BROOK STONE CREEK-UNIT 2E

Sewage Collection System Application



BROOK STONE CREEK-UNIT 2E Sewage Collection System Application

September 2024





Texas Engineering Firm #470 Texas Surveying Firm #10028800



September 11, 2024

Ms. Lillian Butler Texas Commission on Environmental Quality Region 13 14250 Judson Road San Antonio, Texas 78233-4480

Re: Brook Stone Creek-Unit 2E Sewage Collection System Application

Dear Ms. Butler:

Please find included herein the Brook Stone Creek-Unit 2E Sewage Collection System Application. This Sewage Collection System Application has been prepared to be consistent with the regulations of the Texas Administrative Code (30 TAC 213, 217 and 290) and current policies for development over the Edwards Aquifer Recharge Zone.

This Sewage Collection System Application applies to the 5,505.82 linear feet of sewer main proposed as part of this project. Please review the plan information for the items it is intended to address. If acceptable, provide a written approval of the plan in order that construction may begin at the earliest opportunity.

Appropriate review fees (\$2,752.91) and fee application form are included. If you have questions or require additional information, please do not hesitate to contact me at your earliest convenience.

Sincerely, Pape-Dawson Consulting Engineers, LLC

Becky Carroll, P.E. Vice President

Attachments

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EDWARDS AQUIFER APPLICATION COVER PAGE (TCEQ-20705)

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 <u>30 TAC 213</u>.

Administrative Review

1. <u>Edwards Aquifer applications</u> 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: <u>http://www.tceq.texas.gov/field/eapp</u>.

- 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 N	ame: ^B	rook S	tone Cre	eek-Un	2. Re	2. Regulated Entity No.: 111218178					
3. Customer Name: ^C	Continenta	al Hom	es of Te	exas, L.	.Р.	4. Ci	istom	er No.:	601213523		
5. Project Type: (Please circle/check one)	New		Modif	icatior	1	Exter	nsion	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)	Resider	ntial	Non-r	esiden	tial		8. Sit	e (acres):	12.52		
9. Application Fee:	\$2,752	2.91	10. Permanent BMP(s):								
11. SCS (Linear Ft.):	5,505	5.82	12. AS	ST/US	ST (No	o. Tar	nks):				
13. County:	Bex	ar	14. W	aters	hed:			Upper Salado Creek			

Application Distribution

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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.

Ausun Kegion												
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.)	_	_		_									
Region (1 req.)	_	_		_									
County(ies)													
Groundwater Conservation District(s)	 ✓ 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 ✔_San Antonio (SAWS) Shavano Park	Bulverde Fair Oaks Ranch Garden Ridge New Braunfels Schertz	NA	San Antonio ETJ (SAWS)	NA								

TCEQ-20705 (Rev. 02-17-17) O:\Public\WORD\Reports-Covers-Dividers\TCEQ\CZP\f-20705_Edwards_Aquifer_application_cover.pdf 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.

Rebecca Ann Carroll, P.E.

Print Name of Customer/Authorized Agent

Signature of Customer/Authorized Agent

9/12/2024

Date

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FOR TCEQ INTERNAL USE ONL	X							
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 Cust	omer Verification:					
Agent Authorization Complete/Notarized (Y/N):		Fee	Payable to TCEQ (Y/N):					
Core Data Form Complete (Y/N):		Check:	Signed (Y/N):					
Core Data Form Incomplete Nos.:		1	Less than 90 days old (Y/N):					

GENERAL INFORMATION FORM (TCEQ-0585)

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: Becky Carroll, P.E.

Date: 9/12/2024

Signature of Customer/Agent:

Project Information

- 1. Regulated Entity Name: Brook Stone Creek-Unit 2E
- 2. County: Bexar
- 3. Stream Basin: Upper Salado Creek
- 4. Groundwater Conservation District (If applicable): Trinity Glen-Rose
- 5. Edwards Aquifer Zone:



6. Plan Type:

WPAP	AST
\leq scs	🗌 UST
Modification	Exception Request

7. Customer (Applicant):

Contact Person: <u>Leslie Ostrander</u> Entity: <u>Continental Homes of Texas, L.P.</u> Mailing Address: <u>5419 N Loop 1604 E</u> City, State: <u>San Antonio, TX</u> Telephone: <u>(210) 496-2668</u> Email Address: <u>LKOstrander@drhorton.com</u>

Zip: <u>78247</u> FAX: _____

8. Agent/Representative (If any):

Contact Person: <u>Becky Carroll, P.E.</u> Entity: <u>Pape-Dawson Engineers, Inc.</u> Mailing Address: <u>2000 NW Loop 410</u> City, State: <u>San Antonio, Texas</u> Telephone: <u>(210) 375-9000</u> Email Address: <u>bcarroll@pape-dawson.com</u>

Zip: <u>78213</u> FAX: <u>(210) 375-9010</u>

9. Project Location:

The project site is located inside the city limits of _____.

The project site is located outside the city limits but inside the ETJ (extra-territorial jurisdiction) of <u>San Antonio</u>.

- 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.

<u>From TCEQ's regional office, head north on Judson Road approximately 2.5 miles to</u> <u>Loop 1604. Travel west on Loop 1604 approximately 1.8 miles and exit to Bulverde</u> <u>Road. Continue on Bulverde Road for 3.3 miles to Evans Road and turn right. Travel</u> <u>on Evans Road for 2.4 miles. The site is located 0.4 miles southwest of the Evans</u> <u>Road & Esperanza Way intersection.</u>

- 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

TCEQ-0587 (Rev. 02-11-15)

2 of 4

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: when advised of TCEQ visit

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:

\times	Area of the site
\times	Offsite areas
	Impervious cover
	Permanent BMP(s)
\times	Proposed site use
\times	Site history
\times	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:

] 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. \square 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.

ATTACHMENT A

BROOK STONE CREEK-PHASE 2 MOD 3 Water Pollution Abatement Plan





Pape-Dawson Engineers Date: Sep 11, 2024, 1: 39pm User ID: seepulveda File: P:\120\93\11\Design\Exhibits\WPAP\RM1209311.dwg

ATTACHMENT B

BROOK STONE CREEK-UNIT 2E SEWAGE COLLECTION SYSTEM



MATCHLINE See Sheet 2 of 2



USGS/EDWARDS RECHARGE ZONE MAP Sheet 1 Of 2 ATTACHMENT B

BROOK STONE CREEK-UNIT 2E SEWAGE COLLECTION SYSTEM







USGS/EDWARDS RECHARGE ZONE MAP Sheet 2 Of 2 ATTACHMENT B

ATTACHMENT C

BROOK STONE CREEK-UNIT 2E Sewage Collection System Plan

Attachment C – Project Description

Brook Stone Creek-Unit 2E is an approximately 138.307 acre single-family residential development. The project site is located outside the city limits of San Antonio, but within its extra-territorial jurisdiction in Bexar County, Texas. The entire site is located over the Edwards Aquifer Recharge Zone. The project site is located 0.4 miles southwest of the Evans Rd. and Esperanza Way intersection.

The Sewage Collection System (SCS) Application proposes the construction of approximately 5,505.82 linear feet (LF) of eight-inch (8") PVC, SDR 26, 160 psi pressure-rated sewer main. Regulated activities proposed include excavation, construction of sewer mains, manholes, backfill, and trench compaction. Approximately 12.52 acres may be disturbed as identified by the limits of the fifty-foot (50') SCS envelope shown on the plans. There were no naturally-occurring sensitive features identified in the Geological Assessment within the SCS envelope.

This application will support 158 single-family lots for the Brook Stone Creek Development. The permanent population for this unit is estimated to be 632 people based on four (4) people per lot. Approximately 31,600 gallons per day (average flow) of domestic wastewater are estimated to be generated by this project based on the 2016 San Antonio Water System (SAWS) Utility Service Regulations.

The sewage flow will be disposed of by conveyance to the existing Steven M. Clouse Water Recycling Center operated by the San Antonio Water System (SAWS). Potable water will be supplied by SAWS.



GEOLOGIC ASSESSMENT FORM (TCEQ-0585)

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: Henry E. Stultz III

Telephone: 210-375-9000 Fax: 210-375-9090

Date: March 20, 2020

Representing: Pape-Dawson Engineers, Inc., Texas Board of Professional Geoscientists No. 50351 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:

Regulated Entity Name: SCHWAB TRACT

Section 1.01 Project Information

1. Date(s) Geologic Assessment was performed: October 26, 2017; October 27, 2017; November 14, 2017; January 22, 2020

2. Type of Project:

\times	WPAP
	SCS

AST
UST

3. Location of Project:



Transition Zone

Contributing Zone within the Transition Zone



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SCHWAB TRACT Geologic Assessment

- 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.

Гable 1 - So	il Units,	Infiltration	Characteristics	and Thickness
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Soil Name	Group*	Thickness(feet)
Crawford and Bexar stoney soils (Cb)	D	2-4
Eckrant cobby clay, 5-15% slopes (TaC)	D	1-2

* 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. X 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" = 200' Site Geologic Map Scale: 1" = 200' Site Soils Map Scale (if more than 1 soil type): 1" = 1000'

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.



SCHWAB TRACT Geologic Assessment

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 (4) 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.
 - \boxtimes 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.



ATTACHMENT A

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Sheet 1 of 1 ATTACHMENT A

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

ATTACHMENT B

SCHWAB TRACT Stratigraphic Column

Period	Epoch	Group	Formation	Member	Thickness	Lithology	Hydro- logic Unit	Hydrostratigra phic Unit	Hydrologic Function	Porosity	Cavern Development
				Cyclic and marine, undivided	80–90	Pelletal limestone; ranges from chalk to mudstone and miliolid grainstone; thin to massive beds; some crossbedding evident; a packstone containing large caprinids is present near contact with the overlying Georgetown Formations; chert is common as beds and large nodules		п	Aquifer	MO, BU, VUG, BP, FR, CV	Many subsurface; might be associated with earlier karst development
			Person	Leached and collapsed,u ndivided	70–90	Hard, dense, recrystallized limestone;mudstone, wackestone, packstone, and grainstone; contains chert as beds and large nodules; heavily bioturbated with iron- stained beds; often stromatolitic; <i>Toucasia</i> sp. Often found above contact with the underlying regional dense member; <i>Montastrea roemeriana</i> and oysters rare		ш	Aquifer	BU, VUG, FR, BP, BR, CV	Extensive lateral development; large rooms
				Regional dense	20–24	Dense, shaly limestone; oyster shell mudstone and iron wackestone; wispy iron staining; chert nodules rarer than in the rest of the chert-bearing Edwards Group		IV	Confining	FR, CV	Very few; only vertical fracture enlargement
Cretaceous	Early Cretaceous	Edwards		Grainstone	40–50	Hard, dense limestone that consists mostly of a tightly cemented miliolid skeletal fragment grainstone; contains interspersed chalky mudstone and wackestone; chert as beds and nodules; crossbedding and ripple marks are common primarily at the contact with the overlying regional dense bed	Edwards Aquifer	v	Aquifer	IP, IG, BU, FR, BP, CV	Few
	[Kirsch- berg Evaporite	40–50	Highly altered crystalline limestone and chalky mudstone with occasional grainstone associated with tidal channels; chert as beds and nodules, boxwork molds are common, matrix recrystallized to a coarse grain spar; intervals of collapse breccia and travertine deposits		VI	Aquifer	IG, MO, VUG, FR, BR, CV	Probably extensive cave development
			Kainer	Dolomitic	90–120	Hard, dense to granular, dolomitic limestone; chert as beds and nodules (absent in lower 20 ft); <i>Toucasia</i> sp. abundant; lower three-fourths composed of sucrosic dolomites and grainstones with hard, dense limestones interspersed; upper one-fourth composed mostly of hard, dense mudstone, wackestone, packstone, grainstone, and recrystallized dolomites with bioturbated beds		VII	Aquifer	IP, IC, IG, MO, BU, VUG, FR, BP, CV	Caves related to structure or bedding planes
				Basal nodular	40–50	Moderately hard, shaly, nodular, burrowed mudstone to miliolid grainstone that also contains dolomite; contains dark, spherical textural features known as black rotund bodies; <i>Ceratostreon texana</i> , <i>Caprina</i> sp., miliolids, and gastropods		VIII	Aquifer, confining unit in areas without caves	IP, MO, BU, BP, FR, CV	Large lateral caves at surface

Source: Clark, Golab, and Morris (2016); Cavern development modified from Stein and Ozuna (1995). Porosity types - Fabric selective: IP, interparticle porosity; IG, intergranular porosity; IC, intercrystalline porosity; SH, shelter porosity; MO, moldic porosity; BU, burrowed porosity; FE, fenestral; BP, bedding plane porosity. Not fabric selective: FR, fracture porosity; CH, channel porosity; BR, breccia; VUG, vug porosity; CV, cave porosity.

ATTACHMENT C

SCHWAB TRACT Geologic Assessment

SUMMARY

The Schwab Tract is located in Bexar County, Texas along Evans Road south of the intersection with Cibolo Vista. The site is currently vacant. Historical aerial photographs indicate the site was predominantly agricultural rangeland with large trees.

Based on the results of the field survey conducted in accordance with *Instructions for Geologists for Geologic Assessments in the Edwards Aquifer Recharge/Transition Zones (TCEQ-0585 Instructions)*, four naturally occurring sensitive features were identified on site. Buffers around the sensitive features were created in accordance with *TCEQ RG-348 Complying with the Edwards Aquifer Rules Technical Guidance on Best Management Practices / Chapter 5 and RG-348 Addendum*. Based on the frequency distribution of sensitive features, the overall potential for fluid migration to the Edwards Aquifer for the site is moderate.

SITE GEOLOGY

As observed through field evidence, the subject site is located within the leached and collapsed (Keplc) member of the Person formation. The Keplc is characterized by interbedded, iron-stained, massive and bioturbated limestone with abundant chert. Karst development within the Keplc is generally characterized by large sinkholes. Caves often develop as large horizontal rooms. (Clark, 2016).

The predominant trend of faults in the vicinity of the site is approximately N45°E, based on faults identified during the previous mapping of the area.

FEATURE DESCRIPTIONS:

A description of the features observed onsite is provided below:

Feature S-1

Feature S-1 is a sinkhole with organics, fine infilling and a thick soil profile that may have been enlarged by animal burrow. No rim rock or bedrock was observed. Therefore, the probability for rapid infiltration is low.

Feature S-2 and S-5

Feature S-2 and S-5 are solution cavities that have been burrowed by animals. Fine and organic soil fill the features. Due to the likely karst origin and fine soil infilling, the probability for rapid infiltration is low.

Feature S-3

Feature S-3 is a vertical solution cavity near a natural drainage. Due to the karst origin, lack of infilling, and proximity to the stream, the probability for rapid infiltration is high.



SCHWAB TRACT Geologic Assessment

Feature S-6

Feature S-6 is a cave located within the floodplain. Three openings at the surface, which are connected at depth mark the entrance to the cave. The largest entrance is an approximately 3 feet long by 2 feet wide shaft that drops to a 4 foot wide by 6 foot tall shaft. Because the feature is an open vertical shaft cave located within the floodplain, the probability of rapid infiltration is high.

Feature S-7

Feature S-7 is a cave located on a hillside. The entrance is approximately 3 feet long by 2 feet wide, and is roughly shaft shaped. The shaft drops 24 feet and is 11 foot wide by 14 foot long at the bottom. Because the feature is an open vertical shaft cave, the probability of rapid infiltration is high.

Feature S-8

Feature S-8 is a cave located within a drainage channel. The entrance is approximately 3 feet long by 2 feet wide and drops 12 feet to a 12 foot wide by 20 foot long room. Because the feature is an open cave located within a drainage channel, the probability of rapid infiltration is high.

Feature S-10

Feature S-10 is a water well that is located near a dilapidated ranch home. The well is constructed with steel casing extending above a concrete slab. The well is open, and airflow was observed coming from the well. Since the well is not capped but extends above the surface on a concrete slab, the probability for rapid infiltration is intermediate.

Features S-11, S-12, and S-13

Features S-11, S-12, and S-13 are existing water wells that extend approximately 1.5 feet above ground surface. Because of the unknown ages, integrity of casings, and location of casing above the ground surface, the probability for rapid infiltration is low.

Feature S-14, S-15, and S-16

Feature S-14, S-15, and S-16 are septic tanks. Due to the non-karst origin and the likelihood that the septic system is confined to the soil horizon, the probability for rapid infiltration to the aquifer is low.

Feature S-17

Feature S-17 is an existing sewer line that is not located beneath pavement. The sewer line has been trenched through bedrock and backfilled with a mix of fine and course fill material that may be more permeable than surrounding undisturbed areas. Therefore, the probability of rapid infiltration is intermediate.

Features S-18, S-19, S-20, and S-21

Features S-18, S-19, S-20, and S-21 are intraformational faults within the Keplc. The faults were identified through aerial photographs and field evidence. Fine infilling with no evidence of increased permeability were observed at the ground surface onsite, therefore the probability of rapid infiltration is low.

REFERENCES

Clark, A.K., Golab, J.A., and Morris, R.R., 2016, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers Within Northern Bexar and Comal Counties, Texas: U.S. Geological Survey Scientific Investigations Map 3366, scale 1:24,000, 20 p. pamphlet.

Nationwide Environmental Title Research, LLC. Historical Aerials. historicalaerials.com. Web. March 20, 2020.

Texas Water Development Board, Wells in TWDB Groundwater Database Viewer, http://www2.twdb.texas.gov/apps/waterdatainteractive/groundwaterdataviewer, March 20, 2020.



ATTACHMENT D



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ORGANIZED SEWAGE COLLECTION SYSTEM PLAN (TCEQ-0582)
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: Brook Stone Creek-Unit 2E

 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

 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: David C. Garcia, P.E.Entity: San Antonio Water SystemMailing Address: 2800 US Hwy 281City, State: San Antonio, TexasZip: 78212Telephone: (210) 233-3605Fax: _____Email Address: david.garcia2@saws.orgThe appropriate regional office must be informed of any changes in this informationwithin 30 days of the change.

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

Contact Person: <u>Becky Carroll, P.E.</u> Texas Licensed Professional Engineer's Number: <u>92666</u> Entity: <u>Pape-Dawson Engineers, Inc.</u> Mailing Address: <u>2000 NW Loop 410</u> City, State:<u>San Antonio, Texas</u> Telephone:(<u>210) 375-9000</u> Email Address:bcarroll@pape-dawson.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):

\boxtimes	Residential: Number of single-family lots: <u>158</u>
	Multi-family: Number of residential units:
	Commercial
	Industrial
	Off-site system (not associated with any development)
	Other:

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

<u>100</u> % Domestic	<u>31,600</u> gallons/day
% Industrial	gallons/day
% Commingled	gallons/day
Total gallons/day: <u>200 gpd/edu x 15</u>	<u> 8 EDU = 31,600 gpd (average)</u>

- 6. Existing and anticipated infiltration/inflow is <u>600</u> gallons/day. This will be addressed by: <u>adequate sizing of the sewer main</u>.
- 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 $\underline{08/16}$, 2024. 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)
			ASTM D2241, Class
			160 ASTM D3139,
8"	5,365.82	PVC, SDR 26	ASTM C1173
			ASTM D2241. Class
			160 ASTM D3139,
8"	140.00	PVC, SDR 26 Class 160	ASTM C1173

Total Linear Feet: 5,505.82

- (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 <u>Steven M. Clouse Water</u> <u>Recycling Center</u> (name) Treatment Plant. The treatment facility is:



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

The City of <u>San Antonio/SAWS</u> standard specifications.

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)

Line	Shown on Sheet	Station	Manhole or Clean- out?
Line "A"	C4.05 Of C4.10	33+07.23	Manhole "M.H. A-13"
Line "B"	C4.06 Of C4.10	4+04.10	Manhole "M.H. B-1"
Line "C"	C4.07 Of C4.10	5+34.47	Manhole "M.H. C-2"

Table 2 - Manholes and Cleanouts

			Manhole or Clean-
Line	Shown on Sheet	Station	out?
Line "D"	C4.08 Of C4.10	8+51.29	Manhole "M.H. D-4"
Line "E"	C4.09 Of C4.10	3+06.23	Manhole "M.H. E-1"
Line "F"	C4.10 Of C4.10	7+02.50	Manhole "M.H. F-3"
	Of		

- 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. \square The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = <u>200</u>'.

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:

 \boxtimes 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:

 \boxtimes 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
	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
	of	to
	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.

Line	Station or Closest Point	Crossing or Parallel	Horizontal Separation Distance	Vertical Separation Distance
"A"	7+71.76	Crossing		12.0'
"A"	10+42.14	Crossing		15.5'
"A"	22+76.23	Crossing		11.0'
"B"	3+22.91	Crossing		4.4'
"D"	3+71.68	Crossing		5.8'
"D"	4+09.06	Crossing		4.7'
See Table 5				

Table 5 - Water Line Crossings

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.

