



QUIDDITY

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San Antonio, Texas 78249
Tel: 210.494.5511
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WATER POLLUTION ABATEMENT PLAN

FOR

TBAR M CAMP EXPANSION

Regulated Entity ID: RNXXXXXXXXXX

Additional ID No: XXXXXXXXX

**Prepared for
Center for Christian Growth, Inc.**



**MAY 2024
Job No. 17758-0001-00**



QUIDDITY

EDWARDS AQUIFER APPLICATION COVER PAGE SECTION

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: T Bar M Camp Expansion					2. Regulated Entity No.:				
3. Customer Name: Center for Christian Growth, Inc.					4. Customer No.: CN604880377				
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):		28.957	
9. Application Fee:	\$6,500		10. Permanent BMP(s):			Vegetative Filter Strips, Bioretention			
11. SCS (Linear Ft.):	3,756		12. AST/UST (No. Tanks):			N/A			
13. County:	Comal		14. Watershed:			Comal River-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)	<input type="checkbox"/> Edwards Aquifer Authority <input type="checkbox"/> Barton Springs/ Edwards Aquifer <input type="checkbox"/> Hays Trinity <input type="checkbox"/> Plum Creek	<input type="checkbox"/> Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	<input type="checkbox"/> Austin <input type="checkbox"/> Buda <input type="checkbox"/> Dripping Springs <input type="checkbox"/> Kyle <input type="checkbox"/> Mountain City <input type="checkbox"/> San Marcos <input type="checkbox"/> Wimberley <input type="checkbox"/> Woodcreek	<input type="checkbox"/> Austin <input type="checkbox"/> Bee Cave <input type="checkbox"/> Pflugerville <input type="checkbox"/> Rollingwood <input type="checkbox"/> Round Rock <input type="checkbox"/> Sunset Valley <input type="checkbox"/> West Lake Hills	<input type="checkbox"/> Austin <input type="checkbox"/> Cedar Park <input type="checkbox"/> Florence <input type="checkbox"/> Georgetown <input type="checkbox"/> Jerrell <input type="checkbox"/> Leander <input type="checkbox"/> Liberty Hill <input type="checkbox"/> Pflugerville <input type="checkbox"/> Round Rock

San Antonio Region					
County:	Bexar	Comal	Kinney	Medina	Uvalde
Original (1 req.)	—	<u>X</u>	—	—	—
Region (1 req.)	—	<u>X</u>	—	—	—
County(ies)	—	<u>X</u>	—	—	—
Groundwater Conservation District(s)	<input type="checkbox"/> Edwards Aquifer Authority <input type="checkbox"/> Trinity-Glen Rose	<input type="checkbox"/> Edwards Aquifer Authority	<input type="checkbox"/> Kinney	<input type="checkbox"/> EAA <input type="checkbox"/> Medina	<input type="checkbox"/> EAA <input type="checkbox"/> Uvalde
City(ies) Jurisdiction	<input type="checkbox"/> Castle Hills <input type="checkbox"/> Fair Oaks Ranch <input type="checkbox"/> Helotes <input type="checkbox"/> Hill Country Village <input type="checkbox"/> Hollywood Park <input type="checkbox"/> San Antonio (SAWS) <input type="checkbox"/> Shavano Park	<input type="checkbox"/> Bulverde <input type="checkbox"/> Fair Oaks Ranch <input type="checkbox"/> Garden Ridge <input checked="" type="checkbox"/> New Braunfels <input type="checkbox"/> Schertz	NA	<input type="checkbox"/> 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.

Darren J McAfee, P.E.

Print Name of Customer/Authorized Agent

Darren McAfee

5/8/2024

Signature of Customer/Authorized Agent

Date

****FOR TCEQ INTERNAL USE ONLY****

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



QUIDDITY

GENERAL INFORMATION SECTION

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: Darren J. McAfee, P.E.

Date: 5/8/2024

Signature of Customer/Agent:



Project Information

1. Regulated Entity Name: T Bar M Camp Expansion
2. County: Comal
3. Stream Basin: Blieders Creek
4. Groundwater Conservation District (If applicable): Comal Trinity GCD, 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: John MacDonald

Entity: Center for Christian Growth, Inc.

Mailing Address: 2549 W State Hwy 46

City, State: New Braunfels, TX

Zip: 78132

Telephone: 830-620-4263

FAX: _____

Email Address: johnmac@tbarm.org

8. Agent/Representative (If any):

Contact Person: Darren J. McAfee, P.E.

Entity: Quiddity Engineering, LLC

Mailing Address: 4350 Lockhill Selma Rd., Suite 100

City, State: San Antonio, TX

Zip: 78249

Telephone: 210-546-0053

FAX: _____

Email Address: dmcafee@quiddity.com

9. Project Location:

☒ The project site is located inside the city limits of New Braunfels.

☐ 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.

The site is located within the city limits of New Braunfels, located off the intersection of SH 46 and FM 1863, approximately 1.45 miles northwest of Loop 337. The proposed site entrance off FM 1863 is approximately 0.25 miles southwest of the intersection. The proposed site entrance off SH 46 is approximately 0.30 miles northwest of the 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: June 1, 2024

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

Location Map

Legend



Google Earth

1000 ft

Attachment B

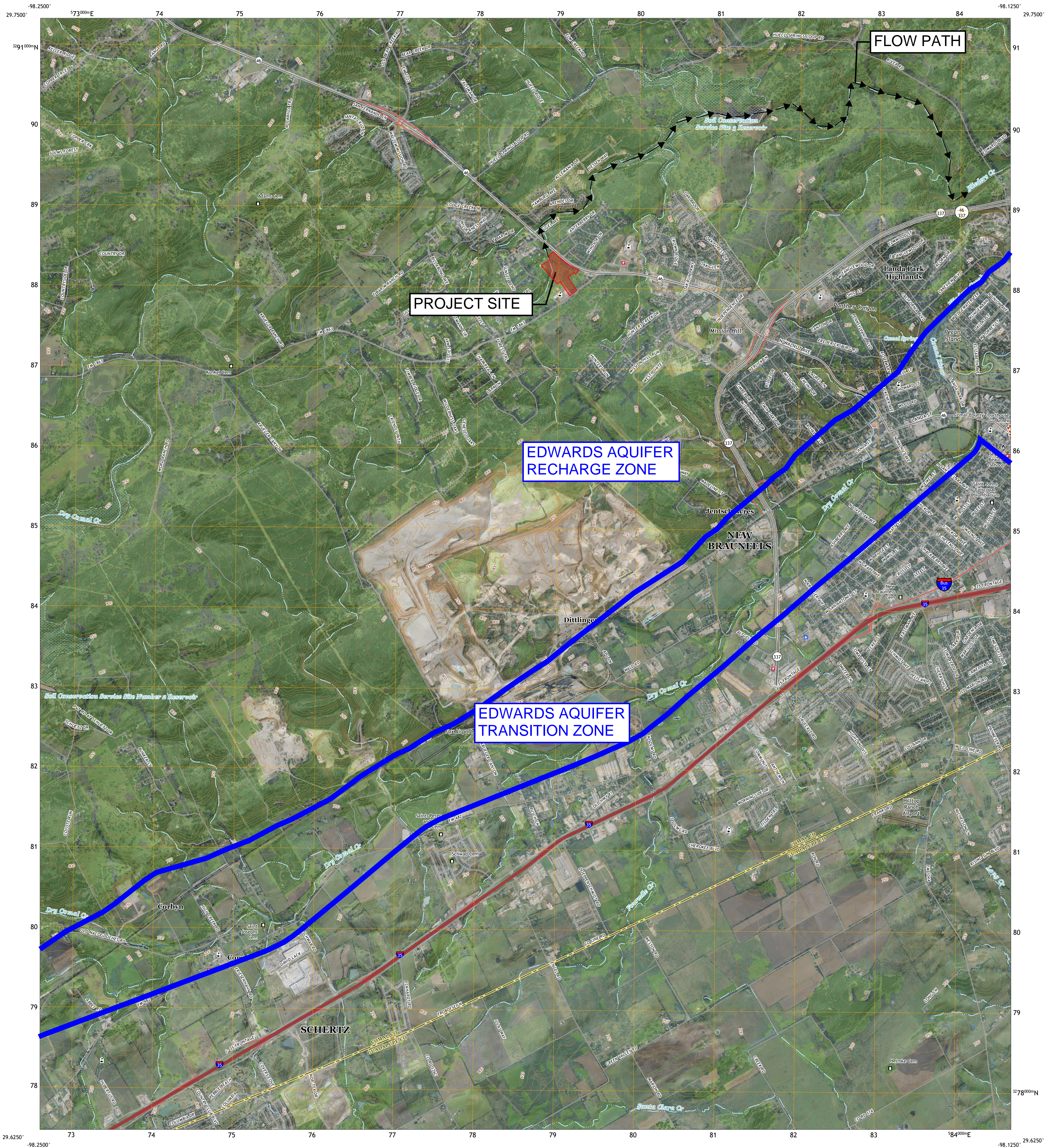
USGS Map



U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY



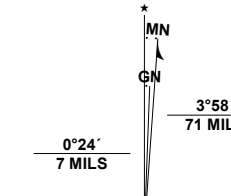
NEW BRAUNFELS WEST QUADRANGLE
TEXAS
7.5-MINUTE SERIES



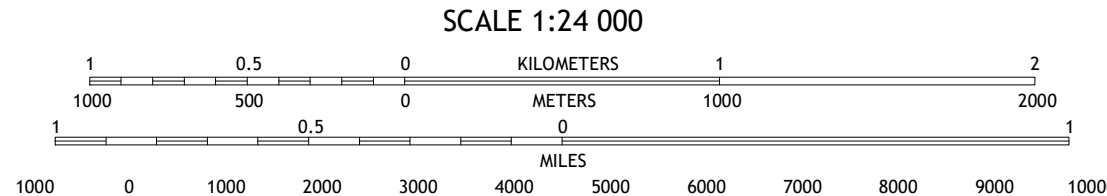
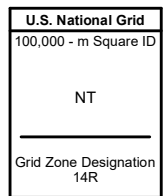
Produced by the United States Geological Survey

North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid/Universal Transverse Mercator, Zone 14R.
This map is not a legal document. Boundaries may be
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.

Imagery.....NAIP, September 2016 - November 2016
Roads.....U.S. Census Bureau, 2015 - 2019
Names.....GNIS, 1979 - 2022
Hydrography.....National Hydrography Dataset, 2000 - 2018
Contours.....National Elevation Dataset, 2021
Boundaries.....Multiple sources; see metadata file, 2019 - 2021
Wetlands.....FWS National Wetlands Inventory, Not Available



UTM GRID AND 2019 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the
National Geospatial Program US Topo Product Standard.



QUADRANGLE LOCATION

1	2	3
4	5	6
7	8	

1 Smithson Valley
2 Sattler
3 Hunter
4 Bat Cave
5 New Braunfels East
6 Schertz
7 Marlon
8 McQueeney

ROAD CLASSIFICATION	
Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD
Interstate Route	US Route
	State Route

NEW BRAUNFELS WEST, TX
2022



Attachment C

PROJECT DESCRIPTION

The T Bar M Camp Expansion is a 28.957-acre commercial lot, located at 2549 West SH Highway 46 in New Braunfels, Texas, within Comal County. The proposed development will be an expansion of the existing T Bar M Camp Retreat facilities directly northwest of the proposed lot. The site mainly consists of uncleared/undeveloped land, with one existing tract that currently has a residential house and unpaved driveway on the property. This residential house is serviced by an on-site water supply well located approximately 90 feet south of the structure and is covered and housed within a wooden well-house structure. The residential house is also serviced by a residential septic tank that is approximately 8 feet by 6 feet in dimension and is located approximately 70 feet west of the structure. There are two existing concrete-lined ponds onsite; one located approximately 200 feet northwest of the residential structure and one located approximately 552 feet south of the north property corner. The project is within the Edwards Aquifer Recharge Zone and the Comal Trinity Groundwater Conservation District. No part of the project site falls within the 100-year floodplain per FEMA firm panel #48091C0435F, dated September 2, 2009.

The proposed use of the site will be an expansion of the adjacent T Bar M Camp Retreat facilities to be used as a family and day camp. The new facilities will include new buildings, paved roads and parking, sports courts, walking paths, and a detention pond. The existing residential structure, septic tank, concrete-lined ponds, unpaved driveway will be demolished. The proposed facilities will be developed over 3 phases of construction. The impervious cover of the site will be 8.39 acres, or 28.97%, at ultimate build-out conditions. There are 143.0 acres of upgradient runoff that flows through a natural dry drainage channel to an unnamed tributary. This unnamed tributary's ultimate outfall is Blieder's Creek. Of this acreage, 0.89 acres will be treated through a bioretention facility, with 0.19 acres of that being impervious. The total impervious area that will be treated for TSS removal is 8.58 acres.

The on-site detention pond will be used for detention only. The proposed permanent BMP's for TSS removal includes natural and engineered vegetative filter strips and bioretention (separate from detention pond). The vegetative filter strips will be used to treat the runoff from the paved streets and paved parking. Bioretention facilities will be used to treat the runoff from the buildings.



QUIDDITY

GEOLOGIC ASSESSMENT SECTION

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: Richard V. Klar, P.G.

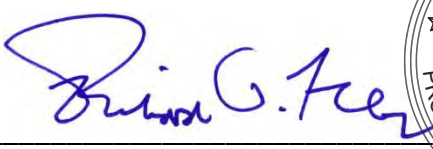
Telephone: 210-699-9090

Date: August 8, 2023

Fax: 210-699-6426

Representing: Raba Kistner, Inc., TBPG Firm #50220 / TBPE Firm #3257 for Quiddity Engineering LLC. (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:


 **8/2/2023**

Regulated Entity Name: T Bar M Camp Expansion – 28.96 Acres

Project Information

1. Date(s) of Geologic Assessment was performed: April 29, 2022 and July 11, 2023
2. Type of Project:

☒ WPAP

☐ AST

☒ SCS

☐ 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)
Rumple-Comfort association, undulating (RUD)	C	Veneer to 4 feet

**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 thickness 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" = 80'

Site Geologic Map Scale: 1" = 80'

Site Soils Map Scale (if more than 1 soil type): See Site Geologic Map

9. Method of collecting positional data:

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

10. ☒ The project site 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 11 (#) test holes/well present on the project site and the locations are shown and labeled. (Check all of the following that apply.)

☒ The test holes are not in use and have been properly abandoned.

☐ The wells are not in use and will be properly abandoned.

☒ The well is in use and complies with 16 TAC Chapter 76.

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

Administrative Information

☒ 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.

ATTACHMENTS

ATTACHMENT A

GEOLOGIC ASSESSMENT TABLE
(TCEQ-0585-TABLE)

COMMENTS TO GEOLOGIC ASSESSMENT TABLE

SOIL PROFILE

GEOLOGIC ASSESSMENT TABLE						PROJECT NAME: <div>T Bar M Camp Expansion - 28.96 Acres - New Braunfels, Comal County, Texas</div> <div>(RKI Project No. ASF15-092-01)</div>															
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								<40	≥40		<1.6	≥1.6	
S-1	N29 43 25.69	W98 11 3.42	SF	20	Kep	8.0	10.0		N-S		1/FT	0.5-1	F	6	26	✓		✓			Hilltop
S-2	N29 43 19.43	W98 10 54.50	CD	5	Kep	6.5	6.0	1.5					F	6	11	✓		✓			Hilltop
S-3	N29 43 16.75	W98 11 2.38	CD	5	Kep	24.0	66.0	3.0					X	6	11	✓			✓		Drainage
S-4	N29 43 20.88	W98 11 2.49	CD	5	Kep	12.0	12.0	2.5					X	6	11	✓			✓		Drainage
S-5	N29 43 23.04	W98 11 0.77	F	20	Kep	854.0	10.0		NE-SW	10			C / F	8	38	✓			✓		Drainage
S-6	N29 43 14.36	W98 11 0.16	MB (Well)	30	Kep	0.3	0.3	~400-425 ⁽¹⁾					N	35	65		✓	✓			Hilltop
S-7	N29 43 15.34	W98 11 0.94	MB (Septic)	30	Kep	8.0	6.0	~6.0					F / X	8	38	✓		✓			Hilltop
S-8	N29 43 23.55	W98 11 3.85	MB (SS)	30	Kep	1,404.0	0.25	~3.0-4.0					F	6	36	✓			✓		Drainage
S-9	N29 43 19.05	W98 11 7.21	MB (PTH, B-1)	30	Kep	8.0	0.5	20.0					Z	5	35	✓		✓			Hilltop
S-10	N29 43 19.25	W98 11 5.75	MB (PTH, B-2)	30	Kep	8.0	0.5	20.0					Z	5	35	✓		✓			Hilltop
S-11	N29 43 16.76	W98 11 3.75	MB (PTH, B-3)	30	Kep	8.0	0.5	20.0					Z	5	35	✓		✓			Hilltop
S-12	N29 43 16.43	W98 11 0.94	MB (PTH, B-4)	30	Kep	8.0	0.5	20.0					Z	5	35	✓		✓			Hilltop
S-13	N29 43 13.70	W98 10 59.16	MB (PTH, B-5)	30	Kep	8.0	0.5	20.0					Z	5	35	✓		✓			Hilltop
S-14	N29 43 15.14	W98 10 57.87	MB (PTH, B-6)	30	Kep	8.0	0.5	20.0					Z	5	35	✓		✓			Hilltop
S-15	N29 43 15.64	W98 10 56.56	MB (PTH, B-7)	30	Kep	8.0	0.5	20.0					Z	5	35	✓		✓			Hilltop
S-16	N29 43 18.40	W98 11 0.22	MB (PTH, B-8)	30	Kep	8.0	0.5	20.0					Z	5	35	✓		✓			Hilltop
S-17	N29 43 22.05	W98 11 2.65	MB (PTH, B-9)	30	Kep	8.0	0.5	20.0					Z	5	35	✓		✓			Hilltop
S-18	N29 43 23.86	W98 11 1.88	MB (PTH, B-10)	30	Kep	8.0	0.5	20.0					Z	5	35	✓		✓			Hilltop

* DATUM: **NAD 83**

Features: SS = sanitary sewer utility; Well = water-supply well; Septic = septic system; PTH = plugged geotechnical test hole.

Formation: Kep = Person Formation

1. The onsite well depth is unknown. The depths are estimated based on surrounding water wells.

2A TYPE	TYPE	2B POINTS	8A INFILLING
C	Cave	30	N None, exposed bedrock
SC	Solution cavity	20	C Coarse - cobbles, breakdown, sand, gravel
SF	Solution-enlarged fracture(s)	20	O Loose or soft mud or soil, organics, leaves, sticks, dark colors
F	Fault	20	F Fines, compacted clay-rich sediment, soil profile, gray or red colors
O	Other natural bedrock features	5	V Vegetation. Give details in narrative description
MB	Manmade feature in bedrock	30	FS Flowstone, cements, cave deposits
SW	Swallow hole	30	X Other materials: Concrete-lined (Features S-3 and S-4) and granular bedding materials for the septic system (Feature S-7) and sewer utility trench (Feature S-8).
SH	Sinkhole	20	
CD	Non-karst closed depression	5	Z Soil cuttings for geotechnical test holes (Features S-9 through S-18).
Z	Zone, clustered or aligned features	30	12 TOPOGRAPHY
			Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed

I have read, I understood, and I have followed the Texas Natural Resource Conservation Commission'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 213.



Date: 8/2/2023

Sheet 1 of 1

COMMENTS TO GEOLOGIC ASSESSMENT TABLE
T Bar M Camp Expansion – 28.96 Acres
New Braunfels, Comal County, Texas

The locations of the following features are indicated on the *Site Geologic Map* provided as *Attachment D* of this report.

Karst Feature

Feature S-1 consists of solution-enlarged fractures in a limestone outcrop measuring approximately 8 x 10 feet in plan view. This feature is located near the north property corner. The limestone exposure is generally consistent along the 840 foot elevation contour interval. The fractures shown are oriented at approximately 170° (N-S). The fracture density was observed to be one per foot with apertures ranging from approximately 6 inches to 1 foot. Fracture infilling consisted of fine, compact soils. At the time field activities were conducted, there was no direct or indirect evidence of capacity for rapid infiltration.



Non-Karst Closed Depression



Feature S-2 is located within the northeast portion of the subject property near State Highway 46 and is classified as a non-karst closed depression. The feature dimensions are 6.5 x 6 x 1 feet in length, width and depth, respectively. The long axis of this feature is oriented E-W. The feature was apparently formed by animal burrowing and is completely contained within the soil horizon. At the time field activities were conducted, there was no direct or indirect evidence of capacity for rapid infiltration.

Feature S-3 consists of concrete-lined pond measuring approximately 24 x 66 feet in plan view. The pond is located approximately 200 feet northwest of the existing residential structure within an existing drainage channel (i.e., tributary to Blieders Creek). As depicted in the photograph, the pond was observed filled with water and water plants. It is inferred that the cementitious materials comprising the pond liner extend through soils to depths greater than approximately 3 feet, intersecting the underlying limestone bedrock (Person Formation).



Feature S-4 consists of concrete-lined pond similar to **Feature S-3** measuring approximately 12 x 12 feet in plan view. The pond is located approximately 552 feet south of the north property corner within the Blieders Creek tributary. The pond was observed filled with water. It is inferred that the cementitious materials comprising the pond liner extend through soils to depths greater than approximately 2.5 feet, intersecting the underlying limestone bedrock (Person Formation).

Fault

Feature S-5

The fault (**Feature S-5**) was mapped based on review of the published geologic reference entitled *Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop* (Small and Hanson, 1994). Field evidence of faulting was not observed near the mapped location or surrounding vicinity. In addition to the field reconnaissance efforts, **Raba Kistner, Inc.** inspected historical aerial photography of the area via Google Earth™ from years 1995 to 2023. No evidence of faulting or pervasive lineations were observed in the aerial photographs. Therefore, the location of this feature is inferred as indicated on the **Site Geologic Map** by the dashed line.

Manmade Features in Bedrock (MB)

Feature S-6 (Sanitary Sewer Line-Trench)

Feature S-6 consists of trench for an existing sanitary sewer utility that extends from the Sanctuary building within the existing T Bar M Camp area into the assessment area along the north property boundary. The sanitary sewer utility extends through the north-central portion of the assessment area

terminating along the west-central property boundary. The existing utility location data was provided by Quiddity (2023). Sanitary sewer manholes were not observed during field reconnaissance activities. It is inferred that the trench hosting the sanitary sewer utility is approximately 3 feet wide and installed to depths of approximately 3 to 4 feet. The length of the trench within the assessment area is estimated to be 1,404 feet.

Feature S-7 (Water-Supply Well)

Feature S-7 is a water-supply well likely completed in the Edwards Aquifer. The wellhead is located approximately 90 feet to the south of the residential structure. The well has a 4-inch polyvinyl chloride (PVC) surface casing with an associated submersible pump and a pressure tank, and is covered and housed within a wooden well-house structure. Review of the Texas Water Development Board (TWDB) Well Registration Database did not indicate any information regarding this well; however a nearby water-supply well located approximately 1,415 feet to the northwest (i.e., within the Mission Valley Estates subdivision) is reportedly installed to a depth of 421 feet in the Edwards Aquifer.



Feature S-8 (Septic System)

Feature S-8 is a septic system of unknown size located approximately 70 feet to the west of an existing residential structure. It is assumed to be approximately 10 feet long, 5 to 10 feet wide, and 6 feet deep based on typical septic system dimensions. It is inferred that the base of the septic system is installed into the limestone bedrock of the underlying Person Formation. Cleanouts and an apparent leach field were observed within the vicinity of the residential structure.



