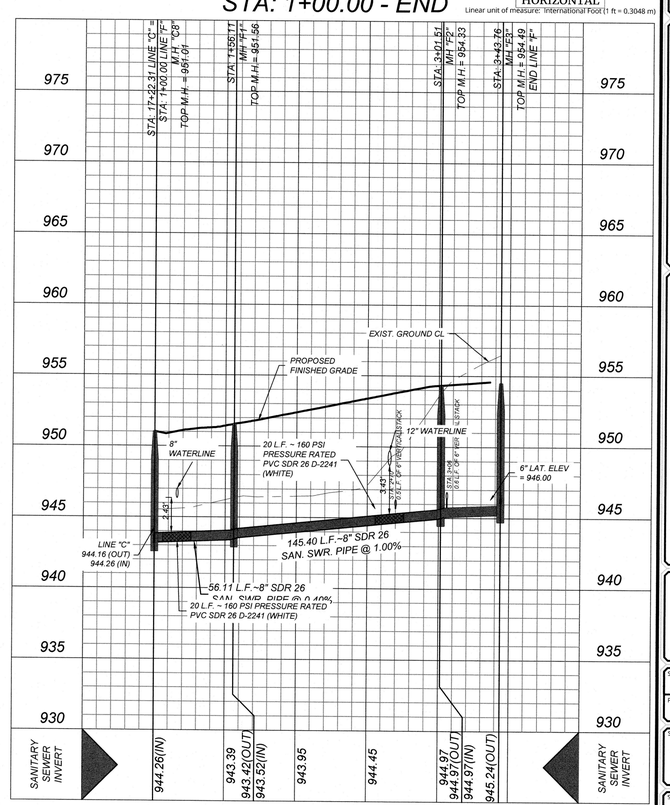
50 0 50
SCALE : 1" = 50'
HORIZONTAL

Linear unit of measure: International Foot (1 ft = 0.3048 m)

LINE "E"
STA: 1+00.00 - END



LINE "F"
STA: 1+00.00 - END



50 0 50
SCALE : 1" = 50'
HORIZONTAL

Linear unit of measure: International Foot (1 ft = 0.3048 m)

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

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STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
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1065-13-03	SS10651303

SHEET TITLE:
LINE "E" & LINE "F" PLAN & PROFILE

SHEET NUMBER:
8.4

C:\DATA\DESIGN\SS10651303.dwg\8.4 LINE "E" & LINE "F" PLAN & PROFILE By: ITHOMPSON

Texas Commission on Environmental Quality
Organized Sewage Collection System
General Construction Notes
TCEQ-0596 (Rev. July 15, 2015)

Edwards Aquifer Protection Program Construction Notes – Legal Disclaimer

The following/listed "construction notes" are intended to be advisory in nature only and do not constitute an approval or conditional approval by the Executive Director, nor do they constitute a comprehensive listing of rules or conditions to be followed during construction. Further actions may be required to achieve compliance with TCEQ regulations found in Title 30, Texas Administrative Code, Chapters 213 and 217, as well as local ordinances and regulations providing for the protection of water quality. Additionally, nothing contained in the following/listed "construction notes" restricts the powers of the Executive Director, the commission or any other governmental entity to prevent, correct, or curtail activities that result or may result in pollution of the Edwards Aquifer or hydrologically connected surface waters. The holder of any Edwards Aquifer Protection Plan containing "construction notes" is still responsible for compliance with Title 30, Texas Administrative Code, Chapters 213 or any other applicable TCEQ regulation, as well as all conditions of an Edwards Aquifer Protection Plan through all phases of plan implementation. Failure to comply with any condition of the Executive Director's approval, whether or not in contradiction of any "construction notes," is a violation of TCEQ regulations and any violation is subject to administrative rules, orders, and penalties as provided under Title 30, Texas Administrative Code § 213.10 (relating to Enforcement). Such violations may also be subject to civil penalties and injunction. The following/listed "construction notes" in no way represent an approved exception by the Executive Director to any part of Title 30 Texas Administrative Code, Chapters 213 and 217, or any other TCEQ applicable regulation.

1. This Organized Sewage Collection System (SCS) must be constructed in accordance with 30 Texas Administrative Code (TAC) §213.5(c), the Texas Commission on Environmental Quality's (TCEQ) Edwards Aquifer Rules and any local government standard specifications.

2. All contractors conducting regulated activities associated with this proposed regulated project must be provided with copies of the SCS plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors must be required to keep on-site copies of the plan and the approval letter.

3. A written notice of construction must be submitted to the presiding TCEQ regional office at least 48 hours prior to the start of any regulated activities. This notice must include:
- the name of the approved project;
- the activity start date; and
- the contact information of the prime contractor.

4. Any modification to the activities described in the referenced SCS application following the date of approval may require the submittal of an SCS application to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval.

5. Prior to beginning any construction activity, all temporary erosion and sedimentation (E&S) control measures must be properly installed and maintained in accordance with the manufacturers specifications. These controls must remain in place until the disturbed areas have been permanently stabilized.

6. If any sensitive features are discovered during the wastewater line trenching activities, all regulated activities near the sensitive feature must be suspended immediately. The applicant must immediately notify the appropriate regional office of the TCEQ of the feature discovered. A geologist's assessment of the location and extent of the feature discovered must be reported to that regional office in writing and the applicant must submit a plan for ensuring the structural integrity of the sewer line or for modifying the proposed collection system alignment around the feature. The regulated activities near the sensitive feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards Aquifer from any potentially adverse impacts to water quality while maintaining the structural integrity of the line.

7. Sewer lines located within or crossing the 5-year floodplain of a drainage way will be protected from inundation and stream velocities which could cause erosion and scouring of backfill. The trench must be capped with concrete to prevent scouring of backfill, or the sewer lines must be encased in concrete. All concrete shall have a minimum thickness of 6 inches.

8. Blasting procedures for protection of existing sewer lines and other utilities will be in accordance with the National Fire Protection Association criteria. Sand is not allowed as bedding or backfill in trenches that have been blasted. If any existing sewer lines are damaged, the lines must be repaired and retested.

9. All manholes constructed or rehabilitated on this project must have watertight size on size resilient connectors allowing for differential settlement. If manholes are constructed within the 100-year floodplain, the cover must have a gasket and be bolted to the ring. Where gasketed manhole covers are required for more than three manholes in sequence or for more than 1500 feet, alternate means of venting will be provided. Bricks are not an acceptable construction material for any portion of the manhole.
The diameter of the manholes must be a minimum of four feet and the manhole for entry must have a minimum clear opening diameter of 30 inches. These dimensions and other details showing compliance with the commission's rules concerning manholes and sewer line/manhole inverts described in 30 TAC §217.55 are included on SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS.
It is suggested that entrance into manholes in excess of four feet deep be accomplished by means of a portable ladder. The inclusion of steps in a manhole is prohibited.

10. Where water lines and new sewer line are installed with a separation distance closer than nine feet (i.e., water lines crossing wastewater lines, water lines paralleling wastewater lines, or water lines next to manholes) the installation must meet the requirements of 30 TAC §217.53(d) (Pipe Design) and 30 TAC §290.44(e) (Water Distribution).

11. Where sewers lines deviate from straight alignment and uniform grade all curvature of sewer pipe must be achieved by the following procedure which is recommended by the pipe manufacturer: .
If pipe flexure is proposed, the following method of preventing deflection of the joint must be used: N/A.
Specific care must be taken to ensure that the joint is placed in the center of the trench and properly bedded in accordance with 30 TAC §217.54.

12. New sewage collection system lines must be constructed with stub outs for the connection of anticipated extensions. The location of such stub outs must be marked on the ground such that their location can be easily determined at the time of connection of the extensions. Such stub outs must be manufactured wyes or tees that are compatible in size and material with both the sewer line and the extension. At the time of original construction, new stub-outs must be constructed sufficiently to extend beyond the end of the street pavement. All stub-outs must be sealed with a manufactured cap to prevent leakage. Extensions that were not anticipated at the time of original construction or that are to be connected to an existing sewer line not furnished with stub outs must be connected using a manufactured saddle and in accordance with accepted plumbing techniques.
If no stub-out is present an alternate method of joining laterals is shown in the detail on SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS. (For potential future laterals).
The private service lateral stub-outs must be installed as shown on the plan and profile sheets on Plan Sheet 8.2 to 8.4 and marked after backfilling as shown in the detail on PSAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS.

13. Trenching, bedding and backfill must conform with 30 TAC §217.54. The bedding and backfill for flexible pipe must comply with the standards of ASTM D-2321, Classes IA, IB, II or III. Rigid pipe bedding must comply with the requirements of ASTM C 12 (ANSI A 106.2) classes A, B or C.

14. Sewer lines must be tested from manhole to manhole. When a new sewer line is connected to an existing stub or clean-out, it must be tested from existing manhole to new manhole. If a stub or clean-out is used at the end of the proposed sewer line, no private service attachments may be connected between the last manhole and the cleanout unless it can be certified as conforming with the provisions of 30 TAC §213.5(c)(3)(E).

15. All sewer lines must be tested in accordance with 30 TAC §217.57. The engineer must retain copies of all test results which must be made available to the executive director upon request. The engineer must certify in writing that all wastewater lines have passed all required testing to the appropriate regional office within 30 days of test completion and prior to use of the new collection system. Testing method will be:
(a) For a collection system pipe that will transport wastewater by gravity flow, the design must specify an infiltration and exfiltration test or a low-pressure air test. A test must conform to the following requirements:
(1) Low Pressure Air Test.
(A) A low pressure air test must follow the procedures described in American Society For Testing And Materials (ASTM) C-828, ASTM C- 924, or ASTM F-1417 or other procedure approved by the executive director, except as to testing times as required in Table C.3 in subparagraph (C) of this paragraph or Equation C.3 in subparagraph (B)(iii) of this paragraph.
(B) For sections of collection system pipe less than 36 inch average inside diameter, the following procedure must apply, unless a pipe is to be tested as required by paragraph (2) of this subsection.
(i) A pipe must be pressurized to 3.5 pounds per square inch (psi) greater than the pressure exerted by groundwater above the pipe.
(ii) Once the pressure is stabilized, the minimum time allowable for the pressure to drop from 3.5 psi gauge to 2.5 psi gauge is computed from the following equation:

Equation C.3

Where:

$$T = \frac{0.085xDxK}{Q}$$

T = time for pressure to drop 1.0 pound per square inch gauge in seconds
K = 0.000419 X D X L, but not less than 1.0
D = average inside pipe diameter in inches
L = length of line of same size being tested, in feet
Q = rate of loss, 0.0015 cubic feet per minute per square foot internal surface

(C) Since a K value of less than 1.0 may not be used, the minimum testing time for each pipe diameter is shown in the following Table C.3:

PIPE DIAMETER (INCHES)	MINIMUM TIME (SECONDS)	LENGTH FOR MINIMUM (FEET)	TIME FOR LONGER LENGTH (SECONDS/FOOT)
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369
33	1870	72	25.856

(D) An owner may stop a test if no pressure loss has occurred during the first 25% of the calculated testing time.
(E) If any pressure loss or leakage has occurred during the first 25% of a testing period, then the test must continue for the entire test duration as outlined above or until failure.
(F) Wastewater collection system pipes with a 27 inch or larger average inside diameter may be air tested at each joint instead of following the procedure outlined in this section.
(G) A testing procedure for pipe with an inside diameter greater than 33 inches must be approved by the executive director.
(2) Infiltration/Exfiltration Test.
(A) The total exfiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch of diameter per mile of pipe per 24 hours at a minimum test head of 2.0 feet above the crown of a pipe at an upstream manhole.
(B) An owner shall use an infiltration test in lieu of an exfiltration test when pipes are installed below the groundwater level.
(C) The total exfiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch diameter per mile of pipe per 24 hours at a minimum test head of two feet above the crown of a pipe at an upstream manhole, or at least two feet above existing groundwater level, whichever is greater.
(D) For construction within a 25-year flood plain, the infiltration or exfiltration must not exceed 10 gallons per inch diameter per mile of pipe per 24 hours at the same minimum test head as in subparagraph (C) of this paragraph.
(E) If the quantity of infiltration or exfiltration exceeds the maximum quantity specified, an owner shall undertake remedial action in order to reducethe infiltration or exfiltration to an amount within the limits specified. An owner shall retest a pipe following a remediation action.
(b) If a gravity collection pipe is composed of flexible pipe, deflection testing is also required. The following procedures must be followed:
(1) For a collection pipe with inside diameter less than 27 inches, deflection measurement requires a rigid mandrel.
(A) Mandrel Sizing.
(i) A rigid mandrel must have an outside diameter (OD) not less than 95% of the base inside diameter (ID) or average ID of a pipe, as specified in the appropriate standard by the ASTMs, American Water Works Association, UNI-BELL, or American National Standards Institute, or any related appendix.
(ii) If a mandrel sizing diameter is not specified in the appropriate standard, the mandrel must have an OD equal to 95% of the ID of a pipe. In this case, the ID of the pipe, for the purpose of determining the OD of the mandrel, must equal be the average outside diameter minus two minimum wall thicknesses for OD controlled pipe and the average inside diameter for ID controlled pipe.
(iii) All dimensions must meet the appropriate standard.
(B) Mandrel Design.
(i) A rigid mandrel must be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed.
(ii) A mandrel must have nine or more odd number of runners or legs.
(iii) A barrel section length must equal at least 75% of the inside diameter of a pipe.
(iv) Each size mandrel must use a separate proving ring.
(C) Method Options.
(i) An adjustable or flexible mandrel is prohibited.
(ii) A test may not use television inspection as a substitute for a deflection test.
(iii) If requested, the executive director may approve the use of a deflectometer or a mandrel with removable legs or runners on a case-by-case basis.
(2) For a gravity collection system pipe with an inside diameter 27 inches and greater, other test methods may be used to determine vertical deflection.
(3) A deflection test method must be accurate to within plus or minus 0.2% deflection.
(4) An owner shall not conduct a deflection test until at least 30 days after the final backfill.
(5) Gravity collection system pipe deflection must not exceed five percent (5%).
(6) If a pipe section fails a deflection test, an owner shall correct the problem and conduct a second test after the final backfill has been in place at least 30 days.

16. All manholes must be tested to meet or exceed the requirements of 30 TAC §217.58.
(a) All manholes must pass a leakage test.
(b) An owner shall test each manhole (after assembly and backfilling) for leakage, separate and independent of the collection system pipes, by hydrostatic exfiltration testing, vacuum testing, or other method approved by the executive director.
(1) Hydrostatic Testing.
(A) The maximum leakage for hydrostatic testing or any alternative test methods is 0.025 gallons per foot diameter per foot of manhole depth per hour.
(B) To perform a hydrostatic exfiltration test, an owner shall seal all wastewater pipes coming into a manhole with an internal pipe plug, fill the manhole with water, and maintain the test for at least one hour.
(C) A test for concrete manholes may use a 24-hour wetting period before testing to allow saturation of the concrete.
(2) Vacuum Testing.
(A) To perform a vacuum test, an owner shall plug all lift holes and exterior joints with a non-shrink grout and plug all pipes entering a manhole.
(B) No grout must be placed in horizontal joints before testing.
(C) Stub-outs, manhole boots, and pipe plugs must be secured to prevent movement while a vacuum is drawn.
(D) An owner shall use a minimum 60 inch/lb torque wrench to tighten the external clamps that secure a test cover to the top of a manhole.
(E) A test head must be placed at the inside of the top of a cone section, and the seal inflated in accordance with the manufacturer's recommendations.
(F) There must be a vacuum of 10 inches of mercury inside a manhole to perform a valid test.
(G) A test does not begin until after the vacuum pump is off.
(H) A manhole passes the test if after 2.0 minutes and with all valves closed, the vacuum is at least 9.0 inches of mercury.

17. All private service laterals must be inspected and certified in accordance with 30 TAC §213.5(c)(3)(I). After installation of and, prior to covering and connecting a private service lateral to an existing organized sewage collection system, a Texas Licensed Professional Engineer, Texas Registered Sanitarian, or appropriate city inspector must visually inspect the private service lateral and the connection to the sewage collection system, and certify that it is constructed in conformity with the applicable provisions of this section. The owner of the collection system must maintain such certifications for five years and forward copies to the appropriate regional office upon request. Connections may only be made to an approved sewage collection system.

Austin Regional Office
12100 Park 35 Circle, Building A
Austin, Texas 78753-1808
Phone (512) 339-2929
Fax (512) 339-3795

San Antonio Regional Office
14250 Judson Road
San Antonio, Texas 78233-4480
Phone (210) 490-3096
Fax (210) 545-4329

THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

I. WHERE A SEWER MAIN CROSSES OVER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE (9) FEET, ALL PORTIONS OF THE SEWER MAIN WITHIN NINE (9) FEET OF THE WATER LINE SHALL BE CONSTRUCTED USING 150 PSI PRESSURE RATED DUCTILE IRON, CAST IRON OR PVC PIPE AND JOINED WITH EQUALLY PRESSURE RATED PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL. A SECTION OF 150 PSI PRESSURE RATED PIPE AT LEAST EIGHTEEN (18) FEET IN LENGTH MAY BE CENTERED ON THE WATER MAIN IN LIEU OF PIPE CONNECTION REQUIREMENTS. (NO SEPARATE PAY ITEM.)

II. WHERE A SEMI-RIGID OR RIGID SEWER MAIN CROSSES UNDER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE FEET BUT GREATER THAN TWO FEET, THE INITIAL BACKFILL SHALL BE CEMENT STABILIZED SAND (TWO OR MORE BAGS OF CEMENT PER CUBIC YARD OF SAND) FOR ALL SECTIONS OF THE SEWER WITHIN NINE FEET OF THE WATER MAIN.

III. WHERE A SEWER MAIN CROSSES UNDER A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN TWO FEET, THE SEWER MAIN SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC WITH A MINIMUM PRESSURE RATING OF 150 PSI WITHIN NINE FEET OF THE WATER MAIN, SHALL HAVE A SEGMENT OF SEWER PIPE CENTERED ON THE WATER MAIN, SHALL BE PLACED NO CLOSER THAN SIX INCHES BETWEEN OUTER DIAMETERS, AND SHALL BE JOINED WITH PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL. A SECTION CENTERED ON THE WATER MAIN IN LIEU OF PIPE CONNECTION REQUIREMENTS. (NO SEPARATE PAY ITEM)

IV. WHERE A SEWER MAIN PARALLELS A WATER MAIN AND THE SEPARATION DISTANCE IS LESS THAN NINE FEET, THE SEWER MAIN SHALL BE BELOW THE WATER MAIN, SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC WITH A MINIMUM PRESSURE RATING OF 150 PSI FOR BOTH PIPE AND JOINTS FOR A DISTANCE OF NINE FEET BEYOND THE POINT OF CONFLICT; SHALL MAINTAIN A MINIMUM SEPARATION DISTANCE BETWEEN OUTER DIAMETERS OF TWO FEET VERTICALLY AND FOUR FEET HORIZONTALLY, AND SHALL BE JOINED WITH PRESSURE RING GASKET CONNECTIONS OR CORROSION PROTECTED MECHANICAL COUPLING DEVICES OF A CAST IRON OR DUCTILE IRON MATERIAL.

V. SANITARY SEWER MANHOLES SHALL NOT BE INSTALLED ANY CLOSER THAN NINE FEET TO WATER MAINS.

30 TAC 217.58 "TESTING REQUIREMENTS FOR MANHOLES"

(a) All manholes must pass a leakage test.

(b) An owner shall test each manhole (after assembly and backfilling) for leakage, separate and independent of the collection system pipes, by hydrostatic exfiltration testing, vacuum testing, or other method approved by the executive director.

(1) Hydrostatic Testing.

(A) The maximum leakage for hydrostatic testing or any alternative test methods is 0.025 gallons per foot diameter per foot of manhole depth per hour.

(B) To perform a hydrostatic exfiltration test, an owner shall seal all wastewater pipes coming into a manhole with an internal pipe plug, fill the manhole with water, and maintain the test for at least one hour.

(C) A test for concrete manholes may use a 24-hour wetting period before testing to allow saturation of the concrete.

(2) Vacuum Testing.

(A) To perform a vacuum test, an owner shall plug all lift holes and exterior joints with a non-shrink grout and plug all pipes entering a manhole.

(B) No grout must be placed in horizontal joints before testing.

(C) Stub-outs, manhole boots, and pipe plugs must be secured to prevent movement while a vacuum is drawn.

(D) An owner shall use a minimum 60 inch/lb torque wrench to tighten the external clamps that secure a test cover to the top of a manhole.

(E) A test head must be placed at the inside of the top of a cone section, and the seal inflated in accordance with the manufacturer's recommendations.

(F) There must be a vacuum of 10 inches of mercury inside a manhole to perform a valid test.

(G) A test does not begin until after the vacuum pump is off.