Line	Manhole	Station	Sheet

Table 6 - Vented Manholes

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(I)(2)(H).

Line	Manhole	Station	Sheet
Line "A"	Manhole "M.H. A-5"	10+60.76	C4.02
Line "A"	Manhole "M.H. A-7"	16+16.92	C4.03
Line "A"	Manhole "M.H. A-9"	22+76.23	C4.04
Line "A"	Manhole "M.H. A-12"	30+57.23	C4.05

Table 7 - Drop Manholes

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(I)(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:

Standard Details	Shown on Sheet
Lateral stub-out marking [Required]	DD-854-EARZ of
	C4.20
Manhole, showing inverts comply with 30 TAC §217.55(I)(2) [Required]	DD-852-01 of
	C4.20
Alternate method of joining lateral to existing SCS line for potential future	DD-854-03 of
connections [Required]	C4.20
Typical trench cross-sections [Required]	DD-804-01 of
	C4.20

Table 9 - Standard Details

Standard Details	Shown on Sheet
Bolted manholes [Required]	DD-852-07 of
	C4.20
Sewer Service lateral standard details [Required]	DD-854-EARZ of
	C4.20
Clean-out at end of line [Required, if used]	N/A of
Baffles or concrete encasement for shock/erosion protection [Required, if	N/A of
flow velocity of any section of pipe >10 fps]	14// 01
Detail showing Wastewater Line/Water Line Crossing [Required, if	C4 00 of C4 10
crossings are proposed]	C4.00 01 C4.10
Mandrel detail or specifications showing compliance with 30 TAC	DD-848-01 of
§217.57(b) and (c) [Required, if Flexible Pipe is used]	C4.20
Drop manholes [Required, if a pipe entering a manhole is more than 24	DD-852-08 of
inches above manhole invert]	C4.30

36. \square 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: when advised of TCEQ visit
- 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: Becky Carroll, P.E.

Date: <u>9/12/</u>2024

Place engineer's seal here:



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.

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

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
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)

Jon Niermann, *Chairman* Bobby Janecka, *Commissioner* Catarina R. Gonzales, *Commissioner* Kelly Keel, *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

August 16, 2024

Leslie Ostrander Continental Homes of Texas, LP. 5419 N. Loop 1604 E. San Antonio, Texas 78247

Re: Modification of an approved Water Pollution Abatement Plan (WPAP) Brook Stone Creek – Phase 2 Modification 3; Located southwest of Esperanza Way and Evans Road; ETJ of San Antonio, Bexar County, Texas Edwards Aquifer Protection Program ID: 13001948, Regulated Entity No. RN111218178

Dear Ms. Ostrander:

The Texas Commission on Environmental Quality (TCEQ) has completed its review on the application for the above-referenced project submitted to the Edwards Aquifer Protection Program (EAPP) by Pape-Dawson Engineers, Inc. on behalf of the applicant, Continental Home of Texas, LP. on June 10, 2024. Final review of the application was completed after additional material was received on July 29, 2024.

As presented to the TCEQ, the application was prepared in general compliance with the requirements of 30 Texas Administrative Codes (TAC) Chapter §213. The permanent best management practices (BMPs) and measures represented in the application were prepared by a Texas licensed professional engineer (PE). All construction plans and design information were sealed, signed, and dated by a Texas licensed PE. Therefore, the application for the construction of the proposed project and methods to protect the Edwards Aquifer are **approved**, subject to applicable state rules and the conditions in this letter.

This approval expires two years from the date of this letter, unless, prior to the expiration date, more than 10 percent of the construction has commenced on the project or an extension of time has been officially requested. This approval or extension will expire, and no extension will be granted if more than 50 percent of the project has not been completed within ten years from the date of this letter.

The applicant or a person affected may file with the chief clerk a motion for reconsideration of the executive director's final action on this Edwards Aquifer protection plan. A motion for reconsideration must be filed in accordance with 30 TAC §50.139.

BACKGROUND

The original Brook Stone Creek Phase 2 WPAP was approved by letter dated June 4, 2021 (EAPP # 13001298) and modified by letters dated November 5, 2021 (EAPP #13001399) and June 27, 2022 (EAPP# 13001529). Approximately 22.47-acres of impervious cover on the 216-acre site. Permanent BMPs included three (3) batch detention basins, two (2) engineered vegetative filter strips (VFS), two (2) natural VFS's, and one (1) interim VFS.

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PROJECT DESCRIPTION

The proposed residential project will have an area of approximately 45.0-acres. The modification will include additional clearing, grading, excavation, installation of utilities and drainage improvements and the construction of 243 single-family homes with associated streets, access drives and sidewalks. The modification also proposes modifying the previously approved Basin K, natural vegetative filter strip #10, engineered vegetative filter strips #11 and #13, and removing the previously approved natural vegetative filter strip #12. The impervious cover will be 25.62-acres (56.93 percent). Project wastewater will be disposed of by conveyance to the existing Steven M. Clouse Water Recycling Center.

PERMANENT POLLUTION ABATEMENT MEASURES

To prevent the pollution of stormwater runoff originating on-site or upgradient of the site and potentially flowing across and off the site after construction, one (1) previously approved batch detention basin (13001529), five (5) engineered VFS, one (1) batch detention pond and two (2) natural vegetative filter strips, designed using the TCEQ technical guidance, *RG-348, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices,* will be constructed and implemented to treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 20,906 pounds of TSS generated from the 25.62-acres of impervious cover. The approved permanent BMPs and measures meet the required 80 percent removal of the increased load in TSS caused by the project.

The permanent BMPS shall be operational prior to occupancy or use of the proposed project. Inspection, maintenance, repair, and retrofit of the permanent BMPs shall be in accordance with the approved application.

GEOLOGY

According to the Geologic Assessment (GA) included with the application, the surficial units of the site is the Person Formation of the Edwards Aquifer. No sensitive geologic features were identified in the GA. The site assessment conducted on July 17, 2024 by TCEQ staff determined the site to be generally as described by the GA.

SPECIAL CONDITIONS

I. This modification is subject to all the special and standard conditions listed in the approval letter(s) dated June 4, 2021, November 5, 2021 and June 27, 2022.

STANDARD CONDITIONS

- 1. The plan holder (applicant) must comply with all provisions of 30 TAC Chapter §213 and all technical specifications in the approved plan. The plan holder should also acquire and comply with additional and separate approvals, permits, registrations or authorizations from other TCEQ Programs (i.e., Stormwater, Water Rights, Dam Safety, Underground Injection Control) as required based on the specifics of the plan.
- 2. In addition to the rules of the Commission, the plan holder must also comply with state and local ordinances and regulations providing for the protection of water quality as applicable.

Prior to Commencement of Construction:

3. Within 60 days of receiving written approval of an Edwards Aquifer protection plan, the plan holder must submit to the EAPP proof of recordation of notice in the county deed records, with the volume and page number(s) of the county record. A description of the

property boundaries shall be included in the deed recordation in the county deed records. TCEQ form, Deed Recordation Affidavit (TCEQ-0625), may be used.

- 4. The plan holder of any approved Edwards Aquifer protection plan must notify the EAPP and obtain approval from the executive director prior to initiating any modification to the activities described in the referenced application following the date of the approval.
- 5. The plan holder must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the EAPP no later than 48 hours prior to commencement of the regulated activity. Notification must include the date on which the regulated activity will commence, the name of the approved plan and program ID number for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person.
- 6. Temporary erosion and sedimentation (E&S) controls as described in the referenced application, must be installed prior to construction, and maintained during construction. Temporary E&S controls may be removed when vegetation is established, and the construction area is stabilized. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.
- 7. All borings with depths greater than or equal to 20 feet must be plugged with non-shrink grout from the bottom of the hole to within three (3) feet of the surface. The remainder of the hole must be backfilled with cuttings from the boring or gravel. All borings less than 20 feet must be backfilled with cuttings from the boring. All borings must be backfilled or plugged within four (4) days of completion of the drilling operation.

During Construction:

- 8. This approval does not authorize the installation of temporary or permanent aboveground storage tanks on this project that will have a total storage capacity of five hundred gallons or more of static hydrocarbons or hazardous substances without prior approval of an Aboveground Storage Tank facility application.
- 9. If any sensitive feature is encountered during construction, replacement, or rehabilitation on this project, all regulated activities must be **immediately** suspended near it and notification must be made to TCEQ EAPP staff. Temporary BMPs must be installed and maintained to protect the feature from pollution and contamination. Regulated activities near the feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the feature and the aquifer from potentially adverse impacts to water quality.
- 10. All water wells, including injection, dewatering, and monitoring wells shall be identified in the geologic assessment and must be in compliance with the requirements of the Texas Department of Licensing and Regulation 16 TAC Chapter §76 and all other locally applicable rules, as appropriate.
- 11. If sediment escapes the construction site, the 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). Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50 percent. Litter, construction debris, and construction chemicals shall be prevented from becoming stormwater discharge pollutants.
- 12. Intentional discharges of sediment laden water are not allowed. If dewatering becomes necessary, the discharge must be filtered through appropriately selected BMPs.

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- 13. The following records shall be maintained and made available to the executive director upon request: 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.
- 14. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.

After Completion of Construction:

- 15. Owners of permanent BMPs and temporary measures must ensure that the BMPs and measures are constructed and function as designed. A Texas licensed PE must certify in writing that the **permanent** BMPs or measures were constructed as designed. The certification letter must be submitted to the EAPP within 30 days of site completion.
- 16. The applicant shall be responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property or the ownership of the property is transferred to the entity. A copy of the transfer of responsibility must be filed with the executive director through the EAPP within 30 days of the transfer. TCEQ form, Change in Responsibility for Maintenance on Permanent BMPs and Measures (TCEQ-10263), may be used.

The holder of the approved Edwards Aquifer protection plan is responsible for compliance with Chapter §213 and any condition of the approved plan through all phases of plan implementation. Failure to comply with any condition within this approval letter is a violation of Chapter §213 and is subject to administrative rule or orders and penalties as provided under §213.10 of this title (relating to Enforcement). Such violations may also be subject to civil penalties and injunction. Upon legal transfer of this property, the new owner is required to comply with all terms of the approved Edwards Aquifer protection plan.

This action is taken as delegated by the executive director of the Texas Commission on Environmental Quality. If you have any questions or require additional information, please contact Drew Evans, P.G. of the Edwards Aquifer Protection Program at (210) 403-4053 or the regional office at 512-339-2929.

Sincerely,

Monica Reyes

Monica Reyes, Section Manager Edwards Aquifer Protection Program Texas Commission on Environmental Quality

MR/de

cc: Becky Carroll, P.E., Pape-Dawson Engineering, Inc.

Brook Stone Creek-Unit 2E Organized Sewage Collection System Application (TCEQ-0582)

Line	Station or Closest Point	Crossing or Parallel	Crossing or Parallel Separation Distance Ve	
"A"	7+71.76	Crossing		12
"A"	10+42.14	Crossing		15.5
"A"	11+24.48	Crossing		16.5
"A"	11+34.50	Crossing		16.5
"A"	12+22.01	Crossing		15.4
"A"	12+32.01	Crossing		15.2
"A"	13+19.56	Crossing		13
"A"	13+29.59	Crossing		12.8
"A"	14+17.79	Crossing		11.5
"A"	14+27.81	Crossing		11.5
"A"	15+30.25	Crossing		12.9
"A"	15+40.25	Crossing		13.2
"A"	16+94.62	Crossing		15.3
"A"	17+44.52	Crossing		14.2
"A"	17+54.52	Crossing		14.1
"A"	18+44.42	Crossing		13.9
"A"	18+54.44	Crossing		14.0
"A"	19+45.06	Crossing		15
"A"	19+55.07	Crossing		15.1
"A"	20+42.73	Crossing		15
"A"	20+52.73	Crossing		14.9
"A"	21+34.73	Crossing		14
"A"	21+44.73	Crossing		13.9
"A"	22+26.73	Crossing		12.5

Table 5 - Water Line Crossings



Brook Stone Creek-Unit 2E Organized Sewage Collection System Application (TCEQ-0582)

Line	Station or Closest Point	Crossing or Parallel	ossing or Parallel Separation Distance	
"A"	22+36.73	Crossing		12.3
"A"	22+76.23	Crossing		11
"A"	26+17.23	Crossing		3.8
"A"	26+62.23	Crossing		3.9
"A"	26+72.23	Crossing		4
"A"	27+53.23	Crossing		3.3
"A"	27+62.23	Crossing		3.0
"A"	28+42.23	Crossing		1.8
"A"	28+52.23	Crossing		1.9
"A"	29+32.23	Crossing		3.9
"A"	29+42.23	Crossing		4.1
"A"	29+87.23	Crossing		5.2
"B"	1+50.96	Crossing		10.2
"B"	1+60.96	Crossing		9.7
"B"	2+42.25	Crossing		6.6
"B"	2+52.25	Crossing		6.2
"B"	3+22.91	Crossing		4.4
"C"	1+24.52	Crossing		2.2
"C"	1+34.56	Crossing		2.1
"C"	2+22.30	Crossing		2.8
"C"	2+32.30	Crossing		3
"C"	3+19.95	Crossing		3.6
"C"	3+29.86	Crossing		3.5
"D"	3+71.68	Crossing		5.8
"D"	4+09.06	Crossing		4.7



Brook Stone Creek-Unit 2E Organized Sewage Collection System Application (TCEQ-0582)

Line	Station or Closest Point	Crossing or Parallel Horizontal Separation Distance		Vertical Separation Distance (ft)
"D"	4+69.13	Crossing	Crossing	
"D"	5+20.29	Crossing		3.3
"D"	5+30.30	Crossing		3.2
"D"	6+22.87	Crossing		2.4
"D"	6+32.88	Crossing		2.5
"D"	7+25.38	Crossing		2.2
"D"	7+35.39	Crossing		2.2
"D"	8+27.85	Crossing		2.5
"D"	8+37.86	Crossing		2.5
"E"	1+78.55	Crossing		4.5
"E"	1+88.56	Crossing		4.4
"E"	2+78.58	Crossing		3.1
"E"	2+88.60	Crossing		2.9
"F"	1+61.50	Crossing		2.2
"F"	1+71.50	Crossing		2.1
"F"	2+53.50	Crossing		1.9
"F"	2+63.50	Crossing		2
"F"	3+09.50	Crossing		2.7
"F"	3+91.50	Crossing		3.7
"F"	4+37.50	Crossing		3.7
"F"	4+47.50	Crossing		3.7
"F"	5+29.50	Crossing		3
"F"	5+39.50	Crossing		3

ATTACHMENT A (Engineering Design Report)

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INTRODUCTION

This Engineering Design Report has been prepared to comply with the Texas Commission on Environmental Quality's Design Criteria for Domestic Wastewater Systems (30 TAC 217), and regulations over the Edwards Aquifer Recharge Zone (30 TAC 213). Please note, throughout this application, the more stringent of SAWS, CoSA or TCEQ regulations shall apply.

PROJECT INFORMATION

Brook Stone Creek-Unit 2E proposes the construction of one (1) phase of a single-family residential subdivision with roads, entirely within the Extra-Territorial Jurisdiction (ETJ) of the City of San Antonio, in Bexar County, Texas. The site is located 0.4 miles southwest of the intersection of Evans Road and Esperanza Way, is uncleared and undeveloped, and is bound by the 100 year-floodplain to the west. The proposed phase in the Brook Stone Creek subdivision is located within the Edwards Aquifer Recharge Zone as shown in Attachment B, USGS Map. There are no naturally-occurring sensitive geological features identified within the project limits in the Geologic Assessment.

This Sewage Collection System (SCS) Application proposes the construction of approximately 5,505.82 linear feet (LF) of eight-inch (8") PVC, SDR 26, 160-psi pressure-rated sewer main over the Edwards Aquifer Recharge Zone. Regulated activities proposed include excavation, construction of sewer mains, manholes, backfill, and compaction. Approximately 12.52 acres may be disturbed as identified by the limits of the fifty-foot (50') SCS/GA envelope shown on the plans. The proposed SCS sewer main will tie into the existing 18" sanitary sewer constructed with SAWS E-54 Sanitary Sewer Project at manhole "EX E54 M.H. C-1" (EAPP ID 13001558)

Potable water service is to be provided by the San Antonio Water System (SAWS). The proposed development will generate approximately 31,600 gallons per day (average flow) of domestic wastewater based on the assumption of 158 EDU for residential development (158 EDUs * 200 GPD/EDU = 31,600 gpd). See the included EDR for complete calculations. Wastewater will be disposed of by conveyance to the existing Steven M. Clouse Water Recycling Center operated by SAWS.

Please refer to Sheets C4.00-C4.10 of the attached sewer plans, which show the proposed service area and its topographic features. This system is designed to have a minimum structural life of 50 years.

Safety considerations are the responsibility of the contractor. Refer to SAWS Item Nos. 550 and 902 for construction safety information. Safety protection shall be accomplished in accordance with the most recent requirements of the Occupational Safety and Health Administration (OSHA) Standards and Interpretations.

GRAVITY SANITARY SEWER PIPING: FLOW & CAPACITY ANALYSIS

Basis for average flow used for design of collection system (check one or more):

Per Capita Contributions:	✓
Service Connections:	
Land Area and Use:	✓
Fixture Analysis:	

Odor Control

Odor Control is not necessary on this project as it is a gravity line and there will be no conditions where sewage is standing and will become septic.

Flow Calculation

Peaking Factor used for design: 2.5

Peaking Factor is based on: SAWS Specifications for peak dry weather flow (from SAWS USR 13.3.4)

Total EDUs = 158

1 EDU = 200 gallons per day (average sewage flow) = 500 gallons per day (peak flow)

Infiltration = 600 gallons per acre served

```
      Avg. Flow =
      158 EDUs x (200 gpd/EDU) + [(600 gpd/acre) x 27.34 acres] = 48,004 gpd =
      33.3

      gpm
      Peak Flow =
      158 EDUs x (500 gpd/EDU) + [(600 gpd/acre) x 27.34 acres] = 95,404 gpd =
      66.3

      gpm
```

Please note that capacities are determined using Manning's equation for pipes flowing full with an "n" value of 0.013. A reference for Manning's Equation can be found in "The Uni-Bell Handbook of PVC Pipe: Design and Construction".

Capacity Calculation

Characteristics of 8" ASTM 2241, Class 160, SDR 26, PVC Sewer Pipe: Nominal Size = 8" Outer Diameter $(D_o) = 8.625''$ Minimum Wall Thickness (t) = 0.332" Inner Diameter $(D_i) = 7.961"$ Manning's Equation: $Q = (k/n)(A)(R^{2/3})(S^{1/2})$ v = Q/AWhere: Q = Discharge (cfs)k = Constant [(1.49 ft^{1/3})/sec.] *n* = Manning's roughness coefficient (unitless) A = Flow area (ft²)R = Hydraulic Radius (ft) = A/P = Cross sectional area of flow (ft^2)/Wetted perimeter (ft.) S = Slope (ft/ft)v = Velocity of flow (ft/s)n = 0.013 [as required by 30 TAC 213.53 A(i)]

Calculations for 8" ASTM 2241, Class 160, SDR 26, PVC Sewer Pipe:

 $A = \pi (D_i^2)/4 = \pi (7.961 \text{ in})^2/4 = 49.76 \text{ in}^2 = 0.346 \text{ ft}^2$

 $P = \pi(D_i) = \pi(7.961 \text{ in}) = 25.01 \text{ in} = 2.08 \text{ ft}$

 $R = A/P = 0.35 ft^2/2.08 ft.=0.166 ft$

S = 0.004

 $Q = [(1.49 \, ft^{1/3}/sec)/0.013](0.346 \, ft^2)(0.166 \, ft)^{2/3}(0.004)^{1/2}$

 $Q = 0.756 \ cfs = 340 \ gpm = Q_{full}$

v ₌ 0.756 cfs/0.35 ft²=**2.19 ft/s**

Qmax = 0.756 cfs (0.90)(7.48 gallons/1 cf)(60 sec/1 min.)=305 gpm

Nominal Main Size (in)	Outer Diameter (in)	Minimum Slope (%)	Area (ft²)	Hydraulic Radius (A/P) ft	R ^{2/3}	S ^{1/2}	Q-Full (cfs)	Max Pipe (%)	Velocity (ft/s)	Q-Max (gpm)
8	8.625	0.40	0.346	0.166	0.30	0.063	0.756	90	2.19	305

Conclusion

The proposed 8" SDR 26 (Class 160) PVC with a minimum slope of 0.40% has sufficient capacity to convey the projected average and peak flows.