Features S-9 through S-18 (Plugged Geotechnical Test Holes):

Features S-9 through S-18 consist of plugged geotechnical test holes installed by Rock Engineering and Testing Laboratory, LLC in April 2023 to support the construction of additional cabins for the T Bar M Camp. A total of ten test holes were drilled within the project site to depths of approximately 20 feet below the existing ground surface using air-rotary methods. According to the geotechnical test hole log data, a dark brown to reddish-brown clay stratum ranging from a few inches to approximately 4 feet was encountered underlain by very hard tan limestone comprising the top of the Edwards formation. Shallow

groundwater was not observed during drilling operations. Based on the referenced geotechnical report and observations in conjunction with field reconnaissance activities, the test holes were backfilled with soil cuttings following completion of drilling activities. No evidence of the test holes were observed during the field mapping effort.

SOIL PROFILE
T Bar M Camp Expansion – 28.96 Acres
New Braunfels, Comal County, Texas

SOIL SERIES	THICKNESS ON SITE	DESCRIPTION
Rumple Comfort	Veneer to 4 feet	<i>Rumple-Comfort-association, undulating (RUD):</i> Rumple soils make up about 60% of this association and are on broad ridge tops and side slopes. The surface layer is dark reddish brown very cherty clay loam about 10 inches thick with rounded chert, limestone cobbles and gravel cover about 20% of the surface. The subsoil is dark reddish brown very cherty clay to approximate depth of 14 inches and dark reddish brown extremely stony clay to a depth of about 28 inches. The surface layer of the Comfort soil is dark brown, neutral, extremely stony clay about 7 inches thick. The subsoil is dark reddish brown, mildly alkaline, extremely stony clay to a depth of 12 inches. The underlying material for both Rumple and Comfort soils is indurated fractured limestone fragments

The preceding table was prepared based on information provided in the *Soil Survey of Comal and Hays Counties, Texas (1984)* in addition to field observations. As presented on the attached ***Site Geologic Map***, native soils mapped for the entire project are classified as Rumple-Comfort association, undulating (RUD). RUD soils are weakly-developed and relatively thin, occurring over weathered limestone units of the Person Formation. RUD soils are noted to have medium runoff and moderate hazard for erosion. The RUD soils are characterized as having a very low water capacity and a moderately slow permeability of approximately 0.06 to 0.6 inches per hour, considering both included soil types. RUD soils have a very slow infiltration when the soils are thoroughly wet and rapid infiltration when the soils are dry.

Reported test hole data (Rock, 2023) indicates that surface soils vary in thickness, ranging from approximately 0.25 to 4 feet and consisting of dark brown to reddish-brown clay soils overlying limestone rock units. The geotechnical drilling data is generally consistent with the published soil information presented above.

ATTACHMENT B

STRATIGRAPHIC COLUMN

STRATIGRAPHIC COLUMN
T Bar M Camp Expansion – 28.96 Acres
New Braunfels, Comal County, Texas

STRATIGRAPHIC FORMATION	THICKNESS	DESCRIPTION
Edwards Limestone (Ked) <u>Person Formation</u> (Kep)	180-224 feet	Unit consists of gray to light tan marly limestone. Identified in the field by the presence of <i>Waconella wacoensis</i> .
<i>Cyclic and Marine Members, undivided</i>	80–100 feet	Unit consists of massive mudstone to packstone; <i>miliolid</i> grainstone; and chert. Identified in the field by cycles of massive beds to relatively thin beds. <i>Isolated exposures observed throughout the SITE.</i>
<i>Leached and Collapsed Members, undivided</i>	80–100 feet	Unit consists of crystalline limestone, mudstone to grainstone and chert. Identified in the field by bioturbated iron-stained beds separated by massive limestone beds. <i>Not exposed at the SITE.</i>
<i>Regional Dense Member</i>	20–24 feet	Unit consists of dense, argillaceous mudstone. Identified in the field by wispy iron-oxide stains. <i>Not exposed at the SITE.</i>

Note: Stratigraphic Column adapted from Small and Hanson (1994) and Collins (2000).

ATTACHMENT C

NARRATIVE OF SITE SPECIFIC GEOLOGY

SITE GEOLOGY NARRATIVE
T Bar M Camp Expansion – 28.96 Acres
New Braunfels, Comal County, Texas

Introduction

The following discussion is a site-specific assessment of existing geological conditions and potential recharge features within the referenced project site (hereinafter referred to as SITE). This assessment was performed by **Raba Kistner, Inc. (RKI)** for Quiddity Engineering LLC, pursuant to applicable Edwards Aquifer Protection Program Rules as specified in *Title 30 of the Texas Administrative Code, Section 213 (30 TAC §213, effective April 24, 2008)*. This assessment report is in the format required by the Texas Commission on Environmental Quality (TCEQ) for the Geologic Assessment portion of a Water Pollution Abatement Plan (WPAP) and/or Sewage Collection System (SCS) Plan, and was prepared in accordance with the revised *Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones (TCEQ-0585)*, which are applicable to submittals received by the TCEQ after October 1, 2004.

This geologic assessment report documents conditions observed by **RKI** within the project boundaries on April 28, 2022, May 2, 2022, and July 11, 2023. The SITE was fully reassessed in July 2023 to support the current land development plan as further discussed in the WPAP.

Site Description

Site Location. The overall tract to be developed, which is located northwest of State Highway (SH) 46 and Farm-to-Market (FM) 1863 intersection, comprises approximately 28.96 acres. The SITE is primarily undeveloped, but hosts a former residential structure. Based on review of official maps published by the TCEQ, the SITE is fully located within the Edwards Aquifer Recharge Zone (EARZ). As such, the performance of a geologic assessment is required to facilitate planned construction activities in accordance with applicable provisions set forth in the Edwards Aquifer Protection Program (EAPP) rules.

RKI understands that planned improvements include main structures, cabins, tennis courts, and roadway, in addition to the installation of a SCS system, which comprises approximately 2,900 linear feet of an 8-inch diameter polyvinyl chloride (PVC) sanitary sewer line. In accordance with TCEQ requirements, the full extent of the proposed SCS alignment and surrounding 50-foot buffer zone were fully assessed in conjunction with Geologic Assessment activities.

As presented on the attached **Site Geologic Map**, adjacent properties include: T Bar M Camp to the northwest; SH 46 to the north/northeast with commercial (Standard Casualty Company) and single-family residential development (Northwoods Subdivision) beyond; residential property to the east; FM 1863 and vacant land beyond to the south; school development to the southwest (New Braunfels Christian Academy); and single-family residential development to the west (Mission Valley Estates).

Topography and Drainage. Topographic contours on the U.S. Geological Survey (USGS, 2022) 7.5-minute topographic map (i.e. New Braunfels West Quadrangle) were reviewed to evaluate the general surface conditions and drainage patterns along with more detailed 2-foot topographic contours obtained from the

Comal County Geographic Information System (GIS) Hub (i.e., open data portal) (CCEO, 2023) are depicted on the **Site Geologic Map**. The SITE consists of a gently sloping hillside characterized by hilltop topography. The property is transected from north to the southwest by an unnamed tributary to Blieders Creek. Maximum elevations occur along the south property boundary near FM 1863 on the order 886 feet relative to mean sea level (msl), which slopes to a minimum elevation of 831 feet msl along the unnamed tributary to Blieders Creek at the north property boundary.

The surface drainage patterns for the majority of the SITE are locally to the north/northwest toward the unnamed tributary. The majority of drainage across the SITE occurs as sheet flow directed toward the unnamed tributary, which reaches a confluence with Blieders Creek approximately 0.2 miles north beyond the SITE boundary. A review of the Flood Insurance Rate Map (FIRM 48091C0435F, FEMA, September 2, 2009) indicates that no portion of the SITE is within the 100-year floodplain. The SITE is fully within Zone X as designated on official maps (i.e., an area determined to be outside of the defined 0.2% annual probability floodplain area).

Historical Property Use. Although research pertaining to past SITE operations and historical land use activities was beyond the scope of this assessment, historical aerial imagery was reviewed to evaluate past land use and the presence of lineations that could indicate the presence of normal faulting. The following aerial photographs Google Earth™ were reviewed: 1995, 2005, 2008, 2010, 2012 through 2021, and 2023. The 1995 aerial photograph indicates a single residential structure and caliche drive within the south-central portion of the property. The 2005 through 2010 aerial photographs indicate small structures in the northwest corner of the property with additional small shed-like structures installed in 2012. The SITE remain unchanged in the aerial photographs from 2013 to 2023. With the exception of the few structures on the property, the SITE is heavily vegetated.

Classification of Recharge Features: As further described herein, 18 recharge features were identified within SITE boundaries including a solution-enlarged fracture outcrop, non-karst closed depressions, manmade features (i.e., water well, a septic system, sanitary sewer utility line, and test holes), in addition to an inferred normal fault. The significance of these features was assessed using definitions and guidance provided in *Instructions to Geologists (TCEQ-0585-Instructions, revised October 1, 2004)*. All features within the SITE that met the criteria presented in this reference were mapped. The characteristics of all mapped features and the assessments of these features, as defined by the TCEQ, are presented in the attached **Geologic Assessment Table (TCEQ-0585-Table)**.

Stratigraphy

As presented in the attached **Stratigraphic Column**, information pertaining to the lithologies and thickness of geologic units underlying the SITE was primarily taken from Collins (2000) and Small and Hanson (1994). Collective published data referenced indicate that the Person Formation (Kep) underlies the SITE. As depicted on the **Site Geologic Map**, the Kep is commonly divided into three distinct members: (i) Cyclic and Marine Member, undivided – mudstone to packstone, grainstone, and chert; (ii) Leached and Collapsed Member, undivided - unit includes crystalline limestone, mudstone to grainstone, and chert; and (iii) Regional Dense Member - unit consists of dense, carbonate mudstone. The reported total thickness of the Kep in the SITE vicinity is on the order of 180 to 224 feet. The uppermost or Cyclic and Marine member of the Kep represents the portion of the Edwards Limestone directly underlying the west

portion of the SITE to depths on the order of 80 to 100 feet. Based upon the work of Maclay (1995), this unit contains many open fractures and possesses low matrix permeability with total porosity on the order of 5 to 10%. Patch exposures of the Kep were observed along the Blieders Creek tributary.

Structure

This SITE is located along the southern edge of the Balcones Fault Zone and, as such, is expected to exhibit a similar structural trend. The Balcones Fault Zone generally consists of a northeast-southwest trending, *en echelon* normal fault system, which juxtaposes Upper Cretaceous lithologies in the southeast with Lower Cretaceous lithologies in the northwest. As a result of this large-scale regional faulting, minor internal fault sequences and fractures exist within this zone, which generally follow the same structural trend and accommodate localized displacement.

Based on review of historical aerial photographs, published maps, and in conjunction with field mapping efforts, no indications of lineations that could be associated with normal faulting were identified within the boundaries of the SITE. Small and Hanson (1994) mapped a fault that transects near the north portion of the SITE, designated herein as **Feature S-18**. This feature is described as a normal fault that juxtaposes the younger Del Rio Clay formation to the northwest with older Edwards Limestone to the southeast in the SITE vicinity. However, as direct evidence of faulting (e.g., lineations, changes in soil type and vegetation, fractured rock outcrops, etc.) was not observed near the mapped fault or in the surrounding vicinity, the location is inferred as indicated by dashed lines on the **Site Geologic Map**. Any direct or indirect evidence of faulting may be obscured by the presence of soil cover.

This feature is classified as not sensitive, based upon the lack of discrete recharge openings along the inferred fault trace and low relative infiltration rate of overlying clay soils (i.e., no evidence of capacity for rapid infiltration). This classification is based upon the point assignment criteria presented in the **Geologic Assessment Table (TCEQ-0585)** and professional judgment.

Karst Feature

A solution enlarged fracture outcrop (**S-1**) is located near the north property corner of the SITE and formed the Person Formation. **Feature S-1** is approximately 8 feet in length and 10 feet in width and is oriented N-S. Fracture density was observed to be one per foot with apertures ranging from approximately 0.5 to 1 foot. Collective field observations indicate that the fractures are limited to the surface and do not connect to larger subsurface karst features openings.

This feature is classified as not sensitive owing to the inferred surficial erosional origin; extent limited to the surface with no connection to underlying limestone, and estimated low relative infiltration rates (i.e., no evidence of rapid infiltration capacity).

Non-Karst Closed Depressions

Three non-karst closed depression (NKCD) were identified throughout the SITE. These features penetrate the surface soils that were not formed by karst processes. No indications of direct drainage or rapid

infiltration were observed in connection with these features. The following is a brief description of these features:

Feature S-2 was apparently formed by animal burrowing and measures approximately 6.5 x 6 x 1 feet in length, width and depth, respectively. The feature is completely contained within the soil horizon. At the time field activities were conducted, there was no direct or indirect evidence of capacity for rapid infiltration.

Features S-3 and S-4 are manmade concrete-lined ponds with brick coping. The larger pond measures approximately 24 feet in length and 66 feet in width and the smaller pond measures approximately 12 feet in length and width. The depths of these features range from approximately 2.5 to 3 feet. These ponds are located along the unnamed tributary to Blieders Creek and were holding water at the time of field reconnaissance.

These non-karst closed depression features do not have capacity for rapid infiltration of surface runoff and are therefore considered not sensitive based upon the point assignment criteria set forth in the **Geologic Assessment Table (TCEQ-0585)** and professional judgment.

Manmade Features

As presented on the **Site Geologic Map**, thirteen manmade features were identified that may potentially serve to enhance the transmission of surface runoff to the subsurface. The features consist of a sanitary sewer utility trench, an existing domestic water well, residential septic system, in addition to plugged geotechnical test holes. Information regarding the location of the existing utility trench was gleaned from the Site Plan Exhibit prepared by Quiddity, the project civil engineer (provided to **RKI** on June 26, 2023), in addition to field observations of a well-house and cleanouts. The following is a brief description of the features that were identified excluding geotechnical test holes:

Feature S-6 is a domestic water-supply well completed in the Edwards Aquifer. Review of the Texas Water Development Board website does not indicate any information regarding this well. It is estimated the well is approximately 400 to 425 in depth based on review of water wells within the SITE vicinity, which extend into the underlying Edwards Limestone. This feature is classified as sensitive, having a high potential of transmitting fluids into the Edwards Aquifer if the well casing was to become compromised. At the time field mapping activities were conducted, the well was operational and the casing was found to be in good condition.

Feature S-7 is a residential septic system estimated to be approximately 8 feet long by 6 feet wide based on typical septic system dimensions. It is likely installed up to 6 feet deep into the underlying bedrock of the Person Formation. This feature is classified as not sensitive considering typical septic system design criteria, which facilitates controlled infiltration to the subsurface, and the absence of natural karst features observed in proximity.

Feature S-8 is an existing sanitary sewer utility trench (Quiddity, 2023). The utility trench is inferred to be approximately 3 feet wide and installed to depths of approximately 3 to 4 feet into the underlying bedrock of the Person Formation. This feature is classified as not sensitive.

Although not directly observable, it is inferred that the subgrade trenches (**Features S-7** and **S-8**) are backfilled in accordance with standard construction practices that include the use of structural fill soils (e.g., base course materials, limestone gravel, compacted clay soils, etc.) overlain by native or fill soils, depending upon location and surface improvements. These trenches were not observed in conjunction with any naturally occurring recharge features. Although the backfilled trenches may exhibit a somewhat greater relative infiltration rate than the surrounding soil/rock strata underlying the project boundaries, these manmade features were collectively classified as not sensitive, having a low potential of preferentially transmitting fluids into the Edwards Aquifer. This classification is based upon the point assignment criteria presented in the **Geologic Assessment Table (TCEQ-0585)** and professional judgment.

Information regarding the locations of the geotechnical test holes were gleaned from the Preliminary Subsurface Exploration, Laboratory Testing Program, and Geotechnical Discussion report prepared by Rock Engineering and Testing Laboratory, LLC, dated May 10, 2023 (provided to **RKI** by Quiddity on June 26, 2023). There were no remaining field indications of these plugged test holes. The following is a discussion of the features that were identified:

Features S-9 through S-18 consist of geotechnical borings installed by Rock Engineering and Testing Laboratory, LLC as part of the referenced geotechnical engineering study (Rock, 2023). These were reportedly installed with air rotary to maximum total depths of approximately 20 feet. Borings generally encountered very stiff dark brown to reddish-brown clay soils to depths of approximately 3 inches to 4 feet. Below these depths, a hard, tan limestone consisting of the uppermost part of the Edwards Limestone was reported. These logging observations are consistent with mapped soil and rock types. No groundwater was observed during drilling operations. These logging observations are consistent with mapped soil and rock types. No shallow groundwater was observed during drilling operations.

These features are collectively classified as not sensitive as they have been plugged and no longer exist. The former locations of these features are included on the **Site Geologic Map**.

Potential for Fluid Migration to the Edwards Aquifer

The majority of the SITE is overlain with clay soils having very slow published infiltration rates. Based on our review of SITE geology, topography and drainage conditions, in addition to the results of our detailed mapping efforts, the overall potential for fluid movement (i.e. surface-derived flow) to the Edwards Aquifer via infiltration is considered to be low to moderate. The following assessment findings support this conclusion.

- The SITE is primarily underlain by surface soils ranging in thickness from approximately 0.25 to 4 feet based on geotechnical drilling data and field observations. The Rumple-Comfort clays are classified as Hydrologic Soil Group C and have low infiltration rate with medium runoff potential when thoroughly wet, and a slow rate of water transmission.

- No features were identified that can be attributed to karstification of limestone terrain. There were no natural karst features observed within the vicinity of any the observed manmade features, which would increase the potential for rapid infiltration.
- With the exception of the water-supply well (**Feature S-6**), which is observed in use and in good condition, the manmade features present at the SITE, are collectively classified as not sensitive based on consideration of construction/plugging details and application of point assignment criteria and professional judgment.
- The fault (**Feature S-5**) is inferred as no direct field evidence was observed. This feature is classified as not sensitive within the SITE boundaries, based upon the lack of discrete recharge openings along the majority of the fault trace, and inferred low relative infiltration rate of overlying soil cover.

References

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- Quiddity, 2023, Site Plan Exhibit (T Bar M Site Plan Exhibit.pdf), received via email June 26, 2023
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- Small, T. A., and J. A. Hanson, 1994, Geologic framework and hydrogeologic characteristics of the Edwards Aquifer Outcrop, Comal County, Texas: USGS Water-Resources Investigations Report 94-4117.
- TCEQ Edwards Aquifer Protection Program, 1998, Edwards Aquifer Recharge Zone Map, New Braunfels West Quadrangle; TNRCC, September 1998.
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- United States Department of Agriculture (USDA), 1984, Soil Survey of Comal and Hays Counties, Texas; USDA / Soil Conservation Service / Texas Agricultural Experiment Station, Issued June 1984.
- United States Department of Agriculture (USDA), 1986, Urban Hydrology for Small Watersheds; USDA / Natural Resource Conservation Service, Technical Release (TR-) 55, June 1986.

ATTACHMENT D

**FEATURE POSITION TABLE
(GPS COORDINATES)**

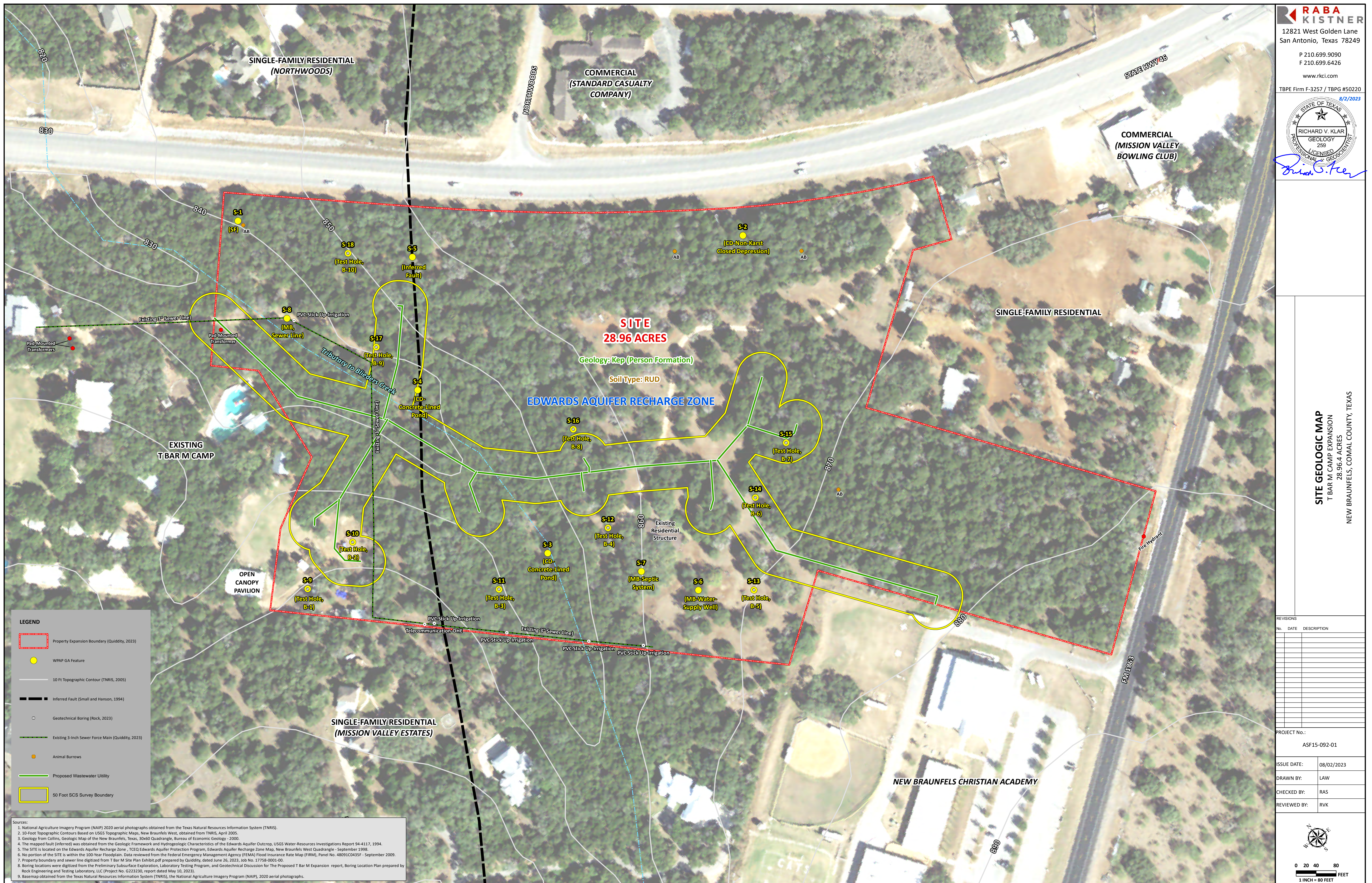
SITE GEOLOGIC MAP

FEATURE POSITION TABLE
T Bar M Camp Expansion - 28.96 Acres
New Braunfels, Comal County, Texas
RKI Project No. ASF15-092-01

Feature Designation	Feature Type	Date Collected	North Latitude	West Longitude	UTM Northing (meters)	UTM Easting (meters)
S-1	Solution-Enlarged Fracture	7/11/2023	N29 43 25.69	W98 11 3.42	3288460	578892
S-2	Non-Karst Closed Depression	7/11/2023	N29 43 19.43	W98 10 54.50	3288269	579133
S-3	Non-Karst Closed Depression	7/11/2023	N29 43 16.75	W98 11 2.38	3288185	578922
S-4	Non-Karst Closed Depression	7/11/2023	N29 43 20.88	W98 11 2.49	3288312	578918
S-5	Fault	7/11/2023	N29 43 23.04	W98 11 0.77	3288378	578964
S-6	Manmade feature in bedrock (Water Well)	7/11/2023	N29 43 14.36	W98 11 0.16	3288112	578982
S-7	Manmade feature in bedrock (Septic Tank)	7/11/2023	N29 43 15.34	W98 11 0.94	3288142	578961
S-8	Manmade feature in bedrock (Sanitary Sewer Utility Trench)	7/11/2023	N29 43 23.55	W98 11 3.85	3288394	578881
S-9	Manmade feature in bedrock (Plugged Geotechnical Test Hole, B-1)	7/11/2023	N29 43 19.05	W98 11 7.21	3288255	578831
S-10	Manmade feature in bedrock (Plugged Geotechnical Test Hole, B-2)	7/11/2023	N29 43 19.25	W98 11 5.75	3288261	578831
S-11	Manmade feature in bedrock (Plugged Geotechnical Test Hole, B-3)	7/11/2023	N29 43 16.76	W98 11 3.75	3288185	578885
S-12	Manmade feature in bedrock (Plugged Geotechnical Test Hole, B-4)	7/11/2023	N29 43 16.43	W98 11 0.94	3288175	579961
S-13	Manmade feature in bedrock (Plugged Geotechnical Test Hole, B-5)	7/11/2023	N29 43 13.70	W98 10 59.16	3288092	579009
S-14	Manmade feature in bedrock (Plugged Geotechnical Test Hole, B-6)	7/11/2023	N29 43 15.14	W98 10 57.87	3288136	579044
S-15	Manmade feature in bedrock (Plugged Geotechnical Test Hole, B-7)	7/11/2023	N29 43 15.64	W98 10 56.56	3288152	579079
S-16	Manmade feature in bedrock (Plugged Geotechnical Test Hole, B-8)	7/11/2023	N29 43 18.40	W98 11 0.22	3288236	578980
S-17	Manmade feature in bedrock (Plugged Geotechnical Test Hole, B-9)	7/11/2023	N29 43 22.05	W98 11 2.65	3288348	579914
S-18	Manmade feature in bedrock (Plugged Geotechnical Test Hole, B-10)	7/11/2023	N29 43 23.86	W98 11 1.88	3288404	578934

Notes:

1. Geographic coordinates are presented Degrees, Minutes, Decimal Seconds
2. Reference Datum is NAD 83.
3. Data were collected utilizing a *Garmin GPS 60cx Global Positioning System*.
4. Horizontal Accuracy: RMS Value < 3 meter ground resolution.
5. GPS data were collected by Rick Sample (RKI Project Professional).
6. GPS coordinates correlate to the points on the map for each feature.