(H) A manhole passes the test if after 2.0 minutes and with all valves closed, the vacuum is at least 9.0 inches of mercury.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

30 TAC 217.54 "PIPE BEDDING AND TRENCH REQUIREMENTS"

A. Pipe Embedment
1. A rigid pipe must be laid with the adequate bedding, haunching, and initial backfill to support the anticipated load. The bedding classes that are allowed are A, B, or C, as described in American Society for Testing and Materials (ASTM) C 12, American National Standards Institute (ANSI) A 106.2,Water Environment Federation Manual of Practice No. 9 or American Society of Civil Engineers (ASCE) MOP 37.
2. A flexible pipe must be laid with the adequate bedding, haunching, and initial backfill to support the anticipated load. The bedding classes that are allowed are IA, IB, II, or III, as described in ASTM D-2321 or ANSI K65.171.
3. Debris, large clods, or stones that are greater than six inches in diameter, organic matter, or other unstable materials are prohibited as bedding, haunching, or initial backfill.
4. Backfill must not disturb the alignment of a collection system pipe.
5. If trenching encounters significant fracture, fault zones, caves, or solutional modification to the rock strata, an owner must halt construction until an engineer prepares a written report detailing how construction will accommodate these site conditions.

B. Compaction
1. Compaction of an embedment envelope must meet the manufacturer's recommendations for the collection system pipe used in a project.
2. Compaction of an embedment envelope must provide the modulus of soil reaction for the bedding material necessary to ensure a wastewater collection system pipe's structural integrity as required by §217.53 of this title (relating to Pipe Design).
3. The placement of the backfill above a pipe must not affect the structural integrity of a pipe.

C. Envelope Size
1. A minimum clearance of 6.0 inches below and on each side of the bell of all pipes to the trench walls and floor is required.
2. The embedment material used for haunching and initial backfill must be installed to a minimum depth of 12 inches above the crown of a pipe.

D. Trench Width
1. The width of a trench must allow a pipe to be laid and jointed properly and must allow the backfill to be placed and compacted as needed.
2. The maximum and minimum trench width needed for safety and a pipe's structural integrity must be included in the report.
3. The width of a trench must be sufficient to properly and safely place and compact haunching materials.
4. The space between a pipe and a trench wall must be wider than the compaction equipment used in the pipe zone.

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111543
LICENSED PROFESSIONAL ENGINEER
3/5/2024

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TEXAS LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: 111543
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909 - TBPLS Firm#: 10194550

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STREET, DRAINAGE, WATER,SANITARY SEWER & UTILITY IMPROVEMENTS
FOR
MOSAIC LAND DEVLOPMENT

CITY OF SAN ANTONIO
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AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER:	DRAWING NAME:
1065-13-03	DTSS10651303

SHEET TITLE:
SANITARY SEWER PLAN NOTES

SHEET NUMBER:
8.5

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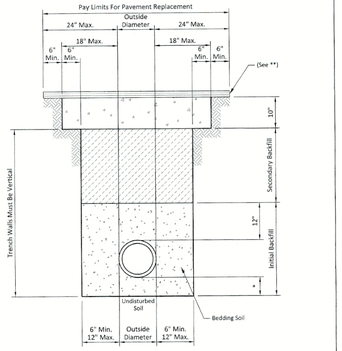


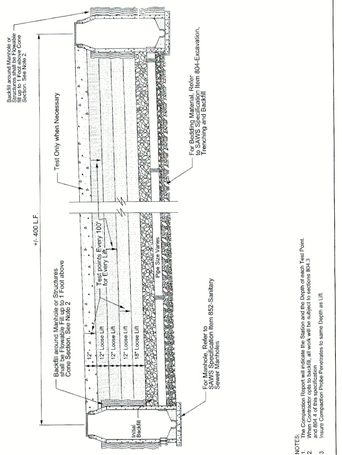
The Existing Material at the Bearing Level shall be Removed and Replaced to a Minimum Depth of 6-Inches or ¼ of the Outside Diameter of the Pipe, whichever is greater, with Bedding Material.

In Areas of over Excavation, Encasement shall extend from Trench Wall. Pay Limits shall not Exceed 12" Max. as shown on Detail. Additional Encasement shall be Incidental.

* Sewer Gravel 6" Min. or ¼ O.D. of the Pipe, whichever is greater.
** Minimum 2" HMAC Type "D" for Trench Repair in Local/Residential Streets.
** Minimum 3" HMAC Type "C" for Trench Repair in Collector/Arterial Streets.

- Hot Mix Asphalt Concrete (HMAC)
- Asphalt Treated Base (A.T.B.)

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	SANITARY SEWER PIPE LAID IN TRENCH	MARCH 2008	AUG 2019
		DD-804-01	SHEET 1 OF 1



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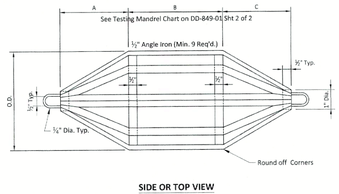
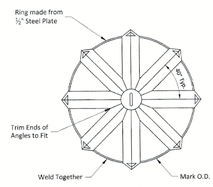
		DD 804-02	SHEET 1 OF 1



SIDE OR TOP VIEW



END VIEW

Note:
All Mandrels must be Approved by SAWS Construction Inspection Dept. and Stamped before Use.

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	GO, NO GO DEFLECTION TESTING MANDREL	March 2008	December 2019
		DD-849-01	SHEET 1 OF 2

SIZE	A	B*	MANDREL O.D. PVC (SDR -26)	RING O.D. PVC (SDR -26)
6"	4.0"	4.5"	5.50	4.79
8"	5.5"	6"	7.37	6.66
10"	7.0"	7.5"	9.21	8.50
12"	8.0"	9"	10.96	10.25
15"	10.0"	11"	13.42	12.71
18"	12.0"	13.5"	———	———
21"	14.0"	16"	———	———
24"	16.0"	18"	———	———
27"	18.0"	20"	———	———

*Minimum Length

CHART

Notes:
PVC Pipes and Fittings 6" to 15" in Diameter shall Conform to ASTM D-2241
PVC Pipes and Fittings 18" to 27" in Diameter shall Conform to ASTM F-679

This information is provided as a reference. All deflection testing shall be done in accordance with TCEQ Capter 217.

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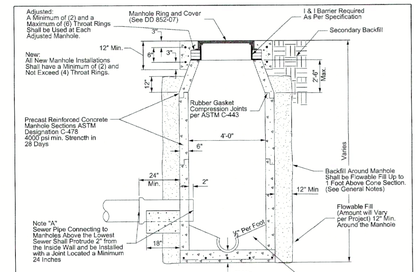
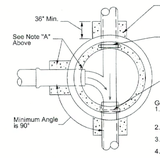
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	GO, NO GO DEFLECTION TESTING MANDREL CHART	March 2008	December 2019
		DD-849-01	SHEET 2 OF 2



PRECAST MANHOLE



Concrete Cradle to Nearest Joint Above Entering or Entering Manholes
All Pipe is Used, Provide Rubber Gasket One Size Smaller than Pipe at Each Wall Crossing of Manhole. If HDPE Pipe is Used a Non-Shrink Grout to be Applied within the Wall Sections, Gasket is also, Required.

No Joints for Pipe will be Allowed within Wall Section

General Notes:
1. Material for Sanitary Sewer Pipe must be the Same from Manhole to Manhole. Changes in Type of Pipe may be Made Only at Manholes, or Special Structures, except as Approved by the SAWS Inspector.
2. Adapters and Concrete Collars shall be Used as Directed and Approved by theSAWS Inspector.
3. Watertight Manhole Rings and Covers shall be Trans-Tex A77 "O" Ring or Approved Equal.
4. The Minimum Angle of Flow for a Connecting Sewer to the Direction of Flow Defined by a Collection System is 90 Degrees, unless Approved by the Engineer.

PRECAST MANHOLE

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SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	STANDARD PRECAST MANHOLE	MAY 2013	AUG 2019
		DD-852-01	SHEET 1 OF 2

MONOLITHIC MANHOLE

General Notes:
1. Material for Sanitary Sewer Pipe Must be the Same from Manhole to Manhole. Changes in Type of Pipe May be Made only at Manholes, or Special Structures, Except as Approved by the Project Engineer.
2. Adaptors and Concrete Collars shall be used as approved by the SAWS Project Engineer.
3. Watertight Manhole Rings and Covers shall be Trans-Tex A77 "O" Ring or Approved Equal.

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SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	STANDARD MONOLITHIC MANHOLE	March 2008	AUG 2019
		DD 852-01	SHEET 2 OF 2

S/P Industries

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SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	30" MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 20'9
		DD 852-07	SHEET 1 OF 5

ERGO Assembly

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SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 20'9
		DD 852-07	SHEET 2 OF 5

ERGO XL Assembly

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SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 2019
		DD 852-07	SHEET 3 OF 5

PROPERTY OF		APPROVED	REVISED
SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 2019
		DD 852-07	SHEET 4 OF 5

NEENAH FOUNDRY

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SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	MANHOLE RING AND COVER DETAIL	MARCH 2008	AUG 2019
		DD 852-07	SHEET 5 OF 5

NOTE: Price for Drop Fittings and Encasement to be Included with the Price of Manhole.

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SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	DROP MANHOLE DETAIL	MARCH 2008	AUG 2019
		DD-852-08	SHEET 1 OF 1

FOR NEW DEVELOPMENT CLEAN-OUTS MAY NOT BE PLACED IN PAVED AREAS I.E. SIDEWALKS, DRIVEWAYS, OR PARKING LOTS, AND MUST BE LOCATED A MINIMUM OF 6" FROM ALL PAVED AREAS.

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SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CLEANOUT DETAIL	MARCH 2008	AUG 2019
		DD-854-02	SHEET 1 OF 3

PLAN - UNPAVED

PLAN - PAVED

*Approved Frame & Lid (Heavy Duty)

FOR NEW DEVELOPMENT CLEAN-OUTS MAY NOT BE PLACED IN PAVED AREAS I.E. SIDEWALKS, DRIVEWAYS, OR PARKING LOTS, AND MUST BE LOCATED A MINIMUM OF 6" FROM ALL PAVED AREAS.

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SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CLEANOUT DETAIL	MARCH 2008	AUG 2019
		DD-854-02	SHEET 2 OF 3

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LICENSE NUMBER: 111543
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SANITARY SEWER DETAILS (SHT 1 OF 2)

SHEET NUMBER:
8.6

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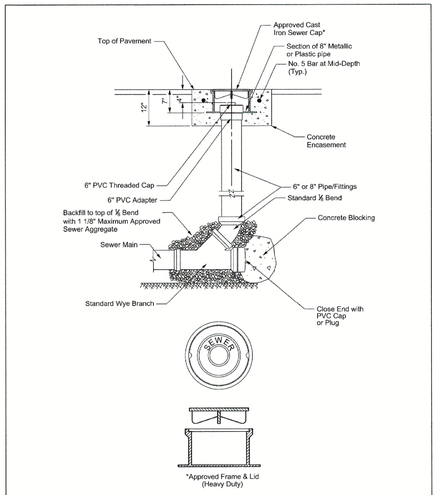
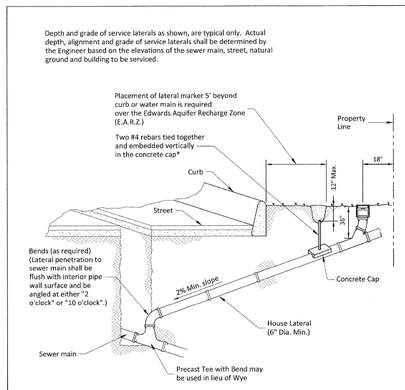
C:\dt\SHEETS\DTS51065130 3.dwg(8.6 SANITARY SEWER DETAILS (SHT 1 OF 2)) By: PTHOMPSON



Note: Depending upon the type of service that an 8 inch lateral (on a dead end main) is providing, a standard manhole in lieu of this cleanout may be required. Consult with the SAWS Inspector.

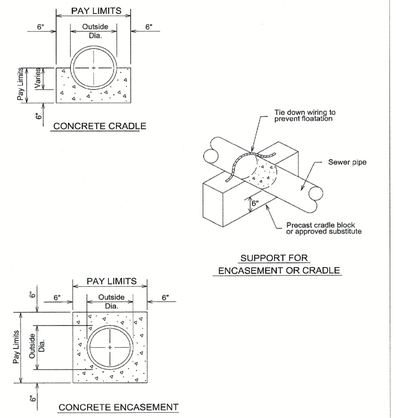
PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CLEANOUT DETAIL (ON DEAD-END MAIN)	APPROVED	REVISED
		MARCH 2008	AUG 2019
		DD-854-02	SHEET 3 OF 3



HOUSE LATERAL DETAIL

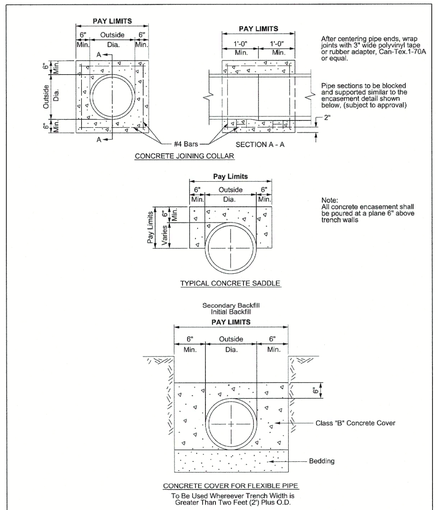
Note:
A minimum of 3' of cover to subgrade is necessary, otherwise concrete encasement will be required.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	HOUSE LATERAL DETAIL (IN THE E.A.R.Z.)	APPROVED	REVISED
		March 2008	December 2018
		DD-854-EARZ	SHEET 1 OF 1



Notes:
1) All concrete encasement shall be poured at a plane 6" above the pipe between excavated trench walls.
2) All sewer pipe with less than 3' of cover to subgrade shall be concrete encased.
3) All Force mains shall be provided with thrust blocks, where changes in direction occur, at Tees, Bends, Crosses, changes in size, stops, or as directed by SAWS.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CONCRETE ENCASEMENT DETAILS	APPROVED	REVISED
		March 2008	AUG 2019
		DD-858-01	SHEET 1 OF 1



PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL CONCRETE DETAILS	APPROVED	REVISED
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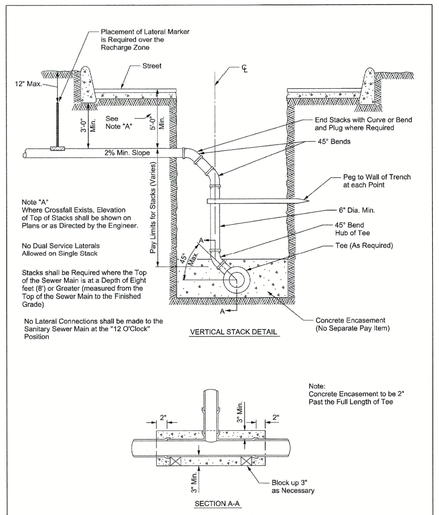
		DD 858-02	SHEET 1 OF 1



PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	TYPICAL VERTICAL STACK DETAIL	APPROVED	REVISED
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SHEET TITLE:
SANITARY SEWER DETAILS (SHT 2 OF 2)

SHEET NUMBER:
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C:\USERS\JTHOMPSON\DESKTOP\2023 PROJECTS\1065-13-03 MOSAIC LAND DEVELOPMENT\CAD\SANITARY SEWER DETAILS SHT 2 OF 2.DWG By: JTHOMPSON

ENGINEERING DESIGN REPORT

ENGINEERING DESIGN REPORT

8” PVC PIPE

TCEQ Engineering Design Report

(PEPP-SA EDR v4.0)

For

Trevor Fields Tract

Organized Sewage Collection System



April 2024

Prepared By:
COLLIERS ENGINEERING & DESIGN
3421 PAESANOS PKWY.
SAN ANTONIO, TX 78231
TBPE Registration Number: 9513

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PVC PIPE STANDARDS

The American Society for Testing and Materials (ASTM) also known as ASTM International (Reference: www.astm.org) governs the manufacturing specifications for Polyvinyl Chloride (PVC) pipes, including the dimension ratio and water pressure allowable for use of each pipe, through its D-2241 standard. ASTM D-2241 lists its pipe dimensions and pipe classes using the "SDR" mark up, such as SDR-13.5, SDR-21, SDR-26 and SDR-41. The SDR refers to the standard dimension ratio (SDR) of the outside pipe diameter and the wall thickness. This project specifies the use of SDR-26 PVC pipe, which are to meet the ASTM pressure rating of greater than 150 psi and fall in the size category listed below. ASTM D-2241 standards must be meticulously adhered to by all PVC pipe manufacturers and is recognized as the standard during PVC pressure pipe testing and quality checks. Other in-depth information can be found published in Thermoplastic Pressure Pipe Design and Selection UNI-TR-7, by the Uni-Bell PVC Pipe Association.

SDR 26 Pipe Size Matrix
(Per ASTM D-2241)

Size (in)	O.D. (in)	Calc I.D. (in)	Thickness (in)
4	4.5	4.154	0.173
6	6.625	6.115	0.255
8	8.625	7.961	0.332
10	10.75	9.924	0.413
12	12.75	11.77	0.49
16	16	14.77	0.615

PROPOSED TYPE OF PIPE

Type I, Grade I, Polyvinyl Chloride (PVC) Specifications:
Size of Pipe: 8.00 in.

SDR 26 Properties

Pipe Compliance:	ASTM D-2241
Joint Compliance:	ASTM D-3139
Cell Classification:	12454
Minimum Tensile Strength (psi):	7,000
Minimum Modulus of Elasticity (psi):	400,000
Calculated Inner Diameter (in) = (Outer Diameter - 2t)	7.961
Outer Diameter (inch):	8.625
Wall Thickness (inch):	0.332
Mean Pipe Diameter (in) = (Outer Diameter - Thickness)	8.293
Approximate Trenching Width (feet):	2.72
Minimum Pipe Depth (Cover) used (feet):	**1.65**
Maximum Pipe Depth (Cover) used (feet):	**16.19**

FLOW/CAPACITY ANALYSIS

Proposed Waste Water Usage: **62,237.00 GPD**

Q_{max} (As determined in Attachment A) = 0.096 CFS

$$Q_{full} = \frac{1.486}{n} \times A \times R^{\frac{2}{3}} \times \sqrt{S}$$

A = Cross-Sectional Area, (ft2)	=	0.346
S = Slope, decimal, minimum used	=	0.004
R_h = hydraulic radius	=	0.166

For the Specified Pipe at the Minimum Design Slope, the full flow is

Q_{full} = 0.754 CFS

0.096 < 0.754
Design meets TCEQ Guidelines

MINIMUM AND MAXIMUM GRADES FOR PIPES (30 TAC §217.53(l)(2)(A))

Minimum and Maximum Pipe Slopes		
Size of Pipe	Minimum Slope (%)	Maximum Slope (%)
6	0.5	12.35
8	0.33	8.4
10	0.25	6.23
12	0.2	4.88
15	0.15	3.62
18	0.11	2.83
21	0.09	2.3
24	0.08	1.93
27	0.06	1.65
30	0.055	1.43
33	0.05	1.26
36	0.045	1.12
39	0.04	1.01
>39	*	*
* For pipes larger than 39 inches in diameter, the slope is determined by Manning's formula to maintain a velocity greater than **2.0 feet per second and less than 10.0 feet per second** when flowing full.		

MINIMUM AND MAXIMUM VELOCITY FOR THE PROPOSED SYSTEM:

So, using 8.00 inch PVC Pipe:

$$V = \frac{1.49}{n} \times R_h^{0.67} \times \sqrt{S}$$

V = velocity (ft/sec)	=	(solve)
n = Manning's coefficient	=	0.013
Calc. Inner Diameter (in)	=	7.961
A = Cross-Sectional Area, ft^2	=	0.346
Wp = Wetted Perimeter, ft	=	2.084
R_h = hydraulic radius, A/Wp	=	0.166
S = slope (ft/ft)	=	0.004

Minimum Slope Used (%): **0.40**

V_{min} = 2.19 ft/sec

2.19 **>** **2.00** ft/sec

Design meets TCEQ Guidelines

Maximum Slope Used (%): **5.75**

V_{max} = 8.29 ft/sec

8.29 **<** **10.00** ft/sec

Design meets TCEQ Guidelines

AVERAGE VALUES OF MODULUS OF SOIL REACTION, E'

Soil type-pipe bedding material (Unified Classification System)	E' for Degree of Compaction of Bedding, in pounds per square inch			
	Dumped	Slight <85% Proctor, <40% relative density	Moderate 85%-95% Proctor, 40%-70% relative density	High, >95% Proctor, >70% relative density
(1)	(2)	(3)	(4)	(5)
Fine-grained Soils (LL>50[b]) Soils with medium to high plasticity CH, MH, CH-MH	No data available; consult a competent soils engineer; Otherwise use E'=0			
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL,with less than 25% coarse-grained particles	50	200	400	1000
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL,with more than 25% coarse-grained particles	100	400	1000	2000
Coarse-grained Soils with Fines GM, GC, SM, SC[c] contains more than 12% fines				
Coarse-grained Soils with Little or no Fines GW, GP, SW, SP[c] contains less than 12% fines	200	1000	2000	3000
Crushed Rock	1000	3000	3000	3000
Accuracy in Terms of Percentage Deflection	± 2	± 2	± 1	± 0.5

Taken from: Howard, Amster K. "Soil Reaction for Buried Flexible Pipe"
U.S. Bureau of Reclamation, Denver, CO and the American Society of Civil Engineers.