GENERAL STRUCTURAL COMPONENTS

Project Materials (Pipe and Joints):

Nominal Pipe Diameter (in)	Linear Feet	Pipe Material	National Standard Specification for Pipe Material	National Standard for Pipe Joints
8	5,505.82	PVC SDR 26	ASTM 2241, Class 160	ASTM D3139 ASTM C1173

Note: Section 217.53 (j)(4) requires a minimum pipe diameter of 6 inches for all gravity sanitary sewer collection system piping.

Watertight, size on size resilient connectors conforming to ASTM C-923 have been specified for connecting pipe to manholes. See SAWS Standard Specification for Construction Detail DD-852-01.

Where a collection system parallels a water supply pipe and a nine-foot separation distance cannot be achieved, Section 217.53 (d)(3)(A)(i) requires a collection system pipe be constructed of cast iron, ductile iron, or PVC meeting ASTM specifications with at least a 150 pounds per square inch (psi) rating for both the pipe and joints. The proposed project will comply with these requirements.

Where a collection system pipe crosses a water supply line and a nine-foot separation distance cannot be achieved, Section 217.53(d)(3)(B)(i) requires the collection system pipe be constructed of cast iron, ductile iron, or PVC with a minimum pressure rating of 150 psi. The proposed project will comply with this requirement and that of 217.53(d)(3)(B)(iii).

Project Materials (Bedding):

The specified bedding will comply with ASTM D2321-11 Class I, II or III for materials and densification. A minimum of 6 inches of bedding is required for all pipe.

Pipe Diameter (in)	Pipe Material	Bedding Class
8	PVC	Class I & Class III

The selection of bedding class is based on SAWS detail DD-804-01 for sanitary sewer pipe laid in a trench. Initial backfill for the pipe sizes shown above will be Class I. Secondary backfill will be Class III. See Table 2 of ASTM D2321-11 "Soil Classes" in Appendix A of this subsection.

Project Materials (Manholes):

Section 217.55 (f) prohibits the use of bricks to adjust a manhole cover to grade or construct a manhole. The proposed project will comply with this requirement.

The inside diameter of a manhole must be no less than 48 inches.

Section 217.55 (n) requires watertight, size-on-size resilient connectors that allow for differential settlement and must conform to American Society for Testing and Materials C-923. The proposed project complies with this requirement.

Under 30 TAC 213.5(C)(3)(A), all manholes over the Recharge Zone must be watertight, with watertight rings and covers. The proposed project complies with this requirement. The materials specified for manhole construction are **precast concrete**.

Project Materials (Manhole Covers):

Manhole covers must be constructed of impervious materials. If personnel entry is required, a minimum 30-inch diameter clear opening must be provided. Inclusion of steps in a manhole is prohibited. If a manhole must be located within a 100-year flood plain, then a means of preventing inflow is required. 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.

Under 30 TAC 213.5 (c)(3)(A), all manholes over the Edwards Aquifer Recharge Zone must be watertight, with watertight rings and covers. This proposed project complies with this requirement.

Minimum and Maximum Slopes

Note: All pipes are designed with a slope that will provide a velocity of at least 2 ft/s flowing full, as calculated using Manning's equation with an "n" value of 0.013. Additionally, the collection system is designed to ensure that, with pipes flowing full, the velocities will be less than 10 feet per second.

The following are the minimum and maximum slopes for each pipe diameter:Pipe Diameter:**8"**Min. Slope:**0.40%**Max. Slope:**5.00%**

Backfill

Note: The backfill will be free of stones greater than 6 inches in diameter and free of organic or any other unstable material. See SAWS Item No. 804 for additional specifications.

Trenching

Note: The trench width will be minimized while still allowing adequate width for proper compaction of backfill, and while still ensuring that at least 6 inches of backfill exists below and on each side of the pipe. The trench walls will be vertical to at least one foot above the pipe.

Trenching will occur over the Recharge Zone and will comply with 30 TAC 213.5.

Minimum and Maximum Trench Width

Based on SAWS Standard Drawing DD-804-01 and 30 TAC 217.54:

Pipe Diameter: <u>8"</u> Min. Trench Width: <u>23</u>" Max. Trench Width: <u>35"</u> These trench widths account for the bell diameter.

Corrosion Prevention

Proposed collection system components (pipes, manholes, etc.) will not be susceptible to deterioration through the corrosive effects of an anaerobic sewage environment. The interior of the manholes, however, are to be coated with a SAWS approved sewer structural coating per SAWS April 2014 Standard Specifications (Item No. 852, Section 852.3, Item 5). Epoxy coating specifically approved. The epoxy coating on the interior walls of the manhole provide interior corrosion protection.

Manholes (General)

Note: Manholes are provided at all changes in size, grade or alignment of pipe, at the intersection of all pipes and at the end of all lines that may be extended at a future date. A clean-out with watertight plugs may be installed instead of a manhole if no extensions are anticipated. Clean outs must pass all testing requirements outlined for gravity collection pipes.

Pipe Diameter (in)	Max. Manhole Spacing (ft)
6 - 15	500
18 - 30	800
36 - 48	1000
54 or larger	2000

The project complies with the maximum manhole spacing allowed by the TCEQ:

Manhole Spacing:

Pipe Diameter: <u>8"</u> Max. Spacing: <u>338.49 LF</u>

See SAWS Standard Specification in Appendix B for additional manhole specifications.

Manholes (Inverts)

The bottom of a manhole must contain a U-shaped channel, which is a smooth continuation of the inlet, and outlet pipes. The bench above the channel must be sloped a minimum of 0.5 inches per foot. See SAWS detail DD-852-01, which complies with these requirements. Note, 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.

Manholes (Ventilation)

Watertight manholes are proposed for this SCS; as a result, every third manhole will be vented. Vents will minimize inflow. Please see SAWS Detail DD-852-02.

FLEXIBLE PIPE COMPUTATIONS

Please note, all flexible pipe computations are based on engineering principles and practices for the design of buried PVC pipe systems. Equations used can be found in "The Uni-Bell PVC Pipe Association Handbook of PVC Pipe: Design and Construction". Please note, the equations used may be in a different format than

shown in the Uni-Bell Handbook. Throughout this application "160 psi" pipe refers to the pressure rating of the ASTM 2241, Class 160, SDR 26 pipe used throughout the SCS.

Live Load Calculations

Minimum burial depth without concrete encasement is seven (7) feet. Based on Table 6-6 Live Loads on PVC pipe (from Uni-Bell Handbook for PVC) for this sewer line would be 1.22 psi.

Buckling Pressure Calculations

This area of the Edwards Aquifer is unsaturated; consequently, there are no anticipated areas where sewer pipe will be placed below the water table. The value of hw=0 as there will be no height or time period of perched water or groundwater above the pipe crowns of the proposed sewer line.

The value of H for use in these calculations is twenty-three (23) feet as it exceeds the maximum burial depth for this line. The value of γ_s equals 143 pcf is a conservative value based on a dry unit weight of 135 pcf and a moisture content of 6%. This value is conservative as it corresponds to saturated unit weights of commonly used backfill materials. Please see information from Raba-Kistner provided in Appendix C.

Allowable Buckling Pressure:

 $\begin{aligned} q_a &= 0.4 * \sqrt{32 * R_w * B' * E_b * (E * I / D^3)} \\ q_a &= 0.4 * \sqrt{32 * 1 * 0.53 * 400 * (400,000 * .003 / 8.29^3)} \\ &= 47.66 \, psi \, (8'' \, PVC \, SDR \, 26, 160 psi \, @23') \\ q_a &= 0.4 * \sqrt{32 * 1 * 0.28 * 400 * (400,000 * .003 / 8.29^3)} \\ &= 34.90 \, psi \, (8'' \, PVC \, SDR \, 26, 160 psi \, @7') \end{aligned}$

 $R_w = 1 - 0.33 * (h_w/h)$ $R_w = 1 - 0.33 * (0/276) = 1$ Equation 2

Equation 1

$$B' = \frac{1}{1+4*e^{-.065*H}}$$
Equation 3

$$B' = \frac{1}{1+4*e^{-.065*23}} = 0.53 (SDR 26 @23')$$

$$B' = \frac{1}{1+4*e^{-.065*7}} = 0.28 (SDR 26 @7')$$

$$I = (t^3/12)*(inches^4/linear inch)$$
Equation 4

$$I = .332^3/12 = .003in^3 (8'' PVC SDR 26, 160psi)$$

$$D = D_o - t$$
Equation 5

$$D = 8.625 inches - 0.332 inches = 8.29 inches (8'' PVC SDR 26, 160psi)$$

Where:

- q_a = Allowable buckling pressure, pounds per square inch (psi)
- h = Height of soil surface above top of pipe in inches (in)
- h_w = Height of water surface above top of pipe in inches (in) (groundwater elevation)
- R_w = Water buoyancy factor. If hw = 0, Rw = 1. If $0 \le hw \le h$ (groundwater elevation is between the top of the pipe and the ground surface), calculate Rw with Equation 2
- H = Depth of burial in feet (ft) from ground surface to crown 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)
- Moment of inertia of the pipe wall cross section per linear inch of pipe, inch4/lineal inch = inch3. For solid wall pipe, "I" can be calculated with Equation 4
- t = Pipe structural wall thickness (in)
- D = Mean pipe diameter (in)
- D_o = Pipe outer diameter (in)

Pressure Under Installed Conditions

$$q_{p} = \gamma_{w}^{*} h_{w} + R_{w}^{*} (W_{c}/D) + L_{l}$$
Equation 6
$$q_{p} = 0.0361 * 0 + 1 * \left(\frac{59.96}{8.29}\right) + 1.22 = 8.45 \text{ psi} (8"PVC, SDR26, 160 \text{ psi} @ 7')$$

$$q_{p} = 0.0361 * 0 + 1 * \left(\frac{197.00}{8.29}\right) + 0 = 23.75 \text{ psi} (8"PVC, SDR26, 160 \text{ psi} @ 23')$$

Where:

- q_p = Pressure applied to pipe under installed conditions (psi)
- γ_w = 0.0361 pounds per cubic inch (pci), specific weight of water
- W_c = Vertical soil load on the pipe per unit length in pounds per linear inch (lb/in)

L_I = Live load (lbs)

$$W_{c} = \gamma_{s} * H * (D+t)/144$$
Equation 7
$$W_{c} = 143 * 7 * (8.29 + 0.332)/144 = 59.96 \ lb/in(8"PVC, SDR26, 160psi)$$

$$W_{c} = 143 * 23 * (8.29 + 0.332)/144 = 197.00 \ lb/in(8"PVC, SDR26, 160psi)$$

- γs = Specific weight of soil in pounds per cubic foot (pcf)
- D = Mean pipe diameter (in)

Pipe Diameter: <u>8" (160 psi)</u> Pipe Material: <u>PVC, SDR 26</u>	<u>5</u> qa: <u>34.90</u>	qբ: <u>8.45</u>
Pipe Diameter: <u>8" (160 psi)</u> Pipe Material: <u>PVC, SDR 26</u>	<u>5</u> q _a : <u>47.66</u>	q _p : <u>23.75</u>

Since $q_a \ge q_p$, the specific pipe is acceptable for the proposed installation.

Wall Crushing Calculations

No portion of the proposed SCS is located in the 5-year floodplain.

$$H = (24 * P_c * A)/(\gamma_s * D_o)$$
 (Equation 8)

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 $A = t(in) \times 12(in/ft)$ (Equation 9) $H = \frac{(24^{*}4,000^{*}3.984)}{143^{*}8.625} = 310.10 \ ft \ (8"PVC, SDR26, 160 psi)$

$$A = 0.332(in) \times 12(in/ft) = 3.984 in^2/ft$$

D_o = outside pipe diameter, 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 [conversion factor of 12 applied to change from ft. to in.]

24 = conversions and coefficients

Installation Temperature Effects

Flexible pipe will be installed under favorable ambient conditions, per pipe manufacturer's specifications.

Tensile Strength

The information below is from "The Uni-Bell Handbook of PVC Pipe: Design and Construction" Table 2.1 pages 14-15. This applies to all PVC SDR-26 pipe.

Pipe Material: <u>PVC SDR 26</u>	Tensile Strength: 7,000	Cell Class (PVC only) <u>12454</u>
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Strain

The conditions of this installation are such that strain-related failure will not be a problem. Strain is generally not a performance-limiting factor for buried PVC pipe or a design-limiting criterion for PVC pipes according to the Uni-Bell Handbook of PVC Pipe (Chapter VII, Pages 255 and 257). As pipe deflection will be below 5%, strain-related failure is not anticipated.

Modulus of Soil Reaction

The modulus of soil reaction for the bedding material, E_b, is <u>400 psi</u>.

This value was determined using the "Table 1: Soil Classification Chart" and "Table 2: Soil Classes" from ASTM D2321-11 and "Average Values of Modulus of Soil Reaction, E" Table 7.3 from "The Uni-Bell Handbook of PVC Pipe: Design and Construction" attached in Appendix A of this subsection. Based on SAWS detail DD-804-01, Class III material was chosen. As the secondary backfill (Class III) has a lower Modulus of Soil Reaction than initial backfill (Class I), its value was used in the calculations that follow. Class III on Table 2 corresponds to coarse-grained soils with fines (GM, GC, SM or SC) and sandy or gravelly fine-grained soils (CL or ML). On Table 7.3, coarse-grained soils with fines at a slight compaction have an E' equal to 400 psi.

The modulus of soil reaction for the in-situ soil, E'n, is 3,000 psi

This value was determined using the "Table 1: Soil Classification Chart" and "Table 2: Soil Classes" from ASTM D 2321-11 and "Average Values of Modulus of Soil Reaction, E" Table 7.3 from "The Uni-Bell Handbook of PVC Pipe: Design and Construction" attached in Appendix A of this subsection. Based on SAWS detail DD-804-01, Class I material was chosen, which includes crushed rock as shown on Table 2. Compacted crushed rock on Table 7.3 has an E' equal to 3,000 psi. Values in Table 7.3 are based on empirical data and derived from laboratory and field tests for buried pipe.

Bedding to in-situ soil modulus of soil reaction ratio = $E_b/E'_n = \frac{400 \text{ psi/3,000 psi} = 0.13}{100 \text{ psi}}$

Zeta Calculation

Where native soil is significantly weaker than bedding material, or where predicted deflection approaches 5%, the effect of native soil must be quantified using Leonhardt's Zeta factor. If the ration of bedding modulus to soil modulus is not equal to 1.0, a zeta factor must be calculated by using the equations below, where zeta is a factor, which corrects for the effect of in-situ soil on pipe stability (Uni-Bell Handbook of

Pipe, page 267). To calculate zeta, directly use the formulas below. The calculations that are done to determine the zeta factors for the different pipe diameters must be included with this submittal.

$$zeta = \frac{1.44}{f + (1.44 - f)^* (E_b / E_{n'})}$$
(Equation 9)
$$zeta = \frac{1.44}{1.22 + (1.44 - 1.22)^* 0.13} = 1.15(8"PVC SDR 26,160 psi)$$

$$f = \frac{b/d_a - 1}{1.154 + 0.444^* (b/d_a - 1)}$$
(Equation 10)
$$f = \frac{35/8.625 - 1}{1.154 + 0.444^* (35/8.625 - 1)} = 1.22(8"PVC, SDR 26,160 psi)$$

Where:

- f = Pipe/trench width coefficient
- b = Trench width (in)
- d_a = Pipe diameter (in)
- E_b = Modulus of soil reaction for the bedding material (psi)
- E'_n = Modulus of soil reaction for the in-situ soil (psi)

Pipe Diameter: **8" (160 psi, SDR 26)** Trench Width: **35"** Zeta: **1.15**

Pipe Stiffness

Ps is based on National Reference Standards and manufacturer's data. Please see Table 7.1 of the "The Uni-Bell Handbook of PVC Pipe: Design and Construction" listing the pipe stiffness of 8" PVC SDR 26 as 115 psi for E = 400,000 psi.

Pipe Diameter: <u>8"</u> Pipe Material: <u>PVC SDR 26</u> Ps: <u>115 psi</u>

Deflection

Maximum allowable deflection in installed lines is 5% (per 30 TAC 217), as determined by the deflection analysis and verified by a mandrel test. It is recommended that the percent of vertical deflection is below this range; however, a 7.5% deflection limit (recommended by ASTM D3034) provides a conservative factor of safety against structural failure (Handbook of PVC Pipe, page 249).

Note: Per Table 7.2 attached in Appendix A of the SCS Application, K = 0.096 when the bedding angle is 90 degrees. A bedding angle of 90 degrees is required as shown on SAWS detail DD-804-01.

$$\Delta Y/D(\%) = \frac{K^*(L_p + L_1)^* 100}{(0.149^* P_s) + (0.061^* zeta^* E_b)}$$
(Equation 11)

$$\frac{\Delta Y}{D(\%)} = \frac{(0.096)(6.95 + 1.22) * 100}{(0.149 * 115) + (0.061 * 1.15 * 400)} = 1.74\% \ (8"PVC, SDR \ 26 \ @ \ 7')$$

 $\frac{\Delta Y}{D(\%)} = \frac{(0.096)(22.84+0)*100}{(0.149*115) + (0.061*1.15*400)} = 4.85\% (8"160 \text{ psi}, \text{SDR 26} @ 23')$

$$L_{p} = \frac{\gamma_{s} * H}{144}$$
(Equation 12)
$$L_{p} = \frac{143 * 7}{144} = 6.95 \text{ psi}$$

$$L_{p} = \frac{143 * 23}{144} = 22.84 \text{ psi}$$

 $\Delta Y/D$ = Predicted % vertical deflection under load

 ΔY = Change in vertical pipe diameter under load

D = Undeflected mean pipe diameter (in)


BROOK STONE CREEK-UNIT 2E Engineering Design Report 8" PVC SDR 26

- K = Bedding angle constant
- γ_s = Unit weight of soil (pcf)
- H = Depth of burial (ft) from ground surface to crown of pipe
- L_p = Prism load (psi)

Type of Pipe Material	P₅ (psi)	Zeta Factor Assumed or Calculated	E₅ (psi)	% Deflection
8" PVC SDR 26	115	1.15	400	4.85

All pipes proposed for this project have a maximum predicted deflection below 5.0%

Signature, Seal and Date of the Texas Professional Engineer Below:



APPENDIX A



January 14, 2009

Raba-Kistner Consultants, Inc. 12821 W. Golden Lane P.O. Box 690287, San Antonio, TX 78269-0287 (210) 699-9090 • FAX (210) 699-6426 www.rkci.com

Charles P. "Frosty" Forster, P.E., P.G. Pape Dawson Engineers 555 East Ramsey San Antonio, Texas 78216

RE: Soil Unit Weight Values for Backfill Materials Various Projects San Antonio, Texas

Dear Mr. Forster:

Raba-Kistner Consultants Inc. (R-K) is pleased to submit this letter providing general guidance for selecting design soil unit weights for use in utility trench design.

In general, the following table contains a list of the frequently used trench backfill materials in the San Antonio area. The table also contains approximate values for the soil dry unit weight, moist unit weight and saturated unit weight for these materials assuming 90 to 95 percent compaction utilizing a standard Proctor (ASTM D 698.)

MATERIAL DESCRIPTION	DRY UNIT WEIGHT, PCF	MOIST UNIT WEIGHT, PCF	SATURATED UNIT WEIGHT, PCF
TxDOT TEX-113E Type A, Gr. 1 or 2	130	137	143
TxDOT TEX-113E Type A, Gr. 3 thru 5	128	135	143
Limestone Millings	115	124	134
Gravelly Clay	110	120	132
Clay	100	120	127
Clayey Sand	95	106	123
Gravel (Clean)	115	120	134
Sand (Clean)	92	98	120
Pit Run Gravel	127	137	142

We appreciate the opportunity to be of service to you. If you have any questions or need additional assistance, please call.