NOTE: This Drawing is Provided for Illustration Only, May Not be to Scale and is Not Suitable for Design or Construction Purposes



QUIDDITY

APPLICATION FORM SECTION

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: Darren J. McAfee, P.E.

Date: 5/8/2024

Signature of Customer/Agent:



Regulated Entity Name: T Bar M Camp Expansion

Regulated Entity Information

1. The type of project is:

- ☐ Residential: Number of Lots: _____
- ☐ Residential: Number of Living Unit Equivalents: _____
- ☒ Commercial
- ☐ Industrial
- ☐ Other: _____

2. Total site acreage (size of property): 28.957

3. Estimated projected population: N/A

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	128,018	$\div 43,560 =$	2.94
Parking	148,835	$\div 43,560 =$	3.42
Other paved surfaces	88,648	$\div 43,560 =$	2.03
Total Impervious Cover	322,377	$\div 43,560 =$	8.39

Total Impervious Cover 8.39 \div Total Acreage 28.957 X 100 = 28.97% 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.

$L \times W =$ _____ $\text{Ft}^2 \div 43,560 \text{ Ft}^2/\text{Acre} =$ _____ acres.

10. Length of pavement area: _____ feet.

Width of pavement area: _____ feet.

$L \times W =$ _____ $\text{Ft}^2 \div 43,560 \text{ Ft}^2/\text{Acre} =$ _____ acres.

Pavement area _____ acres \div R.O.W. area _____ acres $\times 100 =$ _____ % 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:

<u>100%</u> Domestic	<u>36,776</u> Gallons/day
<u> </u> % Industrial	<u> </u> Gallons/day
<u> </u> % Commingled	<u> </u> Gallons/day
TOTAL gallons/day <u>36,776</u>	

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 Gruene WRF (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" = 80'.

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 #48091C0435F, dated September 2, 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 1 (#) 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

FACTORS AFFECTING SURFACE WATER QUALITY

Potential sources of contamination could be from the following:

Construction Phase

1. Fluids may be dropped from the use of construction equipment.
2. Fluids may be dropped from vehicles entering the site during construction.
3. Fluids may be dropped or spilled by construction workers constructing on site.
4. Mud or dirt may be tracked onto streets from construction areas.
5. Fine Particles may be washed from non-stabilized surfaces.
6. Debris from the site may leave the site by person, vehicle, or construction equipment.
7. Miscellaneous litter may be left on site from construction workers on site.

Post Construction

1. Fluids from vehicles or maintenance equipment that utilizes the site.
2. Landscape chemicals to maintain landscape features.
3. Litter that comes from the general public within the site or in the surrounding areas.

Attachment B

VOLUME AND CHARACTER OF STORMWATER

Existing Conditions

The existing tract currently does not have storm sewer infrastructure, temporary BMPs, or permanent BMPs in place. The existing conditions of the 28.957-acre tract mainly consists of uncleared/undeveloped land, with one existing tract that currently has a residential house and unpaved driveway on the property. The site is located within the Edwards Aquifer Recharge Zone and the Comal Trinity Groundwater Conservation District. The average slope of the site is approximately 3%, with a natural channel located in the middle of the site. The site currently has 143.0 acres of upgradient runoff that flows through the natural channel to an unnamed tributary, and ultimately to Blieder's Creek. The existing 100-year storm event flow, including upstream and offsite flow, is 1,046.8 cubic feet per second (cfs) at the downstream analysis point.

Proposed Conditions

The proposed facilities will include new buildings, paved roads, sports courts, walking paths, and a detention pond. The proposed slopes will be similar to existing with grading changes concentrated around proposed buildings, roadways, and walking paths. Ground disturbance will be isolated to the areas of proposed development. Otherwise, the site will not be disturbed and will be left in a natural state. Stormwater will sheet flow across the site to a proposed on-site detention pond. Runoff from buildings will be treated for TSS removal through bioretention. All proposed runoff from buildings, paved parking, and streets will be treated for TSS removal through bioretention or natural and engineered vegetative filter strips. The proposed flow for a 100-year storm event at the downstream analysis point will be 1,035.8 cfs. Refer to the Proposed Drainage Area Map included with Attachment G in the Temporary Stormwater section of this report.

Attachment C

SUITABILITY LETTER FROM AUTHORIZED AGENT

The site does not have an on-site sewage facility.

Attachment D

EXCEPTION TO THE REQUIRED GEOLOGIC ASSESSMENT

The Geologic Assessment is included in this report.



QUIDDITY

TEMPORARY STORMWATER SECTION

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: Darren J McAfee, P.E.

Date: 5/8/2024

Signature of Customer/Agent:



Regulated Entity Name: T Bar M Camp Expansion

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: diesel & other fuel for construction equipment

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: Blieders Creek

Temporary Best Management Practices (TBMPs)

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

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

- ☒ A description of how BMPs and measures will prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.
 - ☒ A description of how BMPs and measures will prevent pollution of surface water or groundwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.
 - ☒ A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.
 - ☒ A description of how, to the maximum extent practicable, BMPs and measures will maintain flow to naturally-occurring sensitive features identified in either the geologic assessment, TCEQ inspections, or during excavation, blasting, or construction.
8. ☒ The temporary sealing of a naturally-occurring sensitive feature which accepts recharge to the Edwards Aquifer as a temporary pollution abatement measure during active construction should be avoided.
- ☐ **Attachment E - Request to Temporarily Seal a Feature.** A request to temporarily seal a feature is attached. The request includes justification as to why no reasonable and practicable alternative exists for each feature.
- ☒ There will be no temporary sealing of naturally-occurring sensitive features on the site.
9. ☒ **Attachment F - Structural Practices.** A description of the structural practices that will be used to divert flows away from exposed soils, to store flows, or to otherwise limit runoff discharge of pollutants from exposed areas of the site is attached. Placement of structural practices in floodplains has been avoided.
10. ☒ **Attachment G - Drainage Area Map.** A drainage area map supporting the following requirements is attached:
- ☒ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.
 - ☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.
 - ☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.
 - ☐ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be used in combination with other erosion and sediment controls within each disturbed drainage area.

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

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

☐ N/A

12. ☒ **Attachment I - Inspection and Maintenance for BMPs.** A plan for the inspection of each temporary BMP(s) and measure(s) and for their timely maintenance, repairs, and, if necessary, retrofit is attached. A description of the documentation procedures, recordkeeping practices, and inspection frequency are included in the plan and are specific to the site and/or BMP.
13. ☒ All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections by the applicant or the executive director, or other information indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations.
14. ☒ If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain).
15. ☒ Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake will be provided that can indicate when the sediment occupies 50% of the basin volume.
16. ☒ Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).

Soil Stabilization Practices

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

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

- 18. ☒ Records must be kept at the site of the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.
- 19. ☒ Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

Administrative Information

- 20. ☒ All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.
- 21. ☒ If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately suspended. The appropriate TCEQ Regional Office shall be immediately notified. Regulated activities must cease and not continue until the TCEQ has reviewed and approved the methods proposed to protect the aquifer from any adverse impacts.
- 22. ☒ Silt fences, diversion berms, and other temporary erosion and sediment controls will be constructed and maintained as appropriate to prevent pollutants from entering sensitive features discovered during construction.

Attachment A

SPILL RESPONSE ACTIONS

From TCEQ Section 30 TAC 327.5.

1. The responsible person shall immediately abate and contain the spill or discharge and cooperate fully with the executive director and the local incident command system. The responsible person shall also begin reasonable response actions which may include, but are not limited to, the following actions:
 - arrival of the responsible person or response personnel hired by the responsible person at the site of the discharge or spill;
 - initiating efforts to stop the discharge or spill;
 - minimizing the impact to the public health and the environment;
 - neutralizing the effects of the incident;
 - removing the discharged or spilled substances; and
 - managing the wastes.
2. Upon request of the local government responders or the executive director, the responsible person shall provide a verbal or written description, or both, of the planned response actions and all actions taken before the local governmental responders or the executive director arrive. When the agency on-scene coordinator requests this information, it is subject to possible additional response action requirements by the executive director. The information will serve as a basis for the executive director to determine the need for:
 - further response actions by the responsible person;
 - initiating state funded actions for which the responsible person may be held liable to the maximum extent allowed by law; and
 - subsequent reports on the response actions.
3. Except for discharges or spills occurring during the normal course of transportation about which carriers are required to file a written report with the U.S. Department of Transportation under 49 CFR §171.16, the responsible person shall submit written information, such as a letter, describing the details of the discharge or spill and supporting the adequacy of the response action, to the appropriate TNRCC regional manager within 30 working days of the discovery of the reportable discharge or spill. The regional manager has the discretion to extend the deadline. The documentation shall contain one of the following items:
 - A statement that the discharge or spill response action has been completed and a description of how the response action was conducted. The statement shall include the initial report information required by §327.3(c) of this title (relating to Notification Requirements). The executive director may request additional information. Appropriate response actions at any time following the discharge or spill include use of the Texas Risk Reduction Program rules in Chapter 350 of this title (relating to Texas Risk Reduction Program).
 - A request for an extension of time to complete the response action, along with the reasons for the request. The request shall also include a projected work schedule outlining the time required to complete the response action. The executive director may grant an extension up to six months from the date the spill or discharge was reported. Unless otherwise notified by the

appropriate regional manager or the Emergency Response Team, the responsible person shall proceed according to the terms of the projected work schedule.

- A statement that the discharge or spill response action has not been completed nor is it expected to be completed within the maximum allowable six month extension. The statement shall explain why completion of the response action is not feasible and include a projected work schedule outlining the remaining tasks to complete the response action. This information will also serve as notification that the response actions to the discharge or spill will be conducted under the Texas Risk Reduction Program rules in Chapter 350 of this title (relating to Texas Risk Reduction Program)

Numbers for Spill Response:

State of Texas 24-Hour Spill-Reporting Hotline and the State Emergency Response Commission

Phone: 1-800-832-8224

Texas Commission on Environmental Quality (San Antonio Regional Office),

Hours: Monday-Friday, 8:00 a.m.–5:00 p.m.

Address: 14250 Judson Rd, San Antonio TX 78233-4480,

Main Line: 210-490-3096

Local Emergency Response Teams

911

Attachment B

POTENTIAL SOURCES OF CONTAMINATION

1. Fluids may be dropped from the use of construction equipment.
2. Fluids may be dropped from vehicles entering the site during construction.
3. Fluids may be dropped or spilled by construction workers constructing on site.
4. Mud or dirt may be tracked onto streets from construction areas.
5. Fine Particles may be washed from non-stabilized surfaces.
6. Debris from the site may leave the site by person, vehicle, or construction equipment.
7. Miscellaneous litter may be left on site from construction workers on site.

Attachment C

SEQUENCE OF MAJOR ACTIVITIES

Major Activities	Area Disturbed	Permanent Stabilization
1. Installation of Temporary Best Management Practices <ul style="list-style-type: none"> • Silt Fence • Silt Fence with Rock Berm • Construction Entrance • Tree Protection • Concrete Washout • Temporary Sedimentation Basin • Inlet Protection 	26.90 ac.	Sod/Seeding
2. Earthwork: site grading, excavation, etc.	26.90 ac.	Sod/Seeding/ Pavement
3. Installation of site utilities	2.87 ac.	Sod/Seeding/ Pavement
4. Building Structures	2.94 ac.	Concrete
5. Cleanup of site and removal of Temporary Best Management Practices	26.90 ac.	Sod/Seeding

Attachment D

TEMPORARY BEST MANAGEMENT PRACTICES AND MEASURES

1. There is upgradient stormwater that will flow into disturbed areas and will be cleaned by silt fencing, silt fencing with rock berm, inlet filters, or in the temporary sedimentation basin as appropriate prior to off-site release.
2. All onsite stormwater flowing will be cleaned by silt fencing, silt fencing with rock berm, inlet filters, or in the temporary sedimentation basin as appropriate prior to off-site release.
3. All “possibly sensitive” or “sensitive” features will either be sealed or protected with a perimeter barrier prior to any construction (but after Erosion and Sedimentation clearing).
4. All runoff flows will be maintained to all "possibly sensitive" or "sensitive" features except any features which have been sealed. Runoff flows will be treated prior to entering or flowing across a feature (see 2 above).
5. Any sensitive features identified on the property have been noted in in the Geologic Assessment section of this report.

Attachment E

REQUEST TO TEMPORARILY SEAL A FEATURE

There will be no temporary sealing required.

Attachment F

STRUCTURAL PRACTICES

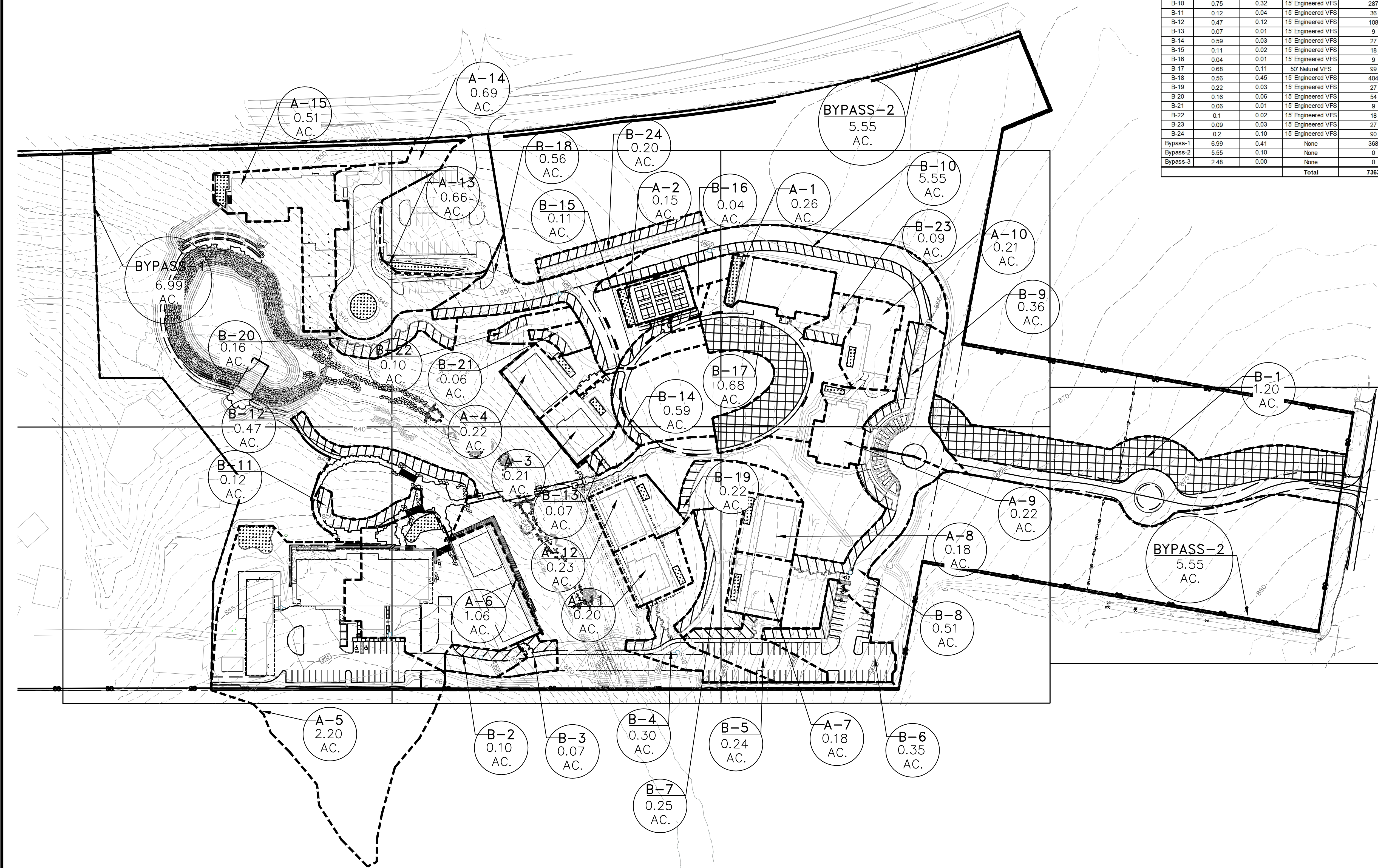
1. A stabilized construction entrance with washout pit will be constructed at all locations where vehicular traffic enters and leaves the site. This will reduce sediments which leave the site and are tracked or fall onto adjacent roadways.
2. Silt fencing and silt fencing with rock berm will be installed adjacent to any drainage way which receives sheet flow from upgradient-disturbed areas and along the side slope perimeter of disturbed areas.
3. Inlet protection will be used to provide protection against silt transport or accumulation in the storm sewer system.

Attachment G

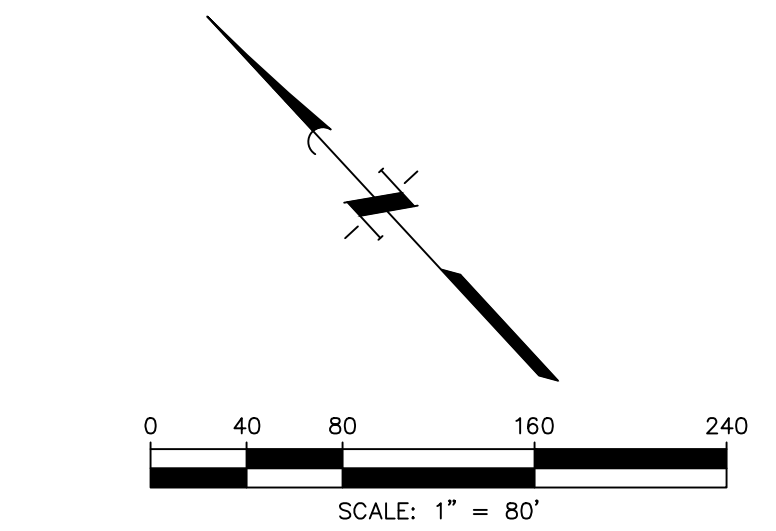
DRAINAGE AREA MAP

The drainage area map included with this section shows that the proposed project exceeds ten (10) acres contributing to the same discharge point disturbed during construction at the same time. A temporary sedimentation basin will be provided. The drainage area map included in this section shows the size of the various drainage sub-areas. The temporary sedimentation basin calculations are included on the Erosion Control Plan following Attachment H of this section.