Modulus of Soil Reaction for the in-situ soil is determined to be = 3000 psi

PIPE BEDDING CLASS

Taken from the American Society for Testing and Material (ASTM) D 2321 and American Association of State Highway and Transportation Officials (AASHTO) M43, and as published on Table 7, in Deflection: The Pipe/Soil Mechanism UNI-TR-1-97, Uni-Bell PVC Pipe Association, Pg 24.

Pipe Embedment Material						E', psi (kPa) for Degree of Embedment Compaction				
ASTM D 2321*		ASTM D 2487		AASHTO M43 Notation	Min. Std. Proctor Density (%)	Lift Placement Depth	Dumped	Slightly < 85%	Moderate 85% - 95%	High > 95%
Class	Description	Notation	Description							
IA	Open-graded, clean manufactured aggregates	N/A	Angular crushed stone or rock, crushed gravel, crushed slag; large voids with little or no fines	5 56	Dumped	18" (0.45 m)	1000 (6,900)	3000 (20,700)	3000 (20,700)	3000 (20,700)
IB	Dense-graded, clean manufactured, processed aggregates	N/A	Angular crushed stone or other Class IA material and stone/sand mixtures; little or no fines							
II	Clean, coarse-grained soils	GW	Well-graded gravel, gravel/sand mixtures; little or no fines	57 6 67	85%	12" (0.30 m)	N/R	1000 (6,900)	2000 (13,800)	3000 (20,700)
		GP	Poorly graded gravel, gravel/sand mixtures; little or no fines							
		SW	Well-graded sands, gravelly sands; little or no fines							
		SP	Poorly graded sands, gravelly sands; little or no fines							
III	Coarse-grained soils with fines	GM	Silty gravels, gravel/sand/silt mixtures	Gravel and sand with <10% fines	90%	9" (0.20 m)	N/R	N/R	1000 (6,900)	2000 (13,800)
		GC	Clayey gravels, gravel/sand/clay mixtures							
		SM	Silty sands, sand/silt mixtures							
		SC	Clayey sands, sand/clay mixtures							

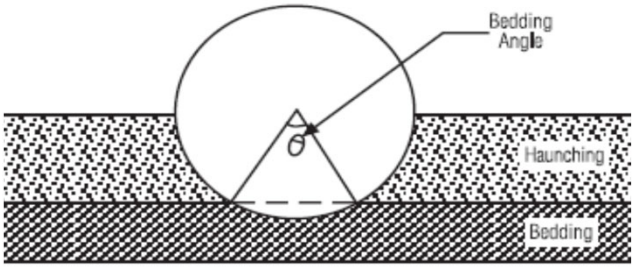
NOTE:

Per TCEQ guidelines, a contractor is allowed to use ASTM D 2321 Bedding Class 1A, 1B, II, or III at no less than 85% percent compaction. To grant the contractor its ability to make the proper judgment of which bedding class to use, the calculations provided in this Engineering Design Report reflect the use of **Bedding Class III, at 85%-95%** compaction, with an E' value of 1000 psi. This provides the "worst case" scenario for the SCS line. All other Bedding Class options will provide an improved value for the zeta factor as well as pipe deflection.

For Bedding Class III, 85%-95% Compaction, E_b = **1000 psi**

PIPE BEDDING ANGLE

As Published on Figure 8 and Table 5, in Deflection: The Pipe/Soil Mechanism UNI-TR-1-97, Uni-Bell PVC Pipe Association, Pgs 18-19.



Bedding Constant Values

Bedding Angle, degrees	Bedding Constant
0	0.110
30	0.108
45	0.105
60	0.102
90	0.096
120	0.090
180	0.083

LIVE LOAD DETERMINATION

Source: AASHTO H20 and E80 Loads and as Published on Table 4, in Deflection: The Pipe/Soil Mechanism UNI-TR-1-97, Uni-Bell PVC Pipe Association, Pg 14.

Height of Cover (ft)	Live Load Transferred to Pipe, lb/in²			Height of Cover (ft)	Live Load Transferred to Pipe, lb/in²		
	Highway H20[1]	Railway E80[2]	Airport [3]		Highway H20[1]	Railway E80[2]	Airport [3]
1	12.50			14	*	4.17	3.06
2	5.56	26.39	13.14	16	*	3.47	2.29
3	4.17	23.61	12.28	18	*	2.78	1.91
4	2.78	18.40	11.27	20	*	2.08	1.53
5	1.74	16.67	10.09	22	*	1.91	1.14
6	1.39	15.63	8.79	24	*	1.74	1.05
7	1.22	12.15	7.85	26	*	1.39	*
8	0.69	11.11	6.93	28	*	1.04	*
10	*	7.64	6.09	30	*	0.69	*
12	*	5.56	4.76	35	*	*	*
				40	*	*	*

[1] Simulates 20 ton truck + impact
[2] Simulates 80,000 lb/ft railway load + impact
[3] 180,000 lbs. dual tandem gear assembly. 26 inch spacing between tires and 66 inch center-to-center spacing between fore and aft tires under a rigid pavement 12 inches thick + impact.
* Negligible live load influence

PRISM LOAD DETERMINATION

Also referred to as the 'dead' load, the prism load is the pressure acting on the pipe by the weight of the soil column above a given section of the pipe. The following prism load columns are industry standards as referenced from Table 3, Deflection: The Pipe/Soil Mechanism UNI-TR-1-97, Uni-Bell PVC Pipe Association, Pg 13.

Table 3
Prism Load Soil Pressure (lbs/in²)

Height of Cover (ft)	Soil Unit Weight (lb/ft³)				
	100	110	120	125	130
1	0.69	0.76	0.83	0.87	0.90
2	1.39	1.53	1.67	1.74	1.81
3	2.08	2.29	2.50	2.60	2.71
4	2.78	3.06	3.33	3.47	3.61
5	3.47	3.82	4.17	4.34	4.51
6	4.17	4.58	5.00	5.21	5.42
7	4.86	5.35	5.83	6.08	6.32
8	5.56	6.11	6.67	6.94	7.22
9	6.25	6.88	7.50	7.81	8.13
10	6.94	7.64	8.33	8.68	9.03
11	7.64	8.40	9.17	9.55	9.93
12	8.33	9.17	10.00	10.42	10.83
13	9.03	9.93	10.83	11.28	11.74
14	9.72	10.69	11.67	12.15	12.64
15	10.42	11.46	12.50	13.02	13.54
16	11.11	12.22	13.33	13.89	14.44
17	11.81	12.99	14.17	14.76	15.35
18	12.50	13.75	15.00	15.63	16.25
19	13.19	14.51	15.83	16.49	17.15
20	13.89	15.28	16.67	17.36	18.06
21	14.58	16.04	17.50	18.23	18.96
22	15.28	16.81	18.33	19.10	19.86
23	15.97	17.57	19.17	19.97	20.76
24	16.67	18.33	20.00	20.83	21.67
25	17.36	19.10	20.83	21.70	22.57
26	18.06	19.86	21.67	22.57	23.47
27	18.75	20.63	22.50	23.44	24.38
28	19.44	21.39	23.33	24.31	25.28
29	20.14	22.15	24.17	25.17	26.18
30	20.83	22.92	25.00	26.04	27.08
31	21.53	23.68	25.83	26.91	27.99
32	22.22	24.44	26.67	27.78	28.89
33	22.92	25.21	27.50	28.65	29.79
34	23.61	25.97	28.33	29.51	30.69
35	24.31	26.74	29.17	30.38	31.60
36	25.00	27.50	30.00	31.25	32.50
37	25.69	28.26	30.83	32.12	33.40
38	26.39	29.03	31.67	32.99	34.31
39	27.08	29.79	32.50	33.85	35.21
40	27.78	30.56	33.33	34.72	36.11
41	28.47	31.32	34.17	35.59	37.01
42	29.17	32.08	35.00	36.46	37.92
43	29.86	32.85	35.83	37.33	38.82
44	30.56	33.61	36.67	38.19	39.72
45	31.25	34.38	37.50	39.06	40.63
46	31.94	35.14	38.33	39.93	41.53
47	32.64	35.90	39.17	40.80	42.43
48	33.33	36.67	40.00	41.67	43.33
49	34.03	37.43	40.83	42.53	44.24
50	34.72	38.19	41.67	43.40	45.14

Note that the Prism Loads are calculated based upon the Marston Theory of Loads, developed by Professor Anson Marston, circa 1913, and is calculated using the formula:

$$P = \frac{\gamma_s * H}{144}$$

This formula determines the earth load on a flexible pipe and is regarded as a conservative approach to determining the dead load placed upon a buried flexible pipe.

At maximum burial depth of 16.19 feet, prism load = 18.55 psi

BUCKLING PRESSURE (ALLOWABLE)

Where:	q_a	=	Allowable buckling pressure (psi)	
	h	=	Height of soil above top of pipe (in) =	194.28 in
	H	=	Depth of burial, feet, from ground surface to top of pipe	
	B'	=	Empirical coefficient of elastic support	
	E_b	=	Modulus of soil reaction for the bedding material (psi)	
	E	=	Modulus of elasticity of the pipe material (psi)	
	I	=	Moment of inertia of the pipe, per linear inch of pipe (in^3)	
	t	=	Pipe wall thickness (in)	
	D	=	Mean Pipe Diameter (in) D =	8.293 in

Solving for the Empirical coefficient of elastic support, given by Luscher in 1966, as referenced on Pg 113 of Moser, A.P., Buried Pipe Design. 2nd Ed., McGraw-Hill:

$$B' = \frac{4(h^2 + Dh)}{1.5(2h + D)^2} \qquad I = \left(\frac{t^3}{12}\right) = \left(\frac{inches^3}{in_{linear}}\right) =$$

$$B' = \frac{157424}{236238} = 0.666 \qquad I = \frac{0.03659}{12} = 0.0030$$

Using the Allowable Buckling Pressure Equation as shown in Moser, A.P., Buried Pipe Design. 2nd Ed., McGraw-Hill, Pg 112, and an initial factor of safety (SF) of 2.5, the Allowable Buckling Pressure is then:

$$q_a = \frac{1}{FS} * \sqrt{32 * R_w * B' * E_b * \left(E * \frac{I}{D^3}\right)}$$

Where,
$R_W = 1 - 0.33(h_w / h)$

$$q_a = \frac{1}{2.5}\sqrt{\left[\ 32\ \right]\left[\ 1\ \right]\left[\ 0.666\ \right]\left[\ 1000\ \right]\left[400000\ \frac{0.0030}{570.34}\right]}$$

$$q_a = \mathbf{85.42}\ \mathbf{psi}$$

BUCKLING PRESSURE (INSTALLED CONDITION)

Where:	q_P	=	Pressure applied to pipe under installed conditions (psi)		
	γ_W	=	Specific Weight of Water = 0.0361 (pci)		
	γ_S	=	Specific Weight of Soil (pcf)		
	W_c	=	Vertical Soil Load on the pipe per unit length (lb/in)		
	L_L	=	Live load as determined from chart		
	hw	=	Height of Groundwater above pipe, typically = 0		
	D	=	Mean Pipe Diameter (in)	D =	8.293 in
	t	=	Pipe Wall Thickness (in)	t =	0.332 in

The Vertical Soil Load can be calculated using Equation 6.6 of Uni-Bell's Handbook of PVC Pipe , Ch VI Superimposed Loads on Buried Pipe, Pg 183

$$W_c = H \times \gamma_s \times (D + t)$$

Where: γ_S = 165 Value taken from:

$$W_C = \left[\ 16.19\ \right]\left[\ 12\ \text{in/ft}\ \right]\left[\ 165.00\ \right]\left[\frac{1\ \text{ft}^3}{1728\ \text{in}^3}\right]\left[\ 8.63\ \right]$$

W_C = 160.00 lb/in

At Max Pipe Depth (H) of 16.19 ft

Using the Equation on Pg 114 of Moser, A.P., Buried Pipe Design. 2nd Ed., McGraw-Hill, Pressure Applied to Pipe under installed conditions at its deepest installed depth (Note, since hw = 0, the Water Buoyancy Factor (Rw) = 1) is calculated to be:

$$q_p = \gamma_w h_w + R_w\left(\frac{W_c}{D+t}\right) + L_L \quad \text{and } L_L = \ 0 \qquad R_W = 1 - 0.33(h_w / h)$$

$$q_P = 0.0361 \times 0 + 1 \times \left[\frac{160.00}{8.625}\right]$$

$$q_P = \mathbf{18.55\ psi}$$

Note: The pressure applied to the pipe under installed conditions is less than the Allowable Buckling Pressure of the specified pipe, (i.e.. $q_a > q_p$) therefore the design is acceptable for installation.

WALL CRUSHING CALCULATION

Where:	D_o	=	outside pipe diameter, in. =	8.625 in
	P_c	=	Compressive stress or hydrostatic design basis (HDB). For typical PVC pipe assume 4,000 psi. For any other pipe material the HDB must be supplied by the pipe manufacturer.	
	A	=	surface area of the pipe wall, $in.^2/ft$ =	0.332 $in.^2/ft$
	γ_S	=	specific weight of soil, pcf, =	165 pcf
	H	=	Depth of burial (ft) from ground surface to crown of pipe	

Using the Wall Crushing and Wall Thrust equations, as referenced in Plastic Pipe Design Manual published by Vylon Pipe, Pg 14 the Wall Crushing due to compressive stress can be found using the following:

$$P_c = \frac{T}{A} \quad \text{where T, Thrust, is calculated as} \quad T = \frac{P_y D}{2}$$

Substituting the Thrust equation into the Wall Crushing equation:

$$P_c = \frac{\frac{P_y D}{2}}{A} = \frac{P_y D}{2A}$$

From the Marston Equation determining the Prism Load Calculation (See previous section on Prism Load), substitute the equation for P_y:

$$P_c = \frac{\frac{\gamma_s * H}{144} D}{2A} \quad \text{Rearranging this equation, it becomes:} \quad 2AP_c = \frac{\gamma_s * H}{144} D$$

And simplifies to: $288AP_c = \gamma_s HD$

Note that the Surface Area of the Pipe Wall, A, is per unit length in $inches^2$ per foot, a conversion factor (from feet to inches) of 12 must be applied, therefore,

$$24AP_c = \gamma_s HD$$

Solving for H, the equation becomes:

$$H = \frac{24 * P_c * A}{\gamma_s * D_o}$$

(Continued on next page)

Using this equation, and converting all units, solve for “height” of the soil column, or in other words, the depth of burial of the PVC pipe:

$$H = \frac{\left[24 \right] \left[4000 \right] \left[0.332 \right]}{165 \times 8.625} = \mathbf{22.40}$$

H = 22.40 feet

Note: The resulting Wall Crushing will occur at a greater depth than the deepest burial depth of the proposed SCS lines, therefore pipe design is acceptable.

DEFLECTION ANALYSIS: LEONHARDT'S ZETA FACTOR

The Leonhardt's Zeta Factor Equation can be calculated using Equation 7.32 of Uni-Bell's Handbook of PVC Pipe , Ch VII Design of Buried PVC Pipe, Pg 268

Where:
- Do = Pipe Outer Diameter, in = 8.625
- B = Trench Width, in, = 32.63 in
- E_b = Modulus of soil reaction, bedding material (psi) = 1000
- E'_n = Modulus of soil reaction for the in-situ soil (psi) = 3000

$$zeta = \frac{1.44}{f + [1.44 - f] \times \left[\frac{E_b}{E'_n}\right]}$$

where,

$$f = \frac{\frac{B}{Do} - 1}{1.154 + 0.444\left[\frac{B}{Do} - 1\right]}$$

$$f = \frac{2.782609}{2.387478} = 1.1655$$

Substituting f into the zeta equation:

$$zeta = \frac{1.44}{[1.166] + [0.274] \times [0.333]}$$

The Leonhardt Zeta factor is then determined as: **1.146**

PIPE STIFFNESS (Figure: 30 TAC §217.53(k)(3))

Using Equation B.1, as directed in 30 TAC §217.53(k)(3), to Calculate the Pipe Stiffness:

$$PS = C \times RSC \times \left(\frac{8.337}{D} \right)$$

Where:	PS	=	Pipe Stiffness, for SDR-26 PVC (psi) =	115	psi
	C	=	Conversion factor =	0.8	
	RSC	=	Ring Stiffness Constant		
	D	=	Mean Pipe Diameter (in), D =	8.293	in

The RSC can be supplied by the manufacturer or calculated by rearranging Equation B.1

$$RSC = \frac{PS}{C \times \left(\frac{8.337}{D} \right)}$$

$$RSC = \frac{115}{0.804245}$$

$$RSC = 142.991$$

PREDICTED PIPE DEFLECTION

Using the Modified Iowa Equation, referenced and published by the Uni-Bell PVC Pipe association and found at http://www.uni-bell.org/faq.html, and Equation 14 of Deflection: The Pipe/Soil Mechanism UNI-TR-1-97, Uni-Bell PVC Pipe Association Pgs 17, the predicted pipe deflection can be calculated.

Where:	%ΔY/D	=	Predicted % vertical deflection under load		
	P	=	Prism Load, psi		
	K	=	Bedding angle constant, Assumed to =	0.096	
	W'	=	Live Load, psi, =	0	At max depth (ft) : 16.19
	DR	=	Dimension Ratio=	26	
	E	=	Modulus of tensile elasticity of the pipe material, psi		
	E'	=	Modulus of Soil Reaction (zeta x Eb) =	1145.58	
	D_L	=	Deflection Lag Factor =	1.5	

And using the Modified Iowa Equation:

$$(\%)\frac{\Delta Y}{D} = \frac{(D_L KP + KW')\times 100}{[2E/(3(DR-1)^3)] + 0.061E'}$$

Where, Prism Load, $P = \frac{\gamma_s * H}{144}$

and/or from previous chart, prism load = 18.55 psi

The Predicted Deflection is determined as:

$$(\%)\frac{\Delta Y}{D} = \frac{\left[\left[1.5 \times 1.781\right] + 0\right] \times 100}{\left[\frac{800000}{46875}\right] + \left[0.061 \times 1145.58\right]} = \mathbf{3.07}\ \%$$

NOTE: **3.07 < 5%,** therefore pipe design is acceptable

A deflection lag factor of 1.0 is typical for new pipes. Over the life of the pipe, the pipe will tend to deflect. Therefore, 1.5 is a conservative factor for the 50 year life.

PIPE STRAIN

Pipe strain is also known as the elongation of the pipe over the original length of the pipe. Under normal loading conditions of the PVC pipe, the variable that affects the elongation or straining of the pipe stems from the either the flexure or deflection (i.e.. bending) of the pipe within the bedding material (i.e. increased or excessive pipe deflection causing the pipe to elongate) or hoop stress within the pipe wall. Please note that pipe strain is not generally known to be the limiting performance factor during pipe failure. For this system, pipe deflection is limited to 5% for a SDR 26 pipe. This 5% deflection value is the industry accepted value placing the pipe within its straining limits. Therefore, as the calculated deflection above is shown to be less than 5%, the pipe and bedding class used in this system is within the acceptable straining limits for this pipe.

However, total Pipe strain is calculated as the combination of the before mentioned hoop stress and the maximum strain due to deflection. Both items are calculated below using Equations 15 and 16 found in Deflection: the Pipe/Soil Mechanism, UNI-TR-1-97, Published by the Uni-Bell PVC Pipe Association (Pgs 28-30):

Where:	$\in_h$	=	Maximum Pipe Strain due to Hoop Stress, in/in	
	P	=	Pressure on the pipe (Live + Prism Loads), psi	
	E	=	Modulus of Elasticity of the Pipe, psi	
	t	=	Pipe Wall thickness (in) =	0.332
	D	=	Pipe Diameter, Outer (in) =	8.625

$$\in_h = \frac{PD}{2tE}$$

Using the maximum cover for both live loads and prism loads as well as the previous unit weight of the soil:

$$\in_h = \frac{[\ 0.00\ +\ 18.55\ ] \times\ 8.625}{2\ \times\ 0.332\ \times\ 400{,}000} = \textbf{6.024E-04}\ \frac{\text{in}}{\text{in}}$$

(*Continued on following page)*

Where:	$\in_f$	=	Maximum Pipe Strain due to Ring Deflection, in/in	
	ΔY	=	Change in vertical pipe diameter under load, in, (numerator in the deflection equation, but in decimal form)	
	t	=	Pipe Wall thickness (in) =	0.332
	D	=	Pipe Diameter, Outer (in) =	8.625
	DR	=	Dimension Ratio, PVC Pipe=	26

$$\in_f = \frac{t}{D}\left[\frac{3\Delta Y / D}{1 - 2\Delta Y / D}\right] = \frac{1}{DR}\left[\frac{3\Delta Y}{D - 2\Delta Y}\right]$$

$$\in_f = \frac{0.332}{8.625} \times \frac{801.405}{8.625 - 534.270} = -0.05869 \frac{\text{in}}{\text{in}}$$

$$\in_{total} = \textbf{-0.0581} \quad \frac{\text{in}}{\text{in}}$$

TCEQ PIPE BEDDING AND TRENCHING REQUIREMENTS (30 TAC 217.54)

These notes are provided in the Construction Documents on **Plan Sheets 1.5 and 8.5

a. Pipe Embedment
   1. A rigid pipe must be laid with the adequate bedding, haunching, and initial backfill to support the anticipated load. The bedding classes that are allowed are A, B, or C, as described in American Society for Testing and Materials (ASTM) C 12, American National Standards Institute (ANSI) A 106.2,Water Environment Federation Manual of Practice No. 9 or American Society of Civil Engineers (ASCE) MOP 37.
   2. A flexible pipe must be laid with the adequate bedding, haunching, and initial backfill to support the anticipated load. The bedding classes that are allowed are IA, IB, II, or III, as described in ASTM D-2321 or ANSI K65.171.
   3. Debris, large clods, or stones that are greater than six inches in diameter, organic matter, or other unstable materials are prohibited as bedding, haunching, or initial backfill.
   4. Backfill must not disturb the alignment of a collection system pipe.
   5. If trenching encounters significant fracture, fault zones, caves, or solutional modification to the rock strata, an owner must halt construction until an engineer prepares a written report detailing how construction will accommodate these site conditions.

