PAPE–DAWSON

PURLSONG UNITS 2 & 3

Water Pollution Abatement Plan Modification and Sewage Collection System Application

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Water Pollution Abatement Plan Modification and Sewage Collection System Application

8/18/2025



Texas Engineering Firm #470

PAPE-DAWSON

August 18, 2025

Ms. Monica Reyes
Texas Commission on Environmental Quality (TCEQ)
Region 13
14250 Judson Road
San Antonio, Texas 78233-4480

Re: Purlsong Units 2 & 3
Water Pollution Abatement Plan Modification and Sewage Collection System Application

Dear Ms. Reyes:

Please find included herein the Purlsong Units 2 & 3 Water Pollution Abatement Plan Modification and Sewage Collection System applications. This Water Pollution Abatement Plan Modification has been prepared in accordance with the regulations of the Texas Administrative Code (30 TAC 213) and current policies for development over the Edwards Aquifer Recharge Zone. 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 Water Pollution Abatement Plan Modification applies to an approximate 100.03-acre site. This Sewage Collection System Application applies to the 4,091.07 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, please provide a written approval of the plan in order that construction may begin at the earliest opportunity.

Appropriate review fees ($12,045.54) and fee application 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

Hayden Fowlkes, P.E.
Vice President

Attachments

P:\300\41\21\Word\Reports\SCS\WPAP Mod & SCS Cover Letter.docx

8/18/2025



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 30 TAC 213.

Administrative Review

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

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

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

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

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

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

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

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

Technical Review

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

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

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

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied **the application fee will be forfeited**.

4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

Mid-Review Modifications

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

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

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

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

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

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

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

1. Regulated Entity Name: Purlsong Units 2 & 3						**2. Regulated Entity No.:** 112110507			
3. Customer Name: Chesmar Homes, LLC						**4. Customer No.:** 605592310			
5. Project Type: **(Please circle/check one)**	New		Modification			Extension		Exception	
6. Plan Type: **(Please circle/check one)**	WPAP	CZP	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: **(Please circle/check one)**	Residential		Non-residential			**8. Site (acres):**			100.03
9. Application Fee:	$12,045.54		**10. Permanent BMP(s):**			4xBatch Detention Basins; 7x15' VFS			
11. SCS (Linear Ft.):	4,091.07		**12. AST/UST (No. Tanks):**						
13. County:	Comal		**14. Watershed:**			Guadalupe River			

Application Distribution

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

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

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

Austin Region			
County:	**Hays**	**Travis**	**Williamson**
Original (1 req.)	☐	☐	☐
Region (1 req.)	☐	☐	☐
County(ies)	☐	☐	☐
Groundwater Conservation District(s)	☐ Edwards Aquifer Authority ☐ Barton Springs/ Edwards Aquifer ☐ Hays Trinity ☐ Plum Creek	☐ Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	☐ Austin ☐ Buda ☐ Dripping Springs ☐ Kyle ☐ Mountain City ☐ San Marcos ☐ Wimberley ☐ Woodcreek	☐ Austin ☐ Bee Cave ☐ Pflugerville ☐ Rollingwood ☐ Round Rock ☐ Sunset Valley ☐ West Lake Hills	☐ Austin ☐ Cedar Park ☐ Florence ☐ Georgetown ☐ Jerrell ☐ Leander ☐ Liberty Hill ☐ Pflugerville ☐ Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	☐	✔	☐	☐	☐
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

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. Hayden Fowlkes, P.E.
Print Name of Customer/Authorized Agent  8/18//2025
Signature of Customer/Authorized Agent Date

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

GENERAL INFORMATION FORM (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: Hayden Fowlkes, P.E.

Date: 8/18/2025

Signature of Customer/Agent:



Project Information

1. Regulated Entity Name: Purlsong Units 2 & 3
2. County: Comal
3. Stream Basin: Guadalupe River
4. Groundwater Conservation District (If applicable): Edwards Aquifer Authority
5. Edwards Aquifer Zone:

   ☒ Recharge Zone
   ☐ Transition Zone

6. Plan Type:

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

7. Customer (Applicant):

   Contact Person: Danny Blue
   Entity: Chesmar Homes, LLC
   Mailing Address: 211 N Loop 1604 #179
   City, State: San Antonio, TX Zip: 78232
   Telephone: 713-227-8790 FAX: _____
   Email Address: danny.blue@chesmar.com

8. Agent/Representative (If any):

   Contact Person: Hayden Fowlkes, P.E.
   Entity: Pape-Dawson Consulting Engineers, LLC
   Mailing Address: 1672 Independence Dr, Ste 102
   City, State: New Braunfels, Texas Zip: 78132
   Telephone: (830) 632-5633 FAX: _____
   Email Address: hfowlkes@pape-dawson.com

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 _____.
   ☒ 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.

    From TCEQ regional office, turn left and proceed approximately 1.5 miles to IH-35 north and turn left. Travel approximately 14.5 miles to exit 184 toward TX-337 and turn left. Proceed approximately 2.8 miles to State Highway 46 exit and turn left. Travel approximately 4 miles on State Highway 46 to the project site. The project is located on the left approximately 0.76 mi NW of State Highway 46 and Farm to Market (FM) 2722 intersection.

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

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

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

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

    ☒ Survey staking will be completed by this date: once advised by TCEQ staff of inspection

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

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

15. Existing project site conditions are noted below:

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

Prohibited Activities

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

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

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

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

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

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

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

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

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

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

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

Administrative Information

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

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

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

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

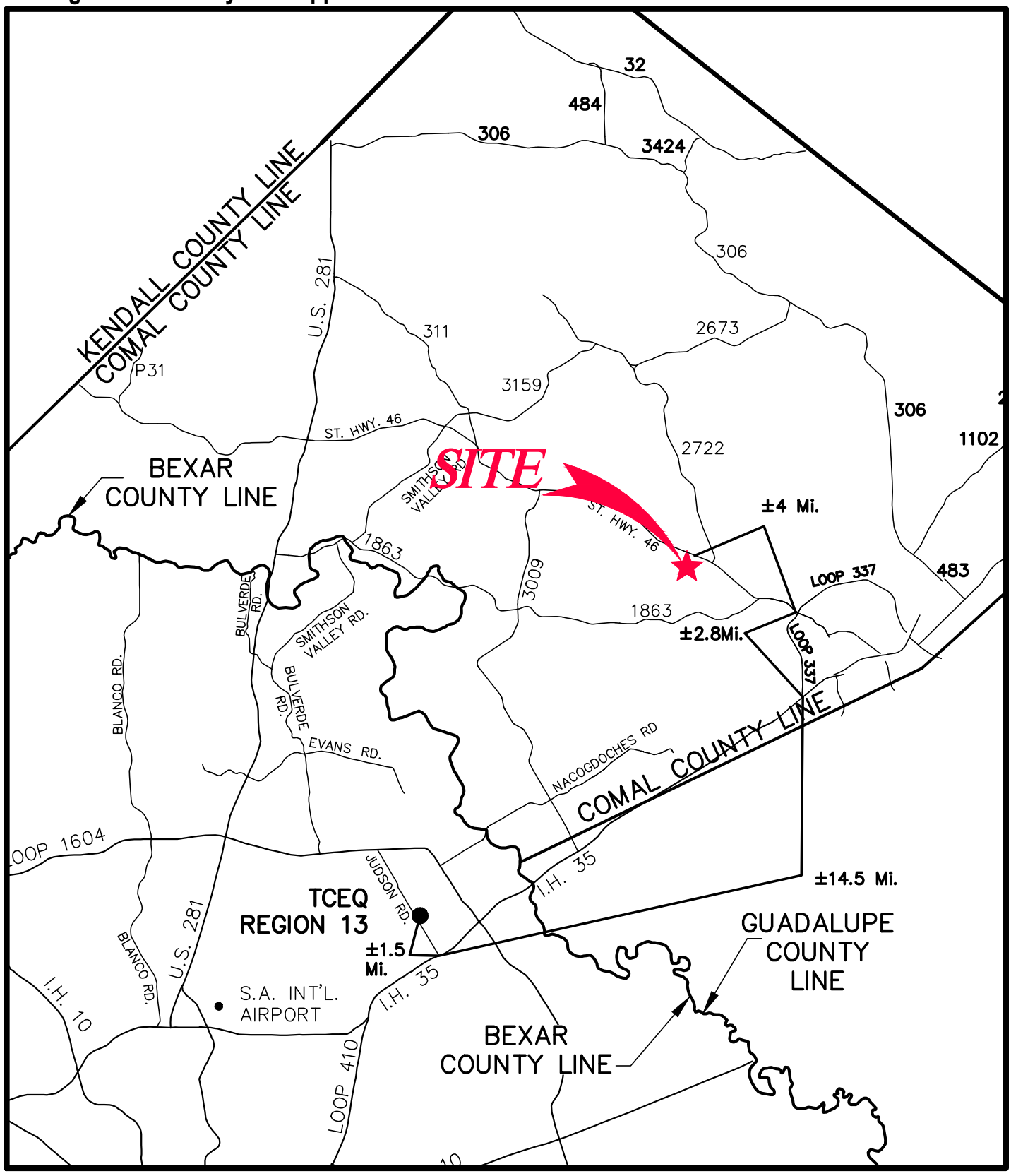
20. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies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

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

ATTACHMENT A

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification and
Sewage Collection System Application

N
NOT TO SCALE

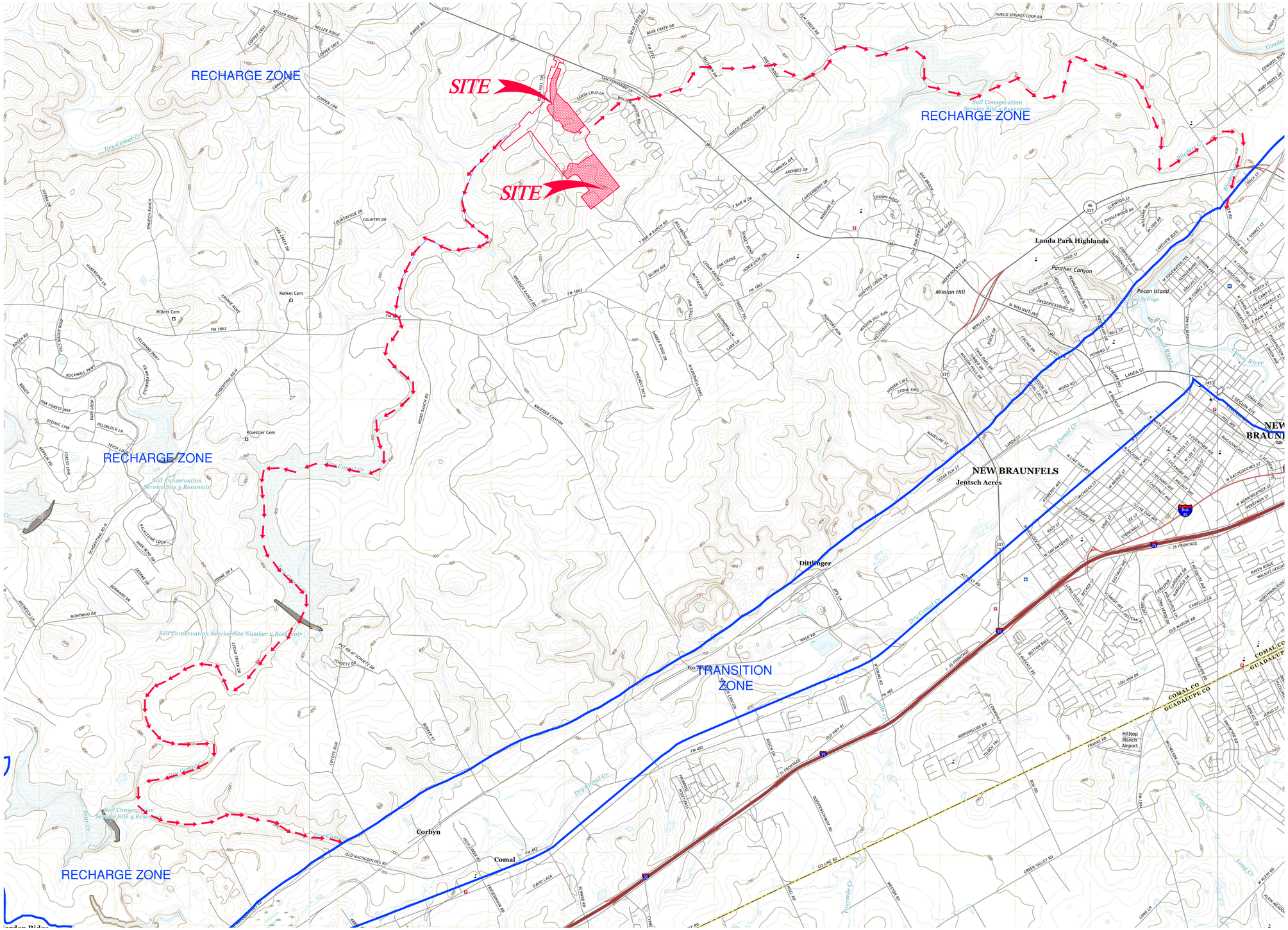


Pape-Dawson Consulting
Engineers, LLC.

Date: Jul 09, 2025, 1:16pm User ID: hhenke
File: P:\300\41\21\Design\Environmental\RM 3004121.dwg

ATTACHMENT A
Road Map

ATTACHMENT B



GENERAL LOCATION MAP - HUNTER, TX QUAD; NEW BRAUNFELS EAST, TX QUAD
DRAINAGE FLOW →

PURLSONG UNITS 2 & 3

WATER POLLUTION ABATEMENT PLAN
MODIFICATION & SEWAGE COLLECTION SYSTEM APPLICATION
USGS/EDWARDS RECHARGE ZONE MAP
ATTACHMENT B

SCALE: 1"= 2,000'
0' 2,000' 4,000' 6,000'

PAPE-DAWSON
1672 INDEPENDENCE DR, STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5633
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Date: July 25, 2025, 3:02 PM - User ID: hheike
File: P:\300\41\21\Design\Environmental\QD 3004121.dwg

THIS 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.

ATTACHMENT C

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification &
Sewage Collection System Application

Attachment C – Project Description

Purlsong Units 2 and 3 consists of 96 single-family residential and eight (8) multi-family residential condominium lots and is part of a planned master development in Comal County, Texas. The site is located approximately 0.76 miles NW of the FM 2722 and State Highway 46 intersection. The property is currently undeveloped, lies within the Guadalupe River watershed, and is within the Edwards Aquifer Recharge Zone. The site does contain naturally occurring sensitive geological features. The site does not lie within the 100-year floodplain.

The previously approved Purlsong Phase 1 WPAP (EAPP ID No. 13002046) covered regulated activities within the Purlsong Unit 1 subdivision including clearing, mass grading with stockpiles, grading, excavation, installation of utilities and drainage improvements, construction of two (2) batch detention basins, arterial roadway, six (6) condominium lots, 146 residential lots with associated streets, hardscapes, landscape, and site clean-up. Purlsong Phase 1 (EAPP ID No. 13002046) did not include a Sewage Collection System (SCS) application. The SCS application for Unit 1 was submitted under separate cover.

Regulated activities include clearing, mass grading with stockpiles, grading, excavation, installation of utilities and drainage improvements, construction of four (4) batch detention basins, 96 single family residential homes and eight (8) condominium lots with associated streets, hardscapes, landscape, and site clean-up. Approximately 53.96 acres of impervious cover, or 53.94% of the 100.03-acre project limits, are proposed for construction in this WPAP. The four (4) batch detention basins and seven (7) areas of vegetative filter strips (VFS) are the PBMPs for this development. Please see treatment summary table included for additional details. All PBMPs have been designed in accordance with the TCEQ'S Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in TSS from the site.

The Purlsong Unit 3 Sewage Collection System (SCS) Application proposes the construction of a total of approximately 4,091.07 linear feet (LF) of sewer main to serve the future residential development. The proposed gravity sewer main alignment will consist of approximately 3,626.07 LF of 8-inch (8") PVC, SDR 26 and 465 LF 8" PVC, SDR 26, 160 psi pressure-rated pipe to be centered at waterline crossings. Approximately 4.72 acres of the project site may be disturbed for this SCS installation as identified by the limits of the fifty-foot (50') SCS/GA envelope shown on the plans.

This project will result in an estimated additional 177 Living Unit Equivalents (LUEs). The permanent population associated with Purlsong Units 2 and 3 is estimated to be 708 people, based on four (4) persons per residential lot (96) and per condominium unit (81 units within 8 condominium lots). Approximately 53,100 gallons per day (average flow) of domestic wastewater, based on 300 gpd/LUE, are estimated to be generated by this project.

The sewage flow for the Unit 3 residential lots (approximately 28,800 gpd) will be disposed of by conveyance to the proposed Purlsong Wastewater Treatment Center operated by Guadalupe-Blanco River Authority (GBRA). The sewage flow for the condominium lots (24,300 gpd) will be served by an on-site septic system per lot. Potable water will be supplied by Texas Water Company.

GEOLOGIC ASSESSMENT FORM (TCEQ-0585)

GEOLOGIC ASSESSMENT

For

CHESMAR HOMES TRACT
HIGHWAY 46
NEW BRAUNFELS, COMAL COUNTY, TEXAS





Prepared for
CHESMAR HOMES
211 NORTH LOOP 1604 EAST, SUITE 179
SAN ANTONIO, TX 78232

Prepared by

Professional Service Industries, Inc.
3 Burwood Lane
San Antonio, Texas 78216
Telephone (210) 342-9377



PSI PROJECT NO.: 0435-6189

March 21, 2024

Professional Service Industries, Inc.
3 Burwood Lane, San Antonio, TX 78216
Phone: (210) 342-9377
Fax: (210) 342-9401

March 21, 2024

Chesmar Homes
211 North Loop 1604 East, Suite 179
San Antonio, Texas 78232

Attn: Mr. Carson Trainer
carson.trainer@chesmar.com

RE: Geologic Assessment
Chesmar Homes Tract
State Highway 46, W of F.M. 2722
New Braunfels, Comal County Texas
PSI Project No. 435-6189

Dear Mr. Trainer:

Professional Service Industries, Inc. (PSI) has completed a geologic recharge assessment for the above referenced project in compliance with the Texas Commission on Environmental Quality (TCEQ) requirements for regulated developments located on the Edwards Aquifer Recharge Zone (EARZ). The purpose of this report is to describe surficial geologic units and identify the locations and extent of significant recharge features present in the development area.

AUTHORIZATION

Authorization to perform this assessment was given via a signed copy of PSI Proposal No. 419395 on February 27, 2024.

PROJECT DESCRIPTION

The property consists of an approximate 438-acre tract of land located on the south side of Highway 46 in New Braunfels, Comal County, Texas. The entrance to the site is approximately 0.88 miles west of the intersection of Highway 46 and F.M. 2722. The subject property is located on the Edwards Aquifer Recharge Zone (EARZ), and therefore subject to special rules promulgated by the Texas Commission on Environmental Quality (TCEQ) designed to protect environmentally sensitive areas. The site is currently cultivated agricultural land. The tract is predominantly undeveloped, but a residence and outbuildings are located in the south-central portion of the tract. Vegetation observed included live oak, ashe-juniper, cedar elm, persimmon, mountain laurel, agarita, prickly pear, sotol and other species common to the Edwards/Balcones Fault Zone region. Significant clearing of vegetation took place between 2012 and 2018, with numerous closed depressions from ashe-juniper removal.

REGIONAL GEOLOGY

Physiography

From northwest to southeast, the three physiographic provinces in Comal County are: the Edwards Plateau, the Blackland Prairie, and the West Gulf Coastal Plain. The Edwards Plateau terrain is rugged and hilly, with elevations ranging from 1,100 feet to 1,900 feet above sea level. This area is underlain

by beds of limestone that dip gently to the southeast. South of the Edwards Plateau is the Balcones Fault Zone, which is also the northernmost limit of the Blackland Prairie. The Balcones Fault Zone extends northeast-southwest across Comal County and is composed of fault blocks of limestone, chalk, shale, and marl. The undulating, hilly topography of the Blackland Prairie ranges in elevation from about 700 feet to 1,100 feet above sea level. The faults are predominantly normal, down-to-the Gulf Coast, with near vertical throws. The West Gulf Coastal Plain lies southeast of the Blackland Prairie and is composed of relatively flat-lying beds of marl, clay, and sandy clay According to topographic maps, elevations at the subject site range from approximately 1,072 feet above sea level on the southwest side of the tract, to about 930 feet MSL on the south corner of the square portion of the tract.

Stratigraphy and Structure

According to available information from the U.S. Geologic Survey and the University of Texas Bureau of Economic Geology as well as the site reconnaissance, the underlying stratigraphy consists of the Lower Cretaceous Person and Kainer Formations of the Edwards Group in the northern areas of the site while the remainder of the site is underlain by the Upper Cretaceous Austin Chalk, Eagle Ford Shale, and Buda Limestone. A series of northeast trending faults are mapped across the middle portions of the site. The faults are downthrown to the southeast with the Upper Cretaceous Formations being present in distinct fault blocks. Bedrock outcrops at the site are relatively sparse with most being associated with the Person and Kainer areas along with a few Buda and Austin Chalk bedrock exposures. Limestone boulder float was common in the Person and Kainer areas.

Rocks on the northern portion of the site are members of the Lower Cretaceous Edwards Person Formation. According to "The Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop, Comal County Texas" written by the USGS, the Person Formation ranges between 180 and 224 feet thick and forms the upper member of the Edwards Group, above the Kainer Formation which compromises the Edwards Aquifer, a federally designated sole source aquifer for the region.

According to the "Geologic Map of the Edwards Aquifer Recharge Zone, South-Central Texas" published by the USGS in 2005, the rocks at the site are the Cyclic and Marine and Leached and Collapsed members of the Person Formation. The Cyclic and Marine member includes chert-bearing mudstone to packstone, miliolid (foraminifera fossil) grainstones, with scattered toucasia (fossil bivalve). The Leached and Collapsed member is a crystalline limestone, ranging from mudstone to grainstone with chert and collapse breccia. It has bioturbated iron-stained beds with very high permeability and cavern development. The Grainstone Member of the Kainer formation occurs in the southwestern portion of the "square" tract. This chert-bearing limestone is a mudstone to wackestone to miliolid (foraminifer microfossil) grainstone. Cavern development is rare to non-existent, and has low permeability due to recrystallization. The thickness of this member is 50-60'.

SITE INVESTIGATION

The site investigation was performed by systematically traversing the subject tract, and mapping fractured or vuggy rock outcrops, closed depressions, sinkholes, caves, or indications of fault/fracture zones. The purpose of the site investigation was to delineate features with recharge potential that may warrant special protection or consideration. The results of the site investigation are included in the attached TCEQ report format.

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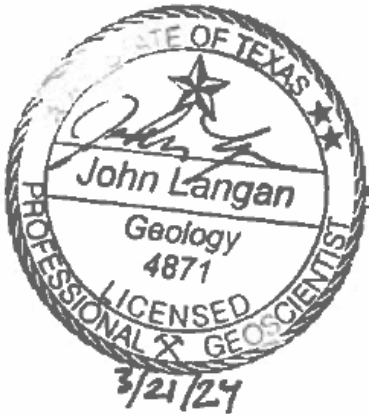
SUMMARY

Three sensitive features were noted on the subject tract, a sinkhole feature in a drainage (S-5), a cave feature S-10, and a man-made septic system feature S-9. Please note that subtle features, buried or obscured from view, may be present on the tract. It is possible that clearing/construction activities will reveal the presence of features currently hidden by thick vegetation and/or soil cover. If caves, sinkholes, or solution cavities are encountered during future clearing/construction activities, please contact our office for additional assistance.

We appreciate this opportunity to be of service to you. If you have any questions, please do not hesitate to contact our office.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.

John Langan, P.G.
Environmental Department Manager



WARRANTY

The field observations and research reported herein are considered enough in detail and scope to form a reasonable basis for a general geological recharge assessment of this site. PSI warrants that the findings and conclusions contained herein have been promulgated in accordance with generally accepted geologic methods, only for the site described in this report. These methods have been developed to provide the client with information regarding apparent indications of existing or potential conditions relating to the subject site and are necessarily limited to the conditions observed at the time of the site visit and research. This report is also limited to the information available at the time it was prepared. In the event additional information is provided to PSI following the report, it will be forwarded to the client in the form received for evaluation by the client. There is a possibility that conditions may exist which could not be identified within the scope of the assessment, or which were not apparent during the site visit. PSI believes that the information obtained from others during the review of public information is reliable; however, PSI cannot warrant or guarantee that the information provided by others is complete or accurate.

This report has been prepared for the exclusive use of Chesmar Homes, Inc. for the site discussed herein. Reproductions of this report cannot be made without the expressed approval of Chesmar Homes. The general terms and conditions under which this assessment was prepared apply solely to Chesmar Homes. No other warranties are implied or expressed.

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: John Langan Telephone: 210/342-9377

Date: 03/21/24 Fax: 210/342-9401

Representing: PSI TBPG No. 50128 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:

Regulated Entity Name: Chesmar Homes Tract

Project Information

1. Date(s) Geologic Assessment was performed: 03/07-19/24
2. Type of Project:
   - ☒ WPAP
   - ☐ SCS
   - ☐ AST
   - ☐ UST
3. Location of Project:
   - ☒ Recharge Zone
   - ☐ Transition Zone
   - ☐ Contributing Zone within the Transition Zone



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

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

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness(feet)
Comfort-Rock outcrop complex, undulating	A	1-2
Medlin-Eckrant association, undulating	B	1-2
Real gravelly loam, 1 to 8 percent slopes	B	1-2
Rumple-Comfort association, undulating (RUD)	B	1-2
Purves Clay 1-4% slopes	B	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. ☒ **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" = 400'
   Site Geologic Map Scale: 1" = 400'

Site Soils Map Scale (if more than 1 soil type): 1" = 1,458'

9. Method of collecting positional data:

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

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

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

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

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

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

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

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

Administrative Information

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

STRATIGRAPHIC COLUMN
Chesmar Homes Tract
Highway 46
New Braunfels, Texas

FORMATION	THICKNESS	LITHOLOGIC DESCRIPTION
Austin Chalk	325-420	Chalk and marl, microgranular calcite with foraminifera microfossils and calcareous nannoplankton; forms ledges, gray to white in color, alternates with marl and bentonitic seams, with pyrite nodules and abundant marine fossils including pelecypods and ammonites
Eagle Ford Group	25-45	Shale and limestone, with silty shale in the upper part, the middle part consists of a silty limestone grading into a calcareous siltstone, flaggy, medium gray, weathering to a pale yellowish brown.
Buda Limestone	45	Fine-grained, massive, poorly bedded to nodular, bioclastic, commonly glauconitic, pyritiferous, weathers to a dark gray to brown, with abundant pelecypods
Del Rio Clay	40-50	Calcareous and gypsiferous, with pyrite common, with a blocky structure that weathers to light gray or yellowish gray. The characteristic marine megafossil, *Ilmatogyra arietina* (formerly *exogyra arietina*) is widespread throughout the formation.
Georgetown Formation	10-40’	Light tan limestone identified by proximity to Del Rio clay and diagnostic marker fossil: *waconella wacoensis* brachiopod; low porosity and permeability development.
Person Formation	180-224’	Limestones and dolomites, extensive porosity development in “honeycomb sections, interbedded with massive, recrystallized limestones with more limited permeabilities (especially Regional Dense Member separating the Person and Kainer Formations.
Kainer Formation	260-310’	Hard, miliolid limestones, overlying calcified dolomites and dolomite. Leached evaporitic “Kirschberg” zone of very porous and permeable collapse breccia formed by the dissolution of gypsum. Overlies the basal nodular (Walnut) bed.
Glen Rose Limestone (upper)	200-400	limestone, dolomite, and marl as alternation resistant and recessive beds forming stairstep topography; limestone, aphanitic to fine grained, hard to soft and marly, light gray to yellowish gray; dolomite, fine grained, porous, yellowish brown; marine megafossils include molluscan steinkerns, rudistids, oysters, and echinoids. Upper part, Kgru, relatively thinner bedded, more dolomitic, and less fossiliferous;

SOILS NARRATIVE

According to the Soil Survey of Comal County, published by the United States Department of Agriculture, Soil Conservation Service, in cooperation with the Texas Agricultural Extension Service, reissued in 1984, the soils beneath the subject property have been classified as Comfort-Rock outcrop complex (CrD), Medlin-Eckrant association, undulating (MEC), Real gravelly loam, 1-8% slopes (RaD) and Rumple-Comfort association, undulating (RUD).

Comfort-Rock outcrop complex, undulating (CrD) – shallow, well drained, moderate permeability, very low available water capacity, moderate hazard of water erosion, chalk fragments.

Medlin-Eckrant association, undulating (MEC) – very shallow, calcareous, moderately alkaline, well drained, rapid surface runoff, moderately to very slow permeability, very low to high water holding capacity, slight to severe hazard of water erosion, overlies limestone.

Real gravelly loam, 1 to 8 percent slopes (RaD) – shallow, well drained, rapid surface runoff, extremely stony, moderate permeability, very low available water capacity, slight hazard of water erosion, overlies platy chalk.

Rumple-Comfort association soils are shallow to moderately deep soils on uplands in the Edwards Plateau. The surface layer is a dark reddish-brown cherty clay loam about 10 inches thick and overlies a subsoil of reddish-brown cherty clay with abundant limestone fragments to a depth of 28 inches. The underlying parent material is an indurated limestone. The soil is well drained, with medium surface runoff, moderately slow permeability, and very low available water capacity. The soil is not suited for cropland, or cultivation, but is used as range land and habitat for wildlife.

SITE GEOLOGIC NARRATIVE

Physiography

From northwest to southeast, the three physiographic provinces in Comal County are: the Edwards Plateau, the Blackland Prairie, and the West Gulf Coastal Plain. The Edwards Plateau terrain is rugged and hilly, with elevations ranging from 1,100 feet to 1,900 feet above sea level. This area is underlain by beds of limestone that dip gently to the southeast. South of the Edwards Plateau is the Balcones Fault Zone, which is also the northernmost limit of the Blackland Prairie. The Balcones Fault Zone extends northeast-southwest across Comal County and is composed of fault blocks of limestone, chalk, shale, and marl. The undulating, hilly topography of the Blackland Prairie ranges in elevation from about 700 feet to 1,100 feet above sea level. The faults are predominantly normal, down-to-the Gulf Coast, with near vertical throws. The West Gulf Coastal Plain lies southeast of the Blackland Prairie and is composed of relatively flat-lying beds of marl, clay, and sandy clay According to topographic maps, elevations at the subject site range from approximately 1,072 feet above sea level on the southwest side of the tract, to about 930 feet MSL on the south corner of the square portion of the tract.

Stratigraphy and Structure

According to available information from the U.S. Geologic Survey and the University of Texas Bureau of Economic Geology as well as the site reconnaissance, the underlying stratigraphy consists of the Lower Cretaceous Person and Kainer Formations of the Edwards Group in the northern areas of the site while the remainder of the site is underlain by the Upper Cretaceous Austin Chalk, Eagle Ford Shale, and Buda Limestone. A series of northeast trending faults are mapped across the middle portions of the site. The faults are downthrown to the southeast with the Upper Cretaceous Formations being present in distinct fault blocks. Bedrock outcrops at the site are relatively sparse with most being associated with the Person and Kainer areas along with a few Buda and Austin Chalk bedrock exposures. Limestone boulder float was common in the Person and Kainer areas.

Rocks on the northern portion of the site are members of the Lower Cretaceous Edwards Person Formation. According to “The Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop, Comal County Texas” written by the USGS, the Person Formation ranges between 180 and 224 feet thick and forms the upper member of the Edwards Group, above the Kainer Formation which compromises the Edwards Aquifer, a federally designated sole source aquifer for the region.

According to the “Geologic Map of the Edwards Aquifer Recharge Zone, South-Central Texas” published by the USGS in 2005, the rocks at the site are the Cyclic and Marine and Leached and Collapsed members of the Person Formation. The Cyclic and Marine member includes chert-bearing mudstone to packstone, miliolid (foraminifera fossil) grainstones, with scattered toucasia (fossil bivalve). The Leached and Collapsed member is a crystalline limestone, ranging from mudstone to grainstone with chert and collapse breccia. It has bioturbated iron-stained beds with very high permeability and cavern development. The Grainstone Member of the Kainer formation occurs in the

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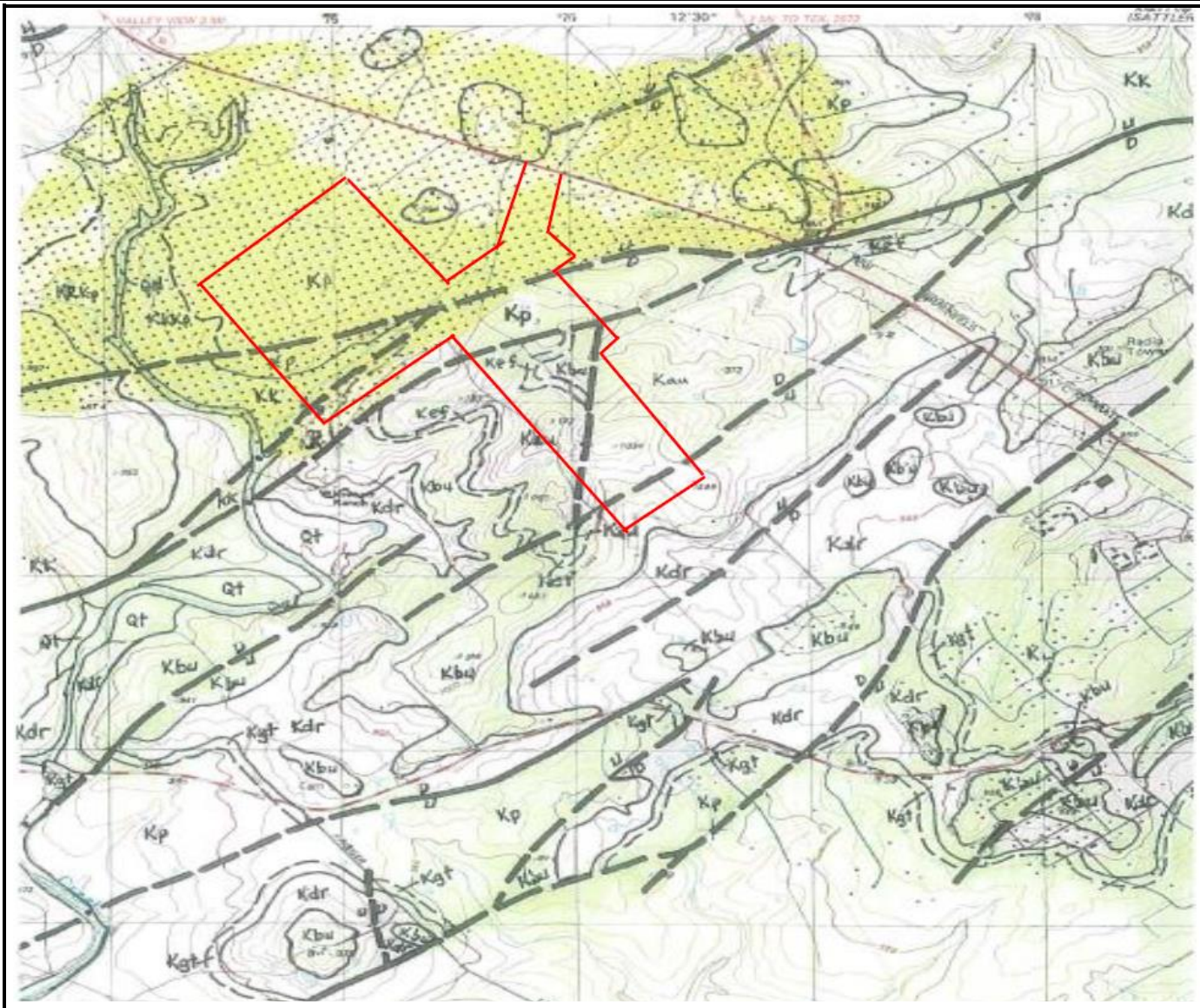
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SUMMARY

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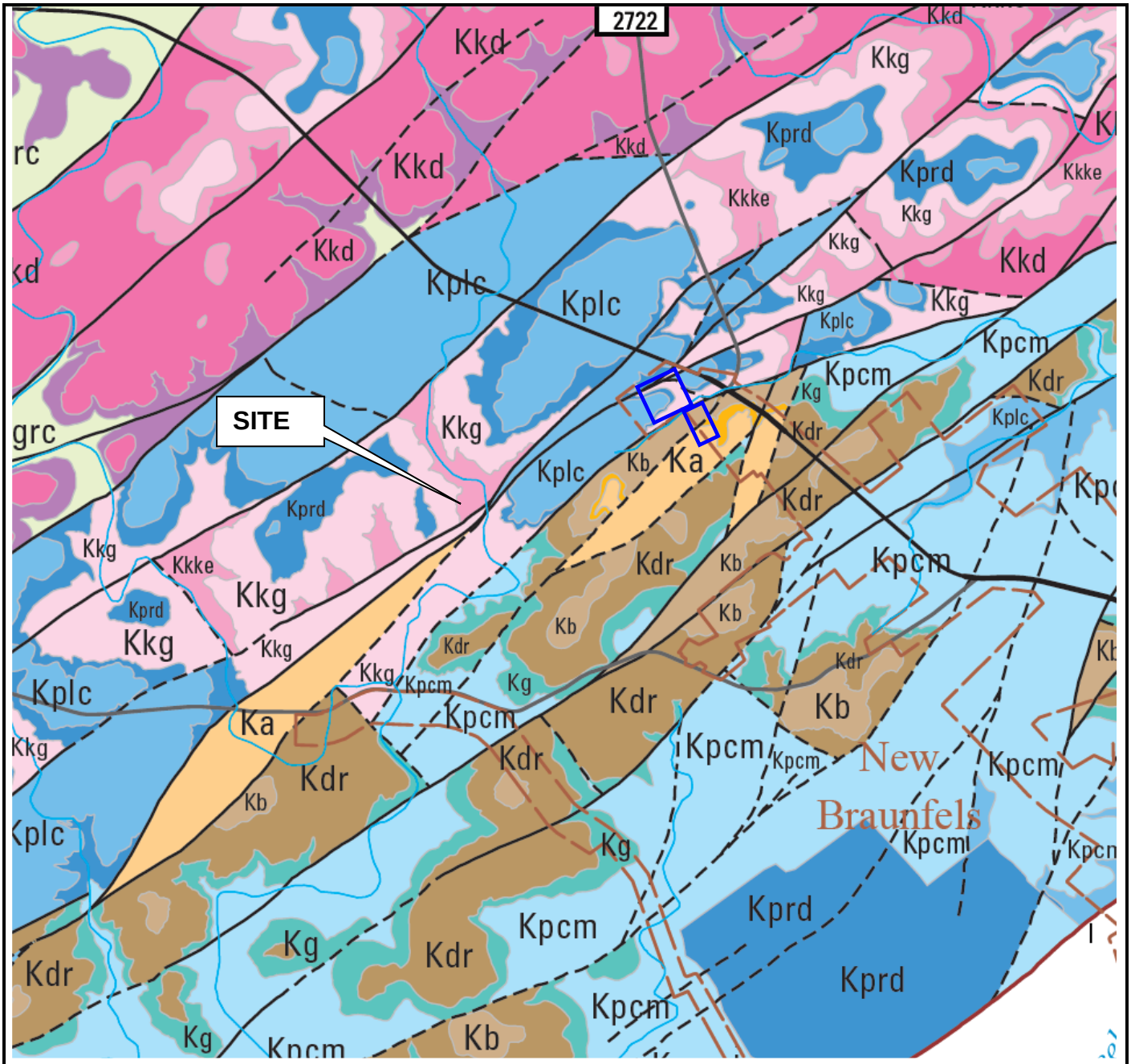
PROJECT NAME:
Chesmar Homes Tract
Highway 46
New Braunfels, Texas
PROJECT NO.:435-6189

STATE OF TEXAS
John Langan
Geology
4871
LICENSED
PROFESSIONAL GEOSCIENTIST
3/21/24

Geologic Map

From USGS "Geologic Map of the New Braunfels West Quadrangle, Texas (Bureau of Economic Geology-Collins, 1993), modified from King (1957) and Abbott (1973)

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Geologic Map

From USGS "Geologic Framework and Hydrostratigraphy of the Edwards & Trinity Aquifers Within Northern Bexar & Comal Counties, Scientific Investigations Map 3366 Texas"(Clark, Golab and Morris, 2016)

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Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers Within Northern Bexar and Comal Counties, Texas

By

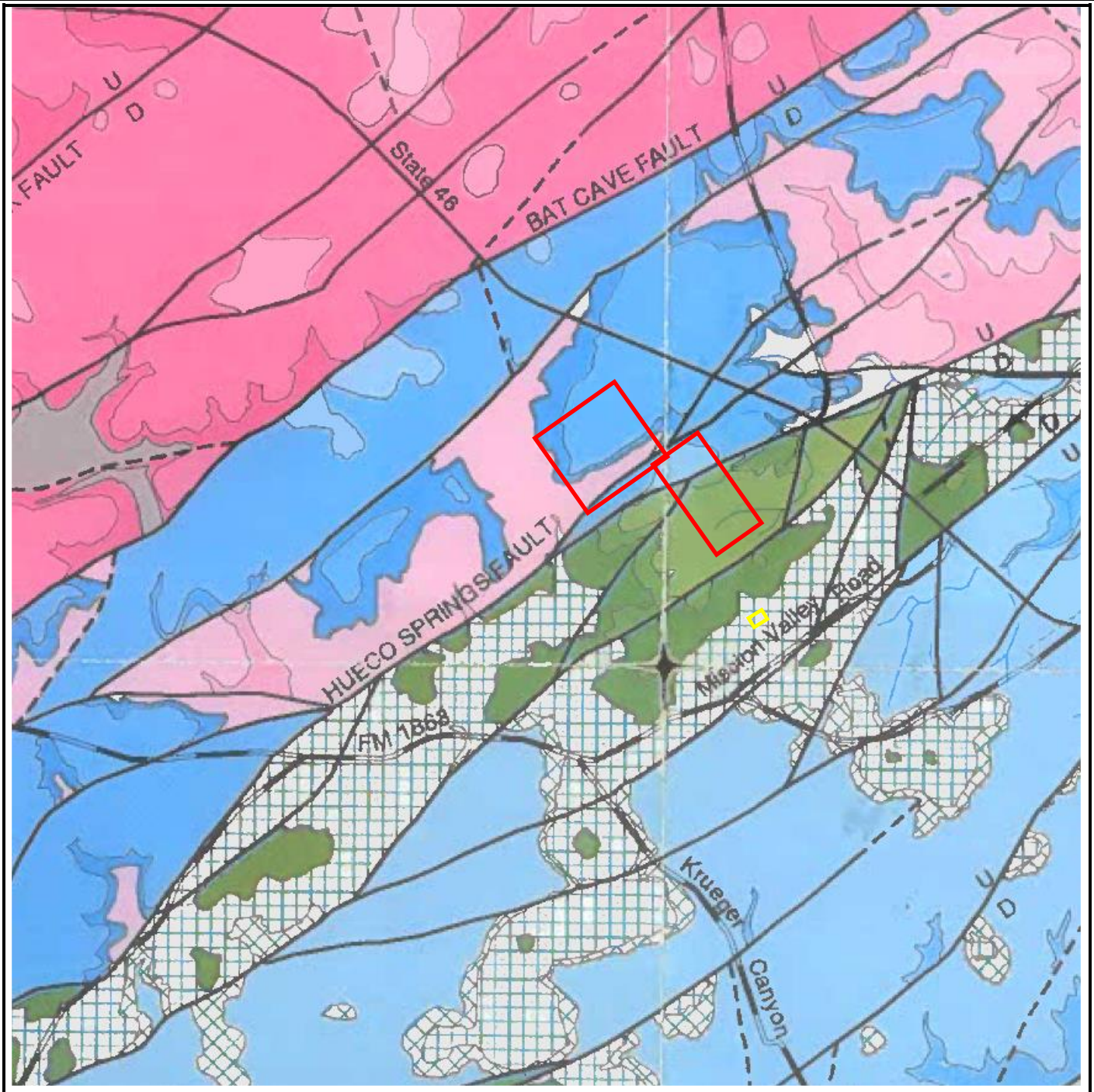
Allan K. Clark, James G. Golab, and Robert R. Morris

2016

Edwards	Person	Cyclic and marine, undivided	Pelletal limestone, mudstone, miliolid grainstone, packstone, chert (bedded and large nodules); caprinids, crossbedded	Kpcm	Edwards aquifer	II	80–90	Aquifer	MO, BU, VUG, BP, FR, CV	Thin graded cycles; massive beds to relatively thin beds; crossbeds, caprinids
		Leached and collapsed, undivided	Recrystallized limestone, mudstone, wackestone, packstone, grainstone; chert (bedded and large nodules); iron stained, stromatolitic, *Toucasia* sp., *Montastrea roemeriana*, oysters	Kplc		III	70–90	Aquifer	BU, VUG, FR, BP, BR, CV	Bioturbated iron-stained beds separated by massive limestone beds; stromatolitic limestone, *Montastrea roemeriana*
		Regional dense	Dense, shaly, mudstone, wackestone, oyster-shell mudstone and wackestone, iron staining, chert	Kprd		IV	20–24	Confining	FR, CV	Wispy iron-oxide stains, thin bedded, often white in aerial photographs
	Kainer	Grainstone	Miliolid, skeletal fragmented grainstone, mudstone, wackestone; chert (beds and nodules); crossbedded and ripple marked	Kkg		V	40–50	Aquifer	IP, IG, BU, FR, BP, CV	Crossbedded, ripple marks, miliolid grainstone
		Kirschberg Evaporite	Highly altered crystalline limestone, chalky mudstone, occasional grainstone associated with tidal channels; chert (beds and nodules), coarse grained spar, breccia, travertine	Kkke		VI	40–50	Aquifer	IG, MO, VUG, FR, BR, CV	Boxwork porosity with neospar and travertine frame
		Dolomitc	Chert (absent in lower 20 ft), dolomitic mudstone, wackestone, packstone, grainstone	Kkd		VII	90–120	Aquifer	IP, IC, IG, MO, BU, VUG, FR, BP, CV	Massively bedded light gray, *Toucasia* sp., abundant
		Basal nodular	Shaly, nodular, burrowed mudstone, wackestone, packstone, miliolid grainstone, dolomite, contains dark, spherical textural features locally known as BRBs; *Ceratostreon texana*, *Caprina* sp., miliolids, and gastropods	Kkbn		VIII	40–50	Aquifer, confining unit in areas without caves	IP, MO, BU, BP, FR, CV	Massive, nodular and mottled limestone, BRBs and orange wisps, *Ceratostreon* [*Exogyra*] *texana*, seeps and springs, ferns growing near contact of underlying unit
		Upper	Evaporites, wackestone, packstone, miliolid grainstone, argillaceous limestone, heavily bioturbated; occasional dinosaur tracks	Kgrc	of the Trinity aquifer	Cavernous	0–120 (absent in northern Comal County)	Aquifer	MO, BR, BP, FR, CV	Heavily bioturbated, evaporite beds, caves
			Alternating beds of burrowed wackestone, packstone, miliolid grainstone, argillaceous limestone	Kgrcb		Camp Bullis (B)	120–230 (thicker in northern Comal County)	Confining	BU, BP, FR, occasional CV	Alternating beds of limestone and argillaceous limestone, fossils rare, stairstep topography
			Dissolved evaporites, highly altered crystalline limestone and chalky mudstone, breccia, boxwork voids	Kgrue		Upper evaporite (C)	0–10	Aquifer	IP, MO, BU, BR	Weathers to an orangish red with a pebbly texture, often has less cedar growth and thicker grasses, boxwork porosity, springs and seeps

EXPLANATION OF HYDROSTRATIGRAPHIC UNITS

Group or Formation	Formal and informal member		Hydrologic unit or Informal hydrostratigraphic unit
Taylor Group (Pecan Gap)		Kpg	Upper Confining Unit (UCU)
Austin Group		Ka	
Eagle Ford Group		Kef	
Buda Limestone		Kb	
Del Rio Clay		Kdr	
Georgetown Formation		Kg	I
Person Formation	Cyclic and marine, undivided	Kpcm	II
	Leached and collapsed	Kplc	III
	Regional dense member	Kprd	IV
Kainer Formation	Grainstone	Kkg	V
	Kirschberg evaporite	Kkke	VI
	Dolomitic	Kkd	VII
	Basal nodular	Kkbn	VIII
Glen Rose	Upper Glen Rose Limestone	Kgrc	Cavernous
		Kgrcb	Camp Bullis
		Kgrue	Upper evaporite
		Kgruf	Fossiliferous Upper
		Kgrlf	Lower
		Kgrle	Lower evaporite



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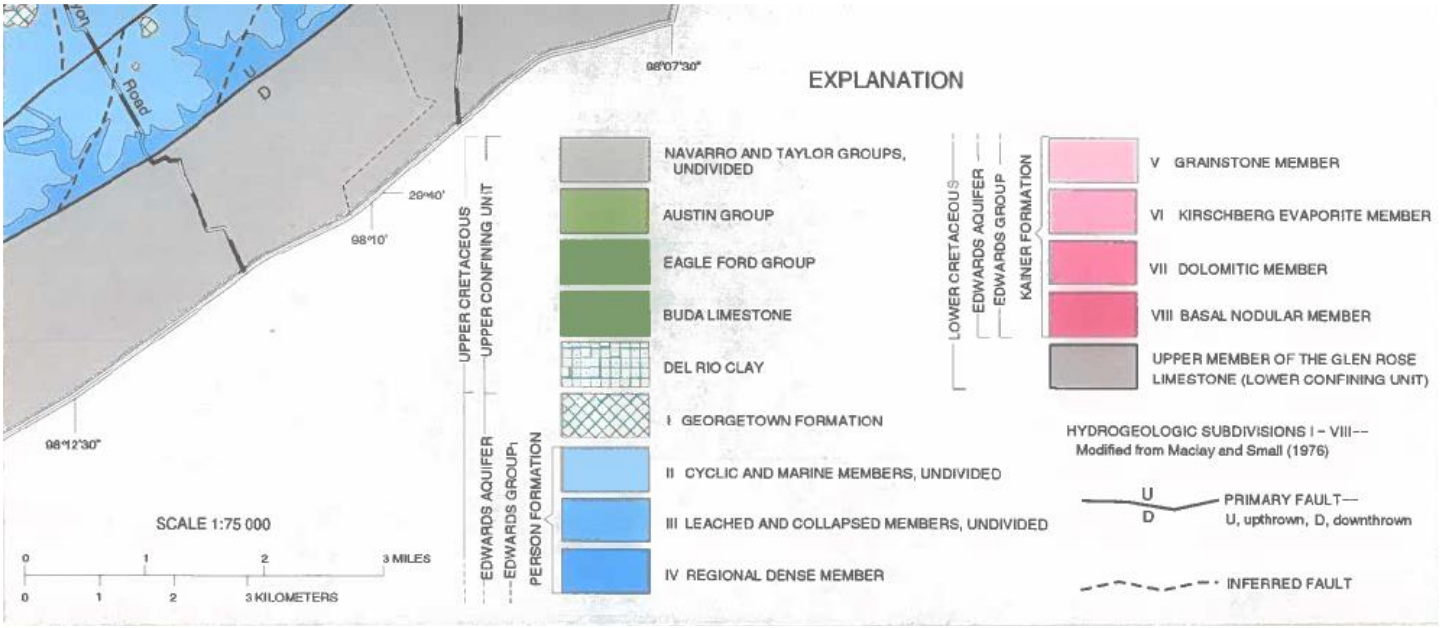
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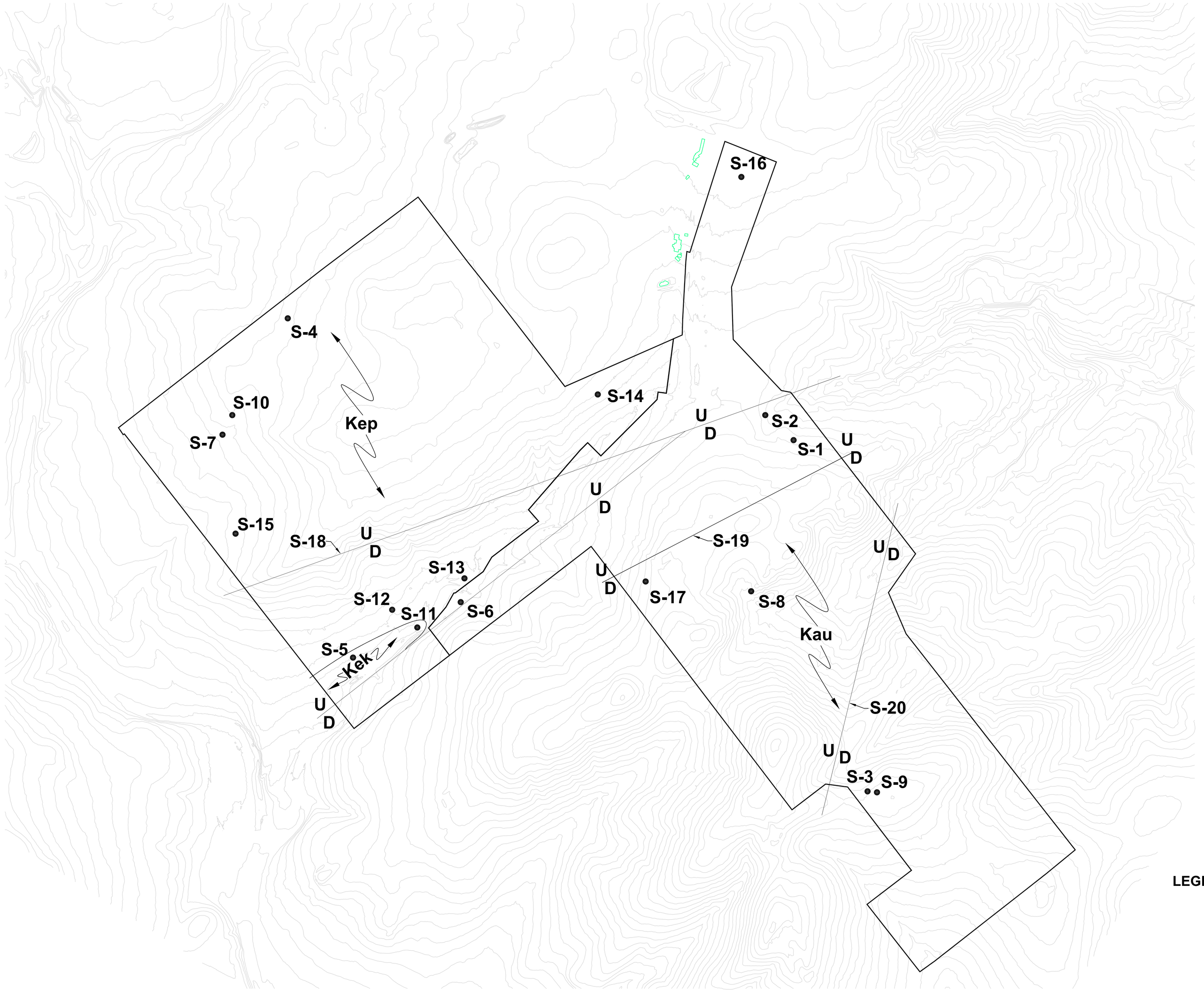
Geologic Map

From USGS "Geologic Map of the Edwards Aquifer Recharge Zone, South-Central Texas"

(Blome, Faith, Pedraza, et al, 2005)

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SCALE 1:75 000
0 1 2 3 MILES
0 1 2 3 KILOMETERS
EXPLANATION
UPPER CRETACEOUS
UPPER CONFINING UNIT
EDWARDS AQUIFER
EDWARDS GROUP
PERSON FORMATION
NAVARRO AND TAYLOR GROUPS, UNDIVIDED
AUSTIN GROUP
EAGLE FORD GROUP
BUDA LIMESTONE
DEL RIO CLAY
I GEORGETOWN FORMATION
II CYCLIC AND MARINE MEMBERS, UNDIVIDED
III LEACHED AND COLLAPSED MEMBERS, UNDIVIDED
IV REGIONAL DENSE MEMBER
LOWER CRETACEOUS
EDWARDS AQUIFER
EDWARDS GROUP
KAINER FORMATION
V GRAINSTONE MEMBER
VI KIRSCHBERG EVAPORITE MEMBER
VII DOLOMITIC MEMBER
VIII BASAL NODULAR MEMBER
UPPER MEMBER OF THE GLEN ROSE LIMESTONE (LOWER CONFINING UNIT)
HYDROGEOLOGIC SUBDIVISIONS I – VIII--
Modified from Maclay and Small (1976)
U
D
PRIMARY FAULT—
U, upthrown, D, downthrown
INFERRED FAULT



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0' 200' 400' 800'

SCALE IN FEET

LEGEND:

Kau - UPPER CRETACEOUS, AUSTIN CHALK FM

Kep - UPPER CRETACEOUS, EDWARDS PERSON FM

Kek - LOWER CRETACEOUS EDWARDS KAINER FM

S-1 - SITE FEATURE LOCATIONS

GEOLOGIC ASSESSMENT
for
CHESMAR HOMES TRACT
STATE HIGHWAY 46 & FM2722
NEW BRAUNFELS, COMAL COUNTY, TX. 78132

STATE OF TEXAS
John Langan
Geology
4871
LICENSED
PROFESSIONAL GEOSCIENTIST
3/21/24

psi
Information To Build On
Engineering • Consulting • Testing
THREE BURWOOD LANE
SAN ANTONIO, TEXAS 78216

REVISIONS:

JOB NO. 04356189
FILE: 04356189.01
DATE: 03/21/24
DESIGN: ~
DRAWN: J LEAL
CHECKED:
SHEET 1 OF 1

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: Chesmar Homes Tract

LOCATION			FEATURE CHARACTERISTICS											EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	29-44-9.5	98-12-51.5	O	5	Kep	120	60	2			3		F	10	15	X		X		Hillside
S-2	29-44-12.4	98-12-55.3	O	5	Kep	150	150	4			3		F	10	15	X		X		Hillside
S-3	29-43-42.8	98-12-51.7	MB/well	30	Kau	1	1	>200						2	32	X		X		Hillside
S-4	29-44-22.2	98-13-40.9	O	5	Kep	80	40	2			2		F	8	13	X		X		Hillside
S-5	29-43-53.1	98-13-31.4	SH	20	Kek	50	50	5					F	20	40		X		X	Drainage
S-6	29-43-57.1	98-13-26.7	F	20	Kek	>5000	20	>200						15	35	X			X	Drainage
S-7	29-44-12.2	98-13-45.3	O	5	Kep	100	75	2			2		F	10	15	X		X		Hillside
S-8	29-43-58.4	98-13-56.3	MB/pond	30	Kbu	110	75	7					F	3	33	X			X	Hillside
S-9	29-43-42	98-12-51.9	MB/septic	30		15	7	6						20	50		X	X		Hillside
S-10	29-44-14	98-13-44	C	30	Kep	1.5	1	35						20	50		X	X		Hillside
S-11	29-43-59.9	98-13-26.2	O	5	Kep	120	20	4						15	20	X			X	Drainage
S-12	29-44-3.3	98-13-28.3	SC	20	Kep	2	2	1						10	30	X		X		Hillside
S-13	29-44-1.8	98-13-21.4	CD	5	Kep	15	15	3						10	15	X		X		Hillside
S-14	29-44-13.3	98-13-12.6	CD	5	Kep	6	4	2						10	15	X		X		Hillside
S-15	29-44-3.1	98-13-40.8	CD	5	Kep	8	6	2						10	15	X		X		Hillside

* DATUM:_____

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

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

12 TOPOGRAPHY

Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed

I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The information presented here complies with that document and is a true representation of the conditions observed in the field.

My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

_____ _____

Date 3/21/24

Sheet 1 of 1

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



GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: Chesmar Homes Tract

LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOD	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-16	29-44-32	98-12-51.57.8	MB/well	30	Kep	0.7	0.7	>100					F	3	33	X		X		Hillside
S-17	29-43-57.6	98-13-2.4	MB/exc	30	Kep	130	80	5			3		F	6	36	X		X		Hillside
S-18	29-44-00	98-13-38.5	F	20	Kep	>5000	20	>50						15	35	X			X	Hillside
S-19	29-44-5.3	98-12-57.1	F	20	Kep	>5000	20	>50						15	35	X			X	Hillside
S-20	29-43-50.9	98-12-48.8	F	20	Kau	>3000	20	>50						15	35	X			X	Hillside

* DATUM:_____

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

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

12 TOPOGRAPHY

Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed

I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The information presented here complies with that document and is a true representation of the conditions observed in the field.

My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

___ _____

Date 3/21/24

Sheet 1 of 1

STATE OF TEXAS
John Langan
Geology
4871
LICENSED
PROFESSIONAL GEOSCIENTIST
3/21/24

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



1. View of fractured rock outcrop feature S-1, located on the east side of the 438- acre property on Highway 46 in New Braunfels, Texas.



2. View of fractured rock outcrop feature S-2, located on the east side of the 438- acre property on Highway 46 in New Braunfels, Texas.



3. View of water well Feature S-3, located in the southwest portion of the tract.



4. View of outcrop Feature (S-4) located in the northern portion of the site.



5. View of sinkhole feature (S-5) located in the southwestern portion of the square tract portion of the 438-acre site at 29-43-53.1; -98-13-31.4



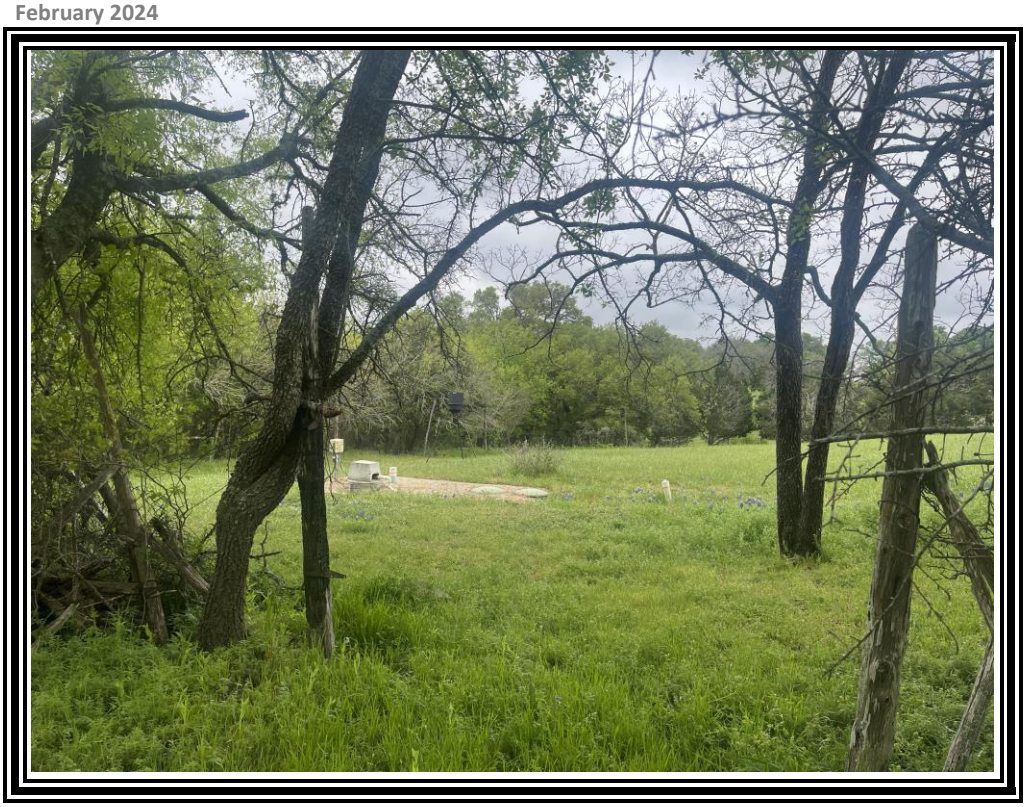
6. Another view of Feature S-5.



7. View of fault line (Feature S-6) on the south side of the Dry Comal Creek tributary on the south side of the square portion of the tract.



8. View of pond (Feature S-8) located on the south-central portion of the tract.



9. View of MM septic tank Feature S-9, in the southwest portion of the site, at 23-41-42; -9812-51.9.



10. View of cave feature S-10 located in the northern portion of the tract. Rock appeared to be placed in opening to restrict access.



11. View inside cave (Feature S-10). Significant air flow was noted at the opening, suggesting an extensive feature.



12. View of fractured rock outcrop feature S-11 located in a drainage along fault line feature S-6.



13. View of solution cavity (Feature S-12) on the south-central portion of the square part of the tract (29-44-3.3; -98-13-28.3).



14. View of closed depression feature S-13 located on the southern portion of the square tract (29-44-1.8; -98-13-21.4). The feature may be from vegetation/tree clearing activities in the area.



15. View of small closed depression (Feature S-14) on the east side of tract (29-44-13.3; -98-13-12.6).



16. View of small closed depression (Feature S-15) on the west side of tract (29-44-3.1; -98-13-40.8). These c/d features appear to be from vegetation/tree clearing activities throughout the tract.

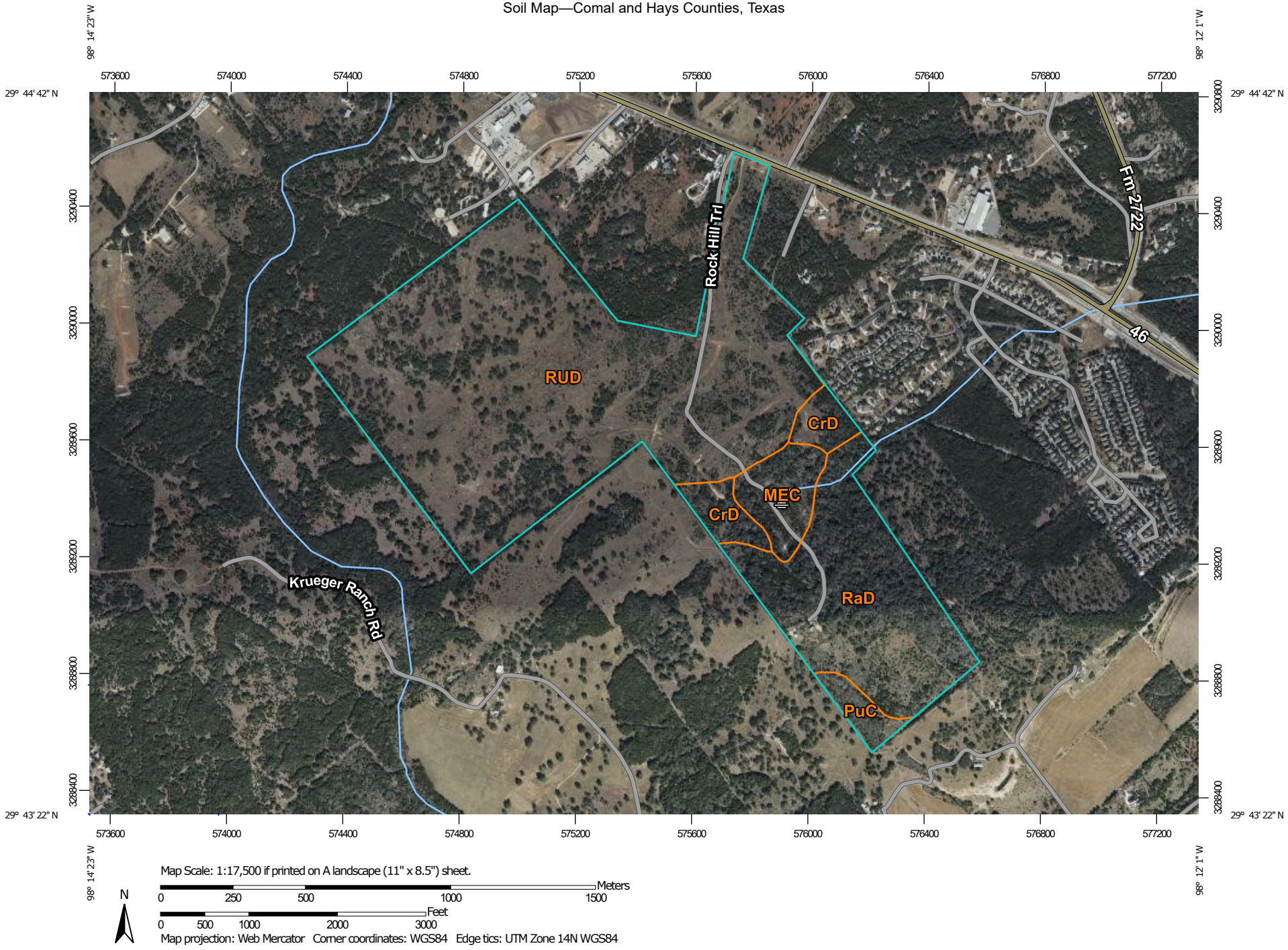


17. View of capped well (Feature S-16) on the entryway just south of Highway 46 (29-44-32; -98-12-57.8).



18. View of MM excavated Feature S-17 located in the west central portion of the tract.

Soil Map—Comal and Hays Counties, Texas



MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

Soil Survey Area: Comal and Hays Counties, Texas
Survey Area Data: Version 20, Sep 5, 2023

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

Date(s) aerial images were photographed: Dec 10, 2020—Jan 15, 2021

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CrD	Comfort-Rock outcrop complex, 1 to 8 percent slopes	18.2	4.2%
MEC	Medlin, warm-Eckrant association, 1 to 8 percent slopes	19.3	4.5%
PuC	Purves clay, 1 to 5 percent slopes	8.0	1.8%
RaD	Real gravelly loam, 1 to 8 percent slopes	92.2	21.2%
RUD	Rumple-Comfort, rubbly association, 1 to 8 percent slopes	296.1	68.3%
Totals for Area of Interest		**433.7**	**100.0%**

MODIFICATION OF A PREVIOUSLY APPROVED WATER POLLUTION ABATEMENT PLAN (TCEQ-0590)

Modification of a Previously Approved Plan

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Transition Zone and Relating to 30 TAC 213.4(j), 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 request for a **Modification of a Previously Approved Plan** is hereby submitted for TCEQ review and executive director approval. The request was prepared by:

Print Name of Customer/Agent: Hayden Fowlkes, P.E.