K:\17758\17758-001-00 T Bar M - Camp Expansion\2 Design Phase\CAD\WPAP\17758-001 T Bar M SWP 4-24.dwg CJ: April 17, 2024



Watershed	Total Watershed Area (ac.)	Total Impervious Coverage (ac.)	BMP	Required TSS Removal in Watershed Area (lbs)	Total TSS Removed (lbs)
A-1	0.26	0.21	Bioretention	190	214
A-2	0.15	0.14	Bioretention	126	142
A-3	0.21	0.16	Bioretention	144	144
A-4	0.22	0.16	Bioretention	144	154
A-5	2.2	1.09	Bioretention	808	808
A-6	1.06	0.73	Bioretention	655	655
A-7	0.18	0.14	Bioretention	126	136
A-8	0.18	0.14	Bioretention	126	136
A-9	0.22	0.15	Bioretention	135	135
A-10	0.21	0.15	Bioretention	135	139
A-11	0.2	0.15	Bioretention	135	135
A-12	0.23	0.15	Bioretention	135	135
A-13	0.66	0.48	Bioretention	429	429
A-14	0.69	0.59	Bioretention	528	528
A-15	0.51	0.44	Bioretention	395	395
B-1	1.2	0.38	50' Natural VFS	341	381
B-2	0.1	0.06	15' Engineered VFS	54	59
B-3	0.07	0.05	15' Engineered VFS	45	49
B-4	0.3	0.13	15' Engineered VFS	117	129
B-5	0.24	0.19	15' Engineered VFS	171	185
B-6	0.35	0.29	15' Engineered VFS	260	282
B-7	0.25	0.05	15' Engineered VFS	45	52
B-8	0.51	0.30	15' Engineered VFS	269	294
B-9	0.36	0.29	15' Engineered VFS	260	283
B-10	0.75	0.32	15' Engineered VFS	287	317
B-11	0.12	0.04	15' Engineered VFS	36	40
B-12	0.47	0.12	15' Engineered VFS	108	122
B-13	0.07	0.01	15' Engineered VFS	9	11
B-14	0.59	0.03	15' Engineered VFS	27	38
B-15	0.11	0.02	15' Engineered VFS	18	21
B-16	0.04	0.01	15' Engineered VFS	9	10
B-17	0.68	0.11	50' Natural VFS	99	115
B-18	0.56	0.45	15' Engineered VFS	404	438
B-19	0.22	0.03	15' Engineered VFS	27	32
B-20	0.16	0.06	15' Engineered VFS	54	60
B-21	0.06	0.01	15' Engineered VFS	9	10
B-22	0.1	0.02	15' Engineered VFS	18	21
B-23	0.09	0.03	15' Engineered VFS	27	30
B-24	0.2	0.10	15' Engineered VFS	90	99
Bypass-1	6.99	0.41	None	368	0
Bypass-2	5.55	0.10	None	0	0
Bypass-3	2.48	0.00	None	0	0
Total				7363	7363


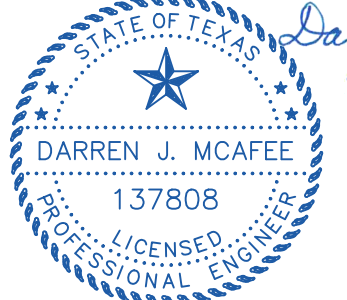


- EXISTING CONTOUR - - - - - 850
- PROPOSED CONTOUR - - - - - 850
- STORM DRAIN - - - - -
- BIORETENTION AREA [Pattern]
- NATURAL VEGETATED FILTER STRIP [Pattern]
- ENGINEERED VEGETATED FILTER STRIP [Pattern]

ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FH	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SIDEWALK
TELE	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WV	WATER VALVE
WY	WATER
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
D.P.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS

!!CAUTION!!
Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
Construction Activities

CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

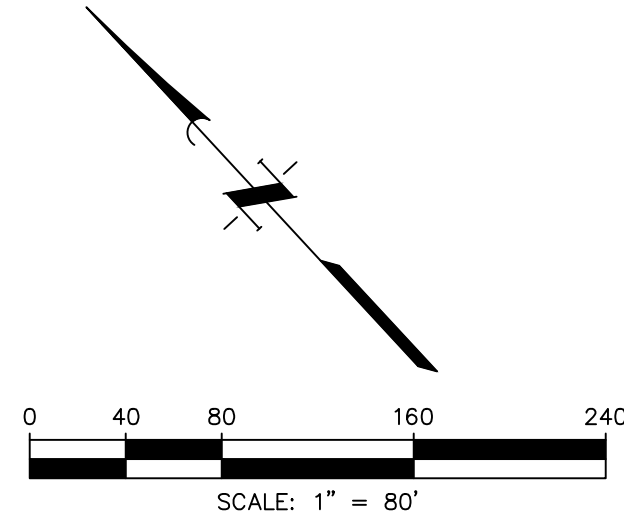
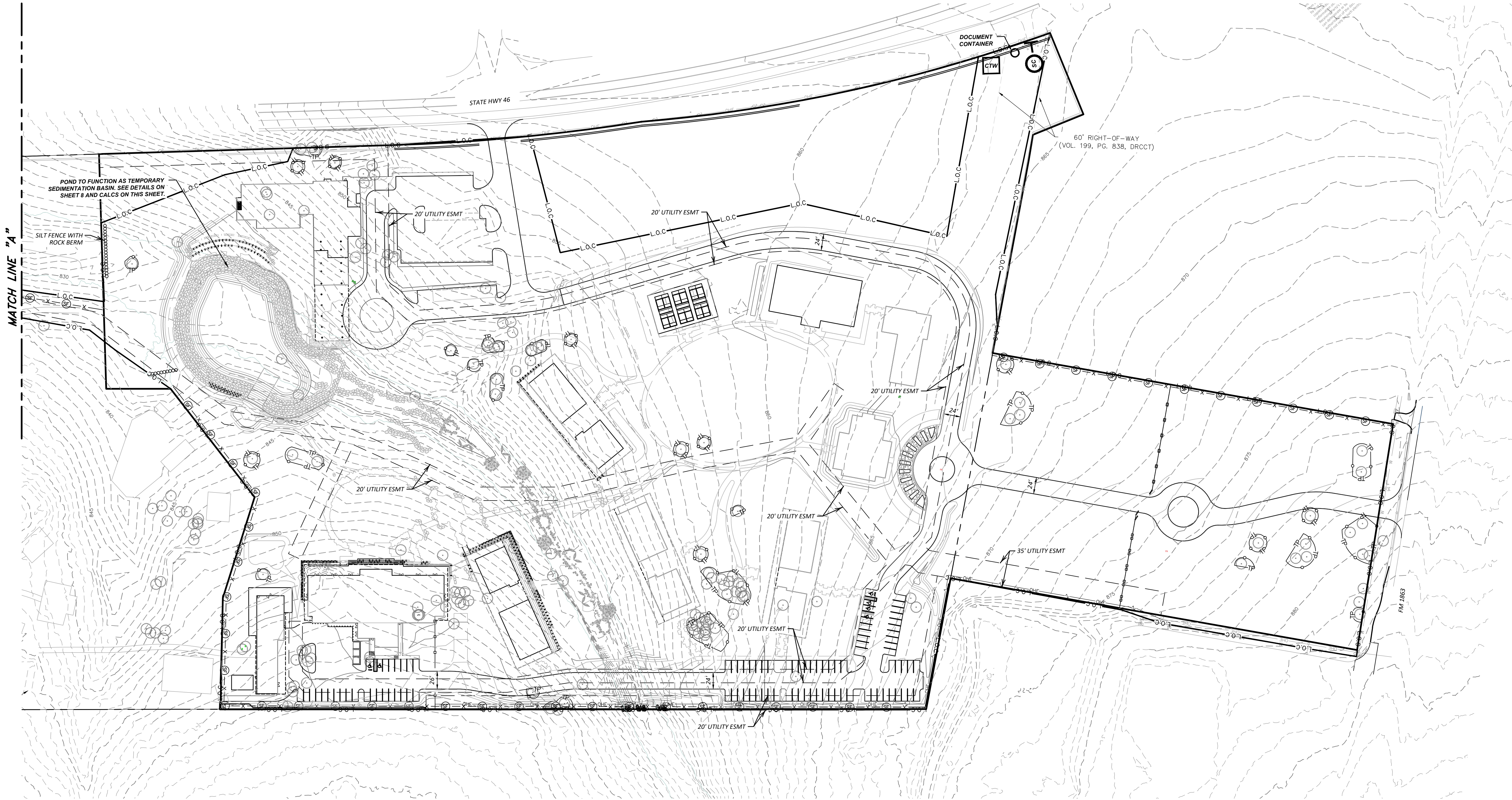
NO.	DATE	REVISIONS	APP.
CENTER FOR CHRISTIAN GROWTH, INC			
T BAR M CAMP EXPANSION			
WPAP DRAINAGE AREA MAP			
 QUIDDITY <small>Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280 4501 Lochlin Seena Road, Suite 100 San Antonio, Texas 78249 P: 210-466-5311</small>			
SCALE:	AS SHOWN	DGN. BY:	DJM
DATE:	APRIL 2024	DWN. BY:	JS/CJ
JOB NO.	17758-0001-00	DWG. NO.	NONE
SUBMITTED:		SURV. BY:	QUIDDITY ENGINEERING
		F.B. NO.	NONE
 <i>Darren J. McAfee</i> 5/8/2024			
SHEET NO. 1 OF 1			

Attachment H

TEMPORARY SEDIMENT POND PLANS AND CALCULATIONS

The project site will have more than 10 acres within a common drainage area disturbed at one time and a temporary sediment basin will be used. The sediment basin will provide storage for the volume of runoff from a 2-year, 24-hour storm in Comal County, in accordance with TCEQ's Technical Guidance Manual (TGM) RG-348 (rev. 2005). Construction plans and calculations for the proposed temporary BMPs and measures are included in this section.

K:\17758\17758-0001-00 T Bar M - Camp Expansion\2 Design Phase\CAD\WPA\17758-0001 T Bar M Erosion Control Plan WPA.dwg CJ April 05, 2024



LEGEND

- L.O.C. LIMITS OF CONSTRUCTION
- ⊕-X-⊕ SILT FENCE
- ⊕-X-⊕ SILT FENCE WITH ROCK BERM
- ⊕-TP-⊕ TREE PROTECTION FENCING
- SC STABILIZED CONSTRUCTION ENTRANCE/EXIT
- CTW CONCRETE TRUCK WASHOUT AREA
- DOCUMENT CONTAINER
- IPB INLET PROTECTION BARRIER

!!CAUTION!!
Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
Construction Activities

CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION



ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EROSION SEDIMENTATION MANAGEMENT TREATMENT
FN	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SIDEWALK
TELE	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WV	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OFFICIAL PUBLIC RECORDS COMAL COUNTY TEXAS

SEDIMENTATION TRAP DATA	
Drainage Area Size (Ac.)	Trap #1 144.80
Trap Volume Req'd (CF)	260,640
Trap Volume Provided (CF)	294,890
Trap Area(SF)	37,464
Embankment Height (MSL)	836.0
Excavation Depth (MSL)	12.0

EROSION CONTROL NOTES:

- PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL INSTALL EROSION AND SEDIMENTATION CONTROLS AT LOCATION SHOWN ON PLANS.
- CONTRACTOR SHALL INSPECT ALL EROSION AND SEDIMENTATION CONTROL SYSTEMS SPECIFIED HEREIN, AT A MINIMUM OF ONCE EVERY CALENDAR DAY.
- CONTRACTOR SHALL MAINTAIN, REPAIR AND/OR REPLACE DAMAGED EROSION AND SEDIMENTATION CONTROL SYSTEM THROUGHOUT THE DURATION OF THE CONTRACT. (NO SEPARATE PAY).
- CONTRACTOR SHALL PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
- CONTRACTOR SHALL LOCATE FUEL/MATERIAL STORAGE AREAS AWAY FROM STORM WATER CONVEYANCE SYSTEMS. CONTRACTOR SHALL USE SILT FENCING, HAY BALES, OR BERMS AROUND FUEL STORAGE AREAS. (NO SEPARATE PAY).
- CONTRACTOR SHALL ADVISE OWNER IMMEDIATELY, VERBALLY, AND IN WRITING, OF ANY FUEL OR TOXIC MATERIAL SPILLS ONTO THE PROJECT/CONSTRUCTION AREA AND THE ACTION TAKEN TO REMEDY THE PROBLEM.
- CONTRACTOR IS RESPONSIBLE FOR DISPOSING OF HIS FUELS, MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER. (NO SEPARATE PAY).
- CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADEQUATELY MAINTAINED SANITARY FACILITIES.
- AT COMPLETION OF THE CONTRACT, OWNER AND/OR OWNER'S REPRESENTATIVE WITH THE CONTRACTOR SHALL EXAMINE EROSION AND SEDIMENTATION CONTROL SYSTEM BEFORE RELIEVING CONTRACTOR OF HIS MAINTENANCE RESPONSIBILITIES.
- CONTRACTOR SHALL BE RESPONSIBLE FOR STREET CLEANING, ON A DAILY BASIS, ALL MUD AND DIRT DEPOSITED ON THE EXISTING PAVEMENT DUE TO HIS CONSTRUCTION ACTIVITY.
- AS PROPOSED INLETS ARE INSTALLED THROUGHOUT THE SITE PROVIDE INLET BARRIER PROTECTION AT EACH INLET IN ORDER TO PROTECT STORM SEWER SYSTEM.
- PER TPDES REQUIREMENTS, DISTURBED AREAS ON WHICH CONSTRUCTION ACTIVITIES HAVE CEASED (TEMPORARILY OR PERMANENTLY) SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITY RESUMES WITHIN 21 DAYS. SEEDING DOES NOT CONSTITUTE AS STABILIZATION.
- SEE SHEET 2 FOR STANDARD EROSION CONTROL DETAILS.

NO.	DATE	REVISIONS	APP.

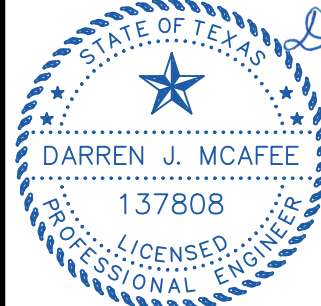
CENTER FOR CHRISTIAN GROWTH, INC

T BAR M CAMP EXPANSION

EROSION CONTROL PLAN



SCALE: AS SHOWN DGN. BY: DJM
DATE: APRIL 2024 DWN. BY: JS/CJ
JOB NO. 17758-0001-00 DWG. NO. NONE
SUBMITTED: SURV. BY: QUIDDITY ENGINEERING
F.B. NO. NONE



SHEET NO.
1
OF 2

Attachment I

INSPECTION AND MAINTENANCE FOR BMPS

1. Inspection

- a. A qualified inspector (representing the discharger) shall inspect the following items once per calendar week and within 24 hours after the end of a 1/2-inch or greater rainfall:
 - i. disturbed areas of the construction site that have not been finally stabilized
 - ii. areas used for storage of materials that are exposed to precipitation
 - iii. structural and stabilization control measures
 - iv. construction entrance/exits
- b. The E & S inspector shall have authority to require immediate action on the part of the Contractor to correct any nonconforming items found during inspections or to require revisions to the E & S controls if appropriate. If revisions are needed, they shall be implemented within 7 calendar days after the date of inspection.
- c. The E & S inspector will provide written reports covering all items/areas inspected and outlining corrective measures if any.

2. Maintenance

- a. All erosion and sedimentation (E & S) measures/controls shall be maintained in good working order by the Contractor. Written maintenance reports shall be prepared covering all inspections and maintenance affecting E & S controls. If repair(s) are necessary, they shall be initiated within 24 hours after report.
- b. The construction entrance shall be maintained in a condition which will prevent/minimize tracking or flowing of sediments onto public roadways. Sediments spilled, dropped, washed or tracked onto public roadway must be removed.
- c. Temporary and permanent seeding and planting shall be maintained to insure the following:
 - bare spots are filled in
 - wash-outs are filled in
 - healthy growth is promoted
- d. For silt fences and rock berms, when silt reaches a depth equal to 1/3 the height of the barrier, the silt shall be removed and mixed with other soil materials to be placed within the embankment areas of the project site. After construction is complete, the silt shall be disposed of off-site.

- e. Silt fences shall be maintained to insure the following:
 - torn fabric is replaced
 - loose fabric is properly resecured
 - loose post supports are plumbed and strengthened
 - fabric bottom is buried as anchor
- f. Rock berms shall be maintained/cleaned by lifting, dropping and reshaping stones as required.
- g. Truck washout pit shall be maintained/cleaned when silt reaches a depth of six(6) inches. Silt shall be removed and disposed of at an approved site.
- h. The temporary sediment basin shall be maintained in accordance with the following:
 - Trash and debris are removed to prevent clogging in the outlet structure.
 - Accumulated silt should be removed, and the basin should be re-graded to its original dimensions at such point that the capacity of the impoundment has been reduced to 75% of its original storage capacity.
 - The removed sediment should be stockpiled or redistributed in areas that are protected from erosion.
- i. Inlet protection shall be maintained in accordance with the following:
 - Sediment is to be removed when buildup reaches a depth of 3 inches. Removed sediment should be deposited in a suitable area in such a manner that it will not erode.
 - Placement of device is to be checked to prevent gaps between device and the curb.
 - Patch or replace filter fabric if torn or missing.
 - Structures should be removed, and the area stabilized only after the remaining drainage area has been properly stabilized.
- j. If damage to protected trees occurs, the following maintenance guidelines should be followed:
 - If the soil has become compacted over the root zone of any tree, the ground should be aerated by punching holes with an iron bar. The bar should be driven 1- foot deep and then moved back and forth until the soil is loosened. This procedure should be repeated every 18 inches until all of the compacted soil beneath the crown of the tree has been loosened.
 - Any damage to the crown, trunk, or root system of any tree retained on the site should be repaired immediately.
 - Whenever major root or bark damage occurs, remove some foliage to reduce the demand for water and nutrients.
 - Damaged roots should immediately be cut off cleanly inside the exposed or damaged area. Cut surfaces should be painted with approved tree paint, and moist peat moss, burlap, or topsoil should be spread over the exposed area.
 - To treat bark damage, carefully cut away all loosened bark back into the undamaged area, taper the cut at the top and bottom, and provide drainage at the base of the wound.
 - All tree limbs damaged during construction or removed for any other reason should be cut off above the collar at the preceding branch junction.

- Care for serious injuries should be prescribed by a forester or a tree specialist.
- Broadleaf trees that have been stressed or damaged should receive a heavy application of fertilizer to aid their recovery. Trees should be fertilized in the late fall (after November 1) or the early spring (until April 1). Fall applications are preferred, as the nutrients will be made available over a longer period of time. Fertilizer should be applied to the soil over the feeder roots. In no case should it be applied closer than 3 feet to the trunk. Fertilizer should be applied using approved fertilization methods and equipment.
- Maintain a ground cover of organic mulch around trees that is adequate to prevent erosion, protect roots, and hold water.

Attachment J

SCHEDULE OF INTERIM AND PERMANENT SOIL STABILIZATION PRACTICES

1. Interim stabilization will be performed any time a denuded area remains disturbed for over 14 days without restart within 21 days.
2. Permanent stabilization will be done after construction is complete.
3. Contractor shall sod or seed all disturbed previous areas once finished grade is met.
4. Seeding rates should be as shown in Table 1-2 or as recommended by the county agricultural extension agent.
5. The seed should be applied uniformly with a cyclone seeder, drill, cultipacker seeder or hydroseeder (slurry includes seed, fertilizer and binder)
6. Slopes that are steeper than 3:1 should be covered with appropriate soil stabilization matting as described in the following section to prevent loss of soil and seed.

Table 1-2 Temporary Seeding for Bexar, Comal, Kinney, Medina and Uvalde Counties (Northcutt, 1993)

Dates	Climate	Species (lb/ac)	
Sept 1 to Nov 30	Temporary Cool Season	Tall Fescue	4.0
		Oats	21.0
		Wheat (Red, Winter)	30.0
		Total	55.0
Sept 1 to Nov 30	Cool Season Legume	Hairy Vetch	8.0
May 1 to Aug 31	Temporary Warm Season	Foxtail Millet	30.0

PERMANENT STORMWATER SECTION

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)(li), (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: Darren J. McAfee, P.E.

Date: 5/8/2024

Signature of Customer/Agent



Regulated Entity Name: T Bar M Camp Expansion

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 A

20% OR LESS IMPERVIOUS COVER DECLARATION

The site will not be used for multi-family residential development, schools, or small business sites.

Attachment B

BMPS FOR UPGRADIENT STORMWATER

The site currently has 143.0 acres of upgradient runoff that flows through a natural dry drainage channel to an unnamed tributary. This unnamed tributary's ultimate outfall is Blieder's Creek. Of this acreage, 0.89 acres will be treated through a bioretention facility, with 0.19 acres of that being impervious. All other off-site gradient will be routed to an on-site detention pond through proposed culverts and grassy swales. Please reference the drainage area map included with Attachment G in the Temporary Stormwater Section and TSS Removal calculations included with the Construction Plans as part of Attachment F in this section.

Attachment C

BMPS FOR ON-SITE STORMWATER

Onsite stormwater will ultimately flow to the on-site detention pond being proposed for detention only. The proposed permanent BMPs for TSS removal include natural and engineered vegetative filter strips and bioretention in accordance with TCEQ's Technical Guidance Manual (TGM) RG-348 (rev. 2005) to remove at least 80% TSS from the proposed improvements. The vegetative filter strips will be used to treat the runoff from the paved streets and parking. Bioretention facilities will be used to treat the runoff from buildings and some paved areas. Table 1 shows a summary of the permanent BMP coverage on the site and TSS removal capacity.

Table 1: BMP Coverage

Watershed	Total Watershed Area (ac.)	Total Impervious Cover (ac.)	BMP	Required TSS Removal in Watershed Area (lbs)	Total TSS Removed (lbs)
A-1	0.26	0.21	Bioretention	190	214
A-2	0.15	0.14	Bioretention	126	142
A-3	0.21	0.16	Bioretention	144	144
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B-1	1.2	0.38	50' Natural VFS	341	381
B-2	0.1	0.06	15' Engineered VFS	54	59
B-3	0.07	0.05	15' Engineered VFS	45	49
B-4	0.3	0.13	15' Engineered VFS	117	129
B-5	0.24	0.19	15' Engineered VFS	171	185
B-6	0.35	0.29	15' Engineered VFS	260	282
B-7	0.25	0.05	15' Engineered VFS	45	52
B-8	0.51	0.30	15' Engineered VFS	269	294
B-9	0.36	0.29	15' Engineered VFS	260	283
B-10	0.75	0.32	15' Engineered VFS	287	317
B-11	0.12	0.04	15' Engineered VFS	36	40
B-12	0.47	0.12	15' Engineered VFS	108	122
B-13	0.07	0.01	15' Engineered VFS	9	11
B-14	0.59	0.03	15' Engineered VFS	27	38
B-15	0.11	0.02	15' Engineered VFS	18	21
B-16	0.04	0.01	15' Engineered VFS	9	10
B-17	0.68	0.11	50' Natural VFS	99	115
B-18	0.56	0.45	15' Engineered VFS	404	438
B-19	0.22	0.03	15' Engineered VFS	27	32
B-20	0.16	0.06	15' Engineered VFS	54	60
B-21	0.06	0.01	15' Engineered VFS	9	10
B-22	0.1	0.02	15' Engineered VFS	18	21
B-23	0.09	0.03	15' Engineered VFS	27	30
B-24	0.2	0.10	15' Engineered VFS	90	99
Bypass-1	6.99	0.41	None	368	0
Bypass-2	5.55	0.10	None	0	0
Bypass-3	2.48	0.00	None	0	0
			Total	7363	7363

Attachment D

BMPS FOR SURFACE STREAMS

The site does not directly outflow into a surface stream. All treated runoff from the vegetative filter strips and bioretention facilities will be directed to the on-site detention pond and discharged at a rate less than or equal to existing conditions.

Attachment E

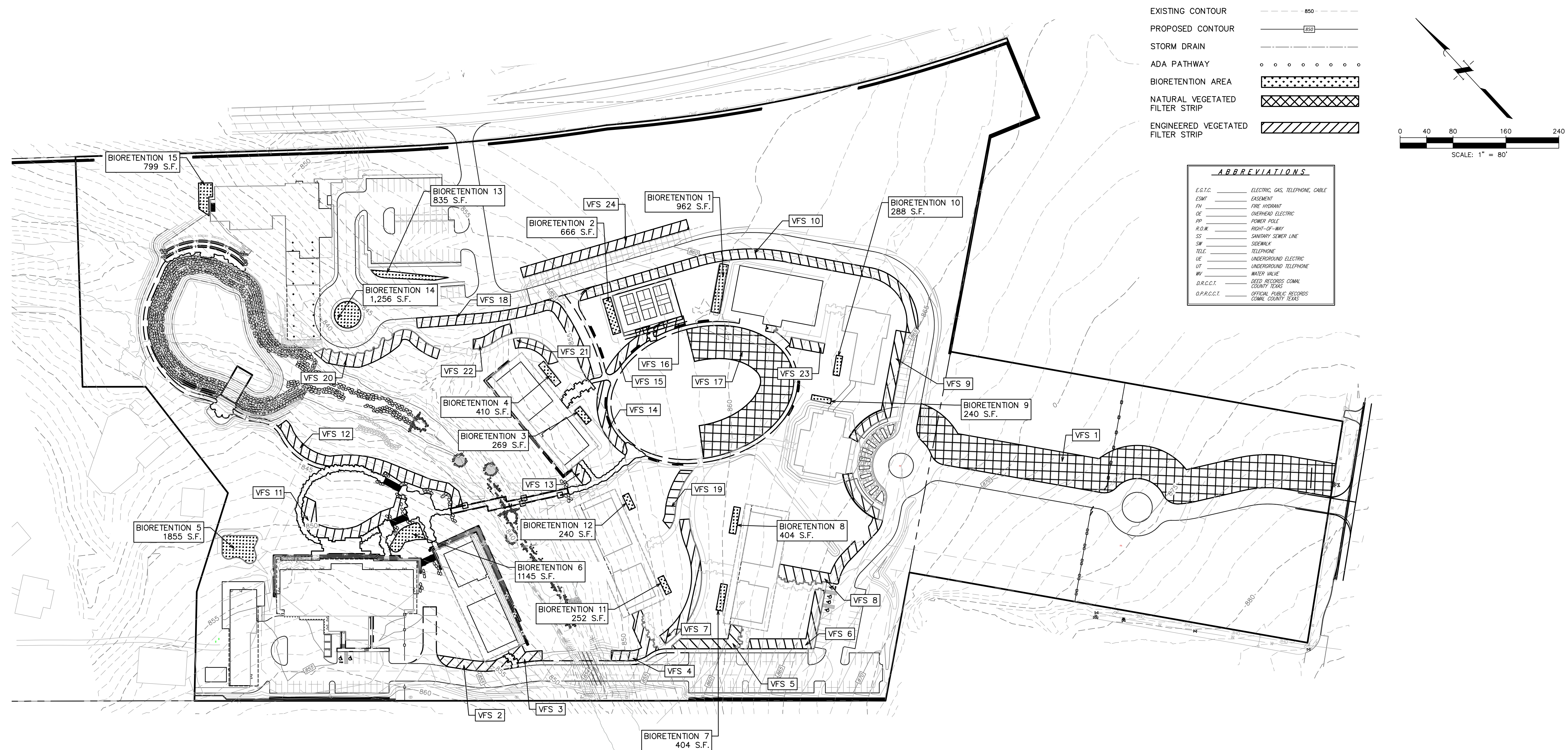
REQUEST TO SEAL FEATURES

The permanent sealing of or diversion of flow from a naturally occurring sensitive feature has not been proposed.