Very truly yours, **RABA-KISTNER CONSU** Chris L. Schultz, P. Senior Vice Preside CLS/mem

SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

TABLE 1 Soil Classification Chart (see Classification D2487)	
--	--

	Criteria for Assigning Group Symi	bols and Group Names	s Using Laboratory Tests ⁴	1633-8837	S	oil Classification
					Group Symbol	Group Name ^B
Coarse-Grained Soils	Gravels	Clean gravels	$C \ge 4$ and $1 \le Cc \le 3^C$		GW	Well-graded gravel ^D
More than 50% M retained on No. 200 of sieve N	More than 50% of coarse fraction retained on No. 4 sieve	Less than 5% of fines ^E	Cu < 4 and/or 1> Cc>3 ^c		GP	Poorly graded gravel ⁰
		Gravels with	Fines classify as ML or MH		GM	Silty gravel ^{DFG}
		more than 12% fines [∉]	Fines classify as CL or CH		GC	Clayey gravel ^{org}
	Sands	Clean sands	$Cu \ge 6$ and $1 \le Cc \le 3^{\circ}$		SW	Well-graded sand ^H
	50% or more of coarse fraction passes on No. 4 sieve	Less than 5% fines′	Cu < 6 and/or 1 > Cc > 3 ^c		SP	Poorly graded sand ^H
		Sand with fines	Fines classify as ML or MH		SM	Silty sand ^{FGH}
	2. 2	More than 12% fines [/]	Fines classify as CL or CH		SC	Clayey sand ^{FGH}
Fine-Grained Solls	Silts and clays	Inorganic	PI > 7 and plots on or above "A" line		CL	Lean clay ^{KLM}
50% or more passes the No. 200 Sieve	Liquid limit less than 50		PI < 4 and plots below "A" line ³		ML	siit ^{ĸ⊥}
	-	Organic	Liquid Limit-Oven dried	<0.75	OL	Organic clay ^{KLMN}
			Liquid Limit-Not dried	-		Organic silt ^{KLMO}
	Silts and clays	Inorganic	PI plots on or above "A" line	185 193	СН	Fat clay ^{KLM}
2	Liquid limit 50 or more		Plots below "A" line		МН	Elastic silt ^{KLM}
		Organic	Liquid Limit-Oven Dried	<0.75	ОН	Organic clayKLMP
		· · · · · · · · · · · · · · · · · · ·	Liquid Limit-Not Dried	 .		Organic silt ^{KLMQ}
Highly organic solls	Primarily organic matter, dark in c	olor, and organic odor			PT	peat

A Based on the material passing the 3-in. (75-mm) sieve.

^e If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Cu = D₆₀ / D₁₀

 $Cc = \frac{\left(D_{30}\right)^2}{D_{10} x D_{60}}$

^D If soil contains ≥15 % sand, add "with sand" to group name.

^E Gravels with 5 to 12 % fines require dual symbols:

GW-GM well-graded gravel with silt:

GW-GC well-graded gravel with clay

GP-GM poorly graded gravel with silt

GP-GC poorly graded gravel with clay ^F If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^G If fines are organic, add "with organic fines" to group name.

^{*H*} If soil contains \geq 15 % gravel, add "with gravel" to group name. 'Sands with 5 to 12 % fines require dual symbols:

SW-SM well graded sand with silt

SW-SC well-graded sand with clay

SP-SM poorly graded sand with silt

SP-SC poorly graded sand with clay

^J If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay (see Test Method D4318).

K If soil contains 15 to 29 % plus No. 200, add "with sand" or "with gravel", whichever is predominant.

^L If soil contains ≥ 30 % plus No. 200, predominantly sand, add "sandy" to group name.

^M If soil contains ≥ 30 % plus No. 200, predominantly gravel, add "gravelly" to group name.

^N PI \geq 4 and plots on or above "A" line.

° PI < 4 or plots below "A" line.

P PI plots on or above "A" line.

^o Pl plots below "A" line.

SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

	And a second	
Soil Group ^{A,B}	Soil Class	American Association of State Highway and Transportation Officials (AASHTO) Soil Groups ^C
Crushed rock, angular D , 100% passing 1-1/2 in. sieve, =15 %<br passing #4 sieve, = 25 % passing 3/8<br in. sieve and = 12 % passing #200<br sieve	Class I	
Clean, coarse grained soils: SW, SP, GW, GP or any soil beginning with one of these symbols with = 12<br % passing #200 sieve ^{E,F}	Class II	A1, A3
Coarse grained soils with fines: GM, GC, SM, SC or any soil beginning with one of these symbols, containing > 12 % passing #200 sieve; Sandy or gravelly fine-grained soils: CL, ML, or any soil beginning with one of these symbols, with >/= 30 % retained on #200 sieve	Class III	A-2-4, A-2-5, A-2-6, or A-4 or A-6 soils with more than 30% retained on #200 sieve
Fine-grained soils: CL, ML, or any soil beginning with one of these symbols, with <30 % retained on #200 sieve	Class IV	A-2-7, or A-4, or A-6 soils with 30% or less retained on #200 sieve
MH, CH, OL, OH, PT	Class V Not for use as embedment	A5, A7
• **		

TABLE 2 Soil Classes

^A See Classification D2487, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

^B Limits may be imposed on the soil group to meet project or local requirements if the specified soil remains within the group. For example, some project applications require a Class I material with minimal fines to address specific structural or hydraulic conditions and the specification may read "Use Class I soil with a maximum of 5% passing the #200 sieve." ^c AASHTO M145, Classification of Soils and Soil Aggregate Mixtures.

^D All particle face shall be fractured.

^E Materials such as broken coral, shells, and recycled concrete, with ≤ = 12% passing a No. 200 sieve, are considered to be Class II materials. These materials should only be used when evaluated and approved by the Engineer.

F Uniform fine sands (SP) with more than 50% passing a No. 100 sieve (0.006 in., 0.15 mm) are very sensitive to moisture and should not be used as backfill unless specifically allowed in the contract documents. If use of these materials is allowed, compaction and handling procedures should follow the guidelines for Class III materials.

SOIL CLASSIFICATION CHART

From ASTM D2321-11: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

TABLE 3 Recommendations for Installation and Use of Soils and Aggregates for Foundation and Pipe-Zone Embedment

Soil Class ⁴	Class I [#]	Class II	Class III	Class IV
General Recommendations and Restrictions	Acceptable and common where no migration is probable or when combined with a geotextile filter media. Suitable for use as a drainage blanket and under drain where adjacent material is suitably graded or when used with a geotextile filter fabric (see X1.8).	Where hydraulic gradient exists check gradation to minimize migration. Clean groups are suitable for use as a drainage blanket and underdrain (see Table 2). Uniform fine sands (SP) with more than 50 % passing a #100 sieve (0.006 in., 0.15 mm) behave like silts and should be treated as Class IV soils.	Do nót use where water conditions in trench prevent proper placement and compaction. Not recommended for use with pipes with stiffness of 9 psi or less.	Difficult to achieve high-soil stiffness. Do not use where water conditions in trench prevent proper placement and compaction. Not recommended for use with pipes with stiffness of 9 psi or less.
Foundation	Suitable as foundation and for replacing over-excavated and unstable trench bottom as restricted above.	Suitable as foundation and for replacing over-excavated and unstable trench bottom as restricted above. Install and compact in 12 in. (300 mm) maximum layers.	Suitable for replacing over- excavated trench bottom as restricted above. Install and compact in 6 in. (150 mm) maximum layers.	Suitable for replacing over- excavated trench bottom as restricted above. Install and compact in 6-in (150 mm) maximum layers.
Pipe Embedment	Suitable as restricted above. Work material under pipe to provide uniform haunch support.	Suitable as restricted above. Work material under pipe to provide uniform haunch support.	Suitable as restricted above. Difficult to place and compact in the haunch zone.	Suitable as restricted above. Difficult to place and compact in the haunch zone.
Embedment Compaction: Min Recommended Percent Compaction, SPD ^p	See Note ^o	85 % (SW and SP soils) For GW and GP soils See Note [∉]	90 %	95 %
Relative Compactive Effort Required to Achieve Minimum Percent Compaction	Low	Moderate	High	Very high
Compaction Methods	Vibration or impact	Vibration or impact	Impact	Impact
Required Moisture Control	None	None	Maintain near optimum to minimize compactive effort	Maintain near optimum to minimize compactive effort

^A Class V materials are unsuitable as embedment. They may be used as final backfill as permitted by the engineer.

а Class I materials have higher stiffness than Class II materials, but data on specific soll stiffness of placed, uncompacted Class I materials can be taken equivalent to Class II materials compacted to 95% of maximum standard Proctor density (SPD95), and the soil stiffness of compacted Class I materials can be taken equivalent to Class II materials compacted to 100% of maximum standard Proctor density (SPD90). Even if placed uncompacted (that is, dumped), Class I materials should always be worked into the haunch zone to assure completed placement. ^c Suitable compaction typically achieved by dumped placement (that is, uncompacted but worked into haunch zone to ensure complete placement).

^D SPD is standard Proctor density as determined by Test Method D698.

^E Place and compact GW and GP soils with at least two passes of compaction equipment.

TABLE 6.6 LIVE LOADS ON PVC PIPE From Uni-Bell Handbook of PVC Pipe: Design and Construction, Fourth Edition (2001)

Height	Live Load Transferred to Pipe, lb/in ²			Height	Live	Load Transferred to F	Pipe, lb/in ²
of Cover (ft)	Highway H20 ¹	Railway E80 ²	Airport 3	of Cover (ft)	Highway H20 ¹	Railway E80 ²	Airport 3
1	12.50	26 30	13 14	14	*	4.17	3.06
3	4.17	23.61 18.40	12.28	18	*	2.78	1.91 1.53
5	1.74	16.67 15.63	10.09	22 24	*	1.91	1.14
7	1.22	12.15	7.85	26	*	1.39	*
10 12	*	7.64	6.09	30	*	0.69	*
12		5.50	4.70	40	*	*	*

 Simulates 20 ton truck traffic + impact (Source: ASTM A 796)
 Simulates 80,000 lb/ft railway load + impact (Source: ASTM A 796)
 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.

FIGURE 7.4 BEDDING ANGLE From Uni-Bell Handbook of PVC Pipe: Design and Construction, Fourth Edition (2001)



TABLE 7.1PVC PIPE STIFFNESS (psi)

<u>DR or SDR</u>	<u>Min. E = 400,000 psi</u>	<u>Min. E = 500,000 psi</u>
64	7	9
51	14	18
42	26	32
41	28	35
35	46	57
33.5	52	65
32.5	57	71
28	91	114
26	115	144
25	129	161
21	224	279
18	364	455
17	437	546
14	815	1,019
13.5	916	1,145