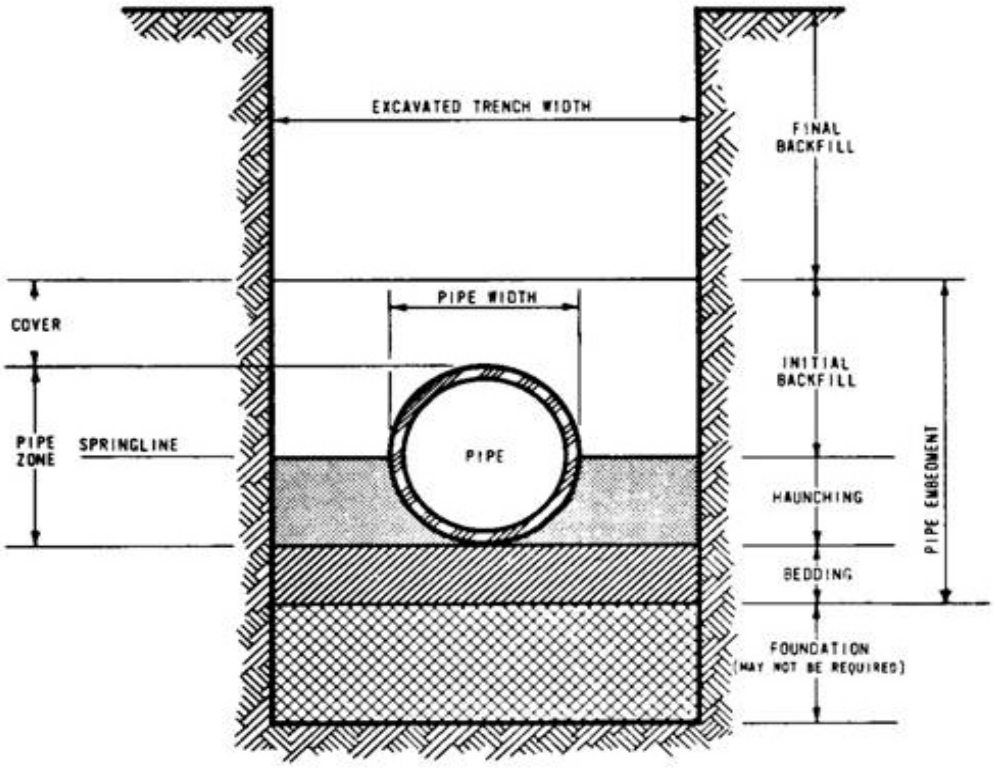
b. Compaction.
   1. Compaction of an embedment envelope must meet the manufacturer's recommendations for the collection system pipe used in a project.
   2. Compaction of an embedment envelope must provide the modulus of soil reaction for the bedding material necessary to ensure a wastewater collection system pipe's structural integrity as required by §217.53 of this title (relating to Pipe Design).
   3. The placement of the backfill above a pipe must not affect the structural integrity of a pipe.

c. Envelope Size.
   1. A minimum clearance of 6.0 inches below and on each side of the bell of all pipes to the trench walls and floor is required.
   2. The embedment material used for haunching and initial backfill must be installed to a minimum depth of 12 inches above the crown of a pipe.

d. Trench Width.

1. The width of a trench must allow a pipe to be laid and jointed properly and must allow the backfill to be placed and compacted as needed.
2. The maximum and minimum trench width needed for safety and a pipe's structural integrity must be included in the report.
3. The width of a trench must be sufficient to properly and safely place and compact haunching materials.
4. The space between a pipe and a trench wall must be wider than the compaction equipment used in the pipe zone.

TRENCH CROSS-SECTION (30 TAC 217.54)



NOTE:
Trenching Details along with 30 TAC 217.54 are annotated in the Construction Documents/Plan Sheets on Sheets 1.6 & 8.6

MANHOLE SPECIFICATIONS

30 TAC 217.55 Requirements with design comments:

a. An owner must include manholes in a wastewater collection system at:
    1. All points of change in alignment, grade, or size;
    2. At the intersection of all pipes; and
    3. At the end of all pipes that may be extended at a future date.

b. Manholes placed at the end of a wastewater collection system pipe that may be extended in the future must include pipe stub outs with plugs.

c. A clean-out with watertight plugs may be installed in lieu of a manhole at the end of a wastewater collection system pipe if no extensions are anticipated. **(Clean outs not used in-lieu of manholes)**

d. Cleanout installations must pass all applicable testing requirements outlined for gravity collection pipes in §217.57 of this title (relating to Testing Requirements for Installation of Gravity Collection System Pipes). **(Clean outs not used in lieu of manholes)**

e. A manhole must be made of monolithic, cast-in-place concrete, fiberglass, pre-cast concrete, high-density polyethylene, or equivalent material that provides adequate structural integrity. (**See the Pre-Cast Manhole Details following these construction notes)**

f. The use of bricks to adjust a manhole cover to grade or construct a manhole is prohibited. **(Not Applicable)**

g. Manholes may be spaced no further apart than the distances specified in the following table for a wastewater collection system with straight alignment and uniform grades, unless a variance based on the availability of cleaning equipment that is capable of servicing greater distances is granted by the executive director. **(Manholes are spaced no greater than 500 L.F.)**

Table C.2. - Maximum Manhole Spacing	
Pipe Diameter	**Maximum Manhole**
6-15	500
18-30	800
36-48	1000
54 or larger	2000

h. Tunnels are exempt from manhole spacing requirements because of construction constraints. **(Not applicable)**

i. An intersection of three or more collection pipes must have a manhole. **(Maintained throughout the design of the SCS)**

j. A manhole must not be located in the flow path of a watercourse, or in an area where ponding of surface water is probable. **(Maintained throughout the design of the SCS)**

k. The inside diameter of a manhole must be no less than 48 inches. A manhole diameter must be sufficient to allow personnel and equipment to enter, exit, and work in the manhole and to allow proper joining of the collection system pipes in the manhole wall. **(See Manhole Details following these notes)**

l. Manholes must meet the following requirements for covers, inlets, and bases.

1. Manhole Covers

A. A manhole where personnel entry is anticipated requires at least a 30 inch diameter clear opening. (**Covers to have 32" Minimum Openings per SAWS Specifications on Sheets 1.6 & 8.6)**

B. A manhole located within a 100-year flood plain must have a means of preventing inflow. **(Not Applicable)**

C. A manhole cover construction must be constructed of impervious material. **(See Details Sheets 1.6 & 8.6)**

D. A manhole cover that is located in a roadway must meet or exceed the American Association of State Highways and Transportation Officials standard M-306 for load bearing. **(See Manhole Details following these construction notes)**

2. Manhole Inverts

A. The bottom of a manhole must contain a U-shaped channel that is a smooth continuation of the inlet and outlet pipes. **(See Details Sheets 1.6 & 8.6)**

B. A manhole connected to a pipe less than 15 inches in diameter must have a channel depth equal to at least half the largest pipe's diameter **(Not Applicable)**

C. A manhole connected to a pipe at least 15 inches in diameter but not more than 24 inches in diameter must have a channel depth equal to at least three-fourths of the largest pipe's diameter **(Not Applicable)**

D. A manhole connected to a pipe greater than 24 inches in diameter must have a channel depth equal to at least the largest pipe's diameter **(Not applicable for this project)**.

E. A manhole with pipes of different sizes must have the tops of the pipes at the same elevation and flow channels in the invert sloped on an even slope from pipe to pipe. **(Not applicable for this project)**

F. A bench provided above a channel must slope at a minimum of 0.5 inch per foot. **(Self Explanatory)**

G. An invert must be filleted to prevent solids from being deposited if a wastewater collection system pipe enters a manhole higher than 24 inches above a manhole invert. **(See Detail Sheets 1.6 & 8.6)**

H. A wastewater collection system pipe entering a manhole more than 24 inches above an invert must have a drop pipe. **(Not Applicable)**

m. The inclusion of steps in a manhole is prohibited.

n. Connections. A manhole-pipe connection must use watertight, size-on-size resilient connectors that allow for differential settlement and must conform to American Society for Testing and Materials C-923. **(See Details Sheets 1.6 & 8.6 and 1.5 & 8.5 General Notes)**

o. Venting. An owner must use an alternate means of venting if manholes are at more than 1,500 foot intervals and gasketed manhole covers are required for more than three manholes in sequence. Vents must meet the following requirements: **(Not Applicable to this project)**

1. Vent design must minimize inflow;
2. Vents must be located above a 100-year flood event elevation; and
3. Tunnels must be vented in compliance with this subsection.

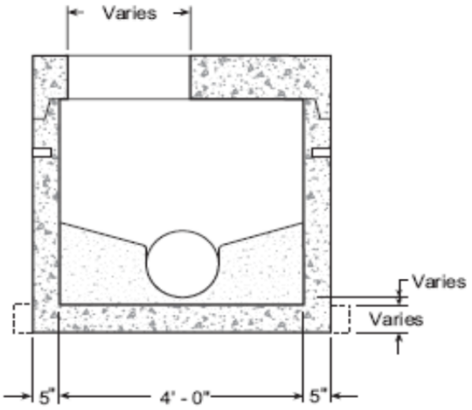
p. Cleanouts. The size of a cleanout must be equal to the size of the wastewater collection system main. **(Not applicable to this project)**

Precast Manhole Information:

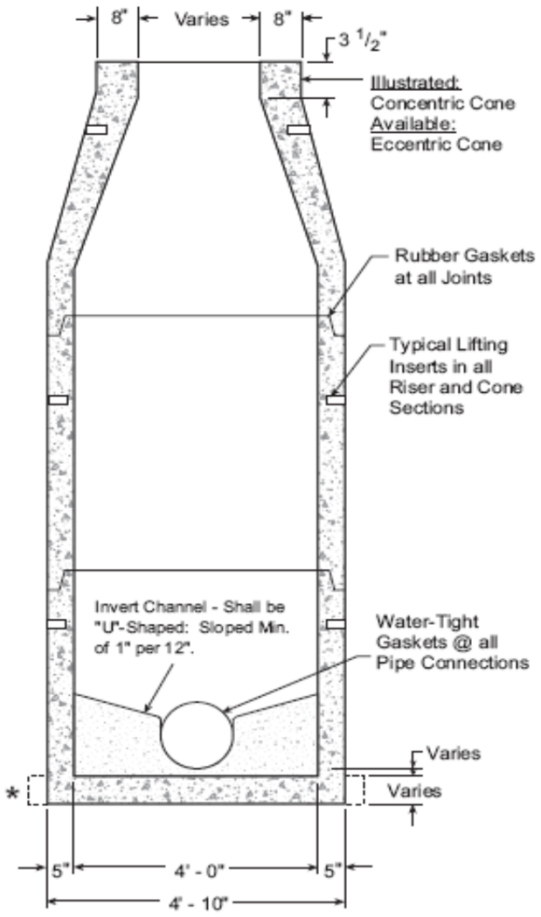
Hanson Pipe and Precast
Hanson Building Products West
300 E John Carpenter Freeway
11th floor
Irving, TX 75062
972.653.5500

San Antonio Metro Area Contact:
210.661.2351
866.426.7661

Precast Manholes



Flattop Illustration
for Shallow Manhole



Section View
4' I.D. Manhole - Regular Base with Reducing Cone

Materials & Features

HOLES AS SPECIFIED: Max diameter = 32"
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
Average weight of 24" depth base w/8" invert = 4,500 lbs.
Estimated weiight of riser and cone sections = 870 lbs. / vt. ft.

* - Extended base is available to meet local requirements.

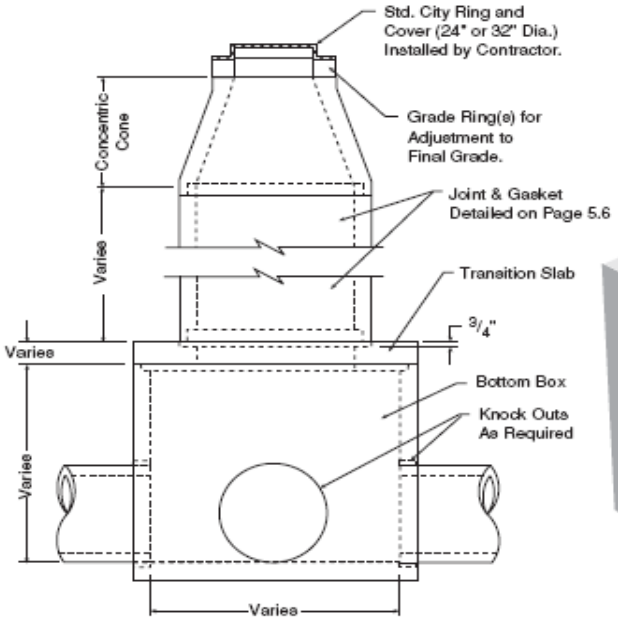
In the event a boot is loose contact your Hanson representative to resolve.

"Manufactured to your specifications."

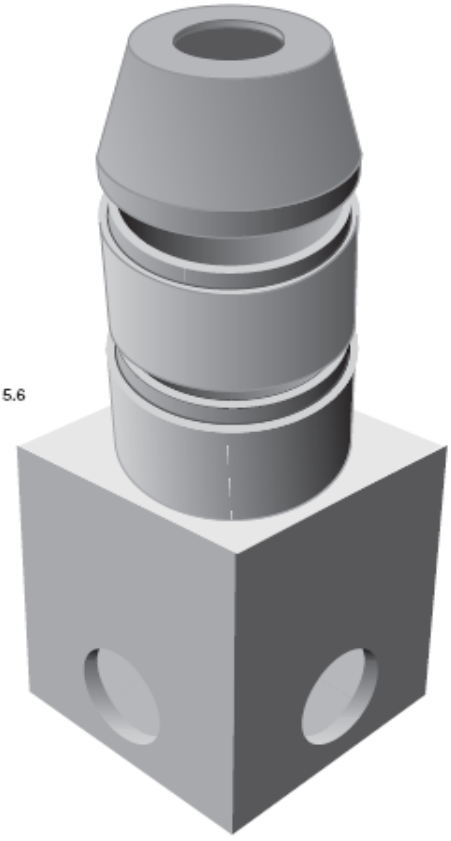
-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
4' I.D. Manhole **Regular Base w / Reducing Cone**	All Plants	TX	5.5	07-01-06	Hanson

Precast Manholes



Side View



Isometric View

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

REINFORCING STEEL: per ASTM A-615 / A-185

REINFORCING to meet AASHTO HS 20-44 Loading.

BASE DESIGN EQUAL TO OR EXCEEDS ASTM C-357

RISER DESIGN EQUAL TO OR EXCEEDS ASTM C-478

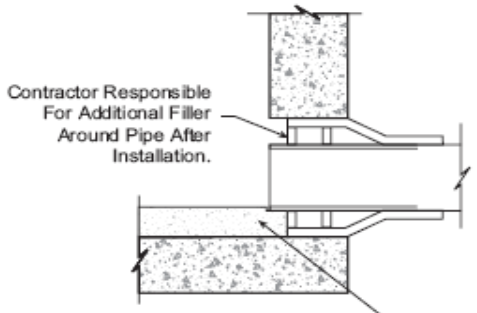
In the event a boot is loose contact your Hanson representative to resolve.

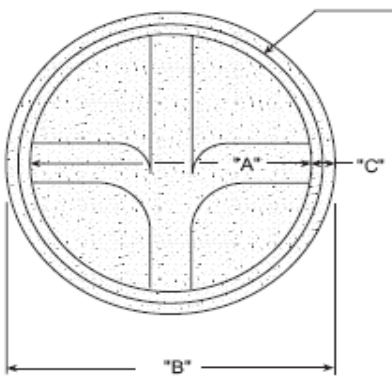
-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
Type "C" Manhole	Houston San Antonio	TX	5.11	07-01-06	Hanson

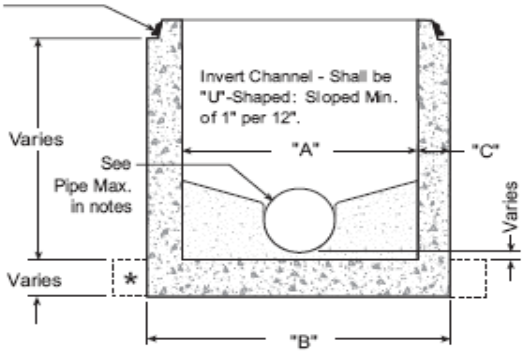
Precast Manholes

For Pipe Entering the Manhole at Excessive Depths Above the Flow Line Out, the Contractor May be Responsible for Grout Work Necessary to Bring Channel up to Flow Line on Inlet Pipe.





Plan View



Section View

Pipe Size	I.D. "A"	O.D. "B"	Wall Thk. "C"
4'	4' - 0"	4' - 10"	5"
5'	5' - 0"	6' - 0"	6"
6'	6' - 0"	7' - 2"	7"

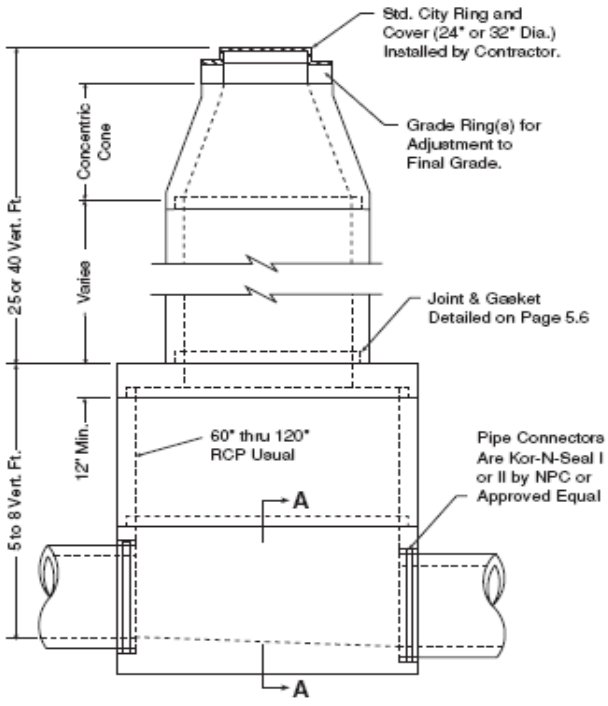
Materials & Features

HOLES AS SPECIFIED:
For 4' I.D. max. diameter = 32"
For 5' I.D. max. diameter = 40"
For 6' I.D. max. diameter = 54"
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
Average weight of 24" depth base w/8" invert = 4,500 lbs.
Water-tight gaskets at all pipe connections.
* - Regular base shown: Extended base also available.
In the event a boot is loose contact your Hanson representative to resolve.

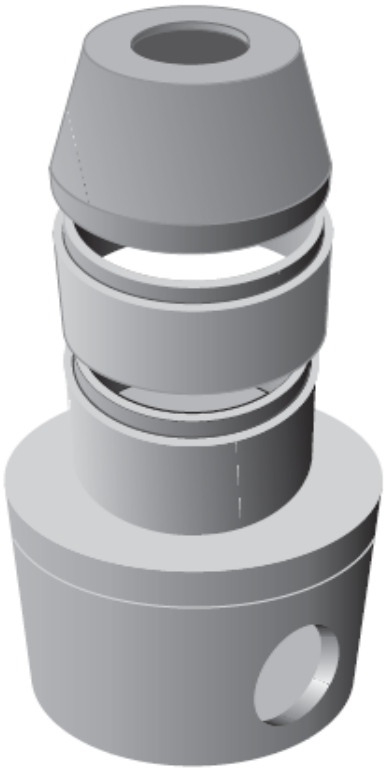
-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
Details: 4', 5' & 6' I.D. Precast Regular Manhole Base	All Plants	TX	5.7	07-01-06	Hanson

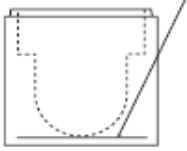
Precast Manholes



w/ Precast Base



Isometric View



Section A-A

Base Slab Reinforcing

30' Deep Structure
60"ø - 6" Thick Slab min. - #5 @ 8" ea.way
72"ø - 8" Thick Slab min. - #5 @ 8" ea.way
84"ø - 8" Thick Slab min. - #5 @ 6" ea.way
96"ø - 10" Thick Slab min. - #5 @ 6" ea.way

45' Deep Structure
60"ø - 8" Thick Slab min. - #5 @ 8" ea.way
72"ø - 8" Thick Slab min. - #5 @ 8" ea.way
84"ø - 10" Thick Slab min. - #5 @ 6" ea.way
96"ø - 12" Thick Slab min. - #5 @ 6" ea.way

All Reinforcing has $1\frac{1}{2}$" cover from top of slab.