Attachment F

CONSTRUCTION PLANS

Construction plans are included in this section.



!!CAUTION!!
Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
Construction Activities

CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

NO.	DATE	REVISIONS	APP.

CENTER FOR CHRISTIAN GROWTH, INC

T BAR M CAMP EXPANSION
TCEQ ATTACHMENT "F"
CONSTRUCTION PLANS –
OVERALL SWQ



Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290
4350 Lockhill-Selma Road, Suite 100 • San Antonio, Texas 78249 • 210.494.5511

SCALE: AS SHOWN DGN. BY: DJM

DATE: APRIL 2024 DWN. BY: JS/CJ

JOB NO. 17758-0001-00 DWG. NO. NONE

SUBMITTED: _____ SURV. BY: _____ QUIDDITY
ENGINEERING

ENGINEERING	
E.B. NO.	NONE

STATE OF TEXAS *Dawn Miller*

5/8/2024

DARREN J. MOSEFF

137000

137808 SHEET 1

OF 17

SHEET NO.
1
OF 17

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER GENERAL CONSTRUCTION NOTES

1. A WRITTEN NOTICE OF CONSTRUCTION MUST BE SUBMITTED TO THE TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY GROUND DISTURBANCE OR CONSTRUCTION ACTIVITIES. THIS NOTICE MUST INCLUDE:
- THE NAME OF THE APPROVED PROJECT;
 - THE ACTIVITY START DATE; AND
 - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.
2. ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT SHOULD BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED CONTRIBUTING ZONE PLAN (CZP) AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTOR(S) SHOULD KEEP COPIES OF THE APPROVED PLAN AND APPROVAL LETTER ON-SITE.
3. NO HAZARDOUS SUBSTANCE STORAGE TANK SHALL BE INSTALLED WITHIN 150 FEET OF A WATER SUPPLY SOURCE, DISTRIBUTION SYSTEM, WELL, OR SENSITIVE FEATURE.
4. 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 MANUFACTURER'S SPECIFICATIONS. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR THESE CONDITIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL THE DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
5. ANY SEDIMENT THAT ESCAPES 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.
6. SEDIMENT MUST BE REMOVED FROM THE SEDIMENT TRAPS OR SEDIMENTATION BASINS WHEN IT OCCUPIES 50% OF THE BASIN'S DESIGN CAPACITY.
7. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BEING DISCHARGED OFFSITE.
8. ALL EXCAVATED MATERIAL THAT WILL BE STORED ON-SITE MUST HAVE PROPER E&S CONTROLS.
9. IF PORTIONS OF THE SITE WILL HAVE A 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.
10. THE FOLLOWING RECORDS SHOULD BE MAINTAINED AND MADE AVAILABLE TO THE TCEQ 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.
11. THE HOLDER OF ANY APPROVED CZP MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:
- A. ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY BEST MANAGEMENT PRACTICES (BMPs) OR STRUCTURE(S), INCLUDING BUT NOT LIMITED TO TEMPORARY OR PERMANENT PONDS, DAMS, BERMS, SILT FENCES, AND DIVERSIONARY STRUCTURES;
 - B. ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED;
 - C. ANY CHANGE THAT WOULD SIGNIFICANTLY IMPACT THE ABILITY TO PREVENT POLLUTION OF THE EDWARDS AQUIFER; OR
 - D. ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE APPROVED CONTRIBUTING ZONE PLAN.
- AUSTIN REGIONAL OFFICE
12100 PARK 35 CIRCLE, BUILDING A
AUSTIN, TEXAS 78753-1808
PHONE (512) 339-2929
FAX (512) 339-3795
- SAN ANTONIO REGIONAL OFFICE
14250 JUDSON ROAD
SAN ANTONIO, TEXAS 78233-4480
PHONE (210) 490-3096
FAX (210) 545-4329

AUSTIN REGIONAL OFFICE
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SAN ANTONIO REGIONAL OFFICE
14250 JUDSON ROAD
SAN ANTONIO, TEXAS 78233-4480
PHONE (210) 490-3096
FAX (210) 545-4329

TSS REMOVAL CALCULATIONS: A-3

Texas Commission on Environmental Quality			
TSS Removal Calculations 04-20-2009		Project Name: T Bar M Camp Expansion Date Prepared: 4/11/2024	
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: $L_{M1} = 27.2(A_{M1} \times P)$			
where:	L_{M1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{M1} = 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 = 28.96 acres			
Predevelopment impervious area within the limits of the plan = 0.33 acres			
Total post-development impervious area within the limits of the plan = 8.39 acres			
Total post-development impervious cover fraction = 0.29			
P = 33 inches			
L_{M1} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 ↕			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = A-3 ↕			
Total drainage basin/outfall area = 0.21 acres			
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres			
Post-development impervious area within drainage basin/outfall area = 0.16 acres			
Post-development impervious fraction within drainage basin/outfall area = 0.76			
L_{M1} THIS BASIN = 144 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Bioretention ↕			
Removal efficiency = 89 percent			
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 = 0.21 acres			
A_i = 0.16 acres			
A_p = 0.05 acres			
L_R = 163 lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{M1} THIS BASIN = 144 lbs.			
F = 0.88 ↕			
6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.			
Rainfall Depth = 1.50 inches			
Post Development Runoff Coefficient = 0.57			
On-site Water Quality Volume = 657 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 = 131			
Total Capture Volume (required water quality volume(s) x 1.20) = 788 cubic feet			
The following sections are used to calculate the required water quality volume(s) for the selected BMP. The values for BMP Types not selected in cell C45 will show NA.			
7. Retention/Irrigation System		Designed as Required in RG-348 Pages 3-42 to 3-46	
Required Water Quality Volume for retention basin = NA cubic feet			
Irrigation Area Calculations:			
Soil infiltration/permeability rate = 0.1 in/hr			
Irrigation area = NA square feet			
Enter determined permeability rate or assumed value of 0.1			
8. Extended Detention Basin System			
Designed as Required in RG-348 Pages 3-46 to 3-51			
Required Water Quality Volume for extended detention basin = NA cubic feet			
9. Filter area for Sand Filters			
Designed as Required in RG-348 Pages 3-58 to 3-63			
9A. Full Sedimentation and Filtration System			
Water Quality Volume for sedimentation basin = NA cubic feet			
Minimum filter basin area = NA square feet			
Maximum sedimentation basin area = NA square feet			
Minimum sedimentation basin area = NA square feet			
For minimum water depth of 2 feet			
For maximum water depth of 8 feet			
9B. Partial Sedimentation and Filtration System			
Water Quality Volume for combined basins = NA cubic feet			
Minimum filter basin area = NA square feet			
Maximum sedimentation basin area = NA square feet			
Minimum sedimentation basin area = NA square feet			
For minimum water depth of 2 feet			
For maximum water depth of 8 feet			
10. Bioretention System			
Designed as Required in RG-348 Pages 3-63 to 3-65			
Required Water Quality Volume for Bioretention Basin = 788 cubic feet			

TSS REMOVAL CALCULATIONS: A-4

Texas Commission on Environmental Quality			
TSS Removal Calculations 04-20-2009		Project Name: T Bar M Camp Expansion Date Prepared: 4/11/2024	
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: $L_{M1} = 27.2(A_{M1} \times P)$			
where:	L_{M1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{M1} = 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 = 28.96 acres			
Predevelopment impervious area within the limits of the plan = 0.33 acres			
Total post-development impervious area within the limits of the plan = 8.39 acres			
Total post-development impervious cover fraction = 0.29			
P = 33 inches			
L_{M1} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 ↕			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = A-4 ↕			
Total drainage basin/outfall area = 0.22 acres			
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres			
Post-development impervious area within drainage basin/outfall area = 0.16 acres			
Post-development impervious fraction within drainage basin/outfall area = 0.73			
L_{M1} THIS BASIN = 144 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Bioretention ↕			
Removal efficiency = 89 percent			
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 = 0.22 acres			
A_i = 0.16 acres			
A_p = 0.06 acres			
L_R = 164 lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{M1} THIS BASIN = 154 lbs.			
F = 0.94 ↕			
6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.			
Rainfall Depth = 2.40 inches			
Post Development Runoff Coefficient = 0.53			
On-site Water Quality Volume = 1024 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 = 205			
Total Capture Volume (required water quality volume(s) x 1.20) = 1229 cubic feet			
The following sections are used to calculate the required water quality volume(s) for the selected BMP. The values for BMP Types not selected in cell C45 will show NA.			
7. Retention/Irrigation System		Designed as Required in RG-348 Pages 3-42 to 3-46	
Required Water Quality Volume for retention basin = NA cubic feet			
Irrigation Area Calculations:			
Soil infiltration/permeability rate = 0.1 in/hr			
Irrigation area = NA square feet			
Enter determined permeability rate or assumed value of 0.1			
8. Extended Detention Basin System			
Designed as Required in RG-348 Pages 3-46 to 3-51			
Required Water Quality Volume for extended detention basin = NA cubic feet			
9. Filter area for Sand Filters			
Designed as Required in RG-348 Pages 3-58 to 3-63			
9A. Full Sedimentation and Filtration System			
Water Quality Volume for sedimentation basin = NA cubic feet			
Minimum filter basin area = NA square feet			
Maximum sedimentation basin area = NA square feet			
Minimum sedimentation basin area = NA square feet			
For minimum water depth of 2 feet			
For maximum water depth of 8 feet			
9B. Partial Sedimentation and Filtration System			
Water Quality Volume for combined basins = NA cubic feet			
Minimum filter basin area = NA square feet			
Maximum sedimentation basin area = NA square feet			
Minimum sedimentation basin area = NA square feet			
For minimum water depth of 2 feet			
For maximum water depth of 8 feet			
10. Bioretention System			
Designed as Required in RG-348 Pages 3-63 to 3-65			
Required Water Quality Volume for Bioretention Basin = 1229 cubic feet			


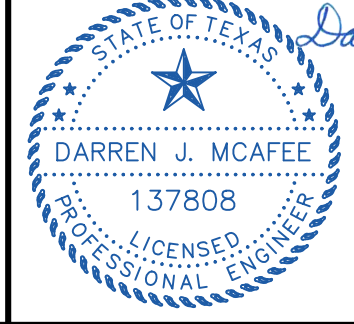
TSS REMOVAL CALCULATIONS: A-5

Texas Commission on Environmental Quality			
TSS Removal Calculations 04-20-2009		Project Name: T Bar M Camp Expansion Date Prepared: 4/11/2024	
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: $L_{M1} = 27.2(A_{M1} \times P)$			
where:	L_{M1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{M1} = 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 = 28.96 acres			
Predevelopment impervious area within the limits of the plan = 0.33 acres			
Total post-development impervious area within the limits of the plan = 8.39 acres			
Total post-development impervious cover fraction = 0.29			
P = 33 inches			
L_{M1} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 ↕			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = A-5 ↕			
Total drainage basin/outfall area = 2.20 acres			
Predevelopment impervious area within drainage basin/outfall area = 0.19 acres			
Post-development impervious area within drainage basin/outfall area = 1.09 acres			
Post-development impervious fraction within drainage basin/outfall area = 0.50			
L_{M1} THIS BASIN = 808 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Bioretention ↕			
Removal efficiency = 89 percent			
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 = 1.29 acres			
A_i = 0.90 acres			
A_p = 0.39 acres			
L_R = 921 lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{M1} THIS BASIN = 808 lbs.			
F = 0.88 ↕			
6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.			
Rainfall Depth = 1.50 inches			
Post Development Runoff Coefficient = 0.50			
On-site Water Quality Volume = 3536 cubic feet			
Calculations from RG-348 Pages 3-36 to 3-37			
Off-site area draining to BMP = 0.90 acres			
Off-site impervious cover draining to BMP = 0.19 acres			
Impervious fraction of off-site area = 0.21			
Off-site Runoff Coefficient = 0.21			
Off-site Water Quality Volume = 1020 cubic feet			
Storage for Sediment = 911			
Total Capture Volume (required water quality volume(s) x 1.20) = 5466 cubic feet			
The following sections are used to calculate the required water quality volume(s) for the selected BMP. The values for BMP Types not selected in cell C45 will show NA.			
7. Retention/Irrigation System		Designed as Required in RG-348 Pages 3-42 to 3-46	
Required Water Quality Volume for retention basin = NA cubic feet			
Irrigation Area Calculations:			
Soil infiltration/permeability rate = 0.1 in/hr			
Irrigation area = NA square feet			
Enter determined permeability rate or assumed value of 0.1			
8. Extended Detention Basin System			
Designed as Required in RG-348 Pages 3-46 to 3-51			
Required Water Quality Volume for extended detention basin = NA cubic feet			
9. Filter area for Sand Filters			
Designed as Required in RG-348 Pages 3-58 to 3-63			
9A. Full Sedimentation and Filtration System			
Water Quality Volume for sedimentation basin = NA cubic feet			
Minimum filter basin area = NA square feet			
Maximum sedimentation basin area = NA square feet			
Minimum sedimentation basin area = NA square feet			
For minimum water depth of 2 feet			
For maximum water depth of 8 feet			
9B. Partial Sedimentation and Filtration System			
Water Quality Volume for combined basins = NA cubic feet			
Minimum filter basin area = NA square feet			
Maximum sedimentation basin area = NA square feet			
Minimum sedimentation basin area = NA square feet			
For minimum water depth of 2 feet			
For maximum water depth of 8 feet			
10. Bioretention System			
Designed as Required in RG-348 Pages 3-63 to 3-65			
Required Water Quality Volume for Bioretention Basin = 5466 cubic feet			







ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FH	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SIDEWALK
TELE	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WV	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OPTIONAL PUBLIC RECORDS COMAL COUNTY TEXAS

!!CAUTION!!
Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
Construction Activities







CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

CENTER FOR CHRISTIAN GROWTH, INC			
T BAR M CAMP EXPANSION			
TCEQ ATTACHMENT "F"			
CONSTRUCTION PLANS –			
BIORETENTION (2 OF 6)			
			
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280 4300 Lochlin-Senna Road, Suite 100 San Antonio, Texas 78249 P.O. Box 5311			
SCALE:	AS SHOWN	DGN. BY:	DJM
DATE:	APRIL 2024	DWN. BY:	JS/CJ
JOB NO.	17758-0001-00	DWG. NO.	NONE
SUBMITTED:		SURV. BY:	QUIDDITY ENGINEERING
		F.B. NO.	NONE
			
SHEET NO. 3 OF 17			







TSS REMOVAL CALCULATIONS: A-6

Texas Commission on Environmental Quality			
TSS Removal Calculations 04-20-2009		Project Name: T Bar M Camp Expansion Date Prepared: 4/11/2024	
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: $L_{dt} = 27.2(A_{dt} \times P)$			
where: L_{dt} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{dt} = 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 = 28.96 acres Predevelopment impervious area within the limits of the plan = 0.33 acres Total post-development impervious area within the limits of the plan = 0.39 acres Total post-development impervious cover fraction = 0.29 P = 33 inches			
L_{dt} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = A-6 			
Total drainage basin/outfall area = 1.06 acres Predevelopment impervious area within drainage basin/outfall area = 0.00 acres Post-development impervious area within drainage basin/outfall area = 0.73 acres Post-development impervious fraction within drainage basin/outfall area = 0.69 L_{dt} THIS BASIN = 655 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Bioretention  Removal efficiency = 89 percent			
4. Calculate Maximum TSS Load Removed (L_d) for this Drainage Basin by the selected BMP Type.			
RG-348 Page 3-33 Equation 3.7: $L_d = (BMP \text{ efficiency}) \times P \times (A_t \times 34.6 + A_p \times 0.54)$			
where: A_t = Total On-Site drainage area in the BMP catchment area A_p = Impervious area proposed in the BMP catchment area A_p = Pervious area remaining in the BMP catchment area L_d = TSS Load removed from this catchment area by the proposed BMP A_t = 1.06 acres A_p = 0.73 acres A_p = 0.33 acres L_d = 747 lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area 			
Desired L_{dt} THIS BASIN = 655 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 = 0.49 On-site Water Quality Volume = 2854 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 = 571 cubic feet Total Capture Volume (required water quality volume(s) x 1.20) = 3425 cubic feet The following sections are used to calculate the required water quality volume(s) for the selected BMP. The values for BMP Types not selected in cell C45 will show NA.			
7. Retention/Irrigation System		Designed as Required in RG-348	Pages 3-42 to 3-46
Required Water Quality Volume for retention basin = NA cubic feet			
Irrigation Area Calculations:			
Soil infiltration/permeability rate = 0.1 in/hr Irrigation area = NA square feet Enter determined permeability rate or assumed value of 0.1			
8. Extended Detention Basin System		Designed as Required in RG-348	Pages 3-46 to 3-51
Required Water Quality Volume for extended detention basin = NA cubic feet			
9. Filter area for Sand Filters		Designed as Required in RG-348	Pages 3-58 to 3-63
9A. Full Sedimentation and Filtration System			
Water Quality Volume for sedimentation basin = NA cubic feet Minimum filter basin area = NA square feet Maximum sedimentation basin area = NA square feet Minimum sedimentation basin area = NA square feet For minimum water depth of 2 feet For maximum water depth of 8 feet			
9B. Partial Sedimentation and Filtration System			
Water Quality Volume for combined basins = NA cubic feet Minimum filter basin area = NA square feet Maximum sedimentation basin area = NA square feet Minimum sedimentation basin area = NA square feet For minimum water depth of 2 feet For maximum water depth of 8 feet			
10. Bioretention System		Designed as Required in RG-348	Pages 3-63 to 3-65
Required Water Quality Volume for Bioretention Basin = 3425 cubic feet			

TSS REMOVAL CALCULATIONS: A-7

Texas Commission on Environmental Quality			
TSS Removal Calculations 04-20-2009		Project Name: T Bar M Camp Expansion Date Prepared: 4/11/2024	
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: $L_{dt} = 27.2(A_{dt} \times P)$			
where: L_{dt} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{dt} = 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 = 28.96 acres Predevelopment impervious area within the limits of the plan = 0.33 acres Total post-development impervious area within the limits of the plan = 0.39 acres Total post-development impervious cover fraction = 0.29 P = 33 inches			
L_{dt} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = A-7 			
Total drainage basin/outfall area = 0.18 acres Predevelopment impervious area within drainage basin/outfall area = 0.00 acres Post-development impervious area within drainage basin/outfall area = 0.14 acres Post-development impervious fraction within drainage basin/outfall area = 0.78 L_{dt} THIS BASIN = 126 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Bioretention  Removal efficiency = 89 percent			
4. Calculate Maximum TSS Load Removed (L_d) for this Drainage Basin by the selected BMP Type.			
RG-348 Page 3-33 Equation 3.7: $L_d = (BMP \text{ efficiency}) \times P \times (A_t \times 34.6 + A_p \times 0.54)$			
where: A_t = Total On-Site drainage area in the BMP catchment area A_p = Impervious area proposed in the BMP catchment area A_p = Pervious area remaining in the BMP catchment area L_d = TSS Load removed from this catchment area by the proposed BMP A_t = 0.18 acres A_p = 0.14 acres A_p = 0.04 acres L_d = 143 lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area 			
Desired L_{dt} THIS BASIN = 136 lbs. F = 0.95 			
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 = 2.60 inches Post Development Runoff Coefficient = 0.59 On-site Water Quality Volume = 1009 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 = 202 cubic feet Total Capture Volume (required water quality volume(s) x 1.20) = 1211 cubic feet The following sections are used to calculate the required water quality volume(s) for the selected BMP. The values for BMP Types not selected in cell C45 will show NA.			
7. Retention/Irrigation System		Designed as Required in RG-348	Pages 3-42 to 3-46
Required Water Quality Volume for retention basin = NA cubic feet			
Irrigation Area Calculations:			
Soil infiltration/permeability rate = 0.1 in/hr Irrigation area = NA square feet Enter determined permeability rate or assumed value of 0.1			
8. Extended Detention Basin System		Designed as Required in RG-348	Pages 3-46 to 3-51
Required Water Quality Volume for extended detention basin = NA cubic feet			
9. Filter area for Sand Filters		Designed as Required in RG-348	Pages 3-58 to 3-63
9A. Full Sedimentation and Filtration System			
Water Quality Volume for sedimentation basin = NA cubic feet Minimum filter basin area = NA square feet Maximum sedimentation basin area = NA square feet Minimum sedimentation basin area = NA square feet For minimum water depth of 2 feet For maximum water depth of 8 feet			
9B. Partial Sedimentation and Filtration System			
Water Quality Volume for combined basins = NA cubic feet Minimum filter basin area = NA square feet Maximum sedimentation basin area = NA square feet Minimum sedimentation basin area = NA square feet For minimum water depth of 2 feet For maximum water depth of 8 feet			
10. Bioretention System		Designed as Required in RG-348	Pages 3-63 to 3-65
Required Water Quality Volume for Bioretention Basin = 1211 cubic feet			

TSS REMOVAL CALCULATIONS: A-8

Texas Commission on Environmental Quality			
TSS Removal Calculations 04-20-2009		Project Name: T Bar M Camp Expansion Date Prepared: 4/11/2024	
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: $L_{dt} = 27.2(A_{dt} \times P)$			
where: L_{dt} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{dt} = 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 = 28.96 acres Predevelopment impervious area within the limits of the plan = 0.33 acres Total post-development impervious area within the limits of the plan = 0.39 acres Total post-development impervious cover fraction = 0.29 P = 33 inches			
L_{dt} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = A-8 			
Total drainage basin/outfall area = 0.18 acres Predevelopment impervious area within drainage basin/outfall area = 0.00 acres Post-development impervious area within drainage basin/outfall area = 0.14 acres Post-development impervious fraction within drainage basin/outfall area = 0.78 L_{dt} THIS BASIN = 126 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Bioretention  Removal efficiency = 89 percent			
4. Calculate Maximum TSS Load Removed (L_d) for this Drainage Basin by the selected BMP Type.			
RG-348 Page 3-33 Equation 3.7: $L_d = (BMP \text{ efficiency}) \times P \times (A_t \times 34.6 + A_p \times 0.54)$			
where: A_t = Total On-Site drainage area in the BMP catchment area A_p = Impervious area proposed in the BMP catchment area A_p = Pervious area remaining in the BMP catchment area L_d = TSS Load removed from this catchment area by the proposed BMP A_t = 0.18 acres A_p = 0.14 acres A_p = 0.04 acres L_d = 143 lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area 			
Desired L_{dt} THIS BASIN = 136 lbs. F = 0.95 			
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 = 2.60 inches Post Development Runoff Coefficient = 0.59 On-site Water Quality Volume = 1009 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 = 202 cubic feet Total Capture Volume (required water quality volume(s) x 1.20) = 1211 cubic feet The following sections are used to calculate the required water quality volume(s) for the selected BMP. The values for BMP Types not selected in cell C45 will show NA.			
7. Retention/Irrigation System		Designed as Required in RG-348	Pages 3-42 to 3-46
Required Water Quality Volume for retention basin = NA cubic feet			
Irrigation Area Calculations:			
Soil infiltration/permeability rate = 0.1 in/hr Irrigation area = NA square feet Enter determined permeability rate or assumed value of 0.1			
8. Extended Detention Basin System		Designed as Required in RG-348	Pages 3-46 to 3-51
Required Water Quality Volume for extended detention basin = NA cubic feet			
9. Filter area for Sand Filters		Designed as Required in RG-348	Pages 3-58 to 3-63
9A. Full Sedimentation and Filtration System			
Water Quality Volume for sedimentation basin = NA cubic feet Minimum filter basin area = NA square feet Maximum sedimentation basin area = NA square feet Minimum sedimentation basin area = NA square feet For minimum water depth of 2 feet For maximum water depth of 8 feet			
9B. Partial Sedimentation and Filtration System			
Water Quality Volume for combined basins = NA cubic feet Minimum filter basin area = NA square feet Maximum sedimentation basin area = NA square feet Minimum sedimentation basin area = NA square feet For minimum water depth of 2 feet For maximum water depth of 8 feet			
10. Bioretention System		Designed as Required in RG-348	Pages 3-63 to 3-65
Required Water Quality Volume for Bioretention Basin = 1211 cubic feet			

ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FH	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SIDEWALK
TELE	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WY	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OPTIONAL PUBLIC RECORDS COMAL COUNTY TEXAS

!!CAUTION!!
Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
Construction Activities

CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

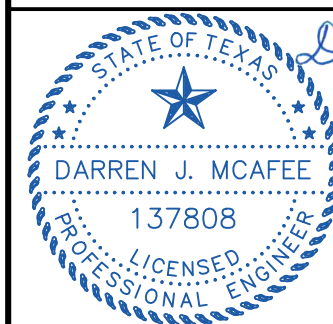
NO.	DATE	REVISIONS	APP.