Date: 8/18/2025

Signature of Customer/Agent:



Project Information

1. Current Regulated Entity Name: Purlsong Units 2 & 3
   Original Regulated Entity Name: Purlsong Phase 1
   Regulated Entity Number(s) (RN): 112110507
   Edwards Aquifer Protection Program ID Number(s): 13002046
   ☒ The applicant has not changed and the Customer Number (CN) is: 605592310
   ☐ The applicant or Regulated Entity has changed. A new Core Data Form has been provided.

2. ☒ **Attachment A: Original Approval Letter and Approved Modification Letters**. A copy of the original approval letter and copies of any modification approval letters are attached.

3. A modification of a previously approved plan is requested for (check all that apply):
   - ☒ Physical or operational modification of any water pollution abatement structure(s) including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;
   - ☐ Change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;
   - ☒ Development of land previously identified as undeveloped in the original water pollution abatement plan;
   - ☐ Physical modification of the approved organized sewage collection system;
   - ☐ Physical modification of the approved underground storage tank system;
   - ☐ Physical modification of the approved aboveground storage tank system.

4. ☒ Summary of Proposed Modifications (select plan type being modified). If the approved plan has been modified more than once, copy the appropriate table below, as necessary, and complete the information for each additional modification.

WPAP Modification Summary	***Approved Project***	***Proposed Modification***
Acres	157.55	100.03
Type of Development	Residential	Residential
Number of Residential Lots	152	104
Impervious Cover (acres)	52.71	53.96
Impervious Cover (%	33.46	53.94
Permanent BMPs	2x Batch Detention Basins; 5x Interim VFS	4x Batch Detention Basins; 7x 15' Engineered VFS
Other	3x 15' Engineered VFS	_____

SCS Modification Summary	***Approved Project***	***Proposed Modification***
Linear Feet	_____	_____
Pipe Diameter	_____	_____
Other	_____	_____

AST Modification Summary	***Approved Project***	***Proposed Modification***
Number of ASTs	_____	_____
Volume of ASTs	_____	_____
Other	_____	_____

UST Modification Summary	***Approved Project***	***Proposed Modification***
Number of USTs	_____	_____
Volume of USTs	_____	_____
Other	_____	_____

5. ☒ **Attachment B: Narrative of Proposed Modification**. A detailed narrative description of the nature of the proposed modification is attached. It discusses what was approved, including any previous modifications, and how this proposed modification will change the approved plan.

6. ☒ **Attachment C: Current Site Plan of the Approved Project**. A current site plan showing the existing site development (i.e., current site layout) at the time this application for modification is attached. A site plan detailing the changes proposed in the submitted modification is required elsewhere.
   - ☐ The approved construction has not commenced. The original approval letter and any subsequent modification approval letters are included as Attachment A to document that the approval has not expired.
   - ☐ The approved construction has commenced and has been completed. Attachment C illustrates that the site was constructed as approved.
   - ☐ The approved construction has commenced and has been completed. Attachment C illustrates that the site was **not** constructed as approved.
   - ☒ The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was constructed as approved.
   - ☐ The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was **not** constructed as approved.

7. ☒ The acreage of the approved plan has increased. A Geologic Assessment has been provided for the new acreage.
   ☐ Acreage has not been added to or removed from the approved plan.

8. ☒ 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

Brooke Paup, *Chairwoman*
Bobby Janecka, *Commissioner*
Catarina R. Gonzales, *Commissioner*
Kelly Keel, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 3, 2025

Mr. Colby Mullins
Chesmar Homes, LLC
211 N Loop 1604 #175
San Antonio, Texas 78323

Re: Approval of a Water Pollution Abatement Plan (WPAP) for the Edwards Aquifer Protection Program
Purlsong Phase 1; Located SW of FM 2722 and SH 46; Comal County, Texas
Edwards Aquifer Protection Program ID: 13002046, Regulated Entity No. RN112110507

Dear Mr. Mullins:

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 Consulting Engineers, LLC on behalf of the applicant, Chesmar Homes, LLC on January 6, 2025. Final review of the application was completed after additional material was received on March 14, 2025 and March 27, 2025.

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.

PROJECT DESCRIPTION

The proposed mixed-use project will have an area of approximately 157.55 acres. The project will include clearing, mass grading with stockpiles, excavation, installation of utilities and drainage improvements, and construction of 148 single-family residential lots and 6 multi-family condominium lots, consisting of 58 total condos, with associated streets, hardscapes, landscape, and site clean-up. The impervious cover will be 52.71 acres (33.46 percent). Project wastewater for the single-family residential lots will be disposed of by conveyance to the future Purlsong wastewater treatment plant. Project wastewater for the condominium lots will be disposed of by on-site sewage facilities. According to a letter dated, December 2, 2024, signed

by Robert Boyd, P.E., with Comal County, the site in the development is acceptable for the use of on-site sewage facilities.

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, two batch detention basins, three engineered vegetative filter strips, and five interim 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 to treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 47,312 pounds of TSS generated from the 52.71 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 are the Kainer Formation, Austin Chalk, Eagle Ford Shale, and Buda Limestone. No sensitive geologic features were identified in the GA located within the project site boundaries. The site assessment conducted on February 27, 2025 by TCEQ staff determined the site to be generally as described by the GA.

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.

<u>During Construction:</u>

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.

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 Mr. Joshua Vacek of the Edwards Aquifer Protection Program at 210-403-4028 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/jv

cc: Ms. Jocelyn Perez, P.E.

ATTACHMENT B

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification &
Sewage Collection System Application

Attachment B – Narrative of Proposed Modification

Purlsong Units 2 & 3 is a modification of the Purlsong Phase 1 Water Pollution Abatement Plan (WPAP) previously approved by the Texas Commission on Environmental Quality (TCEQ) on April 03, 2025 (EAPP ID No. 13002046). This 100.03-acre project site is located approximately 0.76 miles NW of the FM 2722 and State Highway 46 intersection in Comal County, Texas, and is entirely over the Edwards Aquifer Recharge Zone.

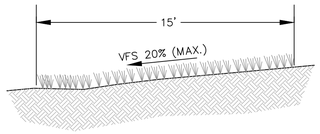
This WPAP MOD proposes a modification by adding to the approved project limits, impervious cover, and removal of the interim vegetive filter strips with level spreaders (EAPP ID No. 13002046). The storm water associated with approved watersheds "O" and "P" are to be routed to and treated by "U1 Basin 1" and "U1 Basin 2", respectively, in the development. Refer to included TSS summary table and calculations for details. Additional regulated activities include clearing, mass grading with stockpiles, grading, excavation, installation of utilities and drainage improvements, construction of four (4) batch detention basins, eight (8) condominium lots, 96 single family residential homes with associated streets, hardscapes, landscape, and site clean-up. Approximately 53.96-acres of impervious cover, or 53.94% of the 100.03-acre project limits are proposed for construction in this WPAP MOD.

Development proposed will include four (4) batch detention basins and seven (7) 15' engineered vegetative filter strips (VFS) as the Permanent Best Management Practice (PBMP) for this project. All PBMPs have been designed in accordance with the TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in TSS from the site.

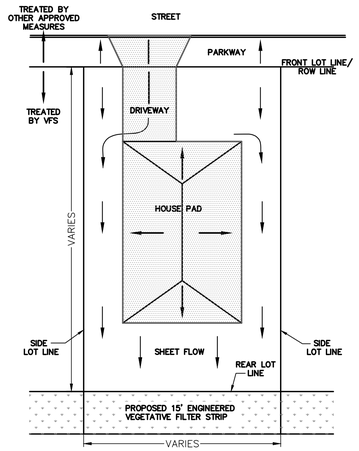
ATTACHMENT C

Treatment Summary by Watershed

Watershed	Total Watershed Area (ac.)	Proposed Impervious Cover to Treat (ac.)	PBMP	Required TSS Removal Annually (lbs)	TSS Removed Annually (lbs)
A	34.20	18.68	Batch Detention Basin 1	16,767	18,382
B	68.43	25.19	Batch Detention Basin 2	22,611	23,783
C	3.20	2.07	Engineered Vegitative Filter Strips (VFS)	1,858	2,026
D	1.44	1.30	Engineered Vegitative Filter Strips (VFS)	1,167	1,264
E	0.77	0.15	Interim VFS	135	135
F	2.06	0.41	Interim VFS	368	368
G	1.23	0.20	Interim VFS	180	180
H	1.95	0.39	Interim VFS	350	350
I	1.31	0.22	Interim VFS	197	197
J	3.56	2.31	Overtreatment	2,073	0
K	0.77	0.58	Overtreatment	521	0
M	1.86	1.21	Engineered Vegitative Filter Strips (VFS)	1,086	1,184
N	18.00	0.00	Grading Only	0	
O	18.77	0.00	Grading Only	0	
TOTAL	157.55	**52.71**	---	47,312	**47,869**



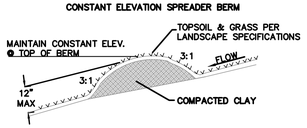
15' WIDE ENGINEERED VEGETATIVE FILTER STRIP DETAIL
N.T.S.



TYPICAL LOT DRAINAGE DETAIL FOR FHA TYPE C LOTS
Not to Scale

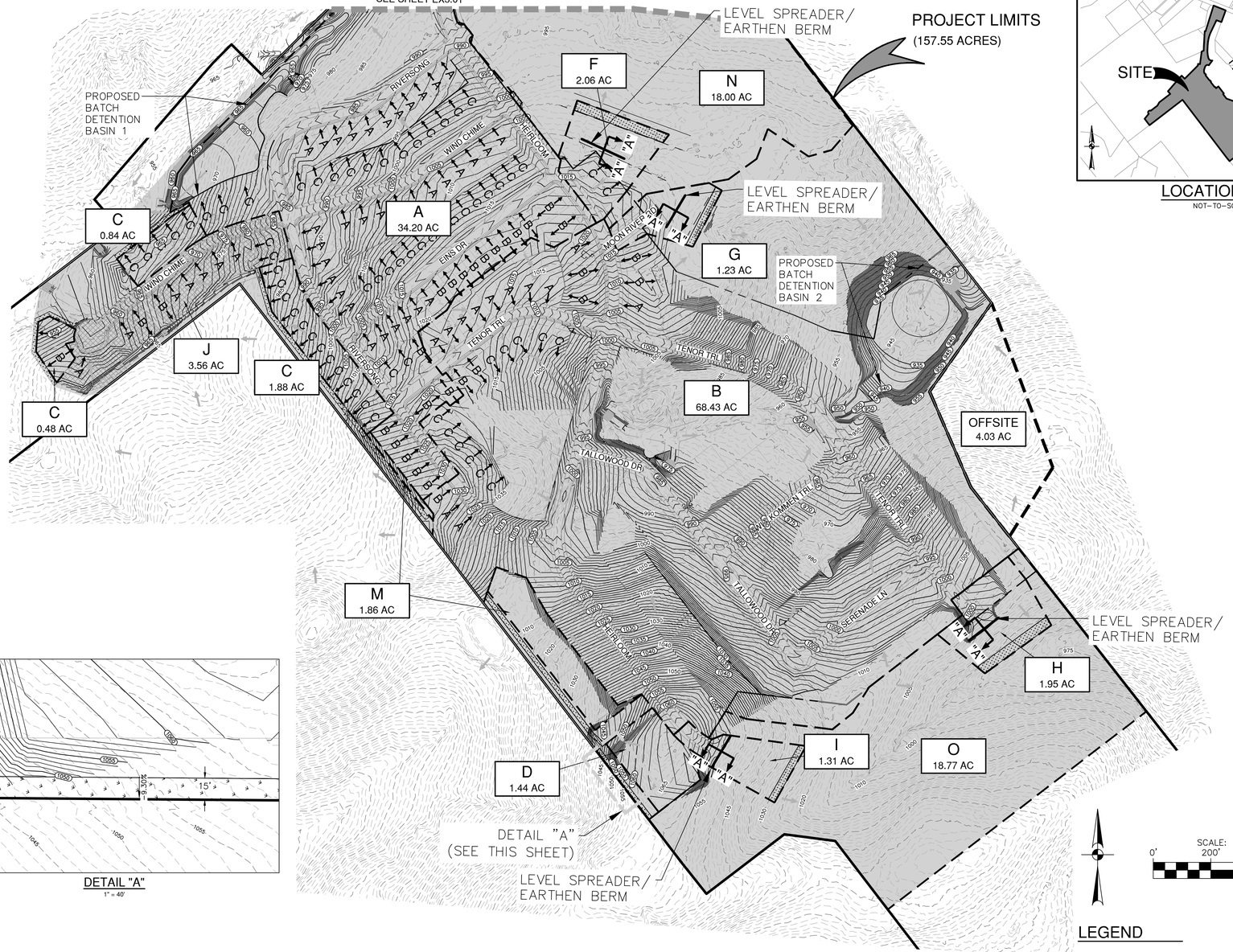
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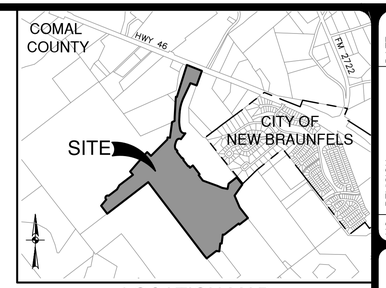
CONSTANT ELEVATION SPREADER BERM



SECTION "A-A"
LEVEL SPREADER/EARTHEN BERM
N.T.S.

DETAIL "A"
1" = 40'





LOCATION MAP
NOT-TO-SCALE

SCALE: 1"= 200' 0' 200' 400' 600'

LEGEND

- DISTURBED AREA
- EXISTING CONTOUR — 690
- PROPOSED CONTOUR — 970
- 100 YR FLOODPLAIN
- DRAINAGE AREA BOUNDARY
- FHA LOT GRADING TYPE — A,B,C
- DIRECTION OF FLOW
- WATERSHED — A
- VEGETATIVE FILTER STRIPS
- UNCAPTURED IMPERVIOUS COVER
- POTENTIAL RECHARGE FEATURE — S-#

SUMMARY OF PERMANENT POLLUTION ABATEMENT MEASURES

1.) TEMPORARY BMP'S WILL BE MAINTAINED UNTIL THE SITE IMPROVEMENTS ARE COMPLETED AND THE SITE HAS BEEN STABILIZED, INCLUDING SUFFICIENT VEGETATION BEING ESTABLISHED.

2.) DURING CONSTRUCTION, TO THE EXTENT PRACTICAL, CONTRACTOR SHALL MINIMIZE THE AREA OF SOIL DISTURBANCE. AREAS OF DISTURBED SOIL SHALL BE REVEGETATED TO STABILIZE SOIL USING SOLID SOD IN A STAGGERED PATTERN. SEE DETAIL ON TEMPORARY POLLUTION ABATEMENT DETAIL SHEET AND REFER TO SECTION 1.3.11 IN TCEQ'S TECHNICAL GUIDANCE MANUAL RG-348 (2005). SOD SHOULD BE USED IN CHANNELS AND ON SLOPES > 15%. THE CONTRACTOR MAY SUBSTITUTE THE USE OF SOD WITH THE PLACEMENT OF TOP SOIL AND A FRIABLE SEED BED WITH A PROTECTIVE MATTING OR HYDRAULIC MULCH ALONG WITH WATERING UNTIL VEGETATION IS ESTABLISHED. APPLICATIONS AND PRODUCTS SHALL BE THOSE APPROVED BY TXDOT AS OF FEBRUARY 2001 AND IN COMPLIANCE WITH THE TGM RG-348 (2005). SEED MIXTURE AND/OR GRASS TYPE TO BE DETERMINED BY OWNER AND SHOULD BE IN COMPLIANCE WITH TGM RG-348 (2005) GUIDELINES. IRRIGATION MAY BE REQUIRED IN ORDER TO ESTABLISH SUFFICIENT VEGETATION.

3.) FOR DISTURBED AREAS WHERE INSUFFICIENT SOIL EXISTS TO ESTABLISH VEGETATION, CONTRACTOR SHALL PLACE A MINIMUM OF 6" OF TOPSOIL PRIOR TO REVEGETATION.

4.) PERMANENT BMPS FOR THIS SITE INCLUDE TWO BATCH DETENTION BASINS AND THREE VEGETATIVE FILTER STRIPS (VFS). THESE PERMANENT BMPS HAVE BEEN DESIGNED TO REMOVE AT LEAST 80% OF THE INCREASED TOTAL SUSPENDED SOLIDS (TSS) FOR THE SITE IN ACCORDANCE WITH THE TCEQ'S TECHNICAL GUIDANCE MANUAL (TGM) RG-348 (2005).

5.) TYPICAL SLOPES ON THIS PROJECT RANGE FROM APPROXIMATELY 2% TO 33%.

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CLAY SPECIFICATIONS

PROPERTY	TEST METHOD	SPECIFICATION
PERMEABILITY (CM/SEC)	ASTM D 2434	1 X 10^{-5}
PLASTICITY INDEX OF CLAY (%)	ASTM D 423/D 424	NOT LESS THAN 15
LIQUID LIMIT OF CLAY (%)	ASTM D 2216	NOT LESS THAN 30
CLAY PARTICLES PASSING (%)	ASTM D 422	NOT LESS THAN 30
CLAY COMPACTION (%)	ASTM D 2216	95% OF STANDARD PROCTOR DENSITY

NO.	REVISION	DATE

12-04-2024
STATE OF TEXAS
JOCELYN PEREZ
98367
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
NEW BRAUNFELS | SAN ANTONIO | AUSTIN | HOUSTON | FT WORTH | DALLAS
1672 INDEPENDENCE DR, STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG PHASE 1
COMAL COUNTY, TEXAS

WATER POLLUTION ABATEMENT PLAN
PERMANENT POLLUTION ABATEMENT PLAN

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE WATER POLLUTION ABATEMENT PLANS (WPAP) REGULATIONS.

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EXHIBIT 3

PLAT NO.
JOB NO. 30041-18
DATE OCTOBER 2024
DESIGNER GDL
CHECKED HF DRAWN
SHEET EX3.00

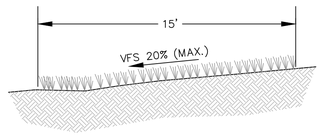
FOR PERMIT

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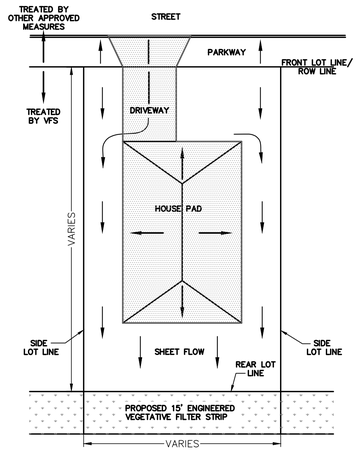
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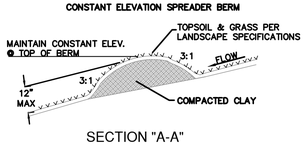
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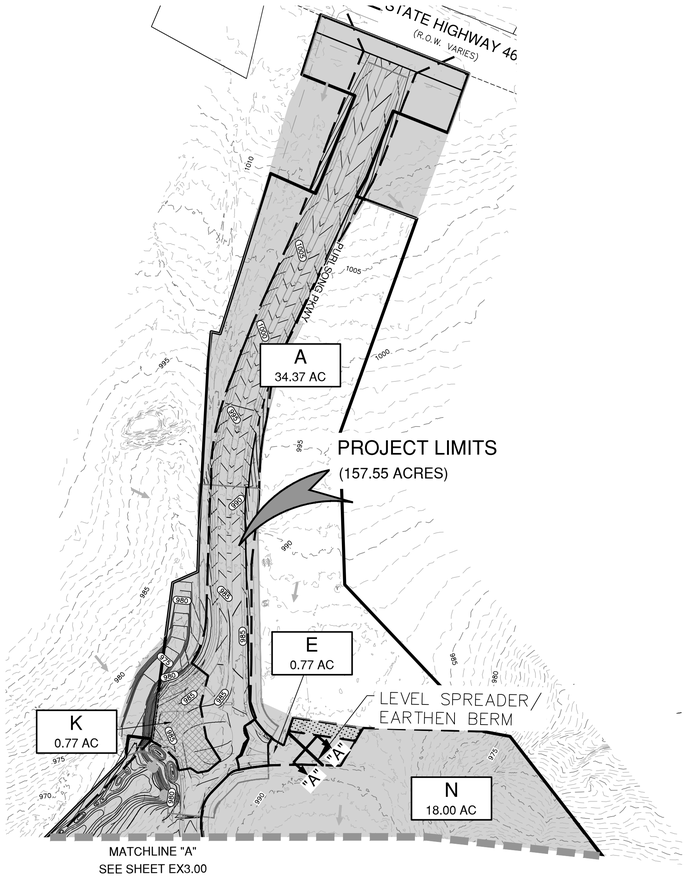
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MATCHLINE "A"
SEE SHEET EX3.00

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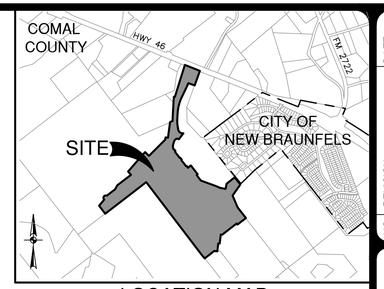
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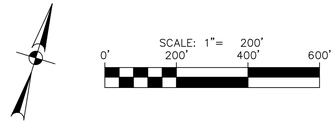
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LOCATION MAP
NOT-TO-SCALE



LEGEND

- DISTURBED AREA
- EXISTING CONTOUR — 690
- PROPOSED CONTOUR — 970
- 100 YR FLOODPLAIN
- DRAINAGE AREA BOUNDARY
- FHA LOT GRADING TYPE — A,B,C
- DIRECTION OF FLOW
- WATERSHED — A
- VEGETATIVE FILTER STRIPS
- UNCAPTURED IMPERVIOUS COVER
- POTENTIAL RECHARGE FEATURE — S-#

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EXHIBIT 3

NO.	REVISION	DATE

12-04-2024

STATE OF TEXAS
JOCELYN PEREZ
98367
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON ENGINEERS
NEW BRAUNFELS | SAN ANTONIO | AUSTIN | HOUSTON | FT WORTH | DALLAS
1672 INDEPENDENCE DR, STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5633
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG PHASE 1
COMAL COUNTY, TEXAS

WATER POLLUTION ABATEMENT PLAN
PERMANENT POLLUTION ABATEMENT PLAN

PLAT NO.
JOB NO. 30041-18
DATE OCTOBER 2024
DESIGNER GDL
CHECKED HF DRAWN
SHEET EX3.01

FOR PERMIT

Date: Mar 14, 2025, 1:15pm User ID: gtolmer
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WATER POLLUTION ABATEMENT PLAN APPLICATION FORM (TCEQ-0584)

Water Pollution Abatement Plan Application

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(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 **Water Pollution Abatement Plan Application Form** is hereby submitted for TCEQ review and Executive Director approval. The form was prepared by:

Print Name of Customer/Agent: Hayden Fowlkes. P.E.

Date: 8/18/2025

Signature of Customer/Agent:



Regulated Entity Name: Purlsong Units 2 & 3

Regulated Entity Information

1. The type of project is:

   ☒ Residential: Number of Lots:104 (96xSingle Family, 8xCondominium Lots w/ 81 Units)
   ☒ Residential: Number of Living Unit Equivalents:177
   ☐ Commercial
   ☐ Industrial
   ☐ Other:_____

2. Total site acreage (size of property):100.03

3. Estimated projected population:708 (4x96 Single Family, 4x81 Condominium Units)

4. The amount and type of impervious cover expected after construction are shown below:

Table 1 - Impervious Cover Table

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	847,246	÷ 43,560 =	19.45
Parking	98,445	÷ 43,560 =	2.26
Other paved surfaces	1,404,807	÷ 43,560 =	32.25
Total Impervious Cover	2,350,498	÷ 43,560 =	53.96

Total Impervious Cover 53.96 **÷ Total Acreage** 100.03 **X 100 =** 53.94**% Impervious Cover**

5. ☒ **Attachment A - Factors Affecting Surface Water Quality**. A detailed description of all factors that could affect surface water and groundwater quality that addresses ultimate land use is attached.

6. ☒ Only inert materials as defined by 30 TAC §330.2 will be used as fill material.

For Road Projects Only

Complete questions 7 - 12 if this application is exclusively for a road project.

7. Type of project:

   ☐ TXDOT road project.
   ☐ County road or roads built to county specifications.
   ☐ City thoroughfare or roads to be dedicated to a municipality.
   ☐ Street or road providing access to private driveways.

8. Type of pavement or road surface to be used:

   ☐ Concrete
   ☐ Asphaltic concrete pavement
   ☐ Other: _____

9. Length of Right of Way (R.O.W.): _____ feet.

   Width of R.O.W.: _____ feet.
   L x W = _____ Ft^2 ÷ 43,560 Ft^2/Acre = _____ acres.

10. Length of pavement area: _____ feet.

    Width of pavement area: _____ feet.
    L x W = _____ Ft^2 ÷ 43,560 Ft^2/Acre = _____ acres.
    Pavement area _____ acres ÷ R.O.W. area _____ acres x 100 = _____% impervious cover.

11. ☐ A rest stop will be included in this project.

    ☐ A rest stop will not be included in this project.

12. ☐ Maintenance and repair of existing roadways that do not require approval from the TCEQ Executive Director. Modifications to existing roadways such as widening roads/adding shoulders totaling more than one-half (1/2) the width of one (1) existing lane require prior approval from the TCEQ.

Stormwater to be generated by the Proposed Project

13. ☒ **Attachment B - Volume and Character of Stormwater**. A detailed description of the volume (quantity) and character (quality) of the stormwater runoff which is expected to occur from the proposed project is attached. The estimates of stormwater runoff quality and quantity are based on the area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and post-construction conditions.

Wastewater to be generated by the Proposed Project

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

100% Domestic	53,100 Gallons/day
_____% Industrial	_____Gallons/day
_____% Commingled	_____Gallons/day

TOTAL gallons/day 53,100 (177 LUE x 300 gpd/LUE)

15. Wastewater will be disposed of by:

☒ On-Site Sewage Facility (OSSF/Septic Tank):

☒ **Attachment C - Suitability Letter from Authorized Agent**. An on-site sewage facility will be used to treat and dispose of the wastewater from this site. The appropriate licensing authority's (authorized agent) written approval is attached. It states that the land is suitable for the use of private sewage facilities and will meet or exceed the requirements for on-site sewage facilities as specified under 30 TAC Chapter 285 relating to On-site Sewage Facilities.

☐ Each lot in this project/development is at least one (1) acre (43,560 square feet) in size. The system will be designed by a licensed professional engineer or registered sanitarian and installed by a licensed installer in compliance with 30 TAC Chapter 285.

☒ Sewage Collection System (Sewer Lines):

☐ Private service laterals from the wastewater generating facilities will be connected to an existing SCS.

☐ Private service laterals from the wastewater generating facilities will be connected to a proposed SCS.

☐ The SCS was previously submitted on_____.

☒ The SCS was submitted with this application.

☐ The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to Executive Director approval.

☒ The sewage collection system will convey the wastewater to the Purlsong Wastewater (name) Treatment Plant. The treatment facility is:

☐ Existing.
☒ Proposed.

16. ☒ All private service laterals will be inspected as required in 30 TAC §213.5.

Site Plan Requirements

Items 17 – 28 must be included on the Site Plan.

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

Site Plan Scale: 1" = 200'.

18. 100-year floodplain boundaries:

☐ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
☒ No part of the project site is located within the 100-year floodplain.
The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s): FEMA FIRM Panel No. 48091C0430F Dated 09/01/2009

19. ☒ The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Lots, recreation centers, buildings, roads, open space, etc. are shown on the plan.

☐ The layout of the development is shown with existing contours at appropriate, but not greater than ten-foot intervals. Finished topographic contours will not differ from the existing topographic configuration and are not shown. Lots, recreation centers, buildings, roads, open space, etc. are shown on the site plan.

20. All known wells (oil, water, unplugged, capped and/or abandoned, test holes, etc.):

☐ There are _____ (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply)

☐ The wells are not in use and have been properly abandoned.
☐ The wells are not in use and will be properly abandoned.
☐ The wells are in use and comply with 16 TAC §76.

☒ There are no wells or test holes of any kind known to exist on the project site.

21. Geologic or manmade features which are on the site:

☒ All sensitive geologic or manmade features identified in the Geologic Assessment are shown and labeled.
☐ No sensitive geologic or manmade features were identified in the Geologic Assessment.
☐ **Attachment D - Exception to the Required Geologic Assessment**. A request and justification for an exception to a portion of the Geologic Assessment is attached.

22. ☒ The drainage patterns and approximate slopes anticipated after major grading activities.

23. ☒ Areas of soil disturbance and areas which will not be disturbed.

24. ☒ Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.

25. ☒ Locations where soil stabilization practices are expected to occur.

26. ☐ Surface waters (including wetlands).

    ☒ N/A

27. ☐ Locations where stormwater discharges to surface water or sensitive features are to occur.

    ☒ There will be no discharges to surface water or sensitive features.

28. ☒ Legal boundaries of the site are shown.

Administrative Information

29. ☒ 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.

30. ☒ Any modification of this WPAP will require Executive Director approval, prior to construction, and may require submission of a revised application, with appropriate fees.

ATTACHMENT A

Attachment A – Factors Affecting Water Quality

Potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the site during construction include:

- Soil erosion due to the clearing of the site;
- Oil, grease, fuel and hydraulic fluid contamination from construction equipment and vehicle drippings;
- Hydrocarbons from asphalt paving operations;
- Miscellaneous trash and litter from construction workers and material wrappings;
- Concrete truck washout.
- Potential overflow/spills from portable toilets

Potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the site after development include:

- Oil, grease, fuel and hydraulic fluid contamination from vehicle drippings;
- Dirt and dust which may fall off vehicles; and
- Miscellaneous trash and litter.

ATTACHMENT B

Attachment B – Volume and Character of Stormwater

Stormwater runoff will increase as a result of this development. For a 25-year storm event, the overall project will generate approximately 978.1 cfs, an increase from 793.1 cfs prior to development. Measures will be placed to decrease stormwater flows to or below original values. The runoff coefficient for the site changes from approximately 0.42 before development to 0.68 after development. Values are based on the Rational Method using runoff coefficients per the City of New Braunfels Drainage Manual.

ATTACHMENT C

COMAL COUNTY
ENGINEER'S OFFICE

June 12, 2025

Greg Latimer, P.E.
Pape-Dawson Engineers
via e-mail: glatimer@pape-dawson.com

Re: Purlsong Phase 2 WPAP On-Site Sewage Facility Suitability Letter, within Comal County, Texas

Dear Mr. Latimer:

In accordance with TAC §213.5(b)(4)(F)(ii), Comal County has found that the entire referenced site is suitable for the use of private sewage facilities, with the exception of the areas identified below, and will meet the special requirements for on-site sewage facilities located on the Edwards Aquifer recharge zone as specified in TAC §285.40-42 based on the following information submitted to our office on December 2, 2024:

- The Geologic Assessment, prepared by Professional Service Industries, Inc.
- The Water Pollution Abatement Plan prepared by Pape-Dawson Engineers

Areas that are not Suitable:

Feature ID	Latitude	Longitude
S-9	29°43'42"	98°12'51.9"

In accordance with TAC §285.91, Table X, Minimum Required Separation Distances for soil absorption systems, unlined ET beds, surface application (edge of spray area), and drip irrigation disposal systems are not suitable within 150' of these sensitive features. Furthermore, tanks, lined ET beds and sewer pipe with watertight joints are not allowed within 50' of these sensitive features.

Finally, according to TAC §285.42(a), if any recharge feature is discovered during construction of an OSSF, all regulated activities near the feature shall be suspended immediately. The owner shall immediately notify the TCEQ San Antonio office of the discovery of the feature. All activities regulated under TAC §213 shall not proceed near the feature until Comal County, in conjunction with the TCEQ San Antonio office, has reviewed and approved a plan proposed to protect the feature, the structural integrity of the OSSF, and the water quality of the aquifer. The plan shall be sealed, signed, and dated by a professional engineer.

195 David Jonas Dr, New Braunfels, Texas, 78132 – Phone (830) 608-2090

If you have any questions or need additional information, please do not hesitate to contact our office.

Sincerely,

Margaret Skulteti, P.E.
Comal County Assistant Engineer

cc: Scott Haag, Comal County Commissioner Precinct No. 2

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. 1+

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

Regulated Entity Name: Purlsong Units 2 & 3

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

Customer Information

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

   Contact Person: Amy Uniacke
   Entity: Guadalupe-Blanco River Authority
   Mailing Address: 2225 E. Common Street
   City, State: New Braunfels, TX Zip: 78130
   Telephone: 830-379-5822 Fax: _____
   Email Address: auniacke@gbra.org
   The appropriate regional office must be informed of any changes in this information within 30 days of the change.

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

   Contact Person: Hayden Fowlkes, P.E.
   Texas Licensed Professional Engineer's Number: 127195
   Entity: Pape-Dawson Consulting Engineers, Inc.
   Mailing Address: 1672 Independence Dr, Ste. 102
   City, State: New Braunfels, TX Zip: 78132
   Telephone: 830-672-5633 Fax: _____
   Email Address: hfowlkes@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):

   ☒ Residential: Number of single-family lots: 96
   ☐ 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:

100 % Domestic	28,800 gallons/day
_____% Industrial	_____ gallons/day
_____% Commingled	_____ gallons/day

   Total gallons/day: 28,800 (96 LUE x 300 gpd/LUE)

6. Existing and anticipated infiltration/inflow is 300 gpd/acre. This will be addressed by: adequate sizing of the sewer main.

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

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

8. Pipe description:

Table 1 - Pipe Description

Pipe Diameter(Inches)	*Linear Feet (1)*	*Pipe Material (2)*	*Specifications (3)*
8" GRAVITY	3,626.07	PVC, SDR 26	ASTM D3034, ASTM D3212
8" PRESSURE RATED (160 psi)	465	PVC, SDR 26	ASTM D2241, ASTM D3139, ASTM C1173

Total Linear Feet: 4,091.07

(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 Purlsong Wastewater (name) Treatment Plant. The treatment facility is:

   ☐ Existing
   ☒ Proposed

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

    ☐ The City of _____standard specifications.
    ☒ Other. Specifications are attached.

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

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

Alignment

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

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

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

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

Manholes and Cleanouts

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

Table 2 - Manholes and Cleanouts

Line	*Shown on Sheet*	*Station*	*Manhole or Clean-out?*
SEE ATTACHED	Of		
	Of		
	Of		
	Of		
	Of		
	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. ☒ The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = 200 '.

19. ☒ The Site Plan must include the sewage collection system general layout, including manholes with station numbers, and sewer pipe stub outs (if any). Site plan must be overlain by topographic contour lines, using a contour interval of not greater than ten feet and showing the area within both the five-year floodplain and the 100-year floodplain of any drainage way.

20. Lateral stub-outs:

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

21. Location of existing and proposed water lines:

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

22. 100-year floodplain:

☒ After construction is complete, no part of this project will be in or cross a 100-year floodplain, either naturally occurring or manmade. (Do not include streets or concrete-lined channels constructed above of sewer lines.)

☐ After construction is complete, all sections located within the 100-year floodplain will have water-tight manholes. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Table 3 - 100-Year Floodplain

Line	*Sheet*	*Station*
	of	to
	of	to
	of	to
	of	to

23. 5-year floodplain:

☒ After construction is complete, no part of this project will be in or cross a 5-year floodplain, either naturally occurring or man-made. (Do not include streets or concrete-lined channels constructed above sewer lines.)

☐ After construction is complete, all sections located within the 5-year floodplain will be encased in concrete or capped with concrete. These locations are listed in the table below and are shown and labeled on the Site Plan. (Do not include streets or concrete-lined channels constructed above sewer lines.)

Table 4 - 5-Year Floodplain

Line	*Sheet*	*Station*
	of	to
	of	to
	of	to
	of	to

24. ☒ Legal boundaries of the site are shown.

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

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

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

variance from the required pressure rated piping at crossings must include a variance approval from 30 TAC Chapter 290.

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

Table 5 - Water Line Crossings

Line	*Station or Closest Point*	*Crossing or Parallel*	*Horizontal Separation Distance*	*Vertical Separation Distance*
SEE ATTACHED				

27. Vented Manholes:

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

Table 6 - Vented Manholes

Line	*Manhole*	*Station*	*Sheet*

28. Drop manholes:

☐ There are no drop manholes associated with this project.
☒ Sewer lines which enter new or existing manholes or "manhole structures" higher than 24 inches above the manhole invert are listed in the table below and labeled on the

appropriate profile sheets. These lines meet the requirements of 30 TAC §217.55(l)(2)(H).

Table 7 - Drop Manholes

Line	*Manhole*	*Station*	*Sheet*
SEE ATTACHED			

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

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

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

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

31. Minimum flow velocity (From Appendix A)

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

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

☒ Assuming pipes are flowing full, all slopes are designed to produce maximum flows of less than or equal to 10 feet per second for this system/line.
☐ **Attachment D – Calculations for Slopes for Flows Greater Than 10.0 Feet per Second.** Assuming pipes are flowing full, some slopes produce flows which are greater than 10 feet per second. These locations are listed in the table below. Calculations are attached.

Table 8 - Flows Greater Than 10 Feet per Second

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

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

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

Administrative Information

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

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

Table 9 - Standard Details

Standard Details	***Shown on Sheet***
Lateral stub-out marking **[Required]**	C5.10
Manhole, showing inverts comply with 30 TAC §217.55(l)(2) **[Required]**	C5.10
Alternate method of joining lateral to existing SCS line for potential future connections **[Required]**	C5.10
Typical trench cross-sections **[Required]**	C5.10
Bolted manholes **[Required]**	C5.10
Sewer Service lateral standard details **[Required]**	C5.10
Clean-out at end of line **[Required, if used]**	C5.10
Baffles or concrete encasement for shock/erosion protection **[Required, if flow velocity of any section of pipe >10 fps]**	C5.10
Detail showing Wastewater Line/Water Line Crossing **[Required, if crossings are proposed]**	C5.10
Mandrel detail or specifications showing compliance with 30 TAC §217.57(b) and (c) **[Required, if Flexible Pipe is used]**	C5.10
Drop manholes **[Required, if a pipe entering a manhole is more than 24 inches above manhole invert]**	C5.10

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

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

☒ Survey staking was completed on this date: when advised by TCEQ staff of site 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.

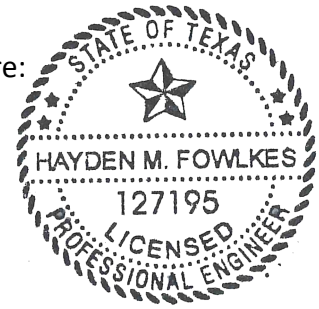
Signature

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: Hayden Fowlkes, P.E.

Date: 8/18/2025

Place engineer's seal here:



Signature of Licensed Professional Engineer:

Appendix A-Flow Velocity Table

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

Table 10 - Slope Velocity

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

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

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

Figure 1 - Manning's Formula

Where:

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

Table 2 – Manholes and Cleanouts

Line	Shown on Sheet	Station	Manhole or Cleanout
"A"	C5.04	20+04.85	M.H. "A12"
"B"	C5.05	7+42.16	M.H. "B4"
"C"	C5.06	7+60.50	M.H. "C2"
"D"	C5.07	7+20.32	M.H. "D4"
"E"	C5.08	3+93.24	M.H. "E3"

Table 5 - Water Line Crossings

Line	Station or Closest Point	Crossing or Parallel	Horizontal Separation Distance	Vertical Separation Distance (ft)
"A"	4+66.81	Crossing	--	9.02
“A”	11+21.68	Crossing	--	3.97
“A”	12+36.68	Crossing	--	5.22
“A”	13+56.68	Crossing	--	5.98
“A”	14+76.69	Crossing	--	7.19
“A”	19+57.09	Crossing	--	7.29
“B”	1+62.73	Crossing	--	4.53
“B”	3+92.16	Crossing	--	4.93
“B”	4+87.16	Crossing	--	5.57
“B”	5+87.16	Crossing	--	5.15
“B”	6+87.16	Crossing	--	4.66
“C”	1+58.50	Crossing	--	3.63
“C”	3+10.50	Crossing	--	5.94
“C”	4+05.50	Crossing	--	5.06
“C”	5+05.50	Crossing	--	4.43
“C”	6+05.50	Crossing	--	4.68
“C”	7+05.50	Crossing	--	4.60
“D”	1+48.50	Crossing	--	9.01
“D”	5+03.11	Crossing	--	13.55
“D”	6+40.32	Crossing	--	4.00
“E”	2+55.52	Crossing	--	7.32
“E”	3+45.05	Crossing	--	5.46

Table 7 – Drop Manholes

Line	Manhole	Station	Sheet
"D"	M.H. "D2"	5+54.06	C5.07

ATTACHMENT A
(Engineering Design Report)

PURLSONG UNITS 2 & 3
Engineering Design Report
8" PVC SDR 26

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PURLSONG UNITS 2 & 3
Engineering Design Report
8" PVC SDR 26

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 Guadalupe-Blanco River Authority (GBRA) or TCEQ regulations shall apply.

PROJECT INFORMATION

Purlsong Units 2 and 3 are part of an overall residential master development to be constructed and are located approximately 0.76 miles northwest of FM 2722 and State Highway 46 intersection. The site is located within Comal County, Texas, outside any city limits, and is entirely over the Edwards Aquifer Recharge Zone. Purlsong Units 2 and 3 will consist of 96 single-family residential lots and 8 multi-family residential condominium lots. The 96 single-family residential lots are to be serviced by the proposed sewage collection system with the condominium lots having a septic system or another approved OSSF per local regulations.

The Purlsong Unit 3 Sewage Collection System (SCS) Application proposes the construction of a total of approximately 4,091.07 linear feet (LF) of sewer main to serve the future residential development. The proposed gravity sewer main alignment will consist of approximately 3,62.07 LF of 8-inch (8") PVC, SDR 26; and 465 LF 8" PVC, SDR 26, 160 psi pressure-rated pipe to be centered at waterline crossings. Regulated activities proposed include excavation, construction of sewer mains, backfill and compaction. Approximately 4.72 acres of the project site may be disturbed for this SCS installation as identified by the limits of the fifty-foot (50') SCS/GA envelope shown on the plans.

This project will result in an estimated Living Unit Equivalent (LUE) of 96. Approximately 28,800 gpd average flow is anticipated for this development based on 300 gpd/LUE. The contributing acreage for inflow and infiltration is 27 acres. The sewage flow will be disposed of by conveyance to the proposed Purlsong Wastewater Treatment Center operated by Guadalupe-Blanco River Authority (GBRA).

Please refer to the C5.00-C5.08 series of attached sewer plans for Purlsong Unit 3, which show the proposed service area and its topographic features. For information regarding the capability of the existing system and facilities to handle this increased flow. This system is designed to have a minimum structural life of 50 years.

Safety considerations are the responsibility of the contractor. 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: ***4.0***

Peaking Factor is based on: ***Greater Blanco River Authority (GBRA) Standards and Design Guidelines for Developer Utilities (March 09,2018)***

Total LUEs = 96

1 LUE = 300 gallons per day (average sewage flow)
= 1200 gallons per day (peak flow)

Infiltration = 300 gallons per acre served

*Avg. Flow = **96** LUEs x (300 gpd/LUE) + [(300 gpd/acre) x 27 acres] = **36,900** gpd =*

***25.63** gpm*

*Peak Flow = **96** LUEs x (1200 gpd/LUE) + [(300 gpd/acre) x 27 acres] = **123,300** gpd =*

***85.63** 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 D3034, SDR 26, PVC Sewer Pipe:

Nominal Size = 8"

Outer Diameter (D_o) = 8.40"

Minimum Wall Thickness (t) = 0.323"

Inner Diameter (D_i) = 7.754"

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:

$Q = (k/n)(A)(R^{2/3})(S^{1/2})$

$v = Q/A$

Where:

Q = Discharge (cfs)

k = Constant [(1.49 $ft^{1/3}$)/sec.]

n = Manning's roughness coefficient (unitless)

A = Flow area (ft^2)

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 D3034, SDR 26, PVC Sewer Pipe

$A = \pi(D_i^2)/4 = \pi(7.754\ in)^2/4 = 47.22\ in^2 = 0.33\ ft^2$

$P = \pi(D_i) = \pi(7.754\ in) = 24.36\ in = 2.03\ ft$

$R = A/P = 0.33\ ft^2/2.03\ ft. = 0.16\ ft$

S = 0.0035

$Q = [(1.49\ ft^{1/3}/sec)/0.013](0.33\ ft^2)(0.16\ ft)^{2/3}(0.0035)^{1/2}$

$Q = 0.66\ cfs = 296\ gpm = Q_{full}$

$v = 0.66\ cfs/0.33\ ft^2 =$ ***2.00 ft/s***

*Qmax at 65% full flow capacity = 0.66 cfs (0.65)(7.48 gallons/1 cf)(60 sec/1 min.)=**193 gpm***

*Qmax at 85% full flow capacity = 0.66 cfs (0.85)(7.48 gallons/1 cf)(60 sec/1 min.)=**252 gpm***

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

$A = \pi(D_i^2)/4 = \pi(7.961\ in)^2/4 = 49.77\ in^2 = 0.35\ ft^2$

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

$R = A/P = 0.35\ ft^2/2.08\ ft. = 0.17\ ft$

S = 0.0035

$Q = [(1.49\ ft^{1/3}/sec)/0.013](0.35\ ft^2)(0.17\ ft)^{2/3}(0.0035)^{1/2}$

$Q = 0.73\ cfs = 328\ gpm = Q_{full}$

$v = 0.73\ cfs/0.35\ ft^2 =$ ***2.09 ft/s***

*Qmax at 65% full flow capacity = 0.73 cfs (0.65)(7.48 gallons/1 cf)(60 sec/1 min.)=**213 gpm***

*Qmax at 85% full flow capacity = 0.73 cfs (0.85)(7.48 gallons/1 cf)(60 sec/1 min.)=**278 gpm***

Nominal Main Size (in)	Outer Diameter (in)	Minimum Slope (%)	Area (ft^2)	Hydraulic Radius (A/P) ft	$R^{2/3}$	$S^{1/2}$	Q-Full (gpm)	Max Pipe (%)	Velocity (ft/s)	Q-Max (gpm)
8 (NR)	*8.40*	*0.35*	*0.33*	*0.16*	*0.30*	*0.059*	*296*	*65*	*2.00*	*193*
8 (PR)	*8.625*	*0.35*	*0.35*	*0.17*	*0.30*	*0.059*	*328*	*65*	*2.09*	*213*
8 (NR)	*8.40*	*0.35*	*0.33*	*0.16*	*0.30*	*0.059*	*296*	*85*	*2.00*	*252*
8 (PR)	*8.625*	*0.35*	*0.35*	*0.17*	*0.30*	*0.059*	*328*	*85*	*2.09*	*278*

***When rounding of velocities is considered all velocities are at, or above, the required 2 fps.**

Conclusion

The proposed 8" pipe (NR & 160 psi) with a minimum slope of 0.35% 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 (NR)	*3,626.07*	*PVC SDR 26*	*ASTM D3034*	*ASTM D3212*
8 pressure-rated	*465*	*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 "GBRA Design Guidelines for Developer Utilities" for Construction Detail.

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. See "GBRA Design Guidelines for Developer Utilities" details for additional specifications.

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

The selection of bedding class is based on GBRA detail 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 FEMA floodplain 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" (NR and 160 psi)*** Min. Slope: ***0.35%*** Max. Slope: ***8.00%***

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 "GBRA Design Guidelines for Developer Utilities" details 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 GBRA Standard Drawing and 30 TAC 217.54:

Pipe Diameter: ***8" (NR)*** Min. Trench Width: ***21***" Max. Trench Width: ***33"***

Pipe Diameter: ***8" (160 psi)*** Min. Trench Width: ***21***" Max. Trench Width: ***33"***

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 GBRA approved sewer structural coating. 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.

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

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

Manhole Spacing:

Pipe Diameter: ***8"*** Max. Spacing: ***390.50 LF***

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. 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)

Vented manholes are proposed for this SCS. Refer to plans and details for additional information.

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 at waterline crossings in the SCS.

Live Load Calculations

Minimum burial depth without concrete encasement is six (6) feet. Based on Table 6-6 Live Loads on PVC pipe (from Uni-Bell Handbook for PVC) for this sewer line would be 1.39 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 feet (20) as it meets the maximum burial depth permitted 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 B.

Allowable Buckling Pressure:

$$q_a = 0.4 * \sqrt[2]{32 * R_w * B' * E_b * (E * I / D^3)} \qquad \textit{Equation 1}$$

$q_a = 0.4 * \sqrt{(32 * 1 * 0.48 * 400 * (400{,}000 * 0.003/8.08^3))} = 47.29\ psi\ (8"PVC\ SDR\ 26, NR)$

$q_a = 0.4 * \sqrt{(32 * 1 * 0.48 * 400 * (400{,}000 * 0.003/8.29^3))} = 45.50\ psi\ (8"PVC\ SDR\ 26, 160psi)$

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

$$R_w = 1 - 0.33 * (0/240) = 1$$

$$B' = \frac{1}{1+4*e^{-0.065H}}$$ *Equation 3*

$$B' = \frac{1}{1+4*e^{-0.065(20)}} = 0.48$$

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

$$I = (0.323^3/12) = 0.003in^3(8"\ PVC, SDR\ 26, NR)$$

$$I = (0.332^3/12) = 0.003in^3(8"\ PVC, SDR\ 26, 160\ psi)$$

$$D = D_o - t$$ *Equation 5*

$$D = 8.40\ inches - 0.323\ inches = 8.08\ inches(8"\ PVC, SDR\ 26, NR)$$

$$D = 8.625\ inches - 0.332\ inches = 8.29\ inches(8"\ PVC, SDR\ 26{,}160\ psi)$$

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 $0 \leq hw \leq h$ (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)

I = 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

$$q_p = \gamma_w * h_w + R_w * (W_c / D) + L_l \qquad \textit{Equation 6}$$

$$q_p = 0.0361 * 0 + 1 * \left(\frac{166.89}{8.08}\right) + 1.39 = 22.04\ psi\ (8"\ PVC, SDR\ 26, NR)$$

$$q_p = 0.0361 * 0 + 1 * \left(\frac{171.24}{8.29}\right) + 1.39 = 22.05\ psi\ (8"\ PVC, SDR\ 26{,}160\ psi)$$

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_l = Live load (lbs)

$$W_c = \gamma_s * H * (D + t)/144 \qquad \textit{Equation 7}$$

$$W_c = 143 * 20 * (8.08 + 0.323)/144 = 166.89\ lb/in\ (8"PVC, SDR\ 26, NR)$$

$$W_c = 143 * 20 * (8.29 + 0.332)/144 = 171.24\ lb/in\ (8"PVC, SDR\ 26{,}160\ psi)$$

Where:

γ_s = Specific weight of soil in pounds per cubic foot (pcf)

D = Mean pipe diameter (in)

Pipe Diameter: ***8" (NR)*** Pipe Material: ***PVC, SDR 26*** q_a: ***47.29*** q_p: ***22.04***

Pipe Diameter: ***8" (160 psi)*** Pipe Material: ***PVC, SDR 26*** q_a: ***45.50*** q_p: ***22.05***

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

Wall Crushing Calculations

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

$$H = (24 * P_c * A)/(\gamma_s * D_o) \qquad \textit{(Equation 8)}$$

$$A = t(in) \times 12(in/ft) \qquad \textit{(Equation 9)}$$

$$H = \frac{(24*4{,}000*3.876)}{143*8.4} = 309.77 \text{ (8" PVC, SDR 26, NR)}$$

$$A = 0.323(in) \times 12\left(\frac{in}{ft}\right) = 3.876$$

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.]

γ_s = specific weight of soil in pounds per cubic foot (pcf)

H = Depth of burial in feet (ft) from ground surface to crown of pipe.

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: ***PVC SDR 26*** Tensile Strength: ***7,000*** Cell Class (PVC only) ***12454***

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 **400 psi**.

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 GBRA detail, 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 GBRA detail, 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 = **400 psi/3,000 psi = 0.13**

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.

$$zeta = \frac{1.44}{f + (1.44 - f) * (E_b / E_{n'})} \qquad \textit{(Equation 9)}$$

$$zeta = \frac{1.44}{1.19 + (1.44 - 1.19) * 0.13} = 1.18 \ (8"PVC\ SDR\ 26, NR)$$

$$zeta = \frac{1.44}{1.17 + (1.44 - 1.17) * 0.13} = 1.19 \ (8"PVC\ SDR\ 26{,}160\ psi)$$

$$f = \frac{b/d_a - 1}{1.154 + 0.444 * (b/d_a - 1)} \qquad \textit{(Equation 10)}$$

$$f = \frac{(33/8.40) - 1}{1.154 + 0.444 * ((33/8.40) - 1)} = 1.19 \ (8"PVC\ SDR\ 26, NR)$$

$$f = \frac{(33/8.625) - 1}{1.154 + 0.444 * ((33/8.625) - 1)} = 1.17 \ (8"PVC\ SDR\ 26{,}160\ \text{psi})$$

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" (NR)*** Trench Width: ***33"*** Zeta: ***1.18***

Pipe Diameter: ***8" (160 psi)*** Trench Width: ***33"*** Zeta: ***1.19***

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: ***8" (NR)*** Pipe Material: ***PVC SDR 26*** Ps: ***115 psi***

Pipe Diameter: ***8" (PR)*** Pipe Material: ***PVC SDR 26*** Ps: ***115 psi***

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.

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

$$\frac{\Delta Y}{D(\%)} = \frac{((0.096)(19.86+1.39)*100)}{(0.149*115)+(0.061*1.18*400)} = 4.44\% \ (8"\ PVC\ SDR\ 26, NR)$$

$$\frac{\Delta Y}{D(\%)} = \frac{((0.096)(19.86+1.39)*100)}{(0.149*115)+(0.061*1.19*400)} = 4.42\% \ (8"\ PVC\ SDR\ 26, 160\ psi)$$

$$L_p = \frac{\gamma_s * H}{144} \qquad \textit{(Equation 12)}$$

$$= \frac{143*20}{144} = 19.86\ psi$$

%ΔY/D = Predicted % vertical deflection under load

ΔY = Change in vertical pipe diameter under load

D = Undeflected mean pipe diameter (in)

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	P_s (psi)	Zeta Factor Assumed or Calculated	E_b (psi)	% Deflection
8" PVC SDR 26 (NR)	*115*	*1.18*	*400*	*4.44*
8" PVC SDR 26 (PR)	*115*	*1.19*	*400*	*4.42*

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

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

8/18/2025



APPENDIX A (TABLES)

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

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

[1] *Simulates 20 ton truck traffic + impact (Source: ASTM A 796)*
[2] *Simulates 80,000 lb/ft railway load + impact (Source: ASTM A 796)*
[3] *180,000 lbs. dual tandem gear assembly. 26 inch spacing between tires and 66 inch center-to-center spacing between fore and aft tires under a rigid pavement 12 inches thick + impact.*
** Negligible live load influence.*

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

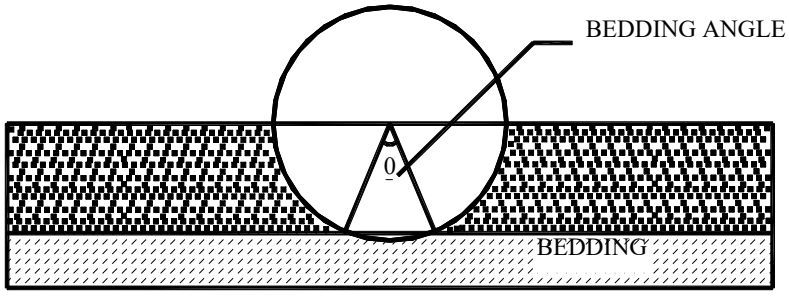


TABLE 7.2
VALUES OF BEDDING CONSTANT, K

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)

Soil type-pipe bedding material (Unified Classification System[a]) (1)	E' for Degree of Compaction of Bedding, in pounds per square inch			
	Dumped (2)	Slight, < 85% Proctor, <40% relative density (3)	Moderate, 85%-95% Proctor, 40%-70% relative density (4)	High, >95% Proctor, >70% relative density (5)
Fine-grained Soils (LL>50)[b] Soils with medium to high plasticity, CH, MH, CH-MH	No data available; consult a competent soils engineer; Otherwise use E' = 0			
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL, with less than 25% coarse-grained particles	50	200	400	1,000
Fine-grained Soils (LL<50) Soils with medium to no plasticity, CL, ML, ML-CL, with more than 25% coarse-grained particles	100	400	1,000	2,000
Coarse-grained Soils with Fines GM, GC, SM, SC[c] contains more than 12% fines				
Coarse-grained Soils with Little or no Fines GW, GP, SW, SP[c] contains less than 12% fines	200	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 E-3.
[b]LL = Liquid limit.
[c]Or any borderline soil beginning with one of these symbols (i.e. GM-GC, GC-SC).
[d]For ± 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/m^3) (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.

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 Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
					Group Symbol	Group Name[B]
Coarse-Grained Soils	Gravels	Clean gravels	C ≥ 4 and 1 ≤ Cc ≤ 3[C]		GW	Well-graded gravel[D]
More than 50% retained on No. 200 sieve	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[D]
		Gravels with more than 12% fines[E]	Fines classify as ML or MH		GM	Silty gravel[DFG]
			Fines classify as CL or CH		GC	Clayey gravel[DFG]
	Sands	Clean sands	Cu ≥ 6 and 1 ≤ Cc ≤ 3[C]		SW	Well-graded sand[H]
	50% or more of coarse fraction passes on No. 4 sieve	Less than 5% fines[I]	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]
		More than 12% fines[I]	Fines classify as CL or CH		SC	Clayey sand[FGH]
Fine-Grained Soils	Silts and clays	Inorganic	PI > 7 and plots on or above "A" line[J]		CL	Lean clay[KLM]
50% or more passes the No. 200 Sieve	Liquid limit less than 50		PI < 4 and plots below "A" line[J]		ML	silt[KLM]
		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		CH	Fat clay[KLM]
	Liquid limit 50 or more		Plots below "A" line		MH	Elastic silt[KLM]
		Organic	Liquid Limit-Oven Dried	<0.75	OH	Organic clay[KLMP]
			Liquid Limit-Not Dried			Organic silt[KLMQ]
Highly organic soils	Primarily organic matter, dark in color, and organic odor				PT	peat

[A] Based on the material passing the 3-in. (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] $Cu = D_{60} / D_{10}$

$$Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

[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 ≥ 15 % gravel, add "with gravel" to group name.
[I] 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 ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI 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

TABLE 2 Soil Classes

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 % passing #4 sieve, </= 25 % passing 3/8 in. sieve and </= 12 % passing #200 sieve	Class I	--
Clean, coarse grained soils: SW, SP, GW, GP or any soil beginning with one of these symbols with </= 12 % 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

[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 $\leq$ = 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[A]	Class I[B]	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 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.	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[D]	See Note[C]	85 % (SW and SP soils) For GW and GP soils See Note[E]	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.
[B] Class I materials have higher stiffness than Class II materials, but data on specific soil 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 (SPD100). 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.

APPENDIX B (SOIL UNIT WEIGHT VALUES)

Raba Kistner

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 CONSULTANTS, INC.

STATE OF TEXAS
CHRIS L. SCHULTZ
80680
LICENSED
PROFESSIONAL ENGINEER
1/14/09

Chris L. Schultz, P.E.
Senior Vice President

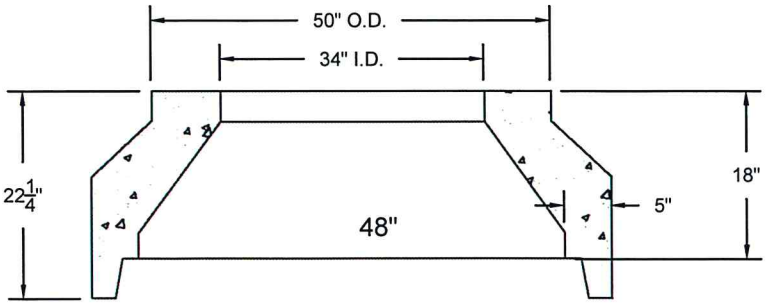
CLS/mem

O:\Admin - Non Project\San Antonio\PD back fill letter.doc

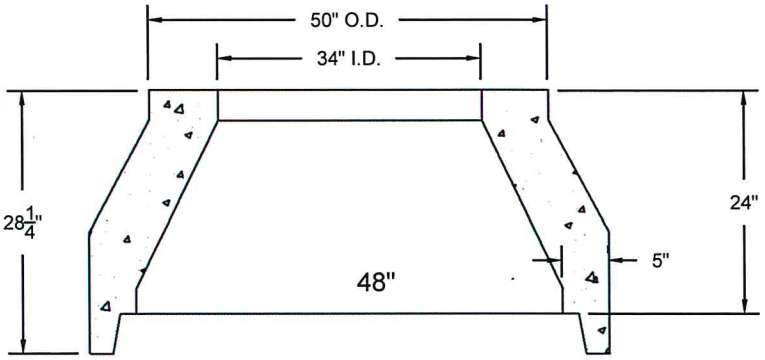
APPENDIX C (STANDARD SPECS AND PRE-CAST MANHOLES SPECS)

48" Dia. Concentric Cones

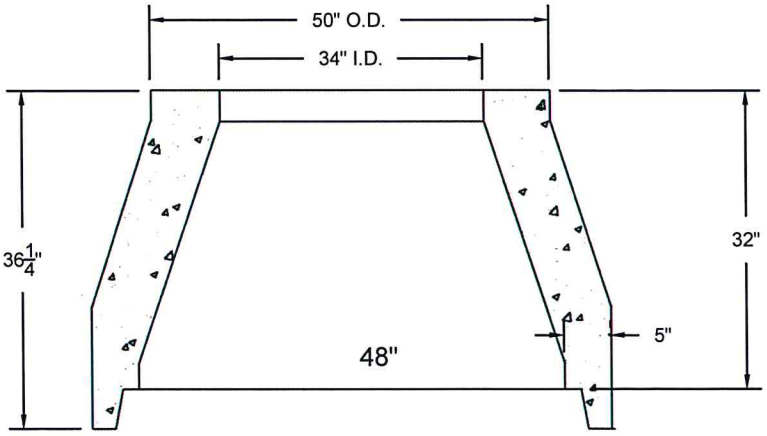
18" Yeild



24" Yeild



32" Yeild



NOTES:

1. Concrete: 4,000 PSI, 28 day Strength. Exceeds ASTM C - 478 - 11
2. Welded wire fabric strength fy = 65,000 psi.
3. Live Load - AASHOT HS-20.

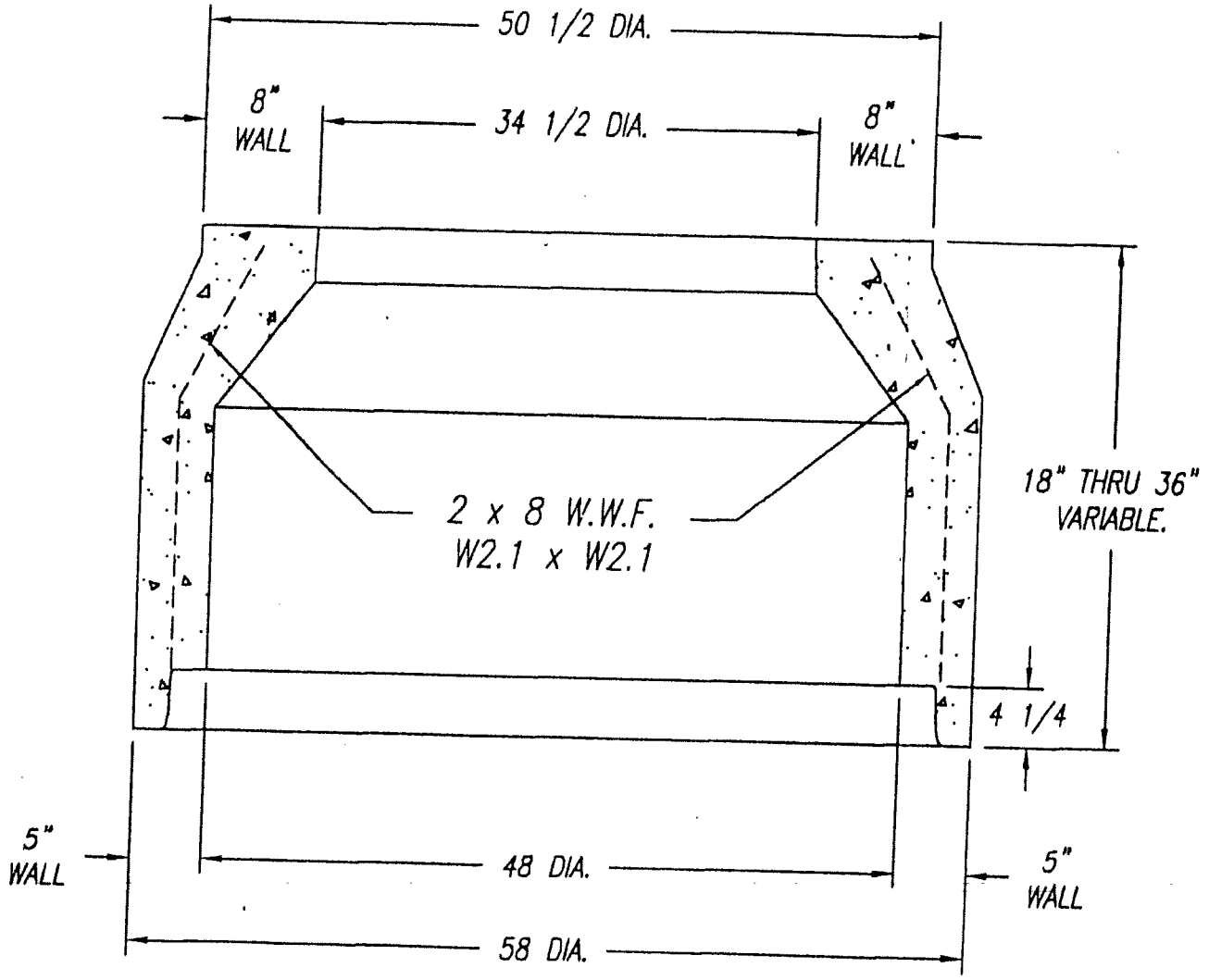
Charlotte's Concrete, Inc.