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

REINFORCING STEEL: per ASTM A-615, Grade 60.

REINFORCING to meet AASHTO HS 20-44 Loading.

DESIGN EQUAL TO OR EXCEEDS ASTM C-478

In the event a boot is loose contact your Hanson representative to resolve.

Note:
- Inverts shall be specifically sized for connecting pipes; and shall be U-Shaped with the min. depth 3/4 of the largest pipe diameter.

-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
30 & 45 Ft. Depth 60" thru 96"Large Base Manhole	Houston San Antonio	TX	5.10	07-01-06	Hanson

ATTACHMENT A
WASTEWATER / SEWAGE CALCULATIONS

TREVOR FIELDS TRACT --- SCS REPORT
WASTEWATER/SEWAGE CALCULATIONS:

NUMBER OF LOTS WITHIN SUBDIVISION:

DWELLING UNITS 158

UNKNOWN COMMERCIAL PROPERTIES 2

NUMBER OF EDU'S:

SAN ANTONIO WATER SYSTEM CRITERIA: 1 EDU PER LOT

$$\frac{0.5 \text{ EDU}}{\text{DWELLING UNIT}} * 158 \text{ LOTS} = 79 \text{ EDU'S}$$

$$\frac{6 \text{ EDU}}{\text{UNKNOWN COMMERCIAL ACRE}} * 1.64 \text{ ACRES} = 10 \text{ EDU'S}$$

$$\frac{6 \text{ EDU}}{\text{UNKNOWN COMMERCIAL ACRE}} * 2.10 \text{ ACRES} = 13 \text{ EDU'S}$$

PEAK WET WEATHER FLOW:

PEAK WET WEATHER FLOW = PEAK DRY WEATHER + I&I

PEAK DRY WEATHER FLOW = 2.5 * AVERAGE DAILY FLOW

PEAK DRY WEATHER:
AVG. DAILY WASTEWATER FLOW (ADF) IS 200 GALLONS PER DAY/EDU
(SAN ANTONIO WATER SYSTEM UTILITY SERVICE REGULATIONS)

$$2.5 * 200 \frac{\text{GAL/DAY}}{\text{EDU}} * 102 \text{ EDU'S} = \underline{\mathbf{50,750}} \textbf{ GAL/DAY}$$

INFLOW & INFILTRATION:
300 GAL PER ACRE/DAY
38.29 ACRES CONTRIBUTING
I&I = **11,487** **GAL/DAY**

PEAK WET WEATHER:
50,750 + 11,487 (GAL / DAY) = 62,237 **GAL/DAY**

$$62{,}237 \frac{\text{GAL}}{\text{DAY}} * \frac{1 \text{ CF}}{7.48 \text{ GAL}} = 8{,}320.45 \frac{\text{CF}}{\text{DAY}}$$

$$8{,}320.45 \frac{\text{CF}}{\text{DAY}} * \frac{1 \text{ DAY}}{24 \text{ HR}} * \frac{1 \text{ HR}}{60 \text{ MIN.}} * \frac{1 \text{ MIN.}}{60 \text{ SEC.}} = \mathbf{0.0963} \textbf{ CUBIC FEET/SEC}$$

ATTACHMENT B
SEWER AVAILABILITY DOCUMENTATION

UTILITY SERVICE AGREEMENT

STATE OF TEXAS §
§
COUNTY OF BEXAR §

This Utility Service Agreement ("Agreement") is entered into by and between the San Antonio Water System ("SAWS") and Mosaic Development ("Developer") together the Parties ("Parties").

Recitals

Whereas, Developer has requested that SAWS provide Water and Wastewater service (the "Services") to an approximate 38.26-acre tract of land, (the "Trevor Fields Subdivision Tract" or "Tract"), which is located inside SAWS water CCN, inside SAWS wastewater CCN, and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board action is not required; and

Whereas, the Tract is located over the Edwards Aquifer Recharge or Contributing Zone, which is located within the 5-mile Awareness Zone of Camp Bullis, such Tract being more particularly described in Attachment VI hereto, as accepted by SAWS; and

Whereas, SAWS desires to provide the Services to the Developer pursuant to this Agreement, the SAWS Utility Service Regulations, and all applicable local, state, and federal regulations, as amended.

Now Therefore, The Parties Hereto Agree To The Following Terms and Conditions:

1.00 Interpretation of Agreement.

1.01 The Parties acknowledge that the Services contemplated by this Agreement shall be provided in accordance with the SAWS Utility Service Regulations, Design Criteria, Schedules, Attachments and Instruments thereto, as amended (together "USR"). In the event the specific terms of this Agreement are in conflict with the USR, the specific terms of this Agreement shall apply. The above notwithstanding, for the specific conflicting terms to prevail, the conflict must be expressly noted in the Agreement. The Parties further acknowledge that this Agreement is subject to future acts of the City Council of the City of San Antonio with respect to the adoption or amendment of impact fee ordinances/resolutions.

1.02 The Parties agree that the purpose of this Agreement is the reservation of the designated water supply and /or wastewater discharge capacity for the Tract. Any rights that the Developer claims arise under Chapter 245, Texas Local Government Code, that are related to this Agreement shall comply with the Unified Development Code Article IV, Division 1, Chapter 35-410 and applicable requirements in Article VII, Division 2 *Vested Rights*. If Developer intends to rely on this USA as its application for the purposes of vested rights under Chapter 245, then please contact Development Services Department, Land Entitlement team at 210-207-1111 or 1901 S. Alamo, San Antonio, TX. 78204. In no event shall the Utility Service Regulations replace or conflict with

Preparer's Initials

the City's Unified Development Code, Article IV, Division 1, Chapter 35-410 and applicable requirements in Article VII, Division 2 *Vested Rights.*

2.00 Obligation Conditioned.

The obligation of SAWS to provide the Services is conditioned upon present rules, regulations and statutes of the United States of America and the State of Texas and any court order that directly affects the SAWS' Regional Water Production and Distribution System and/or Regional Wastewater Transportation and Treatment System and/or the utility infrastructure directly servicing the Tract. Developer acknowledges that if the rules, regulations and statutes of the United States of America and/or the State of Texas that are in effect upon the execution date of this Agreement are repealed, revised or amended to such an extent that SAWS becomes incapable of, or prevented from, providing the Services, then no liability of any nature is to be imposed upon SAWS as a result of SAWS' compliance with such legal or regulatory mandates. SAWS agrees that it will use its best efforts to prevent the enactment of such legal or regulatory mandates.

3.00 Term.

3.01 The term of this Agreement shall be seven (7) years from the Effective Date if the Developer complies with the requirements set out in G.C. 19.00 (attached) within the time period therein stated. This Agreement shall automatically expire if Developer fails to comply with the requirements of G.C. 19.00 within the time period therein provided. The term of this Agreement may be extended to fifteen (15) years from the Effective Date, if Developer complies with the requirements to extend the term set forth in G.C. 19.00 within the time period therein stated. Certain obligations of SAWS (described in Section 3.03 below) may survive the expiration of the term of this Agreement, to the extent that Developer has (i) paid all applicable impact fees for the Services at the then-current rate, and (ii) complied with all On-Site and Off-Site utility infrastructure requirements of this Agreement (described in the Special Conditions), including over-sizing requirements.

3.02 To the extent that SAWS' obligations do not survive the expiration of this Agreement, Developer understands and agrees that a new Utility Service Agreement must be entered into with SAWS to receive the Services for the development project that is the subject of this Agreement.

3.03 To the extent that Developer timely pays all applicable impact fees and complies with all On-Site and Off-Site utility infrastructure requirements prior to the expiration of this Agreement, the following obligations will survive expiration of this Agreement:

(i) SAWS' recognition of the EDUs referenced as the subject of this agreement as Guaranteed Capacity.

(ii) SAWS' continued recognition of impact fee credits previously earned by the Developer pursuant to Sections 15.8 and 15.9 of the USR.

(iii) SAWS' continued provision of the Services to retail customers located in the Tract, so long as such customers pay for the services and comply with the regulations applicable to individual customers.

Preparer's Initials

6.00 Indemnity.

TO THE EXTENT ALLOWED BY LAW AND TEXAS CONSTITUTION, THE DEVELOPER FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS SAWS AND ITS SUCCESSOR AND ASSIGNS FROM THE CLAIMS OF THIRD PARTIES ARISING OUT OF SAWS' RECOGNITION OF THE TRANSFER OF CAPACITY UNDER THIS AGREEMENT TO DEVELOPER'S SUBSEQUENT PURCHASERS, SUCCESSORS AND ASSIGNS.

7.00 Notices.

Any notice, request, demand, report, certificate or other instrument which may be required or permitted to be furnished to or served upon the parties shall be deemed sufficiently given or furnished or served if in writing and deposited in the United States mail, registered or certified, return receipt requested, addressed to such party at the address set forth below:

IF TO SAN ANTONIO WATER SYSTEM:

SAN ANTONIO WATER SYSTEM
POST OFFICE BOX 2449
SAN ANTONIO, TEXAS 78298-2449
ATTN: TRACEY B. LEHMANN, P.E., DIRECTOR, DEVELOPMENT ENGINEERING

IF TO DEVELOPER:

Mosaic Development
6812 West Ave., Ste. 100
San Antonio, Tx 78213
Attn: Blake Yantis

8.00 Severability.

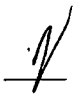
If for any reason any one or more paragraph of this Agreement are held legally invalid, such judgment shall not prejudice, affect impair or invalidate the remaining paragraphs of the Agreement as a whole, but shall be confined to the specific sections, clauses, or paragraphs of this contract held legally invalid.

9.00 Effective Date.

The Effective Date of this Agreement shall be the date signed by the authorized representative of the San Antonio Water System.

10.00 Ownership.

By signing this Agreement the Developer represents and warrants that it is the owner of the Tract or has the authority of the Tract owner to develop the area. Any misrepresentation of authority or ownership by Developer shall make this Agreement voidable by SAWS. If the Developer does not own the Tract, then the Developer must provide documentation from the owner of the Tract to show that Developer has the proper authority to develop the Tract.

Preparer's Initials 

ACCEPTED AND AGREED TO IN ALL THINGS:

San Antonio Water System	**Developer**
Signature:	**Signature:**
Print Name: Robert R. Puente	**Print Name:** Blake Yantis
Title: President/Chief Executive Officer	**Title:** Mgr
Date: 07-27-22	**Date:** 6/8/22

ACKNOWLEDGEMENTS

STATE OF TEXAS, COUNTY OF BEXAR §

BEFORE ME, the undersigned Notary Public, on this day personally appeared Robert R. Puente known to me to be the person whose name is subscribed to the foregoing instrument and that he has executed the same as President/CEO for the purposes and consideration therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 27 **day of** July **, 2022.**

(seal) CAROLINE G. GONZALES My Notary ID # 130329928 Expires August 13, 2023

Notary Public

STATE OF TEXAS, COUNTY OF BEXAR §

BEFORE ME, the undersigned Notary Public, on this day personally appeared Blake Yantis known to me to be the person whose name is subscribed to the foregoing instrument and that he has executed the same as Manager for the purposes and consideration therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 8 **day of** June **, 2022.**

(seal) MICHELLE THI HOANG Notary Public, State of Texas Comm. Expires 01-05-2026 Notary ID 133517899

Notary Public

Preparer's Initials

GENERAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

G.C.1.00 Definitions.

G.C.1.01 Developer.

Owner of the tract, his subsequent purchasers, successors, and/or assigns.

G.C.1.02 Director of Development Engineering.

The Director of Development Engineering of the San Antonio Water System or his/her designated representative.

G.C. 1.03 Definition of Terms.

Unless defined in the Utility Service Agreement (the "Agreement"), the terms used in this General Conditions of the Utility Service Agreement (the "General Conditions") shall have the same definitions and meaning as those set out in Chapter 2, Definitions, of the Utility Service Regulations ("USR"). In the event a term is specifically defined in the General Conditions, and the definition is in conflict with that found in the USR, and such conflict is acknowledged in the General Conditions, the definition set out in the General Conditions shall apply.

G.C.2.00 Required Submittals.

If determined to be necessary by the Director of Development Engineering ("Director"), the Developer hereby agrees to submit the following documents prior to the execution of the Agreement: Developer Master Plan, Developer Utility Layout, Water Recycling and Conservation Plan, and Engineering Report. The Parties agree that such documents are included instruments to the Agreement. The submittal of such documents is a condition precedent to plat recordation and initiation of Services. Developer shall modify such documents as may be reasonably required by the Director. Such documents shall be updated as required by the Director and the USR.

G.C.3.00 Dedication to SAWS.

The Developer agrees to dedicate, grant, and convey to SAWS all rights, title and interest of Developer in both the Off-Site and On-Site utility infrastructure that the Developer is required to construct under the Special Conditions of the Utility Service Agreement (the "Special Conditions"), and to dedicate, grant, and convey to SAWS easements for such utility infrastructure. Upon written acceptance of Off-Site and On-Site utility infrastructure by SAWS, the infrastructure shall be owned, operated and maintained by SAWS.

G.C.4.00 Design and Construction Requirements.

The design and construction of all Off-Site and On-Site utility infrastructure shall, at a minimum, comply with the requirements established by SAWS, including the USR, the City of San Antonio, the County of Bexar, the State of Texas, and any agency thereof with jurisdiction, including but not limited to the Texas Commission on Environmental Quality and the Texas Department of Health. Off-Site and On-Site utility infrastructure shall be constructed under the inspection of SAWS. Provision of the Services to the Tract shall not commence until the Director has accepted and approved Off-Site and On-Site utility infrastructure in writing.

G.C.5.00 Joint Venture Agreements.

In the event the Developer enters into a Joint Venture Agreement covering the costs for supplying the Services to the Tract, the Developer shall send a copy of such agreement to the attention of the Director.

G.C.6.00 Assignment.

This Agreement may not be assigned in whole or in part; however, Developer may assign, convey or transfer EDU capacity ("EDU capacity transfer") to buyers of portions of the Tract in accordance with the terms in G.C. 20.00

G.C.7.00 Event of Foreclosure.

In the event Developer's interest in the Tract described in Attachment VI are extinguished by an act of foreclosure, and the foreclosing party has supplied sufficient evidence to SAWS that they are the successor in interest to the Tract as a result of such foreclosure, and that there are no lawsuits pending concerning the Tract, SAWS shall consider the foreclosing party a successor in interest if the foreclosing party executes a utility service agreement with SAWS after the Director determines that the execution of such an agreement will not be adverse to SAWS' interest.

G.C.8.00 Payment for Provision of Utility Service.

In the event payment for the Services provided to a subdivision plat within the Tract is not billed by SAWS, the amount of the monthly fees for the provision of the Services will be those charged to the various customer classifications as set by City Ordinances, with the billing and collection thereof on behalf of SAWS, being the responsibility of the billing utility purveyor. To facilitate this arrangement, Developer is to insert into any utility agreement with whatever utility purveyor is to bill for utility services to a subdivision plat within the Tract, a provision requiring said purveyor to enter into a Contract with SAWS to bill and collect SAWS' monthly utility services fees and transmit said fees to SAWS. The billing utility purveyor shall advise customers that delinquent non-payment of any of SAWS' fees will result in interruption and/or termination of the Services provided by SAWS, in accordance with applicable interruption and termination policies and procedures, as amended. SAWS shall not be obligated to provide the Services to any plat within the Tract unless and until the utility purveyor has executed a contract with SAWS to provide for the billing and collection of the Services provided by SAWS.

G.C.9.00 Enforcement of Industrial Waste Ordinance if Required by SAWS.

The Developer shall cause to be recorded in the Deed and Plat Records of the counties in which the Tract is located, a restrictive covenant covering the entire Tract. This restrictive covenant shall run with the land in the Tract described in Attachment VI. Such covenant shall contain language expressly granting to SAWS the right, should SAWS so elect, to enforce and or otherwise pursue to the extent provided at law or in equity, the provisions of the City's Industrial Waste Ordinance No. 57214, as amended or as may be amended (codified as Chapter 34, Article V, Division 3 of the City Code). SAWS' right shall include, to the extent provided at law or in equity, the right to inspection, sampling and monitoring of the collection system to assure ordinance compliance.

Recordation of the Covenant shall be a condition precedent for SAWS' provision of the Services to any portion of said Tract.

G.C.10.00 Oversizing.

Developer must pay for all mains and other utility facilities needed to serve the Tract. SAWS may require the installation of oversized water mains and wastewater mains and related facilities. SAWS' requirements for over-sizing, if any, are set forth in the Special Conditions. SAWS will execute a trilateral contract with Developer and a contractor for the construction of oversized facilities. Contracts for the construction of oversized facilities must be competitively bid as required by law. All oversizing shall be done in accordance with the USR.

G.C.11.00 Off-Site /On-Site Facilities.

Developer shall construct and install all required Off-Site and On-Site utility infrastructure in accordance with the USR and Special Conditions, at no cost to SAWS. Any specific requirements related to the facilities are set forth in the Special Conditions.

G.C.12.00 Impact Fee Payment.

Developer agrees that the Agreement does not constitute an assessment of impact fees. Developer agrees to pay all applicable impact fees at the time and in the amount prescribed by ordinance or resolution of the City Council of the City of San Antonio and the USR, as amended. An estimate of the impact fees for the development Tract is provided in the Special Conditions. The estimate does not constitute an assessment of impact fees, and the amount of impact fees is subject to change by the City Council of the City of San Antonio as provided by law.

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G.C.13.00 SAWS' Obligation to Supply Service.

To the extent that Developer pays all applicable impact fees and complies with all Off-Site and On-Site utility infrastructure requirements, Developer shall be entitled to the permanent use and benefit of the Services and is entitled to receive immediate service from any existing facilities with actual capacity to serve the development for which impact fees were paid, subject to compliance with other valid regulations. If, after collecting the impact fees, there is no actual capacity in existing facilities to provide the Services, SAWS will provide the Services within a reasonable period of time not to exceed five (5) years, as prescribed by Chapter 395 of the Local Government Code, as amended. In the event Services are required by Developer earlier than the five (5) year period, Developer and SAWS may agree that Developer may construct or finance the capital improvements or facility expansions required to provide Services, and the costs incurred or funds advanced will be credited against impact fees otherwise due from the new development or reimbursed to Developer from impact fees paid from other new developments that will use such capital improvements or facility expansions, which fees shall be collected and reimbursed to Developer at the time the other new development records it plat.

G.C.14.00 Facility Design and Construction.

The Developer shall design and construct all On-Site and Off-Site utility infrastructure described in the Special Conditions, including any oversizing, in accordance with the USR and all applicable local, state and federal requirements. Developer further recognizes that SAWS' approval in all respects as to facility right-of-way adequacy, location, size, grade and invert elevation is a condition precedent to any further obligation of SAWS. Specific design and construction requirements are set forth in the Special Conditions.

G.C.15.00 Use of Capacity by SAWS.

Developer understands that capacity in Off-Site and On-Site utility infrastructure resulting from the Agreement for the Tract may be utilized by SAWS for other tracts requesting service from SAWS. SAWS shall keep accurate records of the capacity provided to the Tract under the Agreement, whether Set-Aside or Guaranteed Capacity, and in no event will Developer be denied capacity as a result of SAWS' utilization of such capacity for another tract. Set-Aside capacity shall not survive the expiration of the Agreement.

G.C.16.00 Utility Master Plan Requirements.

The Developer will prepare a utility master plan, which details the water and/or wastewater systems for the Tract pursuant to the USR, as amended.

G.C.17.00 Phased Utility Master Plans.

If the Developer's water and/or wastewater systems are to be installed in phases or units, the Developer shall submit overall utility master plans to SAWS for review and approval. The overall utility master plan(s) shall be submitted before the first construction phase is submitted for plat approval. The overall utility master plan(s) shall show the development phases or units including the sequence and a timetable for build-out. The Developer shall also provide SAWS with a digital version of the proposed recorded plat, as submitted for plat recordation in a format acceptable to SAWS, for each phase or unit of the devolvement project.

G.C.18.00 Conformance of Plans to Utility Master Plan.

All water and wastewater system facilities to serve the Tract shall be designed and constructed in conformance with the approved utility master plan. Changes in the water and wastewater system design shall be resubmitted to SAWS for written approval.

G.C.19.00 Timing Requirements for Submission of Plans.