CENTER FOR CHRISTIAN GROWTH, INC

T BAR M CAMP EXPANSION
TCEQ ATTACHMENT "F"
CONSTRUCTION PLANS –
BIORETENTION (3 OF 6)

Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280
4300 Lochlin-Serra Road, Suite 100 San Antonio, Texas 78249 P.O. Box 5311

SCALE: AS SHOWN DGN. BY: DJM
DATE: APRIL 2024 DWN. BY: JS/CJ
JOB NO. 17758-0001-00 DWG. NO. NONE
SUBMITTED: QUIDDITY ENGINEERING
F.B. NO. NONE



SHEET NO.
4
OF 17

TSS REMOVAL CALCULATIONS: A-9

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{d,TOTAL PROJECT} = 27.2(A_{N1} \times P)$			
where:	$L_{d,TOTAL PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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	acres	
Total project area included in plan =	28.96	acres	
Predevelopment impervious area within the limits of the plan =	0.33	acres	
Total post-development impervious area within the limits of the plan =	8.39	acres	
Total post-development impervious cover fraction =	0.29		
P =	33	inches	
$L_{d,TOTAL PROJECT}$ =	7234	lbs.	
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = A-9			
Total drainage basin/outfall area =	0.22	acres	
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres	
Post-development impervious area within drainage basin/outfall area =	0.15	acres	
Post-development impervious fraction within drainage basin/outfall area =	0.68		
$L_{d,THIS BASIN}$ =	135	lbs.	
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP =	Bioretention		
Removal efficiency =	89	percent	
4. Calculate Maximum TSS Load Removed (L_d) for this Drainage Basin by the selected BMP Type.			
RG-348 Page 3-33 Equation 3.7: $L_d = (BMP \text{ efficiency}) \times P \times (A_1 \times 34.6 + A_{p1} \times 0.54)$			
where:	A_1 = Total On-Site drainage area in the BMP catchment area A_p = Impervious area proposed in the BMP catchment area A_{p1} = Previous area remaining in the BMP catchment area L_d = TSS Load removed from this catchment area by the proposed BMP		
A_1 =	0.22	acres	
A_p =	0.15	acres	
A_{p1} =	0.07	acres	
L_d =	154	lbs.	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_d THIS BASIN =	135	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 =	0.49		
On-site Water Quality Volume =	585	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 =	117	cubic feet	
Total Capture Volume (required water quality volume(s) x 1.20) =	701	cubic feet	
The following sections are used to calculate the required water quality volume(s) for the selected BMP. The values for BMP Types not selected in cell C45 will show NA.			
7. Retention/Irrigation System			
Designed as Required in RG-348 Pages 3-42 to 3-46			
Required Water Quality Volume for retention basin =	NA	cubic feet	
Irrigation Area Calculations:			
Soil infiltration/permeability rate =	0.1	in/hr	Enter determined permeability rate or assumed value of 0.1
Irrigation area =	NA	square feet	
Irrigation area =	NA	acres	
8. Extended Detention Basin System			
Designed as Required in RG-348 Pages 3-46 to 3-51			
Required Water Quality Volume for extended detention basin =	NA	cubic feet	
9. Filter area for Sand Filters			
Designed as Required in RG-348 Pages 3-58 to 3-63			
9A. Full Sedimentation and Filtration System			
Water Quality Volume for sedimentation basin =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	For minimum water depth of 2 feet
Minimum sedimentation basin area =	NA	square feet	For maximum water depth of 8 feet
9B. Partial Sedimentation and Filtration System			
Water Quality Volume for combined basins =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	For minimum water depth of 2 feet
Minimum sedimentation basin area =	NA	square feet	For maximum water depth of 8 feet
10. Bioretention System			
Designed as Required in RG-348 Pages 3-63 to 3-65			
Required Water Quality Volume for Bioretention Basin =	701	cubic feet	

TSS REMOVAL CALCULATIONS: A-10

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{d,TOTAL PROJECT} = 27.2(A_{N1} \times P)$			
where:	$L_{d,TOTAL PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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	acres	
Total project area included in plan =	28.96	acres	
Predevelopment impervious area within the limits of the plan =	0.33	acres	
Total post-development impervious area within the limits of the plan =	8.39	acres	
Total post-development impervious cover fraction =	0.29		
P =	33	inches	
$L_{d,TOTAL PROJECT}$ =	7234	lbs.	
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = A-10			
Total drainage basin/outfall area =	0.21	acres	
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres	
Post-development impervious area within drainage basin/outfall area =	0.15	acres	
Post-development impervious fraction within drainage basin/outfall area =	0.71		
$L_{d,THIS BASIN}$ =	135	lbs.	
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP =	Bioretention		
Removal efficiency =	89	percent	
4. Calculate Maximum TSS Load Removed (L_d) for this Drainage Basin by the selected BMP Type.			
RG-348 Page 3-33 Equation 3.7: $L_d = (BMP \text{ efficiency}) \times P \times (A_1 \times 34.6 + A_{p1} \times 0.54)$			
where:	A_1 = Total On-Site drainage area in the BMP catchment area A_p = Impervious area proposed in the BMP catchment area A_{p1} = Previous area remaining in the BMP catchment area L_d = TSS Load removed from this catchment area by the proposed BMP		
A_1 =	0.21	acres	
A_p =	0.15	acres	
A_{p1} =	0.06	acres	
L_d =	153	lbs.	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_d THIS BASIN =	139	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 =	0.52		
On-site Water Quality Volume =	714	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 =	143	cubic feet	
Total Capture Volume (required water quality volume(s) x 1.20) =	857	cubic feet	
The following sections are used to calculate the required water quality volume(s) for the selected BMP. The values for BMP Types not selected in cell C45 will show NA.			
7. Retention/Irrigation System			
Designed as Required in RG-348 Pages 3-42 to 3-46			
Required Water Quality Volume for retention basin =	NA	cubic feet	
Irrigation Area Calculations:			
Soil infiltration/permeability rate =	0.1	in/hr	Enter determined permeability rate or assumed value of 0.1
Irrigation area =	NA	square feet	
Irrigation area =	NA	acres	
8. Extended Detention Basin System			
Designed as Required in RG-348 Pages 3-46 to 3-51			
Required Water Quality Volume for extended detention basin =	NA	cubic feet	
9. Filter area for Sand Filters			
Designed as Required in RG-348 Pages 3-58 to 3-63			
9A. Full Sedimentation and Filtration System			
Water Quality Volume for sedimentation basin =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	For minimum water depth of 2 feet
Minimum sedimentation basin area =	NA	square feet	For maximum water depth of 8 feet
9B. Partial Sedimentation and Filtration System			
Water Quality Volume for combined basins =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	For minimum water depth of 2 feet
Minimum sedimentation basin area =	NA	square feet	For maximum water depth of 8 feet
10. Bioretention System			
Designed as Required in RG-348 Pages 3-63 to 3-65			
Required Water Quality Volume for Bioretention Basin =	857	cubic feet	



TSS REMOVAL CALCULATIONS: A-11

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{d,TOTAL PROJECT} = 27.2(A_{N1} \times P)$			
where:	$L_{d,TOTAL PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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	acres	
Total project area included in plan =	28.96	acres	
Predevelopment impervious area within the limits of the plan =	0.33	acres	
Total post-development impervious area within the limits of the plan =	8.39	acres	
Total post-development impervious cover fraction =	0.29		
P =	33	inches	
$L_{d,TOTAL PROJECT}$ =	7234	lbs.	
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = A-11			
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 =	0.15	acres	
Post-development impervious fraction within drainage basin/outfall area =	0.75		
$L_{d,THIS BASIN}$ =	135	lbs.	
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP =	Bioretention		
Removal efficiency =	89	percent	
4. Calculate Maximum TSS Load Removed (L_d) for this Drainage Basin by the selected BMP Type.			
RG-348 Page 3-33 Equation 3.7: $L_d = (BMP \text{ efficiency}) \times P \times (A_1 \times 34.6 + A_{p1} \times 0.54)$			
where:	A_1 = Total On-Site drainage area in the BMP catchment area A_p = Impervious area proposed in the BMP catchment area A_{p1} = Previous area remaining in the BMP catchment area L_d = TSS Load removed from this catchment area by the proposed BMP		
A_1 =	0.20	acres	
A_p =	0.15	acres	
A_{p1} =	0.05	acres	
L_d =	153	lbs.	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_d THIS BASIN =	135	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 =	0.56		
On-site Water Quality Volume =	610	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 =	122	cubic feet	
Total Capture Volume (required water quality volume(s) x 1.20) =	732	cubic feet	
The following sections are used to calculate the required water quality volume(s) for the selected BMP. The values for BMP Types not selected in cell C45 will show NA.			
7. Retention/Irrigation System			
Designed as Required in RG-348 Pages 3-42 to 3-46			
Required Water Quality Volume for retention basin =	NA	cubic feet	
Irrigation Area Calculations:			
Soil infiltration/permeability rate =	0.1	in/hr	Enter determined permeability rate or assumed value of 0.1
Irrigation area =	NA	square feet	
Irrigation area =	NA	acres	
8. Extended Detention Basin System			
Designed as Required in RG-348 Pages 3-46 to 3-51			
Required Water Quality Volume for extended detention basin =	NA	cubic feet	
9. Filter area for Sand Filters			
Designed as Required in RG-348 Pages 3-58 to 3-63			
9A. Full Sedimentation and Filtration System			
Water Quality Volume for sedimentation basin =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	For minimum water depth of 2 feet
Minimum sedimentation basin area =	NA	square feet	For maximum water depth of 8 feet
9B. Partial Sedimentation and Filtration System			
Water Quality Volume for combined basins =	NA	cubic feet	
Minimum filter basin area =	NA	square feet	
Maximum sedimentation basin area =	NA	square feet	For minimum water depth of 2 feet
Minimum sedimentation basin area =	NA	square feet	For maximum water depth of 8 feet
10. Bioretention System			
Designed as Required in RG-348 Pages 3-63 to 3-65			
Required Water Quality Volume for Bioretention Basin =	732	cubic feet	

ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FM	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SEWER
TELE	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WV	WATER VALVE
WV	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
D.P.R.C.C.T.	OPTIONAL PUBLIC RECORDS COMAL COUNTY TEXAS

!!CAUTION!!
Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
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CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

NO.	DATE	REVISIONS	APP.
CENTER FOR CHRISTIAN GROWTH, INC			
T BAR M CAMP EXPANSION			
TCEQ ATTACHMENT "F"			
CONSTRUCTION PLANS -			
BIORETENTION (4 OF 6)			
			
Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280 4350 Lochlin-Senna Road, Suite 100 San Antonio, Texas 78249 P 210-496-5311			
SCALE:	AS SHOWN	DGN. BY:	DJM
DATE:	APRIL 2024	DWN. BY:	JS/CJ
JOB NO.	17758-0001-00	DWG. NO.	NONE
SUBMITTED:		SURV. BY:	QUIDDITY ENGINEERING
		F.B. NO.	NONE
			
SHEET NO. 5 OF 17			

TSS REMOVAL CALCULATIONS: A-12

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **T Bar M Camp Expansion**
Date Prepared: **4/11/2024**

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: $L_{d,T} = 27.2(A_N \times P)$

where:

 $L_{d,T}$ 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

acres

Total project area included in plan =

28.96

acres

Predevelopment impervious area within the limits of the plan =

0.33

acres

Total post-development impervious area within the limits of the plan =

8.39

acres

Total post-development impervious cover fraction =

0.29

inches

 P =

33

 $L_{d,T}$ TOTAL PROJECT =

7234

lbs.

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

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

1

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

Drainage Basin/Outfall Area No. =

A-12

acres

Total drainage basin/outfall area =

0.23

Predevelopment impervious area within drainage basin/outfall area =

0.00

Post-development impervious area within drainage basin/outfall area =

0.15

Post-development impervious fraction within drainage basin/outfall area =

0.65

 $L_{d,T}$ THIS BASIN =

135

lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP =

Bioretention

Removal efficiency =

89

percent

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: $L_R = (\text{BMP efficiency}) \times P \times (A_N \times 34.6 + A_P \times 0.54)$

where:

 A_C = Total On-Site drainage area in the BMP catchment area A_P = 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 =

0.23

acres

 A_P =

0.15

acres

 A_P =

0.08

acres

 L_R =

154

lbs.

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

Desired $L_{d,T}$ THIS BASIN =

135

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 =

0.46

On-site Water Quality Volume =

578

cubic feet

Calculations from RG-348

Pages 3-36 to 3-37

Off-site area draining to BMP =

0.00

Off-site impervious cover draining to BMP =

0.00

Impervious fraction of off-site area =

0

Off-site Runoff Coefficient =

0.00

Off-site Water Quality Volume =

0

cubic feet

Storage for Sediment =

116

cubic feet

Total Capture Volume (required water quality volume(s) x 1.20) =

693

cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP.

The values for BMP Types not selected in cell C45 will show NA.

7. Retention/Irrigation System

Designed as Required in RG-348

Pages 3-42 to 3-46

Required Water Quality Volume for retention basin =

NA

cubic feet

Irrigation Area Calculations:

Soil infiltration/permeability rate =

0.1

in/hr

Irrigation area =

NA

square feet

acres

8. Extended Detention Basin System

Designed as Required in RG-348

Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin =

NA

cubic feet

9. Filter area for Sand Filters

Designed as Required in RG-348

Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin =

NA

cubic feet

Minimum filter basin area =

NA

square feet

Maximum sedimentation basin area =

NA

square feet

Minimum sedimentation basin area =

NA

square feet

square feet

square feet

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TSS REMOVAL CALCULATIONS: A-15

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: T Bar M Camp Expansion

Date Prepared: 4/11/2024

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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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 = 28.96 acres
Predevelopment impervious area within the limits of the plan = 0.33 acres
Total post-development impervious area within the limits of the plan = 0.39 acres
Total post-development impervious cover fraction = 0.29
P = 33 inches

L_{M} TOTAL PROJECT = 7234 lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = 1

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

Drainage Basin/Outfall Area No. = A-15

Total drainage basin/outfall area = 0.51 acres
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres
Post-development impervious area within drainage basin/outfall area = 0.44 acres
Post-development impervious fraction within drainage basin/outfall area = 0.86
 L_{M} THIS BASIN = 395 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Bioretention

Removal efficiency = 89 percent

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: $L_R = (BMP \text{ efficiency}) \times P \times (A_p \times 34.6 + A_{p1} \times 0.54)$

where: A_{p1} = Total On-Site drainage area in the BMP catchment area
 A_p = Impervious area proposed in the BMP catchment area
 A_{p1} = Pervious area remaining in the BMP catchment area
 L_R = TSS Load removed from this catchment area by the proposed BMP

A_{p1} = 0.51 acres
 A_p = 0.44 acres
 A_{p1} = 0.07 acres
 L_R = 448 lbs

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

Desired L_{M} THIS BASIN = 395 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 = 0.70
On-site Water Quality Volume = 1956 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 = 391 cubic feet

Total Capture Volume (required water quality volume(s) x 1.20) = 2348 cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP.

The values for BMP Types not selected in cell C45 will show NA.

7. Retention/Irrigation System

Designed as Required in RG-348

Pages 3-42 to 3-46

Required Water Quality Volume for retention basin = NA cubic feet

Irrigation Area Calculations:

Soil infiltration/permeability rate = 0.1 in/hr
Irrigation area = NA square feet

Enter determined permeability rate or assumed value of 0.1

8. Extended Detention Basin System

Designed as Required in RG-348

Pages 3-46 to 3-51

Required Water Quality Volume for extended detention basin = NA cubic feet

9. Filter area for Sand Filters

Designed as Required in RG-348

Pages 3-58 to 3-63

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin = NA cubic feet

Minimum filter basin area = NA square feet

Maximum sedimentation basin area = NA square feet
Minimum sedimentation basin area = NA square feet

For minimum water depth of 2 feet
For maximum water depth of 8 feet

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins = NA cubic feet

Minimum filter basin area = NA square feet

Maximum sedimentation basin area = NA square feet
Minimum sedimentation basin area = NA square feet

For minimum water depth of 2 feet
For maximum water depth of 8 feet

10. Bioretention System

Designed as Required in RG-348

Pages 3-63 to 3-65

Required Water Quality Volume for Bioretention Basin = 2348 cubic feet

ABBREVIATIONS

E.G.T.C. _____ ELECTRIC, GAS, TELEPHONE, CABLE
ESMT _____ EASEMENT
FH _____ FIRE HYDRANT
OE _____ OVERHEAD ELECTRIC
PP _____ POWER POLE
R.O.W. _____ RIGHT-OF-WAY
SS _____ SANITARY SEWER LINE
SW _____ SIDEWALK
TELE _____ TELEPHONE
UE _____ UNDERGROUND ELECTRIC
UT _____ UNDERGROUND TELEPHONE
WV _____ WATER VALVE
D.R.C.C.T. _____ DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T. _____ OFFICIAL PUBLIC RECORDS COMAL COUNTY TEXAS

!!CAUTION!!

Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
Construction Activities

CAUTION!!!

CONTACT:

1-800-DIG-TESS

48 HOURS PRIOR TO CONSTRUCTION

NO.	DATE	REVISIONS	APP.

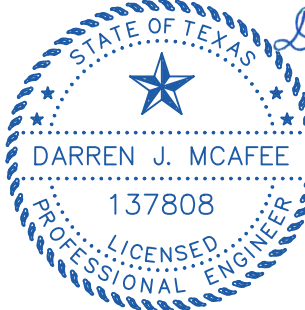
CENTER FOR CHRISTIAN GROWTH, INC

T BAR M CAMP EXPANSION
TCEQ ATTACHMENT "F"
CONSTRUCTION PLANS –
BIORETENTION (6 OF 6)

QUIDDITY

Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280
4350 Lochlin-Senna Road, Suite 100 San Antonio, Texas 78249 P.O. Box 5311

SCALE: AS SHOWN DGN. BY: DJM
DATE: APRIL 2024 DWN. BY: JS/CJ
JOB NO. 17758-0001-00 DWG. NO. NONE
SUBMITTED: SURV. BY: QUIDDITY ENGINEERING
F.B. NO. NONE



5/8/2024

SHEET NO.

7

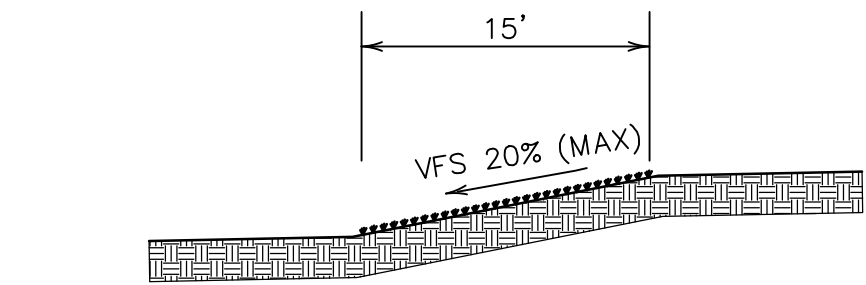
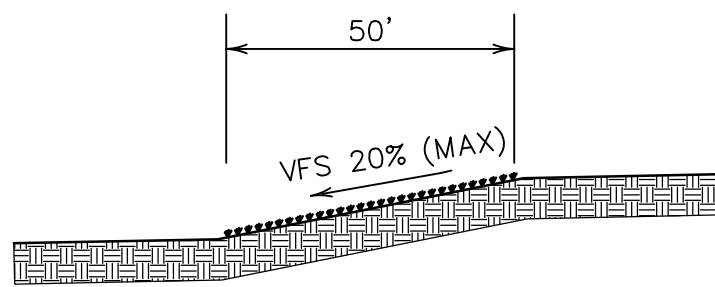
OF 17

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TSS REMOVAL CALCULATIONS: B-1

TSS REMOVAL CALCULATIONS: B-2

ENGINEERED VEGETATIVE FILTER STRIP DETAIL
NOT TO SCALENATURAL VEGETATIVE FILTER STRIP DETAIL
NOT TO SCALE

Slope should not exceed 10%

The minimum dimension (in the direction of flow) should be 50 feet

Vegetative Filter Strip	Type	TSS Removal Required (lbs)	Total TSS Removed (lbs)
B-1	50' Natural VFS	341	381
B-2	15' Engineered VFS	54	59
B-3	15' Engineered VFS	45	49
B-4	15' Engineered VFS	117	129
B-5	15' Engineered VFS	171	185
B-6	15' Engineered VFS	260	282
B-7	15' Engineered VFS	45	52
B-8	15' Engineered VFS	269	294
B-9	15' Engineered VFS	260	283
B-10	15' Engineered VFS	287	317
B-11	15' Engineered VFS	36	40
B-12	15' Engineered VFS	108	122
B-13	15' Engineered VFS	9	11
B-14	15' Engineered VFS	27	38
B-15	15' Engineered VFS	18	21
B-16	15' Engineered VFS	9	10
B-17	50' Natural VFS	99	115
B-18	15' Engineered VFS	404	438
B-19	15' Engineered VFS	27	32
B-20	15' Engineered VFS	54	60
B-21	15' Engineered VFS	9	10
B-22	15' Engineered VFS	18	21
B-23	15' Engineered VFS	27	30
B-24	15' Engineered VFS	90	99

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **T Bar M Camp Expansion**
Date Prepared: **4/11/2024**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 = **28.96** acresPredevelopment impervious area within the limits of the plan = **0.33** acresTotal post-development impervious area within the limits of the plan = **8.39** acresTotal post-development impervious cover fraction = **0.29** P = **33** inches L_M TOTAL PROJECT = **7234** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **1**

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

Drainage Basin/Outfall Area No. = **B-1**Total drainage basin/outfall area = **1.20** acresPredevelopment impervious area within drainage basin/outfall area = **0.00** acresPost-development impervious area within drainage basin/outfall area = **0.38** acresPost-development impervious fraction within drainage basin/outfall area = **0.32** L_M THIS BASIN = **341** lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Vegetated Filter Strips**Removal efficiency = **85** percent4. 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 = **1.20** acres A_i = **0.38** acres A_p = **0.82** acres L_R = **381** lbs

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

Desired L_M THIS BASIN = **381** lbs. F = **1.00**

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 = **4.00** inchesPost Development Runoff Coefficient = **0.27**On-site Water Quality Volume = **4645** cubic feet

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

Off-site area draining to BMP = **0.00** acresOff-site Impervious cover draining to BMP = **0.00** acresImpervious fraction of off-site area = **0**Off-site Runoff Coefficient = **0.00**Off-site Water Quality Volume = **0** cubic feetStorage for Sediment = **929**Total Capture Volume (required water quality volume(s) x 1.20) = **5574** cubic feet

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **T Bar M Camp Expansion**
Date Prepared: **4/11/2024**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.