TABLE 7.2VALUES OF BEDDING CONSTANT, K

BEDDING ANGLE (DEGREES)	K
0	0.110
30	0.108
45	0.105
60	0.102
90	0.096
120	0.090
180	0.083

TABLE 7.3

AVERAGE VALUES OF MODULUS OF SOIL REACTION, E' (For Initial Flexible Pipe Deflection) From Uni-Bell Handbook of PVC Pipe: Design and Construction, Fourth Edition (2001)

		~~~~		162
9.9954.0002000994.948 - 20120.0793.547950	E' for De	gree of Comj n pounds per	paction of Be square inch	dding,
		Slight, < 85%	Moderate, 85%-95%	High, >95%
•		Proctor,	Proctor,	Proctor,
¥1		<40%	40%-70%	>70%
Soil type-pipe bedding material		relative	relative	relative
(Unified Classification System ^a )	Dumped	density	density	density
(1)	(2)	(3)	(4)	(5)
Fine-grained Soils (LL>50) ^b	200 P .			
Soils with medium to high plasticity,	No dat	a available; o	consult a com	petent
CH, MH, CH-MH	SOILS	engineer; Otl	nerwise use E	/ = 0
Fine-grained Soils (LL<50)				
Solis with medium to no plasticity, CL,				
with ress than 25% coarse-	50	200	400	1 000
graineu particies	- 30	200	400	1,000
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL, with more than 25% coarse-grained particles Coarse-grained Soils with Fines GM, GC, SM, SC ^e contains more than 12% fines	100	400	1,000	2,000
Coarse-grained Soils with Little or no Fines GW, GP, SW, SP ^c contains less than 12% fines	200	1,000	2,000	3,000
Crushed Rock	1,000	3,000	3,000	3,000
Accuracy in Terms of Percentage Deflection ^d	+ 2	+2	+1	+0.5
^a ASTM Designation D 2487, USBR Designation	n E-3.		L	

 $^{\circ}LL = Liquid limit.$ 

°Or any borderline soil beginning with one of these symbols (i.e. GM-GC, GC-SC).

^dFor  $\pm$  1% accuracy and predicted deflection of 3%, actual deflection would be between 2% and 4%

Note: Values applicable only for fills less than 50 ft (15 m). Table does not include any safety factor. For use in predicting initial deflections only, appropriate Deflection Lag Factor must be applied for long-term deflections. If bedding falls on the borderline between two compaction categories, select lower E' value or average the two values. Percentage Proctor based on laboratory maximum dry density from test standards using about 12,500 ft-lb/cu ft (598,000 J/m³) (ASTM D 698, AASHTO T-99, USBR Designation E-11). 1 psi = 6.9 kPa.

SOURCE: "Soil Reaction for Buried Flexible Pipe" by Amster K. Howard, U.S. Bureau of Reclamation, Denver, Colorado. Reprinted with permission from American Society of Civil Engineers.

# **APPENDIX B**

# 30 TAC 217 regulations will apply where more stringent than the following SAWS Specifications

Specification 852: Sanitary Sewer Manholes

https://apps.saws.org/business_center/specs/constspecs/docs/conspecs_2021/ITEM%20NO.%20 852%20Sanitary%20Sewer%20Manholes.pdf

Specification 854: Sanitary Sewer Laterals https://apps.saws.org/business_center/specs/constspecs/docs/conspecs_2021/ITEM%20NO.%20 854%20Sanitary%20Sewer%20Laterals.pdf

Specification 804: Excavation, Trenching and Backfill https://apps.saws.org/business_center/specs/constspecs/docs/conspecs_2021/ITEM%20NO.%20 804%20Excavation%20Trenching%20and%20Backfill.pdf



# **APPENDIX C**

# PRE-CAST MANHOLE DRAWINGS & SPECIFICATIONS























ecast Manholes						
Torque Clamp Bolt to 60 tb/in Single Clamp	Sier Tor All C Clamp to 50	Que Que Dater Bolts Ib/in	Mul	Sten Ty Torqu All Inne Clamp Bo to 60 ib/ Sten tiple Cl	amps	Sten Three Re-torque All Clamp Bolts to 60 (b/In
, s		In	strue	<u>ctions</u>		
	1. Clean pipe	and boot to	ensure	a no dirt (	or foreign	materials are present
الدوم وا	2. Clamping s	urface on pip	be mu:	st be clea	in and sm	ooth.
Jinita_	3. Center pipe inside plane	in opening a of the man	and in: Iole,	sert until	plpe is at	east equal to the
	4. Attach take- the groove c Make sure e	up clamps(s If the gasket ach clamp is	) and : so tha : comp	stagger s at take-up pletely in	crew(s) of pressure the correc	i clamps(s) around will be equalized. t groove.
	<ol> <li>Using a torq of clamp(s) it</li> </ol>	ue ratchet or n an alternat	torqu Ing pa	e wrench Itern to 6	, graduali 0 lbs/in to	y lighten all screw(s) rque.
	<ol> <li>After reachin to ensure equilation</li> </ol>	g 60 ibs/in to Jal compress	ion of	on final s all ciam	crew, <u>che</u> 25.	ok all screws again
	<ol> <li>If system is to following all r manufacturer ASTM C-1244</li> </ol>	be tested, i ecommenda Vacuum te 1.	esting tions a sting a	i shall be Ind requi shall be c	complete rements o conducted	d prior to backfilling. f lhe lest system in accordance with
	<ol> <li>Adjust pipe to and technique</li> </ol>	line and gra is so that pip	de, U e delli	se prope ection an	r bedding, d deforme	backfill materials ton is minimized.
	9. Any pipe stub from movement	s installed in nt.	the m	anhole m	iust be po	sitively restrained
	10. Vacuum testi	ng after bac	dill voi	ids warra	nty.	
	For more infor	mation cor	itact j	yor loca	il Hansoi	n Representative.
°∎2 27						
: 						2 8
Pipe to Manhole Con		PLANT	STATE	SECTOR, PAG	DATE	***
I STATE AND A STAT		2			-	
	ecast Manholes	ecast Manholes	ecast Manholes	ecast Manholes         Torque Clamp Boilt 160 Ib/in         Single Clamp         Single Clamp         Unit         Clean pipe and boot to ensure (Clamp Boilt)         Single Clamp         Unit         Clean pipe and boot to ensure (Clamping surface on pipe multi inside plane of the manhole.         Clean pipe and boot to ensure (Clamping surface on pipe multi inside plane of the manhole.         Clean pipe and boot to ensure (Clamping surface on pipe multi inside plane of the manhole.         Clean pipe and boot to ensure (Clamping surface on pipe multi inside plane of the manhole.         Clean pipe and boot to ensure (Cleanping surface on pipe multi inside plane of the manhole.         Clean pipe and boot to ensure (Cleanpips) in an alternating pa (Cleanpips) in an alternat	Caset Manholes         Torque Clamp Boit 0 60 to/in         Single Clamp         Single Clamp         Clamp Boit 0 60 to/in         Single Clamp         Clamp Boit 0 60 to/in         Single Clamp         Clamp Boit 0 60 to/in         Clamp Boit 0 60 to/in         Single Clamp         Clamp Boit 0 60 to/in         Clamp Boit 0 for 0 for gasket so that take- Make sure each clamp Is completely in Make sure each clamp Is completely in Clamp Boit 0 to/in torque on final st to ensure equal compression of all clamp 0 for clamp(5) in an alternating pattern to 6 0 for ensure equal compression of all clamp 0 for clamp(5) in an alternating shall be of soft C-1244.         Adjust pipe to line and grade. Use prope and techniques so that pipe deflection an 0 Any pipe stubs installed in the manhole m from movement.         Claup tipe to line and grade. Use prope and techniques so that pipe deflection an 0 Any pipe stubs installed in the manhole m from movement.         Claup tipe to line and grade. Use prope and techniques so that pipe deflection an 0 for movement.         Claup tipe to line and grade. Use prope and techniques so that pipe deflecti	ecast Manholes         Torque Single Clamp         Single Clamp       Single Clamp         Single Clamp         Single Clamp       Single Clamp         Clamp Bait 560 Ib/In         Single Clamp       Single Clamp         Multiple Clamps         Single Clamp         Clamp Bait 560 Ib/In         Single Clamp         Single Clamp         Single Clamp         Clamp Bait 500 Ib/In         Clamp Bait 500 Ib/In         Clamp Bait 500 Ib/In         Clamp Bait 500 Ib/In         Single Clamp         Single Clamp         Multiple Clamps         Single Clamp         Clean pipe and boat to ensure no dirt or foreign in solde plane of the manhole.         Clean pipe and boat to ensure no dirt or foreign in solde plane of the gasket so that take-up pressure solde the grouper back in the cleanp(s) in an alternating pattern to 60 Ibs/In to cleanp(s) and techniquees so I



# TEMPORARY STORMWATER SECTION (TCEQ-0602)

## **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: Becky Carroll, P.E.

Date: _____9/12/2024

Signature of Customer/Agent:

Regulated Entity Name: Brook Stone Creek-Unit 2E

### **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: <u>Construction</u> <u>Staging Areas</u>

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.

TCEQ-0602 (Rev. 02-11-15)

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: <u>Upper Salado Creek</u>

### **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. X 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:

	<ul> <li>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.</li> <li>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.</li> <li>A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.</li> <li>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.</li> </ul>
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.
	<ul> <li>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.</li> <li>There will be no temporary sealing of naturally-occurring sensitive features on the site.</li> </ul>
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:
	<ul> <li>For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.</li> <li>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.</li> <li>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.</li> <li>There are no areas greater than 10 acres within a common drainage area that will be used in combination with other reosion and sediment controls within each 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</li> </ul>

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.  $\square$  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.

# ATTACHMENT A

### BROOK STONE CREEK-UNIT 2E Sewage Collection System Plan

### Attachment A – Spill Response Actions

In the event of an accidental leak or spill:

- Spill must be contained and cleaned up immediately.
- Spills will not be merely buried or washed with water.
- Contractor shall take action to contain spill. Contractor may use sand or other absorbent material stockpiled on site to absorb spill. Absorbent material should be spread over the spill area to absorb the spilled product.
- In the event of an uncontained discharge the contractor shall utilize onsite equipment to construct berms downgradient of the spill with sand or other absorbent material to contain and absorb the spilled product.
- Spill containment/absorbent materials along with impacted media must be collected and stored in such a way so as not to continue to affect additional media (soil/water). Once the spill has been contained, collected material should be placed on poly or plastic sheeting until removed from the site. The impacted media and cleanup materials should be covered with plastic sheeting and the edges weighed down with paving bricks or other similarly dense objects as the material is being accumulated. This will prevent the impacted media and cleanup materials from becoming airborne in windy conditions or impacting runoff during a rain event. The stockpiled materials should not be located within an area of concentrated runoff such as along a curb line or within a swale.
- Contaminated soils and cleanup materials will be sampled for waste characterization. When the analysis results are known the contaminated soils and cleanup materials will be removed from the site and disposed in a permitted landfill in accordance with applicable regulations.
- The contractor will be required to notify the owner, who will in turn contact TCEQ to notify them in the event of a significant hazardous/reportable quantity spill. Additional notifications as required by the type and amount of spill will be conducted by owner or owner's representative.

In the event of an accidental significant or hazardous spill:

- The contractor will be required to report significant or hazardous spills in reportable quantities to:
  - 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.
  - 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.
  - Notification should first be made by telephone and followed up with a written report.



### BROOK STONE CREEK-UNIT 2E Sewage Collection System Plan

- 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.
- Other agencies which may need to be consulted include, but are not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.
- Contaminated soils will be sampled for waste characterization. When the analysis results are known the contaminated soils will be removed from the site and disposed in a permitted landfill in accordance with applicable regulations.

Additional guidance can be obtained from TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) Section 1.4.16. Contractor shall review this section.

# **ATTACHMENT B**
**Preventative Measure** 

**Potential Source** 

**Potential Source** 

**Preventive Measure** 

**Preventive Measure** 

#### Attachment B – Potential Sources of Contamination

Other potential sources of contamination during construction include:

- Potential Source Asphalt products used on this project.
- Preventative Measure After placement of asphalt, emulsion or coatings, the contractor will be responsible for immediate cleanup should an unexpected rain occur. For the duration of the asphalt product curing time, the contractor will maintain standby personnel and equipment to contain any asphalt wash-off should an unexpected rain occur. The contractor will be instructed not to place asphalt products on the ground within 48 hours of a forecasted rain. Oil. grease, fuel and hydraulic fluid
  - Oil, grease, fuel and hydraulic fluid contamination from construction equipment and vehicle dripping.
    - Vehicle maintenance when possible will be performed within the construction staging area.
      - Construction vehicles and equipment shall be checked regularly for leaks and repaired immediately.
  - Potential Source Accidental leaks or spills of oil, petroleum products and substances listed under 40 CFR parts 110, 117, and 302 used or stored temporarily on site.
- Preventative Measure Contractor to incorporate into regular safety meetings, a discussion of spill prevention and appropriate disposal procedures.
  - Contractor's superintendent or representative overseer shall enforce proper spill prevention and control measures.
  - Hazardous materials and wastes shall be stored in covered containers and protected from vandalism.

A stockpile of spill cleanup materials shall be stored on site where it will be readily accessible.

- Miscellaneous trash and litter from construction workers and material wrappings.
- Trash containers will be placed throughout the site to encourage proper trash disposal.
- Construction debris.
- Construction debris will be monitored daily by contractor. Debris will be collected weekly and placed in disposal bins. Situations requiring

Potential Source

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Preventative Measure

immediate attention will be addressed on a case by case basis.

- Spills/Overflow of waste from portable toilets
- Portable toilets will be placed away from high traffic vehicular areas and storm drain inlets.
- Portable toilets will be placed on a level ground surface.
- Portable toilets will be inspected regularly for leaks and will be serviced and sanitized at time intervals that will maintain sanitary conditions.

### ATTACHMENT C

#### Attachment C – Sequence of Major Activities

The sequence of major activities which disturb soil during construction on this site will be divided into two stages. The first is site preparation that will include installation of TBMPs as shown on Exhibit 1 and clearing and grubbing of vegetation where applicable. This will disturb approximately 12.52 acres as identified by the fifty-foot (50') SCS envelope shown on the plans.

The second phase will include trenching, installation of sewer mains and manholes, backfilling, and site cleanup, including removal of excess material. This will disturb approximately 12.52 acres as identified by the fifty-foot (50') SCS envelope shown on the plans.



### ATTACHMENT D

#### Attachment D – Temporary Best Management Practices and Measures

a. 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.

Developed upgradient areas will cross the limits of the proposed sewer line. All TBMPs provided are adequate for the drainage areas served.

b. 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.

Site preparation, which is the initiation of all activity on the project, will disturb the largest amount of soil. Therefore, before any of this work can begin, the clearing and grading contractor will be responsible for the installation of all on-site control measures. The methodology for pollution prevention of on-site stormwater will include: (1) erection of silt fences along the downgradient boundary of construction activities for temporary erosion and sedimentation controls, (2) installation of rock berms with silt fencing downgradient from areas of concentrated stormwater flow for temporary erosion control, (3) installation of stabilized construction entrance/exit(s) to reduce the dispersion of sediment from the site, and (4) installation of construction staging area(s).

Prior to the initiation of construction, all previously installed control measures will be repaired or reestablished for their designed or intended purpose. This work, which is the remainder of all activity on the project, may also disturb additional soil. The construction contractor will be responsible for the installation of all remaining on-site control measures that includes installation of the concrete truck washout pit(s), as construction phasing warrants.

Temporary measures are intended to provide a method of slowing the flow of runoff from the construction site in order to allow sediment and suspended solids to settle out of the runoff. By containing the sediment and solids within the site, they will not enter surface streams and/or sensitive features.

c. A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.

Temporary measures are intended to provide a method of slowing the flow of runoff from the construction site in order to allow sediment and suspended solids to settle out of the runoff. By containing the sediment and solids within the site, they will not enter surface streams and/or sensitive features.



d. 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.

There were no naturally-occurring geological sensitive features identified in the Geologic Assessment within the SCS envelope.



### ATTACHMENT F

#### Attachment F – Structural Practices

The following structural measures will be installed prior to the initiation of site preparation activities:

- Erection of silt fences along the downgradient boundary of construction activities and rock berms with silt fence for secondary protection, as located on Exhibit 1 and illustrated in Exhibit 2.
- Installation of stabilized construction entrance/exit(s) and construction staging area(s), as located on Exhibit 1, and illustrated on Exhibit 2.

The following structural measures will be installed at the initiation of construction activities or as appropriate based on the construction sequencing:

• Installation of concrete truck washout pit(s), as required and located on Exhibit 1 and illustrated on Exhibit 2.



### ATTACHMENT G

#### <u>Attachment G – Drainage Area Map</u>

No more than ten (10) acres will be disturbed within a common drainage area at one time as construction of civil infrastructure (utilities, roads, drainage, etc.) will precede home building construction. All TBMPs utilized are adequate for the drainage areas served.



### **ATTACHMENT I**

#### INSPECTIONS

Designated and qualified person(s) shall inspect Pollution Control Measures weekly and within 24 hours after a storm event. An inspection report that summarizes the scope of the inspection, names and qualifications of personnel conducting the inspection, date of the inspection, major observations, and actions taken as a result of the inspection shall be recorded and maintained as part of Storm Water TPDES data for a period of three years after the Notice of Termination (NOT) has been filed. A copy of the Inspection Report Form is provided in this Storm Water Pollution Prevention Plan.