Developer shall have three (3) years from the Effective Date of the Agreement to complete and submit the required utility master plan and to start construction of the Off-Site and On-Site utility infrastructure described in the Special Conditions. Developer agrees that the Agreement for the provision of Services shall automatically expire if Developer

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has not submitted a utility master plan and started construction of required Off-Site and On-Site utility infrastructure within three (3) years of the Effective Date of the Agreement, and a new request for the Services must be submitted to SAWS, which SAWS will grant based on then existing policies and regulations. In the event Developer meets the above-mentioned requirements within the three (3) year period provided, the Agreement shall remain in effect for seven (7) years from the Effective Date. If Developer submits a revised Utility Master Plan in accordance with the USR prior to the expiration of the seven (7) year period, the Agreement for the provision of Services may be extended to a maximum term of fifteen (15) years from the Effective Date.

G.C. 20.00 EDU Transfers.

The transfer of EDU capacity outside the original boundaries of this Utility Service Agreement will not be allowed. The San Antonio Water System considers this Agreement to run with the land; however, EDU capacity transfers to subdivided tracts within the Tract of this Agreement are the responsibility of the Developer and approval of such transfers is not required by the San Antonio Water System. The Developer shall maintain an accounting of the EDU capacity that is used by the Developer and/or transferred after the effective date of this Agreement to portions of the Tract. If the Developer sells a portion of the Tract and transfers part of the EDU capacity contained in this Agreement, then that EDU capacity transfer must be included in the deed, bill of sale or instrument conveying the land and the Developer must require the buyer of the land who receives the allocated EDUs to record the instrument effectuating the transfer. Developer may file a Master Development Plan or an EDU Plan, prepared by an engineer, that shows specific EDU capacity allocations within the Tract and shall ensure that the Master Development Plan or EDU Plan is attached to this Agreement and properly recorded. SAWS will recognize the capacity allocations within the Master Development Plan or EDU Plan so long as those allocations are within the parameters of this Agreement. For properties that have areas of unplanned use, the demand will be calculated at four (4) EDUs per acre unless the engineering report specifies otherwise or there is not enough EDU capacity remaining for the Tract to allocate four (4) EDUs per acre.

In no event will the System be responsible to 3rd parties for providing water supply or wastewater discharge capacity beyond the total EDU capacity identified in this Agreement for the Tract. Developer expressly disclaims, releases and holds harmless SAWS from any liability, damages, costs or fees, and agrees to indemnify SAWS for any liability, including, costs and attorney's fees, associated with any dispute related to the transfer of all or a portion of EDU capacity approved for the Tract in this Utility Services Agreement.

G.C. 21.00 Camp Bullis Awareness Zone.

In the event that the Tract is located within, or partially within, the Camp Bullis Awareness Zone, the Developer acknowledges that certain lighting regulations may apply within at least a 3-mile radius of Camp Bullis, commonly referred to as down-lighting or dark sky lighting, and Developer will comply with those regulations. Developer agrees to comply with any local, state or federal law, rule or regulation related to the protection of the environment or endangered species, including but not limited to, any site assessments or surveys and notice to the United States Fish & Wildlife when required by law, rule or regulation. Developer acknowledges that any required assessment, survey or notice shall be current or updated as may be required by law, rule or regulation.

G.C. 22.00 Written Project Information.

The project associated with this Utility Service Agreement is described in the forms submitted by the applicant including but not limited to 1) a cover sheet clearly stating "USA Request" and the project name; 2) the Engineering Report; and 3) a legal description, metes and bounds description, or Master Development Plan (MDP), subdivision plat, or similar document of the Tract.

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SPECIAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

WATER SERVICE

S.C.1.00 Tract Location and Ultimate Demand.

Trevor Fields Subdivision, a 38.26-acre tract inside the City of San Antonio limits, is located at the W. Hausman Rd and Ridge Oak Pkwy. intersection, as shown in Attachment VI (the "Tract"). The Tract is located over the Edwards Aquifer Recharge or Contributing Zone and is located within the 5-mile Awareness Zone of Camp Bullis. The proposed Tract is located inside SAWS' water CCN, inside SAWS' wastewater CCN and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board Action is not required.

The ultimate demand from the proposed development, on SAWS' water infrastructure, shall not exceed 480 equivalent dwelling units (EDUs) of water supply.

S.C.2.00 Infrastructure Requirements.

Water Supply to the Tract will be from Pressure Zone (PZ) 1170. The flow capacity of a 12-inch main is required to supply water to the 38.26-acre Tract, in conformance with SAWS' Utility Service Regulations (USR).

The Developer shall construct a 12-inch main from the existing 24-inch main (Job No 5516) on W Hausman, along the Tract's entire frontage on W Hausman Rd, and reconnect to the existing 24-inchmain on W Hausman, as shown in Attachment III. The Developer shall then construct a 12-inch main from the proposed 12-inch border main, through the Tract, to the existing 24-inch main (Job No 5516) on W Hausman Rd as shown in Attachment III.

The Developer shall then construct a series of looped 8-inch mains throughout the Tract with no less than two (2) connections to the proposed 12-inch main traversing the Tract and/or the proposed 12-inch border main. The Developer shall then connect services to the proposed 12-inch main traversing the Tract, the proposed 12-inch border main and/or the proposed series of looped 8-inch mains throughout the Tract.

S.C. 3.00 SAWS Master Plan and Oversizing Requirements.

N/A

S.C.4.00 Impact Fee Credit Eligibility.

N/A

S.C.5.00 Engineering Study Report and/or Pro-Rata Refund Eligibility.

The engineering study report "Trevor Fields Subdivision, Utility Service Agreement Engineering Report", by KFW Engineers, dated October, 2021 is included as Attachment VI.

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S.C.6.00 Developer On-Site and/or Off-Site Requirements.

The Developer shall acquire any right-of-way or easements, and install all On-Site and Off-Site utility infrastructure required to serve the Tract in accordance with SAWS' USR, solely at the Developer's cost, unless otherwise stated in S.C.3.00 or S.C.4.00. Other On-Site requirements within the Tract will be determined at such time as the engineer submits an overall Utility Master Plan, and any subsequent revisions, for the Tract.

S.C.7.00 Requirement to Install Approved Pressure Regulators and/or Booster Pumps.

The entire Tract is below ground elevation of 985 feet where the static pressure will theoretically exceed 80 psi. Any service connections within the Tract, at elevations lower than this ground elevation, shall require the installation of a Pressure Reducing Valve (PRV), on the customer(s) side of the meter, rated for a maximum working pressure of no less than 300 psi, prior to a SAWS meter being installed. Installation shall be in conformance with the current Plumbing Code with Local Amendments adopted by the City of San Antonio.

S.C.8.00 Time for Water Impact Fee Assessment and Payment.

Water Impact Fees will be assessed at the rates in effect at the time of plat recordation or the latest date allowed by law. Impact fees will be collected at either the time of plat recordation or connection to the SAWS' water system, at the discretion of the Developer.

S.C.9.00 Water Impact Fee Estimates Based Upon Current Charges.

Following is an estimate of impact fees for the provision of Services contemplated under the Agreement, which are based on current impact fee rates. This estimate shall not constitute an assessment of impact fees and impact fee rates are subject to change by the San Antonio City Council.

Type of Impact Fee	EDUs	$/EDUs	Current Total
Flow Development	480	$1,188	$570,240
System Development Middle	480	$1,014	$486,720
Water Supply	480	$2,706	$1,298,880
Total			$2,355,840

S.C.10.00 Pro-Rata Charge Requirement.

Developer shall be required to pay a Pro-Rata Charge pursuant to the USR, as amended, prior to connection to the SAWS water system if Developer is tying into a main that is subject to a pro-rata refund.

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SPECIAL CONDITIONS OF THE UTILITY SERVICE AGREEMENT

WASTEWATER SERVICE

S.C.1.00 Tract Location and Ultimate Demand.

Trevor Fields Subdivision, a 38.26-acre tract inside the City of San Antonio limits, is located at the W. Hausman Rd and Ridge Oak Pkwy. intersection, as shown in Attachment VI (the "Tract") and lies within SAWS' Upper Collection and Treatment Area (UCTA). The Tract is located over the Edwards Aquifer Recharge or Contributing Zone and is located within the 5-mile Awareness Zone of Camp Bullis. The proposed Tract is located inside SAWS' water CCN, inside SAWS' wastewater CCN and does not require SAWS' financial participation in the development of infrastructure through oversizing or impact fee credits, therefore, Board Action is not required.

The ultimate demand from the proposed development, on SAWS' wastewater infrastructure, shall not exceed 480 equivalent dwelling units (EDUs) of wastewater discharge.

S.C.2.00 Infrastructure Requirements.

The Tract is situated within SAWS' Upper Collection and Treatment Area (UCTA) and lies within the Upper Leon Creek Watershed. The capacity of an 8-inch gravity main at 0.40 percent minimum slope is required to provide wastewater service to the Tract, in conformance with SAWS' USR.

The Developer may connect a maximum of 480 EDUs of total capacity to the existing 27-inch gravity sewer main (Job No. DJ-2406) along the south side of the Tract, in accordance with SAWS USR.

S.C.3.00 SAWS Master Plan and Oversizing Requirements.

N/A

S.C.4.00 Impact Fee Credit Eligibility.

N/A

S.C.5.00 Engineering Study Report and/or Pro-Rata Refund Eligibility.

The engineering study report "Trevor Fields Subdivision, Utility Service Agreement Engineering Report", by KFW Engineers, dated October, 2021 is included as Attachment VI.

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S.C.6.00 Developer On-Site and/or Off-Site Requirements.

The Developer will also be required to acquire any right-of-way and easements, install all On-Site and Off-Site utility infrastructure, and upgrade existing lift stations necessary to serve the Tract in accordance with SAWS' USR, solely at the Developer's cost, unless stated otherwise in S.C.3.00 or S.C.4.00. Other On-Site utility infrastructure requirements within the Tract will be determined at such time as the engineer submits an overall Utility Master Plan, and any subsequent revisions, for the Tract.

S.C.7.00 Lift Stations and Force Mains.

Lift stations and force mains are only allowed by prior written supplemental agreement with SAWS. Applicable fees, as set out in the supplemental agreement, must be paid in full prior to service connection. Whenever a lift station is proposed, a Present Value analysis of the lift station vs. gravity solutions, shall be included in the Engineering Report/Study in conformance with the requirements of SAWS' USR.

S.C.8.00 Time for Wastewater Impact Fee Assessment and Payment.

Wastewater Impact Fees will be assessed at the rates in effect at the time of plat recordation or the latest date allowed by law. Wastewater Impact Fees will be collected at either the time of plat recordation or connection to the SAWS wastewater system, at the discretion of the Developer.

S.C.9.00 Wastewater Impact Fee Estimates Based Upon Current Charges.

Following is an estimate of impact fees for the provision of Services contemplated under the Agreement, which are based on impact fee rates in effect as of the Effective Date of the Agreement. This estimate shall not constitute an assessment of impact fees and impact fee rates are subject to change by action of the San Antonio City Council as permitted by law.

Type of Impact Fee	EDUs	$/EDUs	Current Total
Wastewater Collection Upper	480	$2,800	$1,344,000
Wastewater Treatment Dos Rios/Leon Creek	480	$651	$312,480
Total			$1,656,480

S.C.10.00 Pro-Rata Payment Fee Requirement.

Developer shall be required to pay a pro-rata fee pursuant to the USR, as amended, prior to connection to the wastewater system, if Developer is tapping into a main that is subject to a pro-rata refund.

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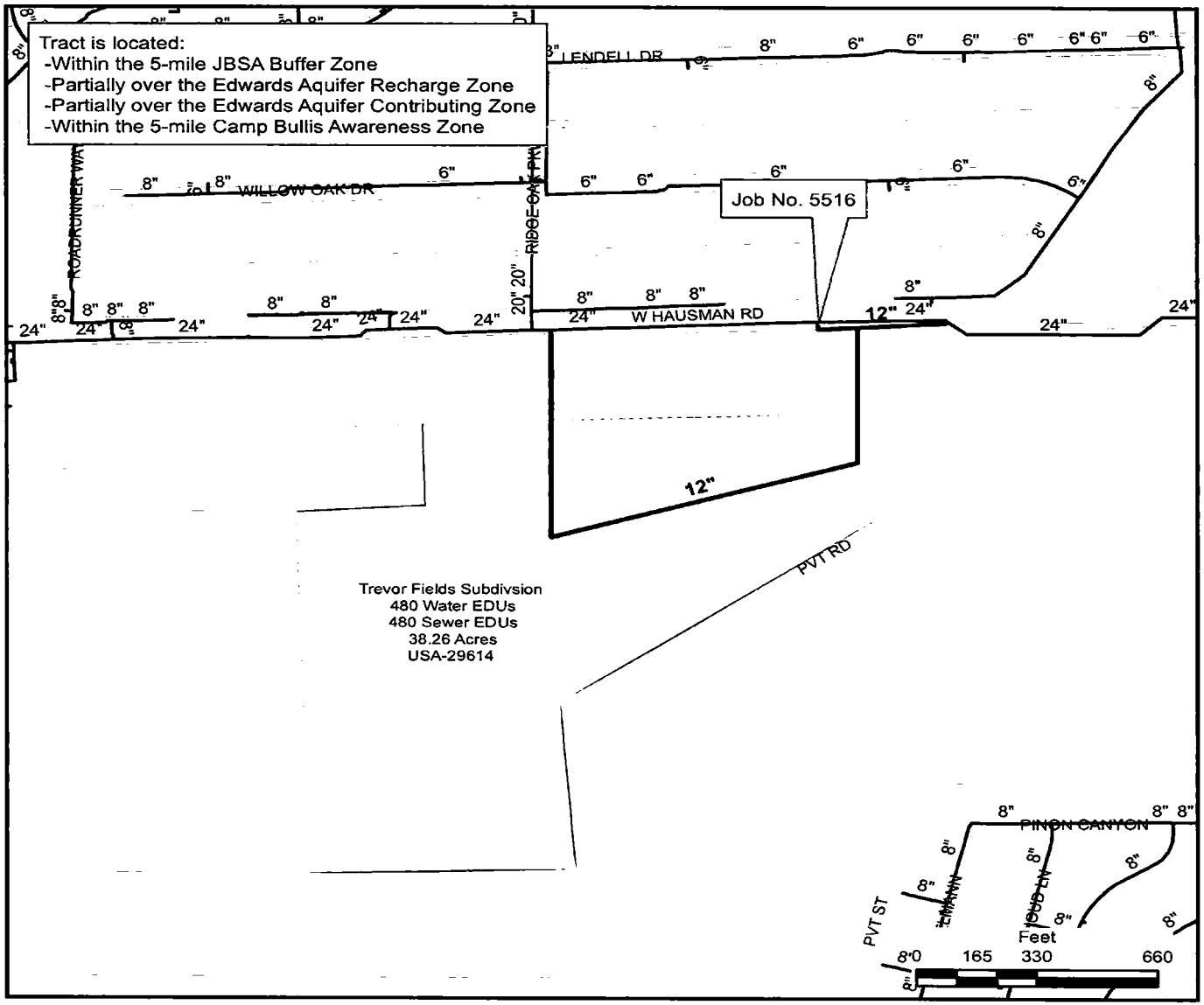


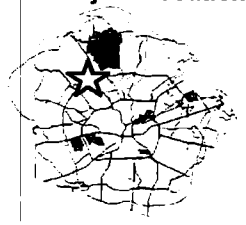
Attachment III:
USA-29614
"Trevor Fields Subdivision" Tract
Proposed Water Infrastructure Map
38.26 Acres

San Antonio Water System

Legend

- Proposed Water Mains
- Existing Water Main
- Parcel
- USA Tract

Project Location



SAWS UTILITY MAP DISCLAIMER
This utility map is for reference only. The information may not represent what actually has been constructed. SAWS explicitly disclaims any representation of the accuracy of the information on this map. SAWS assumes no liability for any errors, omissions, or inaccuracies in the map regardless of how caused. Field verification should be done as necessary. SAWS prohibits the reproduction or sale of this document. This SAWS utility map may not under any circumstances, be copied, reproduced, or published in any form or media, or transferred to another without the written permission of the San Antonio Water System (SAWS).

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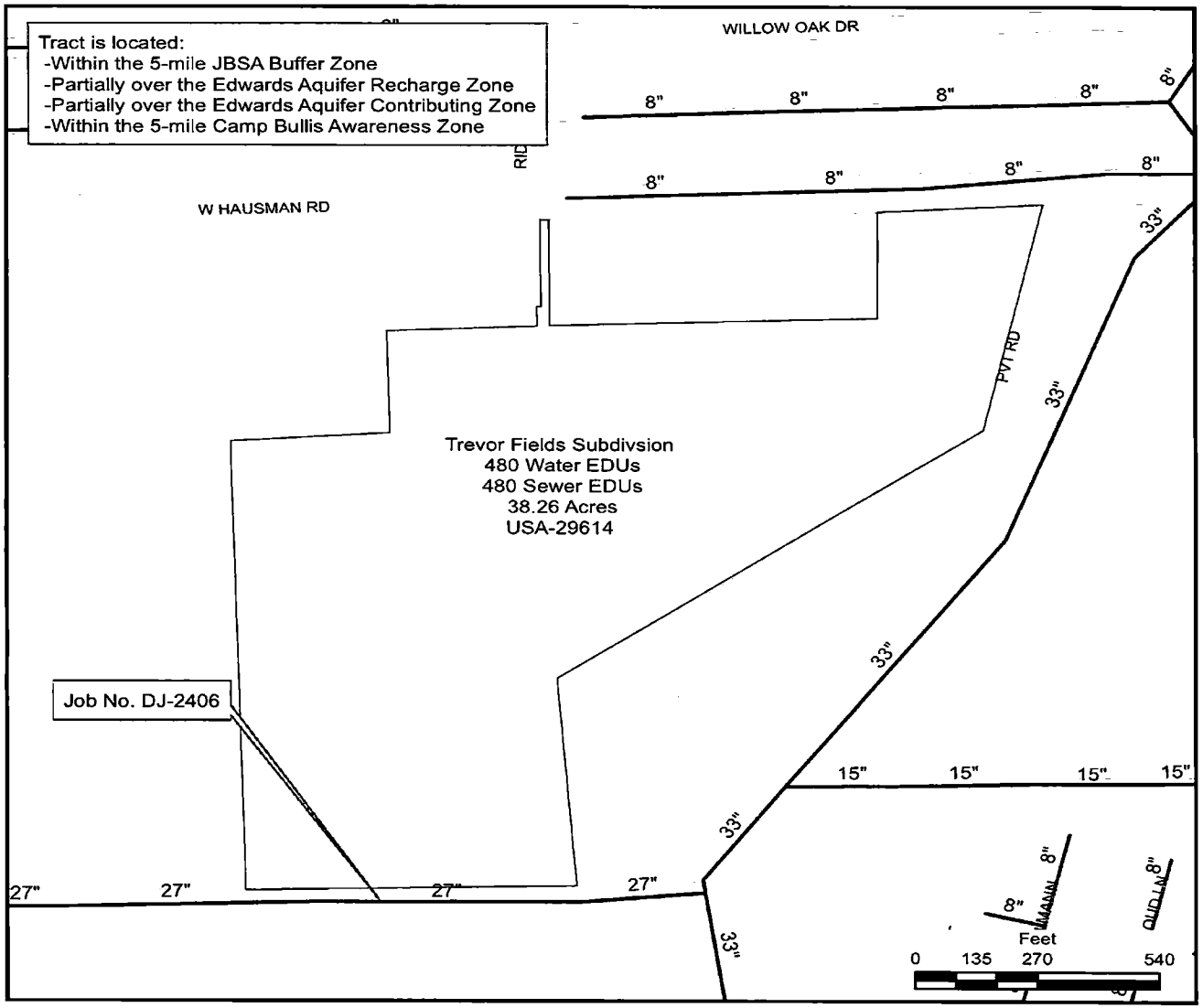


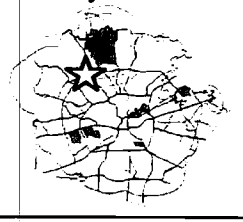
Attachment III:
USA-29614
"Trevor Fields Subdivision" Tract
Proposed Sewer Infrastructure Map
38.26 Acres

San Antonio Water System

Legend

- Existing Sewer Main
- Parcel
- USA Tract

Project Location



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File Information

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STATE OF TEXAS, COUNTY OF BEXAR

I hereby Certify that this instrument was eFILED in File Number Sequence on this date and at the time stamped hereon by me and was duly eRECORDED in the Official Public Record of Bexar County, Texas on: 8/4/2022 12:22 PM

Lucy Adame-Clark
Lucy Adame-Clark
Bexar County Clerk

ATTACHMENT C
GENERAL WASTEWATER NOTES

Texas Commission on Environmental Quality
Organized Sewage Collection System
General Construction Notes

Edwards Aquifer Protection Program Construction Notes – Legal Disclaimer

The following/listed "construction notes" are intended to be advisory in nature only and do not constitute an approval or conditional approval by the Executive Director, nor do they constitute a comprehensive listing of rules or conditions to be followed during construction. Further actions may be required to achieve compliance with TCEQ regulations found in Title 30, Texas Administrative Code, Chapters 213 and 217, as well as local ordinances and regulations providing for the protection of water quality. Additionally, nothing contained in the following/listed "construction notes" restricts the powers of the Executive Director, the commission or any other governmental entity to prevent, correct, or curtail activities that result or may result in pollution of the Edwards Aquifer or hydrologically connected surface waters. The holder of any Edwards Aquifer Protection Plan containing "construction notes" is still responsible for compliance with Title 30, Texas Administrative Code, Chapters 213 or any other applicable TCEQ regulation, as well as all conditions of an Edwards Aquifer Protection Plan through all phases of plan implementation. Failure to comply with any condition of the Executive Director's approval, whether or not in contradiction of any "construction notes," is a violation of TCEQ regulations and any violation is subject to administrative rules, orders, and penalties as provided under Title 30, Texas Administrative Code § 213.10 (relating to Enforcement). Such violations may also be subject to civil penalties and injunction. The following/listed "construction notes" in no way represent an approved exception by the Executive Director to any part of Title 30 Texas Administrative Code, Chapters 213 and 217, or any other TCEQ applicable regulation.