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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 = **28.96** acresPredevelopment impervious area within the limits of the plan = **0.33** acresTotal post-development impervious area within the limits of the plan = **8.39** acresTotal post-development impervious cover fraction = **0.29** P = **33** inches L_M TOTAL PROJECT = **7234** lbs.

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

Number of drainage basins / outfalls areas leaving the plan area = **1**

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

Drainage Basin/Outfall Area No. = **B-2**Total drainage basin/outfall area = **0.10** acresPredevelopment impervious area within drainage basin/outfall area = **0.00** acresPost-development impervious area within drainage basin/outfall area = **0.06** acresPost-development impervious fraction within drainage basin/outfall area = **0.60** L_M THIS BASIN = **54** lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Vegetated Filter Strips**Removal efficiency = **85** percent4. 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 = **0.10** acres A_i = **0.06** acres A_p = **0.04** acres L_R = **59** lbs

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

Desired L_M THIS BASIN = **59** lbs. F = **1.00**

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 = **4.00** inchesPost Development Runoff Coefficient = **0.42**On-site Water Quality Volume = **610** cubic feet

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

Off-site area draining to BMP = **0.00** acresOff-site Impervious cover draining to BMP = **0.00** acresImpervious fraction of off-site area = **0**Off-site Runoff Coefficient = **0.00**Off-site Water Quality Volume = **0** cubic feetStorage for Sediment = **122**Total Capture Volume (required water quality volume(s) x 1.20) = **732** cubic feet

ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FH	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SIDEWALK
TELE.	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WV	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OPTIONAL PUBLIC RECORDS COMAL COUNTY TEXAS

!!CAUTION!!

Contractor to Verify

Exact Location &

Depth of Exist

Facilities Prior to any

Construction Activities

CAUTION!!!

CONTACT:

1-800-DIG-TESS

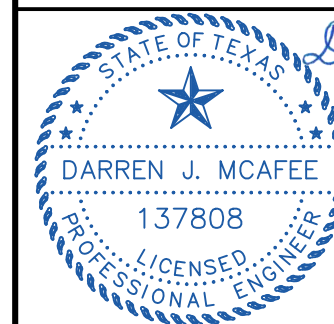
48 HOURS PRIOR TO CONSTRUCTION

NO.	DATE	REVISIONS	APP.

CENTER FOR CHRISTIAN GROWTH, INC

T BAR M CAMP EXPANSION
TCEQ ATTACHMENT "F"
CONSTRUCTION PLANS –
VEGETATIVE FILTER STRIPS
(1 OF 9)

QUIDDITY

Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280
4300 Lochlin-Serra Road, Suite 100 San Antonio, Texas 78249 P.O. Box 5311SCALE: AS SHOWN DGN. BY: DJM
DATE: APRIL 2024 DWN. BY: JS/CJ
JOB NO. 17758-0001-00 DWG. NO. NONE
SUBMITTED: SURV. BY: QUIDDITY ENGINEERING
F.B. NO. NONEDarren J. McAfee
5/8/2024

SHEET NO.

8

OF 17

TSS REMOVAL CALCULATIONS: B-5

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion Date Prepared: 4/11/2024	
TSS Removal Calculations 04-20-2009			
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: $L_d = 27.2(A_{ti} \times P)$			
where:	L_d TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{ti} = 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 =	28.86 acres		
Preddevelopment impervious area within the limits of the plan =	0.33 acres		
Total post-development impervious area within the limits of the plan =	8.39 acres		
Total post-development impervious cover fraction =	0.29		
P =	33 inches		
L_d TOTAL PROJECT =	7234 lbs.		
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-5			
Total drainage basin/outfall area =	0.24 acres		
Preddevelopment impervious area within drainage basin/outfall area =	0.00 acres		
Post-development impervious area within drainage basin/outfall area =	0.19 acres		
Post-development impervious fraction within drainage basin/outfall area =	0.79		
L_d THIS BASIN =	171 lbs.		
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP =	Vegetated Filter Strips		
Removal efficiency =	85 percent		
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 =	0.24 acres		
A_i =	0.19 acres		
A_p =	0.05 acres		
L_R =	185 lbs		
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_d THIS BASIN =	185 lbs.		
F =	1.00		
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 =	4.00 inches		
Post Development Runoff Coefficient =	0.61		
On-site Water Quality Volume =	2134 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 =	427		
Total Capture Volume (required water quality volume(a) x 1.20) =	2561 cubic feet		

!!CAUTION!!
Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
Construction Activities

NO.	DATE	REVISIONS	APP.








**T BAR M CAMP EXPANSION
TCEQ ATTACHMENT "F"
CONSTRUCTION PLANS –
VEGETATIVE FILTER STRIPS
(2 OF 9)**










A circular professional engineer seal for the State of Texas. The outer ring contains the text "STATE OF TEXAS" at the top and "PROFESSIONAL ENGINEER" at the bottom, separated by stars. In the center, there is a five-pointed star above the name "DARREN J. MCAFEE" and the license number "137808". Below the license number, the word "LICENSED" is written. The seal is blue and white.

SHEET NO.
9
OF 17








TSS REMOVAL CALCULATIONS: B-6

TSS Removal Calculations 04-20-2009		Project Name: T Bar M Camp Expansion	
		Date Prepared: 4/11/2024	
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: $L_{M1} = 27.2(A_{N1} \times P)$			
where: L_{M1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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 = 28.96 acres Predevelopment impervious area within the limits of the plan = 0.33 acres Total post-development impervious area within the limits of the plan = 8.39 acres Total post-development impervious cover fraction = 0.29 P = 33 inches			
L_{M1} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-6 			
Total drainage basin/outfall area = 0.35 acres Predevelopment impervious area within drainage basin/outfall area = 0.00 acres Post-development impervious area within drainage basin/outfall area = 0.29 acres Post-development impervious fraction within drainage basin/outfall area = 0.83 L_{M1} THIS BASIN = 260 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Vegetated Filter Strips Removal efficiency = 85 percent			
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 = 0.35 acres A_i = 0.29 acres A_p = 0.06 acres L_R = 282 lbs.			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area 			
Desired L_{M1} THIS BASIN = 282 lbs. F = 1.00 			
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 = 4.00 inches Post Development Runoff Coefficient = 0.67  On-site Water Quality Volume = 3380 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 = 678 Total Capture Volume (required water quality volume(s) x 1.20) = 4056 cubic feet			

TSS REMOVAL CALCULATIONS: B-7

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: $L_{M1} = 27.2(A_{N1} \times P)$	
where: L_{M1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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 = 28.96 acres Predevelopment impervious area within the limits of the plan = 0.33 acres Total post-development impervious area within the limits of the plan = 8.39 acres Total post-development impervious cover fraction = 0.29 P = 33 inches	
L_{M1} TOTAL PROJECT = 7234 lbs.	
* The values entered in these fields should be for the total project area.	
Number of drainage basins / outfalls areas leaving the plan area = 1 	
2. Drainage Basin Parameters (This information should be provided for each basin):	
Drainage Basin/Outfall Area No. = B-7 	
Total drainage basin/outfall area = 0.25 acres Predevelopment impervious area within drainage basin/outfall area = 0.00 acres Post-development impervious area within drainage basin/outfall area = 0.05 acres Post-development impervious fraction within drainage basin/outfall area = 0.20 L_{M1} THIS BASIN = 45 lbs.	
3. Indicate the proposed BMP Code for this basin.	
Proposed BMP = Vegetated Filter Strips Removal efficiency = 85 percent	
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 = 0.25 acres A_i = 0.05 acres A_p = 0.20 acres L_R = 52 lbs.	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area 	
Desired L_{M1} THIS BASIN = 52 lbs. F = 1.01 	
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 = 4.00 inches Post Development Runoff Coefficient = 0.20  On-site Water Quality Volume = 729 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 = 146 Total Capture Volume (required water quality volume(s) x 1.20) = 875 cubic feet	

TSS REMOVAL CALCULATIONS: B-8

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{M1} = 27.2(A_{N1} \times P)$			
where: L_{M1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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 = 28.96 acres Predevelopment impervious area within the limits of the plan = 0.33 acres Total post-development impervious area within the limits of the plan = 8.39 acres Total post-development impervious cover fraction = 0.29 P = 33 inches			
L_{M1} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-8 			
Total drainage basin/outfall area = 0.51 acres Predevelopment impervious area within drainage basin/outfall area = 0.00 acres Post-development impervious area within drainage basin/outfall area = 0.30 acres Post-development impervious fraction within drainage basin/outfall area = 0.59 L_{M1} THIS BASIN = 269 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Vegetated Filter Strips Removal efficiency = 85 percent			
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 = 0.51 acres A_i = 0.30 acres A_p = 0.21 acres L_R = 294 lbs.			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area 			
Desired L_{M1} THIS BASIN = 294 lbs. F = 1.00 			
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 = 4.00 inches Post Development Runoff Coefficient = 0.41  On-site Water Quality Volume = 3051 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 = 610 Total Capture Volume (required water quality volume(s) x 1.20) = 3661 cubic feet			

ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FM	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SIDEWALK
TELE.	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WV	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OPTIONAL PUBLIC RECORDS COMAL COUNTY TEXAS

!!CAUTION!!
Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
Construction Activities

CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

NO.	DATE	REVISIONS	APP.

CENTER FOR CHRISTIAN GROWTH, INC

T BAR M CAMP EXPANSION
TCEQ ATTACHMENT "F"
CONSTRUCTION PLANS –
VEGETATIVE FILTER STRIPS
(3 OF 9)

Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280
4350 Lochlin-Serra Road, Suite 100 • San Antonio, Texas 78249 • (210) 486-5311

SCALE: AS SHOWN DGN. BY: DJM
DATE: APRIL 2024 DWN. BY: JS/CJ
JOB NO. 17758-0001-00 DWG. NO. NONE
SUBMITTED: SURV. BY: QUIDDITY ENGINEERING
F.B. NO. NONE



Darren J. McAfee
5/8/2024

SHEET NO.
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OF 17

TSS REMOVAL CALCULATIONS: B-9

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{dt} = 27.2(A_{dt} \times P)$			
where:	L_{dt} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{dt} = 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	acres	
Total project area included in plan =	28.96	acres	
Predevelopment impervious area within the limits of the plan =	0.33	acres	
Total post-development impervious area within the limits of the plan =	8.39	acres	
Total post-development impervious cover fraction =	0.29		
P =	33	inches	
L_{dt} THIS BASIN =	7234	lbs.	
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-9			
Total drainage basin/outfall area =	0.36	acres	
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres	
Post-development impervious area within drainage basin/outfall area =	0.29	acres	
Post-development impervious fraction within drainage basin/outfall area =	0.81		
L_{dt} THIS BASIN =	260	lbs.	
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP =	Vegetated Filter Strips		
Removal efficiency =	85	percent	
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: $L_R = (BMP \text{ efficiency}) \times P \times (A_i \times 34.6 + A_p \times 0.54)$			
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 =	0.36	acres	
A_i =	0.29	acres	
A_p =	0.07	acres	
L_R =	283	lbs.	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{dt} THIS BASIN =	283	lbs.	
F =	1.00		
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 =	4.00	inches	
Post Development Runoff Coefficient =	0.63		
On-site Water Quality Volume =	3301	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 =	660		
Total Capture Volume (required water quality volume(s) x 1.20) =	3962	cubic feet	

TSS REMOVAL CALCULATIONS: B-10

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{dt} = 27.2(A_{dt} \times P)$			
where:	L_{dt} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{dt} = 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	acres	
Total project area included in plan =	28.96	acres	
Predevelopment impervious area within the limits of the plan =	0.33	acres	
Total post-development impervious area within the limits of the plan =	8.39	acres	
Total post-development impervious cover fraction =	0.29		
P =	33	inches	
L_{dt} TOTAL PROJECT =	7234	lbs.	
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-10			
Total drainage basin/outfall area =	0.75	acres	
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres	
Post-development impervious area within drainage basin/outfall area =	0.32	acres	
Post-development impervious fraction within drainage basin/outfall area =	0.43		
L_{dt} THIS BASIN =	287	lbs.	
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP =	Vegetated Filter Strips		
Removal efficiency =	85	percent	
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: $L_R = (BMP \text{ efficiency}) \times P \times (A_i \times 34.6 + A_p \times 0.54)$			
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 =	0.75	acres	
A_i =	0.32	acres	
A_p =	0.43	acres	
L_R =	317	lbs.	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{dt} THIS BASIN =	317	lbs.	
F =	1.00		
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 =	4.00	inches	
Post Development Runoff Coefficient =	0.32		
On-site Water Quality Volume =	3482	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 =	696		
Total Capture Volume (required water quality volume(s) x 1.20) =	4179	cubic feet	

TSS REMOVAL CALCULATIONS: B-11

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{dt} = 27.2(A_{dt} \times P)$			
where:	L_{dt} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{dt} = 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	acres	
Total project area included in plan =	28.96	acres	
Predevelopment impervious area within the limits of the plan =	0.33	acres	
Total post-development impervious area within the limits of the plan =	8.39	acres	
Total post-development impervious cover fraction =	0.29		
P =	33	inches	
L_{dt} TOTAL PROJECT =	7234	lbs.	
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-11			
Total drainage basin/outfall area =	0.12	acres	
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres	
Post-development impervious area within drainage basin/outfall area =	0.04	acres	
Post-development impervious fraction within drainage basin/outfall area =	0.33		
L_{dt} THIS BASIN =	36	lbs.	
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP =	Vegetated Filter Strips		
Removal efficiency =	85	percent	
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: $L_R = (BMP \text{ efficiency}) \times P \times (A_i \times 34.6 + A_p \times 0.54)$			
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 =	0.12	acres	
A_i =	0.04	acres	
A_p =	0.08	acres	
L_R =	40	lbs.	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{dt} THIS BASIN =	40	lbs.	
F =	1.00		
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 =	4.00	inches	
Post Development Runoff Coefficient =	0.27		
On-site Water Quality Volume =	479	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 =	96		
Total Capture Volume (required water quality volume(s) x 1.20) =	575	cubic feet	

ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FM	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SIDEWALK
TELE	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WY	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OFFICIAL PUBLIC RECORDS COMAL COUNTY TEXAS

!!CAUTION!!
Contractor to Verify
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Construction Activities

CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

NO.	DATE	REVISIONS	APP.
CENTER FOR CHRISTIAN GROWTH, INC			
T BAR M CAMP EXPANSION TCEQ ATTACHMENT "F" CONSTRUCTION PLANS – VEGETATIVE FILTER STRIPS (4 OF 9)			
 Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280 4300 Lochlin-Serra Road, Suite 100 San Antonio, Texas 78249 P.O. Box 5311			
SCALE:	AS SHOWN	DGN. BY:	DJM
DATE:	APRIL 2024	DWN. BY:	JS/CJ
JOB NO.	17758-0001-00	DWG. NO.	NONE
SUBMITTED:		SURV. BY:	QUIDDITY ENGINEERING
		F.B. NO.	NONE
 Darren J. McAfee 5/8/2024			
SHEET NO. 11 OF 17			

TSS REMOVAL CALCULATIONS: B-12

Texas Commission on Environmental Quality			
TSS Removal Calculations 04-20-2009		Project Name: T Bar M Camp Expansion Date Prepared: 4/11/2024	
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 = 28.96 acres			
Predevelopment impervious area within the limits of the plan = 0.33 acres			
Total post-development impervious area within the limits of the plan = 8.39 acres			
Total post-development impervious cover fraction = 0.29			
$P = 33$ inches			
L_M TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 ↗			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-12 ↗			
Total drainage basin/outfall area = 0.47 acres			
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres			
Post-development impervious area within drainage basin/outfall area = 0.12 acres			
Post-development impervious fraction within drainage basin/outfall area = 0.26			
L_M THIS BASIN = 108 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Vegetated Filter Strips			
Removal efficiency = 85 percent			
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			
$A_C = 0.47$ acres			
$A_i = 0.12$ acres			
$A_p = 0.35$ acres			
$L_R = 122$ lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_M THIS BASIN = 122 lbs.			
$F = 1.00$ ↗			
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 = 4.00 inches			
Post Development Runoff Coefficient = 0.23 ↗			
On-site Water Quality Volume = 1599 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 = 320 cubic feet			
Total Capture Volume (required water quality volume(s) x 1.20) = 1918 cubic feet			

TSS REMOVAL CALCULATIONS: B-13

Texas Commission on Environmental Quality			
TSS Removal Calculations 04-20-2009		Project Name: T Bar M Camp Expansion Date Prepared: 4/11/2024	
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 = 28.96 acres			
Predevelopment impervious area within the limits of the plan = 0.33 acres			
Total post-development impervious area within the limits of the plan = 8.39 acres			
Total post-development impervious cover fraction = 0.29			
$P = 33$ inches			
L_M TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 ↗			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-13 ↗			
Total drainage basin/outfall area = 0.07 acres			
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres			
Post-development impervious area within drainage basin/outfall area = 0.01 acres			
Post-development impervious fraction within drainage basin/outfall area = 0.14			
L_M THIS BASIN = 9 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Vegetated Filter Strips			
Removal efficiency = 85 percent			
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			
$A_C = 0.07$ acres			
$A_i = 0.01$ acres			
$A_p = 0.06$ acres			
$L_R = 11$ lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_M THIS BASIN = 11 lbs.			
$F = 1.04$ ↗			
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 = 4.00 inches			
Post Development Runoff Coefficient = 0.18 ↗			
On-site Water Quality Volume = 163 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 = 33 cubic feet			
Total Capture Volume (required water quality volume(s) x 1.20) = 196 cubic feet			

TSS REMOVAL CALCULATIONS: B-14

Texas Commission on Environmental Quality			
TSS Removal Calculations 04-20-2009		Project Name: T Bar M Camp Expansion Date Prepared: 4/11/2024	
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 = 28.96 acres			
Predevelopment impervious area within the limits of the plan = 0.33 acres			
Total post-development impervious area within the limits of the plan = 8.39 acres			
Total post-development impervious cover fraction = 0.29			
$P = 33$ inches			
L_M TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1 ↗			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-14 ↗			
Total drainage basin/outfall area = 0.59 acres			
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres			
Post-development impervious area within drainage basin/outfall area = 0.03 acres			
Post-development impervious fraction within drainage basin/outfall area = 0.05			
L_M THIS BASIN = 27 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Vegetated Filter Strips			
Removal efficiency = 85 percent			
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			
$A_C = 0.59$ acres			
$A_i = 0.03$ acres			
$A_p = 0.56$ acres			
$L_R = 38$ lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_M THIS BASIN = 38 lbs.			
$F = 1.01$ ↗			
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 = 4.00 inches			
Post Development Runoff Coefficient = 0.08 ↗			
On-site Water Quality Volume = 665 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 = 133 cubic feet			
Total Capture Volume (required water quality volume(s) x 1.20) = 799 cubic feet			

ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FM	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SIDEWALK
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UT	UNDERGROUND TELEPHONE
WV	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OPTIONAL PUBLIC RECORDS COMAL COUNTY TEXAS

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CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

NO.	DATE	REVISIONS	APP.
CENTER FOR CHRISTIAN GROWTH, INC			
T BAR M CAMP EXPANSION TCEQ ATTACHMENT "F" CONSTRUCTION PLANS – VEGETATIVE FILTER STRIPS (5 OF 9)			
 QUIDDITY Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280 4500 Lochlin Seena Road, Suite 100 San Antonio, Texas 78249 P.O. Box 5311			
SCALE: AS SHOWN		DGN. BY: DJM	
DATE: APRIL 2024		DWN. BY: JS/CJ	
JOB NO. 17758-0001-00		DWG. NO. NONE	
SUBMITTED:		SURV. BY: QUIDDITY ENGINEERING	
		F.B. NO. NONE	
 <i>Darren J. McAfee</i> 5/8/2024			
SHEET NO. 12 OF 17			

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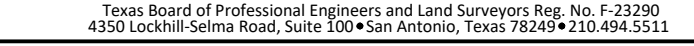
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!!CAUTION!!
Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
Construction Activities

DATE	REVISIONS	APP.