Charlotte's Concrete, Inc.
4950 Lane Dr.
San Antonio, Tx. 78263
Ph. (210) 648-4774

NPCA CERTIFIED PLANT

FOR 18", 24" & 32" Concentric Cones			
JOB			
DRAWN BY CA	DATE 08-06-15	REV. NO. -	SHEET 1 OF 1
FILE			

\APPROVAL\CONCENTRIC.DWG



(7R JOINT)

REF. FORM DWG. 3-303-5561

INTERNATIONAL PIPE MACHINERY CORP.

QUINN

MACHINE & FOUNDRY CORP.

A MEMBER OF THE BESSER FAMILY OF COMPANIES

BOONE, IOWA U.S.A.

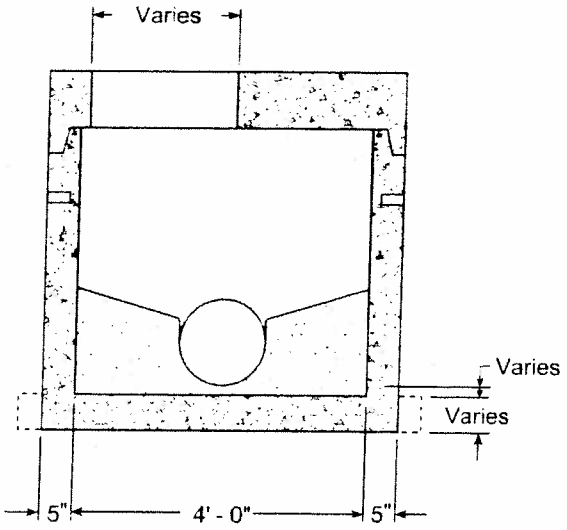
THIS PRINT IS THE PROPERTY OF INTERNATIONAL PIPE MACHINERY CORP. IT IS CONFIDENTIAL AND NOT TO BE REPRODUCED WITHOUT OUR EXPRESSED PERMISSION AND MUST BE RETURNED UPON REQUEST.

CHARLOTTES

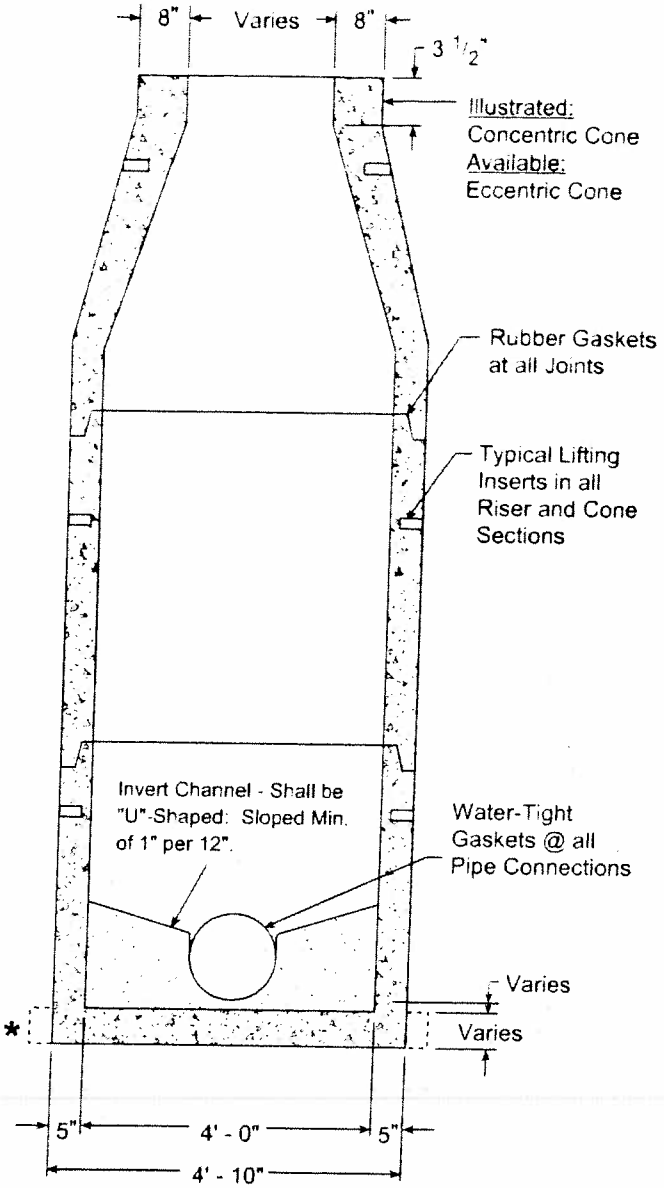
48 x 5 x 34 1/2 x 8 x 36 & 18

CONCENTRIC CONCRETE SECTION

DRAFTER	J.K	4/19/02	CONCENTRIC	REV.
CHECKED				
SCALE:	1/12" = 1"			



Flattop Illustration
for Shallow Manhole



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

Materials & Features

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

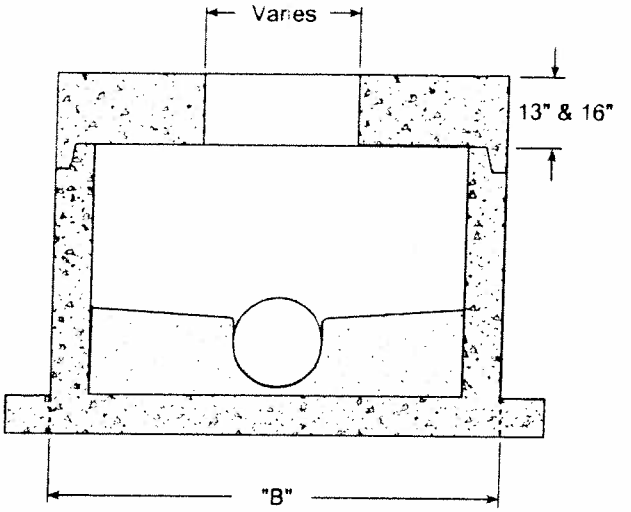
* - Extended base is available to meet local requirements.

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

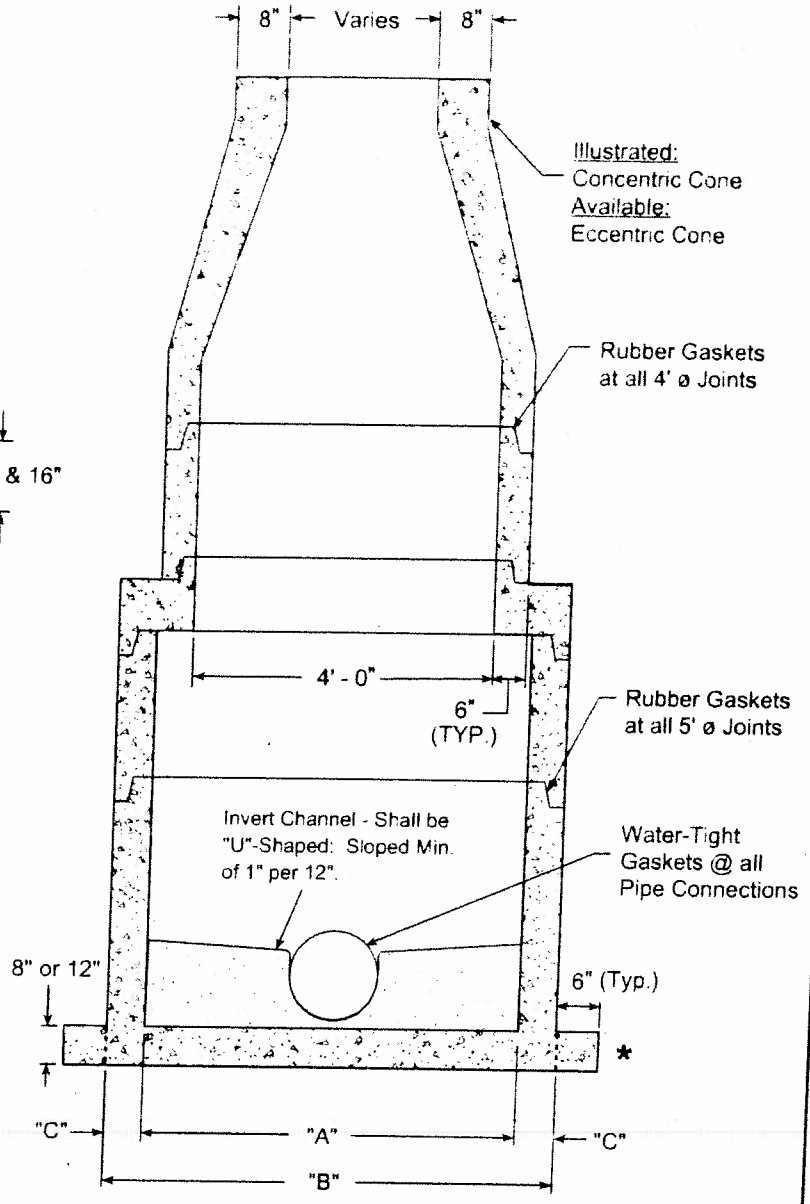
"Manufactured to your specifications."

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

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
4' I.D. Manhole **Regular Base w/ Reducing Cone**	All Plants	TX	5.5	08-15-06	Hanson



Flattop Illustration
for Shallow Manhole



Section View
5'/4' & 6'/4' I.D. Manhole
Extended Base with Reducing Cone

Materials & Features

HOLES AS SPECIFIED: for 5' I.D. max diameter = 40"
for 6' I.D. max diameter = 54"
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
Average weight of 24" depth base w/8" invert:
for 5' I.D. = 7,500 lbs.
for 6' I.D. = 10,600 lbs.
Estimated weight of riser and sections:
for 5' I.D. = 1,325 lbs. / vt. ft.
for 6' I.D. = 1,800 lbs. / vt. ft.
For pipe sizes 15" and larger, invert shall be equal to the larger pipe diameter.
* - Extended base shown; Regular base also available."
In the event a boot is loose contact your Hanson representative to resolve.

"Manufactured to your specifications."

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

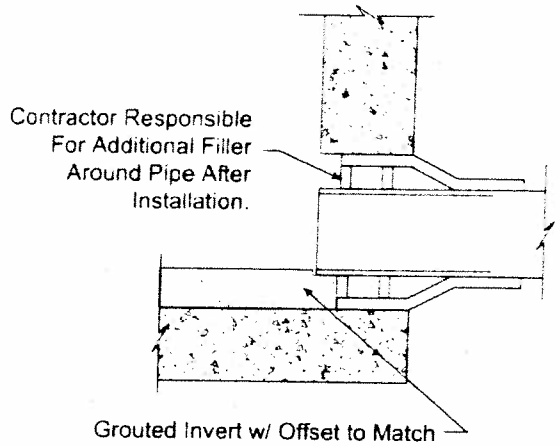
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All dimensions subject to allowable specification tolerances.

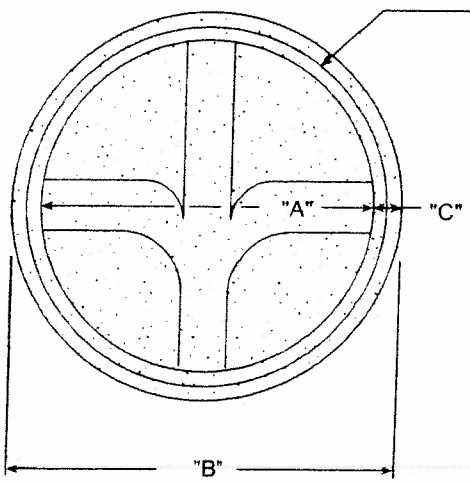
TITLE	PLANT	STATE	SECTION-PAGE	DATE
5'/4' & 6'/4'I.D. Manhole **Extended Base w/Reducing Cone**	All Plants	TX	5.6	08-15-06

Hanson

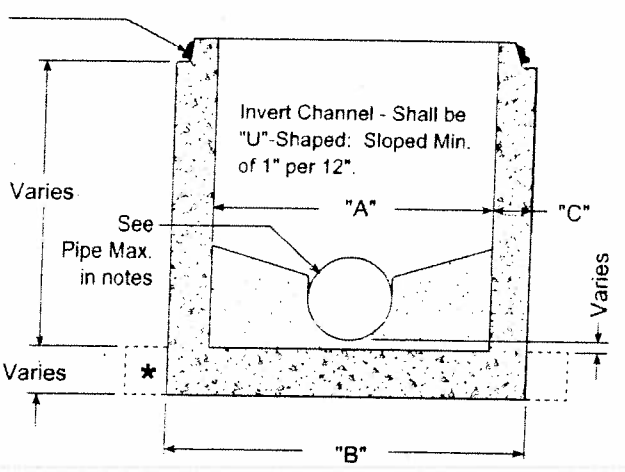
Precast Manholes

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





Plan View



Section View

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

Materials & Features

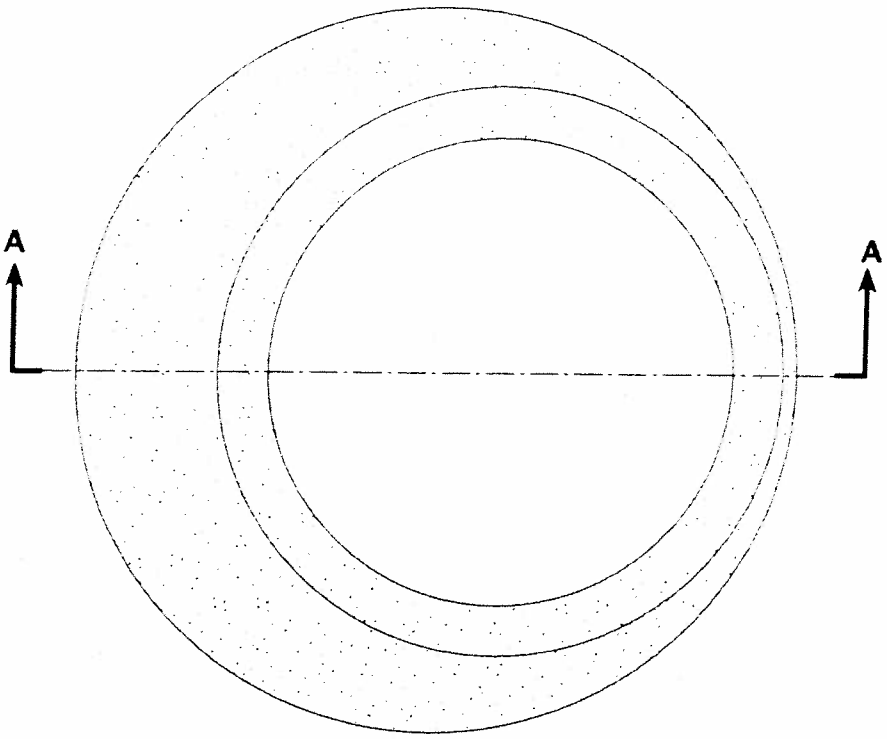
HOLES AS SPECIFIED:
- For 4' I.D. max. diameter = 32"
- For 5' I.D. max. diameter = 40"
- For 6' I.D. max. diameter = 54"

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

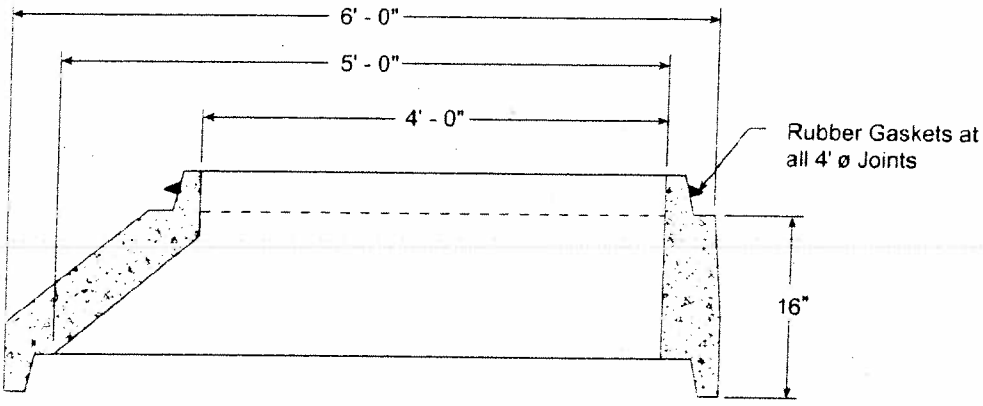
-No Scale-
All dimensions subject to allowable specification tolerances.

TITLE	PLANT	STATE	SECTION-PAGE	DATE
Details: 4', 5' & 6' I.D. Precast Regular Manhole Base	All Plants	TX	5.7	08-15-06

Hanson



Plan View



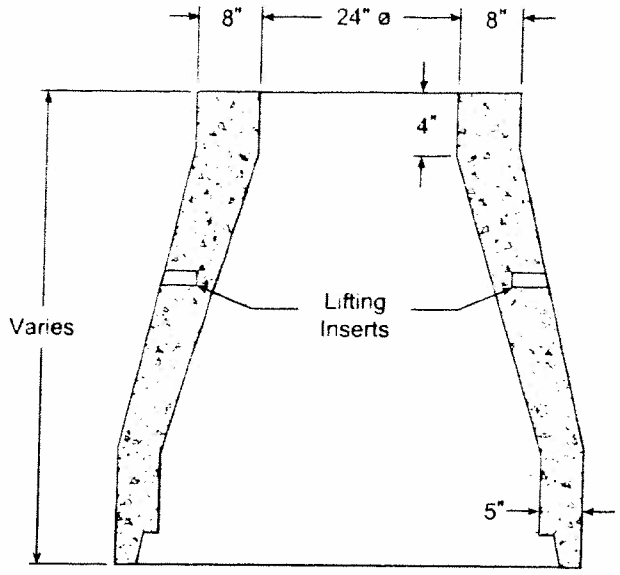
Section View

Materials & Features

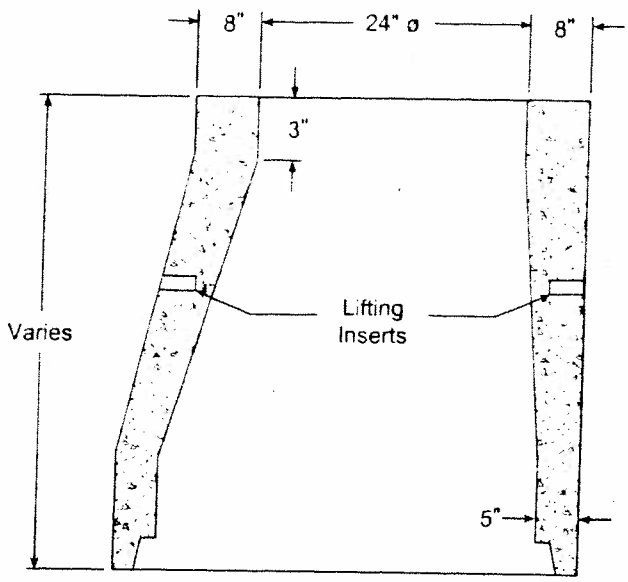
CONCRETE. 5,000 PSI. 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
CONSTRUCTION OF PRECAST is in accordance with ASTM C478.
Concrete is poured according to ACI-500.

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

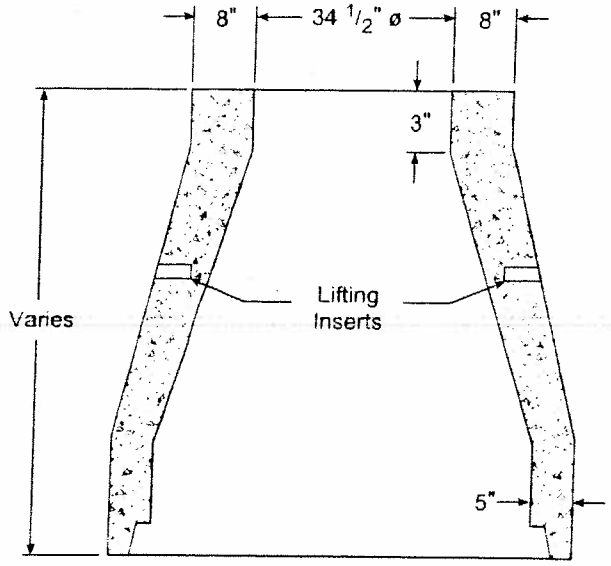
TITLE	PLANT	STATE	SECTION.PAGE	DATE	
5' x 4' Conical Adaptor	Waco	TX	5 8	08-15-06	Hanson



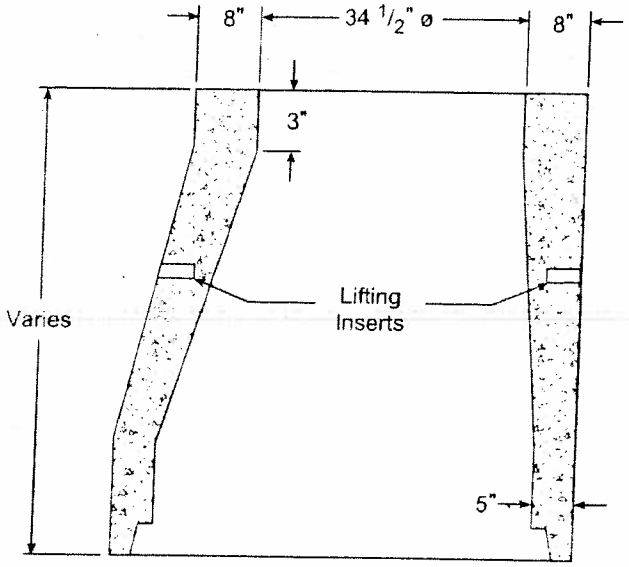
Concentric Cone
24" ø Opening



Eccentric Cone
24" ø Opening



Concentric Cone
34 1/2" ø Opening



Eccentric Cone
34 1/2" ø Opening

Materials & Features

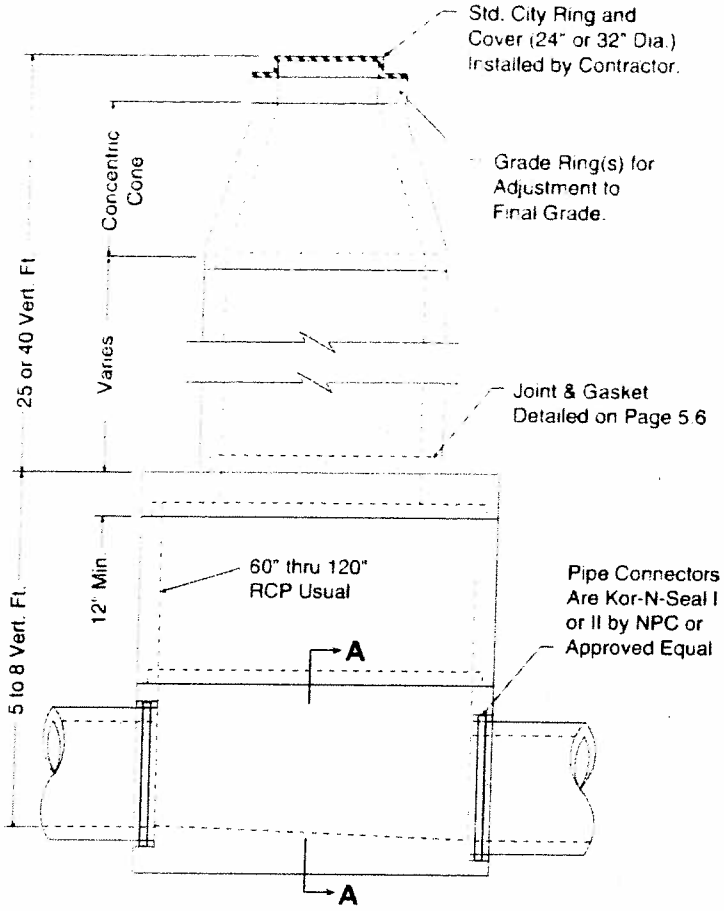
CONCRETE: 5,000 PSI, 28 day strength.
REINFORCING: Meets or exceeds ASTM C478 requirements.
30" ø also available in North Texas.

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

TITLE	PLANT	STATE	SECTION/PAGE	DATE
Hanson 48" Manhole Reducing Cone Detail	Waco Houston	TX	5.9	08-15-06

Hanson

Precast Manholes



w/ Precast Base



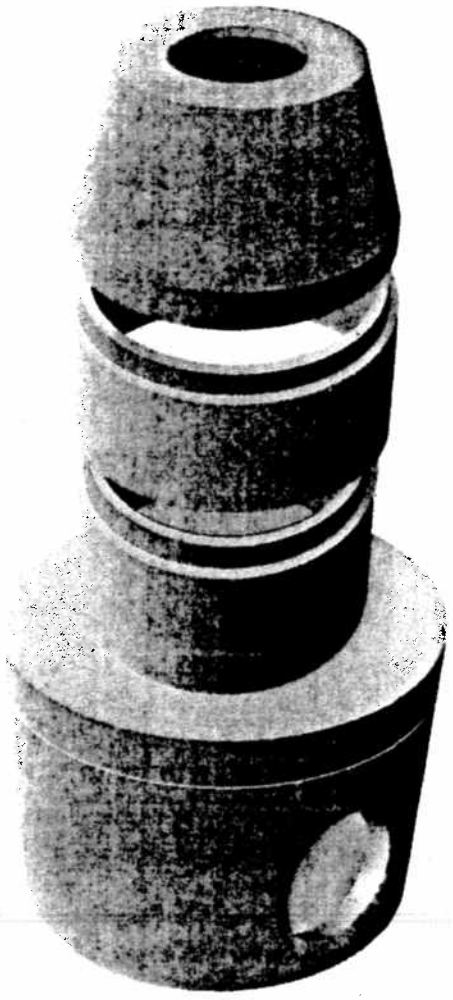
Section A-A

Base Slab Reinforcing

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

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

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



Isometric View

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

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

REINFORCING to meet AASHTO HS 20-44 Loading.

DESIGN EQUAL TO OR EXCEEDS ASTM C-478

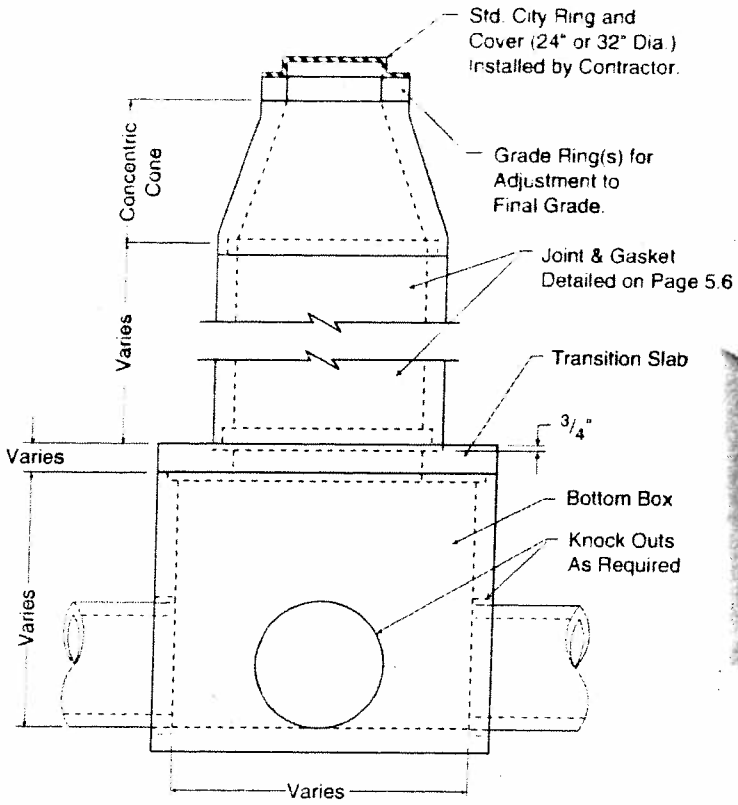
In the event a boot is loose contact your Hanson representative to resolve.

Note:

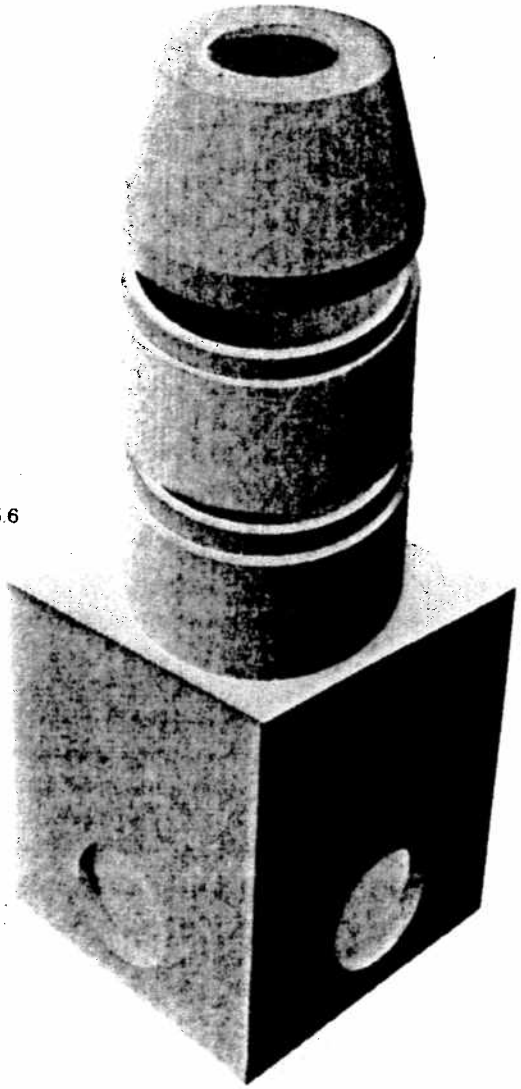
- Inverts shall be specifically sized for connecting pipes; and shall be U-Shaped with the min. depth 3/4 of the largest pipe diameter.

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

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
30 & 45 Ft. Depth 60" thru 96"Large Base Manhole	Houston San Antonio	TX	5.10	08-15-06	Hanson



Side View



Isometric View

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

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

REINFORCING to meet AASHTO HS 20-44 Loading.

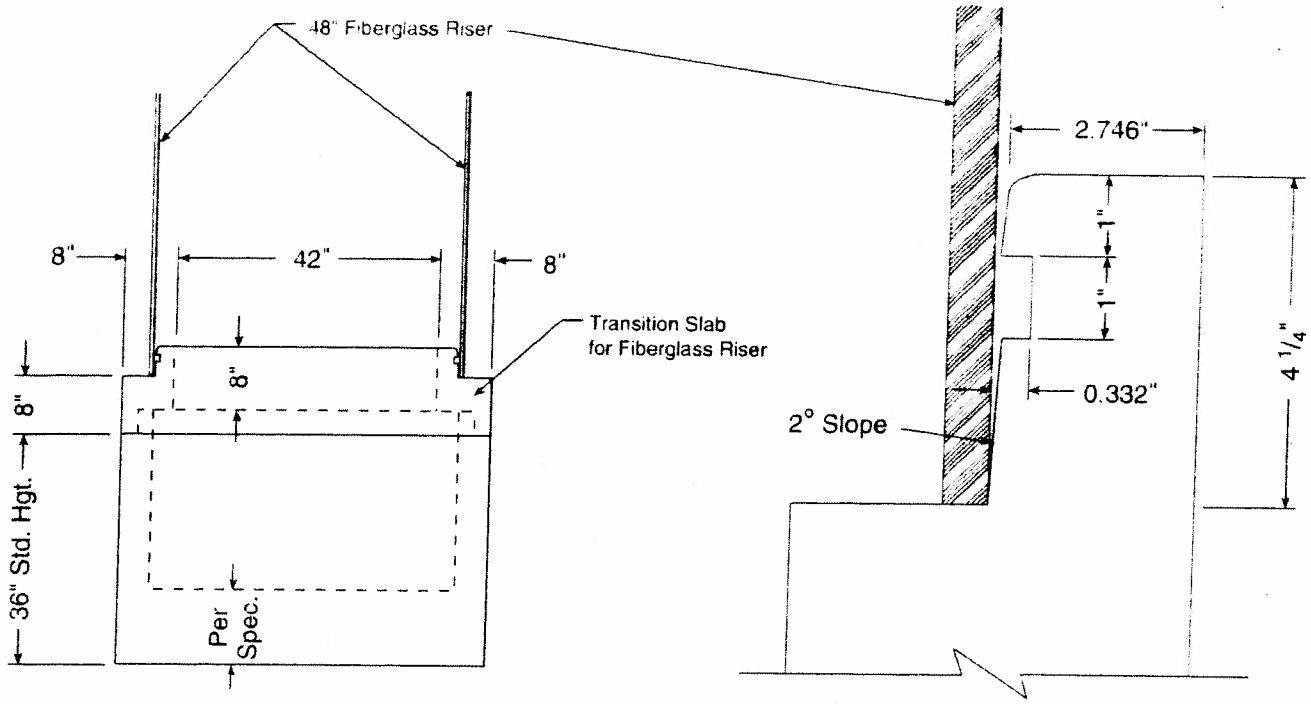
BASE DESIGN EQUAL TO OR EXCEEDS ASTM C-357

RISER DESIGN EQUAL TO OR EXCEEDS ASTM C-478

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

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

TITLE	PLANT	STATE	SECTION, PAGE	DATE	
Type "C" Manhole	Houston San Antonio	TX	5.11	08-15-06	Hanson



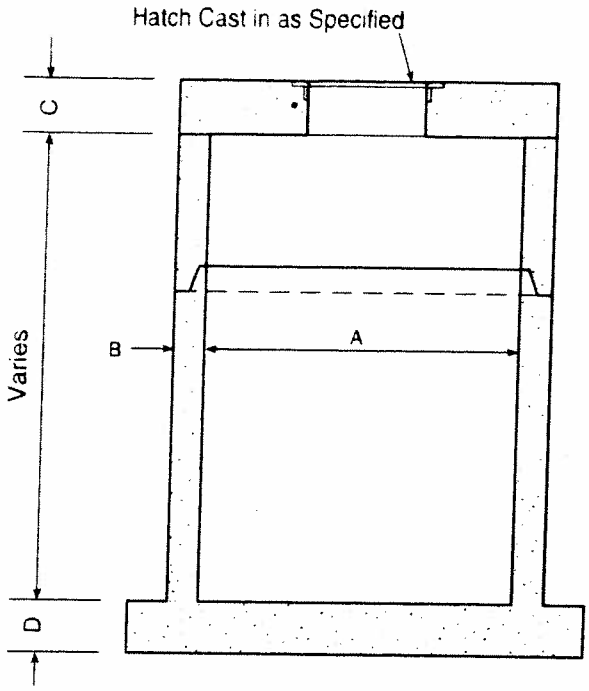
Profile **Joint Detail**

Materials & Features

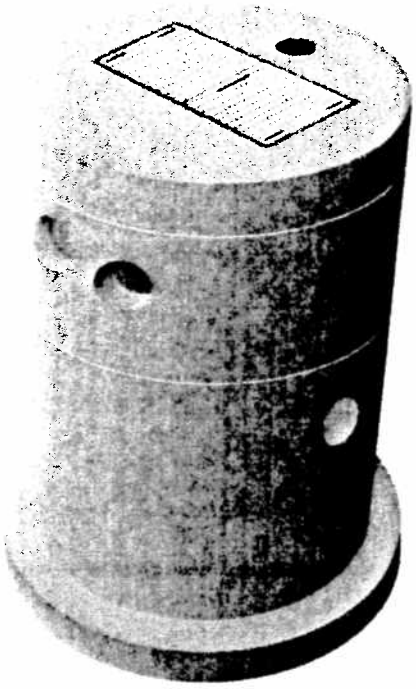
CONCRETE: 5,000 PSI in 28 days.
REINFORCING STEEL: per ASTM A-615, Grade 60.
REINFORCING to meet AASHTO HS 20-44 Loading.
DESIGN EQUAL TO OR EXCEEDS ASTM C-478

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

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
ASTM C-478 Special Base	Houston	TX	5.12	08-15-06	Hanson

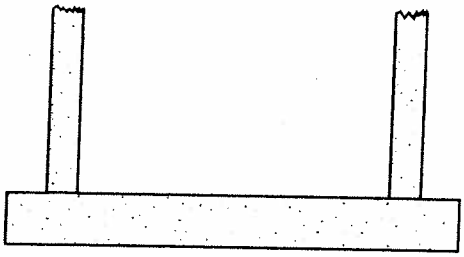


Section View
(Base configuration for 60", 72" & 84")

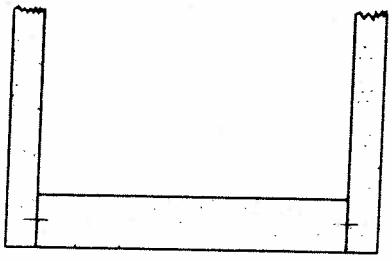


Isometric View

Product Dimensions			
A	B	C	D
60"	Contact your local Hanson representative for product dimensions.		
72"			
84"			
96"			
108"			
120"			
132"			
144"			



Section View
Base configuration for 96"



Section View
Base configuration for 108"-144"

Materials & Features

CONCRETE: 5,000 PSI in 28 days.

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

REINFORCING to meet AASHTO HS 20-44 Loading.

BASE DESIGN EQUAL TO OR EXCEEDS ASTM C-357

RISER DESIGN EQUAL TO OR EXCEEDS ASTM C-478

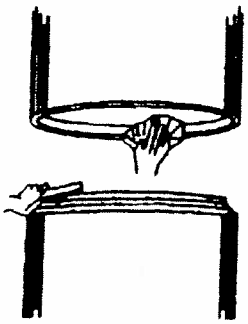
(A). Hatches as specified by Engineer.

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

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

TITLE	PLANT	STATE	SECTION.PAGE	DATE	
Typical Wetwells - Various Diameters	All Plants	TX	5.13	08-15-06	Hanson

① "O"-Ring Gasket

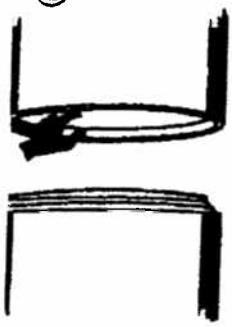


Carefully clean all dirt & foreign objects from the joining surface of the bell or groove end of pipe.

Carefully clean spigot or tongue end of pipe, including the gasket recess. Inspect the bell and spigot ends of each section to make sure they are free from cracks, chips or voids that will interfere with gasket.

Improperly prepared bell and spigot surfaces may prevent homing of the pipe or keep the gasket from sealing.

② Lubricate bell joint surface liberally, covering entire inside surface using proper pipe gasket lubricant.



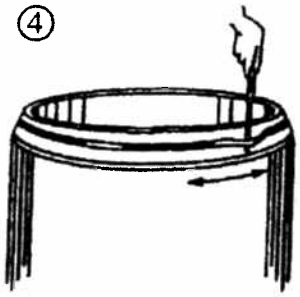
③



Lubricate the gasket throughly before it is placed on the spigot or tongue.

Bell and Gasket not lubricated or improperly lubricated may cause the gasket to roll and leak or possibly damage the bell.

④

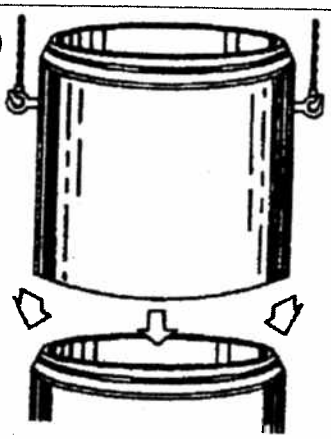


IMPORTANT

Fit the gasket carefully, equalizing the rubber gasket stretch by running a smooth, round object (inserted between the gasket & spigot) around the entire circumference several times.

Unequal stretch could cause bunching of the gasket and may cause leaks in the joint or crack the bell.

⑤



Align the bell & spigot to be joined. Before homing the joint, check that the gasket is in contact with the bell end entrance taper around the entire circumference.

Do not force sections together. If sections do not seat properly, unstack and contact your Hanson Sales Representative.

Improper alignment can dislodge gasket, causing leaks or possibly breaking the bell.

Profile Gasket

1. Manhole sections should be handed with extreme caution to avoid chipping of the bell or spigot ends. Proper lifting devices must be used on all sections.
2. Inspect gasket sealing area for any voids or rough edges that may interfere with the seal.
3. Place the 4-G Gasket in the step of the spigot. (Making sure that the pointed end of the gasket is toward the end of the pipe as shown in Fig A.)
4. **IMPORTANT** Equalize the stretch on the gasket by pulling the sealing lube away from the spigot at least one inch and then releasing the gasket. Repeat this every three or four inches around the circumference of the pipe. Equalization of stretch makes sure that the gasket has the same stretched cross-section and tension throughout. **Do not lube the gasket or spigot end of the pipe.**
5. Remove all dirt and other foreign matter from the inside surface of the bell. Apply lube to the inner surface of the bell including the lead-in taper surface on the outer edge of the bell. Align spigot with the bell. Gasket should touch lead-in taper around the entire circumference before pushing the pipe home.
6. Push the manhole section carefully, until the spigot is all the way home. (Fig B) Do not force sections together. If sections do not seat properly, unstack and contact your Hanson Sales Representative.
7. Every manhole will not come home exactly the same. Differences in application, consistency of lubricants, dimensions in the spigot and groove will cause variations in installation. If joining problems arise, please contact the manhole manufacturer immediately rather than forcing manhole sections together with subsequent damage to the manhole.
8. All testing should be performed prior to backfill of the manhole. Problems can not be detected after the manhole is backfilled. **Testing the manhole after backfill voids all warranties.**

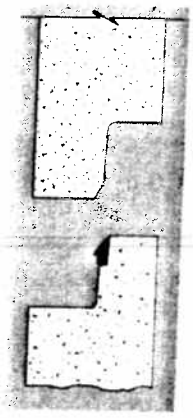


Fig. A

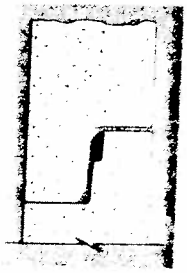
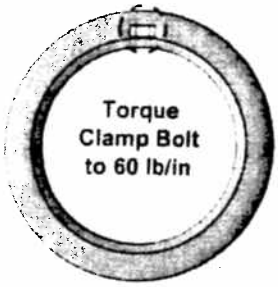


Fig. B

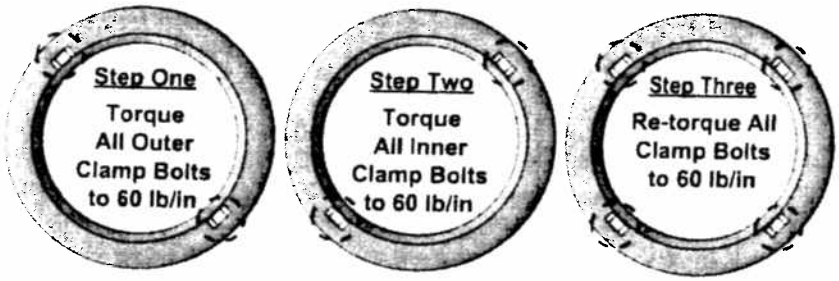
Note: *Manholes in excess of 30' in depth must be vacuum tested prior to backfill. The loads presented by soils and possible groundwater at 30' in addition to the load from the vacuum may exceed the design capacity of the pipe to manhole connector.*

TITLE	PLANT	STATE	SECTION.PAGE	DATE
O-Ring & Profile Gasket Installation on Manholes	All Plants	TX	5.14	08-15-06

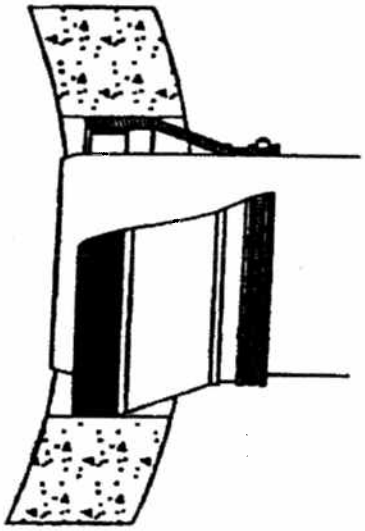
Hanson



Single Clamp



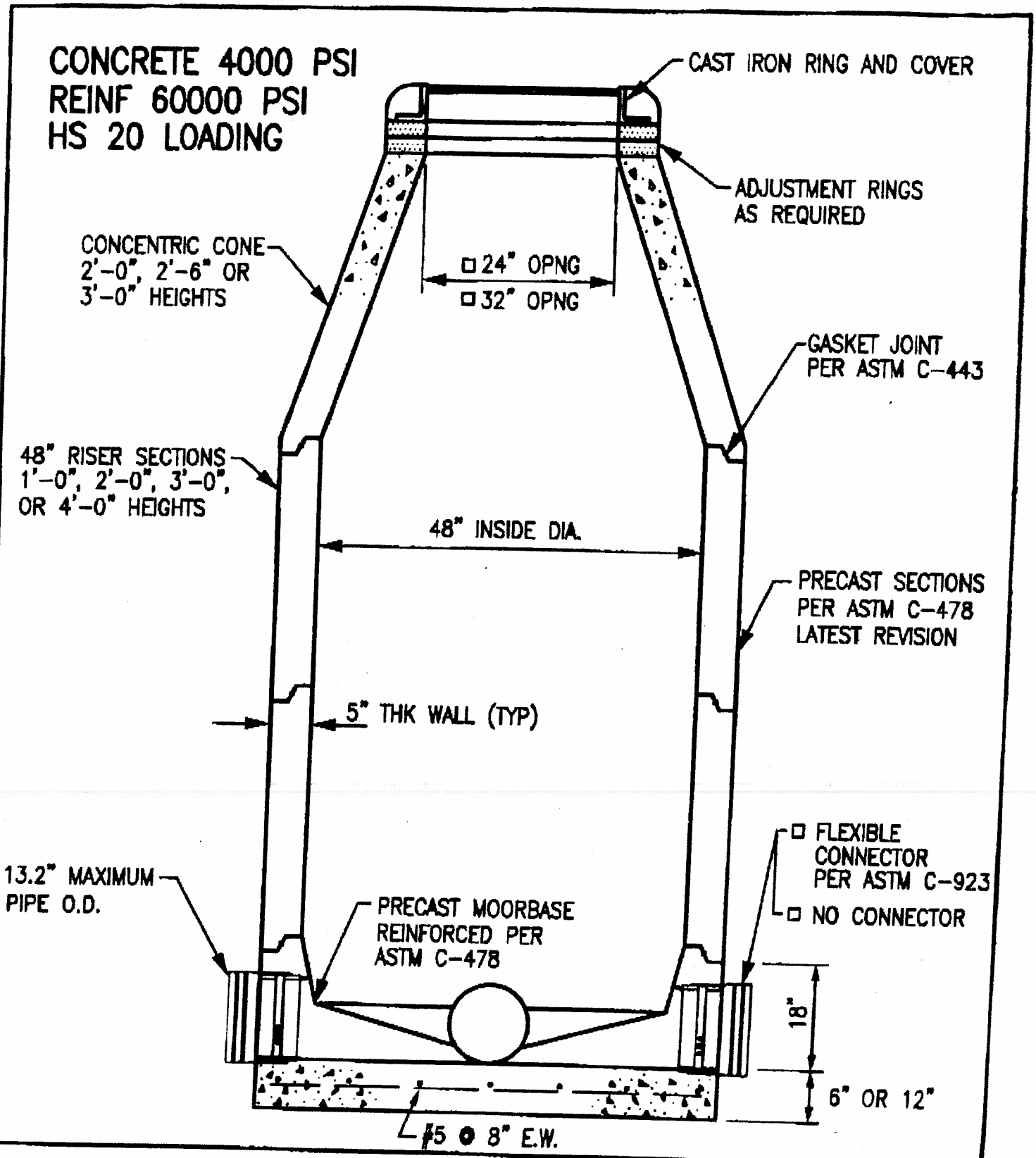
Multiple Clamps



Instructions

1. Clean pipe and boot to ensure no dirt or foreign materials are present.
2. Clamping surface on pipe must be clean and smooth.
3. Center pipe in opening and insert until pipe is at least equal to the inside plane of the manhole.
4. Attach take-up clamps(s) and stagger screw(s) of clamps(s) around the groove of the gasket so that take-up pressure will be equalized. Make sure each clamp is completely in the correct groove.
5. Using a torque ratchet or torque wrench, gradually tighten all screw(s) of clamp(s) in an alternating pattern to 60 lbs/in torque.
6. After reaching 60 lbs/in torque on final screw, check all screws again to ensure equal compression of all clamps.
7. If system is to be tested, testing shall be completed prior to backfilling, following all recommendations and requirements of the test system manufacturer. Vacuum testing shall be conducted in accordance with ASTM C-1244.
8. Adjust pipe to line and grade. Use proper bedding, backfill materials and techniques so that pipe deflection and deformation is minimized.
9. Any pipe stubs installed in the manhole must be positively restrained from movement.
10. Vacuum testing after backfill voids warranty.

For more information contact yor local Hanson Representative.



Rinker MATERIALS Moor-Tex
2735 HWY. 36 NORTH
MAILING: P.O. BOX 1088
SEALY, TEXAS 77474
PH: (979) 885-7403
(281) 375-6121
FAX:(979) 885-7001

REV.	DESCRIPTION	DATE
DATE: 8-09-02	SCALE: 3/4"=1'-0"	BY: RB

48" PRECAST CONCENTRIC MANHOLE WITH MOORBASE

JOB: 2002	FILE: 48CM	DWG. NO. 48CM

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: Hayden Fowlkes, P.E.

Date: 8/18/2025

Signature of Customer/Agent:



Regulated Entity Name: Purlsong Units 2 & 3

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: Construction Staging Area

   These fuels and/or hazardous substances will be stored in:

   ☒ Aboveground storage tanks with a cumulative storage capacity of less than 250 gallons will be stored on the site for less than one (1) year.

☐ Aboveground storage tanks with a cumulative storage capacity between 250 gallons and 499 gallons will be stored on the site for less than one (1) year.

☐ Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An Aboveground Storage Tank Facility Plan application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project.

☐ Fuels and hazardous substances will not be stored on the site.

2. ☒ **Attachment A - Spill Response Actions**. A site specific description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is attached.

3. ☒ Temporary aboveground storage tank systems of 250 gallons or more cumulative storage capacity must be located a minimum horizontal distance of 150 feet from any domestic, industrial, irrigation, or public water supply well, or other sensitive feature.

4. ☒ **Attachment B - Potential Sources of Contamination**. A description of any activities or processes which may be a potential source of contamination affecting surface water quality is attached.

Sequence of Construction

5. ☒ **Attachment C - Sequence of Major Activities**. A description of the sequence of major activities which will disturb soils for major portions of the site (grubbing, excavation, grading, utilities, and infrastructure installation) is attached.

   ☒ For each activity described, an estimate (in acres) of the total area of the site to be disturbed by each activity is given.

   ☒ For each activity described, include a description of appropriate temporary control measures and the general timing (or sequence) during the construction process that the measures will be implemented.

6. ☒ Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: Guadalupe River

Temporary Best Management Practices (TBMPs)

Erosion control examples: tree protection, interceptor swales, level spreaders, outlet stabilization, blankets or matting, mulch, and sod. Sediment control examples: stabilized construction exit, silt fence, filter dikes, rock berms, buffer strips, sediment traps, and sediment basins. Please refer to the Technical Guidance Manual for guidelines and specifications. All structural BMPs must be shown on the site plan.

7. ☒ **Attachment D – Temporary Best Management Practices and Measures**. TBMPs and measures will prevent pollution of surface water, groundwater, and stormwater. The construction-phase BMPs for erosion and sediment controls have been designed to retain sediment on site to the extent practicable. The following information is attached:

☒ A description of how BMPs and measures will prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.

☒ A description of how BMPs and measures will prevent pollution of surface water or groundwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.

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

☒ A description of how, to the maximum extent practicable, BMPs and measures will maintain flow to naturally-occurring sensitive features identified in either the geologic assessment, TCEQ inspections, or during excavation, blasting, or construction.

8. ☒ The temporary sealing of a naturally-occurring sensitive feature which accepts recharge to the Edwards Aquifer as a temporary pollution abatement measure during active construction should be avoided.

☐ **Attachment E - Request to Temporarily Seal a Feature**. A request to temporarily seal a feature is attached. The request includes justification as to why no reasonable and practicable alternative exists for each feature.

☒ There will be no temporary sealing of naturally-occurring sensitive features on the site.

9. ☒ **Attachment F - Structural Practices**. A description of the structural practices that will be used to divert flows away from exposed soils, to store flows, or to otherwise limit runoff discharge of pollutants from exposed areas of the site is attached. Placement of structural practices in floodplains has been avoided.

10. ☒ **Attachment G - Drainage Area Map**. A drainage area map supporting the following requirements is attached:

☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.

☒ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.

☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.

☐ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be used in combination with other erosion and sediment controls within each disturbed drainage area.

☐ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. Erosion and sediment controls other than sediment basins or sediment traps within each disturbed drainage area will be used.

11. ☐ **Attachment H - Temporary Sediment Pond(s) Plans and Calculations**. Temporary sediment pond or basin construction plans and design calculations for a proposed temporary BMP or measure have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information must be signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed temporary BMPs and measures are attached.

☒ N/A

12. ☒ **Attachment I - Inspection and Maintenance for BMPs.** A plan for the inspection of each temporary BMP(s) and measure(s) and for their timely maintenance, repairs, and, if necessary, retrofit is attached. A description of the documentation procedures, recordkeeping practices, and inspection frequency are included in the plan and are specific to the site and/or BMP.

13. ☒ All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections by the applicant or the executive director, or other information indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations.

14. ☒ If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain).

15. ☒ Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake will be provided that can indicate when the sediment occupies 50% of the basin volume.

16. ☒ Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).

Soil Stabilization Practices

Examples: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, or preservation of mature vegetation.

17. ☒ **Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices**. A schedule of the interim and permanent soil stabilization practices for the site is attached.

18. ☒ Records must be kept at the site of the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.

19. ☒ Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

Administrative Information

20. ☒ All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.

21. ☒ If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately suspended. The appropriate TCEQ Regional Office shall be immediately notified. Regulated activities must cease and not continue until the TCEQ has reviewed and approved the methods proposed to protect the aquifer from any adverse impacts.

22. ☒ Silt fences, diversion berms, and other temporary erosion and sediment controls will be constructed and maintained as appropriate to prevent pollutants from entering sensitive features discovered during construction.

ATTACHMENT A

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification & Sewage Collection System Application

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. https://www.tceq.texas.gov/response/spills/spill_rq.html
- 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.

- 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

Attachment B – Potential Sources of Contamination

Other potential sources of contamination during construction include:

Potential Source	Preventative Measure
Asphalt products used on this project.	▪ 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 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.
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.	▪ 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 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

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification &
Sewage Collection System Application

Attachment C – Sequence of Major Activities

Purlsong Unit 2 & 3 will be constructed concurrently with one another. 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 illustrated on Exhibit 1. Following the installation of TBMPS is clearing, and grubbing of vegetation where applicable, and mass grading and stockpiling of soils. The second stage is the construction of Purlsong Units 2 & 3 that will include the construction of four (4) batch detention basins, eight (8) single-family condominium lots, 96 single family residential homes with associated streets, construction of new pavement area (roads and sidewalks), utilities, landscaping and site cleanup. This will disturb approximately 100.03 acres for all development phases. Approximately 4.72 acres of the project site may be disturbed for the SCS installation of Purlsong Units 2 & 3, including excavation, construction of sewer mains, backfill and compaction.

ATTACHMENT D

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification &
Sewage Collection System Application

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.

Due to the surrounding topography, there are areas of upgradient water that will cross the site from the undeveloped adjacent areas. The upgradient water originating from the southeast and southwest adjacent properties of Purlsong Unit 2 will be captured and diverted around the project site via earthen channels. All TBMPs are adequate for the drainage areas they serve.

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 gravel bags and drain inlet protection at inlets and downgradient areas of construction activities for sediment control (4) installation of stabilized construction entrance/exit(s) to reduce the dispersion of sediment from the site, and (5) 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.

BMP measures utilized in this plan are intended to allow stormwater to continue downstream after passing through the BMPs. This will allow stormwater runoff to continue downgradient to streams or features that may exist downstream of the site.

ATTACHMENT F

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification &
Sewage Collection System Application

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 gravel bags and drain inlet protection at inlets and downgradient areas of construction activities, 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

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification & Sewage Collection System Application

Attachment G – Drainage Area Map

More than ten (10) acres will be disturbed within a common drainage area at one time, therefore, a smaller sediment trap will be provided within the basin locations. A combination of TBMPs are to be utilized and are adequate for the drainage areas served.

ATTACHMENT I

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification &
Sewage Collection System Application

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 Prevention Measure	Inspected in Compliance	Corrective Action Required	
		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 Name _____ Inspector's Signature _____ Date _____

PROJECT MILESTONE DATES

Date when major site grading activities begin:

Construction Activity	Date
Installation of BMPs	

Dates when construction activities temporarily or permanently 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

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification &
Sewage Collection System Application

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.

PERMANENT STORMWATER SECTION (TCEQ-0600)

Permanent 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)(C), (D)(Ii), (E), and (5), 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 **Permanent Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Hayden Fowlkes, P.E.

Date: 8/18/2025

Signature of Customer/Agent



Regulated Entity Name: Purlsong Units 2 & 3

Permanent Best Management Practices (BMPs)

Permanent best management practices and measures that will be used during and after construction is completed.

1. ☒ Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.

   ☐ N/A

2. ☒ These practices and measures have been designed, and will be constructed, operated, and maintained to insure that 80% of the incremental increase in the annual mass loading of total suspended solids (TSS) from the site caused by the regulated activity is removed. These quantities have been calculated in accordance with technical guidance prepared or accepted by the executive director.

   ☒ The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.

☐ A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used is: _____

☐ N/A

3. ☒ Owners must insure that permanent BMPs and measures are constructed and function as designed. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the appropriate regional office within 30 days of site completion.

   ☐ N/A

4. Where a site is used for low density single-family residential development and has 20 % or less impervious cover, other permanent BMPs are not required. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.

   ☐ The site will be used for low density single-family residential development and has 20% or less impervious cover.
   ☐ The site will be used for low density single-family residential development but has more than 20% impervious cover.
   ☒ The site will not be used for low density single-family residential development.

5. The executive director may waive the requirement for other permanent BMPs for multi-family residential developments, schools, or small business sites where 20% or less impervious cover is used at the site. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.

   ☐ **Attachment A - 20% or Less Impervious Cover Waiver**. The site will be used for multi-family residential developments, schools, or small business sites and has 20% or less impervious cover. A request to waive the requirements for other permanent BMPs and measures is attached.
   ☒ The site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.
   ☐ The site will not be used for multi-family residential developments, schools, or small business sites.

6. ☒ **Attachment B - BMPs for Upgradient Stormwater**.

☒ A description of the BMPs and measures that will be used to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site is attached.

☐ No surface water, groundwater or stormwater originates upgradient from the site and flows across the site, and an explanation is attached.

☐ Permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, and an explanation is attached.

7. ☒ **Attachment C - BMPs for On-site Stormwater**.

☒ A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff from the site is attached.

☐ Permanent BMPs or measures are not required to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff, and an explanation is attached.

8. ☐ **Attachment D - BMPs for Surface Streams**. A description of the BMPs and measures that prevent pollutants from entering surface streams, sensitive features, or the aquifer is attached. Each feature identified in the Geologic Assessment as sensitive has been addressed.

☒ N/A

9. ☒ The applicant understands that to the extent practicable, BMPs and measures must maintain flow to naturally occurring sensitive features identified in either the geologic assessment, executive director review, or during excavation, blasting, or construction.

☒ The permanent sealing of or diversion of flow from a naturally-occurring sensitive feature that accepts recharge to the Edwards Aquifer as a permanent pollution abatement measure has not been proposed.

☐ **Attachment E - Request to Seal Features**. A request to seal a naturally-occurring sensitive feature, that includes, for each feature, a justification as to why no reasonable and practicable alternative exists, is attached.

10. ☒ **Attachment F - Construction Plans**. All construction plans and design calculations for the proposed permanent BMP(s) and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. The plans are attached and, if applicable include:

☒ Design calculations (TSS removal calculations)
☒ TCEQ construction notes
☒ All geologic features
☒ All proposed structural BMP(s) plans and specifications

☐ N/A

11. ☒ **Attachment G - Inspection, Maintenance, Repair and Retrofit Plan**. A plan for the inspection, maintenance, repairs, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan includes all of the following:

    ☒ Prepared and certified by the engineer designing the permanent BMPs and measures
    ☒ Signed by the owner or responsible party
    ☒ Procedures for documenting inspections, maintenance, repairs, and, if necessary retrofit
    ☒ A discussion of record keeping procedures

    ☐ N/A

12. ☐ **Attachment H - Pilot-Scale Field Testing Plan**. Pilot studies for BMPs that are not recognized by the Executive Director require prior approval from the TCEQ. A plan for pilot-scale field testing is attached.

    ☒ N/A

13. ☒ **Attachment I -Measures for Minimizing Surface Stream Contamination**. A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is attached. The measures address increased stream flashing, the creation of stronger flows and in-stream velocities, and other in-stream effects caused by the regulated activity, which increase erosion that results in water quality degradation.

    ☐ N/A

Responsibility for Maintenance of Permanent BMP(s)

Responsibility for maintenance of best management practices and measures after construction is complete.

14. ☒ The applicant is 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 (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. Such entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred.

    ☐ N/A

15. ☒ A copy of the transfer of responsibility must be filed with the executive director at the appropriate regional office within 30 days of the transfer if the site is for use as a multiple single-family residential development, a multi-family residential development, or a non-residential development such as commercial, industrial, institutional, schools, and other sites where regulated activities occur.

    ☐ N/A

ATTACHMENT B

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification &
Sewage Collection System Application

Attachment B – BMPs for Upgradient Stormwater

Due to the surrounding topography, a portion of an undeveloped adjacent property to the southeast and southwest of Purlsong Unit 2 will flow across the project limits. These offsite flows are captured and diverted via earthen channels or accounted for in watershed “A” and “B”, where they are captured by Basins 1 and 2 of Purlsong Unit 2, respectively. The onsite PBMP has been sized to account for the flows from these areas.

The project’s proposed Permanent Best Management Practices (PBMPs) for stormwater treatment are four (4) proposed batch detention basins and seven (7) areas of 15’ engineered vegetative filter strips (VFS) which are designed in accordance with the TCEQ’s Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the site.

ATTACHMENT C

Attachment C – BMPs for On-Site Stormwater

The proposed Permanent Best Management Practices (PBMPs) for stormwater treatment are four (4) batch detention basins and seven (7) areas utilizing fifteen-foot (15') engineered vegetative filter strips. All PBMPs are designed in accordance with the TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the site.

ATTACHMENT D

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification & Sewage Collection System Application

Attachment D – BMPs for Surface Streams

There are no surface streams on, or near, the project site. The proposed Permanent Best Management Practices (PBMPs) for stormwater treatment are four (4) batch detention basins and seven (7) areas utilizing fifteen-foot (15') engineered vegetative filter strips. All PBMPs are designed in accordance with the TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) to remove 80% of the increase in Total Suspended Solids (TSS) from the site.

ATTACHMENT F

PURLSONG UNITS 2 & 3
Water Pollution Abatement Plan Modification & Sewage Collection System Application

Attachment F – Construction Plans

Please refer to the Exhibits Section of this application for the Water Pollution Abatement Site Plans.

ATTACHMENT G

PERMANENT POLLUTION ABATEMENT MEASURES
MAINTENANCE SCHEDULE AND MAINTENANCE PROCEDURES

This document has been prepared to provide a description and schedule for the performance of maintenance on permanent pollution abatement measures. Maintenance measures to be performed will be dependent on what permanent pollution abatement measures are incorporated into the project. The project specific water pollution abatement plan should be reviewed to determine what permanent pollution abatement measures are incorporated into a project.

It should also be noted that the timing and procedures presented herein are general guidelines, adjustment to the timing and procedures may have to be made depending on project specific characteristics as well as weather related conditions but may not be altered without TCEQ approval.

Where a project is occupied by the owner, the owner may provide for maintenance with his own skilled forces or contract for recommended maintenance of Permanent Best Management Practices. Where a project is occupied or leased by a tenant, the owner shall require tenants to contract for such maintenance services either through a lease agreement, property owners association covenants, or other binding document.

I understand that I am responsible for maintenance of the Permanent Pollution Abatement Measures included in this project until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property or ownership is transferred.

I, the owner, have read and understand the requirements of the attached Maintenance Plan and Schedule.

Nathan Moreno, Denny Blue
Chesmar Homes, LLC

8/7/25
Date

INSPECTION AND MAINTENANCE SCHEDULE
FOR
PERMANENT POLLUTION ABATEMENT MEASURES

Recommended Frequency	Task to be Performed												
	1	2	3	4	5	6	7	8	9	10	11	12	13
After Rainfall	√							√			√		√
Biannually*	√	√	√	√	√	√	√	√	√	√	√	√	√

At least one biannual inspection must occur during or immediately after a rainfall event.
√Indicates maintenance procedure that applies to this specific site.

See description of maintenance task to be performed on the following pages. Frequency of maintenance tasks may vary depending on amount of rainfall and other weather-related conditions but may not be altered without TCEQ approval.

A written record should be kept of inspection results and maintenance performed.

Task No. & Description	***Included in this project***	
1. Mowing	**Yes**	No
2. Litter and Debris Removal	**Yes**	No
3. Erosion Control	**Yes**	No
4. Level Sensor	**Yes**	No
5. Nuisance Control	**Yes**	No
6. Structural Repairs and Replacement	**Yes**	No
7. Discharge Pipe	**Yes**	No
8. Detention and Drawdown Time	**Yes**	No
9. Sediment Removal	**Yes**	No
10. Logic Controller	**Yes**	No
11. Vegetated Filter Strips	**Yes**	No
12. Visually Inspect Security Fencing for Damage or Breach	**Yes**	No
13. Recordkeeping for Inspections, Maintenance, and Repairs	**Yes**	No

MAINTENANCE PROCEDURES FOR PERMANENT POLLUTION ABATEMENT MEASURES

Note: Additional guidance can be obtained from TCEQ's Technical Guidance Manual (TGM) RG-348 (2005) Section 3.5.

Inspections. Inspections should take place a minimum of twice a year. One inspection should take place during wet weather to determine if the basin is meeting the target detention time of 12 hours and a drawdown time of no more than 48 hours. The remaining inspections should occur between storm events so that manual operation of the valve and controller can be verified. The level sensor in the basin should be inspected and any debris or sediment in the area should be removed. The outlet structure and the trash screen should be inspected for signs of clogging. Debris and sediment should be removed from the orifice and outlet(s) as described in previous sections. Debris obstructing the valve should be removed. During each inspection, erosion areas inside and downstream of this BMP should be identified and repaired/revegetated immediately. *A written record should be kept of inspection results and corrective measures taken*

1. Mowing. The basin, basin side-slopes, and embankment of the basin must be mowed to prevent woody growth and control weeds. A mulching mower should be used, or the grass clippings should be caught and removed. Mowing should take place at least twice a year, or more frequently if vegetation exceeds 18 inches in height. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas.

2. Litter and Debris Removal. Litter and debris removal should take place at least twice a year, as part of the periodic mowing operations and inspections. Debris and litter should be removed from the surface of the basin. Particular attention should be paid to floatable debris around the outlet structure. The outlet should be checked for possible clogging or obstructions and any debris removed.

3. Erosion control. The basin side slopes and embankment all may periodically suffer from slumping and erosion. To correct these problems, corrective action, such as regrading and revegetation, may be necessary. Correction of erosion control should take place whenever required based on the periodic inspections.

4. Level Sensor. The level sensor in the basin should be inspected and any debris or sediment in the area should be removed. Litter and debris removal should take place at least twice a year, as part of the periodic mowing operations and inspections. Debris and litter should be removed from the surface of the basin.

5. Nuisance Control. Standing water or soggy conditions may occur in the basin. Some standing water may occur after a storm event since the valve may close with 2 to 3 inches of water in the basin. Some flow into the basin may also occur between storms due to spring flow and residential water use that enters the storm sewer system. Twice a year, the facility should be evaluated in terms of nuisance control (insects, weeds, odors, algae, etc.).