1. This Organized Sewage Collection System (SCS) must be constructed in accordance with 30 Texas Administrative Code (TAC) §213.5(c), the Texas Commission on Environmental Quality's (TCEQ) Edwards Aquifer Rules and any local government standard specifications.

2. All contractors conducting regulated activities associated with this proposed regulated project must be provided with copies of the SCS plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors must be required to keep on-site copies of the plan and the approval letter.

3. A written notice of construction must be submitted to the presiding TCEQ regional office at least 48 hours prior to the start of any regulated activities. This notice must include:
   - the name of the approved project;
   - the activity start date; and
   - the contact information of the prime contractor.

4. Any modification to the activities described in the referenced SCS application following the date of approval may require the submittal of an SCS application to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval.

5. Prior to beginning any construction activity, all temporary erosion and sedimentation (E&S) control measures must be properly installed and maintained in accordance with the manufacturers specifications. These controls must remain in place until the disturbed areas have been permanently stabilized.

6. If any sensitive features are discovered during the wastewater line trenching activities, all regulated activities near the sensitive feature must be suspended immediately. The applicant must immediately notify the appropriate regional office of the TCEQ of the feature discovered. A geologist's assessment of the location and extent of the feature discovered must be reported to that regional office in writing and the applicant must submit a plan for ensuring the structural integrity of the sewer line or for modifying the proposed collection system alignment around the feature. The regulated activities near the sensitive feature may not proceed until the

executive director has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards Aquifer from any potentially adverse impacts to water quality while maintaining the structural integrity of the line.

7. Sewer lines located within or crossing the 5-year floodplain of a drainage way will be protected from inundation and stream velocities which could cause erosion and scouring of backfill. The trench must be capped with concrete to prevent scouring of backfill, or the sewer lines must be encased in concrete. All concrete shall have a minimum thickness of 6 inches.

8. Blasting procedures for protection of existing sewer lines and other utilities will be in accordance with the National Fire Protection Association criteria. Sand is not allowed as bedding or backfill in trenches that have been blasted. If any existing sewer lines are damaged, the lines must be repaired and retested.

9. All manholes constructed or rehabilitated on this project must have watertight size on size resilient connectors allowing for differential settlement. If manholes are constructed within the 100-year floodplain, the cover must have a gasket and be bolted to the ring. Where gasketed manhole covers are required for more than three manholes in sequence or for more than 1500 feet, alternate means of venting will be provided. Bricks are not an acceptable construction material for any portion of the manhole.

   The diameter of the manholes must be a minimum of four feet and the manhole for entry must have a minimum clear opening diameter of 30 inches. These dimensions and other details showing compliance with the commission's rules concerning manholes and sewer line/manhole inverts described in 30 TAC §217.55 are included on Plan Sheet __ of __.

   It is suggested that entrance into manholes in excess of four feet deep be accomplished by means of a portable ladder. The inclusion of steps in a manhole is prohibited.

10. Where water lines and new sewer line are installed with a separation distance closer than nine feet (i.e., water lines crossing wastewater lines, water lines paralleling wastewater lines, or water lines next to manholes) the installation must meet the requirements of 30 TAC §217.53(d) (Pipe Design) and 30 TAC §290.44(e) (Water Distribution).

11. Where sewers lines deviate from straight alignment and uniform grade all curvature of sewer pipe must be achieved by the following procedure which is recommended by the pipe manufacturer: N/A.

    If pipe flexure is proposed, the following method of preventing deflection of the joint must be used: N/A.

    Specific care must be taken to ensure that the joint is placed in the center of the trench and properly bedded in accordance with 30 TAC §217.54.

12. New sewage collection system lines must be constructed with stub outs for the connection of anticipated extensions. The location of such stub outs must be marked on the ground such that their location can be easily determined at the time of connection of the extensions. Such stub outs must be manufactured wyes or tees that are compatible in size and material with both the sewer line and the extension. At the time of original construction, new stub-outs must be constructed sufficiently to extend beyond the end of the street pavement. All stub-outs must be sealed with a manufactured cap to prevent leakage. Extensions that were not anticipated at the time of original construction or that are to be connected to an existing sewer line not furnished with stub outs must be connected using a manufactured saddle and in accordance with accepted plumbing techniques.

If no stub-out is present an alternate method of joining laterals is shown in the detail on Plan Sheet 1.7 of 1.7 & Sheet 8.7 of 8.7. (For potential future laterals).

The private service lateral stub-outs must be installed as shown on the plan and profile sheets on Plan Sheet 1.7 of 1.7 & Sheet 8.7 of 8.7 and marked after backfilling as shown in the detail on Plan
Sheet 1.6 of 1.7 & Sheet 8.6 of 8.7.

13. Trenching, bedding and backfill must conform with 30 TAC §217.54. The bedding and backfill for flexible pipe must comply with the standards of ASTM D-2321, Classes IA, IB, II or III. Rigid pipe bedding must comply with the requirements of ASTM C 12 (ANSI A 106.2) classes A, B or C.

14. Sewer lines must be tested from manhole to manhole. When a new sewer line is connected to an existing stub or clean-out, it must be tested from existing manhole to new manhole. If a stub or clean-out is used at the end of the proposed sewer line, no private service attachments may be connected between the last manhole and the cleanout unless it can be certified as conforming with the provisions of 30 TAC §213.5(c)(3)(E).

15. All sewer lines must be tested in accordance with 30 TAC §217.57. The engineer must retain copies of all test results which must be made available to the executive director upon request. The engineer must certify in writing that all wastewater lines have passed all required testing to the appropriate regional office within 30 days of test completion and prior to use of the new collection system. Testing method will be:
    (a) For a collection system pipe that will transport wastewater by gravity flow, the design must specify an infiltration and exfiltration test or a low-pressure air test. A test must conform to the following requirements:
        (1) *Low Pressure Air Test.*
            (A) A low pressure air test must follow the procedures described in American Society For Testing And Materials (ASTM) C-828, ASTM C-924, or ASTM F-1417 or other procedure approved by the executive director, except as to testing times as required in Table C.3 in subparagraph (C) of this paragraph or Equation C.3 in subparagraph (B)(ii) of this paragraph.
            (B) For sections of collection system pipe less than 36 inch average inside diameter, the following procedure must apply, unless a pipe is to be tested as required by paragraph (2) of this subsection.
                (i) A pipe must be pressurized to 3.5 pounds per square inch (psi) greater than the pressure exerted by groundwater above the pipe.
                (ii) Once the pressure is stabilized, the minimum time allowable for the pressure to drop from 3.5 psi gauge to 2.5 psi gauge is computed from the following equation:

Equation C.3 $$T = \frac{0.085 \times D \times K}{Q}$$

Where:

T = time for pressure to drop 1.0 pound per square inch gauge in seconds
K = 0.000419 X D X L, but not less than 1.0

D = average inside pipe diameter in inches
L = length of line of same size being tested, in feet
Q = rate of loss, 0.0015 cubic feet per minute per square foot internal surface

(C) Since a K value of less than 1.0 may not be used, the minimum testing time for each pipe diameter is shown in the following Table C.3:

Pipe Diameter *(inches)*	**Minimum Time** *(seconds)*	**Maximum Length for Minimum Time** *(feet)*	**Time for Longer Length** *(seconds/foot)*
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369
33	1870	72	25.856

(D) An owner may stop a test if no pressure loss has occurred during the first 25% of the calculated testing time.

(E) If any pressure loss or leakage has occurred during the first 25% of a testing period, then the test must continue for the entire test duration as outlined above or until failure.

(F) Wastewater collection system pipes with a 27 inch or larger average inside diameter may be air tested at each joint instead of following the procedure outlined in this section.

(G) A testing procedure for pipe with an inside diameter greater than 33 inches must be approved by the executive director.

(2) *Infiltration/Exfiltration Test.*

(A) The total exfiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch of diameter per mile of pipe per 24 hours at a minimum test head of 2.0 feet above the crown of a pipe at an upstream manhole.

(B) An owner shall use an infiltration test in lieu of an exfiltration test when pipes are installed below the groundwater level.

(C) The total exfiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch diameter per mile of pipe per 24 hours at a minimum test head of two feet above the crown of a pipe at an upstream manhole, or at least two feet above existing groundwater level, whichever is greater.

(D) For construction within a 25-year flood plain, the infiltration or exfiltration must not exceed 10 gallons per inch diameter per mile of pipe per 24 hours at the same minimum test head as in subparagraph (C) of this paragraph.

(E) If the quantity of infiltration or exfiltration exceeds the maximum quantity specified, an owner shall undertake remedial action in order to reduce the infiltration or exfiltration to an amount within the limits specified. An owner shall retest a pipe following a remediation action.

(b) If a gravity collection pipe is composed of flexible pipe, deflection testing is also required. The following procedures must be followed:

(1) For a collection pipe with inside diameter less than 27 inches, deflection measurement requires a rigid mandrel.

(A) *Mandrel Sizing.*

(i) A rigid mandrel must have an outside diameter (OD) not less than 95% of the base inside diameter (ID) or average ID of a pipe, as specified in the appropriate standard by the ASTMs, American Water Works Association, UNI-BELL, or American National Standards Institute, or any related appendix.

(ii) If a mandrel sizing diameter is not specified in the appropriate standard, the mandrel must have an OD equal to 95% of the ID of a pipe. In this case, the ID of the pipe, for the purpose of determining the OD of the mandrel, must equal be the average outside diameter minus two minimum wall thicknesses for OD controlled pipe and the average inside diameter for ID controlled pipe.

(iii) All dimensions must meet the appropriate standard.

(B) *Mandrel Design*.

(i) A rigid mandrel must be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed.

(ii) A mandrel must have nine or more odd number of runners or legs.

(iii) A barrel section length must equal at least 75% of the inside diameter of a pipe.

(iv) Each size mandrel must use a separate proving ring.

(C) *Method Options.*

(i) An adjustable or flexible mandrel is prohibited.

(ii) A test may not use television inspection as a substitute for a deflection test.

(iii) If requested, the executive director may approve the use of a deflectometer or a mandrel with removable legs or runners on a case-by-case basis.

(2) For a gravity collection system pipe with an inside diameter 27 inches and greater, other test methods may be used to determine vertical deflection.

(3) A deflection test method must be accurate to within plus or minus 0.2% deflection.

(4) An owner shall not conduct a deflection test until at least 30 days after the final backfill.

(5) Gravity collection system pipe deflection must not exceed five percent (5%).

(6) If a pipe section fails a deflection test, an owner shall correct the problem and conduct a second test after the final backfill has been in place at least 30 days.

16. All manholes must be tested to meet or exceed the requirements of 30 TAC §217.58.

(a) All manholes must pass a leakage test.

(b) An owner shall test each manhole (after assembly and backfilling) for leakage, separate and independent of the collection system pipes, by hydrostatic exfiltration testing, vacuum testing, or other method approved by the executive director.

(1) Hydrostatic Testing.

(A) The maximum leakage for hydrostatic testing or any alternative test methods is 0.025 gallons per foot diameter per foot of manhole depth per hour.

(B) To perform a hydrostatic exfiltration test, an owner shall seal all wastewater pipes coming into a manhole with an internal pipe plug, fill the manhole with water, and maintain the test for at least one hour.

(C) A test for concrete manholes may use a 24-hour wetting period before testing to allow saturation of the concrete.

(2) Vacuum Testing.

(A) To perform a vacuum test, an owner shall plug all lift holes and exterior joints with a non-shrink grout and plug all pipes entering a manhole.

(B) No grout must be placed in horizontal joints before testing.

(C) Stub-outs, manhole boots, and pipe plugs must be secured to prevent movement while a vacuum is drawn.

(D) An owner shall use a minimum 60 inch/lb torque wrench to tighten the external clamps that secure a test cover to the top of a manhole.

(E) A test head must be placed at the inside of the top of a cone section, and the seal inflated in accordance with the manufacturer's recommendations.

(F) There must be a vacuum of 10 inches of mercury inside a manhole to perform a valid test.

(G) A test does not begin until after the vacuum pump is off.

(H) A manhole passes the test if after 2.0 minutes and with all valves closed, the vacuum is at least 9.0 inches of mercury.

17. All private service laterals must be inspected and certified in accordance with 30 TAC §213.5(c)(3)(I). After installation of and, prior to covering and connecting a private service lateral to an existing organized sewage collection system, a Texas Licensed Professional Engineer, Texas Registered Sanitarian, or appropriate city inspector must visually inspect the private service lateral and the connection to the sewage collection system, and certify that it is constructed in conformity with the applicable provisions of this section. The owner of the collection system must maintain such certifications for five years and forward copies to the appropriate regional office upon request. Connections may only be made to an approved sewage collection system.

Austin Regional Office 12100 Park 35 Circle, Building A Austin, Texas 78753-1808 Phone (512) 339-2929 Fax (512) 339-3795	San Antonio Regional Office 14250 Judson Road San Antonio, Texas 78233-4480 Phone (210) 490-3096 Fax (210) 545-4329

THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

No deviation in straight alignment without a manhole is proposed with this sewer plan.

Request for variance from manhole spacing is not necessary with this sewer design.

Slopes for this sewer system will not produce flows greater than 10 feet per second.

Temporary Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(A), (B), (D)(I) and (G); Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Temporary Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Clayton Linney, P.E.

Date: 4/10/2024

Signature of Customer/Agent:

Clayton Linney

Regulated Entity Name: Trevor Fields Tract

Project Information

Potential Sources of Contamination

Examples: Fuel storage and use, chemical storage and use, use of asphaltic products, construction vehicles tracking onto public roads, and existing solid waste.

1. Fuels for construction equipment and hazardous substances which will be used during construction:

   ☐ The following fuels and/or hazardous substances will be stored on the site: _____

   These fuels and/or hazardous substances will be stored in:

   ☐ Aboveground storage tanks with a cumulative storage capacity of less than 250 gallons will be stored on the site for less than one (1) year.

☐ Aboveground storage tanks with a cumulative storage capacity between 250 gallons and 499 gallons will be stored on the site for less than one (1) year.

☐ Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An Aboveground Storage Tank Facility Plan application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project.

☒ Fuels and hazardous substances will not be stored on the site.

2. ☒ **Attachment A - Spill Response Actions**. A site specific description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is attached.

3. ☒ Temporary aboveground storage tank systems of 250 gallons or more cumulative storage capacity must be located a minimum horizontal distance of 150 feet from any domestic, industrial, irrigation, or public water supply well, or other sensitive feature.

4. ☒ **Attachment B - Potential Sources of Contamination**. A description of any activities or processes which may be a potential source of contamination affecting surface water quality is attached.

Sequence of Construction

5. ☒ **Attachment C - Sequence of Major Activities**. A description of the sequence of major activities which will disturb soils for major portions of the site (grubbing, excavation, grading, utilities, and infrastructure installation) is attached.

   ☒ For each activity described, an estimate (in acres) of the total area of the site to be disturbed by each activity is given.

   ☒ For each activity described, include a description of appropriate temporary control measures and the general timing (or sequence) during the construction process that the measures will be implemented.

6. ☒ Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: Maverick Creek & Leon Creek

Temporary Best Management Practices (TBMPs)

Erosion control examples: tree protection, interceptor swales, level spreaders, outlet stabilization, blankets or matting, mulch, and sod. Sediment control examples: stabilized construction exit, silt fence, filter dikes, rock berms, buffer strips, sediment traps, and sediment basins. Please refer to the Technical Guidance Manual for guidelines and specifications. All structural BMPs must be shown on the site plan.

7. ☒ **Attachment D – Temporary Best Management Practices and Measures**. TBMPs and measures will prevent pollution of surface water, groundwater, and stormwater. The construction-phase BMPs for erosion and sediment controls have been designed to retain sediment on site to the extent practicable. The following information is attached:

☒ A description of how BMPs and measures will prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.

☒ A description of how BMPs and measures will prevent pollution of surface water or groundwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.

☒ A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.

☒ A description of how, to the maximum extent practicable, BMPs and measures will maintain flow to naturally-occurring sensitive features identified in either the geologic assessment, TCEQ inspections, or during excavation, blasting, or construction.

8. ☒ The temporary sealing of a naturally-occurring sensitive feature which accepts recharge to the Edwards Aquifer as a temporary pollution abatement measure during active construction should be avoided.

☐ **Attachment E - Request to Temporarily Seal a Feature**. A request to temporarily seal a feature is attached. The request includes justification as to why no reasonable and practicable alternative exists for each feature.

☒ There will be no temporary sealing of naturally-occurring sensitive features on the site.

9. ☒ **Attachment F - Structural Practices**. A description of the structural practices that will be used to divert flows away from exposed soils, to store flows, or to otherwise limit runoff discharge of pollutants from exposed areas of the site is attached. Placement of structural practices in floodplains has been avoided.

10. ☒ **Attachment G - Drainage Area Map**. A drainage area map supporting the following requirements is attached:

☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.

☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.

☒ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.

☐ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be used in combination with other erosion and sediment controls within each disturbed drainage area.

☐ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. Erosion and sediment controls other than sediment basins or sediment traps within each disturbed drainage area will be used.

11. ☐ **Attachment H - Temporary Sediment Pond(s) Plans and Calculations**. Temporary sediment pond or basin construction plans and design calculations for a proposed temporary BMP or measure have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information must be signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed temporary BMPs and measures are attached.

☒ N/A

12. ☒ **Attachment I - Inspection and Maintenance for BMPs.** A plan for the inspection of each temporary BMP(s) and measure(s) and for their timely maintenance, repairs, and, if necessary, retrofit is attached. A description of the documentation procedures, recordkeeping practices, and inspection frequency are included in the plan and are specific to the site and/or BMP.

13. ☒ All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections by the applicant or the executive director, or other information indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations.

14. ☒ If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain).

15. ☒ Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake will be provided that can indicate when the sediment occupies 50% of the basin volume.

16. ☒ Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).

Soil Stabilization Practices

Examples: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, or preservation of mature vegetation.

17. ☒ **Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices**. A schedule of the interim and permanent soil stabilization practices for the site is attached.

18. ☒ Records must be kept at the site of the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.

19. ☒ Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

Administrative Information

20. ☒ All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.

21. ☒ If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately suspended. The appropriate TCEQ Regional Office shall be immediately notified. Regulated activities must cease and not continue until the TCEQ has reviewed and approved the methods proposed to protect the aquifer from any adverse impacts.

22. ☒ Silt fences, diversion berms, and other temporary erosion and sediment controls will be constructed and maintained as appropriate to prevent pollutants from entering sensitive features discovered during construction.

SPILL RESPONSE ACTIONS

If there is an accidental spill on site, the contractor shall respond with appropriate action. The contractor will be required to contact the owner and in turn the owner will contact the TCEQ in the event of a spill on site. In addition to the following guidance, reference the latest version of TCEQ's Technical Guidance Manual (TGM) RG-348 Section 1.4.16.

General Measures

1. To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
2. Store hazardous materials and wastes in covered containers and protect from vandalism.
3. Place a stockpile of spill cleanup materials where it will be readily accessible.
4. Train employees in spill prevention and cleanup.
5. Designate responsible individuals to oversee and enforce control measures.
6. Spills should be covered and protected from stormwater runoff during rainfall to the extent that it doesn't compromise clean-up activities.
7. Do not bury or wash spills with water.
8. Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
9. Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.
10. Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
11. Place Material Safety Data Sheets (MSDS), as well as proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
12. Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

1. Clean up leaks and spills immediately.
2. Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.
3. Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. Specific spill response procedures are outlined below for each spill category (Minor – Hazardous).

Minor Spills

1. Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
2. Use absorbent materials on small spills rather than hosing down or burying the spill.
3. Absorbent materials should be promptly removed and disposed of properly.
4. Follow the practice below for a minor spill:
   - Contain the spread of the spill.
   - Recover spilled materials.
   - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

Spills should be cleaned up immediately:

1. Contain spread of the spill.
2. Notify the project foreman immediately.
3. If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
4. If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
5. If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

1. Notify the TCEQ by telephone as soon as possible and within 24 hours at (512)339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
2. For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
3. Notification should first be made by telephone and followed up with a written report.
4. The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
5. Other agencies which may need to be consulted include, but not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.