As a minimum, the inspector shall observe: (1) significant disturbed areas for evidence of erosion, (2) storage areas for evidence of leakage from the exposed stored materials, (3) structural controls (rock berm outlets, silt fences, drainage swales, etc.) for evidence of failure or excess siltation (over 6 inches deep), (4) vehicle exit point for evidence of off-site sediment tracking, (5) vehicle storage areas for signs of leaking equipment or spills, (6) concrete truck rinse-out pit for signs of potential failure, (7) embankment, spillways, and outlet of sediment basin (where applicable) for erosion damage, and (8) sediment basins (where applicable) for evidence that basin has accumulated 50% of its volume in silt. Deficiencies noted during the inspection will be corrected and documented within seven calendar days following the inspection or before the next anticipated storm event if practicable.

Contractor shall review Sections 1.3 and 1.4 of TCEQ's Technical Guidance Manual for additional BMP inspection and maintenance requirements.



Pollution	. <u>e</u>	Corrective Action Required						
Prevention Measure	Inspected Compliance	Description (use additional sheet if necessary)	Date Completed					
Best Management Practices								
Natural vegetation buffer strips								
Temporary vegetation								
Permanent vegetation								
Sediment control basin								
Silt fences								
Rock berms								
Gravel filter bags								
Drain inlet protection								
Other structural controls								
Vehicle exits (off-site tracking)								
Material storage areas (leakage)								
Equipment areas (leaks, spills)								
Concrete washout pit (leaks, failure)								
General site cleanliness								
Trash receptacles								
Evidence of Erosion								
Site preparation								
Roadway or parking lot construction								
Utility construction								
Drainage construction								
Building construction								
Major Observations								
Sediment discharges from site								
BMPs requiring maintenance								
BMPs requiring modification								
Additional BMPs required								

#### _ A brief statement describing the qualifications of the inspector is included in this SWP3.

"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's Signature

Date

#### **PROJECT MILESTONE DATES**

Date when	maior	site	grading	activities	begin:
Dute when	major	Site	Sidding	activities	DCSIII.

Construction Activity	Date
Installation of BMPs	
Dates when construction activities temporarily or perman	nently cease on all or a portion of the project:
Construction Activity	Date
Dates when stabilization measures are initiated:	
Stabilization Activity	Date
Removal of BMPs	

### **ATTACHMENT J**

#### Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices

Interim on-site stabilization measures, which are continuous, will include minimizing soil disturbances by exposing the smallest practical area of land required for the shortest period of time and maximizing use of natural vegetation. As soon as practical, all disturbed soil will be stabilized as per project specifications in accordance with pages 1-35 to 1-60 of TCEQ's Technical Guidance Manual (TGM) RG-348 (2005). Mulching, netting, erosion blankets and seeding are acceptable.

Stabilization measures will be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and except as provided below, will be initiated no more than fourteen (14) days after the construction activity in that portion of the site has temporarily or permanently ceased. 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 site. In 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 practicable.



# AGENT AUTHORIZATION FORM (TCEQ-0599)

#### Agent Authorization Form

For Required Signature Edwards Aquifer Protection Program Relating to 30 TAC Chapter 213 Effective June 1, 1999

I	Leslie Ostrander	
	Print Name	,
	Assistant Secretary	
	Title - Owner/President/Other	
of	Continental Homes of Texas, L.P.	,
	Corporation/Partnership/Entity Name	
have authorized	Pape-Dawson Engineers	
	Print Name of Agent/Engineer	
of	Pape-Dawson Engineers	
	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

THE STATE OF Web §

County of Breac §

BEFORE ME, the undersigned authority, on this day personally appeared <u>Leven Leven L</u>

GIVEN under my hand and seal of office on thist day of And and seal of office on thist day of And

Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 4-2-27



# APPLICATION FEE FORM (TCEQ-0574)

### **Application Fee Form**

Texas Commission on Environmental Quality										
Name of Proposed Regulated Entity: Brook Stone Creek-Unit 2E										
Regulated Entity Location: Approx. 0.4 miles southwest of Evans Road and Esperanza Way										
Name of Customer: Continental Homes of Texas, L.P.										
Contact Person: Leslie Ostrander Phone: (210) 496-2668										
Customer Reference Number (if issued):CN <u>601213523</u>										
<b>Regulated Entity Reference Numb</b>	er (if issued):RN <u>111218</u>	<u>178</u>								
Austin Regional Office (3373)										
Hays Travis Williamson										
San Antonio Regional Office (336	2)									
🖂 Bexar	Medina	□ Uva	lde							
Comal	Kinney									
Application fees must be paid by o	check. certified check. or	money order, payable	e to the <b>Texas</b>							
Commission on Environmental O	uality. Your canceled ch	eck will serve as your	receipt. This							
form must be submitted with you	<b>Ir fee payment</b> . This pay	vment is being submit	ted to:							
Auctin Regional Office	⊠ sa	n Antonio Pogional Of	fico							
Mailed to: TCEO - Cashier		ernight Delivery to: T	FO - Cashier							
	12	100 Derly 25 Circle	LQ - Cashiel							
Revenues Section	12	100 Park 35 Circle								
	Bu	ilding A, 3rd Floor								
P.U. BOX 13088	AU	stin, IX 78753								
Austin, 1X /8/11-3088	(5)	12)239-0357								
Site Location (Check All That App	ly):									
Recharge Zone	Contributing Zone	🗌 Transiti	on Zone							
Type of Pla	an	Size	Fee Due							
Water Pollution Abatement Plan	, Contributing Zone									
Plan: One Single Family Resident	ial Dwelling	Acres	\$							
Water Pollution Abatement Plan	, Contributing Zone									
Plan: Multiple Single Family Resid	dential and Parks	Acres	\$							
Water Pollution Abatement Plan	, Contributing Zone									
Plan: Non-residential		Acres	\$							
Sewage Collection System	5,505.82 L.F.	\$ 2,752.91								
Lift Stations without sewer lines	Acres	\$								
Underground or Aboveground St	Tanks	\$								
Piping System(s)(only)	Each	\$								
Exception		Each	\$							
Extension of Time		Each	\$							
	Signat	ure:								

#### 9/12/2024

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 Area in	
Project	Acres	Fee
One Single Family Residential Dwelling	< 5	\$650
Multiple Single Family Residential and Parks	< 5	\$1,500
	5 < 10	\$3,000
	10 < 40	\$4,000
	40 < 100	\$6 <i>,</i> 500
	100 < 500	\$8,000
	≥ 500	\$10,000
Non-residential (Commercial, industrial,	< 1	\$3,000
institutional, multi-family residential, schools, and	1 < 5	\$4,000
other sites where regulated activities will occur)	5 < 10	\$5 <i>,</i> 000
	10 < 40	\$6 <i>,</i> 500
	40 < 100	\$8,000
	≥ 100	\$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

#### Extension of Time Requests

Project	Fee
Extension of Time Request	\$150

# CORE DATA FORM (TCEQ-10400)



### **TCEQ Core Data Form**

For detailed instructions regarding completion of this form, please read the Core Data Form Instructions or call 512-239-5175.

#### **SECTION I: General Information**

	1. 000	ei ui imioi n	interon											
1. Reason fo	or Submis	<b>sion</b> (If other is c	hecked pleas	e desci	ribe in s	space	provid	ed.)						
🖂 New Per	mit, Regis	tration or Author	ization (Core	Data Fo	orm sho	ould be	e subm	nitted w	ith the p	rogram ap	plicatio	n.)		
Renewal (Core Data Form should be submitted with the renewal form)							Other							
2. Customer	Referenc	e Number <i>(if iss</i>	sued)	Follow	w this lin	<u>ik to se</u>	arch	3. Re	3. Regulated Entity Reference Number (if issued)					
CN 601213523				tor CN or RN numbers in Central Registry**			RN	1112	18178					
ECTION	II: Cu	stomer Info	ormation	ı										
4. General Co	ustomer li	nformation	5. Effective	e Date f	for Cus	stome	r Infor	mation	Updat	<b>es</b> (mm/do	l/yyyy)			
New Cust	omer Legal Nar	ne (Verifiable wit	h the Texas S	Update Secreta	e to Cus ry of St	stomer ate or	Inform Texas	nation Compt	roller of	Cha Public Ac	ange in counts)	Regulated E	Entity Ownership	
The Custo	mer Nan	ne submitted	here may	be up	dated	auto	mati	cally l	based	on what	t is cu	rrent and	active with th	e
Texas Sec	retary of	f State (SOS)	or Texas C	Compt	troller	of P	ublic	Acco	unts (	CPA).				
6. Customer	Legal Nar	<b>ne</b> (If an individua	l, print last nam	ne first: e	eg: Doe,	John)		<u>lf</u>	new Cu	stomer, en	ter previ	ous Custom	er below:	
Continenta	al Home	es of Texas, I	L.P.											
7. TX SOS/CI	PA Filing	Number	8. TX State	Tax ID (11 digits)			9	9. Federal Tax ID (9 digits) 10.			10. DUN	S Number (if applica	able)	
								7	74-2791904					
11. Type of C	Sustomer:	Corporat	ion	🗌 Individual				Partnership:  General  Limited						
Government:	City 🗌 🕻	County 🔲 Federal [	] State 🗌 Othe	Sole Proprietors			torship	orship 🔲 Other:						
12. Number of	of Employ	ees	_				13. Independently Owned and Operated?							
0-20	21-100	101-250	251-500	) 501 and higher					Ves No					
14. Custome	<b>r Role</b> (Pro	posed or Actual) -	- as it relates to	o the Re	gulated	Entity I	isted or	n this fo	rm. Plea	se check or	ne of the i	following		
Owner		Opera	tor		0	wner 8	& Oper	ator						
	nal License	ee 🗌 Respo	onsible Party			oluntar	y Clea	inup Ap	plicant	Ot	her:			
	5419 N	North Loop 1	604 East											
15. Mailing Address:														
/10010001	City	San Antoni	0	S	State TX			ZIP	<b>v</b> 78247		ZIP + 4			
16. Country Mailing Information (if outside USA)						17. E	. E-Mail Address (if applicable)							
			lkostra			strander@drhorton.com								
18. Telephon	e Numbei	•		19. Extension or Code				20. Fax Number (if applicable)						
(210)49	6-2668			( )				-						

#### **SECTION III: Regulated Entity Information**

**21. General Regulated Entity Information** (If 'New Regulated Entity" is selected below this form should be accompanied by a permit application)

 New Regulated Entity
 Update to Regulated Entity Name

 Update to Regulated Entity
 Update to Regulated Entity Name

The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency 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.)

Brook Stone Creek-Unit 2E

	NI/A										
23. Street Address of	1N/A										
the Regulated Entity: (No PO Boxes)											
	City		State			ZIP			ZIP	+ 4	
24. County	Bexar										
Enter Physical Location Description if no street address is provided.											
25. Description to Physical Location: 0.40 miles southwest of Evans Road and Esperanza Way Intersection											
26. Nearest City State Nearest ZIP Co						rest ZIP Code					
San Antonio TX											
<b>27. Latitude (N) In Decimal:</b> 29.642778			28. Longitude (W) In		N) In D	ecimal: -98.389444		14			
Degrees	Minutes		Seconds		Degrees Minutes			Seconds			
29		38	34		98		23			22	
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)						CS Code					
1623				237110							
33. What is the Primary Business of this entity? (Do not repeat the SIC or NAICS description.)											
Sewage Collection	System	for single-fa	mily residentia	al su	bdivisi	ion					
	5419 North Loop 1604 East										
34. Mailing											
Address:	City	San Anton	io State		ТΧ	ZIP		78247	ZIP	+ 4	
35. E-Mail Address: LKOstrander@drhorton.com											
36. Telepho	er	37. Extension or Code			3	38. Fax Number (if applicable)					
( 210 ) 496-2668								(	) -		

**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 Revie		OSSF 0	Petroleum Storage Tank	PWS	
Sludge	Storm Water	Title V Air	Tires	Used Oil	
□ Voluntary Cleanup □ Waste Water □		Wastewater Agriculture	Water Rights	Other:	

#### **SECTION IV: Preparer Information**

40. Name: Seth Sepulveda, E.I.T.				41. Title:	Engineer IV
42. Tele	phone Number	43. Ext./Code	44. Fax Number	45. E-Mail	Address
(210)	375-9000		(210)375-9010	ssepulve	da@pape-dawson.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:	Pape-Dawson Engineers Job Title: Vice Pres				sident		
Name (In Print):	Becky Carroll, P.E.			Phone:	( 210 ) 375- <b>9000</b>		
Signature:				Date:	9/12/2024		

# FINAL PLAN AND PROFILE SHEETS



Sep 11, 2024, 11:59am User ID: ssepulveda P:\120\93\11\Desian\Exhibits\SCS\TM120931'



DIVERSION RIDGE >2% GRADE ROAD DIVERSION RIDGE -GEOTEXTILE FABRIC T FOTEXTILE FABRIC TO STABILIZE FOUNDATION STABILIZE FOUNDATION 4" TO 8" COARSE_ AGGREGATE SCHEMATIC OF TEMPORARY SECTION "A-A" OF A CONSTRUCTION ENTRANCE/EXIT CONSTRUCTION ENTRANCE/EXI MATERIALS COMMON TROUBLE POINTS THE AGGREGATE SHOULD CONSIST OF 4-INCH TO 8-INCH WASHED STONE 1. INADEQUATE RUNOFF CONTROL-SEDIMENT WASHES ONTO PUBLIC ROAD. OVER A STABLE FOUNDATION AS SPECIFIED IN THE PLAN. . STONE TOO SMALL OR GEOTEXTILE FABRIC ABSENT, RESULTS IN MUDDY CONDITION AS STONE IS PRESSED INTO SOIL. 2. THE AGGREGATE SHOULD BE PLACED WITH A MINIMUM THICKNESS OF 8-INCHES. PAD TOO SHORT FOR HEAVY CONSTRUCTION TRAFFIC-EXTEND PAD BEYOND 3. THE GEOTEXTILE FABRIC SHOULD BE DESIGNED SPECIFICALLY FOR USE AS THE MINIMUM 50-FOOT LENGTH AS NECESSARY. A SOIL FILTRATION MEDIA WITH AN APPROXIMATE WEIGHT OF 6 OZ/YD², A 4. PAD NOT FLARED SUFFICIENTLY AT ROAD SURFACE, RESULTS IN MUD BEING MULLEN BURST RATING OF 140 LB/IN², AND AN EQUIVALENT OPENING SIZE TRACKED ON TO ROAD AND POSSIBLE DAMAGE TO ROAD. GREATER THAN A NUMBER 50 SIEVE 5. UNSTABLE FOUNDATION - USE GEOTEXTILE FABRIC UNDER PAD AND/OR 4. IF A WASHING FACILITY IS REQUIRED, A LEVEL AREA WITH A MINIMUM OF IMPROVE FOUNDATION DRAINAGE. 4-INCH DIAMETER WASHED STONE OR COMMERCIAL ROCK SHOULD BE INCLUDED IN THE PLANS. DIVERT WASTEWATER TO A SEDIMENT TRAP O BASIN. INSPECTION AND MAINTENANCE GUIDELINES THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL INSTALLATION PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS . AVOID CURVES ON PUBLIC ROADS AND STEEP SLOPES. REMOVE VEGETATION AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES AREA. GRADE CROWN FOUNDATION FOR POSITIVE DRAINAGE. USED TO TRAP SEDIMENT 2. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC THE MINIMUM WIDTH OF THE ENTRANCE/EXIT SHOULD BE 12 FEET OR THE RIGHTS-OF-WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR. FULL WIDTH OF EXIT ROADWAY, WHICHEVER IS GREATER. 3. THE CONSTRUCTION ENTRANCE SHOULD BE AT LEAST 50 FEET LONG. 3. WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY. 4. IF THE SLOPE TOWARD THE ROAD EXCEEDS 2%, CONSTRUCT A RIDGE 4. WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED 6-INCHES TO 8-INCHES HIGH WITH 3:1 (H:V) SIDE SLOPES, ACROSS THE WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR FOUNDATION APPROXIMATELY 15 FEET FROM THE ENTRANCE TO DIVERT RUNOFF AWAY FROM THE PUBLIC ROAD. SEDIMENT BASIN. 5. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, 5. PLACE GEOTEXTILE FABRIC AND GRADE FOUNDATION TO IMPROVE STABILITY, DITCH OR WATER COURSE BY USING APPROVED METHODS. ESPECIALLY WHERE WET CONDITIONS ARE ANTICIPATED. 6. PLACE STONE TO DIMENSIONS AND GRADE SHOWN ON PLANS. LEAVE SURFACE SMOOTH AND SLOPE FOR DRAINAGE. 7. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE STONE PAD TO A SEDIMENT TRAP OR BASIN. 8. INSTALL PIPE UNDER PAD AS NEEDED TO MAINTAIN PROPER PUBLIC ROAD DRAINAGE STABILIZED CONSTRUCTION ENTRANCE/EXIT DETAIL NOT-TO-SCALE HOOTS OR GRASS BLADES. GRASS SHOULD BE GREEN AND HEALTHY: MOWED AT A 2"-3" CUTTING HEIGHT - THATCH- GRASS CLIPPINGS AND CORRECT DEAD LEAVES, UP TO 1/2" THICK LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER <u>ROOT ZONE</u>— SOIL AND ROOTS SHOULD BE 1/2"-3/4" THICK, WITH DO NOT LEAVE SPACES AND DO NOT DENSE ROOT MAT FOR STRENGTH. OVERLAP. A SHARPENED MASON'S TROWEL IS A HANDY TOOL FOR TUCKING DOWN THE APPEARANCE OF GOOD SOD ENDS AND TRIMMING PIECES. INCORRECT - ANGLED ENDS CAUSED BY THE ROLL SOD IMMEDIATELY TO ACHIEVE FIRM CONTACT WITH THE AUTOMATIC SOD CUTTER MUST BE MATCHED SOIL. SOD INSTALLATION CORRECTLY. 2. WATER TO A DEPTH OF 4" AS NEEDED. WATER WELL AS SOON AS THE SOD IS LAID. 3. MOW WHEN THE SOD IS ESTABLISHED - IN 2-3 WEEKS. SET THE MOWER HIGH  $(2^{\circ}-3^{\circ})$ . LAY SOD ACROSS THE DIRECTION OF FLOW PEG OR STAPLE USE PEGS OR STAPLES TO FASTEN SOD FIRMLY - AT THE ENDS OF STRIPS AND IN THE CENTER, OR EVERY 3-4 FEET IF THE STRIPS ARE LONG. WHEN READY TO MOW, DRIVE PEGS OR STAPLES FLUSH IN CRITICAL AREAS, SECURE SOD WITH THE GROUND. WITH NETTING. USE STAPLES. MATERIALS GENERAL INSTALLATION (VA. DEPT. OF 1. SOD SHOULD BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4" INCH CONSERVATION, 1992 (± 1/4" INCH) AT THE TIME OF CUTTING. THIS THICKNESS SHOULD EXCLUDE SOD SHOULD NOT BE CUT OR LAID IN EXCESSIVELY WET OR DRY WEATHER. SHOOT GROWTH AND THATCH. SOD ALSO SHOULD NOT BE LAID ON SOIL SURFACES THAT ARE FROZEN. 2. PIECES OF SOD SHOULD BE CUT TO THE SUPPLIER'S STANDARD WIDTH AND 2. DURING PERIODS OF HIGH TEMPERATURE, THE SOIL SHOULD BE LIGHTLY LENGTH, WITH A MAXIMUM ALLOWABLE DEVIATION IN ANY DIMENSION OF 5%. IRRIGATED IMMEDIATELY PRIOR TO LAYING THE SOD, TO COOL THE SOIL AND TORN OR UNEVEN PADS SHOULD NOT BE ACCEPTABLE. REDUCE ROOT BURNING AND DIEBACK. 3. STANDARD SIZE SECTIONS OF SOD SHOULD BE STRONG ENOUGH TO THE FIRST ROW OF SOD SHOULD BE LAID IN A STRAIGHT LINE WITH SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUBSEQUENT ROWS PLACED PARALLEL TO AND BUTTING TIGHTLY AGAINST EACH SUSPENDED FROM A FIRM GRASP ON ONE END OF THE SECTION OTHER. LATERAL JOINTS SHOULD BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. CARE SHOULD BE EXERCISED TO ENSURE THAT SOD 4. SOD SHOULD BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT OF 36 HOURS. IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE DRYING OF THE ROOTS (SEE FIGURE ABOVE). 4. ON SLOPES 3:1 OR GREATER, OR WHEREVER EROSION MAY BE A PROBLEM SITE PREPARATION SOD SHOULD BE LAID WITH STAGGERED JOINTS AND SECURED BY STAPLING OR OTHER APPROVED METHODS. SOD SHOULD BE INSTALLED WITH THE LENGTH . PRIOR TO SOIL PREPARATION, AREAS TO BE SODDED SHOULD BE BROUGHT PERPENDICULAR TO THE SLOPE (ON CONTOUR). TO FINAL GRADE IN ACCORDANCE WITH THE APPROVED PLAN. THE SURFACE SHOULD BE CLEARED OF ALL TRASH, DEBRIS AND OF ALL 5. AS SODDING OF CLEARLY DEFINED AREAS IS COMPLETED, SOD SHOULD BE ROOTS, BRUSH, WIRE, GRADE STAKES AND OTHER OBJECTS THAT WOULD ROLLED OR TAMPED TO PROVIDE FIRM CONTACT BETWEEN ROOTS AND SOIL. INTERFERE WITH PLANTING, FERTILIZING OR MAINTENANCE OPERATIONS. . AFTER ROLLING, SOD SHOULD BE IRRIGATED TO A DEPTH SUFFICIENT THAT THE UNDERSIDE OF THE SOD PAD AND THE SOIL 4 INCHES BELOW THE SOD IS 3. FERTILIZE ACCORDING TO SOIL TESTS. FERTILIZER NEEDS CAN BE THOROUGHLY WET. DETERMINED BY A SOIL TESTING LABORATORY OR REGIONAL RECOMMENDATIONS CAN BE MADE BY COUNTY AGRICULTURAL EXTENSION AGENTS. FERTILIZE SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 3 INCHES WITH A DISC, UNTIL SUCH TIME A GOOD ROOT SYSTEM BECOMES DEVELOPED, IN THE ABSENCE OF ADEQUATE RAINFALL, WATERING SHOULD BE PERFORMED AS SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT. ON SLOPING LAND, THE OFTEN AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF AT LEAST 4 FINAL HARROWING OR DISCING OPERATION SHOULD BE ON THE CONTOUR.

INSTALLATION IN CHANNELS

SOD STRIPS IN WATERWAYS SHOULD BE LAID PERPENDICULAR TO THE DIRECTION OF FLOW. CARE SHOULD BE TAKEN TO BUTT ENDS OF STRIPS TIGHTLY (SEE FIGURE ABOVE).

2. AFTER ROLLING OR TAMPING, SOD SHOULD BE PEGGED OR STAPLED TO RESIST WASHOUT DURING THE ESTABLISHMENT PERIOD. MESH OR OTHER NETTING MAY BE PEGGED OVER THE SOD FOR EXTRA PROTECTION IN CRITICAL AREAS.

INSPECTION AND MAINTENANCE GUIDELINES SOD SHOULD BE INSPECTED WEEKLY AND AFTER EACH RAIN EVENT TO LOCATE AND REPAIR ANY DAMAGE.

8. THE FIRST MOWING SHOULD NOT BE ATTEMPTED UNTIL THE SOD IS FIRMLY

ROOTED, USUALLY 2-3 WEEKS. NOT MORE THAN ONE THIRD OF THE GRASS

LEAF SHOULD BE REMOVED AT ANY ONE CUTTING.

2. DAMAGE FROM STORMS OR NORMAL CONSTRUCTION ACTIVITIES SUCH AS TIRE RUTS OR DISTURBANCE OF SWALE STABILIZATION SHOULD BE REPAIRED AS SOON AS PRACTICAL.

IS DOCUMENT HAS BEEN PRODUCED FROM MATERIAL THAT WAS STORED AND/OR TRANSMITTED ELECTRONICALLY AND MAY HAVE BEEN INADVERTENTLY ALTERED. RELY ONLY ON FINAL HARDCOPY MATERIALS BEARING THE CONSULTANT'S ORIGINAL SIGNATURE AND SEAL. AERIAL IMAGERY PROVIDED BY GOOGLE UNLESS OTHERWISE NOTED. Imagery © 2016, CAPCOG, Digital Globe, Texas Orthoimagery Program, USDA Farm Service Agency.

SOD INSTALLATION DETAIL

INCHES.



ISOMETRIC PLAN VIEW