6. Structural Repairs and Replacement. With each inspection, any damage to structural elements of the basin (pipes, concrete drainage structures, retaining walls, etc.) should be identified and repaired immediately. An example of this type of repair can include patching of cracked concrete, sealing of voids, removal of vegetation from cracks and joints. The various inlet/outlet structures in a basin will eventually deteriorate and must be replaced. *A written record should be kept of inspection results and corrective measures taken*

7. Discharge Pipe. The basin discharge pipe shall be checked for accumulation of silt, debris or other obstructions which could block flow. Soil accumulations, vegetative overgrowth and other blockages should be cleared from the pipe discharge point. Erosion at the point of discharge shall be monitored. If erosion occurs, the addition of rock rubble to disperse the flow should be accomplished. *A written record should be kept of inspection results and corrective measures taken*

8. Detention and Drawdown Time. One inspection should take place during wet weather to determine if the basin is meeting the target detention time of 12 hours and a drawdown time of no more than 48 hours. This characteristic can be a sign of the need for maintenance. The minimum drawdown time is 24 hours. If drawdown time is less than 24 hours, the actuator valve shall be checked and partially closed to limit the drawdown time. Extensive drawdown time greater than 48 hours may indicated blockage of the discharge pipe. Corrective actions should be performed and completed within 15 working days. *A written record of the inspection findings and corrective actions performed should be made.*

9. Sediment Removal. A properly designed batch detention basin will accumulate quantities of sediment over time. The accumulated sediment can detract from the appearance of the facility and reduce the pollutant removal performance of the facility. The sediment also tends to accumulate near the outlet structure and can interfere with the level sensor operation. Sediment shall be removed from the basin at least every 5 years, when sediment depth exceeds 6 inches, when the sediment interferes with the level sensor or when the basin does not drain within 48 hours. Care should be taken not to compromise the basin lining during maintenance.

10. Logic Controller. The Logic Controller should be inspected as part of the twice-yearly investigations. Verify that the external indicators (active, cycle in progress) are operating properly by turning the controller off and on, and by initiating a cycle by triggering the level sensor in the basin. The valve should be manually opened and closed using the open/close switch to verify valve operation and to assist in inspecting the valve for debris. The solar panel should be inspected and any dust or debris on the panel should be carefully removed. The controller and all other circuitry and wiring should be inspected for signs of corrosion, damage from insects, water leaks, or other damage. At the end of the inspection, the controller should be reset.

11. Vegetated Filter Strips. Vegetation height for native grasses shall be limited to no more than 18-inches. When vegetation exceeds that height, the filter strip shall be cut to a height of approximately 4 inches. Turf grass shall be limited to a height of 4-inches with regular maintenance that utilizes a mulching mower. Trash and debris shall be removed from filter strip

prior to cutting. Check filter strip for signs of concentrated flow and erosion. Areas of filter strip showing signs of erosion shall be repaired by scarifying the eroded area, reshaping, regrading, and placement of solid block sod over the affected area. *A written record of the inspection findings and corrective actions performed should be made*

12. Visually Inspect Security Fencing for Damage or Breach. Check maintenance access gates for proper operation. Damage to fencing or gates shall be repaired within 5 working days. *A written record should be kept of inspection results and maintenance performed.*

13. Recordkeeping Procedures for Inspections, Maintenance, Repairs, and Retrofits.
    - Written records shall be kept by the party responsible for maintenance or a designated representative.
    - Written records shall be retained for a minimum of five years.

ATTACHMENT I

Attachment I – Measures for Minimizing Surface Stream Contamination

There are no surface streams on, or near the project site. Any points where discharge from the site is concentrated and erosive velocities exist will include appropriately sized energy dissipators to reduce velocities to non-erosive levels.

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 Danny Blue,
Print Name

Director of Land,
Title - Owner/President/Other

of Chesmar Homes, LLC,
Corporation/Partnership/Entity Name

have authorized **Pape Dawson Consulting Engineers, LLC**
Print Name of Agent/Engineer

of Pape-Dawson Consulting Engineers,LLC
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

9/7/25
Date

THE STATE OF Texas §

County of Bexar §

BEFORE ME, the undersigned authority, on this day personally appeared Danny Bruce known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 7th day of August, 2025.

NOTARY PUBLIC

ALLYSON WALTERS
Notary ID #129531158
My Commission Expires
April 13, 2026

Allyson Walters
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 4-13-26

APPLICATION FEE FORM (TCEQ-0574)

Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: Purlsong Units 2 & 3
Regulated Entity Location: 0.76 miles NW of FM 2722 and State HWY 46, New Braunfels, TX
Name of Customer: Chesmar Homes, LLC
Contact Person: Nathan Moreno Phone: 713-227-8790
Customer Reference Number (if issued):CN 605592310
Regulated Entity Reference Number (if issued):RN _____

Austin Regional Office (3373)

☐ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362)

☐ Bexar ☐ Medina ☐ Uvalde
☒ Comal ☐ Kinney

Application fees must be paid by check, certified check, or money order, payable to the **Texas Commission on Environmental Quality**. Your canceled check will serve as your receipt. **This form must be submitted with your fee payment**. This payment is being submitted to:

☐ Austin Regional Office
☐ Mailed to: TCEQ - Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☐ San Antonio Regional Office
☒ Overnight Delivery to: TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
(512)239-0357

Site Location (Check All That Apply):

☒ Recharge Zone ☐ Contributing Zone ☐ Transition Zone

Type of Plan	***Size***	***Fee Due***
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	100.03 Acres	$ 10,000
Sewage Collection System	4,091.07 L.F.	$ 2,045.54
Lift Stations without sewer lines	Acres	$
Underground or Aboveground Storage Tank Facility	Tanks	$
Piping System(s)(only)	Each	$
Exception	Each	$
Extension of Time	Each	$

Signature: _____ Date: 8/18/2025

Application Fee Schedule

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

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

Organized Sewage Collection Systems and Modifications

Project	*Cost per Linear Foot*	*Minimum Fee-Maximum Fee*
Sewage Collection Systems	$0.50	$650 - $6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

Project	*Cost per Tank or Piping System*	*Minimum Fee-Maximum Fee*
Underground and Aboveground Storage Tank Facility	$650	$650 - $6,500

Exception Requests

Project	*Fee*
Exception Request	$500

Extension of Time Requests

Project	*Fee*
Extension of Time Request	$150

CORE DATA FORM
(TCEQ-10400)

TCEQ Use Only

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. Reason for Submission (*If other is checked please describe in space provided.*)

☒ New Permit, Registration or Authorization (*Core Data Form should be submitted with the program application.*)

☐ Renewal (*Core Data Form should be submitted with the renewal form*) ☐ Other

2. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number *(if issued)*
CN 605592310		RN

SECTION II: Customer Information

4. General Customer Information	5. Effective Date for Customer Information Updates (mm/dd/yyyy)	10/16/2024

☒ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership

☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)*	*If new Customer, enter previous Customer below:*
Chesmar Homes, LLC	

7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number *(if applicable)*
0803161138	32035414203	20-272064	

11. Type of Customer: ☒ Corporation ☐ Individual Partnership: ☐ General ☐ Limited

Government: ☐ City ☐ County ☐ Federal ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

12. Number of Employees
☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☒ 501 and higher

13. Independently Owned and Operated?
☐ Yes ☒ No

14. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check one of the following*

☒ Owner ☐ Operator ☐ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other:

15. Mailing Address:	211 N Loop 1604, Suite179						
	City	San Antonio	State	TX	ZIP	78232	ZIP + 4

16. Country Mailing Information *(if outside USA)*	17. E-Mail Address *(if applicable)*
United States of America	nathan.moreno@chesmar.com

18. Telephone Number	19. Extension or Code	20. Fax Number *(if applicable)*
(713) 277-8790		( ) -

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 Information

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.*)

Purlsong Unit 2 & 3

23. Street Address of the Regulated Entity: *(No PO Boxes)*							
	City		**State**	TX	**ZIP**	78132	**ZIP + 4**
24. County	Comal						

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	Aapproximately 0.76 miles NW of the FM 2722 and State Highway 46 intersection

26. Nearest City	**State**	**Nearest ZIP Code**
New Braunfels	TX	78132

27. Latitude (N) In Decimal:	29.7343	**28. Longitude (W) In Decimal:**	-98.2188

Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	44	3.48	98	12	58.6

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)
1521	1611	236115	237310

33. What is the Primary Business of this entity? *(Do not repeat the SIC or NAICS description.)*

Single Family Residential

34. Mailing Address:	**211 N Loop 1604, STE 179**						
	City	**San Antonio**	**State**	**TX**	**ZIP**	**78232**	**ZIP + 4**

35. E-Mail Address:	**nathan.moreno@chesmar.com**

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
( ) -		( ) -

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☒ Edwards Aquifer	☐ Emissions Inventory Air	☐ Industrial Hazardous Waste
☐ Municipal Solid Waste	☐ New Source Review Air	☒ OSSF	☐ Petroleum Storage Tank	☐ PWS
☐ Sludge	☐ Storm Water	☐ Title V Air	☐ Tires	☐ Used Oil
☐ Voluntary Cleanup	☐ Waste Water	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

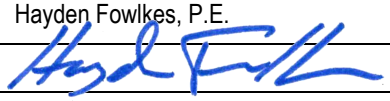
SECTION IV: Preparer Information

40. Name:	Greg Latimer, P.E.	**41. Title:**	Project Manager

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(830) 632-5633		( ) -	glatimer@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 Consulting Engineers, LLC	**Job Title:**	Vice President
Name *(In Print):*	Hayden Fowlkes, P.E.	**Phone:**	(830) 632- **5633**
Signature:		**Date:**	

POLLUTANT LOAD AND REMOVAL CALCULATIONS

Purlsong Units 2 & 3 WPAP Mod & SCS

Treatment Summary by Watershed

Watershed	Total Watershed Area (ac.)	Previously Approved Impervious Cover (ac.)	Proposed Impervious Cover to Treat (ac.)	Total Impervious Cover (ac.)	PBMP	Required TSS Removal Annually (lbs)	TSS Removed Annually (lbs)
A	19.65		10.35	10.35	Proposed Batch Detention Basin 1 (Unit 2)	9,290	9,650
B	17.21		8.61	8.61	Proposed Batch Detention Basin 2 (Unit 2)	7,728	8,313
C	9.36		4.89	4.89	Proposed Batch Detention Basin 3 (Unit 2)	4,389	4,818
D	0.67		0.20	0.20	Vegetated Filter Strip	180	201
E	2.30		0.92	0.92	Vegetated Filter Strip	826	914
F	1.74		0.69	0.69	Vegetated Filter Strip	619	686
G	1.17		0.36	0.36	Vegetated Filter Strip	323	362
H	0.36		0.32	0.32	Overtreatment	287	0
I	2.61		0.93	0.93	Vegetated Filter Strip	835	928
J	5.75		1.01	1.01	Overtreatment	907	0
K	26.75		12.73	12.73	Proposed Batch Detention Basin 1 (Unit 3)	11,426	12,176
L	2.35		1.26	1.26	Vegetated Filter Strip	1,131	1,239
M	0.20		0.11	0.11	Vegetated Filter Strip	99	108
N	0.59		0.27	0.27	Overtreatment	242	0
O	34.86	18.68	2.80	21.48	Approved Batch Detention Basin 1 (EAPP ID: 13002046)	19,280	20,619
P	71.29	25.19	8.51	33.70	Approved Batch Detention Basin 2 (EAPP ID: 13002046)	30,249	30,103
TOTAL	196.86	**43.87**	**53.96**	**97.83**	---	87,812	**90,117**

Water Quality Basin Summary

Basin	Designed Capture Volume (cf)	Required Volume (cf)	Excess Volume Capacity (cf)
Approved Batch Detention Basin 1 (U1)	129,981	**118,169**	11,812
Approved Batch Detention Basin 2 (U1)	135,463	**134,175**	1,288
Proposed Batch Detention Basin 1 (U2)	50,272	**47,847**	2,425
Proposed Batch Detention Basin 2 (U2)	52,719	**48,263**	4,456
Proposed Batch Detention Basin 3 (U2)	35,985	**33,203**	1,231
Proposed Batch Detention Basin 1 (U3)	70,840	**68,255**	2,585

8/18/2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED
PROFESSIONAL ENGINEER

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Pulsong Units 2 & 3
Date Prepared: 7/31/2025

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = A

Total drainage basin/outfall area =	19.65	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	10.35	acres
Post-development impervious fraction within drainage basin/outfall area =	0.53	
$L_{M\ THIS\ BASIN}$ =	9290	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Extended Detention
Removal efficiency = 91 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	19.65	acres
A_I =	10.35	acres
A_P =	9.30	acres
L_R =	10905	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 9650 lbs.

F = 0.88

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.50	inches
Post Development Runoff Coefficient =	0.37	
On-site Water Quality Volume =	39873	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	7975	
Total Capture Volume (required water quality volume(s) x 1.20) =	47847	cubic feet

8/18/2025



Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Pulsong Units 2 & 3
Date Prepared: 7/31/2025

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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

*** The values entered in these fields should be for the total project area.**

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = B

Total drainage basin/outfall area =	17.21	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	8.61	acres
Post-development impervious fraction within drainage basin/outfall area =	0.50	
$L_{M\ THIS\ BASIN}$ =	7728	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Extended Detention
Removal efficiency = 91 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	17.21	acres
A_I =	8.61	acres
A_P =	8.60	acres
L_R =	9086	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 8313 lbs.

F = 0.91

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.80	inches
Post Development Runoff Coefficient =	0.36	
On-site Water Quality Volume =	40219	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	8044	
Total Capture Volume (required water quality volume(s) x 1.20) =	48263	cubic feet

8/18/2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED
PROFESSIONAL ENGINEER

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Pulsong Units 2 & 3
Date Prepared: 7/31/2025

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
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where:

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A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = C

Total drainage basin/outfall area =	9.36	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	4.89	acres
Post-development impervious fraction within drainage basin/outfall area =	0.52	
$L_{M\ THIS\ BASIN}$ =	4389	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Extended Detention
Removal efficiency = 91 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	9.36	acres
A_I =	4.89	acres
A_P =	4.47	acres
L_R =	5153	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 4818 lbs.

F = 0.93

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	2.20	inches
Post Development Runoff Coefficient =	0.37	
On-site Water Quality Volume =	27670	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	5534	
Total Capture Volume (required water quality volume(s) x 1.20) =	33203	cubic feet

8/18/2025



Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Pulsong Units 2 & 3**
Date Prepared: **7/31/2025**

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where:

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P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = D

Total drainage basin/outfall area =	0.67	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.20	acres
Post-development impervious fraction within drainage basin/outfall area =	0.30	
$L_{M\ THIS\ BASIN}$ =	180	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.67	acres
A_I =	0.20	acres
A_P =	0.47	acres
L_R =	201	lbs

8/18/2025



5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 201 lbs.

F = 1.00

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Pulsong Units 2 & 3**
Date Prepared: **7/31/2025**

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = E

Total drainage basin/outfall area =	2.30	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.92	acres
Post-development impervious fraction within drainage basin/outfall area =	0.40	
$L_{M\ THIS\ BASIN}$ =	826	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	2.30	acres
A_I =	0.92	acres
A_P =	1.38	acres
L_R =	914	lbs

8/18/2025



5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 914 lbs.

F = 1.00

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Pulsong Units 2 & 3**
Date Prepared: **7/31/2025**

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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = F

Total drainage basin/outfall area =	1.74	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.69	acres
Post-development impervious fraction within drainage basin/outfall area =	0.40	
$L_{M\ THIS\ BASIN}$ =	619	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	1.74	acres
A_I =	0.69	acres
A_P =	1.05	acres
L_R =	686	lbs

8/18/2025



5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 686 lbs.

F = 1.00

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Pulsong Units 2 & 3**
Date Prepared: **7/31/2025**

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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = G

Total drainage basin/outfall area =	1.17	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.36	acres
Post-development impervious fraction within drainage basin/outfall area =	0.31	
$L_{M\ THIS\ BASIN}$ =	323	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	1.17	acres
A_I =	0.36	acres
A_P =	0.81	acres
L_R =	362	lbs

8/18/2025



5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 362 lbs.

F = 1.00

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Pulsong Units 2 & 3**
Date Prepared: **7/31/2025**

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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = I

Total drainage basin/outfall area =	2.61	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.93	acres
Post-development impervious fraction within drainage basin/outfall area =	0.36	
$L_{M\ THIS\ BASIN}$ =	835	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	2.61	acres
A_I =	0.93	acres
A_P =	1.68	acres
L_R =	928	lbs

8/18/2025



5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 928 lbs.

F = 1.00

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Pulsong Units 2 & 3
Date Prepared: 8/12/2025

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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = K

Total drainage basin/outfall area =	26.75	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	12.73	acres
Post-development impervious fraction within drainage basin/outfall area =	0.48	
$L_{M\ THIS\ BASIN}$ =	11426	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Extended Detention
Removal efficiency = 91 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	26.75	acres
A_I =	12.73	acres
A_P =	14.02	acres
L_R =	13454	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 12176 lbs.

F = 0.90

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.70	inches
Post Development Runoff Coefficient =	0.34	
On-site Water Quality Volume =	56879	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	11376	
Total Capture Volume (required water quality volume(s) x 1.20) =	68255	cubic feet

8/18/2025



Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Pulsong Units 2 & 3**
Date Prepared: **7/31/2025**

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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = L

Total drainage basin/outfall area =	2.35	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	1.26	acres
Post-development impervious fraction within drainage basin/outfall area =	0.54	
$L_{M\ THIS\ BASIN}$ =	1131	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	2.35	acres
A_I =	1.26	acres
A_P =	1.09	acres
L_R =	1239	lbs

8/18/2025



5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ =	1239	lbs.
F =	1.00	

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Pulsong Units 2 & 3**
Date Prepared: **7/31/2025**

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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = M

Total drainage basin/outfall area =	0.20	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.11	acres
Post-development impervious fraction within drainage basin/outfall area =	0.55	
$L_{M\ THIS\ BASIN}$ =	99	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Vegetated Filter Strips
Removal efficiency = 85 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.20	acres
A_I =	0.11	acres
A_P =	0.09	acres
L_R =	108	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 108 lbs.

F = 1.00

8/18/2025



Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Pulsong Units 2 & 3
Date Prepared: 7/31/2025

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1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

*** The values entered in these fields should be for the total project area.**

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = O

Total drainage basin/outfall area =	34.86	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	21.48	acres
Post-development impervious fraction within drainage basin/outfall area =	0.62	
$L_{M\ THIS\ BASIN}$ =	19280	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Extended Detention
Removal efficiency = 91 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	34.86	acres
A_I =	21.48	acres
A_P =	13.38	acres
L_R =	22536	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 20619 lbs.

F = 0.91

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.80	inches
Post Development Runoff Coefficient =	0.43	
On-site Water Quality Volume =	98474	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	19695	
Total Capture Volume (required water quality volume(s) x 1.20) =	118169	cubic feet

8/18/2025



Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Pulsong Units 2 & 3
Date Prepared: 7/31/2025

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:

$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal	
Total project area included in plan * =	196.86	acres
Predevelopment impervious area within the limits of the plan * =	0.00	acres
Total post-development impervious area within the limits of the plan* =	97.83	acres
Total post-development impervious cover fraction * =	0.50	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	87812	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 15

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = P

Total drainage basin/outfall area =	71.29	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	33.70	acres
Post-development impervious fraction within drainage basin/outfall area =	0.47	
$L_{M\ THIS\ BASIN}$ =	30249	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Extended Detention
Removal efficiency = 91 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times 34.6 + A_P \times 0.54)$

where:

A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	71.29	acres
A_I =	33.70	acres
A_P =	37.59	acres
L_R =	35625	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 30103 lbs.

F = 0.84

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.26	inches
Post Development Runoff Coefficient =	0.34	
On-site Water Quality Volume =	111813	cubic feet

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	22363	
Total Capture Volume (required water quality volume(s) x 1.20) =	134175	cubic feet

8/18/2025



EXHIBITS

GENERAL NOTES

1. DO NOT DISTURB VEGETATED AREAS (TREES, GRASS, WEEDS, BRUSH, ETC.) ANY MORE THAN NECESSARY FOR CONSTRUCTION.

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7. STORM WATER POLLUTION PREVENTION STRUCTURES SHOULD BE CONSTRUCTED WITHIN THE SITE BOUNDARIES. SOME OF THESE FEATURES MAY BE SHOWN OUTSIDE THE SITE BOUNDARIES ON THIS PLAN FOR VISUAL CLARITY.

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9. BEST MANAGEMENT PRACTICES MAY BE INSTALLED IN STAGES TO COINCIDE WITH THE DISTURBANCE OF UPGRADIENT AREAS.

10. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN STAGES ONCE THE WATERSHED FOR THAT PORTION CONTROLLED BY THE BEST MANAGEMENT PRACTICES HAS BEEN STABILIZED IN ACCORDANCE WITH TPDES REQUIREMENTS.

11. UPON COMPLETION OF THE PROJECT, INCLUDING SITE STABILIZATION, AND BEFORE FINAL PAYMENT IS ISSUED, CONTRACTOR SHALL REMOVE ALL SEDIMENT AND EROSION CONTROL MEASURES, PAYING SPECIAL ATTENTION TO ROCK BERMS IN DRAINAGE FEATURES.

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14. PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR SHALL COORDINATE PLACEMENT OF TEMPORARY BEST MANAGEMENT PRACTICES WITHIN TXDOT RIGHT-OF-WAY WITH TXDOT.

TEMPORARY POLLUTION ABATEMENT NOTES

1. CONSTRUCTION OF CIVIL INFRASTRUCTURE AND DRAINAGE STRUCTURES MAY PRECEDE CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF THE DISTRUBED AREA PERPENDICULAR TO THE DRAINAGE FLOW.

2. ROCK BERMS SHALL BE PLACED IN AREAS WHERE DRAINAGE FLOW IS CONCENTRATED DUE TO NATURAL CONDITIONS OR CONSTRUCTION ACTIVITIES SUCH AS DRAINAGE STRUCTURES. THESE BERMS WILL BE MAINTAINED UNTIL THEY ARE NO LONGER NEEDED OR UNTIL THEY ARE REPLACED WITH PERMANENT POLLUTION ABATEMENT MEASURES.

3. THIS PROJECT DOES NOT INCLUDE THE INSTALLATION OF ABOVE GROUND STORAGE TANKS (AST) WITH VOLUMES GREATER THAN OR EQUAL TO 500 GALLONS.

4. DRAINAGE PATTERNS ARE ILLUSTRATED BY FLOW ARROWS. SLOPES VARY THROUGHOUT THE SITE; TYPICAL SLOPES IN THIS PROJECT WILL RANGE FROM 1% TO 30%.

5. THE NATURE OF CONSTRUCTION IS SUCH THAT IT IS DIFFICULT TO PREDICT AREAS THAT WILL BE DISTURBED AND RE-VEGETATED. THE CONSTRUCTION PLANS INCLUDE A NOTE ON EXHIBIT 3 WHICH WILL REQUIRE THE CONTRACTOR TO RE-VEGETATE DISTURBED AREAS WITH SEEDING, HYDROMULCH, OR SOD AND SPRINKLING. ALL IMPERVIOUS COVER AREAS WILL BE DISTURBED.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER POLLUTION ABATEMENT PLAN GENERAL CONSTRUCTION NOTES

1. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE TCEQ REGIONAL OFFICE AT LEASR 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
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   - THE ACTIVITY START DATE; AND
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2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN (WPAP) AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON-SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.

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4. NO TEMPORARY OR PERMANENT HAZARDOUS SUBSTANCE STORAGE TANK SHALL BE INSTALLED WITHIN 150 FEET OF A WATER SUPPLY SOURCE, DISTRIBUTION SYSTEM, WELL OR SENSITIVE FEATURE.

5. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND MANUFACTURERS SPECIFICATIONS. IF INSPECTIONS INDICATED A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.

6. ANY SEDIMENT THAT ESCAPED THE CONSTRUCTION SITE MUST BE COLLECTED AND PROPERLY DISPOSED OF BEFORE THE NEXT RAIN EVENT TO ENSURE IT IS NOT WASHED INTO SURFACE STREAMS, SENSITIVE FEATURES, ETC.

7. SEDIMENT MUST BE REMOVED FROM THE SEDIMENT TRAPS OR SEDIMENTATION BASINS NOT LATER THAN WHEN IT OCCUPIES 50% OF THE BASIN'S DESIGN CAPACITY.

8. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BEING DISCHARGED OFFSITE.

9. ALL SPOILS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON-SITE WITH PROPER E&S CONTROLS. FOR STORAGE OF DISPOSAL OF SPOILS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPOILS AT THE OTHER SITE.

10. IF PORTIONS OF THE SITE WILL HAVE A TEMPORARY OR PERMANENT CEASE IN CONSTRUCTION ACTIVITY LASTING LONGER THAN 14 DAYS, SOIL STABILIZATION IN THOSE AREAS SHALL BE INITIATED AS SOON AS POSSIBLE PRIOR TO THE 14TH DAY OF INACTIVITY. IF ACTIVITY WILL RESUME PRIOR TO THE 21ST DAY, STABILIZATION MEASURES ARE NOT REQUIRED. IF DROUGHT CONDITIONS OR INCLEMENT WEATHER PREVENT ACTION BY THE 14TH DAY, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS POSSIBLE.

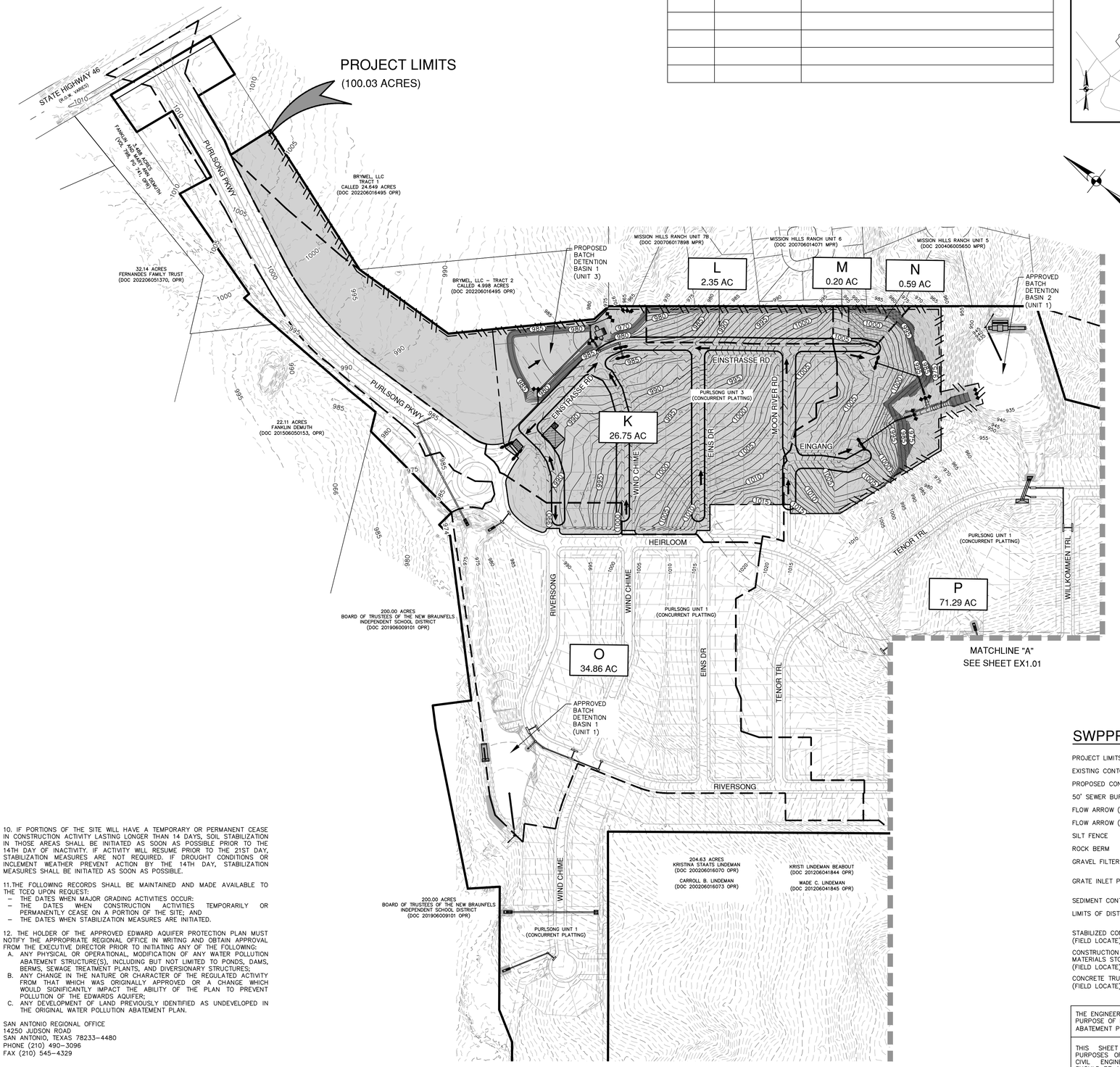
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   - THE DATES WHEN STABILIZATION MEASURES ARE INITIATED.

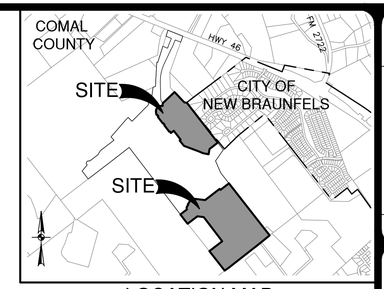
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   - A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO PONDS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;
   - B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER;
   - C. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN.

SAN ANTONIO REGIONAL OFFICE
14250 JUDSON ROAD
SAN ANTONIO, TEXAS 78233-4480
PHONE (210) 490-3096
FAX (210) 545-4329

TEMPORARY BMP MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION





LOCATION MAP
NOT-TO-SCALE

SCALE: 1"= 200'
0' 200' 400' 600'

SWPPP LEGEND

- PROJECT LIMITS
- EXISTING CONTOUR (976)
- PROPOSED CONTOUR (970)
- 50' SEWER BUFFER
- FLOW ARROW (EXISTING)
- FLOW ARROW (PROPOSED)
- SILT FENCE
- ROCK BERM
- GRAVEL FILTER BAGS
- GRATE INLET PROTECTION
- SEDIMENT CONTROL ROLLS
- LIMITS OF DISTURBED AREA
- STABILIZED CONSTRUCTION ENTRANCE/EXIT (FIELD LOCATE)
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA (FIELD LOCATE)
- CONCRETE TRUCK WASH-OUT PIT (FIELD LOCATE)

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE WATER POLLUTION ABATEMENT PLANS (WPAP) REGULATIONS.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF THE WPAP ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 1

FOR PERMIT

NO. | REVISION | DATE

08-15-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

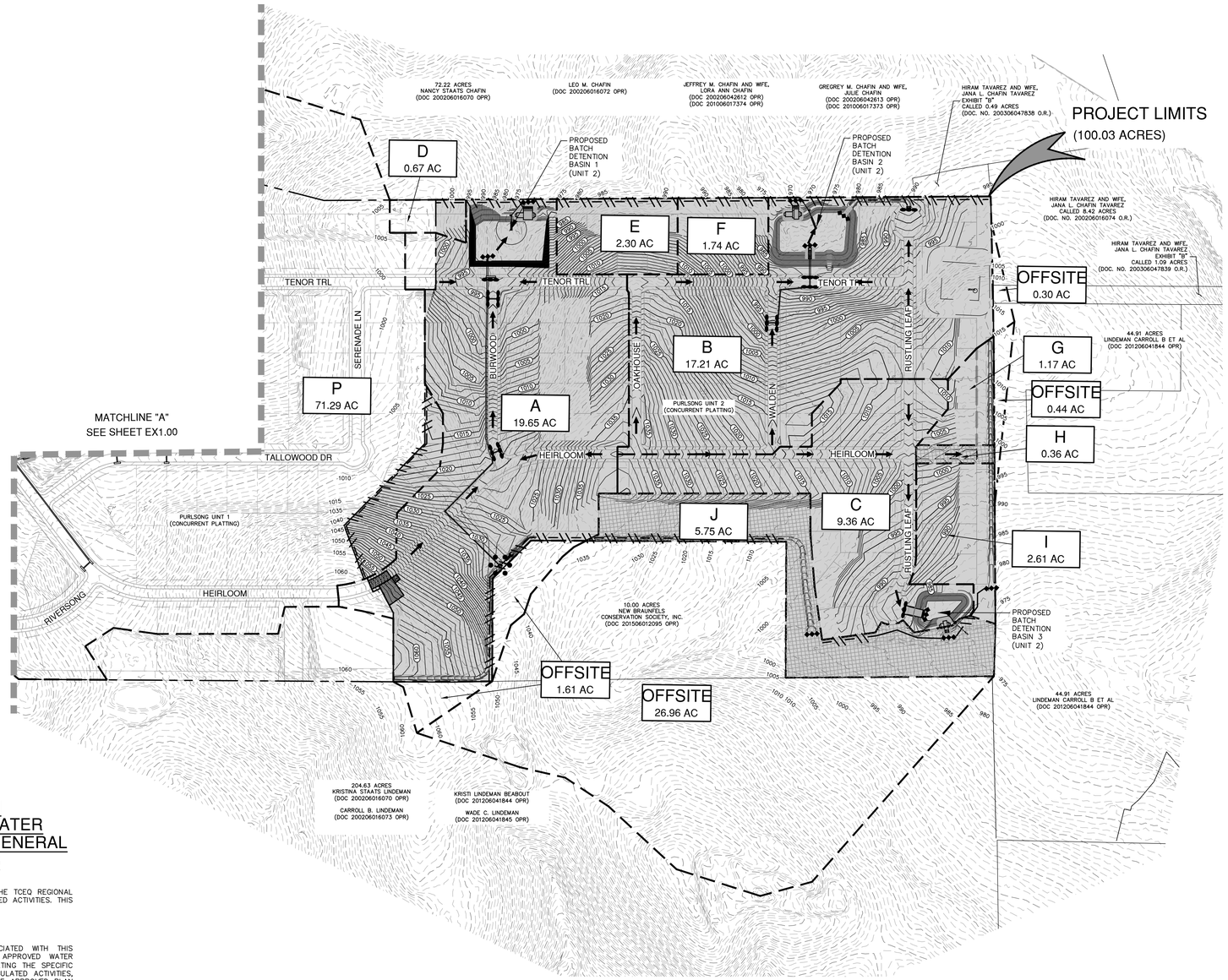
PURLSONG UNITS 2 & 3
COMAL COUNTY, TEXAS

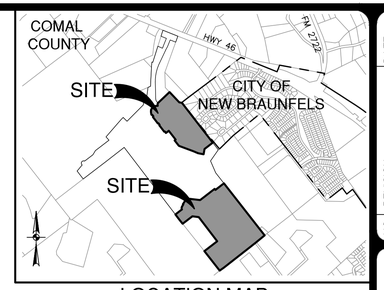
WATER POLLUTION ABATEMENT PLAN
TEMPORARY POLLUTION ABATEMENT PLAN

PLAT NO.
JOB NO. 30041-20/21
DATE JULY 2025
DESIGNER GDL
CHECKED HF DRAWN
SHEET EX1.00

Date: Aug 15, 2025, 2:36pm User ID: hhenke
File: P:\300\41\21\Design\Environmental\TM-300421.dwg

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SAN ANTONIO REGIONAL OFFICE
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1. CONSTRUCTION OF CIVIL INFRASTRUCTURE AND DRAINAGE STRUCTURES MAY PRECEDE CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PLACING SILT FENCE ALONG THE DOWN GRADIENT SIDE OF THE DISTRUBED AREA PERPENDICULAR TO THE DRAINAGE FLOW.

2. ROCK BERMS SHALL BE PLACED IN AREAS WHERE DRAINAGE FLOW IS CONCENTRATED DUE TO NATURAL CONDITIONS OR CONSTRUCTION ACTIVITIES SUCH AS DRAINAGE STRUCTURES. THESE BERMS WILL BE MAINTAINED UNTIL THEY ARE NO LONGER NEEDED OR UNTIL THEY ARE REPLACED WITH PERMANENT POLLUTION ABATEMENT MEASURES.

3. THIS PROJECT DOES NOT INCLUDE THE INSTALLATION OF ABOVE GROUND STORAGE TANKS (AST) WITH VOLUMES GREATER THAN OR EQUAL TO 500 GALLONS.

4. DRAINAGE PATTERNS ARE ILLUSTRATED BY FLOW ARROWS. SLOPES VARY THROUGHOUT THE SITE; TYPICAL SLOPES IN THIS PROJECT WILL RANGE FROM 1% TO 30%.

5. THE NATURE OF CONSTRUCTION IS SUCH THAT IT IS DIFFICULT TO PREDICT AREAS THAT WILL BE DISTURBED AND RE-VEGETATED. THE CONSTRUCTION PLANS INCLUDE A NOTE ON EXHIBIT 3 WHICH WILL REQUIRE THE CONTRACTOR TO RE-VEGETATE DISTURBED AREAS WITH SEEDING, HYDROMULCH, OR SOD AND SPRINKLING. ALL IMPERVIOUS COVER AREAS WILL BE DISTURBED.

TEMPORARY BMP MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE WATER POLLUTION ABATEMENT PLANS (WPAP) REGULATIONS.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF THE WPAP ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 1

NO.	REVISION	DATE

08-15-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNITS 2 & 3
COMAL COUNTY, TEXAS

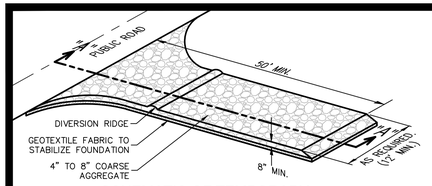
WATER POLLUTION ABATEMENT PLAN
TEMPORARY POLLUTION ABATEMENT PLAN

PLAT NO.
JOB NO. 30041-20/21
DATE JULY 2025
DESIGNER GDL
CHECKED HF DRAWN
SHEET EX1.01

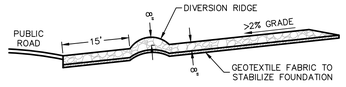
FOR PERMIT

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SCHEMATIC OF TEMPORARY CONSTRUCTION ENTRANCE/EXIT



SECTION "A-A" OF A CONSTRUCTION ENTRANCE/EXIT

MATERIALS

1. THE AGGREGATE SHOULD CONSIST OF 4–INCH TO 8–INCH WASHED STONE OVER A STABLE FOUNDATION AS SPECIFIED IN THE PLAN.

2. THE AGGREGATE SHOULD BE PLACED WITH A MINIMUM THICKNESS OF 8–INCHES.

3. THE GEOTEXTILE FABRIC SHOULD BE DESIGNED SPECIFICALLY FOR USE AS A SOIL FILTRATION MEDIA WITH AN APPROXIMATE WEIGHT OF 6 OZ/YD^2, A MULLEN BURST RATING OF 140 LB/IN^2, AND AN EQUIVALENT OPENING SIZE GREATER THAN A NUMBER 50 SIEVE.

4. IF A WASHING FACILITY IS REQUIRED, A LEVEL AREA WITH A MINIMUM OF 4–INCH DIAMETER WASHED STONE OR COMMERCIAL ROCK SHOULD BE INCLUDED IN THE PLANS. DIVERT WASTEWATER TO A SEDIMENT TRAP OR BASIN.

INSTALLATION

1. AVOID CURVES ON PUBLIC ROADS AND STEEP SLOPES. REMOVE VEGETATION AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA. GRADE CROWN FOUNDATION FOR POSITIVE DRAINAGE.

2. THE MINIMUM WIDTH OF THE ENTRANCE/EXIT SHOULD BE 12 FEET OR THE FULL WIDTH OF EXIT ROADWAY, WHICHEVER IS GREATER.

3. THE CONSTRUCTION ENTRANCE SHOULD BE AT LEAST 50 FEET LONG.

4. IF THE SLOPE TOWARD THE ROAD EXCEEDS 2%, CONSTRUCT A RIDGE, 6–INCHES TO 8–INCHES HIGH WITH 3:1 (H:V) SIDE SLOPES, ACROSS THE FOUNDATION APPROXIMATELY 15 FEET FROM THE ENTRANCE TO DIVERT RUNOFF AWAY FROM THE PUBLIC ROAD.

5. PLACE GEOTEXTILE FABRIC AND GRADE FOUNDATION TO IMPROVE STABILITY, 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.

COMMON TROUBLE POINTS

1. INADEQUATE RUNOFF CONTROL–SEDIMENT WASHES ONTO PUBLIC ROAD.

2. STONE TOO SMALL OR GEOTEXTILE FABRIC ABSENT, RESULTS IN MUDDY CONDITION AS STONE IS PRESSED INTO SOIL.

3. PAD TOO SHORT FOR HEAVY CONSTRUCTION TRAFFIC–EXTEND PAD BEYOND THE MINIMUM 50–FOOT LENGTH AS NECESSARY.

4. PAD NOT FLARED SUFFICIENTLY AT ROAD SURFACE, RESULTS IN MUD BEING TRACKED ON TO ROAD AND POSSIBLE DAMAGE TO ROAD.

5. UNSTABLE FOUNDATION – USE GEOTEXTILE FABRIC UNDER PAD AND/OR IMPROVE FOUNDATION DRAINAGE.

INSPECTION AND MAINTENANCE GUIDELINES

1. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.

2. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.

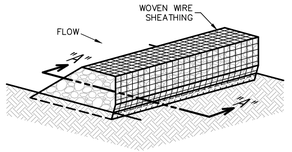
3. WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY.

4. WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

5. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE BY USING APPROVED METHODS.

STABILIZED CONSTRUCTION ENTRANCE/EXIT DETAIL

NOT–TO–SCALE



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.

INSPECTION AND MAINTENANCE GUIDELINES

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

2. 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.

5. 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

1. 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.

INSTALLATION

1. 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.

3. 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

1. 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).

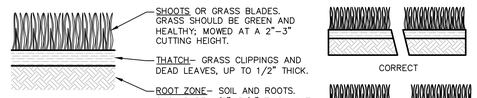
ROCK BERM DETAIL

NOT–TO–SCALE



LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER. DO NOT LEAVE SPACES AND DO NOT OVERLAP. A SHARPENED MASON'S TROWEL IS A HANDY TOOL FOR TUCKING DOWN THE ENDS AND TRIMMING PIECES.

BUTTING – ANGLED ENDS CAUSED BY THE AUTOMATIC SOD CUTTER MUST BE MATCHED CORRECTLY.



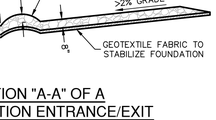
APPEARANCE OF GOOD SOD

NOTES:
1. ROLL SOD IMMEDIATELY TO ACHIEVE FIRM CONTACT WITH THE SOIL.

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"–3").

SOD INSTALLATION



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 WITH THE GROUND.

MATERIALS

1. SOD SHOULD BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4" INCH (± 1/4" INCH) AT THE TIME OF CUTTING. THIS THICKNESS SHOULD EXCLUDE SHOOT GROWTH AND THATCH.

2. PIECES OF SOD SHOULD BE CUT TO THE SUPPLIER'S STANDARD WIDTH AND LENGTH, WITH A MAXIMUM ALLOWABLE DEVIATION IN ANY DIMENSION OF 5%. TORN OR UNEVEN PADS SHOULD NOT BE ACCEPTABLE.

3. STANDARD SIZE SECTIONS OF SOD SHOULD BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED FROM A FIRM GRASP ON ONE END OF THE SECTION.

4. SOD SHOULD BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS.

SITE PREPARATION

1. PRIOR TO SOIL PREPARATION, AREAS TO BE SODDED SHOULD BE BROUGHT TO FINAL GRADE IN ACCORDANCE WITH THE APPROVED PLAN.

2. THE SURFACE SHOULD BE CLEARED OF ALL TRASH, DEBRIS AND OF ALL ROOTS, BRUSH, WIRE, GRADE STAKES AND OTHER OBJECTS THAT WOULD INTERFERE WITH PLANTING, FERTILIZING OR MAINTENANCE OPERATIONS.

3. FERTILIZE ACCORDING TO SOIL TESTS. FERTILIZER NEEDS CAN BE DETERMINED BY A SOIL TESTING LABORATORY OR REGIONAL RECOMMENDATIONS CAN BE MADE BY COUNTY AGRICULTURAL EXTENSION AGENTS. FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 3 INCHES WITH A DISC, SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT. ON SLOPING LAND, THE FINAL HARROWING OR DISCING OPERATION SHOULD BE ON THE CONTOUR.

INSTALLATION IN CHANNELS

1. 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.

GENERAL INSTALLATION (VA. DEPT. OF CONSERVATION, 1992)

1. SOD SHOULD NOT BE CUT OR LAID IN EXCESSIVELY WET OR DRY WEATHER. SOD ALSO SHOULD NOT BE LAID ON SOIL SURFACES THAT ARE FROZEN.

2. DURING PERIODS OF HIGH TEMPERATURE, THE SOIL SHOULD BE LIGHTLY IRRIGATED IMMEDIATELY PRIOR TO LAYING THE SOD, TO COOL THE SOIL AND REDUCE ROOT BURNING AND DIEBACK.

3. THE FIRST ROW OF SOD SHOULD BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO AND BUTTING TIGHTLY AGAINST EACH OTHER. LATERAL JOINTS SHOULD BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. CARE SHOULD BE EXERCISED TO ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT 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, SOD SHOULD BE LAID WITH STAGGERED JOINTS AND SECURED BY STAPLING OR OTHER APPROVED METHODS. SOD SHOULD BE INSTALLED WITH THE LENGTH PERPENDICULAR TO THE SLOPE (ON CONTOUR).

5. AS SODDING OF CLEARLY DEFINED AREAS IS COMPLETED, SOD SHOULD BE ROLLED OR TAMPED TO PROVIDE FIRM CONTACT BETWEEN ROOTS AND SOIL.

6. 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 THOROUGHLY WET.

7. UNTIL SUCH TIME A GOOD ROOT SYSTEM BECOMES DEVELOPED, IN THE ABSENCE OF ADEQUATE RAINFALL, WATERING SHOULD BE PERFORMED AS OFTEN AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF AT LEAST 4 INCHES.

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.

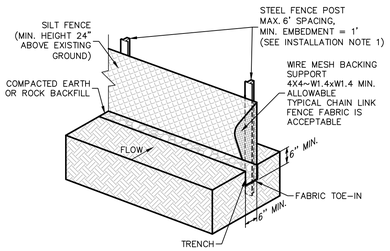
INSPECTION AND MAINTENANCE GUIDELINES

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

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

SOD INSTALLATION DETAIL

NOT–TO–SCALE



ISOMETRIC PLAN VIEW

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 CONTROLING 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

1. 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.

2. 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

1. 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.

2. 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 ¼ 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.

5. 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

1. 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.

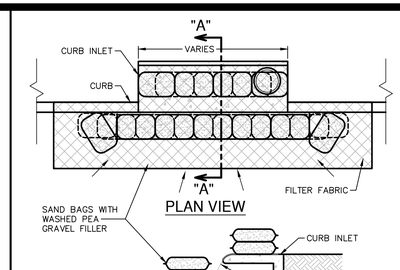
3. REPLACE TORN FABRIC OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE TORN SECTION.

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.

5. 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.

SILT FENCE DETAIL

NOT–TO–SCALE



PLAN VIEW

SECTION "A-A"

GENERAL NOTES

1. CONTRACTOR TO INSTALL 2"x4"–W1.4xW1.4 WIRE MESH SUPPORTING FILTER FABRIC OVER THE INLET OPENING. FABRIC MUST BE SECURED TO WIRE BACKING WITH CLIPS OR WIRE TIES AT THIS LOCATION. SAND BAGS FILLED WITH WASHED PEA GRAVEL SHOULD BE PLACED ON TOP OF WIRE MESH ON TOP OF THE INLET AS SHOWN ON THIS DETAIL TO HOLD WIRE MESH IN PLACE. SANDBAGS FILLED WITH WASHED PEA GRAVEL SHOULD ALSO BE PLACED ALONG THE GUTTER AS SHOWN ON THIS DETAIL TO HOLD WIRE MESH IN PLACE. SAND BAGS TO BE STACKED TO FORM A CONTINUOUS BARRIER AROUND INLETS.

2. THE BAGS SHOULD BE TIGHTLY ABUTTED AGAINST EACH OTHER TO PREVENT RUNOFF FROM FLOWING BETWEEN THE BAGS.

INSPECTION AND MAINTENANCE GUIDELINES

1. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. REPAIR OR REPLACEMENT SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.

2. REMOVE SEDIMENT WHEN BUILDUP REACHES A DEPTH OF 3 INCHES. REMOVED SEDIMENT SHOULD BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.

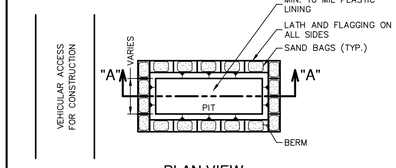
3. CHECK PLACEMENT OF DEVICE TO PREVENT GAPS BETWEEN DEVICE AND CURB.

4. INSPECT FILTER FABRIC AND PATCH OR REPLACE IF TORN OR MISSING.

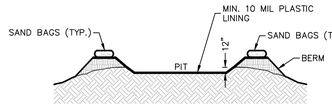
5. STRUCTURES SHOULD BE REMOVED AND THE AREA STABILIZED ONLY AFTER THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

BAGGED GRAVEL CURB INLET PROTECTION DETAIL

NOT–TO–SCALE



PLAN VIEW



SECTION "A-A"

GENERAL NOTES

1. DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY OF USE.

2. WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.

3. WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORM WATER RUNOFF.

4. LOCATE WASHOUT AREA AT LEAST 50 FEET FROM SENSITIVE FEATURES, STORM DRAINS, OPEN DITCHES OR WATER BODIES.

5. TEMPORARY CONCRETE WASHOUT FACILITY SHOULD BE CONSTRUCTED WITH SUFFICIENT QUANTITY AND VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.

MATERIALS

PLASTIC LINING MATERIAL SHOULD BE A MINIMUM OF 10 MIL IN POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.

MAINTENANCE

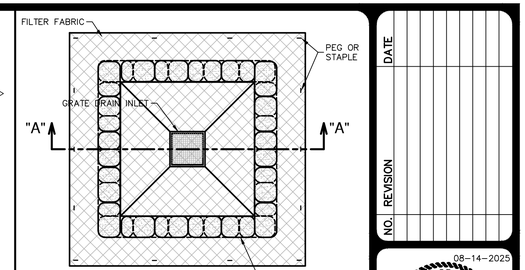
1. WHEN TEMPORARY CONCRETE WASHOUT FACILITIES ARE NO LONGER REQUIRED FOR THE WORK, THE HARDENED CONCRETE SHOULD BE REMOVED AND DISPOSED OF.

2. MATERIALS USED TO CONSTRUCT TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE REMOVED FROM THE SITE OF THE WORK AND DISPOSED OF.

3. HOLES, DEPRESSIONS OR OTHER GROUND DISTURBANCES CAUSED BY THE REMOVAL OF THE TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE BACKFILLED AND REPAIRED.

CONCRETE TRUCK WASHOUT PIT DETAIL

NOT–TO–SCALE



PLAN VIEW

SECTION "A-A"

GENERAL NOTES

1. THE SANDBAGS SHOULD BE FILLED WITH WASHED PEA GRAVEL AND STACKED TO FORM A CONTINUOUS BARRIER ABOUT 1 FOOT HIGH AROUND INLETS.

2. THE BAGS SHOULD BE TIGHTLY ABUTTED AGAINST EACH OTHER TO PREVENT RUNOFF FROM FLOWING BETWEEN THE BAGS.

INSPECTION AND MAINTENANCE GUIDELINES

1. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. REPAIR OR REPLACEMENT SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.

2. REMOVE SEDIMENT WHEN BUILDUP REACHES A DEPTH OF 3 INCHES. REMOVED SEDIMENT SHOULD BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MATTER THAT IT WILL NOT ERODE.

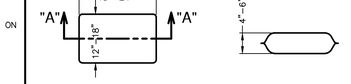
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4. INSPECT FILTER FABRIC AND PATCH OR REPLACE IF TORN OR MISSING.

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BAGGED GRAVEL GRATE INLET PROTECTION DETAIL

NOT–TO–SCALE



PLAN VIEW

SECTION "A-A"

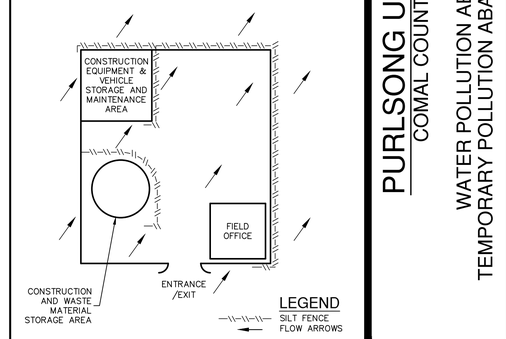
NOTES:
1. THE FILTER BAG MATERIAL SHALL BE MADE OF POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN FABRIC, MIN. UNIT WEIGHT OF 4 OUNCES/SY, HAVE A MULLEN BURST STRENGTH EXCEEDING 300 PSI AND ULTRAVIOLET STABILITY EXCEEDING 70%.

2. THE FILTER BAG SHALL BE FILLED WITH CLEAN, MEDIUM WASHED PEA GRAVEL TO COARSE GRAVEL (0.31 TO 0.75 INCH DIAMETER).

3. SAND SHALL NOT BE USED TO FILL THE FILTER BAGS.

GRAVEL FILTER BAG DETAIL

NOT–TO–SCALE



CONSTRUCTION STAGING AREA

NOT–TO–SCALE

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THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF THE WPAP ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 2

NO. REVISION DATE

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER
08–14–2025

PAPE–DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5533
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

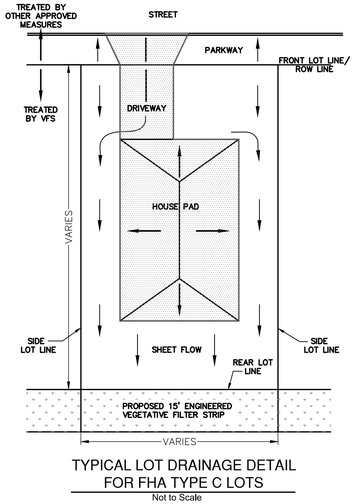
PURLSONG UNITS 2 & 3

COMAL COUNTY, TEXAS

WATER POLLUTION ABATEMENT PLAN
TEMPORARY POLLUTION ABATEMENT PLAN DETAILS

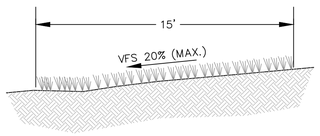
PLAT NO.
JOB NO. 30041–20/21
DATE JULY 2025
DESIGNER GDL
CHECKED HF DRAWN
SHEET

FOR PERMIT

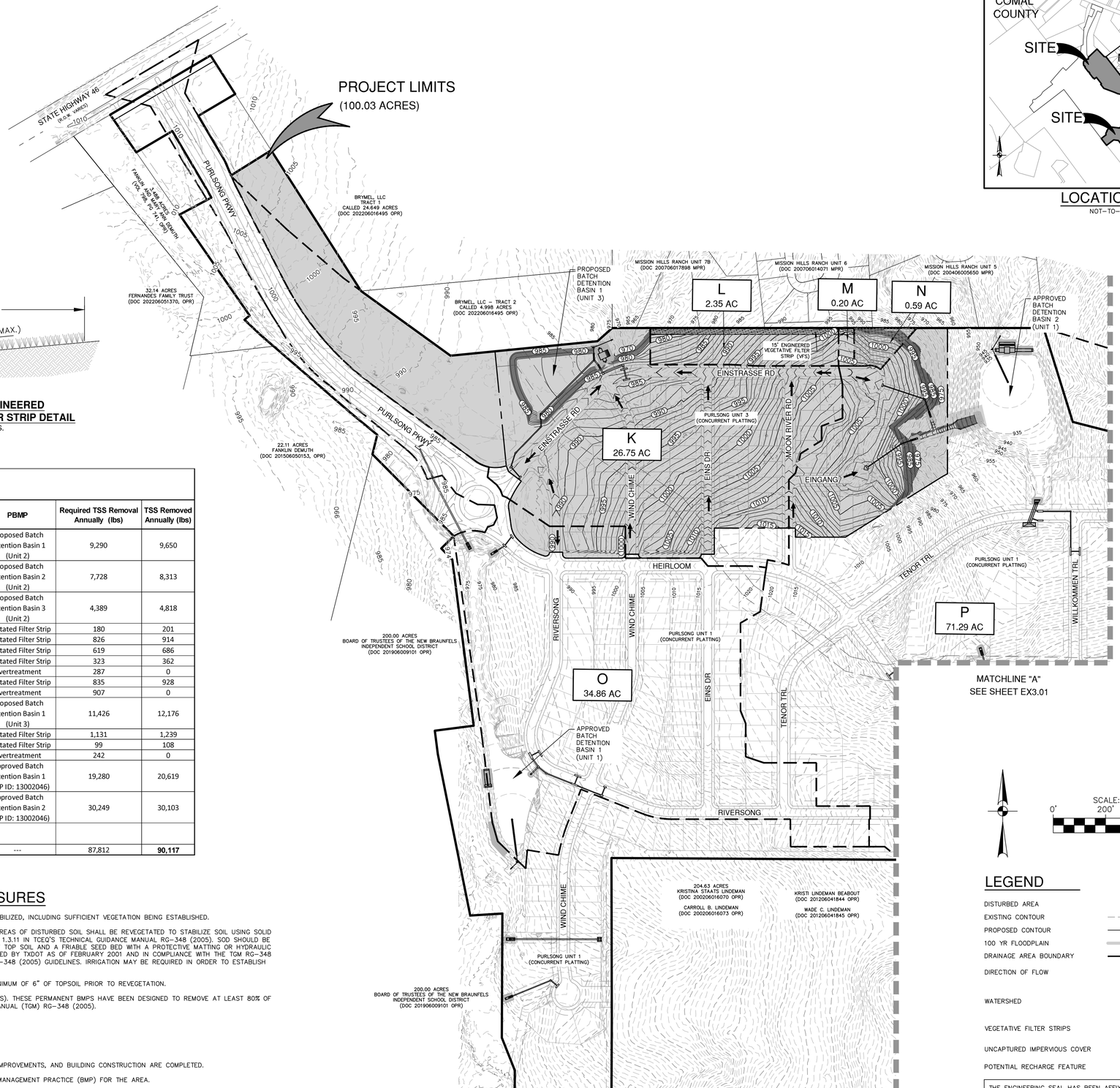


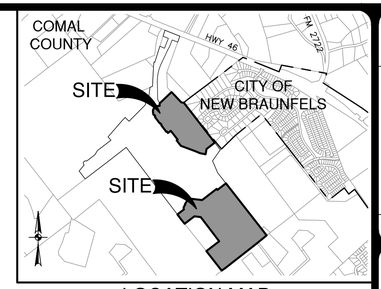
TYPICAL LOT DRAINAGE DETAIL
FOR FHA TYPE C LOTS
Not to Scale

NOTE:
ROOF DRAINAGE PATTERN IS APPROXIMATE AND SUBJECT TO CHANGE BASED ON FINAL HOUSE PAD DESIGN. HOWEVER RUNOFF FROM DRIVEWAY, ROOF OR OTHER IMPERVIOUS SURFACES WITHIN THE LOT WILL NOT FLOW ACROSS MORE THAN 72' OF IMPERVIOUS SURFACE BEFORE REACHING THE PROPOSED 15' ENGINEERED VEGETATIVE FILTER STRIP. FINAL LOT GRADING TO ALLOW FOR SHEET FLOW OVER VEGETATIVE FILTER STRIP.



15' WIDE ENGINEERED
VEGETATIVE FILTER STRIP DETAIL
N.T.S.





LOCATION MAP
NOT-TO-SCALE

Purlsong Units 2 & 3 WPAP Mod & SCS

Treatment Summary by Watershed

Watershed	Total Watershed Area (ac.)	Previously Approved Impervious Cover (ac.)	Proposed Impervious Cover to Treat (ac.)	Total Impervious Cover (ac.)	PBMP	Required TSS Removal Annually (lbs)	TSS Removed Annually (lbs)
A	19.65		10.35	10.35	Proposed Batch Detention Basin 1 (Unit 2)	9,290	9,650
B	17.21		8.61	8.61	Proposed Batch Detention Basin 2 (Unit 2)	7,728	8,313
C	9.36		4.89	4.89	Proposed Batch Detention Basin 3 (Unit 2)	4,389	4,818
D	0.67		0.20	0.20	Vegetated Filter Strip	180	201
E	2.30		0.92	0.92	Vegetated Filter Strip	826	914
F	1.74		0.69	0.69	Vegetated Filter Strip	619	686
G	1.17		0.36	0.36	Vegetated Filter Strip	323	362
H	0.36		0.32	0.32	Overtreatment	287	0
I	2.61		0.93	0.93	Vegetated Filter Strip	835	928
J	5.75		1.01	1.01	Overtreatment	907	0
K	26.75		12.73	12.73	Proposed Batch Detention Basin 1 (Unit 3)	11,426	12,176
L	2.35		1.26	1.26	Vegetated Filter Strip	1,131	1,239
M	0.20		0.11	0.11	Vegetated Filter Strip	99	108
N	0.59		0.27	0.27	Overtreatment	242	0
O	34.86	18.68	2.80	21.48	Approved Batch Detention Basin 1 (EAPP ID: 13002046)	19,280	20,619
P	71.29	25.19	8.51	33.70	Approved Batch Detention Basin 2 (EAPP ID: 13002046)	30,249	30,103
TOTAL	196.86	**43.87**	**53.96**	**97.83**	---	87,812	**90,117**

SUMMARY OF PERMANENT POLLUTION ABATEMENT MEASURES

1.) TEMPORARY BMP'S WILL BE MAINTAINED UNTIL THE SITE IMPROVEMENTS ARE COMPLETED AND THE SITE HAS BEEN STABILIZED, INCLUDING SUFFICIENT VEGETATION BEING ESTABLISHED.

2.) DURING CONSTRUCTION, TO THE EXTENT PRACTICAL, CONTRACTOR SHALL MINIMIZE THE AREA OF SOIL DISTURBANCE. AREAS OF DISTURBED SOIL SHALL BE REVEGETATED TO STABILIZE SOIL USING SOLID SOD IN A STAGGERED PATTERN. SEE DETAIL ON TEMPORARY POLLUTION ABATEMENT DETAIL SHEET AND REFER TO SECTION 1.3.11 IN TCEQ'S TECHNICAL GUIDANCE MANUAL RG–348 (2005). SOD SHOULD BE USED IN CHANNELS AND ON SLOPES > 15%. THE CONTRACTOR MAY SUBSTITUTE THE USE OF SOD WITH THE PLACEMENT OF TOP SOIL AND A FRIABLE SEED BED WITH A PROTECTIVE MATTING OR HYDRAULIC MULCH ALONG WITH WATERING UNTIL VEGETATION IS ESTABLISHED. APPLICATIONS AND PRODUCTS SHALL BE THOSE APPROVED BY TXDOT AS OF FEBRUARY 2001 AND IN COMPLIANCE WITH THE TGM RG–348 (2005). SEED MIXTURE AND/OR GRASS TYPE TO BE DETERMINED BY OWNER AND SHOULD BE IN COMPLIANCE WITH TGM RG–348 (2005) GUIDELINES. IRRIGATION MAY BE REQUIRED IN ORDER TO ESTABLISH SUFFICIENT VEGETATION.

3.) FOR DISTURBED AREAS WHERE INSUFFICIENT SOIL EXISTS TO ESTABLISH VEGETATION, CONTRACTOR SHALL PLACE A MINIMUM OF 6" OF TOPSOIL PRIOR TO REVEGETATION.

4.) PERMANENT BMPS FOR THIS SITE INCLUDE FOUR BATCH DETENTION BASINS AND SEVEN VEGETATIVE FILTER STRIPS (VFS). THESE PERMANENT BMPS HAVE BEEN DESIGNED TO REMOVE AT LEAST 80% OF THE INCREASED TOTAL SUSPENDED SOLIDS (TSS) FOR THE SITE IN ACCORDANCE WITH THE TCEQ'S TECHNICAL GUIDANCE MANUAL (TGM) RG–348 (2005).

5.) TYPICAL SLOPES ON THIS PROJECT RANGE FROM APPROXIMATELY 2% TO 33%.

PERMANENT POLLUTION ABATEMENT MEASURES

1.) SILT FENCING AND ROCK BERMS, WHERE APPROPRIATE, WILL BE MAINTAINED UNTIL THE ROADWAY, UTILITY, DRAINAGE IMPROVEMENTS, AND BUILDING CONSTRUCTION ARE COMPLETED.

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NOTES:

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2.) ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

SCALE: 1"= 200'
0' 200' 400' 600'

LEGEND

- DISTURBED AREA
- EXISTING CONTOUR — 690 —
- PROPOSED CONTOUR — 970 —
- 100 YR FLOODPLAIN
- DRAINAGE AREA BOUNDARY
- DIRECTION OF FLOW
- WATERSHED — A
- VEGETATIVE FILTER STRIPS
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- POTENTIAL RECHARGE FEATURE — S-#

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EXHIBIT 3

NO.	REVISION	DATE

08-15-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5533
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

PURLSONG UNITS 2 & 3
COMAL COUNTY, TEXAS

WATER POLLUTION ABATEMENT PLAN
PERMANENT POLLUTION ABATEMENT PLAN

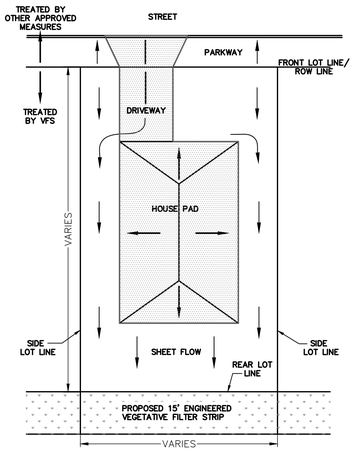
PLAT NO.
JOB NO. 30041-20/21
DATE JULY 2025
DESIGNER GDL
CHECKED HF DRAWN
SHEET EX3.00

FOR PERMIT

Purlsong Units 2 & 3 WPAP Mod & SCS

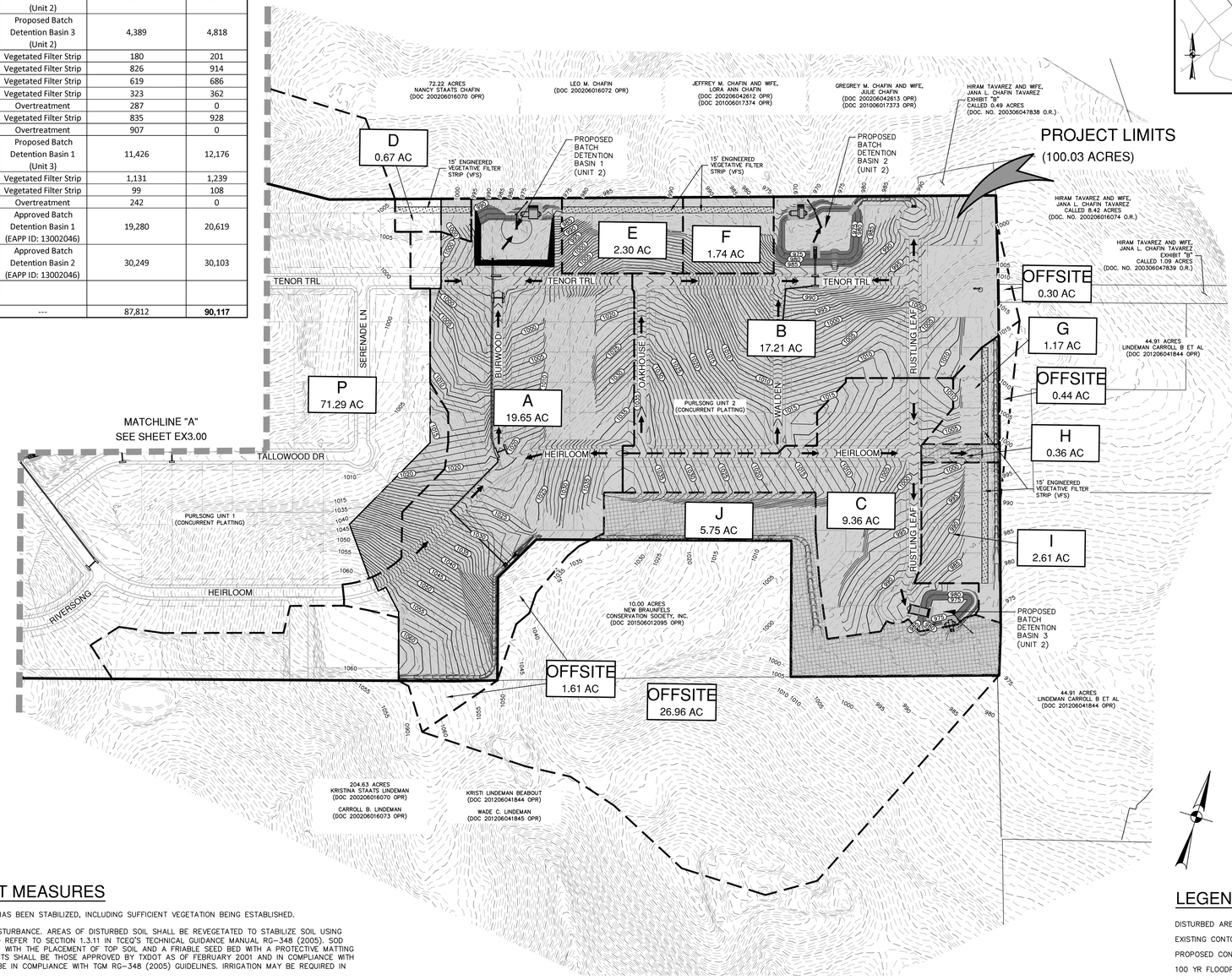
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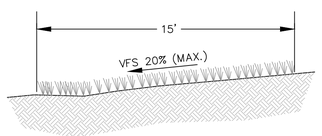
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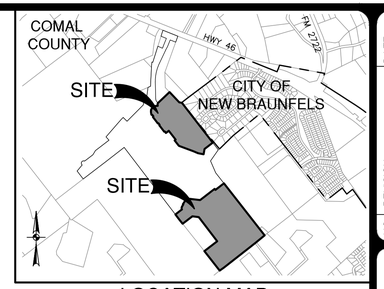
TYPICAL LOT DRAINAGE DETAIL
FOR FHA TYPE C LOTS
Not to Scale

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15' WIDE ENGINEERED VEGETATIVE FILTER STRIP DETAIL
N.T.S.