Vehicle and Equipment Maintenance

1. If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runoff of stormwater and the runoff of spills.
2. Regularly inspect onsite vehicles and equipment for leaks and repair immediately
3. Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
4. Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
5. Place drip pans or absorbent materials under paving equipment when not in use.
6. Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
7. Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
8. Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
9. Store cracked batteries in a non- leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

1. If fueling must occur on site, use designated areas, located away from drainage courses, to prevent the runoff of stormwater and the runoff of spills.
2. Discourage "topping off" of fuel tanks.
3. Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

POTENTIAL SOURCES OF CONTAMINATION

During Construction:

1. Oil, grease, fuel, and hydraulic fluid contamination from construction equipment and vehicle dripping.

2. Hydrocarbons from paving operations.

3. Miscellaneous trash and litter from construction workers and material wrappings.

4. Construction debris.

5. Silt leaving the site.

Ultimate Use:

1. Pollutants from vehicles utilizing the roadways

2. Stormwater runoff contamination from fertilizers, herbicides, and pesticides used to maintain landscaping and lawns.

3. Dumping of hazardous materials into the storm drain system by the general public.

SEQUENCE OF MAJOR ACTIVITIES

Intended Schedule or Sequence of Major Activities:

1. Mobilization of the contractor's equipment.
2. Installation of temporary BMP's as described in attachment "D" of this section.
3. Site clearing and grubbing activities for streets, drains, detention ponds, and utilities.
    a. 35.45 Acres
4. Rough subgrade preparation: earthwork, grading, street and drainage excavation and embankment
    a. 35.45 Acres
5. Trenching and installation of utilities
    a. 2.73 Acres
6. Final street prep, curbing, and paving activities
    a. 8.15 Acres
7. Home construction
    a. 12.20 Acres
8. Topsoil, irrigation and landscaping
    a. 7.33 Acres
9. Site cleanup and removal of temporary BMP's

TEMPORARY BEST MANAGEMENT PRACTICES AND MEASURES

A: A majority of the upgradient runoff will be intercepted by earthen swales along the property lines and directed to the natural lows. The upgradient drainage area flowing onto the site is undeveloped and vegetation is well established so additional sedimentation is not anticipated to originate from upstream. The selection of the onsite BMP's has taken into account the additional runoff volume from the upgradient area.

B: Temporary BMPs will be installed prior to soil disturbing construction activity. Silt fencing and natural vegetated buffers will be placed along the down-gradient sides of the property to prevent silt from escaping the construction area. Rock berms will be placed in the drainage lows where runoff is concentrated. A temporary construction entrance will be placed at the site entry/exit point to reduce tracking onto adjoining streets. A construction staging area will be used onsite to perform all vehicle maintenance and for equipment and material storage. A concrete truck washout pit will be placed on site to provide containment and easier clean up of waste from concrete operations.

Practices may also be implemented on site for interim and permanent stabilization. Stabilization practices may include but are not limited to: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of existing trees and vegetation, and other similar measures.

C: There are no existing surface streams or sensitive features within the site, therefore additional temporary BMP's are not required.

D: There are no sensitive features identified within this site, therefore additional temporary BMP's are not required. If a naturally-occurring sensitive feature is identified during construction all activity will be stopped and the contractor should notify TCEQ.

REQUEST TO TEMPORARILY SEAL A FEATURE

There will be no temporary sealing of any naturally occurring features on site.

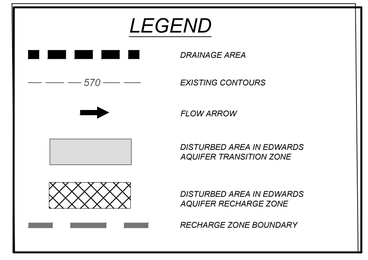
STRUCTURAL PRACTICES

Structural BMPs will be used to limit runoff discharge of pollutants from exposed areas of the site. BMPs will be installed prior to soil disturbing construction activity. Silt fencing will be placed along the down-gradient sides of the property to prevent silt from escaping the construction area. A temporary construction entrance will be placed at the site entry/exit point to reduce tracking onto adjoining streets. A construction staging area will be used onsite to perform all vehicle maintenance and for equipment and material storage. A concrete truck washout pit will be placed on site to provide containment and easier clean up of waste from concrete operations. The location of all structural temporary BMP's is shown on the Site Plan, **EX-1.0** and details and specifications are provided in **EX-1.1** which can be found at the end of this report under the appropriate tab.

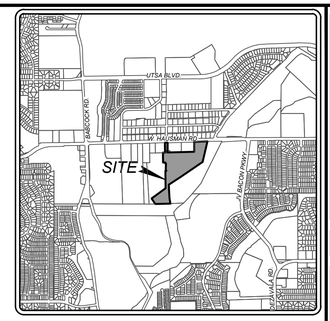
DRAINAGE AREA MAP

A drainage area map is included with this report as **Attachment G**.

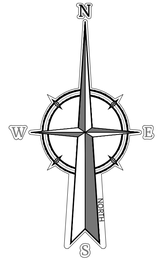


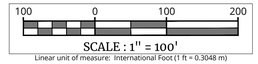


1% AC (100-YEAR) ULTIMATE FLOODPLAIN PER FLOOD STUDY PREPARED BY KFW ENGINEERS, DATED MARCH, 2023



LOCATION MAP
NOT-TO-SCALE





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Formerly Known as KFW

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

TREVOR FIELDS, UNIT 1
STREET, DRAINAGE,
WATER,SANITARY SEWER &
UTILITY IMPROVEMENTS
FOR

MOSAIC LAND
DEVLOPMENT

CITY OF SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14809
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	DEC - 2023	JA	CL

PROJECT NUMBER:	DRAWING NAME:
1065-13-03	DRAINAGE AREA MAP

SHEET TITLE:
DRAINAGE AREA MAP

SHEET NUMBER:
ATT. G

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Exhibit/CAD/WIP/Dwg/Drainage Area Map.dwg/Drainage Area Map By: ITHOMPSON

TEMPORARY SEDIMENT POND(S) PLANS AND CALCULATIONS

Temporary sediment basin and/or traps are not proposed; however other temporary BMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.

INSPECTION AND MAINTENANCE FOR BMP'S

MAINTENANCE

All temporary and permanent erosion and sediment control BMPs will be maintained and repaired as needed to assure continued performance of their intended function. All maintenance and repair of BMPs will be conducted in accordance with manufacturers' specifications.

All temporary erosion and sediment control BMPs will be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment will be removed or stabilized on site. Disturbed soil areas resulting from removal of BMPs or vegetation will be permanently stabilized as soon as possible.

Erosion and sediment controls are designed to prevent soil erosion and sediment migration offsite, to the extent practicable, which may result from construction activity. This design considers local topography, soil type, and rainfall.

Control measures must be installed and maintained according to the manufacturer's specifications. If periodic inspections or other information indicates a control has been used inappropriately, or incorrectly, the permitee must replace or modify the control for site situations.

Sediment must be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%.

If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize off-site impacts, and whenever feasible, prior to the next rain event.

The controls must be installed, maintained, and operated in a manner that will limit, to the extent practicable, offsite transport of litter, construction debris, and construction materials.

INSPECTIONS

An inspection will be performed by the qualified personnel, as designated by the permitee, on a weekly basis and after any rainfall event. An inspection and maintenance report shall be made per inspection. An inspection form has been included in this report. Based on the inspection results, the controls shall be corrected before the next scheduled inspection.

A log of inspection results will be maintained on-site and will include the name of the inspector, date, major observations, and necessary corrective measures. Reports of maintenance and inspection activities will be maintained on-site, in conformance with the TPDES permit conditions. Reports must identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report must

contain a certification that the facility or site is in compliance with the SCS. This report must be signed by the responsible party.

Major observations shall, at a minimum, include the following:

The locations of discharges of sediment or other pollutants from the site;

Locations of BMPs that need to be maintained;

Locations of BMPs that failed to operate as designed or proved inadequate for a particular location;

Location where additional BMP's are needed;

All needed repairs or modifications will be reported to the contractors to permit the timely implementation of required actions. Necessary repairs of modifications will be implemented within seven days of inspection. The SCS will be modified within seven days to reflect any modifications to measures as a result of inspection.

The SCS must be amended whenever there is a change in design, construction, operation or maintenance that has a significant effect on the discharge of pollutants to the waters of the United States that was not addressed in the SCS.

The SCS must be amended when inspections or investigations by site operations, local, state or federal officials indicate that the SCS is proving ineffective in eliminating or significantly minimizing pollutants from the construction site or otherwise is not achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity.

INSPECTION FORM

Project Name: **Owner (s)/Operator (s):** **Permit Numbers(s):** **Inspection Date:**	*NOT APPLICABLE*	*IN COMPLIANCE*	*NEEDS CORRECTION*	*COMMENTS*
RECORD KEEPING				
SWP3 Current				
NOI and Permit Posted				
BEST MANAGEMENT PRACTICES (BMPs)				
Vegetative Buffers				
Soil Covering(Including mulch and temporary vegetation)				
Outlet Protection				
Sediment Control Basins				
Silt Fence				
Stabilized Entrances/Exits				
Construction Staging Areas				
Inlet Protection				
Gravel Filter Bags				
Vegetated Filter Strip				
Concrete Truck Washout Pit				
Trash Receptacles				
General Site Cleanliness				
Other _____				
Other _____				
Other _____				

MAJOR OBSERVATIONS

_____

_____

_____

CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."
"I further certify I am an authorized signatory in accordance with the provisions of 30 TAC §305.128."

INSPECTOR NAME/SIGNATURE: DATE:
(Inspector must attach a brief summary of qualifications to this report.)

OWNER NAME/SIGNATURE: DATE:

SCHEDULE OF INTERIM AND PERMANENT SOIL STABILIZATION

Construction practices shall disturb the minimal amount of existing ground cover as required for land clearing, grading, and construction activity for the shortest amount of time possible to minimize the potential of erosion and sedimentation from the site. Existing vegetation shall be maintained and left in place until it is necessary to disturb for construction activity. For this project the following stabilization practices will be implemented:

1. Hydraulic Mulch and Seeding: Disturbed areas subject to erosion shall be stabilized with hydraulic mulch and/or seeded and watered to provide interim stabilization. For areas that are not to be sodded as per the project landscaping plan, a minimum of 85% vegetative cover will be established to provide permanent stabilization.

2. Sodding and Wood Mulch: As per the project landscaping plan, Sodding and wood mulch will be applied to landscaped areas to provide permanent stabilization prior to project completion.

Records of the following shall be maintained by the permitee in the attached Project Timeline:

a) The dates when major grading activities occur;

b) The dates when construction activities temporarily or permanently cease on a portion of the site;

c) The dates when stabilization measures are initiated.

Stabilization measures must be initiated as soon as practical in portions of the site where construction activities have temporarily or permanently ceased, and except as provided in the following, must be initiated no more that fourteen (14) days after the construction activity in that portion of the site has temporarily or permanently ceased:

Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures must be initiated as soon as practical.

Where construction activity on a portion of the site is temporarily ceased and earth disturbing activities will be resumed within twenty-one (21) days, temporary stabilization measures do not have to be initiated on that portion of the site. In arid areas (areas with an average rainfall of 0-10 inches), semiarid areas (areas with an average annual rainfall of 10 to 20 inches), and areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is precluded by seasonably arid conditions, stabilization measures must be initiated as soon as practical.

PROJECT TIMELINE

DATES WHEN MAJOR GRADING ACTIVITIES OCCUR	
Date	Construction Activity

DATES WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE	
Date	Construction Activity

DATES WHEN STABILIZATION MEASURES ARE INITIATED	
Date	Stabilization Activity

Owner Authorization Form

Texas Commission on Environmental Quality
for Required Signature
Edwards Aquifer Protection Program
Relating to 30 TAC Chapter 213
Effective June 1, 1999

Land Owner Authorization

I, Blake Yantis of SA Given To Fly, LP.
Land Owner Signatory Name — Land Owner Name (Legal Entity or Individual)

am the owner of the property located at
N.C.B. 14861, LOT 50,51 & 901 (VOL. 20003, PG. 656-657 O.P.R.)
Legal description of the property referenced in the application

and am duly authorized in accordance with §213.4(c)(2) and §213.4(d)(1) or §213.23(c)(2) and §213.23(d) relating to the right to submit an application, signatory authority, and proof of authorized signatory.

I do hereby authorize Beazer Homes Texas, LP.
Applicant Name (Legal Entity or Individual)

to conduct Water Pollution Abatement Plan and Sewer Collection System Reports
Description of the proposed regulated activities

at Trevor Fields Tract.
Precise location of the authorized regulated activities

Land Owner Acknowledgement

I understand that SA Given to Fly, LP.
Land Owner Name (Legal Entity or Individual)

Is ultimately responsible for compliance with the approved or conditionally approved Edwards Aquifer protection plan and any special conditions of the approved plan through all phases of plan implementation even if the responsibility for compliance and the right to possess and control the property referenced in the application has been contractually assumed by another legal entity. I further understand that any failure to comply with any condition of the executive director's approval is a violation is subject to administrative rule or orders and penalties as provided under §213.10 (relating to Enforcement). Such violation may also be subject to civil penalties and injunction.

Land Owner Signature

Land Owner Signature

4/9/24
Date

THE STATE OF § Texas

County of § Bexar

BEFORE ME, the undersigned authority, on this day personally appeared Blake Yantis known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 9th day of April, 2024

Jamie Littrell
NOTARY PUBLIC

JAMIE LYNN LITTRELL
Notary Public, State of Texas
Comm. Expires 12-05-2026
Notary ID 131816187

Jamie Littrell
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 12/05/2026

Attached: (Mark all that apply)

- ☐ Lease Agreement
- ☐ Signed Contract
- ☐ Deed Recorded Easement
- ☐ Other legally binding document

Applicant Acknowledgement

I, John Friesenhahn of Beazer Homes Texas, LP.
Applicant Signatory Name — Applicant Name (Legal Entity or Individual)

acknowledge that SA Given To Fly, LP.
Land Owner Name (Legal Entity or Individual)

has provided Beazer Homes Texas, LP.
Applicant Name (Legal Entity or Individual)

with the right to possess and control the property referenced in the Edwards Aquifer protection plan.

I understand that Beazer Homes Texas, LP.
Applicant Name (Legal Entity or Individual)

is contractually responsible for compliance with the approved or conditionally approved Edwards Aquifer protection plan and any special conditions of the approved plan through all phases of plan implementation. I further understand that failure to comply with any condition of the executive director's approval is a violation is subject to administrative rule or orders and penalties as provided under §213.10 (relating to Enforcement). Such violation may also be subject to civil penalties and injunction.

Applicant Signature

[signature] 4/9/24
Applicant Signature — Date

THE STATE OF § Texas

County of § Bexar

BEFORE ME, the undersigned authority, on this day personally appeared John Friesenhahn known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 9th day of April, 2024

[signature]
NOTARY PUBLIC

COLLEEN TAYLOR
Notary Public, State of Texas
Comm. Expires 05-24-2024
Notary ID 341838

Colleen Taylor
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 05-24-2024

Agent Authorization Form
For Required Signature
Edwards Aquifer Protection Program
Relating to 30 TAC Chapter 213
Effective June 1, 1999

I John Friesenhahn,
Print Name

Division President,
Title - Owner/President/Other

of Beazer Homes Texas, LP.,
Corporation/Partnership/Entity Name

have authorized Clayton Linney, P.E.
Print Name of Agent/Engineer

of Colliers Engineering & Design
Print Name of Firm

to represent and act on the behalf of the above named Corporation, Partnership, or Entity for the purpose of preparing and submitting this plan application to the Texas Commission on Environmental Quality (TCEQ) for the review and approval consideration of regulated activities.

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to $10,000 per day per violation.

2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.

3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.

4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.

5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:

Applicant's Signature

3/1/24
Date

THE STATE OF Texas §

County of Bexar §

BEFORE ME, the undersigned authority, on this day personally appeared John Friesenhahn known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 1st day of March, 2024.

NOTARY PUBLIC

COLLEEN TAYLOR
Notary Public, State of Texas
Comm. Expires 05-24-2024
Notary ID 341838

Colleen Taylor
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 05-24-2024

Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: Trevor Fields Tract
Regulated Entity Location: 2,000 L.F. East of the intersection of Babcock Rd and W Hausman Rd.
Name of Customer: Beazer Homes Texas, LP.
Contact Person: Calvin New Phone: (214) 769-0966
Customer Reference Number (if issued):CN 601723620
Regulated Entity Reference Number (if issued):RN _____
Austin Regional Office (3373)

☐ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362)

☒ Bexar ☐ Medina ☐ Uvalde
☐ Comal ☐ Kinney

Application fees must be paid by check, certified check, or money order, payable to the **Texas Commission on Environmental Quality**. Your canceled check will serve as your receipt. **This form must be submitted with your fee payment**. This payment is being submitted to:

☐ Austin Regional Office
☐ Mailed to: TCEQ - Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☒ San Antonio Regional Office
☐ Overnight Delivery to: TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
(512)239-0357

Site Location (Check All That Apply):

☒ Recharge Zone ☐ Contributing Zone ☐ Transition Zone

Type of Plan	*Size*	*Fee Due*
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	Acres	$
Sewage Collection System	5,649 L.F.	$ 2,824.50
Lift Stations without sewer lines	Acres	$
Underground or Aboveground Storage Tank Facility	Tanks	$
Piping System(s)(only)	Each	$
Exception	Each	$
Extension of Time	Each	$

Signature: 

Date: _____

Application Fee Schedule

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

Project	*Project Area in Acres*	*Fee*
One Single Family Residential Dwelling	< 5	$650
Multiple Single Family Residential and Parks	< 5 5 < 10 10 < 40 40 < 100 100 < 500 ≥ 500	$1,500 $3,000 $4,000 $6,500 $8,000 $10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1 1 < 5 5 < 10 10 < 40 40 < 100 ≥ 100	$3,000 $4,000 $5,000 $6,500 $8,000 $10,000

Organized Sewage Collection Systems and Modifications

Project	*Cost per Linear Foot*	*Minimum Fee-Maximum Fee*
Sewage Collection Systems	$0.50	$650 - $6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

Project	*Cost per Tank or Piping System*	*Minimum Fee-Maximum Fee*
Underground and Aboveground Storage Tank Facility	$650	$650 - $6,500

Exception Requests

Project	*Fee*
Exception Request	$500

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions on completing this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (*If other is checked please describe in space provided.*)

☒ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)

☐ Renewal *(Core Data Form should be submitted with the renewal form)* ☐ Other

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	**3. Regulated Entity Reference Number** *(if issued)*
CN 601723620		**RN**

SECTION II: Customer Information

4. General Customer Information | **5. Effective Date for Customer Information Updates** (mm/dd/yyyy)

☐ New Customer ☒ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)* — *If new Customer, enter previous Customer below:*

Beazer Homes Texas, LP.

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** *(if applicable)*
0010702011	17604963532	76-0496353	

11. Type of Customer: ☒ Corporation ☐ Individual Partnership: ☐ General ☐ Limited
Government: ☐ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees
☒ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

13. Independently Owned and Operated?
☒ **Yes** ☐ **No**

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☐ Owner ☐ Operator ☒ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant ☐ Other:

15. Mailing Address:							
	11467 Huebner Road, Suite 225						
City	San Antonio	**State**	TX	**ZIP**	78230	**ZIP + 4**	

16. Country Mailing Information *(if outside USA)*	**17. E-Mail Address** *(if applicable)*
	William.new@beazer.com

18. Telephone Number	**19. Extension or Code**	**20. Fax Number** *(if applicable)*

(214) 769-0966		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☒ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

Trevor Fields Tract

23. Street Address of the Regulated Entity: ***(No PO Boxes)***								
	City		**State**		**ZIP**		**ZIP + 4**	
24. County								

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:		
26. Nearest City	**State**	**Nearest ZIP Code**
San Antonio	TX	78249

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:	29.570359		**28. Longitude (W) In Decimal:**	-98.624211	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	34	13	-98	37	27

29. Primary SIC Code (4 digits)	**30. Secondary SIC Code** (4 digits)	**31. Primary NAICS Code** (5 or 6 digits)	**32. Secondary NAICS Code** (5 or 6 digits)
1522		236116	

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

Multi-Family Residential

34. Mailing Address:	**11467 Huebner Road, Suite 225**							
	City	**San Antonio**	**State**	**TX**	**ZIP**	**78230**	**ZIP + 4**	
35. E-Mail Address:	**William.new@beazer.com**							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(214) 769-0966		( ) -

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☒ Edwards Aquifer	☐ Emissions Inventory Air	☐ Industrial Hazardous Waste
☐ Municipal Solid Waste	☐ New Source Review Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Wastewater	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	Clayton Linney, P.E.	41. Title:	Department Manager

42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(877) 627-3772		( ) -	Clayton.Linney@collierseng.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	Colliers Engineering & Design	Job Title:	Department Manager
Name *(In Print)*:	Clayton Linney, P.E.	Phone:	(877) 627- 3772
Signature:	Clayton Linney	Date:	4/10/2024