### SECTION "A-A"

#### ROCK BERMS

THE PURPOSE OF A ROCK BERM IS TO SERVE AS A CHECK DAM IN AREAS OF CONCENTRATED FLOW. TO INTERCEPT SEDIMENT-LADEN RUNOFF. DETAIN THE SEDIMENT AND RELEASE THE WATER IN SHEET FLOW. THE ROCK BERM SHOULD BE USED WHEN THE CONTRIBUTING DRAINAGE AREA IS LESS THAN 5 ACRES. ROCK BERMS ARE USED IN AREAS WHERE THE VOLUME OF RUNOFF IS TOO GREAT FOR A SILT FENCE TO CONTAIN. THEY ARE LESS EFFECTIVE FOR SEDIMENT REMOVAL THAN SILT FENCES, PARTICULARLY FOR FINE PARTICLES, BUT ARE ABLE TO WITHSTAND HIGHER FLOWS THAN A SILT FENCE. AS SUCH, ROCK BERMS ARE OFTEN USED IN AREAS OF CHANNEL FLOWS DITCHES, GULLIES, ETC.). ROCK BERMS ARE MOST EFFECTIVE AT REDUCING BED LOAD IN CHANNELS AND SHOULD NOT BE SUBSTITUTED FOR OTHER EROSION AND SEDIMENT CONTROL MEASURES FARTHER UP THE WATERSHED.

#### NSPECTION AND MAINTENANCE GUIDELINES

. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL BY THE RESPONSIBLE PARTY. FOR INSTALLATIONS IN STREAMBEDS, ADDITIONAL DAILY INSPECTIONS SHOULD BE MADE.

. REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6 INCHES AND DISPOSE OF THE ACCUMULATED SILT IN AN APPROVED MANNER THAT WILL NOT CAUSE ANY ADDITIONAL SILTATION. 3. REPAIR ANY LOOSE WIRE SHEATHING.

4. THE BERM SHOULD BE RESHAPED AS NEEDED DURING INSPECTION

. THE BERM SHOULD BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

6. THE ROCK BERM SHOULD BE LEFT IN PLACE UNTIL ALL UPSTREAM AREAS ARE STABILIZED AND ACCUMULATED SILT REMOVED.

#### MATERIALS

#### THE BERM STRUCTURE SHOULD BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM OPENING OF 1 INCH AND A MINIMUM WIRE DIAMETER OF 20 GAUGE GALVANIZED AND SHOULD BE SECURED WITH SHOAT RINGS.

2. CLEAN, OPEN GRADED 3-INCH TO 5-INCH DIAMETER ROCK SHOULD BE USED, EXCEPT IN AREAS WHERE HIGH VELOCITIES OR LARGE VOLUMES OF FLOW ARE EXPECTED, WHERE 5-INCH TO 8-INCH DIAMETER ROCKS MAY BE USED.

#### NSTALLATION

LAY OUT THE WOVEN WIRE SHEATHING PERPENDICULAR TO THE FLOW LINE. THE SHEATHING SHOULD BE 20 GAUGE WOVEN WIRE MESH WITH 1 INCH OPENINGS.

2. BERM SHOULD HAVE A TOP WIDTH OF 2 FEET MINIMUM WITH SIDE SLOPES BEING 2:1 (H:V) OR FLATTER. 5. PLACE THE ROCK ALONG THE SHEATHING AS SHOWN IN THE DIAGRAM TO

A HEIGHT NOT LESS THAN 18" 4. WRAP THE WIRE SHEATHING AROUND THE ROCK AND SECURE WITH TIE

WIRE SO THAT THE ENDS OF THE SHEATHING OVERLAP AT LEAST 2 INCHES. AND THE BERM RETAINS ITS SHAPE WHEN WALKED UPON.

5. BERM SHOULD BE BUILT ALONG THE CONTOUR AT ZERO PERCENT GRADE OR AS NEAR AS POSSIBLE

6. THE ENDS OF THE BERM SHOULD BE TIED INTO EXISTING UPSLOPE GRADE AND THE BERM SHOULD BE BURIED IN A TRENCH APPROXIMATELY 3 TO 4 INCHES DEEP TO PREVENT FAILURE OF THE CONTROL.

#### COMMON TROUBLE POINTS

INSUFFICIENT BERM HEIGHT OR LENGTH (RUNOFF QUICKLY ESCAPES OVER THE TOP OR AROUND THE SIDES OF BERM).

2. BERM NOT INSTALLED PERPENDICULAR TO FLOW LINE (RUNOFF ESCAPING AROUND ONE SIDE).







#### SILT FENCE

A SILT FENCE IS A BARRIER CONSISTING OF GEOTEXTILE FABRIC SUPPORTED BY METAL POSTS TO PREVENT SOIL AND SEDIMENT LOSS FROM A SITE. WHEN PROPERLY USED. SILT FENCES CAN BE HIGHLY EFFECTIVE AT CONTROLLING SEDIMENT FROM DISTURBED AREAS. THEY CAUSE RUNOFF TO POND, ALLOWING HEAVIER SOLIDS TO SETTLE OUT. IF NOT PROPERLY INSTALLED, SILT FENCES ARE NOT LIKELY TO BE EFFECTIVE.

THE PURPOSE OF A SILT FENCE IS TO INTERCEPT AND DETAIN WATER-BORN SEDIMENT FROM UNPROTECTED AREAS OF A LIMITED EXTENT. SILT FENCE IS USED DURING THE PERIOD OF CONSTRUCTION NEAR THE PERIMETER OF A DISTURBED AREA TO INTERCEPT SEDIMENT WHILE ALLOWING WATER TO PERCOLATE THROUGH. THIS FENCE SHOULD REMAIN IN PLACE UNTIL THE DISTURBED AREA IS PERMANENTLY STABILIZED. SILT FENCE SHOULD NOT BE USED WHERE THERE IS A CONCENTRATION OF WATER IN A CHANNEL OR DRAINAGE WAY. IF CONCENTRATED FLOW OCCURS AFTER INSTALLATION, CORRECTIVE ACTION MUST BE TAKEN SUCH AS PLACING A ROCK BERM IN THE AREAS OF CONCENTRATED FLOW.

SILT FENCING WITHIN THE SITE MAY BE TEMPORARILY MOVED DURING THE DAY TO ALLOW CONSTRUCTION ACTIVITY PROVIDED IT IS REPLACED AND PROPERLY ANCHORED TO THE GROUND AT THE END OF THE DAY. SILT FENCES ON THE PERIMETER OF THE SITE OR AROUND DRAINAGE WAYS SHOULD NOT BE MOVED AT ANY TIME.

#### MATERIALS

. SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE, OR POLYAMIDE WOVEN OR NONWOVEN FABRIC. THE FABRIC SHOULD BE 36 INCHES, WITH A MINIMUM UNIT WEIGHT OF 4.5 OZ/YD, MULLEN BURST STRENGTH EXCEEDING 190 LB/IN2, ULTRAVIOLET STABILITY EXCEEDING 70%, AND MINIMUM APPARENT OPENING SIZE OF U.S. SIEVE NUMBER 30.

. FENCE POSTS SHOULD BE MADE OF HOT ROLLED STEEL, AT LEAST 4 FEET LONG WITH TEE OR Y-BAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM WEIGHT 1.25 LB/FT, AND BRINDELL HARDNESS EXCEEDING 140.

3. WOVEN WIRE BACKING TO SUPPORT THE FABRIC SHOULD BE GALVANIZED 2" X 4" WELDED WIRE, 12 GAUGE MINIMUM.

#### INSTALLATION

. STEEL POSTS, WHICH SUPPORT THE SILT FENCE, SHOULD BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POSTS MUST BE EMBEDDED A MINIMUM OF 1-FOOT DEEP AND SPACED NOT MORE THAN 8 FEET ON CENTER. WHERE WATER CONCENTRATES, THE MAXIMUM SPACING SHOULD BE 6 FEET.

. LAY OUT FENCING DOWN-SLOPE OF DISTURBED AREA, FOLLOWING THE CONTOUR AS CLOSELY AS POSSIBLE. THE FENCE SHOULD BE SITED SO THAT THE MAXIMUM DRAINAGE AREA IS 1/4 ACRE/100 FEET OF FENCE.

3. THE TOE OF THE SILT FENCE SHOULD BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWN-SLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G., PAVEMENT OR ROCK OUTCROP), WEIGHT FABRIC FLAP WITH 3 INCHES OF PEA GRAVEL ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.

4. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST. THERE SHOULD BE A 3-FOOT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET

6. SILT FENCE SHOULD BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

#### COMMON TROUBLE POINTS FENCE NOT INSTALLED ALONG THE CONTOUR CAUSING WATER TO

CONCENTRATE AND FLOW OVER THE FENCE. 2. FABRIC NOT SEATED SECURELY TO GROUND (RUNOFF PASSING UNDER

FENCE). 3. FENCE NOT INSTALLED PERPENDICULAR TO FLOW LINE (RUNOFF ESCAPING

AROUND SIDES

4. FENCE TREATING TOO LARGE AN AREA, OR EXCESSIVE CHANNEL FLOW (RUNOFF OVERTOPS OR COLLAPSES FENCE).

#### INSPECTION AND MAINTENANCE GUIDELINES 1. INSPECT ALL FENCING WEEKLY, AND AFTER RAINFALL.

2. REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES.

3. REPLACE TORN FABRIC OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE TORN SECTION.

4. REPLACE OR REPAIR SECTIONS CRUSHED OR COLLAPSED IN THE COURSE OF CONSTRUCTION ACTIVITY. IF A SECTION OF FENCE IS OBSTRUCTING VEHICULAR ACCESS, CONSIDER RELOCATING IT TO A SPOT WHERE IT WILL PROVIDE EQUAL PROTECTION, BUT WILL NOT OBSTRUCT VEHICLES. A TRIANGULAR FILTER DIKE MAY BE PREFERABLE TO A SILT FENCE AT COMMON VEHICLE ACCESS POINTS.

WHEN CONSTRUCTION IS COMPLETE, THE SEDIMENT SHOULD BE DISPOSED OF IN A MANNER THAT WILL NOT CAUSE ADDITIONAL SILTATION AND THE PRIOR LOCATION OF THE SILT FENCE SHOULD BE REVEGETATED. THE FENCE ITSELF SHOULD BE DISPOSED OF IN AN APPROVED LANDFILL





SAND BAGS (TYP.)

FROM STORM WATER RUNOFF.

# MATERIALS

MAINTENANCE

BACKFILLED AND REPAIRED.

SILT FENCE DETAIL

NOT-TO-SCALE



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#### **TCEQ - ORGANIZED SEWAGE** COLLECTION SYSTEM GENERAL CONSTRUCTION NOTES

- 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.
- 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 I 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.
- 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.
- 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.
- 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.
- 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.
- SEWER LINES LOCATED WITHIN OR CROSSING THE 5-YEAR FLOODPLAIN OF DRAINAGE WAY WILL BE PROTECTED FROM INUNDATION AND STREAM VELOCITIES WHICH COULD CAUSE EROSION AND SCOURING OF BACKFILL. THE TRENCH MUS 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.
- 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.
- 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 C4.05.
- 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.
- 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 1 \$217.53(D) (PIPE DESIGN) AND 30 TAC \$290.44(E) (WATER DISTRIBUTION).
- 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
- 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 SHEET <u>C4.20</u>. (FOR POTENTIAL FUTURE LATERALS).
- THE PRIVATE SERVICE LATERAL STUB-OUTS MUST BE INSTALLED AS SHOWN ON THE PLAN AND PROFILE SHEETS ON PLAN SHEET C4.02 TO C4.10 AND MARKED AFTER BACKFILLING AS SHOWN IN THE DETAIL ON PLAN SHEET C4.20
- 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.
- . 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)
- 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
- ) 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:
- LOW PRESSURE AIR TEST.
- A) A LOW PRESSURE AIR TEST MUST FOLLOW THE PROCEDURES DESCRIBED II 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 INSURPARAGRAPH (C OF THIS PARAGRAPH OR EQUATION C.3 IN SUBPARAGRAPH (B)(II) OF THIS PARAGRAPH
- 3) 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 ) 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 PRESSURE TO DROP FROM 3.5 PSI GAUGE TO 2.5 PSI GAUGE IS COMPUTED

- FROM THE FOLLOWING EQUATION: EQUATION C.3
  - WHERE: T = (0.085 * D * K)/Q
  - T = TIME FOR PRESSURE TO DROP 1.0 POUND PER SQUARE INCH GAUGE IN SECONDS

- $K = 0.000419 \times D \times L$ , 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

PIPE DIAMETER	MIN. TIME (SECONDS)	LENGTH FOR MIN. (FEET)	TIME, LONGER LENGTH (SECONDS)
5	340	398	0.855(L)
3	454	298	1.520(L)
0	567	239	2.374(L)
2	680	199	3.419(L)
5	850	159	5.342(L)
8	1020	133	7.693(L)
21	1190	114	10.471(L)
24	1360	100	13.676(L)
27	1530	88	17.309(L)
30	1700	80	21.369(L)
33	1870	72	25.856(L)

- (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% O
- 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 ertINSIDE 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. INFILTRATION / EXFILTRATION TEST. (A) THE TOTAL ÉXFILTRATION. AS DETERMINED BY A HYDROSTATIC HEAD TEST, MUST NOT EXCEED 50 GALLONS PER INCH OF DIAMETER PER MILE OF PIPE PER 24 8. ON AN
- HOURS AT A MINIMUM TEST HEAD OF 2.0 FEET ABOVE THE CROWN OF A PIPE AT SALVAGED 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 OF 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 PECIFIED. 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
- ) 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 WIDTH OF 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 SEWER MAI 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. 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 ZONE OF OF A PIP
- (iv) EACH SIZE MANDREL MUST USE A SEPARATE PROVING RING. C) METHOD OPTIONS.
- AN ADJUSTABLE OR FLEXIBLE MANDREL IS PROHIBITED. ) 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. A DEFLECTION TEST METHOD MUST BE ACCURATE TO WITHIN PLUS OR MINUS 0.2% DEFLECTION.
- (3) AN OWNER SHALL NOT CONDUCT A DEFLECTION TEST UNTIL AT LEAST 30 DAYS AFTER THE FINAL BACKFILL.
- (4) GRAVITY COLLECTION SYSTEM PIPE DEFLECTION MUST NOT EXCEED FIVE PERCENT (5) 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.
- 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 T 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.
- 7. ALL PRIVATE SERVICE LATERALS MUST BE INSPECTED AND CERTIFIED IN 849 IN ACCORDANCE WITH 30 TAC §213.5(C)(3)(I). AFTER INSTALLATION OF AND, PRIOR ANTONIO V TO COVERING AND CONNECTING A PRIVATE SERVICE LATERAL TO AN EXISTING ORGANI7FD 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 SANITARY CONFORMITY WITH THE APPLICABLE PROVISIONS OF THIS SECTION. THE OWNER OF OF SAN A THE COLLECTION SYSTEM MUST MAINTAIN SUCH CERTIFICATIONS FOR FIVE YEARS AND SAWS AND FORWARD COPIES TO THE APPROPRIATE REGIONAL OFFICE UPON REQUEST. CONNECTIONS MAY ONLY BE MADE TO AN APPROVED SEWAGE COLLECTION

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TCEQ - ORGANIZED SEWAGE COLLECTION SYSTEM	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:	SAWS NOTES FOR EDWARDS AQUIFER RECHARGE ZONE	28. A COPY OF ALL TESTING REPORTS SHALL BE FORWARDED TO THE SAN ANTONIO WATER SYSTEM CONSTRUCTION INSPECTION DIVISION.	SAWS CONSTRUCTION NOTES (LAST REVISED JANUARY 2022)
1. THIS ORGANIZED SEWAGE COLLECTION SYSTEM (SCS) MUST BE CONSTRUCTED IN ACCORDANCE WITH 30 TEXAS ADMINISTRATIVE CODE (TAC) SOLA 5(C) THE TEXAS	EQUATION C.3 WHERE: T= (0.085 * D * K)/0	<u>(JAINUARY 26, 2006)</u> 1. THIS PROJECT IS WITHIN THE <u>EDWARDS AQUIFER RECHARGE ZONE</u> . ALL MATERIAL AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS	29. NO EXTRA PAYMENT SHALL BE ALLOWED FOR WORK CALLED FOR ON THE PLANS BUT NOT INCLUDED ON THE BID SCHEDULE. THIS INCIDENTAL WORK WILL BE REQUIRED AND SHALL BE INCLUDED UNDER THE PAY ITEM TO WHICH IT RELATES	ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCORE OF
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.	T = TIME FOR PRESSURE TO DROP 1.0 POUND PER SQUARE INCHGAUGE IN SECONDSK = 0.000418 X D X L PUT NOT LESS THAN 1.0	CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) AND COMPLY WITH CURRENT SPECIFICATIONS.	30. THE DEVELOPER DEDICATES THE SANITARY SEWER MAINS UPON COMPLETION BY THE DEVELOPER AND ACCEPTANCE BY THE SAN ANTONIO WATER SYSTEM.	I. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) COMPLY WITH THE PLANS, SPECIFICATIONS, GENERAL CONDITIONS AND WITH FOLLOWING AS APPLICABLE:
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	$K = 0.000419 \times D \times L$ , but not less than 1.0 D = AVERAGE INSIDE PIPE DIAMETER IN INCHES L = LENGTH OF LINE OF SAME SIZE BEING TESTED, IN FEET $Q = RATE OF LOSS, 0.0015 CUBIC FEET PER MINUTE PER SQUARE$	UNTIL THEY OBTAIN A COPY OF THE APPROVED G.C.P. FROM THE CONSULTANT AND HAS BEEN NOTIFIED BY SAWS CONSTRUCTION INSPECTION DIVISION TO PROCEED WITH THE WORK AND HAS ARRANGED A MEETING WITH THE INSPECTOR	THE SAN ANTONIO WATER SYSTEM WILL OWN AND MAINTAIN SAID SANITARY SEWER MAINS WHICH ARE LOCATED WITHIN THIS PARTICULAR SUBDIVISION. (AS APPLICABLE)	A.CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEM", TEXAS ADMINISTRATIVE CODE (TAC) TITLE 30 PART 1 CHAPTER 217 AND "PUBLIC DRINKING
CONTRACTORS MUST BE REQUIRED TO KEEP ON-SITE COPIES OF THE PLAN AND THE APPROVAL LETTER.	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:	AND CONSULTANT FOR THE WORK REQUIREMENTS. 3. THE LOCATIONS AND DEPTHS OF EXISTING UTILITIES, TO INCLUDE SERVICE LATERALS, SHOWN IN THESE PLANS ARE APPROXIMATE ONLY. IT SHALL BE THE	31. THE DEVELOPER WILL BE RESPONSIBLE FOR THE LIFT STATION MAINTENANCE FEE IN EFFECT AT THE TIME OF CERTIFICATION. THE CURRENT LIFT STATION MAINTENANCE FEE PER LIFT STATION WILL BE COLLECTED PRIOR TO PLAT	WATER", TAC TITLE 30 PART 1 CHAPTER 290. B. CURRENT TXDOT "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE".
<ul> <li>A WRITTEN NUTICE 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:</li> <li>THE NAME OF THE APPROVED PROJECT;</li> </ul>	PIPE DIAMETER MIN. TIME LENGTH FOR MIN. TIME, LONGER LENGTH (INCHES) (SECONDS) (FEET) (SECONDS) 6 340 398 0.855(L)	CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES 48 HOURS PRIOR TO EXCAVATION AND TO PROTECT THE SAME DURING CONSTRUCTION.	RECORDATION. 32. WORK COMPLETED BY THE CONTRACTOR WHICH HAS NOT RECEIVED A GENERAL CONSTRUCTION PERMIT OR THE CONSENT OF THE SAN ANTONIO WATER	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"
THE ACTIVITY START DATE; AND     THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.	8         454         298         1.520(L)           10         567         239         2.374(L)           12         680         199         3.419(L)	SAN ANTONIO WATER SYSTEM233-2010(WATER, SEWER & RECYCLED WATER)0DRAINAGE1-800-545-6005TELEPHONE1-800-545-6005	SYSTEM CONSTRUCTION INSPECTION DIVISION WILL BE SUBJECT TO REMOVAL AND REPLACEMENT BY AND AT THE EXPENSE OF THE CONTRACTOR.	E. CURRENT CITY OF SAN ANTONIO "UTILITY EXCAVATION CRITERIA MANUAL" (UECM).
4. ANT 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	15     850     159     5.342(L)       18     1020     133     7.693(L)       21     1190     114     10.471(L)       24     1360     100     13.675(L)	CITY PUBLIC SERVICE     1-800-545-6005       PARAGON CABLE TV     1-800-545-6005       VALERO ENERGY CO.     1-800-545-6005		2. THE CONTRACTOR SHALL NOT PROCEED WITH ANY PIPE INSTALLATION WORK U THEY OBTAIN A COPY OF THE APPROVED COUNTER PERMIT OR GENE CONSTRUCTION PERMIT (GCP) FROM THE CONSULTANT AND HAS BEEN NOTIFIED
APPROVAL. 5. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (F&S) CONTROL MEASURES MUST BE DEODEDLY INSTALLED AND	27     1500     100     15.676(L)       27     1530     88     17.309(L)       30     1700     80     21.369(L)       33     1870     72     25.856(L)	4. THE CONTRACTOR SHALL MAINTAIN SERVICE TO ALL EXISTING SANITARY SEWERS AT ALL TIMES DURING CONSTRUCTION.		SAWS CONSTRUCTION INSPECTION DIVISION TO PROCEED WITH THE WORK AND ARRANGED A MEETING WITH THE INSPECTOR AND CONSULTANT FOR THE W REQUIREMENTS. WORK COMPLETED BY THE CONTRACTOR WITHOUT AN APPRO COUNTER PERMIT AND/OR A GCP WILL BE SUBJECT TO REMOVAL
MAINTAINED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.	(D) AN OWNER MAY STOP A TEST IF NO PRESSURE LOSS HAS OCCURRED DURING THE FIRST 25% OF THE CALCULATED TESTING TIME.	5. ALL WORK IN TEXAS HIGHWAY DEPARTMENT AND BEXAR COUNTY RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE WITH RESPECTIVE CONSTRUCTION SPECIFICATIONS AND PERMIT.		3. THE CONTRACTOR SHALL OBTAIN THE SAWS STANDARD DETAILS FROM THE SAWS STANDARD DETAILS FROM THE SAWS OF CONTRACTOR SHALL OBTAIN THE SAWS STANDARD DETAILS FROM THE SAWS OF CONTRACTOR SHALL OBTAIN THE SAWS OF CONTRACTOR SHALL OBTAIN THE SAWS STANDARD DETAILS FROM THE SAWS OF CONTRACTOR SHALL OBTAIN THE SAWS STANDARD DETAILS FROM THE SAWS STANDARD SAWS SAWS SAWS SAWS SAWS SAWS SAWS SAW
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	<ul> <li>(L) 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.</li> <li>(F) WASTEWATER COLLECTION SYSTEM PIPES WITH A 27 INCH OR LARGER AVERAGE</li> </ul>	6. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.181, CITY PUBLIC SERVICE MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND GAS VALVES THAT ARE IN THE PROJECT AREAS.		4. THE CONTRACTOR IS TO MAKE ARRANGEMENTS WITH THE SAWS CONSTRUCT
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	<ul> <li>INSIDE DIAMETER MAY BE AIR TESTED AT EACH JOINT INSTEAD OF FOLLOWING THE PROCEDURE OUTLINED IN THIS SECTION.</li> <li>(G) A TESTING PROCEDURE FOR PIPE WITH AN INSIDE DIAMETER GREATER THAN 33 INCHES MUST BE APPROVED BY THE EXECUTIVE DIRECTOR</li> </ul>	7. ALL MANHOLES SHALL BE CONSTRUCTED SO THAT THE TOP OF THE RING IS AT LEAST FOUR INCHES ABOVE THE FINISHED GRADE OF THE SURROUNDING GROUND EXCEPT WHEN LOCATED IN PAYED ABEAS. IN DAYED ABOAS		INSPECTION DIVISION AT (210) 233-2973, ON NOTIFICATION PROCEDURES THAT WILL BE USED TO NOTI AFFECTED HOME RESIDENTS AND/OR PROPERTY OWNERS 48 HOURS PRIOR
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	<ul> <li>(2) INFILTRATION/EXFILTRATION TEST.</li> <li>(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</li> </ul>	8. ON ANY MANHOLES TO BE ABANDONED, THE RINGS AND COVER SHALL BE		BEGINNING ANY WORK. 5. LOCATION AND DEPTH OF EXISTING UTILITIES AND SERVICE LATERALS SHOWN THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE ACTUAL LOCATIONS
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.	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.	SALVAGED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, ITEM 862, AND THE HOLE BACKFILLED TO THE SATISFACTION OF THE INSPECTOR.		DEPTHS MUST BE FIELD VERIFIED BY THE CONTRACTOR AT LEAST 1 WEEK PRIOF CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOC UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT 1
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	(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 CROUNDWATER	CONTRACT. ALL DUCTILE IRON PIPE USED IN THIS SYSTEM SHALL BE CORROSION PROTECTED ON BOTH THE INTERIOR AND EXTERIOR SURFACES. ALL CORROSION PROTECTION SHALL BE APPLIED AND INSTALLED IN SUCH A MANNER AS TO		DURING CONSTRUCTION AT NO COST TO SAWS. 6. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILL AND DRAINAGE STRUCTURES AT LEAST 1-2 WEEKS PRIOR TO CONSTRUCT
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.	<ul> <li>(D) FOR CONSTRUCTION WITHIN A 25-YEAR FLOOD PLAIN, THE INFILTRATION OR EXFILTRATION MUST NOT EXCEED 10 GALLONS PER INCH DIAMETER PER MILE OF DIAMETER PER MILE DIAMETER PER MILE OF DIAMETER PER MILE DIAMETER PER MILE OF DIAMETER PER MILE DIAMETER DIAMETER PER MILE DIAMETER PER MILE DIAMETER PER MILE DIAMETER</li></ul>	MAINTAIN A CONTINUOUSLY PROTECTED SURFACE AFTER FINAL PIPE INSTALLATION. 10. ALL PVC SEWER PIPF WITH OVER 14 FEET OF COVER SHALL BE EXTRA		WHETHER SHOWN ON PLANS OR NOT. PLEASE ALLOW UP TO 7 BUSINESS DAYS LOCATES REQUESTING PIPE LOCATION MARKERS ON SAWS FACILITIES. FOLLOWING CONTACT INFORMATION ARE SUPPLIED FOR VERIFICATION PURPOSES:
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	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	STRENGTH, MINIMUM PIPE STIFFNESS OF 115 PSI. 11. SEWER PIPE CONNECTIONS TO PRE-CAST MANHOLES WILL BE COMPRESSION		<ul> <li>SAWS UTILITY LOCATES: HTTP: //WWW.SAWS.ORG/SERVICE/LOCATES</li> <li>COSA DRAINAGE (210) 207-0724 OR (210) 207-6026</li> <li>COSA TRAFELO SIGNAL OPERATIONS (200) 202 2025</li> </ul>
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	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	JUINTS AS APPROVED BY SAWS, MECHANICAL JOINT "BOOT TYPE" CONNECTIONS ALONE WILL NOT BE ALLOWED. "BOOT TYPE JOINTS MAY BE USED IN CONJUNCTION WITH COMPRESSION JOINTS AS APPROVED BY SAWS. ANY CHANGES FROM THESE METHODS MUST BE APPROVED BY SAWS		<ul> <li>COSA TRAFFIC SIGNAL OPERATIONS (210) 206-8480</li> <li>COSA TRAFFIC SIGNAL DAMAGES (210) 207-3951</li> <li>TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005 OR 811</li> </ul>
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.	<ul> <li>TESTING IS ALSO REQUIRED. THE FOLLOWING PROCEDURES MUST BE FOLLOWED:</li> <li>(1) FOR A COLLECTION PIPE WITH INSIDE DIAMETER LESS THAN 27 INCHES, DEFLECTION MEASUREMENT REQUIRES A RIGID MANDREL.</li> </ul>	12. ALL RESIDENTIAL SEWER SERVICE LATERAL SHALL BE EXTENDED TO THE PROPERTY LINE AND CAPPED AND SEALED. (ITEM. NO. DD-854-01).		7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING EXISTING FEN CURBS, STREETS, DRIVEWAYS, SIDEWALKS, LANDSCAPING AND STRUCTURES TO ORIGINAL OR BETTER CONDITION IF DAMAGES ARE MADE AS A RESULT OF
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.	<ul> <li>(A) MANDREL SIZING.</li> <li>(i) A RIGID MANDREL MUST HAVE AN OUTSIDE DIAMETER (OD) NOT LESS THAN 95%</li> <li>OF THE BASE INSIDE DIAMETER (ID) OR AVERAGE ID OF A PIPE, AS SPECIFIED IN THE APPROPRIATE STANDARD BY THE ASTMS, AMERICAN WATER WORKS</li> </ul>	13. WHERE REQUIRED, CONCRETE ENCASEMENT SHALL BE PLACED FOR FULL WIDTH OF THE TRENCH TO A PLANE 6" ABOVE THE TOP OF THE PIPE, WITH PAY		PROJECT'S CONSTRUCTION. 8. ALL WORK IN TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) AND/OR BE
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 SUDWING CONDUCTION TO THE	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 FOUND TO DES OF THE ID OF T	14. A MINIMUM OF 3 FEET OF COVER IS TO BE MAINTAINED OVER THE SANITARY SEWER MAIN AND LATERALS AT SUBGRADE, OTHERWISE CONCRETE ENCASEMENT		9. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OT
COMMISSION'S RULES CONCERNING MANHOLES AND SEWER LINE/MANHOLE INVERTS DESCRIBED IN 30 TAC §217.55 ARE INCLUDED ON PLAN SHEET <u>C4.05</u> .	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	WILL BE REQUIRED. 15. NO BLASTING SHALL BE PERFORMED WITHIN 75 FEET OF EXISTING UTILITIES.		GOVERNING MUNICIPALITY'S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.
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.	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.	16. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL WASTE MATERIALS UPON PROJECT COMPLETION. THE CONTRACTOR SHALL NOT PERMANENTLY PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST ORTAINING AN APPROVAL FLOOD PLAIN DEVELOPMENT DEDUCT		11. HOLIDAY WORK: CONTRACTORS WILL NOT BE ALLOWED TO PERFORM SAWS WORK SAWS RECOGNIZED HOLIDAYS. REQUEST SHOULD BE SENT TO
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	<ul> <li>MATERIAL THAT CAN WITHSTAND 200 PSI WITHOUT BEING DEFORMED.</li> <li>(ii) A MANDREL MUST HAVE NINE OR MORE ODD NUMBER OF RUNNERS OR LEGS.</li> <li>(iii) A BARREL SECTION LENGTH MUST EQUAL AT LEAST 75% OF THE INSIDE DIAMETER</li> </ul>	17. THE CONTRACTOR SHALL NOT PLACE ANY MATERIALS ON THE RECHARGE ZONE OF THE EDWARDS AQUIFER WITHOUT AN APPROVED WATER POLLUTION		CONSTWORKREQ@SAWS.ORG.
MANHULES) 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	OF A FIFE. (iv) EACH SIZE MANDREL MUST USE A SEPARATE PROVING RING. (C) METHOD OPTIONS. (i) AN ADJUSTABLE OR FLEXIBLE MANDREL IS PROHIBITED.	ABATEMENT PLAN FROM THE TCEQ. 18. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/CECTECHNICAL/CATETY/COURDINENT CONCUT TANK		CONSTRUCTION DEPARTMENT 48 HOURS IN ADVANCE TO REQUEST WEEKEND W REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG.
ALL CURVATURE OF SEWER PIPE MUST BE ACHIEVED BY THE FOLLOWING PROCEDURE WHICH IS RECOMMENDED BY THE PIPE MANUFACTURER: <u>N/A</u>	<ul> <li>(ii) A TEST MAY NOT USE TELEVISION INSPECTION AS A SUBSTITUTE FOR A DEFLECTION TEST.</li> <li>(iii) IF REQUESTED, THE EXECUTIVE DIRECTOR MAY APPROVE THE USE OF A DEFLECTOR METER OF A MANUPEL WITH DEMOVABLE LEGG OF SUBVISION OF A MANUPEL WITH DEMOVABLE LEGG.</li> </ul>	ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY		APPROVAL WILL BE SUBJECT TO BE UNCOVERED FOR PROPER INSPECTION.
IF PIPE FLEXURE IS PROPOSED, THE FOLLOWING METHOD OF PREVENTING DEFLECTION OF THE JOINT MUST BE USED: $N/A$	<ul> <li>(2) FOR A GRAVITY COLLECTION SYSTEM PIPE WITH AN INSIDE DIAMETER 27 INCHES AND GREATER, OTHER TEST METHODS MAY BE USED TO DETERMINE VERTICAL</li> </ul>	PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES. THE CONTRACTOR'S IMPLEMENTATION OF THE SYSTEM, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT		MEETING THE COMPACTION REQUIREMENTS ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS PERFORMED BY A THIRD PARTY. COMPACTION TESTS BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED, OR AS INDICATED BY SAWS INSPECTOR AND OR THE TEST ADMINISTRATOR DED FACTLY OF THE
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.	DEFLECTION. A DEFLECTION TEST METHOD MUST BE ACCURATE TO WITHIN PLUS OR MINUS 0.2% DEFLECTION. (3) AN OWNER SHALL NOT CONDUCT A DEFLECTION TEST UNTIL AT LEAST 30 DAYS AFTER THE FINAL BACKFILL.	COMPLIES 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 10 CONTRAVING THE		LIFT PER 400 LINEAR FEET AT A MINIMUM. THIS PROJECT WILL NOT BE ACCEP AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.
12. NEW SEWAGE COLLECTION SYSTEM LINES MUST BE CONSTRUCTED WITH STUB OUTS FOR THE CONNECTION OF ANTICIPATED EXTENSIONS. THE LOCATION OF SUCH	<ul> <li>(4) GRAVITY COLLECTION SYSTEM PIPE DEFLECTION MUST NOT EXCEED FIVE PERCENT (5%).</li> <li>(5) IF A PIPE SECTION FAILS A DEFLECTION TEST, AN OWNER SHALL CORRECT THE DEPORTED A DEFLECTION TEST.</li> </ul>	PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.		13. A COPY OF ALL TESTING REPORTS SHALL BE FORWARDED TO SAWS CONSTRUC INSPECTION DIVISION.
SIUB OUIS 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 LINF AND THE EXTENSION AT 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	19. A. THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND ENVIRONMENTAL PROTECTION AGENCY (EPA) REQUIRE EROSION AND SEDIMENTATION CONTROL FOR CONSTRUCTION OF SEWER COLLECTION SYSTEMS. DEVELOPER OR AUTHORIZED REPRESENTATIVE SHALL PROVIDE EROSION AND		
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.	TAC §217.58. (d) 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 DY	SEDIMENTATION CONTROL AS NOTED ON THE PROJECT'S PLAN AND PROFILE SHEETS.		
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.	HYDROSTATIC EXFILTRATION TESTING, VACUUM TESTING, OR OTHER METHOD APPROVED BY THE EXECUTIVE DIRECTOR. (1) HYDROSTATIC TESTING.	B. AT A MINIMUM THESE CONTROLS SHALL CONSIST OF ROCK BERMS AND/OR SILT FENCES CONSTRUCTED PARALLEL TO AND DOWN GRADIENT FROM THE TRENCHES. THE ROCK BERM OR SILT FENCES SHALL BE INSTALLED IN A MANNER SUCH THAT ANY RAINFALL RUNDEE SHALL BE FUTTERED HAY RAIFS SHALL NOT	[ <u>;</u> , 4	r
IF NO STUB-OUT IS PRESENT AN ALTERNATE METHOD OF JOINING LATERALS IS SHOWN IN THE DETAIL ON SHEET <u>C4.20</u> . (FOR POTENTIAL FUTURE LATERALS).	<ul> <li>(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.</li> <li>(B) TO PERFORM A HYDROSTATIC EXFILTRATION TEST AN OWNER SHALL SEAL ALL</li> </ul>	BE USED FOR TEMPORARY EROSION AND SEDIMENTATION CONTROLS. C. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS MUST BE INSTALLED	Manhole Ring and Cover Per DD 852-07 Street On the Street	
THE PRIVATE SERVICE LATERAL STUB-OUTS MUST BE INSTALLED AS SHOWN ON THE PLAN AND PROFILE SHEETS ON PLAN SHEET <u>C4.02</u> TO <u>C4.10</u> AND MARKED AFTER BACKFILLING AS SHOWN IN THE DETAIL ON PLAN	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	PRIOR TO CONSTRUCTION, SHALL BE MAINTAINED DURING CONSTRUCTION, AND SHALL BE REMOVED WHEN VEGETATION IS ESTABLISHED AND THE CONSTRUCTION AREA IS STABILIZED. ADDITIONAL PROTECTION MAY BE NECESSARY IF EXCESSIVE SOLIDS ARE BEING DISCHARGED FROM THE SITE	Timal Grade	Finished Grade
SHEET <u>C4.20</u> 13. TRENCHING, BEDDING AND BACKFILL MUST CONFORM WITH 30 TAC \$217.54. THE BEDDING AND BACKFILL FOR FLEXIBLE PIPE MUST COMPLY WITH THE STANDARDS	<ul> <li>(2) VACUUM TESTING.</li> <li>(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</li> </ul>	20. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE REMOVED BY THE CONTRACTOR AT FINAL ACCEPTANCE OF THE PROJECT BY THE SAN ANTONIO WATER SYSTEM	6" 60" 60" Fiberglass Manhole Per ASTM D-3753 Specifications Commercial Grade	
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.	MANHULE. (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.	21. PLACEMENT OF SUCH CONTROLS SHALL BE IN ACCORDANCE WITH THE CONSTRUCTION PLANS. ACTUAL LOCATIONS MAY VARY SLIGHTLY FROM THE	Inickness 0.50     Polyester       Thickness     Type "E" Fiberglass       (½" Nom.     Silane Treated Silica Sand       FRP Coupling or Approved     Equal**	
TH. SEWER LINES MUST BE LESTED 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	<ul> <li>(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.</li> <li>(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 WATHER TO THE TOP OF A CONE SECTION.</li> </ul>	PLANS, BUT WILL BE VERIFIED BY THE ENGINEER/INSPECTOR IN THE FIELD PRIOR TO SEWER LINE CONSTRUCTION. THE CONTRACTOR AND CITY INSPECTOR SHALL INSPECT THE CONTROLS AT WEEKLY INTERVALS AND AFTER EVERY SIGNIFICANT RAINEALL TO INSURE SIGNIFICANT DISTURBANCE TO THE STRUCTURES WAS	Grout Annular Space 12" Min	(Amount will Vary per Project)     Image: Amount will Vary per Project)       Concrete Encase 12" Min.     Image: Amount will Vary per Project)       Concrete Encase 12" Min.     Image: Amount will Vary per Project)
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).	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.	OCCURRED. SEDIMENT DEPOSITED AFTER A SIGNIFICANT RAINFALL SHALL BE REMOVED FROM THE SITE OR PLACED IN AN APPROVED DESIGNATED SOIL DISPOSAL AREA.	8" Min.	
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	<ul> <li>(G) A TEST DOES NOT BEGIN UNTIL AFTER THE VACUUM PUMP IS OFF.</li> <li>(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.</li> </ul>	22. A DEFLECTION TEST SHALL BE PERFORMED ON ALL FLEXIBLE PIPE. THE TEST SHALL BE CONDUCTED AFTER INITIAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS ITEM NO. 849, 23, ALL MAINS MUST DASS ARE TESTING DED. ITEM NO.	Fiberglass* Sewer Pipe Fiberglass* Coupling	Standard Wve
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:	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	849 IN THE STANDARD SPECIFICATIONS PRIOR TO ACCEPTANCE BY THE SAN ANTONIO WATER SYSTEM.	Fiberglass* Fiberglass** Tee Base Fiberglass ** Coupling Fiberglass Fiberglass Coupling	% Bend     2" Typ.       % Bend     Press Seal Gasket
(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	URGANIZED 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	24. ALL MAINS MUSI COMPLY WITH ITEM NO. 868 OF SEWER MAIN CLEANING. 25. WATER JETTING THE BACKFILL WITHIN A STREET WILL NOT BE PERMITTED. SANITARY SEWER TRENCHES SUBJECT TO TRAFFIC SHALL CONFORM TO THE CITY	Sewer Pipe Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Fiberglass Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coupling Coup	8" Dia. Min. Pipe
(1) LOW PRESSURE AIR TEST. (A) A LOW PRESSURE AIR TEST MUST FOLLOW THE PROCEDURES DESCRIBED 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.	OF SAN ANTONIO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND SAWS ITEM 804.	Tee-Base Z. All Concrete Encasement Required for Tee Base Manholes Shall be Considered Incidental to the Cost of the Manholes. Backfil Around Manhole Shall be Flowable with a Min. Thickness of 12-Inches and Fill Shall be Placed to within 12-Inches of Final Grade. This Cost Shall be Incidental to the Cost of the Manhole	
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 INSUBPARAGRAPH (C)	CUNNECTIONS MAY UNLY BE MADE TO AN APPROVED SEWAGE COLLECTION SYSTEM. THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION	20. SANITARY SEWER MAIN CONNECTIONS MADE DIRECTLY TO EXISTING MANHOLES WILL REQUIRE SUCCESSFUL TESTING OF THE MANHOLES IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS ITEM 849.	<ul> <li>and Cover</li> <li>and Cover</li> <li>8" Min.</li> <li>8" Min.</li> <li>8" Min.</li> <li>Cover Excavation within Areas for Placement of Sanitary Sewer Manholes and Structures Shall be Back filled Per Detail This Sheet with Regards to Flowable Fill and ASTM D448 Aggregate. This Cost Shall be Subsidiary to the Cost of the Manhole or Structure.</li> </ul>	6" Min. If PVC 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
UF IHIS 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	PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.	27. AFTER CONSTRUCTION, TESTING WILL BE DONE BY T.V. CAMERA BY THE CONTRACTOR AND OBSERVED BY INSPECTOR, AND WASTEWATER ENGINEERING PERSONNEL AS THE CAMERA IS RUN THROUGH THE LINES. ANY ABNORMALITIES, SUCH AS BROKEN PIPE OF MISALIONED JOINTE MUST BE DEPINATED FOR THE	Reinforced Concrete Encasement W/ #5 Bars 12° O.C.E.W. (Note Shown) (N.S.P.L)	within the Wall Sections.
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	AUSTIN REGIONAL OFFICESAN ANTONIO REGIONAL OFFICE12100 PARK 35 CIRCLE, BUILDING A14250 JUDSON ROADAUSTIN, TEXAS 78753–1808SAN ANTONIO, TEXAS 78233–4480PHONE (512) 339–2929PHONE (210) 490–3096	CONTRACTOR AT HIS EXPENSE.	PLAN VIEW     ** Fiberglass (FRP) Pipe Joints Using Fiberglass* Sewer Pipe       PROPERTY OF     APPROVED	NOTE: Price for Drop Fittings and Encasement to be Included with the Price of Manhole.  PROPERTY OF APPROVED REVISED
	FAX (512) 339–3795 FAX (210) 545–4329		SAN ANTONIO WATER SYSTEM     TEE - BASE     AUG 2019       SAN ANTONIO, TEXAS     FIBERGLASS MANHOLE     DD-852-11     SHEET	SAN ANTONIO WATER SYSTEM     DROP MANHOLE DETAIL     MARCH 2008     AUG 2019       SAN ANTONIO, TEXAS     DD-852-08     SHE

#### **RUCTION NOTES** D JANUARY 2022)

#### ΟN

PROCEDURES WITHIN THE SCOPE OF THIS THE SAN ANTONIO WATER SYSTEM (SAWS) AND ATIONS, GENERAL CONDITIONS AND WITH THE

EED WITH ANY PIPE INSTALLATION WORK UNTIL APPROVED COUNTER PERMIT OR GENERAL THE CONSULTANT AND HAS BEEN NOTIFIED B VISION TO PROCEED WITH THE WORK AND HAS NSPECTOR AND CONSULTANT FOR THE WORK THE CONTRACTOR WITHOUT AN APPROVED CP WILL BE SUBJECT TO REMOVAL AND THE CONTRACTORS AND/OR THE DEVELOPER.

E SAWS STANDARD DETAILS FROM THE SAWS JSINESS_CENTER/SPECS. UNLESS OTHERWISE

RANGEMENTS WITH THE SAWS CONSTRUCTION PROCEDURES THAT WILL BE USED TO NOTIFY DR PROPERTY OWNERS 48 HOURS PRIOR TO

UTILITIES AND SERVICE LATERALS SHOWN ON BE APPROXIMATE. ACTUAL LOCATIONS AND THE CONTRACTOR AT LEAST 1 WEEK PRIOR TO CONTRACTOR'S RESPONSIBILITY TO LOCATE FOR CONSTRUCTION AND TO PROTECT THEM TO SAWS.

EXACT LOCATION OF UNDERGROUND UTILITIES EAST 1-2 WEEKS PRIOR TO CONSTRUCTION PLEASE ALLOW UP TO 7 BUSINESS DAYS FOR TION MARKERS ON SAWS FACILITIES. RE SUPPLIED FOR VERIFICATION PURPOSES

PONSIBLE FOR RESTORING EXISTING FENCES, ALKS, LANDSCAPING AND STRUCTURES TO ITS DAMAGES ARE MADE AS A RESULT OF THE

OF TRANSPORTATION (TXDOT) AND/OR BEXAR DONE IN ACCORDANCE WITH RESPECTIVE PERMIT REQUIREMENTS.

WITH CITY OF SAN ANTONIO OR OTHER NANCES WHEN EXCAVATING NEAR TREES. E ANY WASTE MATERIALS IN THE 100-YEAR

ST SHOULD BE SENT TO REQUIRED TO NOTIFY THE SAWS INSPECTION

RS IN ADVANCE TO REQUEST WEEKEND WORK. TWORKREQ@SAWS.ORG.

CONTRACTOR SHALL BE RESPONSIBLE FOR MENTS ON ALL TRENCH BACKFILL AND FOR BY A THIRD PARTY. COMPACTION TESTS WILL ANDOMLY SELECTED, OR AS INDICATED BY THE ADMINISTRATOR, PER EACH 12-INCH LOOSE NIMUM THIS PROJECT WILL NOT BE ACCEPTED HIS REQUIREMENT BEING MET AND VERIFIED BY ITED TEST RESULTS.

SHALL BE FORWARDED TO SAWS CONSTRUCTION

![](_page_150_Picture_92.jpeg)

### SAWS SEWER NOTES

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 SOURCE 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 COSTS 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 THE TCEQ AND SAWS.

- 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".
- 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 TO SEQUENCE THE WORK ACCORDINGLY.
- SEWER PIPE WHERE WATER LINE CROSSES SHALL BE 160 PSI AND MEET THE REQUIREMENTS OF ASTM D2241. TAC 217.53 AND TCE 290.44(E)(4)(B). CONTRACTOR SHALL CENTER A 20' JOINT OF 160 PSI PRESSÙRÉ RÀTED PVC AT THE PROPOSED WATER CROSSING.
- 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.
- 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 THE SAWS SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION.
- ALL PVC PIPE OVER 14 FEET OF COVER SHALL BE EXTRA STRENGTH WITH MINIMUM PIPE STIFFNESS OF 115 PSI.

## NOT BE ALLOWED TO PERFORM SAWS WORK ON PROJECT SEWER NOTES

- ALL RESIDENTIAL SEWER SERVICE LATERALS ARE 6" DIA. AND SHALL BE EXTENDED TO 10' PAST THE PROPERTY LINE AND CAPPED AND SEALED CONTRACTOR SHALL INSTALL A 2" X 4" STAKE, FOUR (4) FEET LONG, TWO FEET DEEP INTO THE GROUND AT THE END OF EACH SERVICE. NO SEPARATE PAY ITEM.
- CONTRACTOR TO INSTALL CLEANOUTS AT THE END OF ALL SEWER LATERALS, PER LATERAL DETAIL SHEET C4.20. NO VERTICAL STACKS ALLOWED FOR ANY LOTS UNLESS OTHERWISE
- SPECIFIED BY THE ENGINEER.
- ALL 6" SEWER LATERALS WILL BE SET AT 2% GRADE FROM THE MAIN TO THE PROPERTY LINE.
- WHEN HORIZONTAL DISTANCE BETWEEN SEWER PIPES AND WATER MAIN IS LESS THAN 9 FOOT OF SEPARATION, SEWER MAIN SHALL BE INSTALLED WITH 150 PSI (MIN) PRESSURE PIPE AND FITTINGS IN ACCORDANCE WITH SAWS CONSTRUCTION CRITERIA FOR CONSTRUCTION OF SEWER MAINS IN THE VICINITY OF WATER MAINS.
- . CONTRACTOR SHALL ENSURE THAT MANHOLES OUTSIDE OF PAVED AREAS ARE SET WITH TOP ELEVATIONS 6" ABOVE FINISHED GRADE WITH CONCRETE RING ENCASEMENT
- . ALL SEWER PIPES SHALL BE 8" PVC (SDR 26), UNLESS OTHERWISE NOTED.
- 3. CONTRACTOR IS TO VERIFY EXISTING INVERT OF EXISTING SANITARY SEWEF MAINS AND ALERT ENGINEER IMMEDIATELY OF ANY DIFFERENCE FROM INVERT SHOWN ON PLANS.
- CONTRACTOR SHALL PROTECT ALL EXISTING FENCES. ANY FENCE DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR AT THEIR EXPENSE
- IO. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS FROM PLANS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE T EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
- CONCRETE RING ENCASEMENT TO BE INSTALLED ON ALL MANHOLES AND WITHIN LIMITS OF PAVEMENT, BE INSTALLED TO THE TOP OF THE BASE LAYER WITH A MINIMUM OF 2" OF ASPHALT ON TOP OF THE RING ENCASEMENT
- 12. MANHOLE OPENING INCREASED TO 30" AS PER TAC CHAPTER 217.55.
- 13. ALL SEWER PIPE LATERALS SHALL BE SDR 26 (CLASS 160) PVC PIPE.
- 14. IF THE GIVEN TOP OF MANHOLE ELEVATION DOES NOT AGREE ON ACTUAL GROUND SURFACE OR FINISH PAVEMENT, THE CONTRACTOR SHALL ADJUS FIFVATIONS SUCH THAT THE TOP OF MANHOLE SHALL BE 0.5' ABOVE EXISTING GROUND, OR FLUSH TO FINISH ASPHALT PAVEMENT.
- 15. ALL MANHOLES CONSTRUCTED OVER THE EDWARDS AQUIFER RECHARGI ZONE SHOULD BE WATERTIGHT.

# OVER THE EARZ

SEWER: UPPER - EAST SEWERSHED - DOS DIOS WR DEVELODED'S NAME. CONTINENTAL HOMES OF TEXAS I D

L	DEVELOPER 3 NAME, CONTINENTAL HOMES OF TEXAS, L.F.
l	ADDRESS: 5419 N LOOP 1604 EAST
l	CITY: SAN ANTONIO STATE: TEXAS ZIP: 78247
l	PHONE# FAX# FAX#
l	SAWS BLOCK MAP $\#192-656$ TOTAL EDU'S 158 TOTAL ACREAGE 138.33
l	TOTAL LINEAR FOOTAGE OF PIPE: 5,506 LF PLAT NO.22-11800769
l	NUMBER OF LOTS 158 SAWS JOB NO. 24-1536
L	

NO.     REVISION     DATE       1.     REVISED SHEET TITLE     07/01/24       1     OT/01/24     07/01/24
7/8/2024
FAPE-DAWSON ENGLISHED ANSON SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS 2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000 TBPE FIRM REGISTRATION #470 I TBPLS FIRM REGISTRATION #10028800
BROOK STONE CREEK-UNIT 2E BEXAR COUNTY, TEXAS SANTARY SEWER NOTES AND DETAILS
PLAT NO. <b>22-11800769</b> JOB NO. <u>12093–11</u> DATE <u>JULY 2024</u> DESIGNER <u>SS</u> CHECKED BAC DRAWN <u>GK</u>