LOCATION MAP
NOT-TO-SCALE

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LEGEND

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- PROPOSED CONTOUR — 970
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NO.	REVISION	DATE

08-15-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNITS 2 & 3
COMAL COUNTY, TEXAS

WATER POLLUTION ABATEMENT PLAN
PERMANENT POLLUTION ABATEMENT PLAN

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EXHIBIT 3

PLAT NO.
JOB NO. 30041-20/21
DATE JULY 2025
DESIGNER GDL
CHECKED HF DRAWN
SHEET EX3.01

FOR PERMIT

DRAINAGE & GRADING NOTES:

1. 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 TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
2. ALL CONCRETE FOR TXDOT DRAINAGE STRUCTURES SHALL MEET TXDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
3. REFERENCE DRAINAGE DETAILS FOR PIPE TRENCH DETAILS, BOX CULVERT, HEADWALL, AND WINGWALL CONSTRUCTION DETAILS, AND BOX CULVERT BEDDING AND EXCAVATION LIMITS.
4. CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.
5. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE COMAL COUNTY OR DISTRICT WILL ACCEPT.
6. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.

NOTES

1. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.
2. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.
3. BASIN HAS BEEN DESIGNED USING TSS REMOVAL AND BMP SIZING CALCULATIONS AS PER THE TCEQ TGM RG-348 (2005).
4. BASIN PLAN DEPICTS MINIMUM INTERIOR DIMENSIONS (LENGTH, WIDTH & HEIGHT FOR TCEQ REVIEW & APPROVAL.
5. BASIN DRAWDOWN IS CONTROLLED BY THE 6" PVC PIPE. BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY ±26 HOURS.
6. CONTRACTOR TO SET THE VALVE POSITION TO FULLY OPEN.

SEQUENCE OF OPERATION

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 6" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 26-48 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 6" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTUATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

CAUTION!!

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

TRENCH EXCAVATION SAFETY PROTECTION:

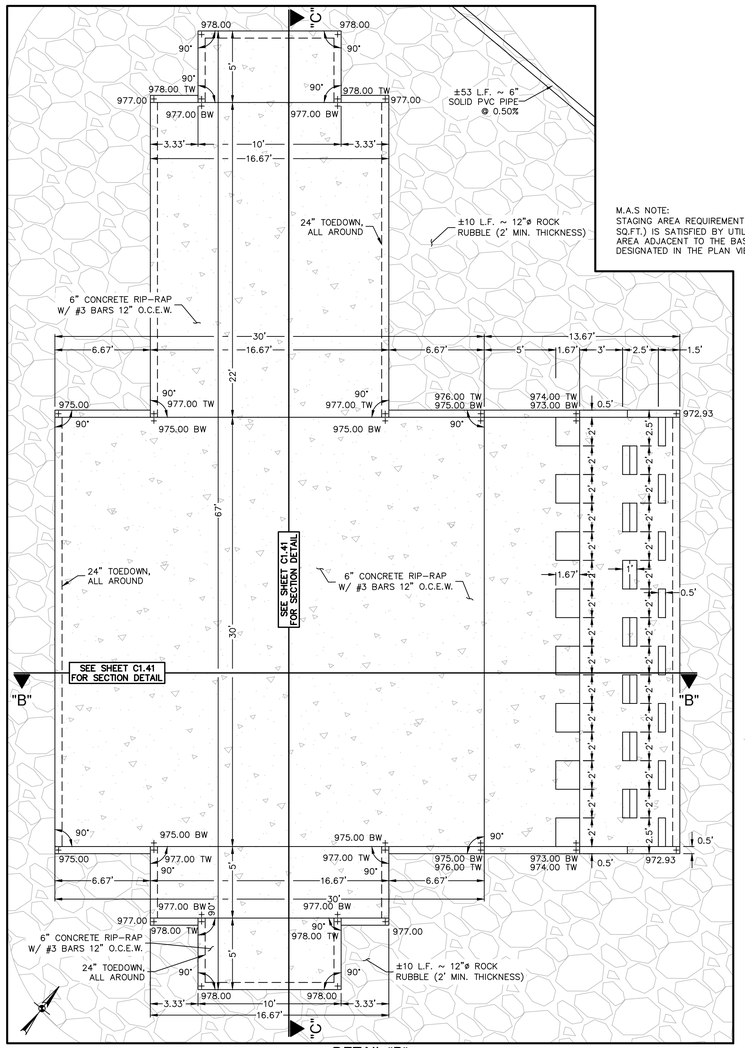
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BASIN DESIGN DATA

BASIN WATERSHED AREA	=	855,954 SF (19.65 AC.)
RUN OFF DEPTH	=	1.50 IN
REQUIRED CAPTURE VOLUME	=	47,847 CF
BASIN STORM WATER DEPTH	=	2.50 FT
BASIN CAPTURE VOLUME	=	50,272 CF

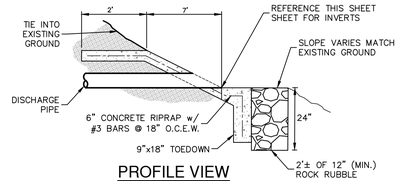
OVERFLOW WEIR CALCULATIONS

Q_{25}	=	$(Cw)(L)(h)^{3/2}$
Q_{25}	=	153 cfs
C	=	2.70
L	=	57 ft
153	=	$(2.70)(57)(h)^{3/2}$
h	=	1.00 ft

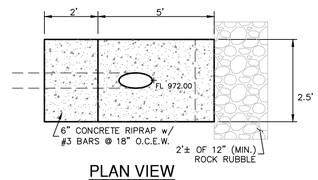


DETAIL "B"
1" = 5'

M.A.S NOTE:
STAGING AREA REQUIREMENT (800 SQ.FT.) IS SATISFIED BY UTILIZING THE AREA ADJACENT TO THE BASIN AS DESIGNATED IN THE PLAN VIEW ABOVE.



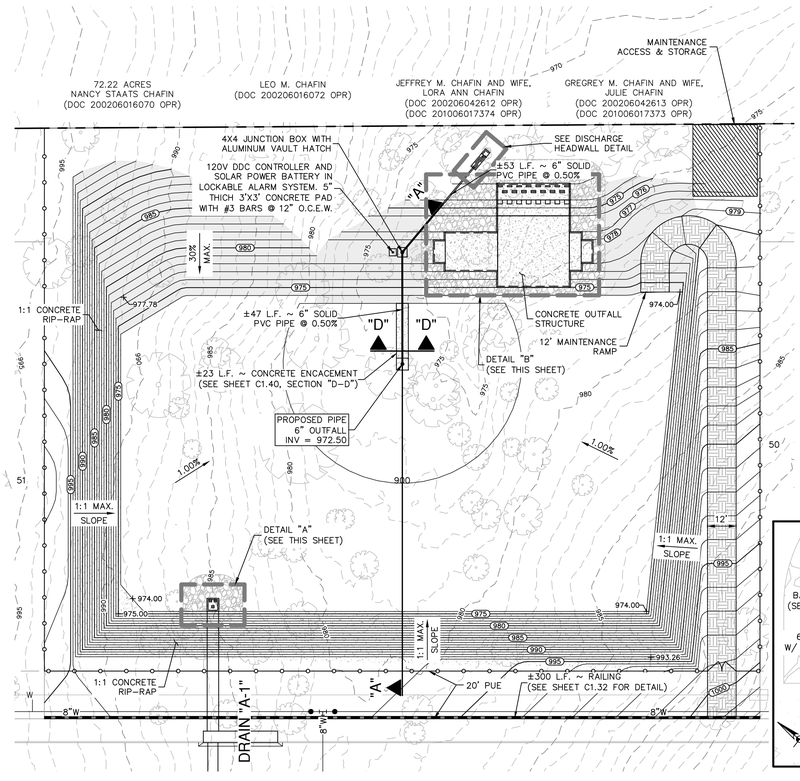
PROFILE VIEW

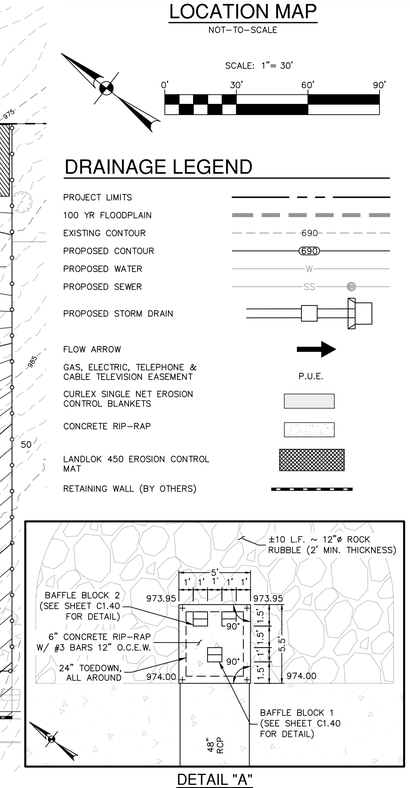


PLAN VIEW

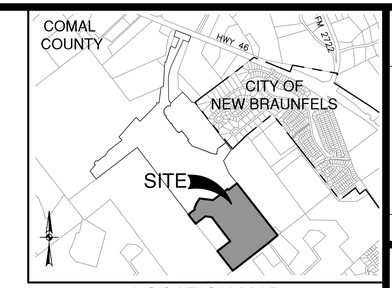
DISCHARGE HEADWALL DETAIL

NOT-TO-SCALE





DETAIL "A"
1" = 5'



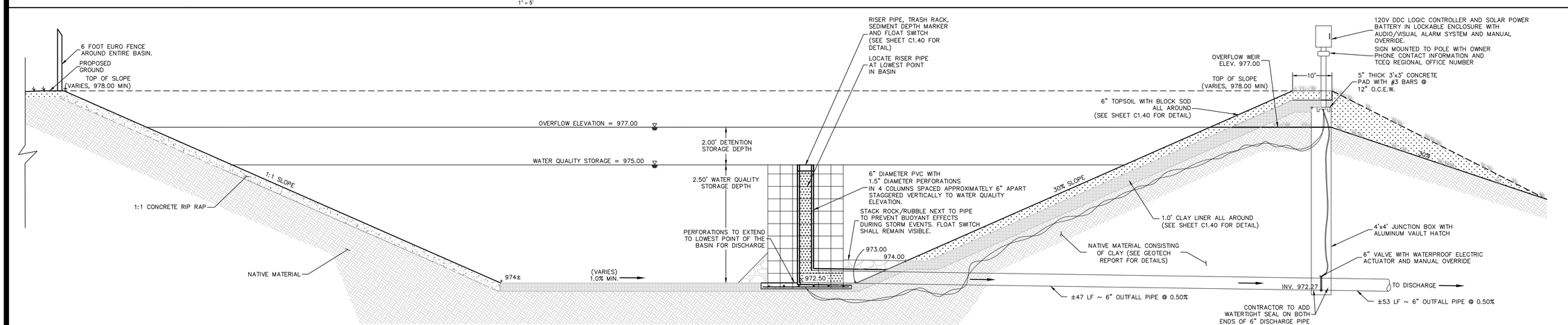
LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 30'
0' 30' 60' 90'

DRAINAGE LEGEND

- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR 690
- PROPOSED CONTOUR 690
- PROPOSED WATER W
- PROPOSED SEWER SS
- PROPOSED STORM DRAIN
- FLOW ARROW
- GAS, ELECTRIC, TELEPHONE & CABLE TELEVISION EASEMENT P.U.E.
- CURLEX SINGLE NET EROSION CONTROL BLANKETS
- CONCRETE RIP-RAP
- LANDLOK 450 EROSION CONTROL MAT
- RETAINING WALL (BY OTHERS)



SECTION "A-A"

N.T.S.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 5

FOR REVIEW

NO.	REVISION	DATE

8-13-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 2
COMAL COUNTY, TEXAS

BASIN 1 PLAN

PLAT NO.
JOB NO. 30041-21
DATE JULY 2025
DESIGNER GDL
CHECKED DRAWN CA
SHEET C1.20

Date: August 13, 2025, 1:53 PM — User ID: HEATH HENKE
File: P:\300\41\21\Design\Civil\BN-30041-21.dwg

THIS 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.

DRAINAGE & GRADING NOTES:

1. 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 TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
2. ALL CONCRETE FOR TXDOT DRAINAGE STRUCTURES SHALL MEET TXDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
3. REFERENCE DRAINAGE DETAILS FOR PIPE TRENCH DETAILS, BOX CULVERT, HEADWALL, AND WINGWALL CONSTRUCTION DETAILS, AND BOX CULVERT BEDDING AND EXCAVATION LIMITS.
4. CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.
5. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE COMAL COUNTY OR DISTRICT WILL ACCEPT.
6. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.

TRENCH EXCAVATION SAFETY PROTECTION:

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CAUTION!!

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

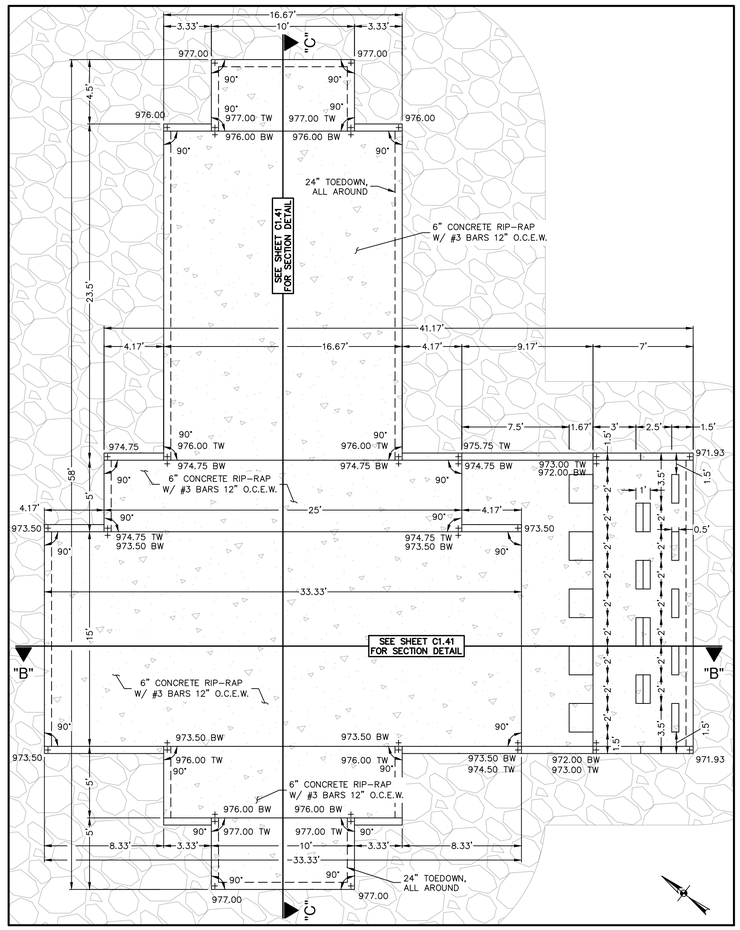
NOTES

1. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.
2. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.
3. BASIN HAS BEEN DESIGNED USING TSS REMOVAL and BMP SIZING CALCULATIONS AS PER THE TCEQ TGM RG-348 (2005).
4. BASIN PLAN DEPICTS MINIMUM INTERIOR DIMENSIONS (LENGTH, WIDTH & HEIGHT FOR TCEQ REVIEW & APPROVAL.
5. BASIN DRAWDOWN IS CONTROLLED BY THE 6" PVC PIPE. BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY ±27 HOURS.
6. CONTRACTOR TO SET THE VALVE POSITION TO FULLY OPEN.

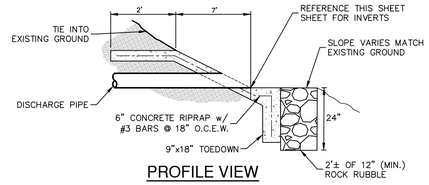
SEQUENCE OF OPERATION

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 6" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 27-48 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 6" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTUATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

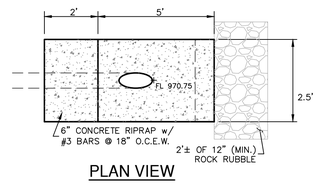
M.A.S NOTE:
STAGING AREA REQUIREMENT (800 SQ.FT.) IS SATISFIED BY UTILIZING THE AREA ADJACENT TO THE BASIN AS DESIGNATED IN THE PLAN VIEW ABOVE.



DETAIL "A"
1" = 5'



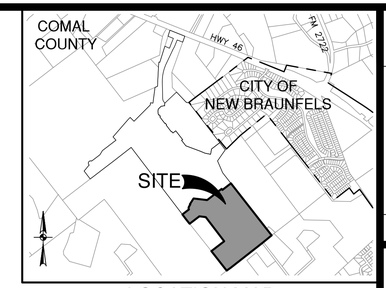
PROFILE VIEW



PLAN VIEW

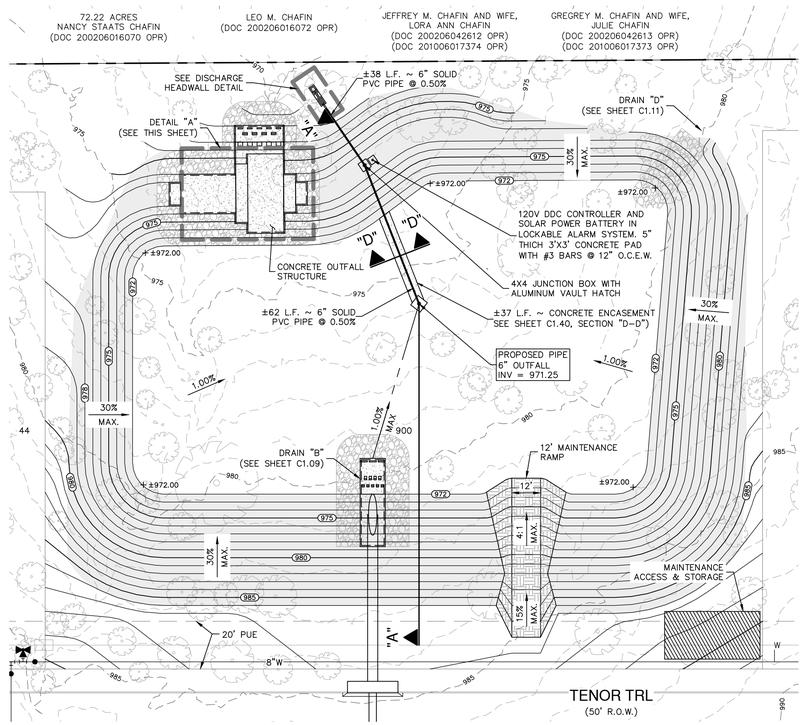
DISCHARGE HEADWALL DETAIL

NOT-TO-SCALE



LOCATION MAP

NOT-TO-SCALE



TENOR TRL
(50' R.O.W.)

DRAINAGE LEGEND

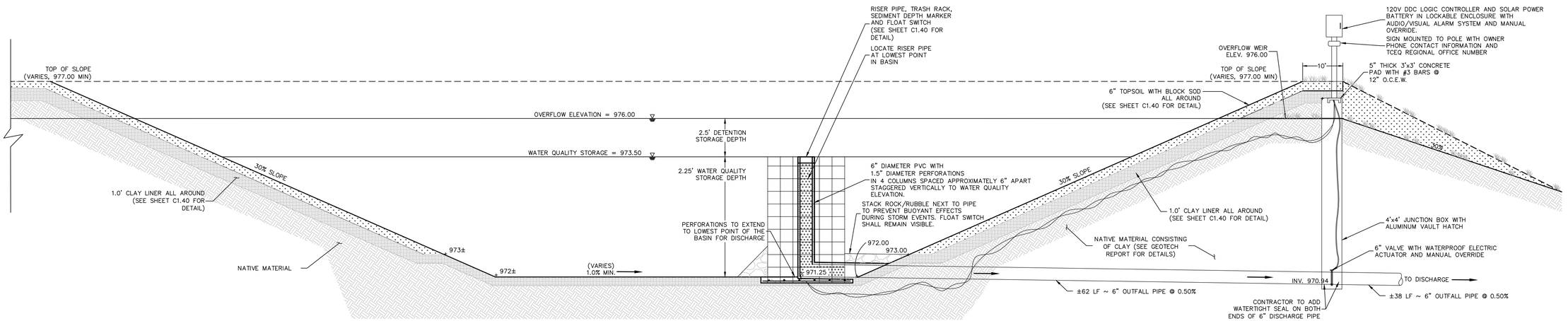
- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR — 690 —
- PROPOSED CONTOUR — 690 —
- PROPOSED WATER — W —
- PROPOSED SEWER — SS —
- PROPOSED STORM DRAIN
- FLOW ARROW
- GAS, ELECTRIC, TELEPHONE & CABLE TELEVISION EASEMENT — P.U.E.
- CURLEX SINGLE NET EROSION CONTROL BLANKETS
- LANDLOK 450 EROSION CONTROL MAT
- RETAINING WALL (BY OTHERS)

OVERFLOW WEIR CALCULATIONS

Q_{25}	=	$(cw)(L)(h)^{3/2}$
Q_{25}	=	129 cfs
C	=	2.70
L	=	48 ft
129	=	$(2.70)(48)(h)^{3/2}$
h	=	1.00 ft

BASIN DESIGN DATA

BASIN WATERSHED AREA	=	749,668 SF (17.21 AC.)
RUN OFF DEPTH	=	1.80 IN
REQUIRED CAPTURE VOLUME	=	48,263 CF
BASIN STORM WATER DEPTH	=	2.25 FT
BASIN CAPTURE VOLUME	=	52,719 CF



SECTION "A-A"

N.T.S.

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EXHIBIT 5

FOR REVIEW

NO.	REVISION	DATE

8-13-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 2
COMAL COUNTY, TEXAS

BASIN 2 PLAN

PLAT NO.
JOB NO. 30041-21
DATE JULY 2025
DESIGNER GDL
CHECKED ___ DRAWN CA
SHEET C1.21

Date: August 13, 2025, 1:56 PM - User ID: HEATH HENKE
File: P:\300\41\21\Design\Civil\BN-30041-21.dwg

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2. ALL CONCRETE FOR TXDOT DRAINAGE STRUCTURES SHALL MEET TXDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
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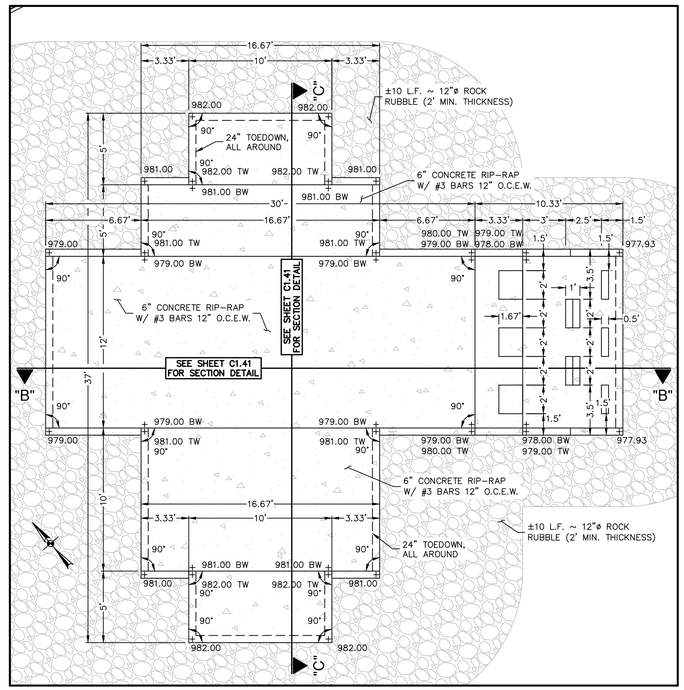
NOTES

1. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.
2. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.
3. BASIN HAS BEEN DESIGNED USING TSS REMOVAL AND BMP SIZING CALCULATIONS AS PER THE TCEQ TGM RG-348 (2005).
4. BASIN PLAN DEPICTS MINIMUM INTERIOR DIMENSIONS (LENGTH, WIDTH & HEIGHT FOR TCEQ REVIEW & APPROVAL.
5. BASIN DRAWDOWN IS CONTROLLED BY THE 4" PVC PIPE. BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY ±38 HOURS.
6. CONTRACTOR TO SET THE VALVE POSITION TO FULLY OPEN.

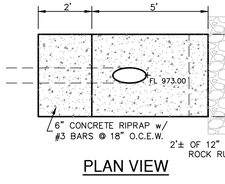
SEQUENCE OF OPERATION

1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 4" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 38-48 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 4" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTUATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

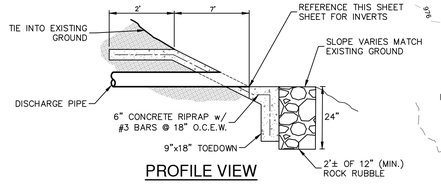
M.A.S NOTE:
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DETAIL "A"
1" = 5'



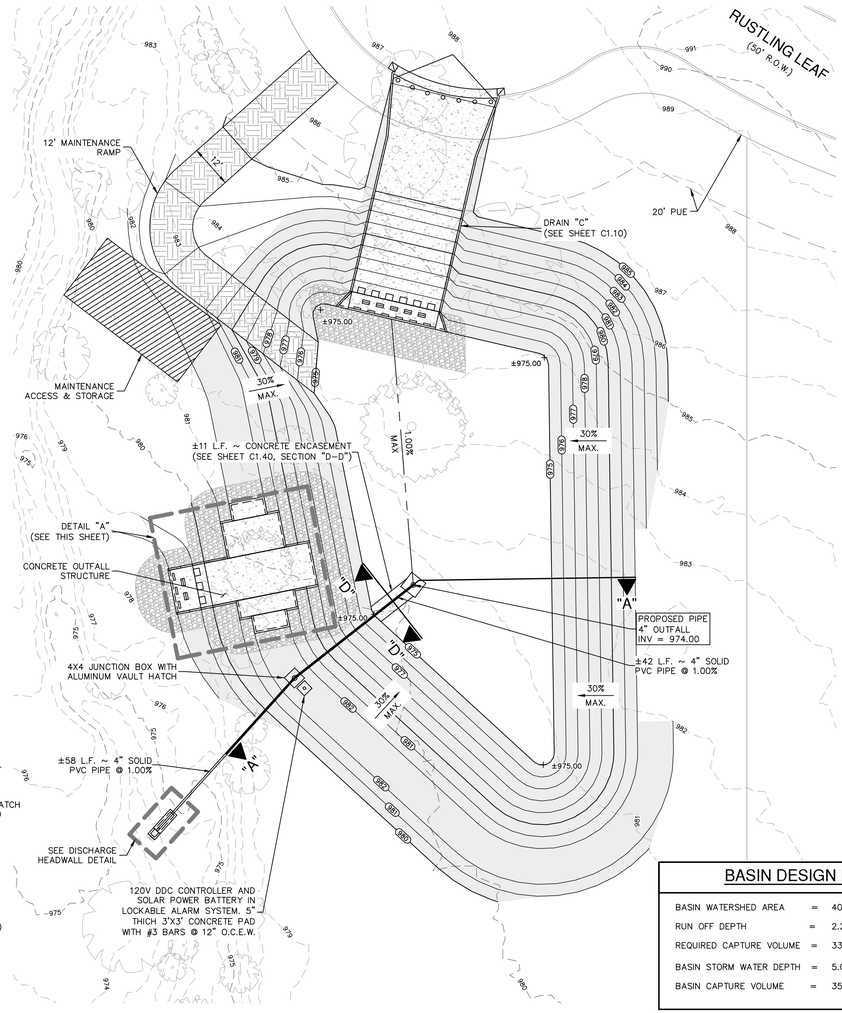
PLAN VIEW

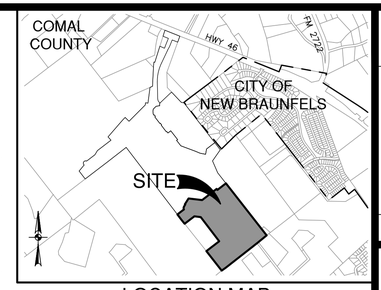


PROFILE VIEW

DISCHARGE HEADWALL DETAIL

NOT-TO-SCALE





LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 20'

0' 20' 40' 60'

DRAINAGE LEGEND

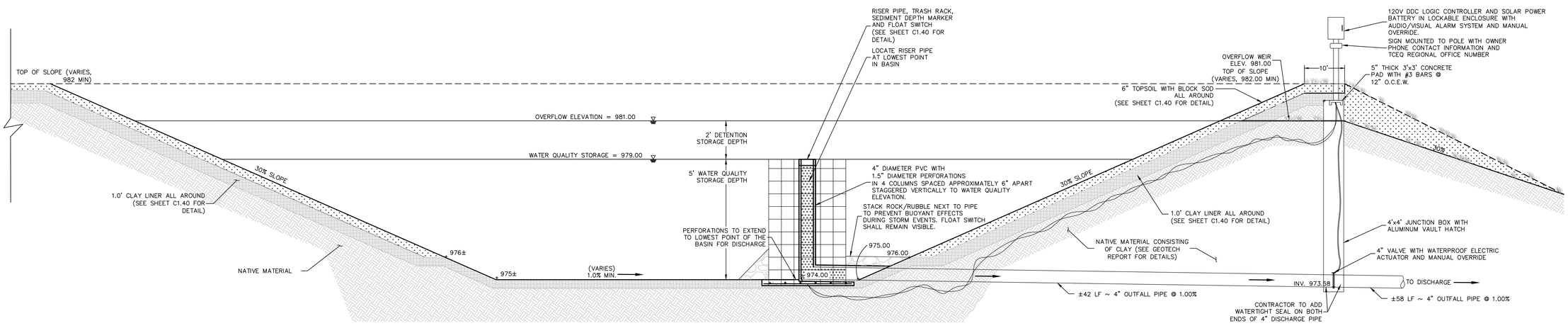
- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR — 690
- PROPOSED CONTOUR — 690
- PROPOSED WATER — W
- PROPOSED SEWER — SS
- PROPOSED STORM DRAIN
- FLOW ARROW
- GAS, ELECTRIC, TELEPHONE & CABLE TELEVISION EASEMENT — P.U.E.
- CURLEX SINGLE NET EROSION CONTROL BLANKETS
- LANDLOK 450 EROSION CONTROL MAT
- RETAINING WALL (BY OTHERS)

BASIN DESIGN DATA

BASIN WATERSHED AREA	=	407,722 SF (9.36 AC.)
RUN OFF DEPTH	=	2.20 IN
REQUIRED CAPTURE VOLUME	=	33,203 CF
BASIN STORM WATER DEPTH	=	5.00 FT
BASIN CAPTURE VOLUME	=	35,985 CF

OVERFLOW WEIR CALCULATIONS

Q_{25}	=	$(Cw)(L)(h)^{3/2}$
Q_{25}	=	71 cfs
C	=	2.70
L	=	27 ft
71	=	$(2.70)(27)(h)^{3/2}$
h	=	0.98 ft



SECTION "A-A"

N.T.S.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 5

FOR REVIEW

NO.	REVISION	DATE

8-13-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5533
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

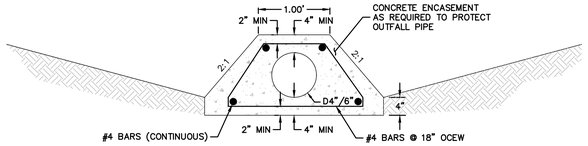
PURSLONG UNIT 2
COMAL COUNTY, TEXAS

BASIN 3 PLAN

PLAT NO.
JOB NO. 30041-21
DATE JULY 2025
DESIGNER GDL
CHECKED DRAWN CA
SHEET C1.22

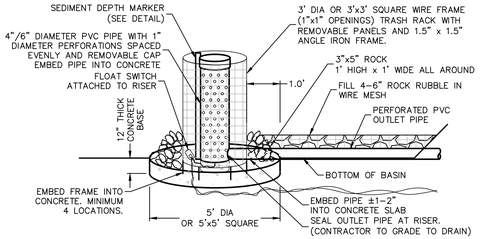
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SECTION D-D

NOT-TO-SCALE



OUTLET STRUCTURE DETAIL WITH SURFACE OUTFALL PIPE

NOT-TO-SCALE

NOTES

1. CONTRACTOR IS ADVISED THAT TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR PRIOR APPROVAL.

2. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:

a. REINFORCING STEEL FOR BASIN OVERFLOW WALL OR RIPRAP PILOT CHANNEL HAS BEEN SET, CONCRETE HAS NOT BEEN PLACED AND DRAIN PIPE AND RISER PIPE IS IN PLACE, CONTRACTOR SHALL PROVIDE ENGINEER WITH SURVEY DATA WHICH DEMONSTRATES THE RISER PIPE HAS BEEN SET AT PROPER ELEVATION AND GRADE.

b. BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE).

3. WORK SHALL NOT CONTINUE ON THE BASIN UNTIL THE ENGINEER HAS HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF CONSTRUCTION. CONTRACTOR SHALL PROVIDE ENGINEER A MINIMUM OF 24 HOURS ADVANCE NOTICE PRIOR TO TIME THE BASIN WILL BE AT THE REQUIRED STAGE.

4. UPON SUBSTANTIAL COMPLETION, OR AS REQUESTED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELD SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:

- TOP OF BANK/WALL AT EACH CORNER OF BASIN
- TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
- SPLASH PAD/INLET PIPES
- OVERFLOW WEIRS

5. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS, AND ACCUMULATED SILT FROM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.

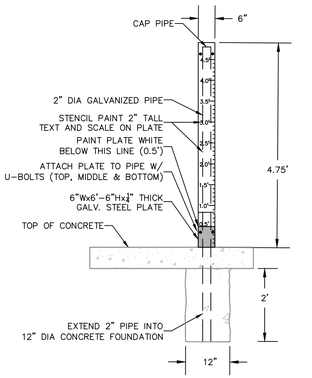
6. THE MINIMUM DRAIN TIME FOR A FULL BASIN IS 24.1 HOURS. CONTRACTOR TO SET BUTTERFLY VALVE TO FULLY OPEN TO BE CONTROLLED DDC CONTROLLER.

CLAY LINER SPECIFICATIONS

PROPERTY	TEST METHOD	UNIT	SPECIFICATION
PERMEABILITY	ASTM D-2434	CM/SEC	1 X 10^{-6}
PLASTICITY INDEX OF CLAY	ASTM D-423 & D-424	%	NOT LESS THAN 15
LIQUID LIMIT OF CLAY	ASTM D-2216	%	NOT LESS THAN 30
CLAY PARTICLES PASSING	ASTM D-422	%	NOT LESS THAN 30
CLAY COMPACTION	ASTM D-2216	%	95% OF STANDARD PROCTOR DENSITY

THE CLAY LINER SHALL HAVE A MINIMUM THICKNESS OF TWELVE (12) INCHES.

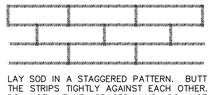
IF A GEOMEMBRANE LINER IS USED IT SHALL HAVE A MINIMUM THICKNESS OF FORTY (40) MILS. AND BE ULTRAVIOLET RESISTANT. A GEOTEXTILE FABRIC SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.



SEDIMENT DEPTH MARKER

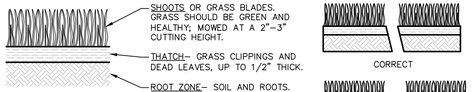
NOT TO SCALE

NOTE: ONCE SEDIMENT IS ABOVE THE 6" DESIGNATION, THE BASIN MUST BE CLEANED OUT TO DESIGN ELEVATIONS AND VOLUMES PER PLAN.



LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER. DO NOT LEAVE SPACES AND DO NOT OVERLAP. A SHARPENED MASON'S TROWEL IS A HANDY TOOL FOR TUCKING DOWN THE ENDS AND TRIMMING PIECES.

BUTTING – ANGLED ENDS CAUSED BY THE AUTOMATIC SOD CUTTER MUST BE MATCHED CORRECTLY.



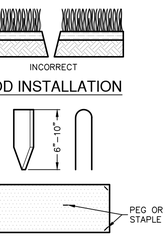
APPEARANCE OF GOOD SOD

NOTES:
1. ROLL SOD IMMEDIATELY TO ACHIEVE FIRM CONTACT WITH THE SOIL.

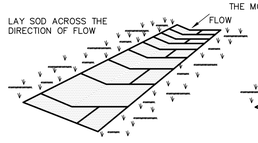
2. WATER TO A DEPTH OF 4" AS NEEDED. WATER WELL AS SOON AS THE SOD IS LAID.

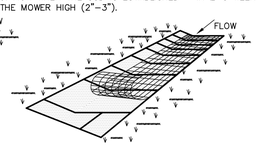
3. MOW WHEN THE SOD IS ESTABLISHED – IN 2-3 WEEKS. SET THE MOWER HIGH (2"-3").

SOD INSTALLATION



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 WITH THE GROUND.





IN CRITICAL AREAS, SECURE SOD WITH NETTING. USE STAPLES.

MATERIALS

1. SOD SHOULD BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4" INCH (± 1/4" INCH) AT THE TIME OF CUTTING. THIS THICKNESS SHOULD EXCLUDE SHOOT GROWTH AND THATCH.

2. PIECES OF SOD SHOULD BE CUT TO THE SUPPLIER'S STANDARD WIDTH AND LENGTH, WITH A MAXIMUM ALLOWABLE DEVIATION IN ANY DIMENSION OF 5%. TORN OR UNEVEN PADS SHOULD NOT BE ACCEPTABLE.

3. STANDARD SIZE SECTIONS OF SOD SHOULD BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED FROM A FIRM GRASP ON ONE END OF THE SECTION.

4. SOD SHOULD BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS.

SITE PREPARATION

1. PRIOR TO SOIL PREPARATION, AREAS TO BE SODDED SHOULD BE BROUGHT TO FINAL GRADE IN ACCORDANCE WITH THE APPROVED PLAN.

2. THE SURFACE SHOULD BE CLEARED OF ALL TRASH, DEBRIS AND OF ALL ROOTS, BRUSH, WIRE, GRADE STAKES AND OTHER OBJECTS THAT WOULD INTERFERE WITH PLANTING, FERTILIZING OR MAINTENANCE OPERATIONS.

3. FERTILIZE ACCORDING TO SOIL TESTS. FERTILIZER NEEDS CAN BE DETERMINED BY A SOIL TESTING LABORATORY OR REGIONAL RECOMMENDATIONS CAN BE MADE BY COUNTY AGRICULTURAL EXTENSION AGENTS. FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 3 INCHES WITH A DISC, SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT. ON SLOPING LAND, THE FINAL HARROWING OR DISCING OPERATION SHOULD BE ON THE CONTOUR.

INSTALLATION IN CHANNELS

1. 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.

GENERAL INSTALLATION (VA. DEPT. OF CONSERVATION, 1992)

1. SOD SHOULD NOT BE CUT OR LAID IN EXCESSIVELY WET OR DRY WEATHER. SOD ALSO SHOULD NOT BE LAID ON SOIL SURFACES THAT ARE FROZEN.

2. DURING PERIODS OF HIGH TEMPERATURE, THE SOIL SHOULD BE LIGHTLY IRRIGATED IMMEDIATELY PRIOR TO LAYING THE SOD, TO COOL THE SOIL AND REDUCE ROOT BURNING AND DIEBACK.

3. THE FIRST ROW OF SOD SHOULD BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO AND BUTTING TIGHTLY AGAINST EACH OTHER. LATERAL JOINTS SHOULD BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. CARE SHOULD BE EXERCISED TO ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT 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, SOD SHOULD BE LAID WITH STAGGERED JOINTS AND SECURED BY STAPLING OR OTHER APPROVED METHODS. SOD SHOULD BE INSTALLED WITH THE LENGTH PERPENDICULAR TO THE SLOPE (ON CONTOUR).

5. AS SODDING OF CLEARLY DEFINED AREAS IS COMPLETED, SOD SHOULD BE ROLLED OR TAMPED TO PROVIDE FIRM CONTACT BETWEEN ROOTS AND SOIL.

6. 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 THOROUGHLY WET.

7. UNTIL SUCH TIME A GOOD ROOT SYSTEM BECOMES DEVELOPED, IN THE ABSENCE OF ADEQUATE RAINFALL, WATERING SHOULD BE PERFORMED AS OFTEN AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF AT LEAST 4 INCHES.

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.

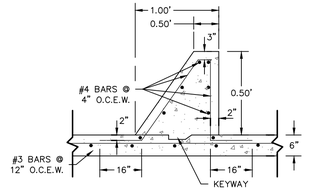
INSPECTION AND MAINTENANCE GUIDELINES

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

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

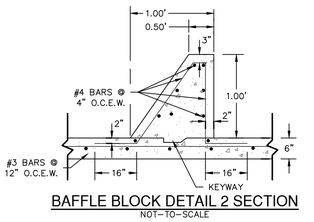
SOD INSTALLATION DETAIL

NOT-TO-SCALE



BAFFLE BLOCK DETAIL 1 SECTION

NOT-TO-SCALE



BAFFLE BLOCK DETAIL 2 SECTION

NOT-TO-SCALE

NOTES:

1. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASINS PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASINS) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

3. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASINS SHALL BE REVEGATATED PRIOR TO COMPLETION.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 6

NO.	REVISION	DATE

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED
PROFESSIONAL ENGINEER
8-13-2025

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 2
COMAL COUNTY, TEXAS

BASIN DETAILS

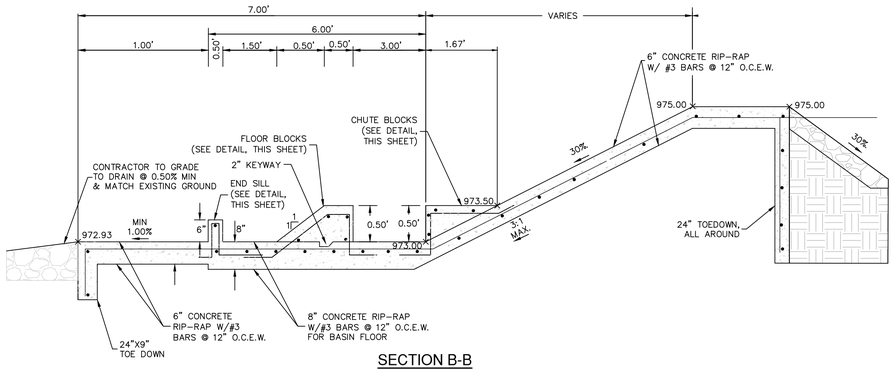
PLAT NO.
JOB NO. 30041-21
DATE JULY 2025
DESIGNER GDL
CHECKED DRAWN CA
SHEET C1.40

Date: August 13, 2025, 1:58 PM – User ID: HEATH HENKE
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FOR REVIEW

BASIN 1 DETAILS AND CALCULATIONS



SECTION B-B
STILLING BASIN SECTION
NOT TO SCALE

**REFERENCE STORM WATER MANAGEMENT PLAN FOR OVERALL DETENTION ANALYSIS OF PEAK DISCHARGE FROM SITE.

FLOW COMPARISON TABLE

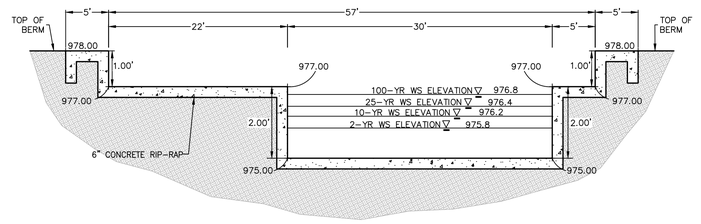
Storm Event	Existing Flows (cfs)	Ultimate Flows (cfs)	Existing vs. Ultimate Flows (cfs)
2-yr	75.9	65.2	-10.7
10-yr	135.3	114.9	-20.4
25-yr	174.0	147.1	-26.9
50-yr	203.9	172.0	-31.9
100-yr	234.7	197.8	-36.9

STAGE STORAGE DISCHARGE TABLE PER STORM EVENT

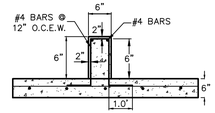
Storm Event	Max Elevation (ft.)	Storage (ac-ft)	Storage Vol (cf)	Ultimate Peak Discharge (cfs)
2-yr	975.8	1.8	78,408	60.4
10-yr	976.2	2.0	87,120	106.2
25-yr	976.4	2.2	95,832	135.8
50-yr	976.6	2.3	100,188	158.5
100-yr	976.8	2.4	104,544	182.0

DETENTION POND & WATER QUALITY CALCULATIONS

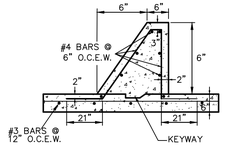
Elevation (ft)	Incremental Height (ft)	Surface Area (sf)	Incremental Vol. (cf)	Cumulative Vol. (cf)	
972.5	0	0	0	0	
973	0.5	6,358	1590	1590	Water Quality
974	1	30,097	18,123	19,713	
975	1	31,430	30,559	50,272	
975	0	31,430	0	0	
976	1	32,728	31,887	82,159	Detention
977	1	34,041	33,209	115,368	
978	1	35,340	34,608	149,976	



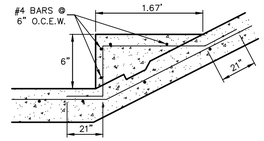
SECTION C-C
NOT-TO-SCALE



END SILL DETAIL
NOT-TO-SCALE

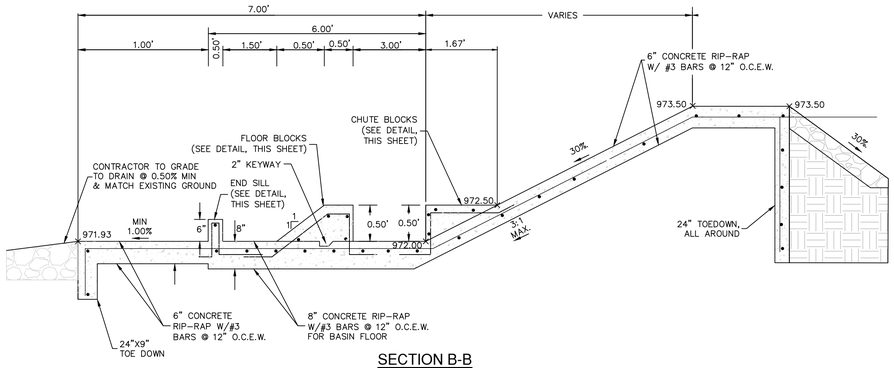


FLOOR BLOCK DETAIL
NOT-TO-SCALE



CHUTE BLOCK DETAIL
NOT-TO-SCALE

BASIN 2 DETAILS AND CALCULATIONS



SECTION B-B
STILLING BASIN SECTION
NOT TO SCALE

**REFERENCE STORM WATER MANAGEMENT PLAN FOR OVERALL DETENTION ANALYSIS OF PEAK DISCHARGE FROM SITE.

FLOW COMPARISON TABLE

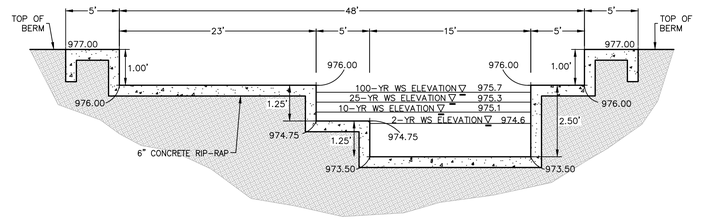
Storm Event	Existing Flows (cfs)	Ultimate Flows (cfs)	Existing vs. Ultimate Flows (cfs)
2-yr	55.8	46.7	-9.1
10-yr	99.6	86.0	-13.6
25-yr	128.0	112.2	-15.8
50-yr	150.1	132.6	-17.5
100-yr	172.7	153.4	-19.3

STAGE STORAGE DISCHARGE TABLE PER STORM EVENT

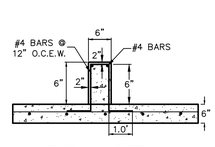
Storm Event	Max Elevation (ft.)	Storage (ac-ft)	Storage Vol (cf)	Ultimate Peak Discharge (cfs)
2-yr	974.6	1.9	82,764	42.8
10-yr	975.1	2.3	100,188	78.7
25-yr	975.3	2.5	108,900	102.8
50-yr	975.5	2.7	117,612	121.2
100-yr	975.7	2.8	121,968	140.4

DETENTION POND & WATER QUALITY CALCULATIONS

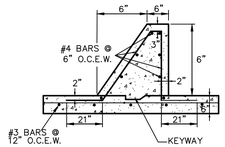
Elevation (ft)	Incremental Height (ft)	Surface Area (sf)	Incremental Vol. (cf)	Cumulative Vol. (cf)	
971.25	0	0	0	0	
972	0.75	25,906	11334	11334	Water Quality
973	1	28,144	27,025	38,359	
973.5	0.5	29,298	14,360	52,719	
973.5	0	29,298	0	0	
974	0.5	30,451	14,937	67,656	Detention
975	1	32,829	31,640	99,296	
976	1	35,276	34,053	133,349	
977	1	37,793	36,534	169,883	



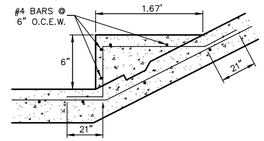
SECTION C-C
NOT-TO-SCALE



END SILL DETAIL
NOT-TO-SCALE

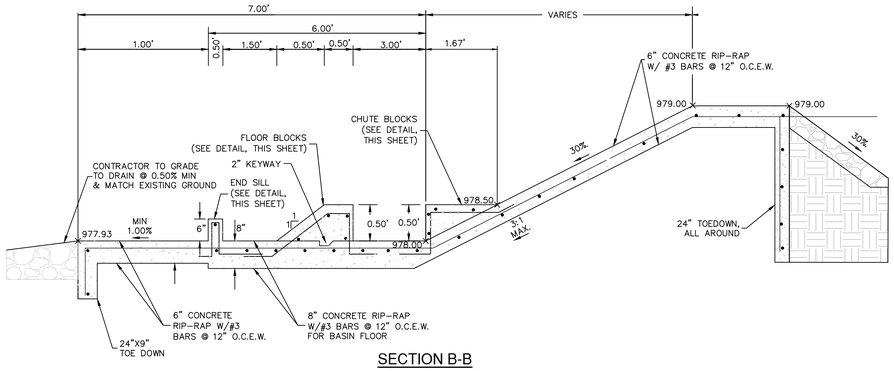


FLOOR BLOCK DETAIL
NOT-TO-SCALE



CHUTE BLOCK DETAIL
NOT-TO-SCALE

BASIN 3 DETAILS AND CALCULATIONS



SECTION B-B
STILLING BASIN SECTION
NOT TO SCALE

**REFERENCE STORM WATER MANAGEMENT PLAN FOR OVERALL DETENTION ANALYSIS OF PEAK DISCHARGE FROM SITE.

FLOW COMPARISON TABLE

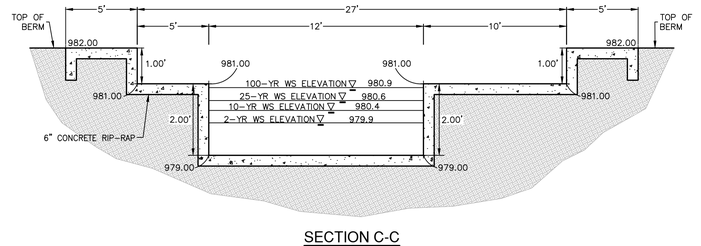
Storm Event	Existing Flows (cfs)	Ultimate Flows (cfs)	Existing vs. Ultimate Flows (cfs)
2-yr	145.0	142.6	-2.4
10-yr	259.2	252.4	-6.8
25-yr	332.8	323.4	-9.4
50-yr	389.8	378.1	-11.7
100-yr	448.4	434.6	-13.8

STAGE STORAGE DISCHARGE TABLE PER STORM EVENT

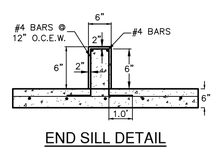
Storm Event	Max Elevation (ft.)	Storage (ac-ft)	Storage Vol (cf)	Ultimate Peak Discharge (cfs)
2-yr	979.9	1.1	47,916	28.5
10-yr	980.4	1.2	52,272	49.4
25-yr	980.6	1.3	56,628	62.7
50-yr	980.8	1.3	56,628	73.1
100-yr	980.9	1.4	60,984	83.9

DETENTION POND & WATER QUALITY CALCULATIONS

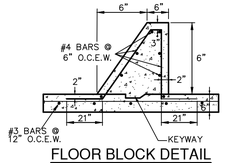
Elevation (ft)	Incremental Height (ft)	Surface Area (sf)	Incremental Vol. (cf)	Cumulative Vol. (cf)	
974	0	0	0	0	
975	1	5,938	2969	2969	Water Quality
976	1	6,956	6,447	9,416	
977	1	8,185	7,571	16,987	
978	1	9,481	8,833	25,820	
979	1	10,849	10,165	35,985	
979	0	10,849	0	0	
980	1	12,280	11,564	47,549	Detention
981	1	13,788	13,034	60,583	
982	1	15,355	14,572	75,155	



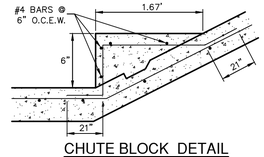
SECTION C-C
NOT-TO-SCALE



END SILL DETAIL
NOT-TO-SCALE



FLOOR BLOCK DETAIL
NOT-TO-SCALE



CHUTE BLOCK DETAIL
NOT-TO-SCALE

NO.	REVISION	DATE

8-13-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5533
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 2
COMAL COUNTY, TEXAS

BASIN DETAILS

PLAT NO.
JOB NO. 30041-21
DATE JULY 2025
DESIGNER GDL
CHECKED DRAWN CA
SHEET C1.41

FOR REVIEW

Date: August 13, 2025, 1:58 PM – User ID: HEATH HENKE
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DRAINAGE & GRADING NOTES:

1. 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 TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
2. ALL CONCRETE FOR TXDOT DRAINAGE STRUCTURES SHALL MEET TXDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
3. REFERENCE DRAINAGE DETAILS FOR PIPE TRENCH DETAILS, BOX CULVERT, HEADWALL, AND WINGWALL CONSTRUCTION DETAILS, AND BOX CULVERT BEDDING AND EXCAVATION LIMITS.
4. CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.
5. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE COMAL COUNTY OR DISTRICT WILL ACCEPT.
6. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.

TRENCH EXCAVATION SAFETY PROTECTION:

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

CAUTION!!

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

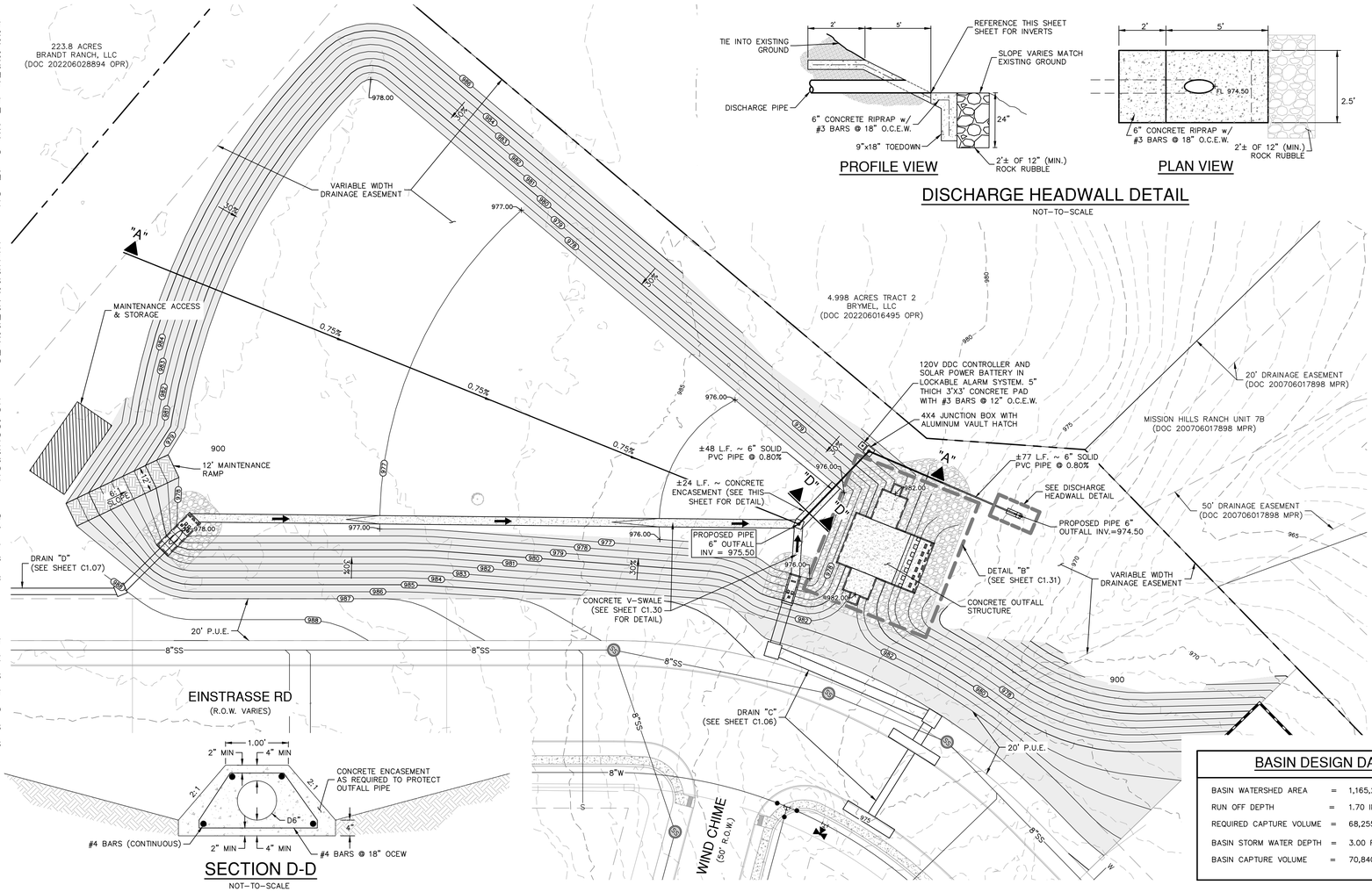
NOTES

1. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.
2. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASIN SHALL BE REVEGETATED PRIOR TO COMPLETION.
3. BASIN HAS BEEN DESIGNED USING TSS REMOVAL AND BMP SIZING CALCULATIONS AS PER THE TCEQ TGM RG-348 (2005).
4. BASIN PLAN DEPICTS MINIMUM INTERIOR DIMENSIONS (LENGTH, WIDTH & HEIGHT FOR TCEQ REVIEW & APPROVAL.
5. BASIN DRAWDOWN IS CONTROLLED BY THE 6" PVC PIPE. BASIN DRAWDOWN WILL OCCUR IN APPROXIMATELY ±29 HOURS.
6. CONTRACTOR TO SET THE VALVE POSITION TO FULLY OPEN.

SEQUENCE OF OPERATION

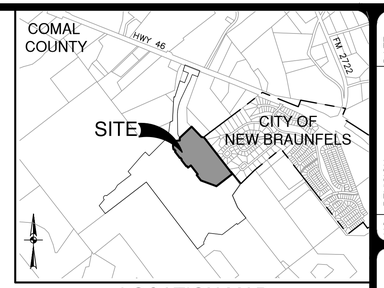
1. UPON ACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #1.
2. DETENTION TIMER #1 TO BE MANUALLY SET TO 12 HOURS AND TO BE USER ADJUSTABLE VALUE.
3. WHEN DETENTION TIMER #1 HAS ELAPSED, A 6" BUTTERFLY VALVE IS TO OPEN AND RELEASE DETAINED WATER BASIN.
4. UPON DEACTIVATION OF FLOAT SWITCH, DDC CONTROLLER TO START DETENTION TIMER #2.
5. DETENTION TIMER #2 TO BE MANUALLY SET TO 29-48 HOURS AND TO BE USER ADJUSTABLE.
6. WHEN DETENTION TIMER #2 HAS ELAPSED, THE 6" BUTTERFLY VALVE IS TO CLOSE.
7. VALVE TO BE ACTUATED PERIODICALLY TO SHOW ACTIVE REGARDLESS OF FLOAT SWITCH OPERATION.

M.A.S NOTE:
STAGING AREA REQUIREMENT (800 SQ.FT.) IS SATISFIED BY UTILIZING THE AREA ADJACENT TO THE BASIN AS DESIGNATED IN THE PLAN VIEW ABOVE.



DISCHARGE HEADWALL DETAIL

NOT-TO-SCALE



LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 30'

0' 30' 60' 90'

DRAINAGE LEGEND

- PROJECT LIMITS
- 100 YR FLOODPLAIN
- EXISTING CONTOUR 690
- PROPOSED CONTOUR 690
- PROPOSED WATER W
- PROPOSED SEWER SS
- PROPOSED STORM DRAIN
- FLOW ARROW
- GAS, ELECTRIC, TELEPHONE & CABLE TELEVISION EASEMENT P.U.E.
- CURLEX SINGLE NET EROSION CONTROL BLANKETS
- LANDLOK 450 EROSION CONTROL MAT
- RETAINING WALL (BY OTHERS)

BASIN DESIGN DATA

BASIN WATERSHED AREA	=	1,165,230 SF (26.75 AC.)
RUN OFF DEPTH	=	1.70 IN
REQUIRED CAPTURE VOLUME	=	68,255 CF
BASIN STORM WATER DEPTH	=	3.00 FT
BASIN CAPTURE VOLUME	=	70,840 CF

OVERFLOW WEIR CALCULATIONS

Q_{25}	=	$(Cw)(L)(h)^{3/2}$
Q_{25}	=	185 cfs (PROPOSED = 188 cfs)
C	=	2.70
L	=	51 ft
185	=	$(2.70)(51)(h)^{3/2}$
h	=	1.22 ft (PROPOSED = 1.23 ft)

SECTION D-D

NOT-TO-SCALE

SECTION "A-A"

N.T.S.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 5

NO.	REVISION	DATE

8-14-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5533
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

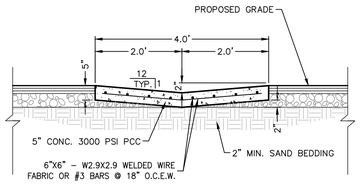
BASIN 1 PLAN

PLAT NO.
JOB NO. 30041-20
DATE JULY 2025
DESIGNER GDL
CHECKED DRAWN CA
SHEET C1.10

FOR REVIEW

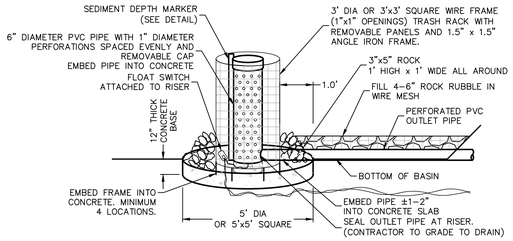
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CONCRETE V-SWALE

NOT TO SCALE



OUTLET STRUCTURE DETAIL WITH SURFACE OUTFALL PIPE

NOT–TO–SCALE

NOTES

1. CONTRACTOR IS ADVISED THAT TCEQ DOES NOT ALLOW CHANGES TO PERMANENT POLLUTION ABATEMENT MEASURES WITHOUT THEIR PRIOR APPROVAL.

2. CONTRACTOR SHALL NOTIFY CERTIFYING ENGINEER WHEN BASIN CONSTRUCTION HAS PROGRESSED TO THE FOLLOWING MILESTONES:

a. REINFORCING STEEL FOR BASIN OVERFLOW WALL OR RIPRAP PILOT CHANNEL HAS BEEN SET, CONCRETE HAS NOT BEEN PLACED AND DRAIN PIPE AND RISER PIPE IS IN PLACE, CONTRACTOR SHALL PROVIDE ENGINEER WITH SURVEY DATA WHICH DEMONSTRATES THE RISER PIPE HAS BEEN SET AT PROPER ELEVATION AND GRADE.

b. BASIN HAS BEEN COMPLETELY FINISHED INCLUDING SOD OR SEED PLACEMENT ON SIDE SLOPES (WHERE APPLICABLE).

3. WORK SHALL NOT CONTINUE ON THE BASIN UNTIL THE ENGINEER HAS HAD AN OPPORTUNITY TO OBSERVE THE STATUS OF CONSTRUCTION. CONTRACTOR SHALL PROVIDE ENGINEER A MINIMUM OF 24 HOURS ADVANCE NOTICE PRIOR TO TIME THE BASIN WILL BE AT THE REQUIRED STAGE.

4. UPON SUBSTANTIAL COMPLETION, OR AS REQUESTED BY ENGINEER, CONTRACTOR TO PROVIDE CERTIFYING ENGINEER WITH FIELD SHOTS VERIFYING ELEVATIONS OF THE FOLLOWING:

– TOP OF BANK/WALL AT EACH CORNER OF BASIN
– TOE OF SLOPE AT EACH CORNER OF BASIN (INSIDE BASIN TOE)
– SPLASH PAD/INLET PIPES
– OVERFLOW WEIRS

5. BEFORE FINAL ACCEPTANCE OF CONSTRUCTION BY THE OWNER, THE CONTRACTOR WILL REMOVE ALL TRASH, DEBRIS, AND ACCUMULATED SILT FROM THE BASINS AND REESTABLISH THEM TO THE PROPER OPERATING CONDITION.

6. THE MINIMUM DRAIN TIME FOR A FULL BASIN IS 24.1 HOURS. CONTRACTOR TO SET BUTTERFLY VALVE TO FULLY OPEN TO BE CONTROLLED DDC CONTROLLER.

CLAY LINER SPECIFICATIONS

PROPERTY	TEST METHOD	UNIT	SPECIFICATION
PERMEABILITY	ASTM D–2434	CM/SEC	1×10^{-6}
PLASTICITY INDEX OF CLAY	ASTM D–423 & D–424	%	NOT LESS THAN 15
LIQUID LIMIT OF CLAY	ASTM D–2216	%	NOT LESS THAN 30
CLAY PARTICLES PASSING	ASTM D–422	%	NOT LESS THAN 30
CLAY COMPACTION	ASTM D–2216	%	95% OF STANDARD PROCTOR DENSITY

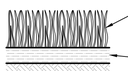
THE CLAY LINER SHALL HAVE A MINIMUM THICKNESS OF TWELVE (12) INCHES.

IF A GEOMEMBRANE LINER IS USED IT SHALL HAVE A MINIMUM THICKNESS OF FORTY (40) MILS. AND BE ULTRAVIOLET RESISTANT. A GEOTEXTILE FABRIC SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS.



LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER. DO NOT LEAVE SPACES AND DO NOT OVERLAP. A SHARPENED MASON'S TROWEL IS A HANDY TOOL FOR TUCKING DOWN THE ENDS AND TRIMMING PIECES.

BUTTING – ANGLED ENDS CAUSED BY THE AUTOMATIC SOD CUTTER MUST BE MATCHED CORRECTLY.

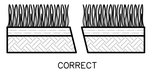


APPEARANCE OF GOOD SOD

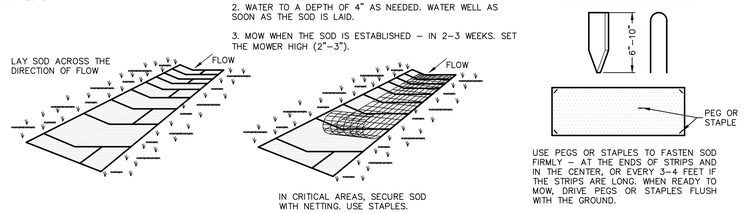
NOTES:
1. ROLL SOD IMMEDIATELY TO ACHIEVE FIRM CONTACT WITH THE SOIL.

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"–3").



SOD INSTALLATION



MATERIALS

1. SOD SHOULD BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4" INCH (± 1/4" INCH) AT THE TIME OF CUTTING. THIS THICKNESS SHOULD EXCLUDE SHOOT GROWTH AND THATCH.

2. PIECES OF SOD SHOULD BE CUT TO THE SUPPLIER'S STANDARD WIDTH AND LENGTH, WITH A MAXIMUM ALLOWABLE DEVIATION IN ANY DIMENSION OF 5%. TORN OR UNEVEN PADS SHOULD NOT BE ACCEPTABLE.

3. STANDARD SIZE SECTIONS OF SOD SHOULD BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED FROM A FIRM GRASP ON ONE END OF THE SECTION.

4. SOD SHOULD BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS.

SITE PREPARATION

1. PRIOR TO SOIL PREPARATION, AREAS TO BE SODDED SHOULD BE BROUGHT TO FINAL GRADE IN ACCORDANCE WITH THE APPROVED PLAN.

2. THE SURFACE SHOULD BE CLEARED OF ALL TRASH, DEBRIS AND OF ALL ROOTS, BRUSH, WIRE, GRADE STAKES AND OTHER OBJECTS THAT WOULD INTERFERE WITH PLANTING, FERTILIZING OR MAINTENANCE OPERATIONS.

3. FERTILIZE ACCORDING TO SOIL TESTS. FERTILIZER NEEDS CAN BE DETERMINED BY A SOIL TESTING LABORATORY OR REGIONAL RECOMMENDATIONS CAN BE MADE BY COUNTY AGRICULTURAL EXTENSION AGENTS. FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 3 INCHES WITH A DISC, SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT. ON SLOPING LAND, THE FINAL HARROWING OR DISCING OPERATION SHOULD BE ON THE CONTOUR.

INSTALLATION IN CHANNELS

1. 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.

GENERAL INSTALLATION (VA. DEPT. OF CONSERVATION, 1992)

1. SOD SHOULD NOT BE CUT OR LAID IN EXCESSIVELY WET OR DRY WEATHER. SOD ALSO SHOULD NOT BE LAID ON SOIL SURFACES THAT ARE FROZEN.

2. DURING PERIODS OF HIGH TEMPERATURE, THE SOIL SHOULD BE LIGHTLY IRRIGATED IMMEDIATELY PRIOR TO LAYING THE SOD, TO COOL THE SOIL AND REDUCE ROOT BURNING AND DIEBACK.

3. THE FIRST ROW OF SOD SHOULD BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO AND BUTTING TIGHTLY AGAINST EACH OTHER. LATERAL JOINTS SHOULD BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. CARE SHOULD BE EXERCISED TO ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT 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, SOD SHOULD BE LAID WITH STAGGERED JOINTS AND SECURED BY STAPLING OR OTHER APPROVED METHODS. SOD SHOULD BE INSTALLED WITH THE LENGTH PERPENDICULAR TO THE SLOPE (ON CONTOUR).

5. AS SODDING OF CLEARLY DEFINED AREAS IS COMPLETED, SOD SHOULD BE ROLLED OR TAMPED TO PROVIDE FIRM CONTACT BETWEEN ROOTS AND SOIL.

6. 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 THOROUGHLY WET.

7. UNTIL SUCH TIME A GOOD ROOT SYSTEM BECOMES DEVELOPED, IN THE ABSENCE OF ADEQUATE RAINFALL, WATERING SHOULD BE PERFORMED AS OFTEN AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF AT LEAST 4 INCHES.

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.

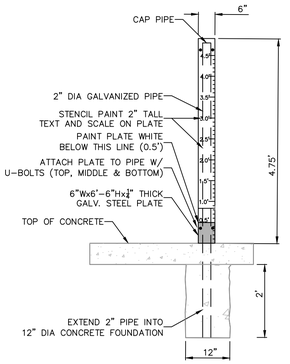
INSPECTION AND MAINTENANCE GUIDELINES

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

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

SOD INSTALLATION DETAIL

NOT–TO–SCALE



SEDIMENT DEPTH MARKER

NOT TO SCALE

NOTE: ONCE SEDIMENT IS ABOVE THE 6" DESIGNATION, THE BASIN MUST BE CLEANED OUT TO DESIGN ELEVATIONS AND VOLUMES PER PLAN.

NOTES:

1. CONTRACTOR SHALL INSTALL AND ESTABLISH VEGETATION IN BASINS PER BASIN DETAIL SHEET PRIOR TO SITE CLOSEOUT.

2. UPON COMPLETION OF CONSTRUCTION, AND IN ACCORDANCE WITH TCEQ REGULATIONS, ALL PERMANENT BMP'S (FILTERSTRIPS AND BASINS) MUST BE CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.

3. ALL AREAS DISTURBED AS PART OF CONSTRUCTION OF BASINS SHALL BE REVEGATATED PRIOR TO COMPLETION.

THE ENGINEERING SEAL HAS BEEN AFFIXED TO THIS SHEET ONLY FOR THE PURPOSE OF DEMONSTRATING COMPLIANCE WITH THE POLLUTION ABATEMENT SIZING AND TREATMENT REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY'S EDWARDS AQUIFER TECHNICAL GUIDANCE MANUAL.

THIS SHEET HAS BEEN PREPARED FOR PURPOSES OF POLLUTION ABATEMENT ONLY. ALL OTHER CIVIL ENGINEERING RELATED INFORMATION SHOULD BE ACQUIRED FROM THE APPROPRIATE SHEET IN THE CIVIL IMPROVEMENT PLANS.

EXHIBIT 6

NO.	REVISION	DATE

8–14–2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE–DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5533
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

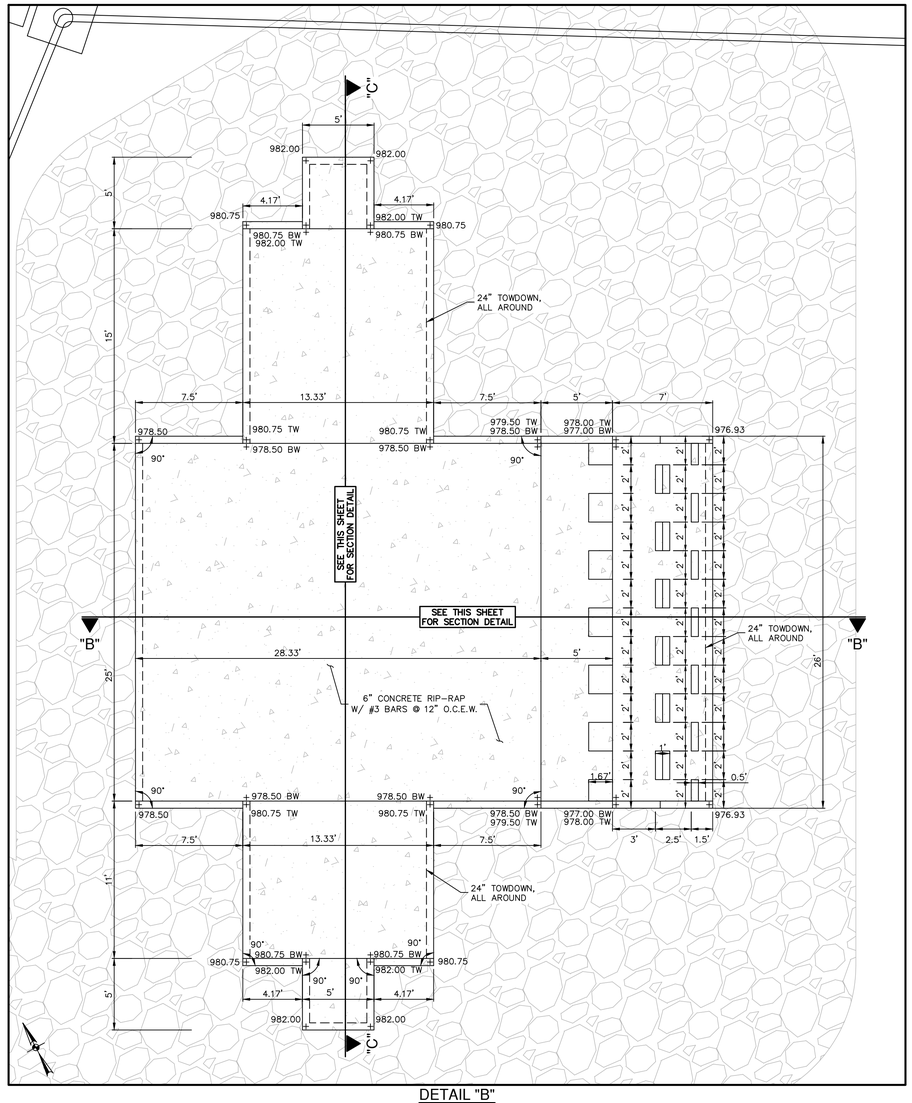
PURLSONG UNIT 3
COMAL COUNTY, TEXAS
BASIN DETAILS

PLAT NO.
JOB NO. 30041–20
DATE JULY 2025
DESIGNER GDL
CHECKED DRAWN CA
SHEET C1.30

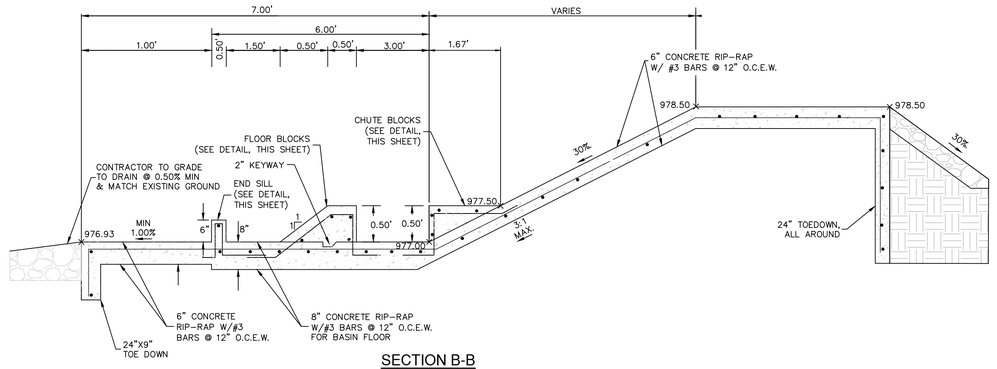
FOR REVIEW

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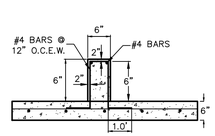
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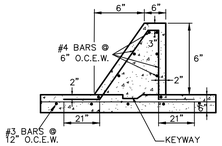
DETAIL "B"
1" = 5'



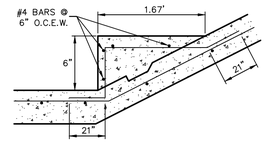
SECTION B-B
STILLING BASIN SECTION
NOT TO SCALE



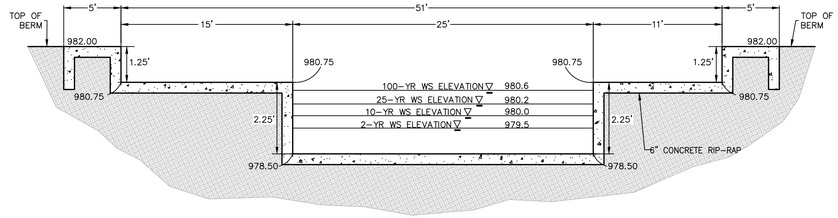
END SILL DETAIL
NOT-TO-SCALE



FLOOR BLOCK DETAIL
NOT-TO-SCALE



CHUTE BLOCK DETAIL
NOT-TO-SCALE



SECTION C-C
NOT-TO-SCALE

FLOW COMPARISON TABLE

Storm Event	Existing Flows (cfs)	Proposed Flows (cfs)	Ultimate Flows (cfs)	Existing vs. Proposed Flows (cfs)	Existing vs. Ultimate Flows (cfs)
2-yr	69.0	63.2	63.8	-5.8	-5.2
10-yr	123.3	115.7	114.5	-7.6	-8.8
25-yr	158.3	149.9	147.3	-8.4	-11
50-yr	185.4	176.4	172.7	-9	-12.7
100-yr	213.5	203.8	199.1	-9.7	-14.4

STAGE STORAGE DISCHARGE TABLE PER STORM EVENT

Storm Event	Max Elevation (ft.)	Storage (ac-ft)	Storage Vol (cf)	Ultimate Peak Discharge (cfs)
2-yr	979.5	2.7	117,612	63.8
10-yr	980.0	3.3	143,748	114.5
25-yr	980.2	3.6	156,816	147.3
50-yr	980.4	3.8	165,528	172.7
100-yr	980.6	4.0	174,240	199.1

DETENTION POND & WATER QUALITY CALCULATIONS

Elevation (ft)	Incremental Height (ft)	Surface Area (sf)	Incremental Vol. (cf)	Cumulative Vol. (cf)	
975.5	0	0	0	0	
976	0.5	4,606	1152	1152	Water Quality
977	1	22,420	13,513	14,665	
978	1	44,574	33,497	48,162	
978.5	0.5	46,139	22,678	70,840	
978.5	0	46,139	-	-	
979	0.5	47,703	23,460	94,300	
980	1	50,908	49,306	143,606	Detention
981	1	54,191	52,549	196,155	
982	1	57,551	55,871	252,026	

**REFERENCE STORM WATER MANAGEMENT PLAN FOR OVERALL DETENTION ANALYSIS OF PEAK DISCHARGE FROM SITE.

NO.	REVISION	DATE

8-14-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

BASIN DETAILS

PLAT NO.
JOB NO. 30041-20
DATE JULY 2025
DESIGNER GDL
CHECKED DRAWN CA
SHEET C1.31

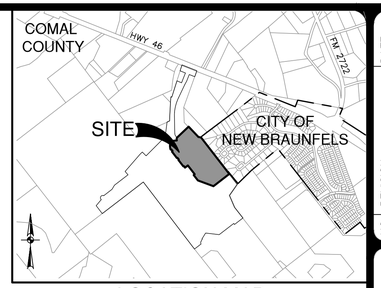
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Calc Pt	Description	Drainage Area ID	Acres	Time of Conc. (minutes)	Intensity (in/hr)	C	Discharge Q (cfs)	Frequency (year)	Total Q (cfs)	Inlets on Grade Intercept	Inlets on Grade Bypass
1	SUMP INLET DRAIN "A"	UA	0.63	10.00	5.05	0.60	2	2			
					7.46	0.67	3	10			
					9.02	0.71	4	25			
					11.50	0.80	6	100			
2	EARTHEN CHANNEL DRAIN "A"	UA+UB	0.90	10.00	5.05	0.56	3	2			
					7.46	0.63	4	10			
					9.02	0.67	5	25			
					11.50	0.75	8	100			
3	SUMP INLET DRAIN "B"	UC	3.33	10.00	5.05	0.60	10	2			
					7.46	0.67	17	10			
					9.02	0.71	21	25			
					11.50	0.80	31	100			
4	EARTHEN CHANNEL DRAIN "B"	UC+UD	4.33	10.00	5.05	0.58	13	2			
					7.46	0.64	21	10			
					9.02	0.69	27	25			
					11.50	0.77	38	100			
5	EARTHEN CHANNEL DRAIN "B"	UA+UB+UC+UD+UE	5.47	10.00	5.05	0.56	16	2			
					7.46	0.63	26	10			
					9.02	0.67	33	25			
					11.50	0.76	48	100			
6	SUMP INLET PURLSONG UNIT 1 DRAIN "A"	UF	6.38	10.00	5.05	0.60	19	2			
					7.46	0.67	32	10			
					9.02	0.71	41	25			
					11.50	0.80	59	100			
7	BASIN OUTFALL PURLSONG UNIT 1 BASIN 1	UF+UG+UH	34.86	15.00	MODELED WITH HEC-HMS		26	2			
							90	10			
							135	25			
							201	100			
8	SUMP INLET DRAIN "D"	UI	2.89	10.00	5.05	0.60	9	2			
					7.46	0.67	14	10			
					9.02	0.71	19	25			
					11.50	0.80	27	100			

Calc Pt	Description	Drainage Area ID	Acres	Time of Conc. (minutes)	Intensity (in/hr)	C	Discharge Q (cfs)	Frequency (year)	Total Q (cfs)	Inlets on Grade Intercept	Inlets on Grade Bypass
9	STREET CAPACITY CHECK	UJ	5.21	10.00	5.05	0.60	16	2			
					7.46	0.67	26	10			
					9.02	0.71	34	25			
					11.50	0.80	48	100			
10	STREET CAPACITY CHECK	UK	8.55	10.00	5.05	0.60	26	2			
					7.46	0.67	43	10			
					9.02	0.71	55	25			
					11.50	0.80	79	100			
11	SUMP INLET DRAIN "C"	UJ+UK	13.76	10.00	5.05	0.60	42	2			
					7.46	0.67	69	10			
					9.02	0.71	88	25			
					11.50	0.80	127	100			
12A	OFFSITE FLOW	UL	2.35	10.00	5.05	0.55	7	2			
					7.46	0.62	11	10			
					9.02	0.66	14	25			
					11.50	0.74	20	100			
12B	OFFSITE FLOW	UM	0.79	10.00	5.05	0.52	2	2			
					7.46	0.58	3	10			
					9.02	0.63	4	25			
					11.50	0.71	6	100			
13	PURLSONG UNIT 1 DOWNSTREAM WEST	UF+UG+UH+UO	274.71	35.00	MODELED WITH HEC-HMS		544	2			
							1031	10			
							1352	25			
							1848	100			
35	BASIN OUTFALL PURLSONG UNIT 1 BASIN 2	UA+UB+UC+UD+UE+UN	71.29	15.00	MODELED WITH HEC-HMS		91	2			
							200	10			
							271	25			
							380	100			
36	BASIN OUTFALL PURLSONG UNIT 3 BASIN 1	UI+UJ+UK+UP+UQ	25.98	10.00	MODELED WITH HEC-HMS		64	2			
							115	10			
							147	25			
							199	100			



LOCATION MAP

NOT-TO-SCALE

0' 100' 200' 300'

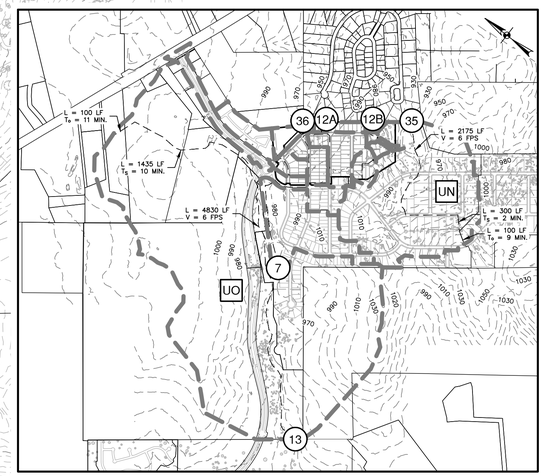
SCALE: 1"= 100'

MASTER DRAINAGE LEGEND

- 100 YR INUNDATION AREA
- EXISTING CONTOUR — 690
- 100 YR FLOODPLAIN
- RUNOFF FLOW PATH
- DRAINAGE AREA BOUNDARY
- FHA LOT GRADING TYPE — A,B,C
- PROPOSED DIRECTION OF FLOW
- DRAINAGE CALCULATION POINT — 11
- DRAINAGE AREA — UA

PURLSONG OUTFALLS

Calc Pt	Frequency (year)	Existing Discharge (cfs)	Proposed Discharge (cfs)	Ultimate Discharge (cfs)
12A	2	7	7	7
	10	13	11	11
	25	17	14	14
	100	26	20	20
12B	2	2	2	2
	10	3	3	3
	25	4	4	4
	100	7	6	6
13	2	602	505	544
	10	1084	965	1031
	25	1396	1266	1352
	100	1889	1734	1848
35	2	218	91	91
	10	390	200	200
	25	501	271	271
	100	675	380	380
36	2	69	63	64
	10	123	116	115
	25	158	150	147
	100	214	204	199



8-6-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5533
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

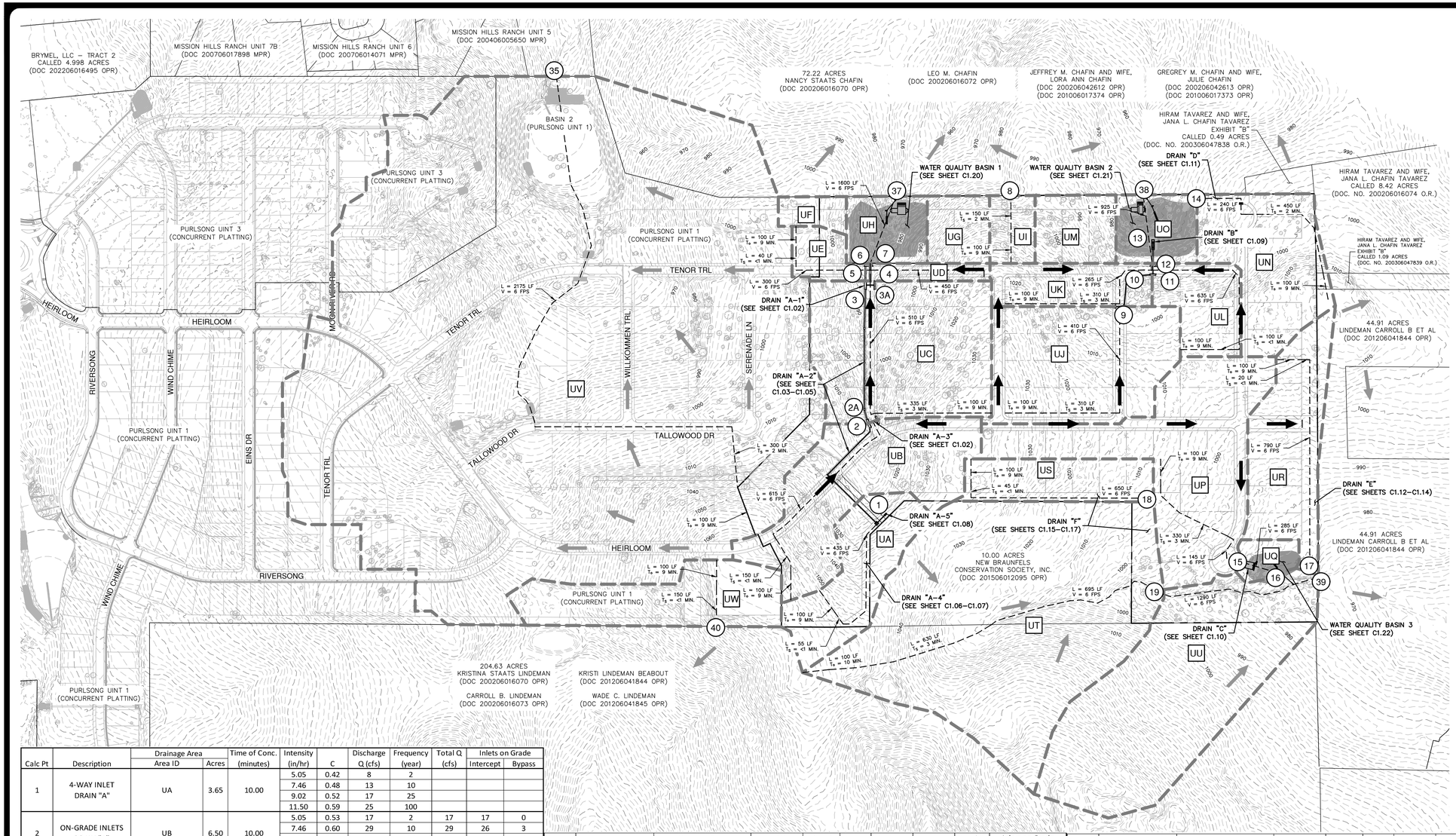
OVERALL DRAINAGE PLAN - ULTIMATE CONDITIONS

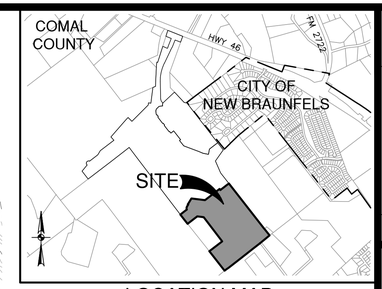
PLAT NO.
JOB NO. 30041-20
DATE JULY 2025
DESIGNER GDL
CHECKED DRAWN CA
SHEET C1.02

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LOCATION MAP

NOT-TO-SCALE

SCALE: 1"= 200'

0' 200' 400' 600'

MASTER DRAINAGE LEGEND

- PROJECT LIMITS
- EXISTING CONTOUR — 690
- 100 YR FLOODPLAIN
- RUNOFF FLOW PATH
- DRAINAGE AREA BOUNDARY
- PROPOSED DIRECTION OF FLOW
- EXISTING DIRECTION OF FLOW
- DRAINAGE CALCULATION POINT — 11
- DRAINAGE AREA — A
- 100 YR INUNDATION AREA

PURLSONG OUTFALLS

Calc Pt	Frequency (year)	Existing Discharge (cfs)	Ultimate Discharge (cfs)
8	2	3	2
	10	4	4
	25	6	5
	100	9	8
35	2	218	91
	10	390	200
	25	501	271
	100	675	380
37	2	76	65
	10	135	115
	25	174	147
	100	235	198
38	2	56	47
	10	100	86
	25	128	112
	100	173	153
39	2	145	143
	10	259	252
	25	333	323
	100	448	435
40	2	8	8
	10	13	13
	25	18	18
	100	27	26

Calc Pt	Description	Drainage Area ID	Drainage Area Acres	Time of Conc. (minutes)	Intensity (in/hr)	C	Discharge Q (cfs)	Frequency (year)	Total Q (cfs)	Inlets on Grade Intercept	Inlets on Grade Bypass
1	4-WAY INLET DRAIN "A"	UA	3.65	10.00	5.05	0.42	8	2			
					7.46	0.48	13	10			
					9.02	0.52	17	25			
					11.50	0.59	25	100			
2	ON-GRADE INLETS DRAIN "A"	UB	6.50	10.00	5.05	0.53	17	2	17	17	0
					7.46	0.60	29	10	29	26	3
					9.02	0.64	38	25	38	31	7
					11.50	0.72	54	100	54	39	15
2A	PIPE FLOW DRAIN "A"	UA+UB(CAPTURE)	3.65	10.00	5.05	0.41	8	2	25		
					7.46	0.46	13	10	38		
					9.02	0.51	17	25	47		
					11.50	0.58	24	100	63		
3	ON-GRADE INLETS DRAIN "A"	UB(BYPASS)+UC	7.73	10.00	5.05	0.48	19	2	19	18	1
					7.46	0.54	31	10	34	29	5
					9.02	0.58	40	25	47	36	11
					11.50	0.66	58	100	73	47	26
3A	PIPE FLOW DRAIN "A"	UA+UB(CAPTURE)+ UC(CAPTURE)	3.65	10.00	5.05	0.41	8	2	43		
					7.46	0.46	13	10	67		
					9.02	0.51	17	25	84		
					11.50	0.58	24	100	111		
4	STREET CAPACITY CHECK	UC(BYPASS)+UD	0.66	10.00	5.05	0.70	2	2	3		
					7.46	0.78	4	10	6		
					9.02	0.83	5	25	10		
					11.50	0.91	7	100	20		
5	STREET CAPACITY CHECK	UC(BYPASS)+UE	1.01	10.00	5.05	0.54	3	2	3		
					7.46	0.60	5	10	7		
					9.02	0.65	6	25	11		
					11.50	0.73	8	100	21		
6	SUMP INLET DRAIN "A"	UC(BYPASS)+UD+UE	1.67	10.00	5.05	0.54	5	2	6		
					7.46	0.60	7	10	12		
					9.02	0.65	10	25	21		
					11.50	0.73	14	100	40		
7	PIPE FLOW DRAIN "A"	UA+UB+UC+UD+UE	19.55	10.00	5.05	0.51	51	2			
					7.46	0.58	84	10			
					9.02	0.62	109	25			
					11.50	0.70	157	100			
8	OFFSITE FLOW	UI	0.97	10.00	5.05	0.49	2	2			
					7.46	0.56	4	10			
					9.02	0.60	5	25			
					11.50	0.68	8	100			

Calc Pt	Description	Drainage Area ID	Drainage Area Acres	Time of Conc. (minutes)	Intensity (in/hr)	C	Discharge Q (cfs)	Frequency (year)	Total Q (cfs)	Inlets on Grade Intercept	Inlets on Grade Bypass
9	ON-GRADE INLETS DRAIN "B"	UJ	6.54	10.00	5.05	0.54	18	2	18	6	12
					7.46	0.60	29	10	29	8	21
					9.02	0.65	38	25	38	10	28
					11.50	0.73	55	100	55	12	43
10	STREET CAPACITY CHECK	UJ(BYPASS)+UK	2.20	10.00	5.05	0.54	6	2	18		
					7.46	0.60	10	10	31		
					9.02	0.65	13	25	41		
					11.50	0.73	18	100	61		
11	STREET CAPACITY CHECK	UL	2.16	10.00	5.05	0.54	6	2			
					7.46	0.60	10	10			
					9.02	0.65	13	25			
					11.50	0.73	18	100			
12	SUMP INLET DRAIN "B"	UJ(BYPASS)+UK+UL	4.36	10.00	5.05	0.54	12	2	24		
					7.46	0.60	20	10	41		
					9.02	0.65	25	25	53		
					11.50	0.73	36	100	79		
13	PIPE FLOW DRAIN "B"	UJ+UK+UL	10.90	10.00	5.05	0.54	30	2			
					7.46	0.60	49	10			
					9.02	0.65	64	25			
					11.50	0.73	91	100			
14	EARTHEN CHANNEL DRAIN "D"	UN	4.85	10.00	5.05	0.45	11	2			
					7.46	0.51	18	10			
					9.02	0.55	24	25			
					11.50	0.63	35	100			
15	SUMP INLET DRAIN "C"	UP	8.67	10.00	5.05	0.53	23	2			
					7.46	0.59	38	10			
					9.02	0.64	50	25			
					11.50	0.72	72	100			
16	BASIN OUTFALL PURLSONG UNIT 2 BASIN 3	UP+UQ	9.36	10.00	MODELED WITH HEC-HMS		29	2			
							49	10			
							63	25			
							84	100			

Calc Pt	Description	Drainage Area ID	Drainage Area Acres	Time of Conc. (minutes)	Intensity (in/hr)	C	Discharge Q (cfs)	Frequency (year)	Total Q (cfs)	Inlets on Grade Intercept	Inlets on Grade Bypass
17	EARTHEN CHANNEL DRAIN "E"	UR	4.58	10.00	5.05	0.48	11	2			
					7.46	0.54	18	10			
					9.02	0.58	24	25			
					11.50	0.66	35	100			
18	EARTHEN CHANNEL DRAIN "F"	US	2.55	10.00	5.05	0.49	6	2			
					7.46	0.55	11	10			
					9.02	0.60	14	25			
					11.50	0.68	20	100			
19	EARTHEN CHANNEL DRAIN "F"	US+UT	21.32	10.00	5.05	0.35	38	2			
					7.46	0.40	64	10			
					9.02	0.44	85	25			
					11.50	0.51	126	100			
35	BASIN OUTFALL PURLSONG UNIT 1 BASIN 2	UV	71.29	15.00	MODELED WITH HEC-HMS		91	2			
							200	10			
							271	25			
							380	100			
37	BASIN OUTFALL PURLSONG UNIT 2 BASIN 1	UA+UB+UC+UD+UE +UF+UG+UH	23.26	10.00	MODELED WITH HEC-HMS		65	2			
							115	10			
							147	25			
							198	100			
38	BASIN OUTFALL PURLSONG UNIT 2 BASIN 2	UJ+UK+UL+UM+UN +UO	19.25	10.00	MODELED WITH HEC-HMS		47	2			
							86	10			
							112	25			
							153	100			
39	DOWNSTREAM PT PURLSONG UNIT 2	UP+UQ+UR+US+UT +UU	46.65	15.00	MODELED WITH HEC-HMS		143	2			
							252	10			
							323	25			
							435	100			
40	OFFSITE FLOW	UW	4.23	10.00	5.05	0.37	8	2			
					7.46	0.42	13	10			
					9.02	0.46	18	25			
					11.50	0.53	26	100			

PAPE–DAWSON
1672 INDEPENDENCE DR, STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

NO.	REVISION	DATE

8–14–2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PURLSONG UNIT 2
COMAL COUNTY, TEXAS
OVERALL DRAINAGE PLAN - ULTIMATE CONDITIONS

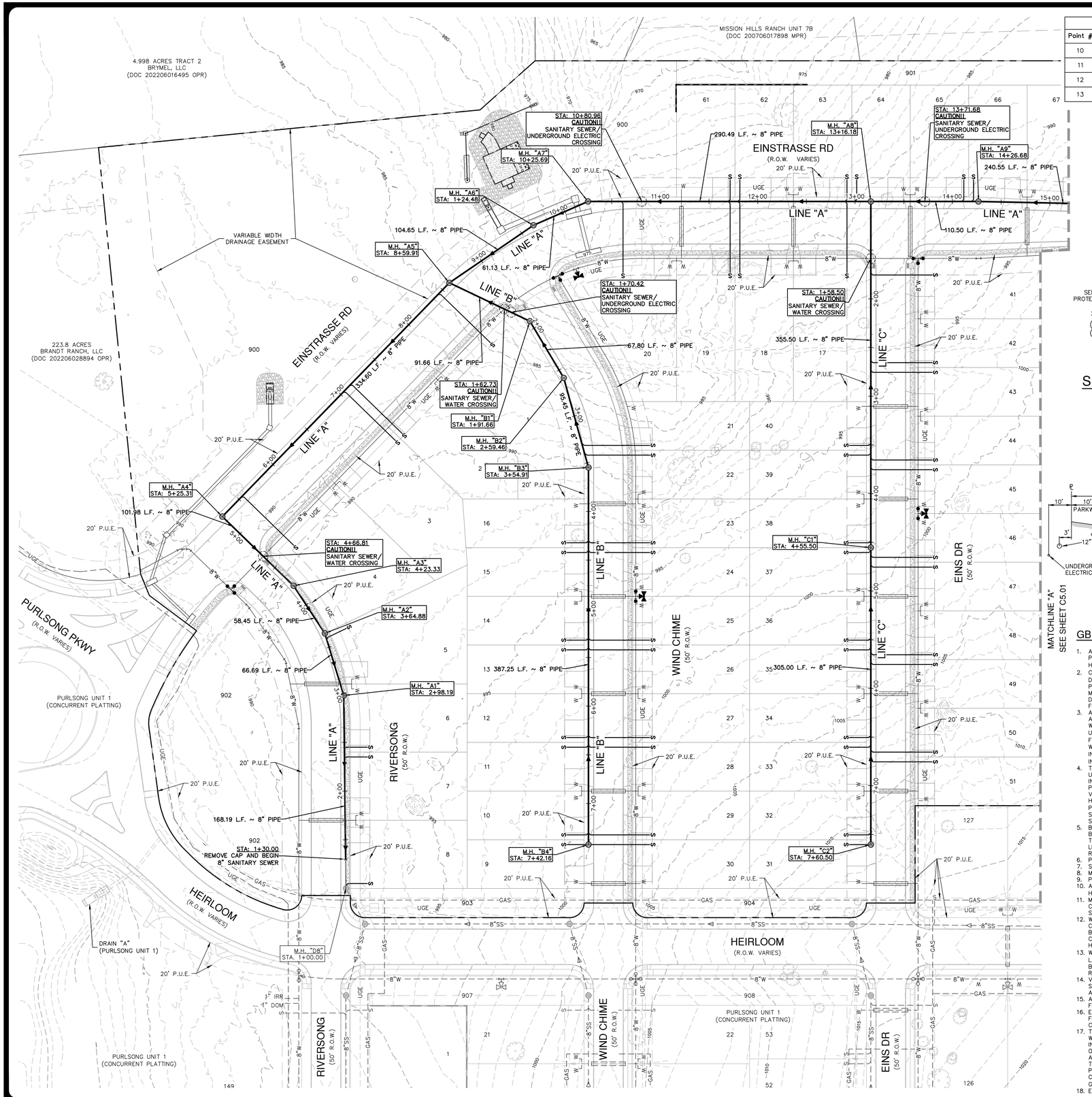
PLAT NO.
JOB NO. 30041–21
DATE JULY 2025
DESIGNER GDL
CHECKED DRAWN CA
SHEET C1.01

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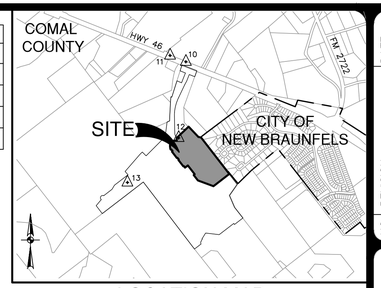
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FOR REVIEW

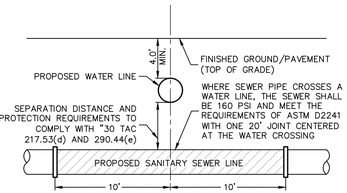
FINAL PLAN AND PROFILE SHEETS



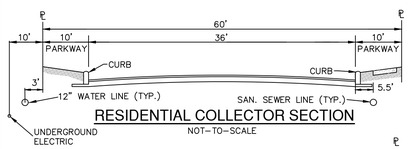
HORIZONTAL AND VERTICAL CONTROL POINTS				
Point #	Northing	Easting	Elevation	Full Description
10	13,820,608.08	2,217,519.36	1011.21	SET I.R. REDCAP (TRAV)
11	13,820,781.83	2,217,080.56	1004.08	SET I.R. REDCAP (TRAV)
12	13,818,494.82	2,217,319.19	990.12	SET I.R. REDCAP (TRAV)
13	13,817,256.96	2,215,896.38	963.40	SET I.R. REDCAP (TRAV)



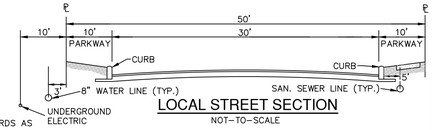
LOCATION MAP
NOT-TO-SCALE



TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
NOT-TO-SCALE

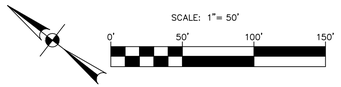


RESIDENTIAL COLLECTOR SECTION
NOT-TO-SCALE



LOCAL STREET SECTION
NOT-TO-SCALE

MATCHLINE "A" SEE SHEET C5.01



SEWER LEGEND

PROJECT LIMITS	
EXISTING WATER	EXISTING FIRE HYDRANT — W
EXISTING UNDERGROUND ELECTRIC	UGE
EXISTING GAS	GAS
EXISTING SEWER	SS — MANHOLE
PROPOSED SEWER	SS — MANHOLE
PROPOSED WATER	FIRE HYDRANT — W
PROPOSED SEWER LATERAL	S
FINISHED FLOOR ELEVATION FOR SEWER	FF = XXXX.XX
PROPOSED STORM DRAIN	
PROPOSED NATURAL GAS (REFER TO CENTERPOINT DESIGN SHEETS AND DETAILS)	GAS
PROPOSED UNDERGROUND ELECTRIC (REFER TO NBU DESIGN SHEETS AND DETAILS)	UGE

GBRA NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH GBRA STANDARDS AS PUBLISHED AT THE FOLLOWING WEBSITE: HTTP://WWW.GBRA.ORG/OPERATIONS/DEVELOPER-RESOURCES/
2. COPIES OF EACH CONSTRUCTION SUBMITTAL (SHOP DRAWINGS, PRODUCT DATA, ETC.) SHALL BE PROVIDED FOR GBRA REVIEW AND APPROVAL PRIOR TO FABRICATION. USE CLOUDS, BOXES, ARROWS, ETC., TO CLEARLY MARK ALL PROPOSED OPTIONS AND PART NUMBERS. LIST ANY PROPOSED DEVIATIONS ON THE SUBMITTAL COVER SHEET. ALLOW 21 CALENDAR DAYS FOR REVIEW.
3. ALL WATER AND WASTEWATER INSTALLATIONS MUST BE INSPECTED AND APPROVED BY GBRA PRIOR TO BACKFILLING OR OTHERWISE COVERING THE WORK. THIS INCLUDES CROSSINGS OF WATER AND WASTEWATER BY OTHER UTILITIES. GBRA WILL PERFORM A MAXIMUM OF ONE (1) INSPECTION DAILY FOR ONE (1) HOUR DURATION BETWEEN 8:00AM AND 5:00PM EXCLUDING WEEKENDS AND HOLIDAYS. CALL 830-379-5822 TO SCHEDULE INSPECTIONS (48 HOURS ADVANCE NOTICE IS REQUIRED FOR ALL INSPECTIONS).
4. TRENCH EXCAVATION AND PIPE INSTALLATION WILL NOT BE PERMITTED UNTIL SUBGRADE HAS BEEN ESTABLISHED. SURVEY STAKING MUST BE INSTALLED PRIOR TO AND MAINTAINED DURING TRENCH EXCAVATION AND PIPE INSTALLATION. SURVEY STAKING SHALL INCLUDE HORIZONTAL AND VERTICAL CONTROL AT A MINIMUM OF 50 FOOT STATION INTERVALS. HORIZONTAL OFFSETS SHALL BE 15 FEET MAXIMUM. INSTALL PROPERTY PINS AND STAKES. MARK FINISH GRADE LINES WITH CUT/FILL ON OFFSET STAKES AND PROPERTY STAKES. ALL MARKS SHALL FACE THE PIPELINE. SURVEY STAKING SHALL BE PERFORMED BY THE CONTRACTOR.
5. BACKFLOW PREVENTION IN THE FORM OF A REDUCED PRESSURE BACKFLOW ASSEMBLY MUST BE PROVIDED FOR TEMPORARY CONNECTIONS TO EXISTING WATER LINES. BACKFLOW DEVICES SHALL BE TESTED BY A LICENSED BACKFLOW PREVENTION ASSEMBLY TESTER. SUBMIT TEST REPORTS.
6. PVC MALE ADAPTERS ARE NOT ALLOWED.
7. SANITARY TAPPING SADDLES ARE NOT ALLOWED.
8. MANHOLE INTERNAL DROPS ARE NOT ALLOWED.
9. PIPE BELLS SHALL BE INSTALLED IN UPSTREAM DIRECTION.
10. ALL PIPING SHALL BE DESIGNED IN STRAIGHT ALIGNMENT VERTICALLY AND HORIZONTALLY. PIPE CURVATURE AND/OR DEFLECTION ARE NOT ALLOWED.
11. MAINTAIN A MINIMUM OF 10 FEET HORIZONTAL AND 12 INCHES VERTICAL CLEARANCE BETWEEN WATER AND WASTEWATER AND OTHER UTILITIES. SHARED TRENCHES ARE NOT ALLOWED.
12. WATER AND WASTEWATER PIPE LENGTHS SHALL BE CENTERED AT CROSSINGS WITH ALL OTHER UTILITIES,INCLUDING DRY UTILITY SERVICES. BOTH PIPES SHALL BE CENTERED AT WATER AND WASTEWATER CROSSINGS, INCLUDING WASTEWATER SERVICE LATERALS AND FIRE HYDRANT LEADS.
13. WATER AND WASTEWATER PIPING (INCLUDING MAINS, SERVICES, AND LATERALS) SHALL BE SLEEVED IF LOCATED UNDER CONCRETE CHANNELS, BOX CULVERTS, OR MULTIPLE BARREL STORM SEWER CROSSINGS REGARDLESS OF SIZE AND SINGLE BARRELS 30"OR LARGER.
14. VALVE BOXES, EXPOSED PIPING AND VALVES, AND APPURTENANCES SHALL BE PAINTED. PROVIDE PAINTED CURB CUT MARKINGS AT VALVES AND SERVICES.
15. ALL EXPOSED VERTICAL AND HORIZONTAL CONCRETE EDGES SHALL BE FORMED WITH ¾"CHAMFER STRIPS.
16. EXISTING MANHOLES THAT ARE DISTURBED SHALL BE RESTORED TO BE IN FULL COMPLIANCE WITH CURRENT GBRA STANDARDS INCLUDING TESTING, CORROSION RESISTANT LINING, RINGS AND COVERS, ETC.
17. THE CONTRACTOR SHALL MAINTAIN SERVICE TO EXISTING WATER AND WASTEWATER SYSTEMS AT ALL TIMES DURING CONSTRUCTION. ANY WORK INVOLVING POWER OUTAGES, BYPASS PUMPING, PUMP AND HAUL, OR ANY OTHER INTERRUPTION OF FLOW MUST BE PERFORMED BETWEEN 8:00AM AND 5:00PM EXCLUDING WEEKENDS AND HOLIDAYS. ALL NECESSARY TEMPORARY POWER, BYPASS PUMPING, PUMP AND HAUL, TEMPORARY PLUGS, ETC., SHALL BE FURNISHED AND PERFORMED BY THE CONTRACTOR. COORDINATE AND SCHEDULE ANY SUCH ACTIVITIES WITH GBRA AT LEAST TWO (2) WEEKS IN ADVANCE.
18. EXPLOSIVES AND BLASTING ARE NOT ALLOWED.

NOTES:

1. SEE THIS SHEET FOR TYPICAL SANITARY SEWER/WATER CROSSING DETAIL.
2. MANHOLES LOCATED WITHIN A 100-YR FLOODPLAIN MUST BE GASKETED AND BOLTED DOWN TO PREVENT INFLOW

DRY UTILITY CROSSING NOTE:

LOCATION AND DEPTH OF DRY UTILITIES SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS ARE TO BE BASED ON THE FINAL DESIGN FROM NBU. CONTRACTOR WILL BE RESPONSIBLE FOR CENTERING 14-FEET OF ASTM D3034 SDR 26 SANITARY SEWER PIPE WHERE SANITARY SEWER MAINS CROSS DRY UTILITIES AND MAINTAINING 10 FT OF HORIZONTAL CLEARANCE BETWEEN DRY UTILITIES AND SANITARY SEWER.

TRENCH EXCAVATION SAFETY PROTECTION:

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

CAUTION!!

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

NO.	REVISION	DATE

7-18-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

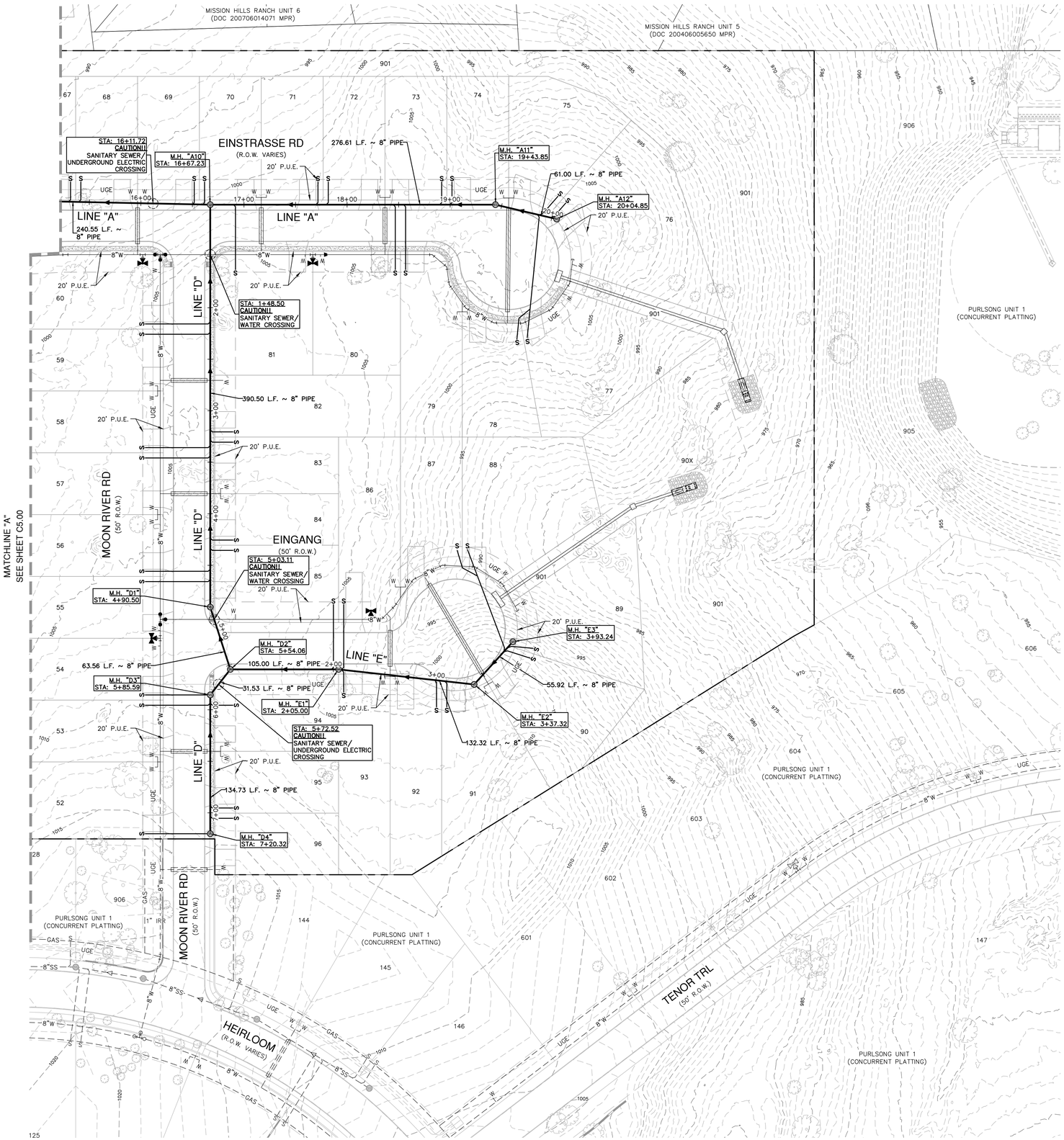
OVERALL SANITARY SEWER PLAN

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JOB NO. 30041-20
DATE JULY 2025
DESIGNER GDL
CHECKED HF DRAWN CA
SHEET C5.00

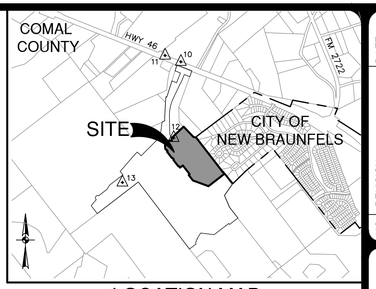
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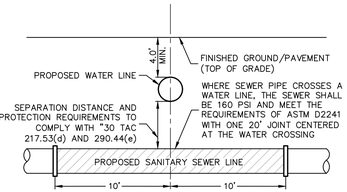
FOR REVIEW



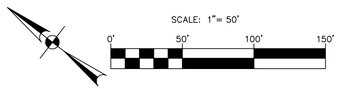
HORIZONTAL AND VERTICAL CONTROL POINTS				
Point #	Northing	Easting	Elevation	Full Description
10	13,820,608.08	2,217,519.36	1011.21	SET I.R. REDCAP (TRAV)
11	13,820,781.83	2,217,080.56	1004.08	SET I.R. REDCAP (TRAV)
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LOCATION MAP
NOT-TO-SCALE

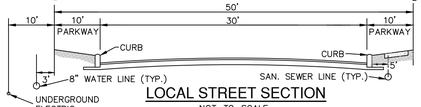


TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
NOT-TO-SCALE



SEWER LEGEND

- PROJECT LIMITS
- EXISTING WATER — EXISTING FIRE HYDRANT
- EXISTING UNDERGROUND ELECTRIC — UGE
- EXISTING GAS — GAS
- EXISTING SEWER — SS — MANHOLE
- PROPOSED SEWER — SS
- PROPOSED WATER — FIRE HYDRANT — W
- PROPOSED SEWER LATERAL — S
- FINISHED FLOOR ELEVATION FOR SEWER — FF = XXXX.XX
- PROPOSED STORM DRAIN
- PROPOSED NATURAL GAS (REFER TO CENTERPOINT DESIGN SHEETS AND DETAILS) — GAS
- PROPOSED UNDERGROUND ELECTRIC (REFER TO NBU DESIGN SHEETS AND DETAILS) — UGE



LOCAL STREET SECTION
NOT-TO-SCALE

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NOTES:

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DRY UTILITY CROSSING NOTE:

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TRENCH EXCAVATION SAFETY PROTECTION:

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

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NO.	REVISION	DATE

7-18-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED
PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5533
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

OVERALL SANITARY SEWER PLAN

PLAT NO.
JOB NO. 30041-20
DATE JULY 2025
DESIGNER GDL
CHECKED CL DRAWN CA
SHEET C5.01

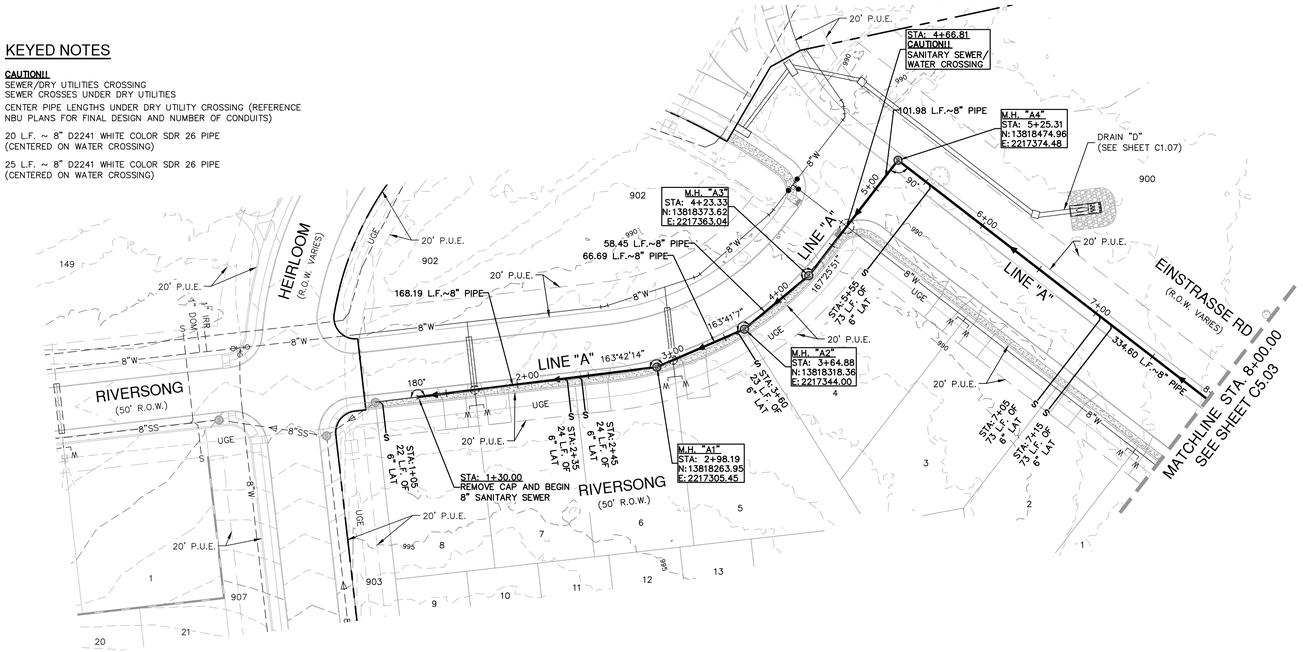
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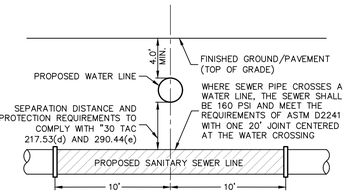
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KEYED NOTES

1. **CAUTION!!** SEWER/DRY UTILITIES CROSSING
   SEWER CROSSES UNDER DRY UTILITIES
2. CENTER PIPE LENGTHS UNDER DRY UTILITY CROSSING (REFERENCE NBU PLANS FOR FINAL DESIGN AND NUMBER OF CONDUITS)
3. 20 L.F. ~ 8" D2241 WHITE COLOR SDR 26 PIPE (CENTERED ON WATER CROSSING)
4. 25 L.F. ~ 8" D2241 WHITE COLOR SDR 26 PIPE (CENTERED ON WATER CROSSING)





TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

NOT-TO-SCALE

NOTES:

1. SEE THIS SHEET FOR TYPICAL SANITARY SEWER/WATER CROSSING DETAIL.
2. MANHOLES LOCATED WITHIN A 100-YR FLOODPLAIN MUST BE GASKETED AND BOLTED DOWN TO PREVENT INFLOW

SCALE: 1" = 50'

0' 50' 100' 150'

SEWER LEGEND

- PROJECT LIMITS
- EXISTING WATER — W —
- EXISTING UNDERGROUND ELECTRIC — UGE —
- EXISTING GAS — GAS —
- EXISTING SEWER — SS —
- PROPOSED SEWER — SS — (MANHOLE)
- PROPOSED WATER — W —
- PROPOSED SEWER LATERAL — S —
- FINISHED FLOOR ELEVATION FOR SEWER — FF = XXXX.XX
- PROPOSED STORM DRAIN
- PROPOSED NATURAL GAS (REFER TO CENTERPOINT DESIGN SHEETS AND DETAILS) — GAS —
- PROPOSED UNDERGROUND ELECTRIC (SEE NBU PLANS FOR FINAL ALIGNMENT. ELECTRIC SHOWN FOR REFERENCE ONLY.) — UGE —
- **CAUTION!** WATER SERVICE/SEWER CROSSING

GBRA NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH GBRA STANDARDS AS PUBLISHED AT THE FOLLOWING WEBSITE: HTTP://WWW.GBRA.ORG/OPERATIONS/DEVELOPER-RESOURCES/
2. COPIES OF EACH CONSTRUCTION SUBMITTAL (SHOP DRAWINGS, PRODUCT DATA, ETC.) SHALL BE PROVIDED FOR GBRA REVIEW AND APPROVAL PRIOR TO FABRICATION. USE CLOUDS, BOXES, ARROWS, ETC., TO CLEARLY MARK ALL PROPOSED OPTIONS AND PART NUMBERS. LIST ANY PROPOSED DEVIATIONS ON THE SUBMITTAL COVER SHEET. ALLOW 21 CALENDAR DAYS FOR REVIEW.
3. ALL WATER AND WASTEWATER INSTALLATIONS MUST BE INSPECTED AND APPROVED BY GBRA PRIOR TO BACKFILLING OR OTHERWISE COVERING THE WORK. THIS INCLUDES CROSSINGS OF WATER AND WASTEWATER BY OTHER UTILITIES. GBRA WILL PERFORM A MAXIMUM OF ONE (1) INSPECTION DAILY FOR ONE (1) HOUR DURATION BETWEEN 8:00AM AND 5:00PM EXCLUDING WEEKENDS AND HOLIDAYS. CALL 830-379-5822 TO SCHEDULE INSPECTIONS (48 HOURS ADVANCE NOTICE IS REQUIRED FOR ALL INSPECTIONS).
4. TRENCH EXCAVATION AND PIPE INSTALLATION WILL NOT BE PERMITTED UNTIL SUBGRADE HAS BEEN ESTABLISHED. SURVEY STAKING MUST BE INSTALLED PRIOR TO AND MAINTAINED DURING TRENCH EXCAVATION AND PIPE INSTALLATION. SURVEY STAKING SHALL INCLUDE HORIZONTAL AND VERTICAL CONTROL AT A MINIMUM OF 50 FOOT STATION INTERVALS. HORIZONTAL OFFSETS SHALL BE 15 FEET MAXIMUM. INSTALL PROPERTY PINS AND STAKES. MARK FINISH GRADE LINES WITH CUT/FILL ON OFFSET STAKES AND PROPERTY STAKES. ALL MARKS SHALL FACE THE PIPELINE. SURVEY STAKING SHALL BE PERFORMED BY THE CONTRACTOR.
5. BACKFLOW PREVENTION IN THE FORM OF A REDUCED PRESSURE BACKFLOW ASSEMBLY MUST BE PROVIDED FOR TEMPORARY CONNECTIONS TO EXISTING WATER LINES. BACKFLOW DEVICES SHALL BE TESTED BY A LICENSED BACKFLOW PREVENTION ASSEMBLY TESTER. SUBMIT TEST REPORTS.
6. PVC MALE ADAPTERS ARE NOT ALLOWED.
7. SANITARY TAPPING SADDLES ARE NOT ALLOWED.
8. MANHOLE INTERNAL DROPS ARE NOT ALLOWED.
9. PIPE BELLS SHALL BE INSTALLED IN UPSTREAM DIRECTION.
10. ALL PIPING SHALL BE DESIGNED IN STRAIGHT ALIGNMENT VERTICALLY AND HORIZONTALLY. PIPE CURVATURE AND/OR DEFLECTION ARE NOT ALLOWED.
11. MAINTAIN A MINIMUM OF 10 FEET HORIZONTAL AND 12 INCHES VERTICAL CLEARANCE BETWEEN WATER AND WASTEWATER AND OTHER UTILITIES. SHARED TRENCHES ARE NOT ALLOWED.
12. WATER AND WASTEWATER PIPE LENGTHS SHALL BE CENTERED AT CROSSINGS WITH ALL OTHER UTILITIES,INCLUDING DRY UTILITY SERVICES. BOTH PIPES SHALL BE CENTERED AT WATER AND WASTEWATER CROSSINGS, INCLUDING WASTEWATER SERVICE LATERALS AND FIRE HYDRANT LEADS.
13. WATER AND WASTEWATER PIPING (INCLUDING MAINS, SERVICES, AND LATERALS) SHALL BE SLEEVED IF LOCATED UNDER CONCRETE CHANNELS, BOX CULVERTS, OR MULTIPLE BARREL STORM SEWER CROSSINGS REGARDLESS OF SIZE AND SINGLE BARRELS 30"OR LARGER.
14. VALVE BOXES, EXPOSED PIPING AND VALVES, AND APPURTENANCES SHALL BE PAINTED. PROVIDE PAINTED CURB CUT MARKINGS AT VALVES AND SERVICES.
15. ALL EXPOSED VERTICAL AND HORIZONTAL CONCRETE EDGES SHALL BE FORMED WITH ¾"CHAMFER STRIPS.
16. EXISTING MANHOLES THAT ARE DISTURBED SHALL BE RESTORED TO BE IN FULL COMPLIANCE WITH CURRENT GBRA STANDARDS INCLUDING TESTING, CORROSION RESISTANT LINING, RINGS AND COVERS, ETC.
17. THE CONTRACTOR SHALL MAINTAIN SERVICE TO EXISTING WATER AND WASTEWATER SYSTEMS AT ALL TIMES DURING CONSTRUCTION. ANY WORK INVOLVING POWER OUTAGES, BYPASS PUMPING, PUMP AND HAUL, OR ANY OTHER INTERRUPTION OF FLOW MUST BE PERFORMED BETWEEN 8:00AM AND 5:00PM EXCLUDING WEEKENDS AND HOLIDAYS. ALL NECESSARY TEMPORARY POWER, BYPASS PUMPING, PUMP AND HAUL, TEMPORARY PLUGS, ETC., SHALL BE FURNISHED AND PERFORMED BY THE CONTRACTOR. COORDINATE AND SCHEDULE ANY SUCH ACTIVITIES WITH GBRA AT LEAST TWO (2) WEEKS IN ADVANCE.
18. EXPLOSIVES AND BLASTING ARE NOT ALLOWED.
19. GRAVITY WASTEWATER PIPE AND FITTINGS SHALL BE GREEN COLOR GASKETED ASTM D3034 SDR26. AT WATER CROSSINGS INCLUDING FIRE HYDRANT LEADS, WHITE COLOR GASKETED ASTM DD2241 SDR26 PIPE AND FITTINGS SHALL BE USED FOR MAINS AND LATERALS.

DRY UTILITY CROSSING NOTE:

LOCATION AND DEPTH OF DRY UTILITIES SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS ARE TO BE BASED ON THE FINAL DESIGN FROM NBU. CONTRACTOR WILL BE RESPONSIBLE FOR CENTERING 14-FEET OF ASTM D3034 SDR 26 SANITARY SEWER PIPE WHERE SANITARY SEWER MAINS CROSS DRY UTILITIES AND MAINTAINING 10 FT OF HORIZONTAL CLEARANCE BETWEEN DRY UTILITIES AND SANITARY SEWER.

TRENCH EXCAVATION SAFETY PROTECTION:

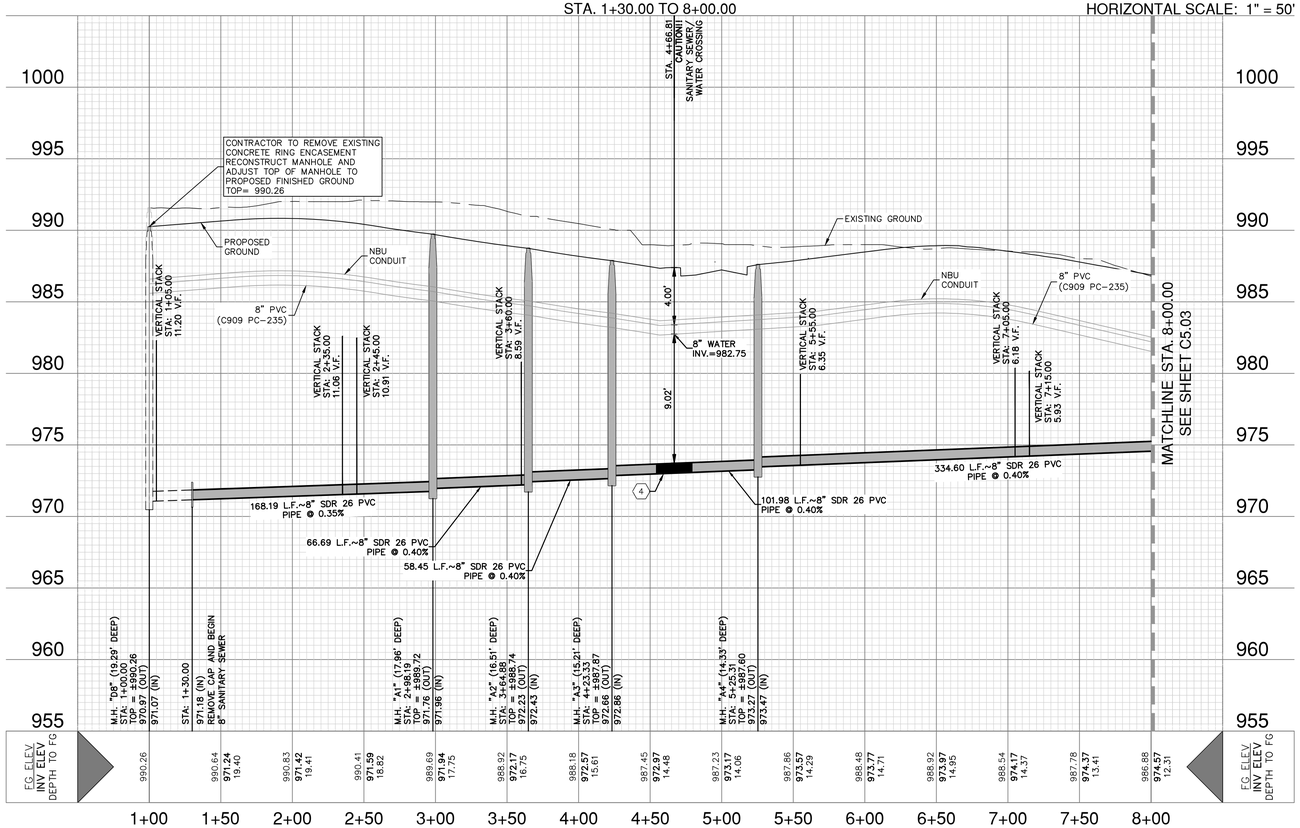
CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/ GEOTECHNICAL/ SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S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

CAUTION!!

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SANITARY SEWER LINE "A" STA. 1+30.00 TO 8+00.00

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



FOR REVIEW

NO.	REVISION	DATE

7-18-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5833
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

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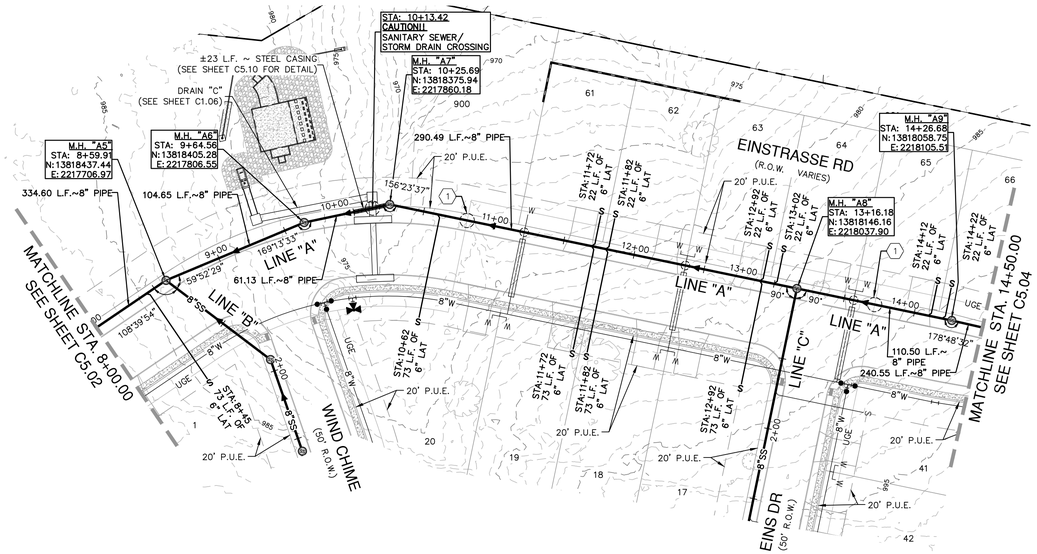
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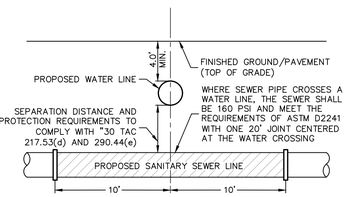
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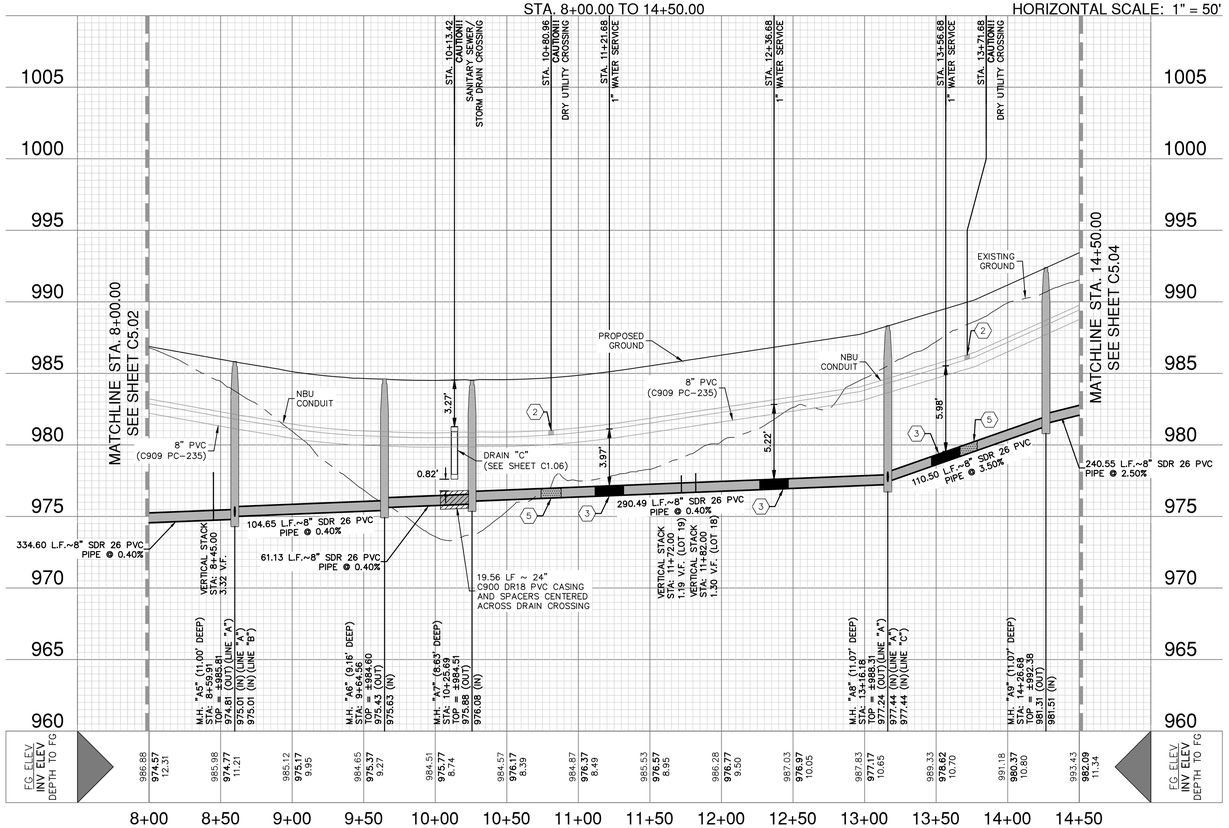
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HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER
7-18-2025

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
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SANITARY SEWER LINE A - PLAN & PROFILE
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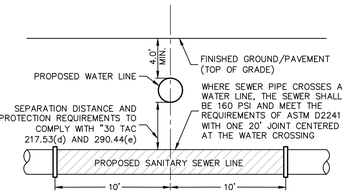
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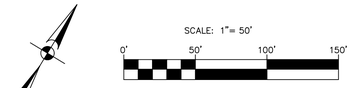
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NOT-TO-SCALE





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5. BACKFLOW PREVENTION IN THE FORM OF A REDUCED PRESSURE BACKFLOW ASSEMBLY MUST BE PROVIDED FOR TEMPORARY CONNECTIONS TO EXISTING WATER LINES. BACKFLOW DEVICES SHALL BE TESTED BY A LICENSED BACKFLOW PREVENTION ASSEMBLY TESTER. SUBMIT TEST REPORTS.
6. PVC MALE ADAPTERS ARE NOT ALLOWED.
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9. PIPE BELLS SHALL BE INSTALLED IN UPSTREAM DIRECTION.
10. ALL PIPING SHALL BE DESIGNED IN STRAIGHT ALIGNMENT VERTICALLY AND HORIZONTALLY. PIPE CURVATURE AND/OR DEFLECTION ARE NOT ALLOWED.
11. MAINTAIN A MINIMUM OF 10 FEET HORIZONTAL AND 12 INCHES VERTICAL CLEARANCE BETWEEN WATER AND WASTEWATER AND OTHER UTILITIES. SHARED TRENCHES ARE NOT ALLOWED.
12. WATER AND WASTEWATER PIPE LENGTHS SHALL BE CENTERED AT CROSSINGS WITH ALL OTHER UTILITIES,INCLUDING DRY UTILITY SERVICES. BOTH PIPES SHALL BE CENTERED AT WATER AND WASTEWATER CROSSINGS, INCLUDING WASTEWATER SERVICE LATERALS AND FIRE HYDRANT LEADS.
13. WATER AND WASTEWATER PIPING (INCLUDING MAINS, SERVICES, AND LATERALS) SHALL BE SLEEVED IF LOCATED UNDER CONCRETE CHANNELS, BOX CULVERTS, OR MULTIPLE BARREL STORM SEWER CROSSINGS REGARDLESS OF SIZE AND SINGLE BARRELS 30"OR LARGER.
14. VALVE BOXES, EXPOSED PIPING AND VALVES, AND APPURTENANCES SHALL BE PAINTED. PROVIDE PAINTED CURB CUT MARKINGS AT VALVES AND SERVICES.
15. ALL EXPOSED VERTICAL AND HORIZONTAL CONCRETE EDGES SHALL BE FORMED WITH ¾" CHAMFER STRIPS.
16. EXISTING MANHOLES THAT ARE DISTURBED SHALL BE RESTORED TO BE IN FULL COMPLIANCE WITH CURRENT GBRA STANDARDS INCLUDING TESTING, CORROSION RESISTANT LINING, RINGS AND COVERS, ETC.
17. THE CONTRACTOR SHALL MAINTAIN SERVICE TO EXISTING WATER AND WASTEWATER SYSTEMS AT ALL TIMES DURING CONSTRUCTION. ANY WORK INVOLVING POWER OUTAGES, BYPASS PUMPING, PUMP AND HAUL, OR ANY OTHER INTERRUPTION OF FLOW MUST BE PERFORMED BETWEEN 8:00AM AND 5:00PM EXCLUDING WEEKENDS AND HOLIDAYS. ALL NECESSARY TEMPORARY POWER, BYPASS PUMPING, PUMP AND HAUL, TEMPORARY PLUGS, ETC., SHALL BE FURNISHED AND PERFORMED BY THE CONTRACTOR. COORDINATE AND SCHEDULE ANY SUCH ACTIVITIES WITH GBRA AT LEAST TWO (2) WEEKS IN ADVANCE.
18. EXPLOSIVES AND BLASTING ARE NOT ALLOWED.
19. GRAVITY WASTEWATER PIPE AND FITTINGS SHALL BE GREEN COLOR GASKETED ASTM D3034 SDR26. AT WATER CROSSINGS INCLUDING FIRE HYDRANT LEADS, WHITE COLOR GASKETED ASTM DD2241 SDR26 PIPE AND FITTINGS SHALL BE USED FOR MAINS AND LATERALS.

DRY UTILITY CROSSING NOTE:

LOCATION AND DEPTH OF DRY UTILITIES SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS ARE TO BE BASED ON THE FINAL DESIGN FROM NBU. CONTRACTOR WILL BE RESPONSIBLE FOR CENTERING 14-FEET OF ASTM D3034 SDR 26 SANITARY SEWER PIPE WHERE SANITARY SEWER MAINS CROSS DRY UTILITIES AND MAINTAINING 10 FT OF HORIZONTAL CLEARANCE BETWEEN DRY UTILITIES AND SANITARY SEWER.

TRENCH EXCAVATION SAFETY PROTECTION:

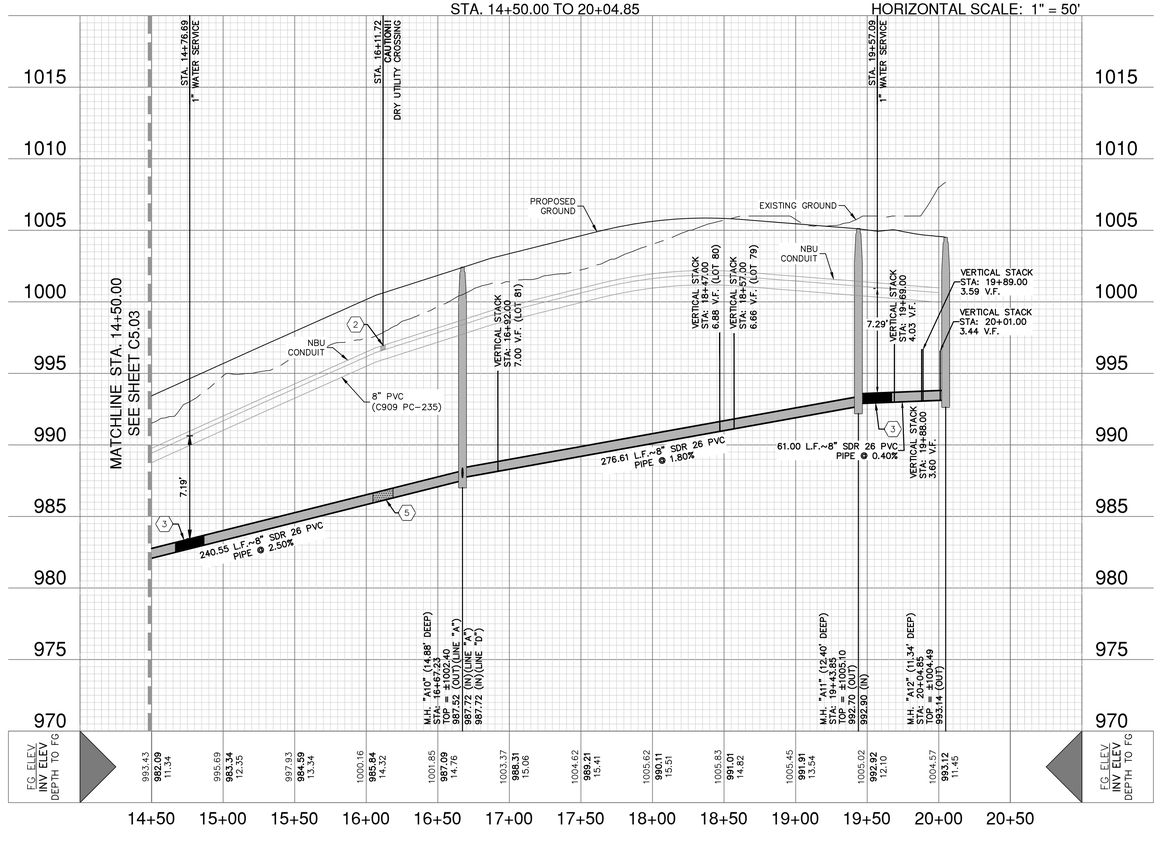
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CAUTION!!

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

SANITARY SEWER LINE "A"
STA. 14+50.00 TO 20+04.85

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



FOR REVIEW

NO.	REVISION	DATE

7-18-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

SANITARY SEWER LINE A - PLAN & PROFILE
STA. 14+50.00 TO 20+04.85

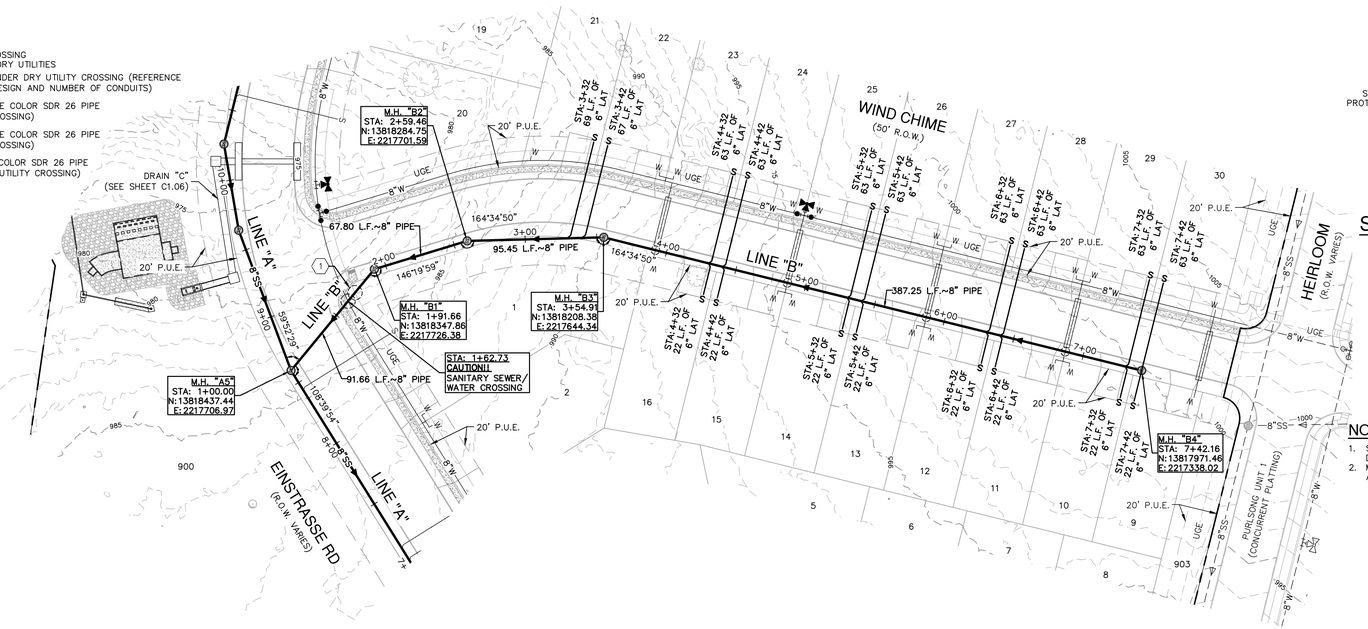
PLAT NO.
JOB NO. 30041-20
DATE JULY 2025
DESIGNER GDL
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SHEET C5.04

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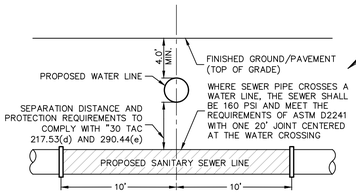
KEYED NOTES

1. **CAUTION!!** SEWER/DRY UTILITIES CROSSING
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5. 14 L.F. ~ D3034 GREEN COLOR SDR 26 PIPE (CENTERED ACROSS DRY UTILITY CROSSING)



TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

NOT-TO-SCALE



NOTES:

1. SEE THIS SHEET FOR TYPICAL SANITARY SEWER/WATER CROSSING DETAIL.
2. MANHOLES LOCATED WITHIN A 100-YR FLOODPLAIN MUST BE GASKETED AND BOLTED DOWN TO PREVENT INFLOW

SCALE: 1" = 50'

0' 50' 100' 150'

SEWER LEGEND

- PROJECT LIMITS
- EXISTING WATER (W)
- EXISTING UNDERGROUND ELECTRIC (UGE)
- EXISTING GAS (GAS)
- EXISTING SEWER (SS)
- PROPOSED SEWER (SS, MANHOLE)
- PROPOSED WATER (W, EXISTING FIRE HYDRANT, FIRE HYDRANT)
- PROPOSED SEWER LATERAL (S)
- FINISHED FLOOR ELEVATION FOR SEWER (FF = XXXX.XX)
- PROPOSED STORM DRAIN
- PROPOSED NATURAL GAS (REFER TO CENTERPOINT DESIGN SHEETS AND DETAILS) (GAS)
- PROPOSED UNDERGROUND ELECTRIC (SEE NBU PLANS FOR FINAL ALIGNMENT. ELECTRIC SHOWN FOR REFERENCE ONLY.) (UGE)
- **CAUTION!** WATER SERVICE/SEWER CROSSING

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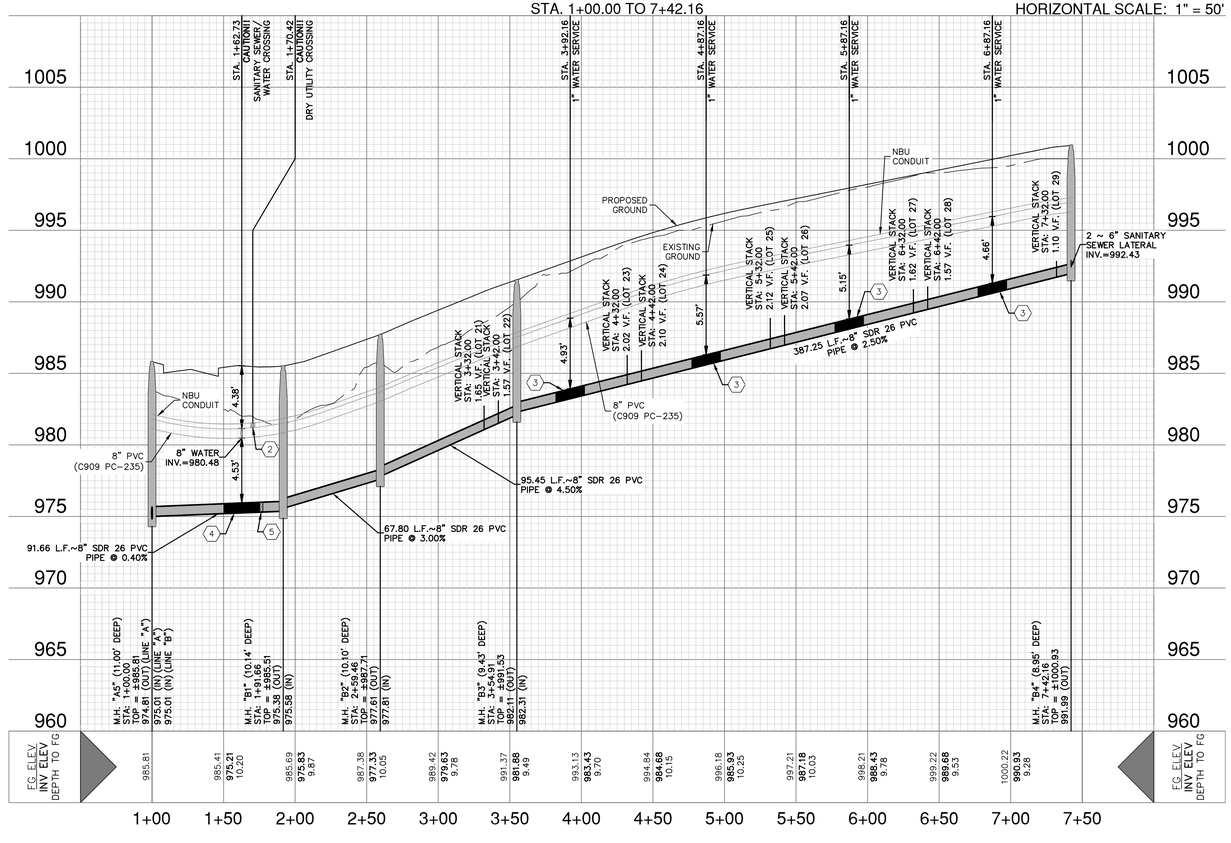
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SANITARY SEWER LINE "B"
STA. 1+00.00 TO 7+42.16

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



FOR REVIEW

7-18-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

NO.	REVISION	DATE

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURSLONG UNIT 3
COMAL COUNTY, TEXAS

SANITARY SEWER LINE B - PLAN & PROFILE
STA. 1+00.00 TO 7+42.16

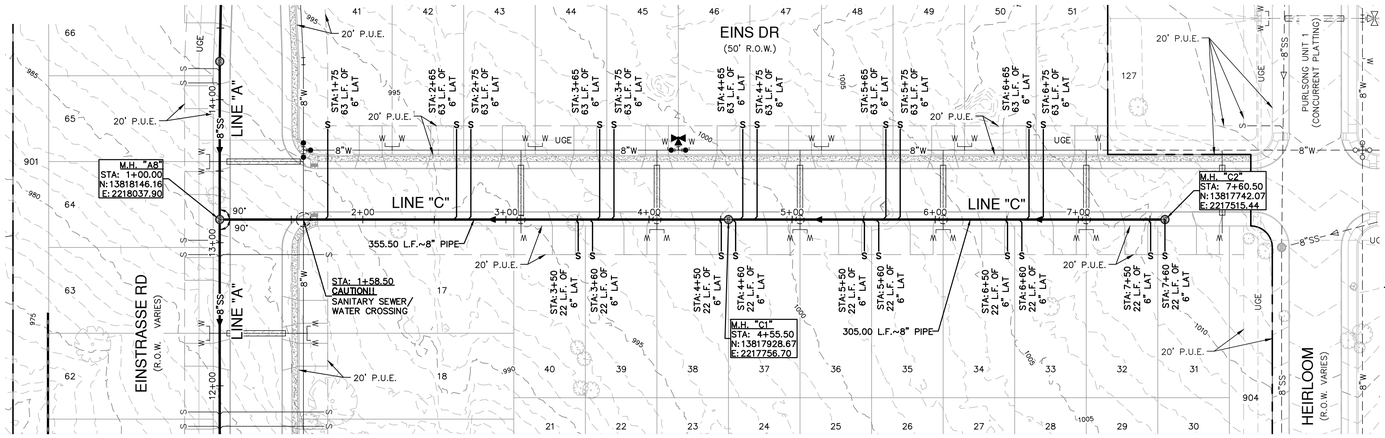
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JOB NO. 30041-20
DATE JULY 2025
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SHEET C5.05

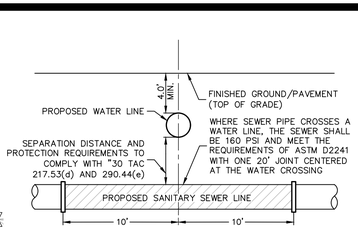
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TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

NOT-TO-SCALE

NOTES:

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SCALE: 1" = 50'

0' 50' 100' 150'

SEWER LEGEND

- PROJECT LIMITS
- EXISTING WATER — W —
- EXISTING UNDERGROUND ELECTRIC — UGE —
- EXISTING GAS — GAS —
- EXISTING SEWER — SS —
- PROPOSED SEWER — SS — (MANHOLE)
- PROPOSED WATER — W — (FIRE HYDRANT)
- PROPOSED SEWER LATERAL — S —
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17. THE CONTRACTOR SHALL MAINTAIN SERVICE TO EXISTING WATER AND WASTEWATER SYSTEMS AT ALL TIMES DURING CONSTRUCTION. ANY WORK INVOLVING POWER OUTAGES, BYPASS PUMPING, PUMP AND HAUL, OR ANY OTHER INTERRUPTION OF FLOW MUST BE PERFORMED BETWEEN 8:00AM AND 5:00PM EXCLUDING WEEKENDS AND HOLIDAYS. ALL NECESSARY TEMPORARY POWER, BYPASS PUMPING, PUMP AND HAUL, TEMPORARY PLUGS, ETC., SHALL BE FURNISHED AND PERFORMED BY THE CONTRACTOR. COORDINATE AND SCHEDULE ANY SUCH ACTIVITIES WITH GBRA AT LEAST TWO (2) WEEKS IN ADVANCE.
18. EXPLOSIVES AND BLASTING ARE NOT ALLOWED.
19. GRAVITY WASTEWATER PIPE AND FITTINGS SHALL BE GREEN COLOR GASKETED ASTM D3034 SDR26. AT WATER CROSSINGS INCLUDING FIRE HYDRANT LEADS, WHITE COLOR GASKETED ASTM DD2241 SDR26 PIPE AND FITTINGS SHALL BE USED FOR MAINS AND LATERALS.

DRY UTILITY CROSSING NOTE:

LOCATION AND DEPTH OF DRY UTILITIES SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS ARE TO BE BASED ON THE FINAL DESIGN FROM NBU. CONTRACTOR WILL BE RESPONSIBLE FOR CENTERING 14-FEET OF ASTM D3034 SDR 26 SANITARY SEWER PIPE WHERE SANITARY SEWER MAINS CROSS DRY UTILITIES AND MAINTAINING 10 FT OF HORIZONTAL CLEARANCE BETWEEN DRY UTILITIES AND SANITARY SEWER.

TRENCH EXCAVATION SAFETY PROTECTION:

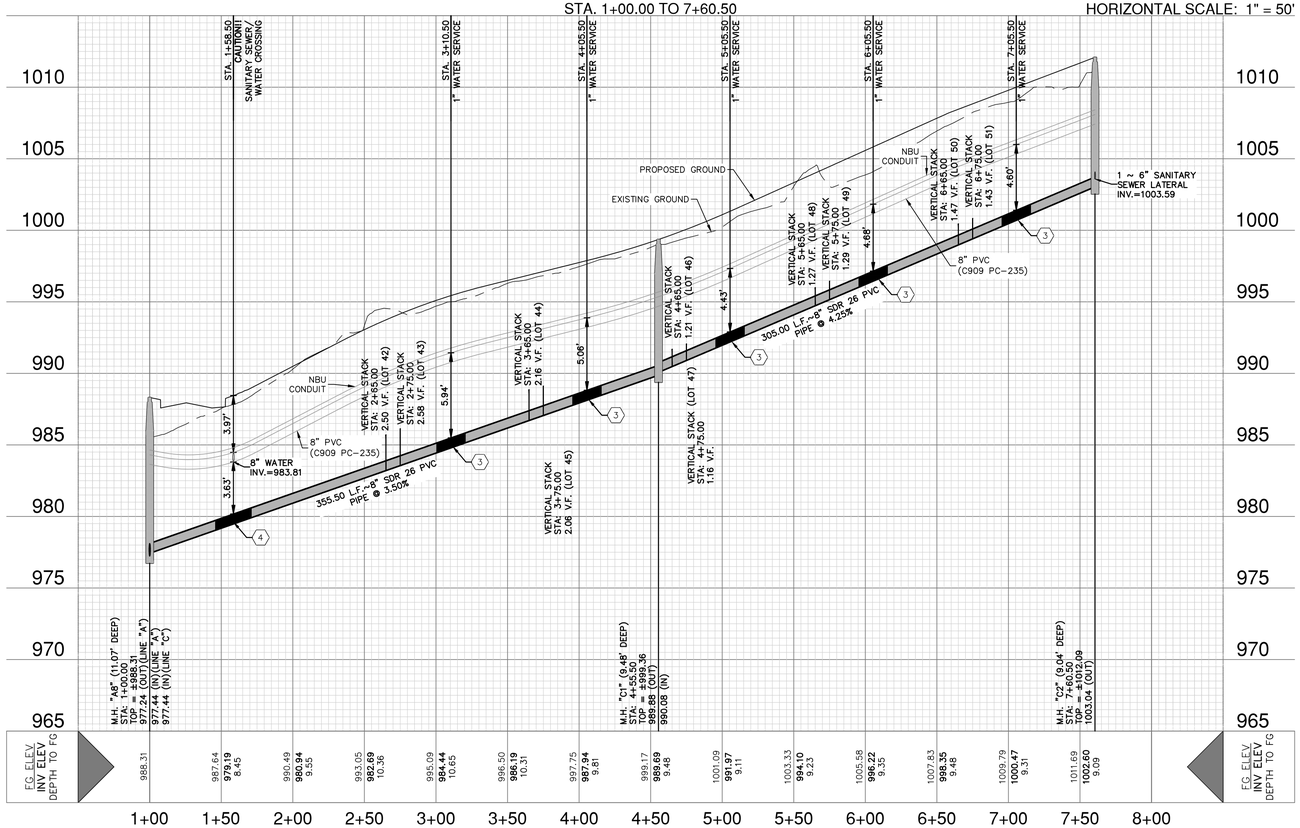
CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/ GEOTECHNICAL/ SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S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

CAUTION!!

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

SANITARY SEWER LINE "C"
STA. 1+00.00 TO 7+60.50

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



NO.	REVISION	DATE

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER
7-18-2025

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5533
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

SANITARY SEWER LINE C - PLAN & PROFILE
STA. 1+00.00 TO 7+60.50

PLAT NO.
JOB NO. 30041-20
DATE JULY 2025
DESIGNER GDL
CHECKED GL DRAWN CA
SHEET C5.06

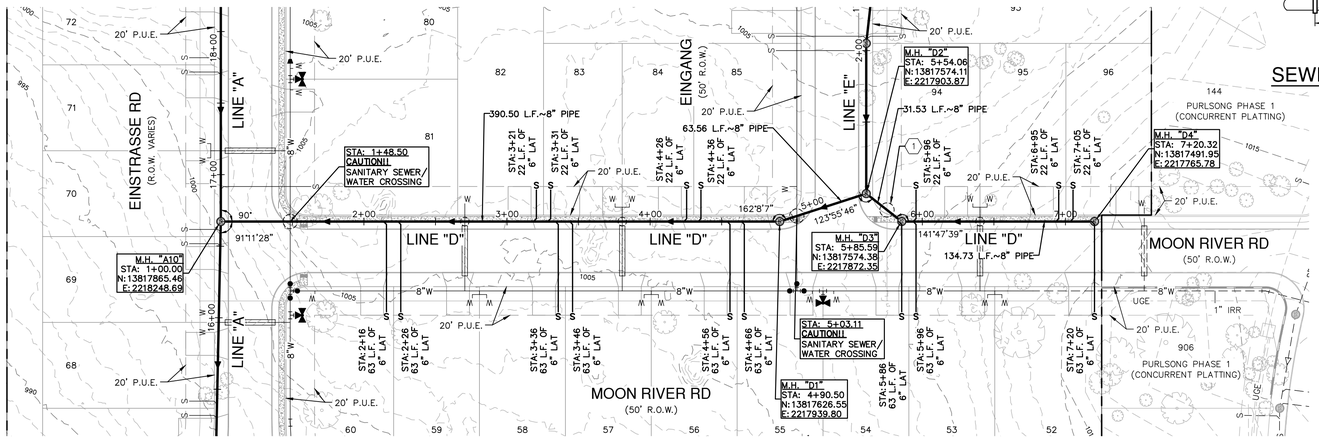
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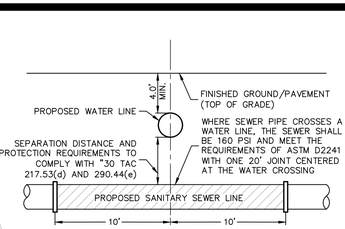
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KEYED NOTES

1. **CAUTION!!** SEWER/DRY UTILITIES CROSSING
   SEWER CROSSES UNDER DRY UTILITIES
2. CENTER PIPE LENGTHS UNDER DRY UTILITY CROSSING (REFERENCE NBU PLANS FOR FINAL DESIGN AND NUMBER OF CONDUITS)
3. 20 L.F. ~ 8" D2241 WHITE COLOR SDR 26 PIPE (CENTERED ON WATER CROSSING)
4. 25 L.F. ~ 8" D2241 WHITE COLOR SDR 26 PIPE (CENTERED ON WATER CROSSING)
5. 14 L.F. ~ D3034 GREEN COLOR SDR 26 PIPE (CENTERED ACROSS DRY UTILITY CROSSING)





TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

NOT-TO-SCALE

SCALE: 1" = 50'

0' 50' 100' 150'

SEWER LEGEND

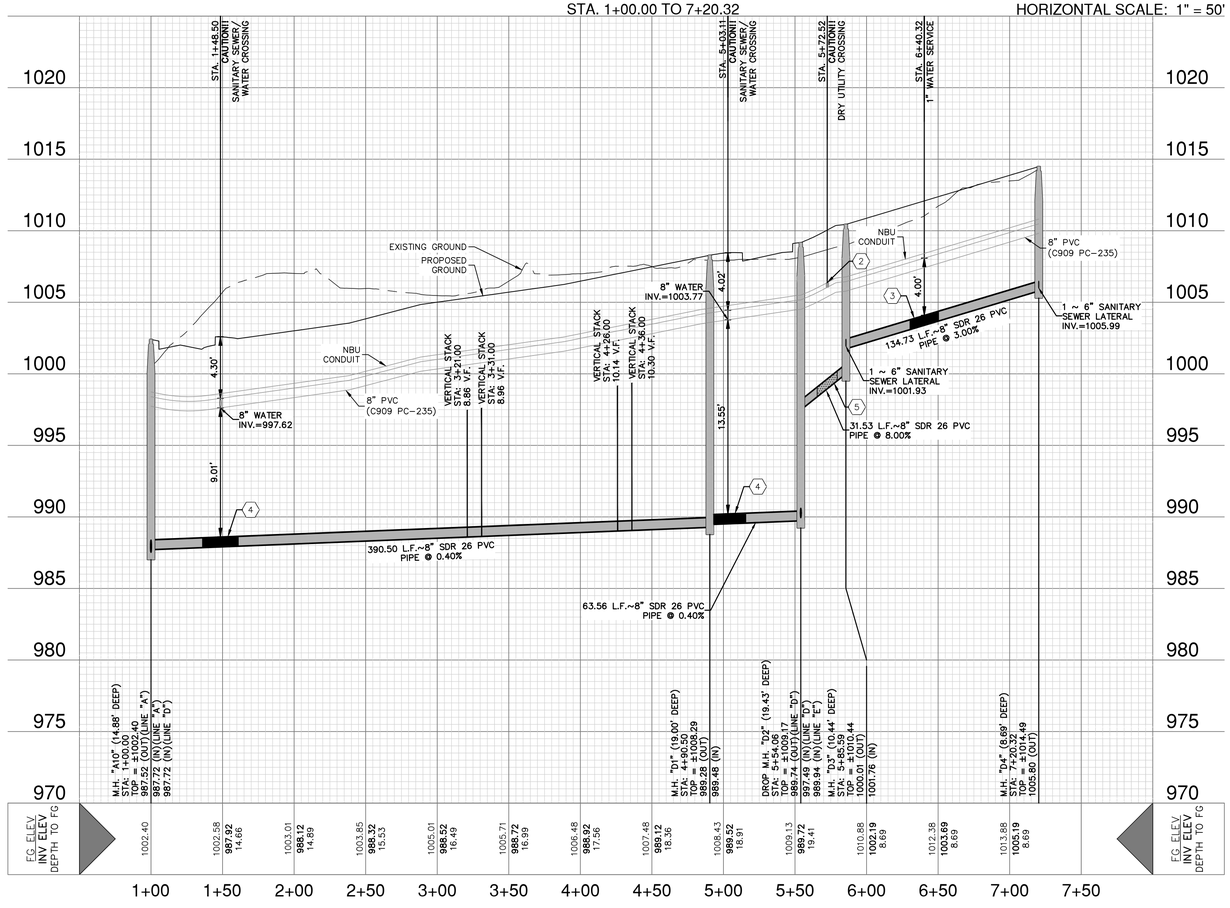
- PROJECT LIMITS
- EXISTING WATER — W —
- EXISTING UNDERGROUND ELECTRIC — UGE —
- EXISTING GAS — GAS —
- EXISTING SEWER — SS —
- PROPOSED SEWER — SS — (MANHOLE)
- PROPOSED WATER — W — (FIRE HYDRANT)
- PROPOSED SEWER LATERAL — S —
- FINISHED FLOOR ELEVATION FOR SEWER — FF = XXXX.XX
- PROPOSED STORM DRAIN
- PROPOSED NATURAL GAS (REFER TO CENTERPOINT DESIGN SHEETS AND DETAILS) — GAS —
- PROPOSED UNDERGROUND ELECTRIC (SEE NBU PLANS FOR FINAL ALIGNMENT. ELECTRIC SHOWN FOR REFERENCE ONLY.) — UGE —
- **CAUTION!** WATER SERVICE/SEWER CROSSING

GBRA NOTES:

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3. ALL WATER AND WASTEWATER INSTALLATIONS MUST BE INSPECTED AND APPROVED BY GBRA PRIOR TO BACKFILLING OR OTHERWISE COVERING THE WORK. THIS INCLUDES CROSSINGS OF WATER AND WASTEWATER BY OTHER UTILITIES. GBRA WILL PERFORM A MAXIMUM OF ONE (1) INSPECTION DAILY FOR ONE (1) HOUR DURATION BETWEEN 8:00AM AND 5:00PM EXCLUDING WEEKENDS AND HOLIDAYS. CALL 830-379-5822 TO SCHEDULE INSPECTIONS (48 HOURS ADVANCE NOTICE IS REQUIRED FOR ALL INSPECTIONS).
4. TRENCH EXCAVATION AND PIPE INSTALLATION WILL NOT BE PERMITTED UNTIL SUBGRADE HAS BEEN ESTABLISHED. SURVEY STAKING MUST BE INSTALLED PRIOR TO AND MAINTAINED DURING TRENCH EXCAVATION AND PIPE INSTALLATION. SURVEY STAKING SHALL INCLUDE HORIZONTAL AND VERTICAL CONTROL AT A MINIMUM OF 50 FOOT STATION INTERVALS. HORIZONTAL OFFSETS SHALL BE 15 FEET MAXIMUM. INSTALL PROPERTY PINS AND STAKES. MARK FINISH GRADE LINES WITH CUT/FILL ON OFFSET STAKES AND PROPERTY STAKES. ALL MARKS SHALL FACE THE PIPELINE. SURVEY STAKING SHALL BE PERFORMED BY THE CONTRACTOR.
5. BACKFLOW PREVENTION IN THE FORM OF A REDUCED PRESSURE BACKFLOW ASSEMBLY MUST BE PROVIDED FOR TEMPORARY CONNECTIONS TO EXISTING WATER LINES. BACKFLOW DEVICES SHALL BE TESTED BY A LICENSED BACKFLOW PREVENTION ASSEMBLY TESTER. SUBMIT TEST REPORTS.
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12. WATER AND WASTEWATER PIPE LENGTHS SHALL BE CENTERED AT CROSSINGS WITH ALL OTHER UTILITIES,INCLUDING DRY UTILITY SERVICES. BOTH PIPES SHALL BE CENTERED AT WATER AND WASTEWATER CROSSINGS, INCLUDING WASTEWATER SERVICE LATERALS AND FIRE HYDRANT LEADS.
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SANITARY SEWER LINE "D"
STA. 1+00.00 TO 7+20.32

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



NOTES:

1. SEE THIS SHEET FOR TYPICAL SANITARY SEWER/WATER CROSSING DETAIL.
2. MANHOLES LOCATED WITHIN A 100-YR FLOODPLAIN MUST BE GASKETED AND BOLTED DOWN TO PREVENT INFLOW

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NO.	REVISION	DATE

7-18-2025

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5533
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

SANITARY SEWER LINE D - PLAN & PROFILE
STA. 1+00.00 TO 7+20.32

PLAT NO.
JOB NO. 30041-20
DATE JULY 2025
DESIGNER GDL
CHECKED GL DRAWN CA
SHEET C5.07

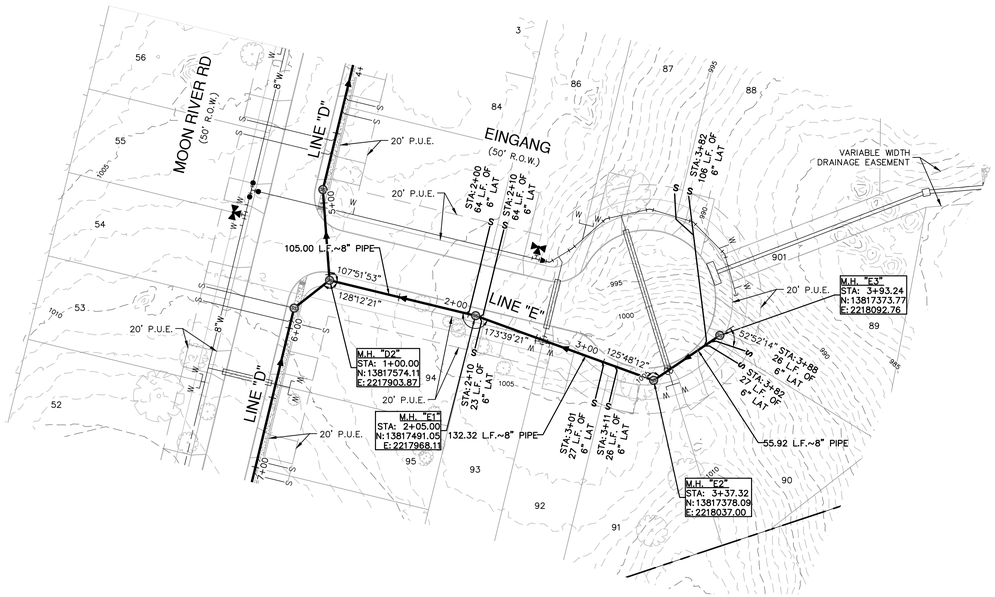
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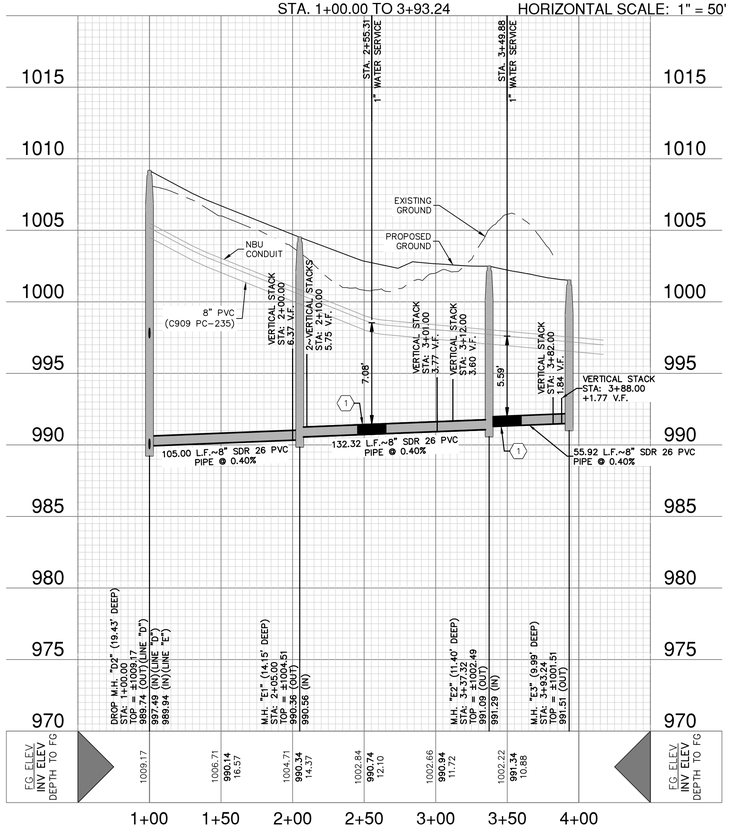
KEYED NOTES

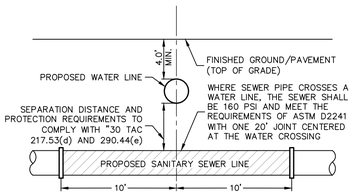
(1) 20 L.F. ~ 8" D2241 WHITE COLOR SDR 26 PIPE (CENTERED ON WATER CROSSING)



SANITARY SEWER LINE "E"
STA. 1+00.00 TO 3+93.24

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'





TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

NOT-TO-SCALE

NOTES:

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SCALE: 1" = 50'

0' 50' 100' 150'

SEWER LEGEND

PROJECT LIMITS

EXISTING FIRE HYDRANT

EXISTING WATER — W —

EXISTING UNDERGROUND ELECTRIC — UGE —

EXISTING GAS — GAS —

EXISTING SEWER — SS —

PROPOSED SEWER — SS — MANHOLE

PROPOSED WATER — W — FIRE HYDRANT

PROPOSED SEWER LATERAL — S

FINISHED FLOOR ELEVATION FOR SEWER — FF = XXXX.XX

PROPOSED STORM DRAIN

PROPOSED NATURAL GAS (REFER TO CENTERPOINT DESIGN SHEETS AND DETAILS) — GAS

PROPOSED UNDERGROUND ELECTRIC (SEE NBU PLANS FOR FINAL ALIGNMENT. ELECTRIC SHOWN FOR REFERENCE ONLY.) — UGE

CAUTION!
WATER SERVICE/SEWER CROSSING

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NO.	REVISION	DATE

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER
7-18-2025

PAPE-DAWSON
1672 INDEPENDENCE DR. STE 102 | NEW BRAUNFELS, TX 78132 | 830.632.5533
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

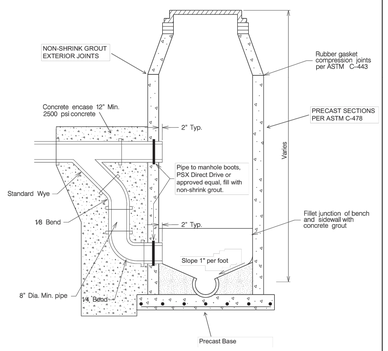
SANITARY SEWER LINE E - PLAN & PROFILE
STA. 1+00.00 TO 3+93.24

PLAT NO.
JOB NO. 30041-20
DATE JULY 2025
DESIGNER GDL
CHECKED GL DRAWN CA
SHEET C5.08

Date: July 17, 2025, 2:48 PM - User ID: corcher
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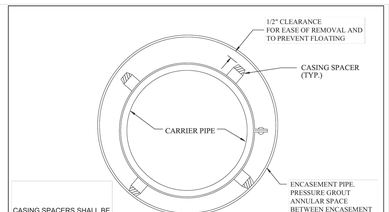
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FOR REVIEW



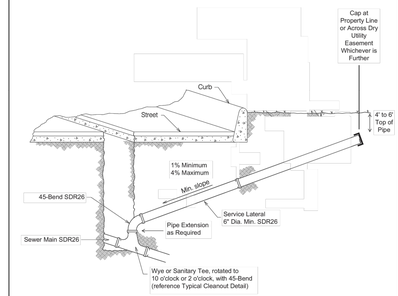
NOTES:
1) A wastewater collection system pipe, including service laterals, entering a manhole more than 24" above the manhole out invert must have an external drop pipe. Internal drops are not allowed.
2) Reference standard precast manhole detail for additional requirements.

Guadalupe-Blanco River Authority	DROP MANHOLE	APPROVED	REVISED
		C. LEWIS	JAN. 28, 2018
			SHEET



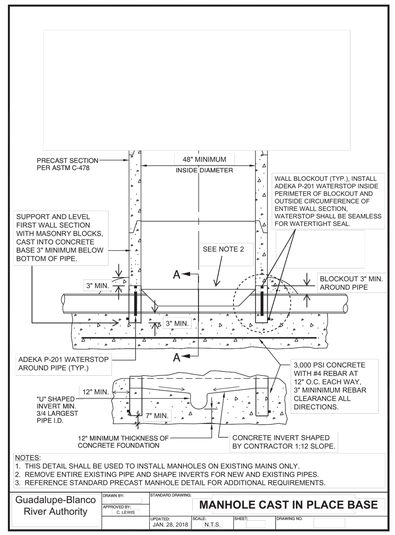
NOTE:
THE MATERIALS SHOWN APPLY TO JACK AND BORE INSTALLATIONS AND STREAM/RIVER CROSSINGS. OPEN CUT SLEEVING OF SUBDIVISION UTILITIES UNDER STORM SEWER MAY BE C900/905 DR18 CASING (COLOR TO MATCH CARRIER PIPE) AND HDPE SPACERS WITH STAINLESS STEEL HARDWARE. THE CLEARANCES AND DIMENSIONS SHOWN APPLY TO ALL INSTALLATIONS.

Guadalupe-Blanco River Authority	CASING AND SPACERS DETAIL	STANDARD NO.
C. LEWIS	JAN. 28, 2018	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.



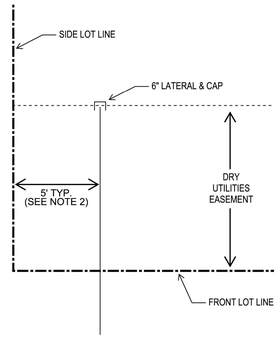
NOTES:
1) Install double services where indicated on design drawings.
2) Cleanout to be installed by customer plumber.
3) Pipe and fittings shall be gasketed. Tees and 90-bends are not allowed.
4) Pressure rated pipe and fittings shall be installed for sewer mains and laterals that cross water lines (use ASTM D2241 SDR26). Center both water and sewer pipe lengths at all crossings. Comply with TCEQ Rules.
5) Tapping saddles are not allowed.

Guadalupe-Blanco River Authority	LATERAL DETAIL	APPROVED	REVISED
		C. LEWIS	JAN. 28, 2018
			SHEET



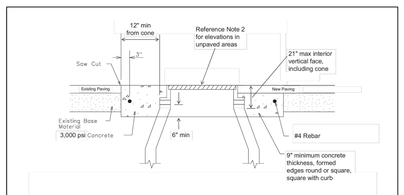
NOTES:
1. THIS DETAIL SHALL BE USED TO INSTALL MANHOLES ON EXISTING MAINS ONLY.
2. REMOVE ENTIRE EXISTING PIPE AND SHAPE INVERTS FOR NEW AND EXISTING PIPES.
3. REFERENCE STANDARD PRECAST MANHOLE DETAIL FOR ADDITIONAL REQUIREMENTS.

Guadalupe-Blanco River Authority	DRAWN BY:	STANDARD DRAWING:	MANHOLE CAST IN PLACE BASE
	APPROVED BY: C. LEWIS		
	UPDATED: JAN. 28, 2018	SCALE: N.T.S.	SHEET: DRAWING NO.



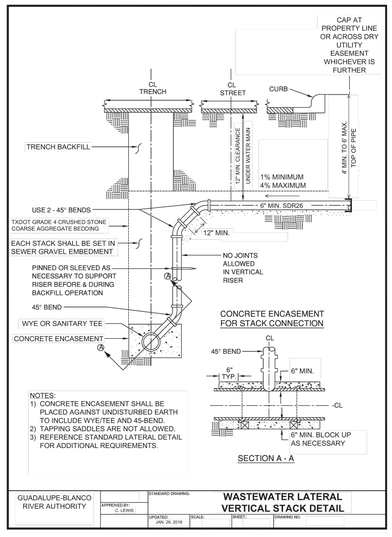
NOTES:
1. REFERENCE STANDARD LATERAL DETAIL FOR ADDITIONAL REQUIREMENTS.
2. PROVIDE 8 FT WHERE LOT CORNER IS SHARED WITH DRY UTILITIES AND 10 FT WHERE SHARED WITH FIRE HYDRANT OR AIR RELEASE VALVE.

WASTEWATER LATERAL LAYOUT DETAIL (N.T.S.)
GUADALUPE-BLANCO RIVER AUTHORITY, 12/15/2021



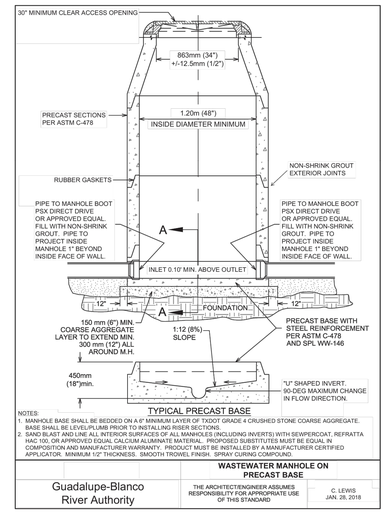
NOTES:
1) Manhole ring concrete encasement is required for all manholes.
2) Manhole rim elevations shown in plan and profile views are approximate. Manholes located in unpaved areas shall be installed with top of concrete encasement 2" above finish grade and covers 2" above top of concrete encasement. Square with curb. All exposed vertical and horizontal concrete edges shall be formed with 3/4" chamfer.
3) Use non-shrink grout for grade ring installation. Grade rings shall be precast concrete.
4) Manhole rings and covers shall be East Jordan Product Number 42432109W01.
5) All manhole rings shall have 30" minimum clear access opening.
6) All manhole covers shall have pick bars.
7) All manhole covers shall be stamped "SANITARY SEWER" only without any city references.
8) All manholes shall have traffic rated bolted and gasketed watertight rings and covers. Bolts, nuts, and flat washers shall be 316SS, apply nickel or aluminum anti-seize compound to threads prior to assembly. Bolts shall include gasket washers. Schedule GBRA to witness final bolting of manholes.
9) Install vented covers where required by TCEQ.

Guadalupe-Blanco River Authority	MANHOLE RING ENCASEMENT DETAIL	APPROVED	REVISED
		C. LEWIS	JAN. 28, 2018
			SHEET



NOTES:
1) CONCRETE ENCASEMENT SHALL BE PLACED AGAINST UNDISTURBED EARTH TO INCLUDE WYE/TEE AND 45-BEND.
2) TAPPING SADDLES ARE NOT ALLOWED.
3) REFERENCE STANDARD LATERAL DETAIL FOR ADDITIONAL REQUIREMENTS.

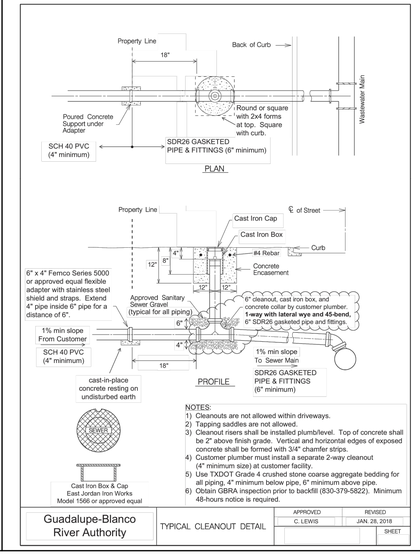
GUADALUPE-BLANCO RIVER AUTHORITY	STANDARD DRAWING:	WASTEWATER LATERAL VERTICAL STACK DETAIL
	APPROVED BY: C. LEWIS	
	UPDATED: JAN. 28, 2018	SCALE: SHEET: DRAWING NO.



TYPICAL PRECAST BASE

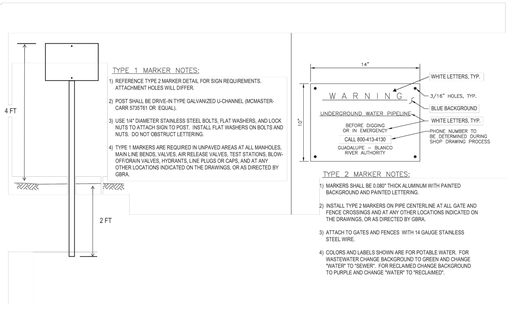
NOTES:
1. MANHOLE BASE SHALL BE BEDDED ON A 6" MINIMUM LAYER OF TXDOT GRADE 4 CRUSHED STONE COARSE AGGREGATE. BASE SHALL BE LEVEL/PLUMB PRIOR TO INSTALLING RISER SECTIONS.
2. SAND BLAST AND LINE ALL INTERIOR SURFACES OF ALL MANHOLES (INCLUDING INVERTS) WITH SEWPERCOAT. REFRATTA HAC 100, OR APPROVED EQUAL CALCIUM ALUMINATE MATERIAL. PROPOSED SUBSTITUTES MUST BE EQUAL IN COMPOSITION AND MANUFACTURER WARRANTY. PRODUCT MUST BE INSTALLED BY A MANUFACTURER CERTIFIED APPLICATOR. MINIMUM 1/2" THICKNESS. SMOOTH TROWEL FINISH. SPRAY CURING COMPOUND.

Guadalupe-Blanco River Authority	WASTEWATER MANHOLE ON PRECAST BASE	
	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD	C. LEWIS JAN. 28, 2018

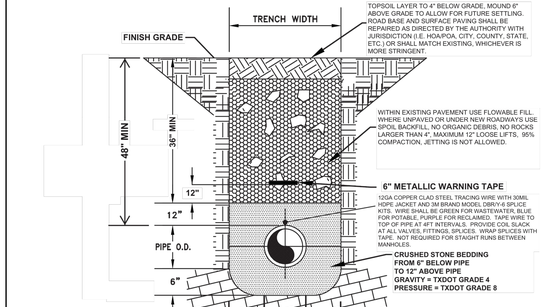


NOTES:
1) Cleanouts are not allowed within driveways.
2) Tapping saddles are not allowed.
3) Cleanout risers shall be installed plumb/level. Top of concrete shall be 2" above finish grade. Vertical and horizontal edges of exposed concrete shall be formed with 3/4" chamfer strips.
4) Customer plumber must install a separate 2-way cleanout (4" minimum size) at customer facility.
5) Use TXDOT Grade 4 crushed stone coarse aggregate bedding for all piping, 4" minimum below pipe, 6" minimum above pipe.
6) Obtain GBRA inspection prior to backfill (830-379-5822). Minimum 48-hours notice is required.

Guadalupe-Blanco River Authority	TYPICAL CLEANOUT DETAIL	APPROVED	REVISED
		C. LEWIS	JAN. 28, 2018
			SHEET



PIPELINE MARKERS
Guadalupe-Blanco River Authority, 01/30/2018



NOTE:
TRACING WIRE TEST STATIONS ARE REQUIRED AT ALL FIRE HYDRANTS OR OTHERWISE TO ACHIEVE 500 LF MAX SPACING. TEST STATIONS SHALL BE COLOR CODED COPPERHEAD MODEL RB14TP. INSTALL WITHIN VALVE BOX CONCRETE COLLARS WITH 6" MINIMUM CONCRETE COVER ON ALL SIDES. LEAVE 12" WIRE SLACK INSIDE TEST STATIONS. NOT REQUIRED FOR STRAIGHT RUNS BETWEEN MANHOLES.

TYPICAL PIPE TRENCH
Guadalupe-Blanco River Authority, 02/05/2018

NO.	REVISION	DATE

STATE OF TEXAS
HAYDEN M. FOWLKES
127195
LICENSED PROFESSIONAL ENGINEER
7–18–2025

PAPE–DAWSON
1672 INDEPENDENCE DR. STE 102 I NEW BRAUNFELS, TX 78132 I 830.632.5833
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

PURLSONG UNIT 3
COMAL COUNTY, TEXAS

SANITARY SEWER DETAILS

PLAT NO.
JOB NO. 30041–20
DATE JULY 2025
DESIGNER GDL
CHECKED GL DRAWN CA
SHEET C5.10

Date: July 17, 2025, 2:48 PM – User ID: corcher
File: P:\300\41\20\Design\Civil\SSD1–30041–20.dwg

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FOR REVIEW

Sewage Collection System over the Edwards Aquifer

1. This Sewage Collection System (SCS) must be designed and constructed in accordance with the Texas Commission on Environmental Quality (TCEQ) Edwards Aquifer Rules 30 Texas Administrative Code (TAC) §213.5 (c), the Design Criteria for Domestic Wastewater Systems: 30 TAC 217 Subchapter C (§§217.51-217.70), and New Braunfels Utilities Standard Specifications.

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

3. Prior to commencing any regulated activity, the applicant or his agent must notify the Austin Regional Office, in writing, of the date on which the regulated activity will begin.

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

5. The temporary erosion and sedimentation controls must be installed prior to initiating any other construction activity and maintained in accordance with the requirements of the construction area is stabilized.

6. The wastewater line trench details showing the cross section with the dimensions, pipe placement, and backfill instructions are included on The Plan Details sheets of these plans. All wastewater pipes joints must meet the requirements in 30 TAC §217.53 (c).

   Gravity lines must be SDR 26 or less. Pressurized sewer systems must have pipe with a minimum working pressure rating of 150 psi.

   The ASTM, ANSI, or AWWA specification numbers for the pipe(s) and joints are specified in the Standard Specifications.

   The pipe material, the pressure classes, and the SDR and/or DR designations are specified in the Standard Specifications.

7. If any sensitive features are discovered during the wastewater line trenching activities, all regulated activities near the sensitive feature must be suspended immediately. The owner must notify the appropriate regional office of the TCEQ in writing within two working days of the feature discovered. 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.

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

9. 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.

10. 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.

    All manholes must be water tight, with watertight rings and covers, and must be constructed and tested to meet the requirements of §217.58 of this title (relatively to Sewage Collection System.)

    The diameter of the manholes must be a minimum of 48 inches and the manhole covers must have a minimum nominal diameter of 22 inches. These dimensions and other details showing compliance with the commission's rules concerning manholes and pipe line/manhole inverts described in 30 TAC §217.55 (l) (2) are included on Plan Detail Sheets.

    The inclusion of steps in a manhole is prohibited.

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

12. Where wastewater lines deviate from straight alignment and uniform grade all curvature of wastewater pipe must be achieved by the following procedure which is recommended by the pipe manufacturer: Joint Deflection.

    If pipe flexure is proposed, the following method of preventing deflection of the joint must be used: Permitted on this project.

    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.

13. New wastewater 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 the location of such "stub outs" 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 edge(s) of any street pavement under which they will pass to the property line. 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 wastewater 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 plan detail sheets. (For potential future laterals).

    The private service lateral stub-outs must be installed as shown on the plan and profile sheets and marked after backfilling as shown in the plan detail on Plan Sheets.

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

15. Wastewater lines must be tested from manhole to manhole. When a new wastewater 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).

16. All wastewater lines must be tested in accordance with 30 TAC §217.57. The engineer must retain copies of all test results, which must be made available to the executive director upon request. The engineer must certify in writing that

all wastewater lines have passed all required testing to the appropriate regional office within 30 days of test completion and prior to use of the new collection system. Testing method will be:

a. Infiltration or Exfiltration Tests. 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 the pipe at the upstream manhole. When pipes are installed below the groundwater level an infiltration test must be used in lieu of the exfiltration test. The total infiltration, 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 the pipe at the upstream manhole, or at least two feet above existing groundwater level, whichever is greater. For construction within the 25 year flood plain, the infiltration or exfiltration must not exceed 10 gallons per inch diameter per mile of pipe per 24 hours at the same minimum test head. If the quantity of infiltration or exfiltration exceeds the maximum quantity specified, remedial action must be undertaken in order to reduce the infiltration or exfiltration to an amount within the limits specified.

b. Low Pressure Air Test. The procedure for the low-pressure air test must conform to the procedures described in ASTM C-828, ASTM C-924, ASTM F-1417 or other appropriate procedures, except for testing times. The test times must be as outlined in this section. For sections of pipe less than 36-inch average inside diameter, the following procedure must apply unless the pipe is to be joint tested. The pipe must be pressurized to 3.5 psi greater than the pressure exerted by groundwater above the pipe. Once the pressure is stabilized, the minimum time allowable for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge must be computed from the following equation:

   where:

$$T = \frac{(0.085 \times D \times K)}{Q}$$

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

Table 1 - Minimum Testing Times for Low-Pressure Air Test

Pipe Diameter (inches)	Minimum Time (seconds)	Maximum Length for Minimum Time (feet)	Time for Longer Length (seconds/foot)
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369
33	1870	72	25.856

The test may be stopped if no pressure loss has occurred during the first 25% of the calculated testing time. If any pressure loss or leakage has occurred during the first 25% of the testing period, then the test must continue for the entire test duration as outlined above or until failure. Lines with a 27-inch average inside diameter and larger may be air tested at each joint. Pipe greater than 36-inch diameter must be tested for leakage at each joint. If the joint test is used, a visual inspection of the joint must be performed immediately after testing. The pipe is to be pressurized to 3.5 psi greater than the pressure exerted by groundwater above the pipe. Once the pressure has stabilized, the minimum time allowable for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge must be 10 seconds.

(C) Deflection Testing. Deflection tests must be performed on all flexible pipes. For pipelines with inside diameters less than 27 inches, a rigid mandrel must be used to measure deflection.

For pipelines with an inside diameter of 27 inches and greater, a method approved by the executive director must be used to test for vertical deflections. Other methods must provide a precision of +/- two tenths of one percent (0.2%) deflection. The test must be conducted after the final backfill has been in place at least 30 days. No pipe will exceed a deflection of five percent. If a pipe should fail to pass the deflection test, the problem must be corrected and a second test must be conducted after the final backfill has been in place an additional 30 days. The tests must be performed without mechanical pulling devices. The design engineer should recognize that this is a maximum deflection criterion for all pipes and a deflection test less than five percent may be more appropriate for specific types and sizes of pipe. Upon completion of construction, the

design engineer or other Texas Licensed Professional Engineer appointed by the owner must certify, to the Executive Director, that the entire installation has passed the deflection test. This certification may be made in conjunction with the notice of completion required in §217.14 of this title (relating to Completion Notice). This certification must be provided for the Commission to consider the requirements of the approval to have been met.

Design and Documents

1. If construction has not commenced within one (1) year of GBRA design approval, that approval is no longer valid.
2. GBRA design approval is reliant upon the adequacy of the work of the engineer of record. All responsibility for the adequacy of the design remains with the engineer of record.
3. Provide complete design submittals for GBRA review and approval prior to bidding. Include master plan, plats, easements, design calculations, specifications, and complete project drawings sets including roads, grading, storm sewer, sanitary sewer, water, dry utilities, etc. Provide six (6) printed and bound half size copies and two (2) CD/PDF electronic copies. Allow 30 calendar days for review.
4. All piping shown on drawings shall be labeled as to the size, type, class, process fluid contained, and flow direction.
5. Submit easements and preliminary and final plats for GBRA review and approval.
   a. Provide dedicated easements in the name of GBRA. Easements shall not overlap or be within residential lots.
   b. Where outside of public right-of-way, provide dedicated easements with a minimum width equal to pipe outside diameter, rounded up to the nearest foot, plus 10 feet minimum on each side. For easements with multiple pipes, provide 10 feet minimum horizontal clearance between pipes. Provide additional width for easements that are not located adjacent to public right-of-way.
   c. Other utilities, structures, grading, drainage, detention/retention ponds, landscaping, trees, roads, parking lots, fences, walls, construction of any type, or any other improvements or obstructions, are not allowed within GBRA easements.
   d. Designs for any proposed alterations or crossings of GBRA easements must be approved in writing by GBRA and the installation of such must be inspected and approved by GBRA.
   e. Maintenance of easements is the responsibility of the property owner.
   f. The property owner must install 16 foot gates in any fences that cross GBRA easements; gates must be centered across GBRA utilities.
   g. Customer water and wastewater services shall not be installed within fenced areas.
6. Copies of each construction submittal (shop drawings, product data, etc.) shall be provided for GBRA review and approval prior to fabrication. Use clouds, boxes, arrows, etc., to clearly mark all proposed options and part numbers. List any proposed deviations on the submittal cover sheet. Allow 21 calendar days for review.
7. Provide the following materials prior to acceptance of facilities by GBRA. Provide one (1) hard copy and one (1) CD/PDF copy unless noted otherwise:
   a. Engineer's certification of completion in accordance with approved plans, specifications, and permits.
   b. Copies of all close-out submittals required by regulatory agencies (city, county, TCEQ, etc.).
   c. O&M Manuals: Provide three (3) hard copies and three (3) CD/PDF searchable electronic copies of each O&M manual. Hard copies shall be printed duplex 8.5"x11" in color on 24# bond paper with reinforced holes and bound in D-ring binders (maximum 4" binders per volume) with sheet lifters front and back, table of contents,

and tabbed sections. Drawings and schematics shall be 11"x17" and z-folded. Include test reports and calibration certificates. O&M description, project name, contractor name, and specification section shall be printed on the spine and cover of each binder. All copies shall be manufacturer original quality. Scanned and/or photocopies are not acceptable. Submit electronic preliminary copies for GBRA review and approval prior to printing final copies. Submit at least two (2) weeks prior to operator training.
   d. Waiver of lien by contractor (and subcontractors, as appropriate).
   e. Warranty certificates, both from contractor and from manufacturer(s), valid for one (1) year from date of project final acceptance. Warranty shall include parts and labor for removal, repair, and replacement.
   f. Executed operating contract or bill of sale transferring facilities to GBRA.
   g. As-Built and Record Drawings: Provide complete project drawing sets including dry utilities, roads, grading, storm sewer, sanitary sewer, water, etc. Submit electronic preliminary copies for GBRA review and approval prior to printing final copies.
      i. Contractor shall provide one (1) printed and bound full size copy of red lined as-built drawings and one (1) CD/PDF electronic copy, each sheet stamped "as-built drawing".
      ii. Engineer shall prepare corrected CAD drawings, each sheet stamped "record drawing", and submit to GBRA five (5) printed and bound half size copies and five (5) CD/PDF searchable electronic copies of the corrected CAD drawings. Scanned and/or photocopies are not acceptable.
   h. Recorded plats and easements.
   i. Title Company review for release of all liens.

Design Requirements

1. Design and installation shall be in accordance with TCEQ rules and AWWA standards, and in accordance with GBRA standards as further described in this document (see attachments).
2. Noise and odor impacts shall be considered in design.
3. The designs of wastewater systems shall be based on minimum 300 GPD/EDU average daily flow, 4.0 peak factor, and 300 GPD/acre inflow and infiltration.
4. Piping friction losses shall be calculated with a Hazen-Williams coefficient no greater than 120 for plastic pipe, and no greater than 100 for concrete or metal pipe.
5. Potable and reclaimed water distribution systems shall be designed to provide 55 PSI minimum at customer meters.
6. Gravity wastewater main depths shall be limited to 20 feet maximum, as measured from pipe invert to finish grade.
7. Low pressure sanitary sewer collection systems are not allowed.
8. Sanitary tapping saddles are not allowed.
9. Manhole internal drops are not allowed.
10. Water mains, force mains, valves, hydrants, services, and cleanouts shall be located outside of roadways, pavement, curbs, driveways, etc., unless specifically approved otherwise. Install 4ft minimum behind back of curb.

11. Gravity wastewater mains may be installed within roadways. Center mains in one lane of traffic, not in center of roadway.
12. All piping shall be designed in straight alignment vertically and horizontally. Pipe curvature and/or deflection are not allowed.
13. Utilize primarily double services installed on lot corners. Minimize the use of single services. Water services shall be installed on opposite lot corners from wastewater services. Services shall not be installed within fenced areas.
14. Water and wastewater pipe lengths shall be centered at crossings with all other utilities, including dry utility services. Both pipes shall be centered at water and wastewater crossings, including wastewater service laterals and fire hydrant leads.
15. Maintain a minimum of 10 feet horizontal and 12 inches vertical clearance between water and wastewater and other utilities. Shared trenches are not allowed.
16. Water and wastewater piping (including mains, services, and laterals) shall be sleeved if located under concrete channels, box culverts, or multiple barrel storm sewer crossings regardless of size and single barrels 30" or larger.
17. Provide overall utilities plan sheets.
18. Profile all water, wastewater, and storm piping regardless of size. Show all utility crossings in all profiles. Show wastewater service laterals in storm and water piping profiles. In a lighter shade, show/overlay water and storm profiles onto wastewater piping profiles. Show all utilities, including dry utility mains and services, on all utility plan sheets.
19. Drains shall be provided for all water mains regardless of main size.
20. Air release valves shall be provided for all water and force mains regardless of main size.
21. Services are not allowed on water transmission lines. No exceptions.

Materials

1. Buried water piping shall be C900 DR14, blue color for potable, purple color for reclaimed. Fittings shall be cement lined AWWA C153 compact mechanical joint ductile iron with Ford Uni-Flange Series 1500 restraints. Pipe bell joint restraints shall be Ford Uni-Flange Series 1300. Fittings for projects near or east of Interstate 35 shall be fusion bonded epoxy coated.
2. Exposed water piping and fittings shall be cement lined flanged ductile iron with field paint coatings as specified herein.
3. Gravity wastewater pipe and fittings shall be green color gasketed ASTM D3034 SDR26. At water crossings including fire hydrant leads, white color gasketed ASTM D2241 SDR26 pipe and fittings shall be used for mains and laterals. Sanitary tapping saddles are not allowed.
4. Force main piping shall be green color C900 DR18 minimum. Fittings shall be epoxy lined AWWA C153 compact mechanical joint ductile iron with Ford Uni-Flange Series 1500 restraints. Pipe bell joint restraints shall be Ford Uni-Flange Series 1300. Fittings for projects near or east of Interstate 35 shall be fusion bonded epoxy coated.

5. MJ tee bolts and nuts for buried locations shall be Corten, except for projects near or east of Interstate 35 use Type 304 stainless steel. Field apply nickel anti-seize compound to threads prior to assembly.
6. All other fasteners shall be Type 304 stainless steel (e.g. hardware, screws, anchor bolts, rods, bolts, nuts, etc. for piping, valves, pumps, motors, equipment, etc.) including those for factory assembly of components. All bolts and nuts shall be heavy hex. Anchor bolts installed within hydraulic structures shall be epoxy type. Field apply nickel anti-seize compound to threads prior to assembly. Stainless steel items shall not be painted.
7. Tapping sleeves 24" and smaller shall be American Flow Control Series 2800. Tapping sleeves 24" and smaller shall be fusion bonded epoxy coated for projects near or east of Interstate 35. Tapping sleeves larger than 24" shall be Smith Blair Model 624. All tapping sleeves shall have stainless steel hardware and split MJ restraints. Field apply nickel anti-seize compound to threads prior to assembly. Tapping sleeves shall be installed 24" minimum from the nearest pipe bell as measured from the edge of the tapping sleeve to taper of bell. Assembly must be successfully disinfected and pressure tested prior to tapping. Perform 100 PSI air test for 10 minutes duration, no allowable leakage. Concrete blocking to undisturbed earth is required under and behind tapping sleeves and valves. Install mechanical restraints 60 LF minimum each way, including on existing piping.
8. All buried metal pipe, fittings, hydrants, and valves shall be wrapped with 8mil poly.
9. Dual pressure reducing valves shall be manufactured by Cla-Val with anti-cavitation trim. Install inside buried H-20 precast concrete vault with lockable aluminum access hatches, aluminum ladder, and floor drain or coarse gravel bottom.
10. Pressure gauge assemblies shall be provided with items:
    a. Stainless steel full port isolation ball valve.
    b. Pressure diaphragm seal and plain end bibb sampling valve, both stainless steel.
    c. 4" Pressure gauge, complying with ASME B40.1, Grade 1A, with 1% full scale accuracy, stainless case and stainless steel wetted parts, glycerin filled.
    d. Gauges shall read in both fifEO and PSI. Select range for normal working pressure to be mid-range.
    e. The entire assembly shall be Type 316 stainless steel
11. Flange coupling adapters shall be Smith Blair Model 911. Flange adapters are not allowed within hydraulic structures.
12. PVC male adapters are not allowed.
13. Paint shall be white color high-build epoxy with topcoat of polyurethane. Topcoat color shall be safety blue for water, safety green for sewer, safety purple for reclaimed. Do not paint stainless steel, hot dip galvanized, brass, or aluminum items. Install in accordance with manufacturer recommendations.

Testing

1. All other utilities must be complete prior to performing any water or wastewater testing.
2. All testing must be complete prior to paving streets.

3. All testing must be complete prior to performing tie-ins to existing water or wastewater systems.
4. Contractor shall perform pre-testing to verify passing results prior to requesting GBRA inspection. Provide connection point for GBRA digital test gauge.
5. All testing shall be performed by the contractor and witnessed by GBRA.
6. Perform trench backfill density testing at intervals specified by the design engineer, exact locations to be designated by inspector. Schedule GBRA to witness testing. Provide copies of reports to GBRA.
7. Follow AWWA pipe testing procedures and allowable leakage for water lines. Test every valved section (i.e. test against every valve in closed position). Test pressure shall be the maximum rating of material installed. Test duration shall be 2 hours.
8. Follow AWWA procedures for flushing and disinfection of water piping. Flushing and disinfection must be complete prior to performing tie-ins to existing systems.
9. All gravity wastewater piping shall be subject to low pressure air testing in accordance with TCEQ requirements. Infiltration and exfiltration testing are not allowed.
10. Mandrel testing shall be performed for all gravity wastewater mains prior to installation of corrosion resistant manhole lining.
11. All manholes, regardless of vehicular traffic detouring, shall be vacuum tested after completion of backfill, compaction, and final grading of road base but prior to paving streets and prior to corrosion resistant manhole lining. Vacuum testing shall be performed with a plate type test head placed on top of completed manhole metal casting ring which has been installed and encased in concrete at final grade. Manholes shall be tested at 10 inches of mercury for 2 minutes duration. Allowable loss is 1 inch of mercury. Infiltration and exfiltration testing are not allowed.
12. Perform video inspection and golf ball testing of gravity wastewater piping after corrosion resistant manhole lining but prior to paving streets. Pipe and manholes must be cleaned free of dirt, rocks, scale, mud, silt, and any other foreign matter prior to performing video inspection and golf ball testing. Flood system with water immediately prior to performing video inspection. Hang and drag a golf ball in front of camera. Pipe grade is out of tolerance if golf ball becomes fully submerged. Schedule GBRA to witness video inspection. Provide DVD's and written reports to GBRA.
13. Follow TCEQ pipe testing procedures and allowable leakage for force mains. Test every valved section (i.e. test against every valve in closed position). Test pressure shall be the maximum rating of material installed.

Construction Notes

1. All work shall be in accordance with GBRA standards as published at the following website: http://www.gbra.org/public/waterwastewaterservices.aspx
2. Copies of each construction submittal (shop drawings, product data, etc.) shall be provided for GBRA review and approval prior to fabrication. Use clouds, boxes, arrows, etc., to clearly

mark all proposed options and part numbers. List any proposed deviations on the submittal cover sheet. Allow 21 calendar days for review.

3. All water and wastewater installations must be inspected and approved by GBRA prior to backfilling or otherwise covering the work. This includes crossings of water and wastewater by other utilities. GBRA will perform a maximum of one (1) inspection daily for one (1) hour duration between 8:00am and 5:00pm excluding weekends and holidays. Call 830-379-5822 to schedule inspections (48 hours advance notice is required for all inspections).
4. Trench excavation and pipe installation will not be permitted until subgrade has been established. Survey staking must be installed prior to and maintained during trench excavation and pipe installation. Survey staking shall include horizontal and vertical control at a minimum of 50 foot station intervals. Mark finish grade lines with cut/fill on offset stakes and property stakes. All marks shall face the pipeline. Survey staking shall be performed by the contractor.
5. Backflow prevention in the form of a reduced pressure backflow assembly must be provided for temporary connections to existing water lines. Backflow devices shall be tested by a licensed backflow prevention assembly tester. Submit test reports.
6. PVC male adapters are not allowed.
7. Sanitary tapping saddles are not allowed.
8. Manhole internal drops are not allowed.
9. Pipe bells shall be installed in upstream direction.
10. All piping shall be designed in straight alignment vertically and horizontally. Pipe curvature and/or deflection are not allowed.
11. Install concrete thrust blocking and mechanical restraints for pressure piping systems.
12. Maintain a minimum of 10 feet horizontal and 12 inches vertical clearance between water and wastewater and other utilities. Shared trenches are not allowed.
13. Water and wastewater pipe lengths shall be centered at crossings with all other utilities, including dry utility services. Both pipes shall be centered at water and wastewater crossings, including wastewater service laterals and fire hydrant leads.
14. Water and wastewater piping (including mains, services, and laterals) shall be sleeved if located under concrete channels, box culverts, or multiple barrel storm sewer crossings regardless of size and single barrels 30" or larger.
15. Valve boxes, exposed piping and valves, and appurtenances shall be painted. Provide painted curb cut markings at valves and services.
16. All exposed vertical and horizontal concrete edges shall be formed with ¾" chamfer strips.
17. Existing facilities that are disturbed shall be restored and tested to be in full compliance with current GBRA standards. The contractor shall adjust existing water and wastewater facilities to proposed finish grades including but not limited to manholes, cleanouts, valves, hydrants, appurtenances, etc.
18. Existing manholes that are disturbed shall be restored to be in full compliance with current GBRA standards including testing, corrosion resistant lining, rings and covers, etc.

19. The contractor shall maintain service to existing water and wastewater systems at all times during construction. Any work involving power outages, bypass pumping, pump and haul, or any other interruption of flow must be performed between 8:00am and 5:00pm excluding weekends and holidays. All necessary temporary power, bypass pumping, pump and haul, temporary plugs, etc., shall be furnished and performed by the contractor. Coordinate and schedule any such activities with GBRA at least two (2) weeks in advance.
20. Explosives and blasting are not allowed.

GBRA NOTES:
MATERIALS

1. GRAVITY WASTEWATER PIPE AND FITTINGS SHALL BE GREEN COLOR GASKETED ASTM D3034 SDR 26. AT WATER CROSSING INCLUDING FIRE HYDRANT LEADS, WHITE COLOR GASKETED ASTM D2241 SDR 26 PIPE AND FITTINGS SHALL BE USED FOR MAINS AND LATERALS. SANITARY TAPPING SADDLES ARE NOT ALLOWED.
2. ALL OTHER FASTENERS SHALL BE TYPE 304 STAINLESS STEEL (E.G. HARDWARE, SCREWS, ANCHOR BOLTS, RODS, BOLTS, NUTS. ETC. FOR PIPING. VALVES, PUMPS, MOTORS, EQUIPMENT, ETC.) INCLUDING THOSE FOR FACTORY ASSEMBLY OF COMPONENTS. ALL BOLTS AND NUTS SHALL BE HEAVY HEX. ANCHOR BOLTS INSTALLED WITHIN HYDRAULIC STRUCTURES SHALL BE EPOXY TYPE, FIELD APPLY NICKEL ANTI-SEIZE COMPOUND TO THREADS PRIOR TO ASSEMBLY. STAINLESS STEEL SHALL NOT BE PAINTED.

TESTING

1. ALL OTHER UTILITIES MUST BE COMPLETE PRIOR TO PERFORMING ANY WATER OR WASTEWATER TESTING.
2. ALL TESTING MUST BE COMPLETE PRIOR TO PAVING STREETS.
3. ALL TESTING MUST BE COMPLETE PRIOR TO PERFORMING TIE-INS TO EXISTING WATER OR WASTEWATER SYSTEMS.
4. CONTRACTOR SHALL PERFORM PRE-TESTING TO VERIFY PASSING RESULTS PRIOR TO REQUESTING GBRA INSPECTION. PROVIDE CONNECTION POINT FOR GBRA DIGITAL TEST GAUGE.
5. ALL TESTING SHALL BE PERFORMED BY THE CONTRACTOR AND WITNESSED BY GBRA.
6. PERFORM TRENCH BACKFILL DENSITY TESTING AT INTERVALS SPECIFIED BY THE DESIGN ENGINEER, EXACT LOCATIONS TO BE DESIGNATED BY INSPECTOR. SCHEDULE GBRA TO WITNESS TESTING. PROVIDE COPIES OF REPORTS TO GBRA.
7. FOLLOW AWWA PIPE TESTING PROCEDURES AND ALLOWABLE LEAKAGE FOR WATER LINES. TEST EVERY VALVES SECTION (I.E. TEST AGAINST EVERY VALVE IN CLOSED POSITION). TEST PRESSURE SHALL BE MAXIMUM RATING OF MATERIAL INSTALLED. TEST DURATION SHALL BE 2 HOURS.
8. FOLLOW AWWA PROCEDURES FOR FLUSHING AND DISINFECTION OF WATER PIPING. FLUSHING AND DISINFECTION MUST BE COMPLETE PRIOR TO PERFORMING TIE-INS TO EXISTING SYSTEMS.
9. ALL GRAVITY WASTEWATER PIPING SHALL BE SUBJECT TO LOW PRESSURE AIR TESTING IN ACCORDANCE WITH TCEQ REQUIREMENTS. INFILTRATION AND EXFILTRATION TESTING ARE NOT ALLOWED.
10. MANDREL TESTING SHALL BE PERFORMED FOR ALL GRAVITY WASTEWATER MAINS PRIOR TO INSTALLATION OF CORROSION RESISTANT MANHOLE LINING.
11. ALL MANHOLES, REGARDLESS OF VEHICULAR TRAFFIC DETOURING, SHALL BE VACUUM TESTED AFTER COMPLETION OF BACKFILL, COMPACTION, AND FINAL GRADING OF ROAD BASE BUT PRIOR TO PAVING STREETS AND PRIOR TO CORROSION RESISTANT MANHOLE LINING. VACUUM TESTING SHALL BE PERFORMED WITH A PLATE TYPE TEST HEAD PLACED ON TOP OF COMPLETED MANHOLE METAL CASTING RING WHICH HAS BEEN INSTALLED AND ENCASED IN CONCRETE AT FINAL GRADE. MANHOLES SHALL BE TESTED AT 10 INCHES OF MERCURY FOR 2 MINUTES DURATION. ALLOWABLE LOSS IS 1 INCH OF MERCURY. INFILTRATION AND EXFILTRATION TESTING ARE NOT ALLOWED.
12. PERFORM VIDEO INSPECTION AND GOLF BALL TESTING OF GRAVITY WASTEWATER PIPING AFTER CORROSION RESISTANT MANHOLE LINING BUT PRIOR TO PAVING STREETS. PIPE AND MANHOLES MUYST BE CLEANED FREE OF DIRT, ROCKS, SCALE, MUD, SILT, AND ANY OTHER FOREIGN MATTER PRIOR TO PERFORMING VIDEO INSPECTION AND GOLF BALL TESTING. FLOOD SYSTEM WITH WATER IMMEDIATELY PRIOR TO PERFORMING VIDEO INSPECTION. HANG AND DRAG A GOLF BALL IN FRONT OF CAMERA. PIPE GRADE IS OUT OF TOLERANCE IF GOLF BALL BECOMES FULLY SUBMERGED. SCHEDULE GBRA TO WITNESS VIDEO INSPECTION. PROVIDE DVD'S AND WRITTEN REPORTS TO GBRA.
13. FOLLOW TCEQ PIPE TESTING PROCEDURES AND ALLOWABLE LEAKAGE FOR FORCE MAINS. TEST EVERY VALVED SECTION (I.E. TEST AGAINST EVERY VALVE IN CLOSED POSITION). TEST PRESSURE SHALL BE THE MAXIMUM RATING OF MATERIAL INSTALLED.

GBRA NOTES (CONT.):
CONSTRUCTION NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH GBRA STANDARDS AS PUBLISHED AT THE FOLLOWING WEBSITE: HTTP://WWW.GBRA.ORG/OPERATIONS/DEVELOPER-RESOURCES/
2. COPIES OF EACH CONSTRUCTION SUBMITTAL (SHOP DRAWINGS, PRODUCT DATA, ETC.) SHALL BE PROVIDED FOR GBRA REVIEW AND APPROVAL PRIOR TO FABRICATION. USE CLOUDS, BOXES, ARROWS, ETC., TO CLEARLY MARK ALL PROPOSED OPTIONS AN PART NUMBERS. LIST ANY PROPOSED DEVIATIONS ON THE SUBMITTAL COVER SHEET. ALLOW 21 CALENDAR DAYS FOR REVIEW.
3. ALL WATER AND WASTEWATER INSTALLATIONS MUST BE INSPECTED AND APPROVED BY GBRA PRIOR TO BACKFILLING OR OTHERWISE COVERING THE WORK. THIS INCLUDES CROSSINGS OF WATER AND WASTEWATER BY OTHER UTILITIES. GBRA WILL PERFORM A MAXIMUM OF ONE (1) INSPECTION DAILY FOR ONE (1) HOUR DURATION BETWEEN 8:00AM AND 5:00PM EXCLUDING WEEKENDS AND HOLIDAYS. CALL 830-379-5822 TO SCHEDULE INSPECTIONS (48 HOURS ADVANCE NOTICE IS REQUIRED FOR ALL INSPECTIONS).
4. TRENCH EXCAVATION AND PIPE INSTALLATION WILL NOT BE PERMITTED UNTIL SUBGRADE HAS BEEN ESTABLISHED. SURVEY STAKING MUST BE INSTALLED PRIOR TO AND MAINTAINED DURING TRENCH EXCAVATION AND PIPE INSTALLATION. SURVEY STAKING SHALL INCLUDE HORIZONTAL AND VERTICAL CONTROL AT A MINIMUM OF 50 FOOT STATION INTERVALS. HORIZONTAL OFFSETS SHALL BE 15 FEET MAXIMUM. INSTALL PROPERTY PINS AND STAKES. MARK FINISH GRADE LINES WITH CUT/FILL ON OFFSET STAKES AND PROPERTY STAKES. ALL MARKS SHALL FACE THE PIPELINE. SURVEY STAKING SHALL BE PERFORMED BY THE CONTRACTOR.
5. BACKFLOW PREVENTION IN THE FORM OF A REDUCED PRESSURE BACKFLOW ASSEMBLY MUST BE PROVIDED FOR TEMPORARY CONNECTIONS TO EXISTING WATER LINES. BACKFLOW DEVICES SHALL BE TESTED BY A LICENSED BACKFLOW PREVENTION ASSEMBLY TESTER. SUBMIT TEST REPORTS.
6. PVC MALE ADAPTERS ARE NOT ALLOWED.
7. SANITARY TAPPING SADDLES ARE NOT ALLOWED.
8. MANHOLE INTERNAL DROPS ARE NOT ALLOWED.
9. PIPE BELLS SHALL BE INSTALLED IN UPSTREAM DIRECTION.
10. ALL PIPING SHALL BE INSTALLED IN STRAIGHT ALIGNMENT VERTICALLY AND HORIZONTALLY. PIPE CURVATURE AND/OR DEFLECTION ARE NOT ALLOWED.
11. INSTALL CONCRETE THRUST BLOCKING AND MECHANICAL RESTRAINTS FOR PRESSURE PIPING SYSTEMS.
12. MAINTAIN A MINIMUM OF 10 FEET HORIZONTAL AND 12 INCH VERTICAL CLEARANCE BETWEEN WATER AND WASTEWATER AND OTHER UTIL

DEED

RECORD AND RETURN TO:
CHESMAR HOMES, LLC
ATTN: ALLYSON WALTERS
211 N. LOOP 1604 E, SUITE 175
SAN ANTONIO, TEXAS 78232

NOTICE OF CONFIDENTIALITY RIGHTS; IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OF THE FOLLOWING INFORMATION FROM THIS INSTRUMENT BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS. YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

SPECIAL WARRANTY DEED

STATE OF TEXAS)
ss.: KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF COMAL)

THAT **BRANDT RANCH, LP,** a Texas limited partnership, f/k/a Brandt Ranch, LLC, a Texas limited liability company ("Grantor"), for and in consideration of the sum of $10.00 and other good and valuable consideration paid to Grantor by **CHESMAR HOMES , LLC**, a Texas limited liability company ("Grantee"), having an address at 211 N Loop 1604 E, Suite 175, San Antonio, Texas 78232, the receipt and sufficiency of which are hereby acknowledged, has GRANTED, SOLD AND CONVEYED, and by these presents does hereby GRANT, SELL AND CONVEY unto Grantee, all of that certain real property situated in Comal County, Texas, more particularly described in **Exhibit A** attached hereto and incorporated herein by reference, together with all buildings, improvements and fixtures (to the extent owned by Grantor) located thereon, and all rights, ways, privileges and appurtenances pertaining thereto, including without limitation, Grantor's right, title and interest, if any, to the adjacent streets, alleys and rights-of-ways, strips and gores adjacent thereto, any easement rights, air rights, surface rights, sub-surface rights, subsurface rights, and any rights, privileges and appurtenances pertaining thereto (collectively, the "Property").

SUBJECT, HOWEVER, to the matters set forth in **Exhibit B** attached hereto and made a part hereof (the "Permitted Exceptions"), the state of facts that would be disclosed by a current accurate survey of the Property, standby fees, taxes and assessments by any taxing authority for the years 2024 and thereafter, not yet due and payable.

TO HAVE AND TO HOLD the Property, subject to the aforesaid encumbrances, unto Grantee, Grantee's successors and assigns, forever, and Grantor does hereby bind Grantor and Grantor's successors and assigns to WARRANT AND FOREVER DEFEND all singular the Property, subject to the aforesaid encumbrances, unto Grantee, Grantee's successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof, by, through or under Grantor, but not otherwise.

EXECUTED as of November 6, 2024.

GRANTOR:

BRANDT RANCH, LP,
a Texas limited partnership
(Formerly known as Brandt Ranch, LLC)

By: Regal, LLC,
a Texas limited liability company
its general partner

By: _____
Name: Clint Jones
Title: Manager

STATE OF TEXAS §

COUNTY OF Bexar §

This instrument was acknowledged before me on the 6th day of November, 2024, by Clint Jones, Manager of Regal, LLC, a Texas limited liability company, general partner of Brandt Ranch, LP, a Texas limited partnership (formerly known as Brandt Ranch, LLC, a Texas limited liability company), on behalf of said entities.

_____
Notary Public, State of Texas

SANDRA M. RAO
Notary Public, State of Texas
Comm. Expires 07-05-2026
Notary ID 293177

UNOFFICIAL

EXHIBIT "A"
To Special Warranty Deed

PROPERTY DESCRIPTION

FIELD NOTES FOR A 221.734 ACRE, OR 9,658,735 SQUARE FEET MORE OR LESS, TRACT SITUATED IN THE A.M. HOLBROOK SURVEY NO. 423, ABSTRACT 271, THE SIMON WASHBURN SURVEY NO. 486, ABSTRACT 663, THE FRIED. MICHEL SURVEY NO. 653, ABSTRACT 400, THE AUGUSTUS MICHEL SURVEY NO. 485, ABSTRACT 394, THE J.M. STEINER SURVEY NO. 596, ABSTRACT 571, AND THE GOTLIEB ARNOLD SURVEY NO. 436, ABSTRACT 13, COMAL COUNTY, TEXAS; BEING A PORTION OF A CALLED 223.8 ACRE TRACT DESCRIBED IN DEED FROM BRANDT RANCH NB, LLC TO BRANDT RANCH, LLC, AS RECORDED IN DOCUMENT NO. 202206028894 OF THE OFFICIAL PUBLIC RECORDS OF COMAL COUNTY, TEXAS. SAID 221.734 ACRE TRACT BEING MORE FULLY DESCRIBED AS FOLLOWS, WITH BEARINGS BASED ON THE TEXAS COORDINATE SYSTEM ESTABLISHED FOR THE SOUTH CENTRAL ZONE FROM THE NORTH AMERICAN DATUM OF 1983 (NA2011) EPOCH 2010.00:

BEGINNING: At a ½" iron rod found on the Southwest right-of-way line of State Highway 46, a 100-foot public right-of-way as shown on TxDOT right-of-way map 15-76-0215-02-029, for the North corner of a called 24.649 acre tract, referenced as Tract 1, described in deed from Charles Frederick Cludius and wife, Blanca C. Cludius to Brymel, LLC, as recorded in Document No. 202206016495 of the said Official Public Records, the Northeast corner of the said 223.8 acre tract and this tract, from Whence a ½" iron rod found on the said Southwest right-of-way line, for the Northeast corner of the said 24.649 acre tract, bears South 68°17'33" East, 445.16 feet;

THENCE: South 19°42'52" West, departing the said Southwest right-of-way line, with the common line of the said 24.649 acre tract and the said 223.8 acre tract, 175.17 feet to a ½" iron rod with yellow plastic cap stamped
"Pape-Dawson" set for an exterior corner of this tract;

THENCE: Departing the said common line, over and across the said 223.8 acre tract the following four courses:

North 68°16'19" West, 164.02 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an interior corner of this tract;

South 21°43'41" West, 200.04 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an angle point;

South 29°01'55" West, 60.04 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an interior corner of this tract;

South 69°46'49" East, 180.68 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set on the said common line of the 24.649 acre tract and 223.8 acre tract, for an exterior corner of this tract;

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THENCE: South 19°42'52" West, with the said common line, 638.42 feet to a mag nail found for the North corner of a called 4.998 acre tract, referenced as Tract 2, described in deed from Charles Frederick Cludius and wife, Blanca C. Cludius to Brymel, LLC, as recorded in Document No. 202206016495 of the said Official Public Records, the West corner of the said 24.649 acre tract, an angle point of the said 223.8 acre tract and this tract;

THENCE: Departing the said common line, with the common line of the said 4.998 acre tract and the said 223.8 acre tract the following three courses:

South 01°52'03" East, 422.28 feet to a ½" inch iron rod with yellow plastic cap stamped "Pape-Dawson" set for an angle point;

South 43°21'07" East, 564.42 feet to a ½" iron rod with plastic cap stamped "HMT" found for an angle point;

South 79°28'21" East, 75.70 feet to a ½" iron rod found for the West corner of Lot 28, Block A, Mission Hills Ranch Unit 7B, as recorded in Document No. 200706017898 of the Map and Plat Records of Comal County, Texas, the South corner of the said 4.998 acre tract, an angle point of the said 223.8 acre tract and this tract;

THENCE: South 37°43'10" East, at 1401.53 feet pass a ½" iron rod found for the South corner of Lot 12, Block A, Mission Hills Ranch Unit 5, as recorded in Document No. 200406005650 of the said Map and Plat Records, the West corner of Lot 11, Block A, of the said Mission Hills Ranch Unit 5, in all 1649.22 feet to a ½" iron rod found, for an angle point of a 72.22 acre tract described in a partition deed to Nancy Staats Chafin, as recorded in Document No. 200206016070 of the Official Records of Comal County, Texas, the South corner of the said Lot 11, an exterior corner of the said 223.8 acre tract and this tract;

THENCE: With the common line of the said 72.22 acre tract and the said 223.8 acre tract the following three courses: South 35°01'36" West, 375.84 feet to a 2" metal fence post found for an angle point;

South 23°19'30" East, 361.86 feet to a 2" metal fence post found for an angle point;

South 38°04'13" East, 2,205.27 feet to the remains of a 9" cedar fence post found on the Northwest line of a called 8.42 acre tract described in deed from Leo M. Chafin and wife, Nancy Staats Chafin to Hiram Tavarez and wife, Jana L. Chafin Tavarez, as recorded in Document No. 200206016074 of the said Official Records, for the South corner of a called 0.49 acre tract described in deed from Leo M. Chafin and wife, Nancy Staats Chafin to Hiram Tavarez and wife, Jana L. Chafin Tavarez, as recorded in Document No. 200306047838 of the said Official Records, the East corner of the said 223.8 acre tract and this tract;

THENCE: South 50°42'51" West, with the common line of the said 8.42 acre tract and the said

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223.8 acre tract, 293.77 feet to the remains of a 6" cedar fence post found for the North corner of a called 1.09 acre tract described in deed from Carroll B. Lindeman and wife, Kristina Staats Lindeman to Hiram Tavarez and wife, Jana L. Chafin Tavarez, as recorded in Document No. 200306047839 of the said Official Records, the West corner of the said 8.42 acre tract, an angle point of the said 223.8 acre tract and this tract;

THENCE: South 51°42'16" West, departing the said common line, at 59.83 feet pass a ½" iron rod with plastic cap stamped "BYRN" found for a North corner of a called 204.63 acre tract described in a partition deed to Kristina Staats Lindeman, as recorded in said Document No. 200206016070, the West corner of the said 1.09 acre tract, in all 231.85 feet to a ½" inch iron rod with yellow plastic cap stamped "Pape-Dawson" set on a Northwest line of the said 204.63 acre tract, for an angle point of the said 223.8 acre tract and this tract;

THENCE: With the common line of the said 204.63 acre tract and the said 223.8 acre tract the following three courses:

South 51°56'23" West, 913.07 feet to a 60D nail in fence post found for an angle point;

South 54°17'17" West, 149.32 feet to a 60D nail in fence post found for an interior corner of the said 204.63 acre tract, the South corner of the said 223.8 acre tract and this tract;

North 38°08'02" West, 688.62 feet to a ½" iron rod found for the South corner of a called 10.00 acre tract described in deed from C. Frederick Cludius, et al. to New Braunfels Conservation Society, Inc., as recorded in Document No. 201506012095 of the said Official Public Records, an interior corner of the said 223.8 acre tract and this tract;

THENCE: Departing the said common line, with the common line of the said 10.00 acre tract and the said 223.8 acre tract the following four courses:

North 52°33'00" East, 450.06 feet to a ½" iron rod with plastic cap stamped "HMT" found for the East corner of the said 10.00 acre tract, an interior corner of the said 223.8 acre tract and this tract;

North 37°26'57" West, 844.29 feet to a ½" iron rod with plastic cap stamped "HMT" found for the Northeast corner of the said 10.00 acre tract, an angle point of the said 223.8 acre tract and this tract;

North 82°26'42" West, 178.51 feet to a ½" iron rod with plastic cap stamped "HMT" found for the North corner of the said 10.00 acre tract, an angle point of the said 223.8 acre tract and this tract;

South 52°35'51" West, 340.53 feet to a ½" iron rod with plastic cap stamped "HMT" found on a Northeast line of the said 204.63 acre tract, for the West corner

of the said 10.00 acre tract, an interior corner of the said 223.8 acre tract and this tract;

THENCE: With the common line of the said 204.63 acre tract and the said 223.8 acre tract the following five courses:

North 38°43'13" West, 142.77 feet to a ½" iron rod with plastic cap stamped "HMT" found for an angle point;

North 37°20'05" West, 2,088.94 feet to a 60D nail in fence post found for an angle point;

North 37°24'18" West, 438.74 feet to a 4" square wood post found for an exterior corner of the said 204.63 acre tract, an interior corner of the said 223.8 acre tract and this tract;

South 52°09'43" West, 621.80 feet to a ½" iron rod found for an angle point;

South 52°32'43" West, 816.40 feet to a ½" iron rod with plastic cap stamped "KFW" found for a Southeast corner of a called 200.00 acre tract described in deed from Japhet III LLC et al. to the Board of Trustees of the New Braunfels Independent School District, as recorded in Document No. 201906009101 of the said Official Public Records, an angle point of the said 204.63 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

THENCE: With the common line of the said 200.00 acre tract and the said 223.8 acre tract the following fifteen courses:

North 37°28'08" West, 277.65 feet to a ½" iron rod with plastic cap stamped "KFW" found for an interior corner of the said 200.00 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

North 39°51'50" East, 218.90 feet to a ½" iron rod with plastic cap stamped "KFW" found for an exterior corner of the said 200.00 acre tract, an interior corner of the said 223.8 acre tract and this tract, the beginning of a curve to the right having a radius of 65.00 feet, an arc length of 180.32 feet, a central angle of 158°56'38", a chord bearing and distance of North 29°02'35" East, 127.81 feet;

With the arc of the said curve to the right, 180.32 feet to a ½" iron rod with plastic cap stamped "KFW" found for an exterior corner of the said 200.00 acre tract, an interior corner of the said 223.8 acre tract and this tract, the beginning of a curve to the left having a radius of 15.00 feet, an arc length of 14.56 feet, a central angle of 55°37'57", a chord bearing and distance of North 80°52'32" East, 14.00 feet;

With the arc of the said curve to the left, 14.56 feet to a ½" iron rod with plastic cap stamped "KFW" found for an angle point;

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North 52°34'31" East, 281.33 feet to a ½" iron rod with plastic cap stamped "KFW" found for an angle point; North 30°36'51" East, 134.76 feet to a ½" iron rod with plastic cap stamped "KFW" found for an angle point;

North 52°32'51" East, 474.62 feet to a ½" iron rod with plastic cap stamped "KFW" found for an exterior corner of the said 200.00 acre tract, an interior corner of the said 223.8 acre tract and this tract;

North 41°15'25" West, 123.23 feet to a ½" iron rod with plastic cap stamped "KFW" found for an interior corner of the said 200.00 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

North 40°55'57" East, 629.37 feet to a ½" iron rod with plastic cap stamped "KFW" found for an angle point;

North 44°56'15" East, 90.24 feet to a ½" iron rod with plastic cap stamped "KFW" found for an interior corner of the said 200.00 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

South 45°03'59" East, 149.95 feet to a ½" iron rod with plastic cap stamped "KFW" found for an exterior corner of the said 200.00 acre tract, an interior corner of the said 223.8 acre tract and this tract;

North 44°56'13" East, 640.30 feet to a ½" iron rod with plastic cap stamped "KFW" found for an angle point;

North 07°30'21" East, 59.96 feet to a ½" iron rod with plastic cap stamped "KFW" found for an interior corner of the said 200.00 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

South 82°29'28" East, 67.03 feet to a ½" iron rod with plastic cap stamped "KFW" found for an exterior corner of the said 200.00 acre tract, an interior corner of the said 223.8 acre tract and this tract;

North 07°28'10" East, 440.90 feet to a ½" iron rod with plastic cap stamped "KFW" found on the Southeast line of a remainder of 23 acre tract described in deed from Marie Kirmse to Mary Ann Demuth, as recorded in Volume 842, Page 116 of the said Official Public Records, for the Northeast corner of the said 200.00 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

THENCE: With the common line of the said 23 acre tract and the said 223.8 acre tract the following three courses:

North 66°08'35" East, 76.75 feet to a 60D nail in fence post found for the Southeast corner of the said 23 acre tract, an interior corner of the said 223.8 acre tract and

this tract;

North 01°46'09" East, 123.77 feet to a ½" iron rod with plastic cap stamped "HMT" found for an angle point;

North 03°07'13" East, at 397.16 feet pass a ¼" iron rod found for the South corner of a called 3.488 acre tract described in deed from Franklin Demuth to Mary Ann Demuth, as recorded in Volume 842, Page 114 of the said Official Public Records, the East corner of the said 23 acre tract, in all 465.17 feet to a ½" iron rod with plastic cap stamped "HMT" found on the common line of the said 3.488 acre tract and the said 223.8 acre tract, for an angle point;

THENCE: With the said common line the following three courses:

North 05°47'21" East, 82.72 feet to a 3" metal fence post found for an interior corner of the said 3.488 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

South 77°04'11" East, 25.29 feet to a 3" metal fence post found for an exterior corner of the said 3.488 acre tract, an interior corner of the said 223.8 acre tract and this tract;

North 17°30'42" East, 469.69 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an exterior corner of this tract;

THENCE: Departing the said common line, over and across the said 223.8 acre tract the following four courses:

South 65°55'47" East, 137.92 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an interior corner of this tract;

North 22°49'19" East, 43.70 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an angle point;

North 21°43'59" East, 251.14 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an interior corner of this tract;

North 68°16'01" West, 159.98 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set on the common line of the said 3.488 acre tract and the said 223.8 acre tract, for an exterior corner of this tract;

THENCE: North 17°30'42" East, 175.08 feet to a ½" iron rod found on the said Southwest right-of-way line of State Highway 46, for the East corner of the said 3.488 acre tract, the North corner of the said 223.8 acre tract and this tract, from Whence a ½" iron rod found on the said Southwest right-of-way line, for the North corner of the said 3.488 acre tract, bears North 68°02'54" West, 161.52 feet;

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THENCE: South 68°17'16" East, with the said Southwest right-of-way line, 445.63 feet to the POINT OF BEGINNING containing 221.734 acres, more or less, in Comal County, Texas.

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EXHIBIT "B"
To Special Warranty Deed

PERMITTED EXCEPTIONS

1. Restrictive covenants of record recorded as County Clerk's File No(s). 201506012093 and 201506019786, of the Official Public Records of Comal County, Texas.

2. Easement and Right of Way as set forth in instrument recorded in Volume 52, Page 532, as affected by assignment recorded in Volume 1002, Page 618, of the Deed Records of Comal County, Texas.

3. Utility Line Right of Way Agreement as set forth in instrument filed for record under Comal County Clerk's File No. 200506030940.

4. Easement Reservation as set forth in instrument filed for record under Comal County Clerk's File No. 201506012093.

5. Edwards Aquifer Protection Plan as set forth in instrument filed for record under Comal County Clerk's File No. 201606016909 and 202006020866.

6. Temporary Ingress-Egress Easement Agreement as set forth in instrument filed for record under Comal County Clerk's File No. 201906007082.

7. Terms, conditions, stipulations, provisions, and easements contained in that certain document as set forth in instrument filed for record under Comal County Clerk's File No. 202206028894.

8. All leases, grants, exceptions or reservations of coal, lignite, oil, gas and other minerals, together with all rights, privileges, and immunities relating thereto, appearing in the Public Records.

9. All conveyances, contracts, deeds, reservations, exceptions, limitations, leases, and similar interests in or to any geothermal energy and associated resources below the surface of the land, together with all rights, privileges, and immunities relating thereto, appearing in the Public Records.

10. The potential exercise of power by governmental authorities to limit, control or deny access, ingress or egress to the property from State Highway 46 or service road.

11. Rights and/or privileges existing or which may later exist by virtue of a portion of the property being used as a cemetery; including, but not limited to, the rights to sepulcher and interment and to the rights of ingress and egress in and to said cemetery.

12. The following matters disclosed on that certain plat of survey made by Chance Trevor SRP, Professional Land Surveyor No. 6916, dated June 27, 2024:

a. Rights or claims, if any, of adjoining property owner(s) in and to the portion of insured property lying between the fence and the insured property line. Paragraph 4(b) must be deleted from any T19.1 endorsement issued.

b. No liability is assumed by the location of Utility Pole(s), Utility Poles(s) With Transformer(s), Overhead Utility Lines(s), Fire Hydrant(s), Gas Sign(s), and Gate(s) inside the herein described property.

c. A20' wide Utility Line Right-Of-Way Agreement along the north property line, as set forth in instrument filed for record under Comal County Clerk's File No. 200506030940.

d. A 7.60 Acre Access Easement partly along the northwest property line, and running through the property, as set forth in instrument filed for record under Comal County Clerk's File No. 201506012093.

e. A 12' wide Dirt Road running through the property.

f. A 12' wide Gravel Road running through the property.

g. A Temporary Ingress/Egress Easement Agreement along the northwest property line, as set forth in instrument filed for record under Comal County Clerk's File No. 201906007082.

h. Tombstones are present in the southeast of the property.

13. Terms, conditions and provisions in that certain Petition For Creation of Purlsong Municipal Management District of Comal County, as set forth and defined in instrument recorded under County Clerk's File No. 202406029151, of the Official Public Records of Comal County, Texas.

14. Terms and conditions related to the property's presence in the Purlsong Municipal Management District of Comal County.

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Filed and Recorded
Official Public Records
Bobbie Koepp, County Clerk
Comal County, Texas
11/08/2024 01:55:08 PM
TERRI 11 Pages(s)
202406034227

County Court of Comal County, Texas

Bobbie Koepp

BILL OF SALE AND ASSIGNMENT

STATE OF TEXAS §
§ KNOW ALL PERSONS BY THESE PRESENTS:
COUNTY OF COMAL §

THIS BILL OF SALE AND ASSIGNMENT (this "Assignment") is executed as of the 6 day of November, 2024, by **BRANDT RANCH, LP**, a Texas limited partnership, f/k/a Brandt Ranch, LLC, a Texas limited liability company ("Assignor"), to and for the benefit of **CHESMAR HOMES, LLC.**, a Texas limited liability company ("Assignee").

WHEREAS, contemporaneously herewith, Assignee is acquiring from Assignor certain real property described in Exhibit "A" attached hereto (the "Land"), together with Assignor's right, title, and interest in and to the Property (as defined in that certain Special Warranty Deed of even date herewith), subject, however, to the Permitted Exceptions (as defined therein) (collectively, the "Property"); and

WHEREAS, in connection with the foregoing, Assignor desires to transfer and assign to Assignee all of Assignor's right, title, and interest in and to certain items and rights applicable or relating thereto, if any, all as hereinafter provided.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Assignor hereby grants, sells, transfers, and assigns unto Assignee all of Assignor's right, title, and interest in and to that certain personal property owned by Assignor or used by Assignor exclusively with all or any portion of the Property (collectively the "Personal Property"), and that certain intangible property owned by Assignor or used by Assignor exclusively in connection with all or any portion of the Property, expressly including all of Assignor's rights, duties and obligations as owner of the Property under any development, financing and reimbursement agreement(s) (or similar agreements), and specifically including all right, title and interest in and to the receipt of any payments, reimbursements, proceeds, credits or offsets of any kind or character to which Assignor or any affiliate of Assignor is or may be come entitled to under any agreement involving Purlsong Municipal Management District of Comal County (collectively the "Intangible Property"), including, without limitation, all of Assignor's right, title, and interest, if any, in and to the following (hereinafter referred to collectively as the "Assigned Properties"):

(i) any and all licenses, permits, certificates of occupancy, approvals, entitlements, development rights, air rights, reimbursement rights, construction contracts, architectural contracts, maintenance contracts, management contracts, utility service contracts, warranties, guaranties, bonds, engineering reports, plans and other intangible property or rights related to or benefitting any of the Property;

(ii) any and all equipment, fixtures, signage and other personal property located on or used in connection with the Property;

N Title Inc.
GF#: NT00-LP241007
CLOSER: Carrie Wallace

(iii) all water, wastewater and other utility rights, allocation, availability and/or capacity attributable to the Property;

(iv) All right, title and interest in and to all site plans, surveys, soil and substrata studies, architectural drawings, plans and specifications, engineering plans and studies, and other plans or studies of any kind that relate to the Property in the possession of Assignor; provided, however, that any information, reports, statements, documents or records produced by third parties and provided or made available to Assignee by Assignor concerning the condition of the Property, including without limitation, the environmental condition of the Property, shall not be representations or warranties, and Assignee shall not rely on such disclosures, but rather, Assignee shall rely only on its own inspection of the Property; and

(v) All other rights, privileges and appurtenances owned by Seller and in any way relating to the above-described Property, save and except as set forth herein or in that certain Agreement of Purchase and Sale between Assignor and Assignee with respect to the Property.

In addition to the foregoing, with respect to that certain Roadway and Utility Construction, Easement and Cost-Sharing Agreement entered into by Assignor, Assignee and the New Braunfels Independent School District on or about _____, 2024 (the "RUCECA"), Assignor not only assigns all of its right, title, and interest pursuant to same with respect to the Property, but also with respect to those two (2) one (1) acre tracts being retained by Assignor which are located adjacent to the Property and more particularly described on Exhibit "B" attached hereto (the "Assignor Retained Tracts"), and by its acceptance of same, Assignee also accepts all of Assignor's rights, duties and obligations of Assignor under the RUCECA with respect to both the Property and the Assignor Retained Tracts. Assignee shall indemnify, defend and hold Assignor harmless from any and all claims, liability, damages, causes or causes of action, costs or other expenses, including without limitation reasonable attorney fees, paid or incurred by or asserted against Assignor based on or relating to any act or negligence of Assignee, its agents, employees, officers or contractors occurring on or in any way relating to the RUCECA, but only to the extent that the underlying act or omission giving basis to such claim(s) occurs subsequent to the date of this Assignment as set forth above.

[Signature Page to follow]

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IN WITNESS WHEREOF, the undersigned has executed this Assignment to be effective as of the date first set forth hereinabove.

ASSIGNOR:

BRANDT RANCH, LP,
a Texas limited partnership
(Formerly known as Brandt Ranch, LLC)

By: Regal, LLC,
a Texas limited liability company
its general partner

CARRIE WALLACE
Notary Public, State of Texas
Comm. Expires 10-05-2028
Notary ID 132711092

Carrie Wallace
11/06/24

By: See attached
Name: _____
Title: _____

ASSIGNEE:

CHESMAR HOMES, LLC,
a Texas limited liability company

By: _____
Name: Terry Shakarisaz.
Title: Authorized Agent

UNOFFICIAL

IN WITNESS WHEREOF, the undersigned has executed this Assignment to be effective as of the date first set forth hereinabove.

ASSIGNOR:

BRANDT RANCH, LP,
a Texas limited partnership
(Formerly known as Brandt Ranch, LLC)

By: Regal, LLC,
a Texas limited liability company
its general partner

By: _____
Name: Clint Jones
Title: Manager

CARRIE WALLACE
Notary Public, State of Texas
Comm. Expires 10-05-2028
Notary ID 132711092

Carrie Wallace
11/06/24

ASSIGNEE:

CHESMAR HOMES, LLC,
a Texas limited liability company

By: See attached
Name: _____
Title: _____

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Exhibit A

The Land

PROPERTY DESCRIPTION

FIELD NOTES FOR A 221.734 ACRE, OR 9,658,735 SQUARE FEET MORE OR LESS, TRACT SITUATED IN THE A.M. HOLBROOK SURVEY NO. 423, ABSTRACT 271, THE SIMON WASHBURN SURVEY NO. 486, ABSTRACT 663, THE FRIED. MICHEL SURVEY NO. 653, ABSTRACT 400, THE AUGUSTUS MICHEL SURVEY NO. 485, ABSTRACT 394, THE J.M. STEINER SURVEY NO. 596, ABSTRACT 571, AND THE GOTLIEB ARNOLD SURVEY NO. 436, ABSTRACT 13, COMAL COUNTY, TEXAS; BEING A PORTION OF A CALLED 223.8 ACRE TRACT DESCRIBED IN DEED FROM BRANDT RANCH NB, LLC TO BRANDT RANCH, LLC, AS RECORDED IN DOCUMENT NO. 202206028894 OF THE OFFICIAL PUBLIC RECORDS OF COMAL COUNTY, TEXAS. SAID 221.734 ACRE TRACT BEING MORE FULLY DESCRIBED AS FOLLOWS, WITH BEARINGS BASED ON THE TEXAS COORDINATE SYSTEM ESTABLISHED FOR THE SOUTH CENTRAL ZONE FROM THE NORTH AMERICAN DATUM OF 1983 (NA2011) EPOCH 2010.00:

BEGINNING: At a ½" iron rod found on the Southwest right-of-way line of State Highway 46, a 100-foot public right-of-way as shown on TxDOT right-of-way map 15-76-0215-02-029, for the North corner of a called 24.649 acre tract, referenced as Tract 1, described in deed from Charles Frederick Cludius and wife, Blanca C. Cludius to Brymel, LLC, as recorded in Document No. 202206016495 of the said Official Public Records, the Northeast corner of the said 223.8 acre tract and this tract, from Whence a ½" iron rod found on the said Southwest right-of-way line, for the Northeast corner of the said 24.649 acre tract, bears South 68°17'33" East, 445.16 feet;

THENCE: South 19°42'52" West, departing the said Southwest right-of-way line, with the common line of the said 24.649 acre tract and the said 223.8 acre tract, 175.17 feet to a ½" iron rod with yellow plastic cap stamped
"Pape-Dawson" set for an exterior corner of this tract;

THENCE: Departing the said common line, over and across the said 223.8 acre tract the following four courses:

North 68°16'19" West, 164.02 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an interior corner of this tract;

South 21°43'41" West, 200.04 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an angle point;

South 29°01'55" West, 60.04 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an interior corner of this tract;

South 69°46'49" East, 180.68 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set on the said common line of the 24.649 acre tract and 223.8 acre tract, for an exterior corner of this tract;

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THENCE: South 19°42'52" West, with the said common line, 638.42 feet to a mag nail found for the North corner of a called 4.998 acre tract, referenced as Tract 2, described in deed from Charles Frederick Cludius and wife, Blanca C. Cludius to Brymel, LLC, as recorded in Document No. 202206016495 of the said Official Public Records, the West corner of the said 24.649 acre tract, an angle point of the said 223.8 acre tract and this tract;

THENCE: Departing the said common line, with the common line of the said 4.998 acre tract and the said 223.8 acre tract the following three courses:

South 01°52'03" East, 422.28 feet to a ½" inch iron rod with yellow plastic cap stamped "Pape-Dawson" set for an angle point;

South 43°21'07" East, 564.42 feet to a ½" iron rod with plastic cap stamped "HMT" found for an angle point;

South 79°28'21" East, 75.70 feet to a ½" iron rod found for the West corner of Lot 28, Block A, Mission Hills Ranch Unit 7B, as recorded in Document No. 200706017898 of the Map and Plat Records of Comal County, Texas, the South corner of the said 4.998 acre tract, an angle point of the said 223.8 acre tract and this tract;

THENCE: South 37°43'10" East, at 1401.53 feet pass a ½" iron rod found for the South corner of Lot 12, Block A, Mission Hills Ranch Unit 5, as recorded in Document No. 200406005650 of the said Map and Plat Records, the West corner of Lot 11, Block A, of the said Mission Hills Ranch Unit 5, in all 1649.22 feet to a ½" iron rod found, for an angle point of a 72.22 acre tract described in a partition deed to Nancy Staats Chafin, as recorded in Document No. 200206016070 of the Official Records of Comal County, Texas, the South corner of the said Lot 11, an exterior corner of the said 223.8 acre tract and this tract;

THENCE: With the common line of the said 72.22 acre tract and the said 223.8 acre tract the following three courses: South 35°01'36" West, 375.84 feet to a 2" metal fence post found for an angle point;

South 23°19'30" East, 361.86 feet to a 2" metal fence post found for an angle point;

South 38°04'13" East, 2,205.27 feet to the remains of a 9" cedar fence post found on the Northwest line of a called 8.42 acre tract described in deed from Leo M. Chafin and wife, Nancy Staats Chafin to Hiram Tavarez and wife, Jana L. Chafin Tavarez, as recorded in Document No. 200206016074 of the said Official Records, for the South corner of a called 0.49 acre tract described in deed from Leo M. Chafin and wife, Nancy Staats Chafin to Hiram Tavarez and wife, Jana L. Chafin Tavarez, as recorded in Document No. 200306047838 of the said Official Records, the East corner of the said 223.8 acre tract and this tract;

THENCE: South 50°42'51" West, with the common line of the said 8.42 acre tract and the said

223.8 acre tract, 293.77 feet to the remains of a 6" cedar fence post found for the North corner of a called 1.09 acre tract described in deed from Carroll B. Lindeman and wife, Kristina Staats Lindeman to Hiram Tavarez and wife, Jana L. Chafin Tavarez, as recorded in Document No. 200306047839 of the said Official Records, the West corner of the said 8.42 acre tract, an angle point of the said 223.8 acre tract and this tract;

THENCE: South 51°42'16" West, departing the said common line, at 59.83 feet pass a ½" iron rod with plastic cap stamped "BYRN" found for a North corner of a called 204.63 acre tract described in a partition deed to Kristina Staats Lindeman, as recorded in said Document No. 200206016070, the West corner of the said 1.09 acre tract, in all 231.85 feet to a ½" inch iron rod with yellow plastic cap stamped "Pape-Dawson" set on a Northwest line of the said 204.63 acre tract, for an angle point of the said 223.8 acre tract and this tract;

THENCE: With the common line of the said 204.63 acre tract and the said 223.8 acre tract the following three courses:

South 51°56'23" West, 913.07 feet to a 60D nail in fence post found for an angle point;

South 54°17'17" West, 149.32 feet to a 60D nail in fence post found for an interior corner of the said 204.63 acre tract, the South corner of the said 223.8 acre tract and this tract;

North 38°08'02" West, 688.62 feet to a ½" iron rod found for the South corner of a called 10.00 acre tract described in deed from C. Frederick Cludius, et al. to New Braunfels Conservation Society, Inc., as recorded in Document No. 201506012095 of the said Official Public Records, an interior corner of the said 223.8 acre tract and this tract;

THENCE: Departing the said common line, with the common line of the said 10.00 acre tract and the said 223.8 acre tract the following four courses:

North 52°33'00" East, 450.06 feet to a ½" iron rod with plastic cap stamped "HMT" found for the East corner of the said 10.00 acre tract, an interior corner of the said 223.8 acre tract and this tract;

North 37°26'57" West, 844.29 feet to a ½" iron rod with plastic cap stamped "HMT" found for the Northeast corner of the said 10.00 acre tract, an angle point of the said 223.8 acre tract and this tract;

North 82°26'42" West, 178.51 feet to a ½" iron rod with plastic cap stamped "HMT" found for the North corner of the said 10.00 acre tract, an angle point of the said 223.8 acre tract and this tract;

South 52°35'51" West, 340.53 feet to a ½" iron rod with plastic cap stamped "HMT" found on a Northeast line of the said 204.63 acre tract, for the West corner

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of the said 10.00 acre tract, an interior corner of the said 223.8 acre tract and this tract;

THENCE: With the common line of the said 204.63 acre tract and the said 223.8 acre tract the following five courses:

North 38°43'13" West, 142.77 feet to a ½" iron rod with plastic cap stamped "HMT" found for an angle point;

North 37°20'05" West, 2,088.94 feet to a 60D nail in fence post found for an angle point;

North 37°24'18" West, 438.74 feet to a 4" square wood post found for an exterior corner of the said 204.63 acre tract, an interior corner of the said 223.8 acre tract and this tract;

South 52°09'43" West, 621.80 feet to a ½" iron rod found for an angle point;

South 52°32'43" West, 816.40 feet to a ½" iron rod with plastic cap stamped "KFW" found for a Southeast corner of a called 200.00 acre tract described in deed from Japhet III LLC et al. to the Board of Trustees of the New Braunfels Independent School District, as recorded in Document No. 201906009101 of the said Official Public Records, an angle point of the said 204.63 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

THENCE: With the common line of the said 200.00 acre tract and the said 223.8 acre tract the following fifteen courses:

North 37°28'08" West, 277.65 feet to a ½" iron rod with plastic cap stamped "KFW" found for an interior corner of the said 200.00 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

North 39°51'50" East, 218.90 feet to a ½" iron rod with plastic cap stamped "KFW" found for an exterior corner of the said 200.00 acre tract, an interior corner of the said 223.8 acre tract and this tract, the beginning of a curve to the right having a radius of 65.00 feet, an arc length of 180.32 feet, a central angle of 158°56'38", a chord bearing and distance of North 29°02'35" East, 127.81 feet;

With the arc of the said curve to the right, 180.32 feet to a ½" iron rod with plastic cap stamped "KFW" found for an exterior corner of the said 200.00 acre tract, an interior corner of the said 223.8 acre tract and this tract, the beginning of a curve to the left having a radius of 15.00 feet, an arc length of 14.56 feet, a central angle of 55°37'57", a chord bearing and distance of North 80°52'32" East, 14.00 feet;

With the arc of the said curve to the left, 14.56 feet to a ½" iron rod with plastic cap stamped "KFW" found for an angle point;

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North 52°34'31" East, 281.33 feet to a ½" iron rod with plastic cap stamped "KFW" found for an angle point; North 30°36'51" East, 134.76 feet to a ½" iron rod with plastic cap stamped "KFW" found for an angle point;

North 52°32'51" East, 474.62 feet to a ½" iron rod with plastic cap stamped "KFW" found for an exterior corner of the said 200.00 acre tract, an interior corner of the said 223.8 acre tract and this tract;

North 41°15'25" West, 123.23 feet to a ½" iron rod with plastic cap stamped "KFW" found for an interior corner of the said 200.00 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

North 40°55'57" East, 629.37 feet to a ½" iron rod with plastic cap stamped "KFW" found for an angle point;

North 44°56'15" East, 90.24 feet to a ½" iron rod with plastic cap stamped "KFW" found for an interior corner of the said 200.00 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

South 45°03'59" East, 149.95 feet to a ½" iron rod with plastic cap stamped "KFW" found for an exterior corner of the said 200.00 acre tract, an interior corner of the said 223.8 acre tract and this tract;

North 44°56'13" East, 640.30 feet to a ½" iron rod with plastic cap stamped "KFW" found for an angle point;

North 07°30'21" East, 59.96 feet to a ½" iron rod with plastic cap stamped "KFW" found for an interior corner of the said 200.00 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

South 82°29'28" East, 67.03 feet to a ½" iron rod with plastic cap stamped "KFW" found for an exterior corner of the said 200.00 acre tract, an interior corner of the said 223.8 acre tract and this tract;

North 07°28'10" East, 440.90 feet to a ½" iron rod with plastic cap stamped "KFW" found on the Southeast line of a remainder of 23 acre tract described in deed from Marie Kirmse to Mary Ann Demuth, as recorded in Volume 842, Page 116 of the said Official Public Records, for the Northeast corner of the said 200.00 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

THENCE: With the common line of the said 23 acre tract and the said 223.8 acre tract the following three courses:

North 66°08'35" East, 76.75 feet to a 60D nail in fence post found for the Southeast corner of the said 23 acre tract, an interior corner of the said 223.8 acre tract and

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this tract;

North 01°46'09" East, 123.77 feet to a ½" iron rod with plastic cap stamped "HMT" found for an angle point;

North 03°07'13" East, at 397.16 feet pass a ¼" iron rod found for the South corner of a called 3.488 acre tract described in deed from Franklin Demuth to Mary Ann Demuth, as recorded in Volume 842, Page 114 of the said Official Public Records, the East corner of the said 23 acre tract, in all 465.17 feet to a ½" iron rod with plastic cap stamped "HMT" found on the common line of the said 3.488 acre tract and the said 223.8 acre tract, for an angle point;

THENCE: With the said common line the following three courses:

North 05°47'21" East, 82.72 feet to a 3" metal fence post found for an interior corner of the said 3.488 acre tract, an exterior corner of the said 223.8 acre tract and this tract;

South 77°04'11" East, 25.29 feet to a 3" metal fence post found for an exterior corner of the said 3.488 acre tract, an interior corner of the said 223.8 acre tract and this tract;

North 17°30'42" East, 469.69 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an exterior corner of this tract;

THENCE: Departing the said common line, over and across the said 223.8 acre tract the following four courses:

South 65°55'47" East, 137.92 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an interior corner of this tract;

North 22°49'19" East, 43.70 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an angle point;

North 21°43'59" East, 251.14 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set for an interior corner of this tract;

North 68°16'01" West, 159.98 feet to a ½" iron rod with yellow plastic cap stamped "Pape-Dawson" set on the common line of the said 3.488 acre tract and the said 223.8 acre tract, for an exterior corner of this tract;

THENCE: North 17°30'42" East, 175.08 feet to a ½" iron rod found on the said Southwest right-of-way line of State Highway 46, for the East corner of the said 3.488 acre tract, the North corner of the said 223.8 acre tract and this tract, from Whence a ½" iron rod found on the said Southwest right-of-way line, for the North corner of the said 3.488 acre tract, bears North 68°02'54" West, 161.52 feet;

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THENCE: South 68°17'16" East, with the said Southwest right-of-way line, 445.63 feet to the POINT OF BEGINNING containing 221.734 acres, more or less, in Comal County, Texas.

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Exhibit B

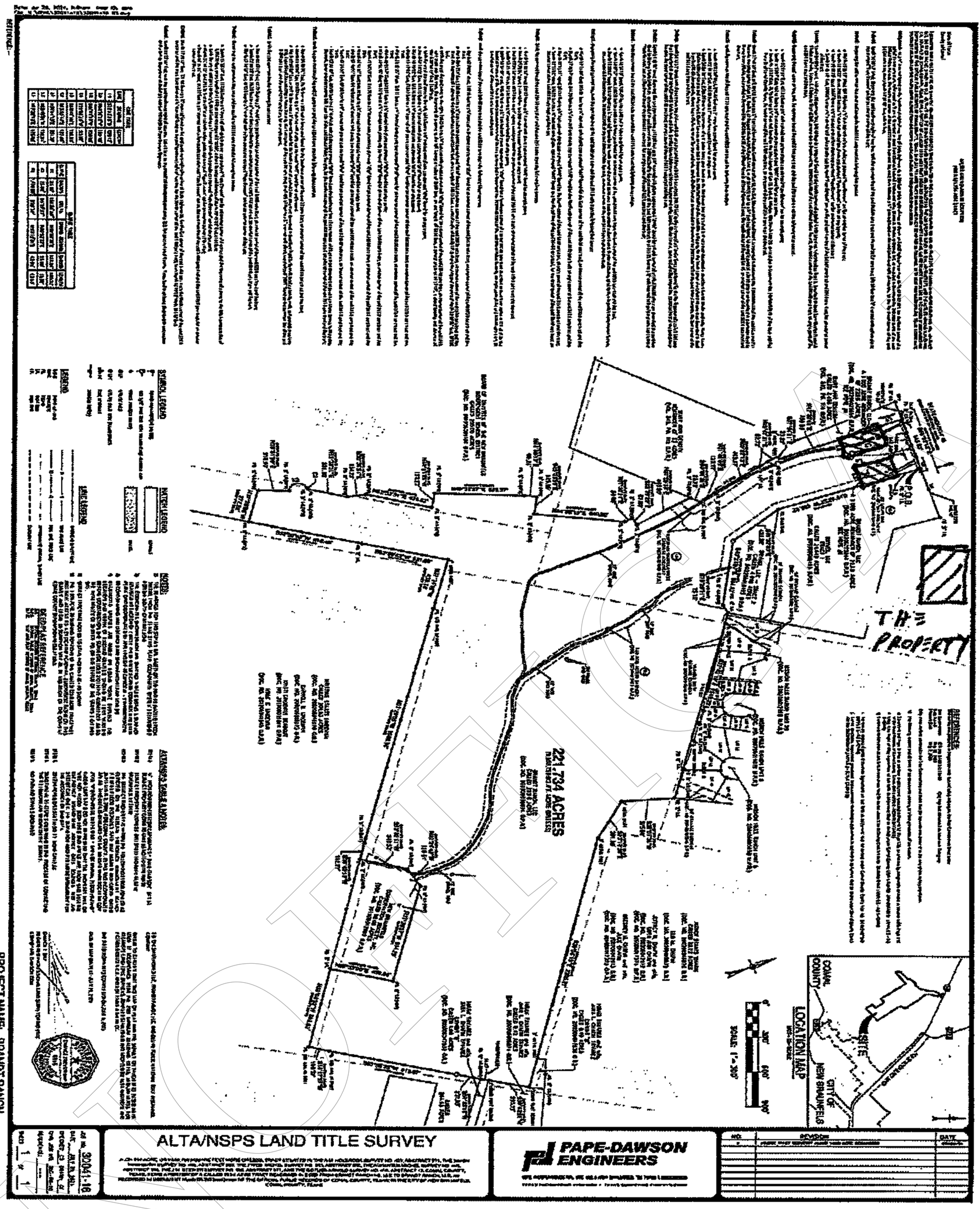
The Assignor Retained Tracts

Those two (2) certain remainder 1.0 acre tracts located in Comal County, Texas, more particularly described as that certain 223.8 acre tract more particularly described in Exhibit "A" attached to that certain special Warranty deed recorded at Document No. 202206028894, Official Public Records of Comal County, Texas, LESS AND EXCEPT the Property (as described in Exhibit A attached hereto). The two (2) tracts comprising the Assignor Retained Tracts are more particularly shown and identified on Exhibit B-1 attached hereto.

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EXHIBIT B-1

THE PROPERTY



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Filed and Recorded
Official Public Records
Bobbie Koepp, County Clerk
Comal County, Texas
12/06/2024 11:00:03 AM
MARY 13 Pages(s)
202406037108

Bobbie Koepp