T BAR M CAMP EXPANSION
TCEQ ATTACHMENT "F"
CONSTRUCTION PLANS –
VEGETATIVE FILTER STRIPS
(6 OF 9)




 Darren Miller
 5/8/2024

SHEET
 13
 OF 17

SHEET NO.
13
OF 17

TSS REMOVAL CALCULATIONS: B-18

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{M1} = 27.2(A_{N1} \times P)$			
where:	L_{M1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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 =	28.96	acres	
Predevelopment impervious area within the limits of the plan =	0.33	acres	
Total post-development impervious area within the limits of the plan =	8.39	acres	
Total post-development impervious cover fraction =	0.29		
P =	33	inches	
L_{M1} TOTAL PROJECT =	7234	lbs.	
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-18			
Total drainage basin/outfall area =	0.56	acres	
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres	
Post-development impervious area within drainage basin/outfall area =	0.45	acres	
Post-development impervious fraction within drainage basin/outfall area =	0.80		
L_{M1} THIS BASIN =	404	lbs.	
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP =	Vegetated Filter Strips		
Removal efficiency =	85	percent	
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: $L_R = (\text{BMP efficiency}) \times P \times (A_1 \times 34.6 + A_P \times 0.54)$			
where:	A_C = Total On-Site drainage area in the BMP catchment area A_1 = 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 =	0.56	acres	
A_1 =	0.45	acres	
A_P =	0.11	acres	
L_R =	438	lbs.	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{M1} THIS BASIN =	438	lbs.	
F =	1.00		
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 =	4.00	inches	
Post Development Runoff Coefficient =	0.63		
On-site Water Quality Volume =	5113	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 =	1023		
Total Capture Volume (required water quality volume(s) x 1.20) =	6135	cubic feet	

TSS REMOVAL CALCULATIONS: B-19

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{M1} = 27.2(A_{N1} \times P)$			
where:	L_{M1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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 =	28.96	acres	
Predevelopment impervious area within the limits of the plan =	0.33	acres	
Total post-development impervious area within the limits of the plan =	8.39	acres	
Total post-development impervious cover fraction =	0.29		
P =	33	inches	
L_{M1} TOTAL PROJECT =	7234	lbs.	
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-19			
Total drainage basin/outfall area =	0.22	acres	
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres	
Post-development impervious area within drainage basin/outfall area =	0.03	acres	
Post-development impervious fraction within drainage basin/outfall area =	0.14		
L_{M1} THIS BASIN =	27	lbs.	
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP =	Vegetated Filter Strips		
Removal efficiency =	85	percent	
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: $L_R = (\text{BMP efficiency}) \times P \times (A_1 \times 34.6 + A_P \times 0.54)$			
where:	A_C = Total On-Site drainage area in the BMP catchment area A_1 = 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 =	0.22	acres	
A_1 =	0.03	acres	
A_P =	0.19	acres	
L_R =	32	lbs.	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{M1} THIS BASIN =	32	lbs.	
F =	1.00		
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 =	4.00	inches	
Post Development Runoff Coefficient =	0.16		
On-site Water Quality Volume =	487	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 =	99		
Total Capture Volume (required water quality volume(s) x 1.20) =	596	cubic feet	



TSS REMOVAL CALCULATIONS: B-20

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{M1} = 27.2(A_{N1} \times P)$			
where:	L_{M1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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 =	28.96	acres	
Predevelopment impervious area within the limits of the plan =	0.33	acres	
Total post-development impervious area within the limits of the plan =	8.39	acres	
Total post-development impervious cover fraction =	0.29		
P =	33	inches	
L_{M1} TOTAL PROJECT =	7234	lbs.	
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-20			
Total drainage basin/outfall area =	0.16	acres	
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres	
Post-development impervious area within drainage basin/outfall area =	0.06	acres	
Post-development impervious fraction within drainage basin/outfall area =	0.38		
L_{M1} THIS BASIN =	54	lbs.	
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP =	Vegetated Filter Strips		
Removal efficiency =	85	percent	
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: $L_R = (\text{BMP efficiency}) \times P \times (A_1 \times 34.6 + A_P \times 0.54)$			
where:	A_C = Total On-Site drainage area in the BMP catchment area A_1 = 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 =	0.16	acres	
A_1 =	0.06	acres	
A_P =	0.10	acres	
L_R =	60	lbs.	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{M1} THIS BASIN =	60	lbs.	
F =	1.00		
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 =	4.00	inches	
Post Development Runoff Coefficient =	0.29		
On-site Water Quality Volume =	685	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 =	137		
Total Capture Volume (required water quality volume(s) x 1.20) =	822	cubic feet	

ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FH	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
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TELE	TELEPHONE
UE	UNDERGROUND ELECTRIC
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WY	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OPTIONAL PUBLIC RECORDS COMAL COUNTY TEXAS

!!CAUTION!!
Contractor to Verify
Exact Location &
Depth of Exist
Facilities Prior to any
Construction Activities

CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

NO.	DATE	REVISIONS	APP.
CENTER FOR CHRISTIAN GROWTH, INC			
T BAR M CAMP EXPANSION TCEQ ATTACHMENT "F" CONSTRUCTION PLANS – VEGETATIVE FILTER STRIPS (7 OF 9)			
 Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280 4500 Lochlin-Senna Road, Suite 100 San Antonio, Texas 78249 P.O. Box 5311			
SCALE:	AS SHOWN	DGN. BY:	DJM
DATE:	APRIL 2024	DWN. BY:	JS/CJ
JOB NO.	17758-0001-00	DWG. NO.	NONE
SUBMITTED:		SURV. BY:	QUIDDITY ENGINEERING
		F.B. NO.	NONE
 Darren J. McAfee 5/8/2024			
SHEET NO. 14 OF 17			

TSS REMOVAL CALCULATIONS: B-21

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{d1} = 27.2(A_{N1} \times P)$			
where:	L_{d1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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 =	28.96 acres		
Predevelopment impervious area within the limits of the plan =	0.33 acres		
Total post-development impervious area within the limits of the plan =	8.39 acres		
Total post-development impervious cover fraction =	0.29		
P =	33 inches		
L_{d1} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-21			
Total drainage basin/outfall area = 0.06 acres			
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres			
Post-development impervious area within drainage basin/outfall area = 0.02 acres			
Post-development impervious fraction within drainage basin/outfall area = 0.17			
L_{d1} THIS BASIN = 9 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Vegetated Filter Strips			
Removal efficiency = 85 percent			
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		
$A_C = 0.06$ acres			
$A_i = 0.01$ acres			
$A_p = 0.05$ acres			
$L_R = 10$ lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{d1} THIS BASIN = 10 lbs.			
F = 0.96			
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 = 2.80 inches			
Post Development Runoff Coefficient = 0.18			
On-site Water Quality Volume = 109 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 = 22			
Total Capture Volume (required water quality volume(s) x 1.20) = 130 cubic feet			

TSS REMOVAL CALCULATIONS: B-22

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{d1} = 27.2(A_{N1} \times P)$			
where:	L_{d1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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 =	28.96 acres		
Predevelopment impervious area within the limits of the plan =	0.33 acres		
Total post-development impervious area within the limits of the plan =	8.39 acres		
Total post-development impervious cover fraction =	0.29		
P =	33 inches		
L_{d1} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-22			
Total drainage basin/outfall area = 0.10 acres			
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres			
Post-development impervious area within drainage basin/outfall area = 0.02 acres			
Post-development impervious fraction within drainage basin/outfall area = 0.20			
L_{d1} THIS BASIN = 18 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Vegetated Filter Strips			
Removal efficiency = 85 percent			
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		
$A_C = 0.10$ acres			
$A_i = 0.02$ acres			
$A_p = 0.08$ acres			
$L_R = 21$ lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{d1} THIS BASIN = 21 lbs.			
F = 1.02			
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 = 4.00 inches			
Post Development Runoff Coefficient = 0.20			
On-site Water Quality Volume = 292 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 = 58			
Total Capture Volume (required water quality volume(s) x 1.20) = 350 cubic feet			

TSS REMOVAL CALCULATIONS: B-23

Texas Commission on Environmental Quality		Project Name: T Bar M Camp Expansion	
TSS Removal Calculations 04-20-2009		Date Prepared: 4/11/2024	
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: $L_{d1} = 27.2(A_{N1} \times P)$			
where:	L_{d1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = 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 =	28.96 acres		
Predevelopment impervious area within the limits of the plan =	0.33 acres		
Total post-development impervious area within the limits of the plan =	8.39 acres		
Total post-development impervious cover fraction =	0.29		
P =	33 inches		
L_{d1} TOTAL PROJECT = 7234 lbs.			
* The values entered in these fields should be for the total project area.			
Number of drainage basins / outfalls areas leaving the plan area = 1			
2. Drainage Basin Parameters (This information should be provided for each basin):			
Drainage Basin/Outfall Area No. = B-23			
Total drainage basin/outfall area = 0.09 acres			
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres			
Post-development impervious area within drainage basin/outfall area = 0.03 acres			
Post-development impervious fraction within drainage basin/outfall area = 0.33			
L_{d1} THIS BASIN = 27 lbs.			
3. Indicate the proposed BMP Code for this basin.			
Proposed BMP = Vegetated Filter Strips			
Removal efficiency = 85 percent			
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		
$A_C = 0.09$ acres			
$A_i = 0.03$ acres			
$A_p = 0.06$ acres			
$L_R = 30$ lbs			
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area			
Desired L_{d1} THIS BASIN = 30 lbs.			
F = 1.00			
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 = 4.00 inches			
Post Development Runoff Coefficient = 0.27			
On-site Water Quality Volume = 359 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 = 72			
Total Capture Volume (required water quality volume(s) x 1.20) = 431 cubic feet			

ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FH	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SIDEWALK
TELE	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WY	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OPTIONAL PUBLIC RECORDS COMAL COUNTY TEXAS

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Depth of Exist
Facilities Prior to any
Construction Activities

CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

NO.	DATE	REVISIONS	APP.

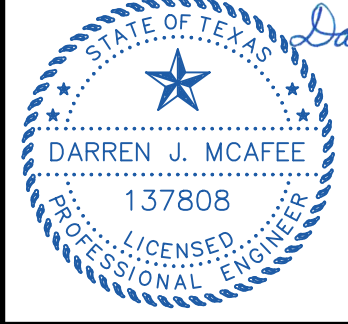
CENTER FOR CHRISTIAN GROWTH, INC

T BAR M CAMP EXPANSION
TCEQ ATTACHMENT "F"
CONSTRUCTION PLANS –
VEGETATIVE FILTER STRIPS
(8 OF 9)



Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280
4350 Lochlin-Serra Road, Suite 100 San Antonio, Texas 78249 P.O. Box 5311

SCALE:	AS SHOWN	DGN. BY:	DJM
DATE:	APRIL 2024	DWN. BY:	JS/CJ
JOB NO.	17758-0001-00	DWG. NO.	NONE
SUBMITTED:		SURV. BY:	QUIDDITY ENGINEERING
		F.B. NO.	NONE



Sam Miller
5/8/2024

K:\17758\17758-0001-00 T Bar M - Camp Expansion\2 Design Phase\CAD\WPAP\17758-0001 T Bar M SWQ-VFS 4.11.24.dwg c:\April 17, 2024

ABBREVIATIONS

E.G.T.G.	ELECTRIC GAS, TELEPHONE, CABLE
EXP.	EXHAUST
FH	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SEWARTY SEWER LINE
SW	SIDEWALK
TEL.	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WV	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OFFICIAL PUBLIC RECORDS COMAL COUNTY TEXAS

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48 HOURS PRIOR TO CONSTRUCTION

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TSS REMOVAL CALCULATIONS: BYPASS-1

Texas Commission on Environmental Quality	
TSS Removal Calculations 04-20-2009	
Project Name: T Bar M Camp Expansion	
Date Prepared: 4/11/2024	
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: $L_{40} = 27.2(A_{40} \times P)$	
where:	
L_{40} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load	
A_{40} = 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 = 28.96 acres	
Predevelopment impervious area within the limits of the plan = 0.33 acres	
Total post-development impervious area within the limits of the plan = 8.39 acres	
Total post-development impervious cover fraction = 0.29	
P = 33 inches	
L_{40} TOTAL PROJECT = 7234 lbs.	
* The values entered in these fields should be for the total project area.	
Number of drainage basins / outfalls areas leaving the plan area = 1	
2. Drainage Basin Parameters (This information should be provided for each basin):	
Drainage Basin/Outfall Area No. = Bypass-1	
Total drainage basin/outfall area = 6.59 acres	
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres	
Post-development impervious area within drainage basin/outfall area = 0.41 acres	
Post-development impervious fraction within drainage basin/outfall area = 0.06	
L_{40} THIS BASIN = 368 lbs.	

TSS REMOVAL CALCULATIONS: BYPASS-2

Texas Commission on Environmental Quality	
TSS Removal Calculations 04-20-2009	
Project Name: T Bar M Camp Expansion	
Date Prepared: 4/11/2024	
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: $L_{40} = 27.2(A_{40} \times P)$	
where:	
L_{40} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load	
A_{40} = 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 = 28.96 acres	
Predevelopment impervious area within the limits of the plan = 0.33 acres	
Total post-development impervious area within the limits of the plan = 8.39 acres	
Total post-development impervious cover fraction = 0.29	
P = 33 inches	
L_{40} TOTAL PROJECT = 7237 lbs.	
* The values entered in these fields should be for the total project area.	
Number of drainage basins / outfalls areas leaving the plan area = 1	
2. Drainage Basin Parameters (This information should be provided for each basin):	
Drainage Basin/Outfall Area No. = Bypass-2	
Total drainage basin/outfall area = 5.75 acres	
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres	
Post-development impervious area within drainage basin/outfall area = 0.00 acres	
Post-development impervious fraction within drainage basin/outfall area = 0.00	
L_{40} THIS BASIN = 0 lbs.	


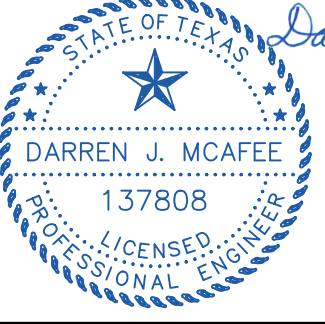
TSS REMOVAL CALCULATIONS: BYPASS-3

Texas Commission on Environmental Quality	
TSS Removal Calculations 04-20-2009	
Project Name: T Bar M Camp Expansion	
Date Prepared: 4/11/2024	
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: $L_{40} = 27.2(A_{40} \times P)$	
where:	
L_{40} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load	
A_{40} = 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 = 28.96 acres	
Predevelopment impervious area within the limits of the plan = 0.33 acres	
Total post-development impervious area within the limits of the plan = 8.39 acres	
Total post-development impervious cover fraction = 0.29	
P = 33 inches	
L_{40} TOTAL PROJECT = 7237 lbs.	
* The values entered in these fields should be for the total project area.	
Number of drainage basins / outfalls areas leaving the plan area = 1	
2. Drainage Basin Parameters (This information should be provided for each basin):	
Drainage Basin/Outfall Area No. = Bypass-3	
Total drainage basin/outfall area = 2.48 acres	
Predevelopment impervious area within drainage basin/outfall area = 0.00 acres	
Post-development impervious area within drainage basin/outfall area = 0.00 acres	
Post-development impervious fraction within drainage basin/outfall area = 0.00	
L_{40} THIS BASIN = 0 lbs.	

ABBREVIATIONS	
E.G.T.C.	ELECTRIC, GAS, TELEPHONE, CABLE
ESMT	EASEMENT
FH	FIRE HYDRANT
OE	OVERHEAD ELECTRIC
PP	POWER POLE
R.O.W.	RIGHT-OF-WAY
SS	SANITARY SEWER LINE
SW	SIDEWALK
TELE	TELEPHONE
UE	UNDERGROUND ELECTRIC
UT	UNDERGROUND TELEPHONE
WV	WATER VALVE
D.R.C.C.T.	DEED RECORDS COMAL COUNTY TEXAS
O.P.R.C.C.T.	OPTIONAL PUBLIC RECORDS COMAL COUNTY TEXAS

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CAUTION!!!
CONTACT:
1-800-DIG-TESS
48 HOURS PRIOR TO CONSTRUCTION

CENTER FOR CHRISTIAN GROWTH, INC			
T BAR M CAMP EXPANSION TCEQ ATTACHMENT "F" CONSTRUCTION PLANS - BYPASS DRAINAGE AREAS (1 OF 1)			
 QUIDDITY <small>Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23280 4390 Lochlin-Seima Road, Suite 100 San Antonio, Texas 78249 P 210-486-5311</small>			
SCALE: AS SHOWN	DGN. BY: DJM		
DATE: APRIL 2024	DWN. BY: JS/CJ		
JOB NO. 17758-0001-00	DWG. NO. NONE		
SUBMITTED:	SURV. BY: QUIDDITY ENGINEERING		
	F.B. NO. NONE		
 <i>Darren J. McAfee</i> 5/8/2024			
SHEET NO. 17 OF 17			

Attachment G

INSPECTION, MAINTENANCE, REPAIR, AND RETROFIT PLAN

Project: T Bar M Camp Expansion

Address: 2549 Hwy 46 W

City, State, Zip: New Braunfels, Texas 78132

Bioretention Maintenance and Monitoring Procedure

The primary maintenance requirement for bioretention areas is that of inspection and repair or replacement of the treatment area's components. Generally, this involves nothing more than the routine periodic maintenance that is required of any landscaped area. Plants that are appropriate for the site, climatic, and watering conditions should be selected for use in the bioretention cell. Appropriately selected plants will aid in reducing fertilizer, pesticide, water, and overall maintenance requirements. Bioretention system components should blend over time through plant and root growth, organic decomposition, and the development of a natural soil horizon. These biologic and physical processes over time will lengthen the facility's life span and reduce the need for extensive maintenance.

Routine maintenance should include a semi-annual health evaluation of the trees and shrubs and subsequent removal of any dead or diseased vegetation. Diseased vegetation should be treated as needed using preventative and low-toxic measures to the extent possible. BMPs have the potential to create very attractive habitats for mosquitoes and other vectors because of highly organic, often heavily vegetated areas mixed with shallow water. Routine inspections for areas of standing water within the BMP and corrective measures to restore proper infiltration rates are necessary to prevent the creation of mosquito and other vector habitat. In addition, bioretention BMPs are susceptible to invasion by aggressive plant species such as cattails, which increase the chances of standing water and subsequent vector production if not routinely maintained.

To maintain the treatment area's appearance, it may be necessary to prune and weed. Furthermore, mulch replacement is suggested when erosion is evident or when the site begins to look unattractive. Specifically, the entire area may require mulch replacement every two to three years, although spot mulching may be sufficient when there are random void areas.

New Jersey's Department of Environmental Protection states in their bioretention systems standards that accumulated sediment and debris removal (especially at the inflow point) will normally be the primary maintenance function. Other potential tasks include replacement of dead vegetation, soil pH regulation, erosion repair at inflow points, mulch replenishment, unclogging the underdrain, and repairing overflow structures.

Other recommended maintenance guidelines include:

- *Inspections.* BMP facilities should be inspected at least twice a year (once during or immediately following wet weather) to evaluate facility operation. During each inspection, erosion areas inside and downstream of the BMP must be identified and repaired or revegetated immediately.
- *Sediment Removal.* Remove sediment from the facility when sediment depth reaches 3 inches or when the sediment interferes with the health of vegetation or ability of the facility to meet required drawdown times. Sediment removal should be performed at least every 2 years.
- *Drain Time.* When the drain time exceeds 72 hours as observed in the observation well, the filter media should be removed and replaced with more permeable material.
- *Vegetation.* All dead and diseased vegetation considered beyond treatment shall be removed and replaced during semi-annual inspections. Diseased trees and shrubs should be treated during inspections. Re-mulch any bare areas by hand whenever needed. Replace mulch annually in the spring, or more frequently if needed, in landscaped areas of the basin where grass or groundcover is not planted. Grass areas in and around bioretention facilities must be mowed at least twice annually to limit vegetation height to 18 inches. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas.
- *Debris and Litter Removal.* Debris and litter will accumulate in the facility and should be removed during regular mowing operations and inspections.
- *Filter Underdrain.* Clean underdrain piping network to remove any sediment buildup every 5 years, or as needed to maintain design drawdown time.
- *Record Keeping.* The Applicant shall maintain records of inspections for the previous five (5) years. The records shall indicate who made the inspections and on what date. In addition, the records shall indicate what the inspector found and what measures were taken to correct the situation.

Vegetative Filter Strips Maintenance and Monitoring Procedures

Once a vegetated area is well established, little additional maintenance is generally necessary. The key to establishing a viable vegetated feature is the care and maintenance it receives in the first few months after it is planted. Once established, all vegetated BMPs require some basic maintenance to ensure the health of the plants including:

- *Pest Management.* An Integrated Pest Management (IPM) Plan should be developed for vegetated areas. This plan should specify how problem insects and weeds will be controlled with minimal or no use of insecticides and herbicides.
- *Seasonal Mowing and Lawn Care.* *If the filter strip is made up of turf grass, it should be mowed as needed to limit vegetation height to 18 inches, using a mulching mower (or removal of clippings). If native grasses are used, the filter may require less frequent mowing, but a minimum of twice annually.*

Grass clippings and brush debris should not be deposited on vegetated filter strip areas. Regular mowing should also include weed control practices, however herbicide use should be kept to a minimum (Urbonas et al., 1992). Healthy grass can be maintained without using fertilizers because runoff usually contains sufficient nutrients. Irrigation of the site can help assure a dense and healthy vegetative cover.

- *Inspection. Inspect filter strips at least twice annually for erosion or damage to vegetation; however, additional inspection after periods of heavy runoff is most desirable. The strip should be checked for uniformity of grass cover, debris and litter, and areas of sediment accumulation. More frequent inspections of the grass cover during the first few years after establishment will help to determine if any problems are developing, and to plan for long-term restorative maintenance needs. Bare spots and areas of erosion identified during semi-annual inspections must be replanted and restored to meet specifications. Construction of a level spreader device may be necessary to reestablish shallow overland flow.*
- *Debris and Litter Removal. Trash tends to accumulate in vegetated areas, particularly along highways. Any filter strip structures (i.e. level spreaders) should be kept free of obstructions to reduce floatables being flushed downstream, and for aesthetic reasons. The need for this practice is determined through periodic inspection, but should be performed no less than 4 times per year.*
- *Sediment Removal. Sediment removal is not normally required in filter strips, since the vegetation normally grows through it and binds it to the soil. However, sediment may accumulate along the upstream boundary of the strip preventing uniform overland flow. Excess sediment should be removed by hand or with flat-bottomed shovels.*
- *Grass Reseeding and Mulching. A healthy dense grass should be maintained on the filter strip. If areas are eroded, they should be filled, compacted, and reseeded so that the final grade is level. Grass damaged during the sediment removal process should be promptly replaced using the same seed mix used during filter strip establishment. If possible, flow should be diverted from the damaged areas until the grass is firmly established. Bare spots and areas of erosion identified during semi-annual inspections must be replanted and restored to meet specifications. Corrective maintenance, such as weeding or replanting should be done more frequently in the first two to three years after installation to ensure stabilization. Dense vegetation may require irrigation immediately after planting, and during particularly dry periods, particularly as the vegetation is initially established.*
- *Record Keeping. The Applicant shall maintain records of inspections for the previous five (5) years. The records shall indicate who made the inspections and on what date. In addition, the records shall indicate what the inspector found and what measures were taken to correct the situation.*

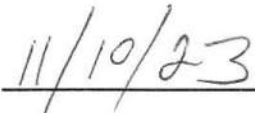


The applicant is responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another's entity having ownership or control of the property (such as without limitation, an owner's association, new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity assumes such obligation in writing or ownership is transferred.

An amended copy of this document will be provided to the Texas Commission on Environmental Quality within thirty (30) days of any changes in the following information.



Signature of Responsible Party



Date

Attachment H

PILOT-SCALE FIELD TESTING PLAN

No pilot study BMPs are being proposed.

Attachment I

MEASURE FOR MINIMIZING SURFACE STREAM CONTAMINATION

Temporary BMPs are to be placed before the start of construction to prevent sediment from leaving the site. These temporary BMPs include a stabilized construction entrance, concrete washout, silt fence, silt fence with rock berm, tree protection, and a temporary sedimentation basin. The proposed permanent BMPs are bioretention and vegetative filter strips. Runoff from the impervious areas will be treated and directed to an on-site detention pond that will discharge flow to conditions less than or equal to existing. All disturbed areas will be re-vegetated after construction activities have been completed.



QUIDDITY

AGENT AUTHORIZATION SECTION

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

I John MacDonald,
Print Name
President,
Title - Owner/President/Other
of Center for Christian Growth, Inc.,
Corporation/Partnership/Entity Name
have authorized Darren J. McAfee, PE
Print Name of Agent/Engineer
of Quiddity Engineering, 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

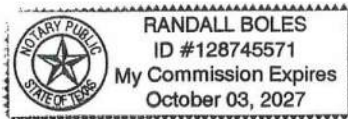
11/10/23
Date


THE STATE OF Texas §

County of Comal §

BEFORE ME, the undersigned authority, on this day personally appeared John McDonald 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 10 day of November, 2023.




NOTARY PUBLIC
Randall Boles
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 10/3/2027



QUIDDITY

APPLICATION FEE FORM SECTION

Application Fee Form

Texas Commission on Environmental Quality

Name of Proposed Regulated Entity: T Bar M Camp Expansion

Regulated Entity Location: 2549 Hwy 46 W, New Braunfels, TX 78123

Name of Customer: Center for Christian Growth, Inc.

Contact Person: John MacDonald

Phone: 210-546-0053

Customer Reference Number (if issued): CN 604880377

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

☒ San Antonio Regional Office

☐ Mailed to: TCEQ - Cashier

☐ Overnight Delivery to: TCEQ - Cashier

Revenues Section

Mail Code 214

P.O. Box 13088

Austin, TX 78711-3088

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	28.957 Acres	\$ 6,500
Sewage Collection System	L.F.	\$
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: 11/10/23

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

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

Organized Sewage Collection Systems and Modifications

<i>Project</i>	<i>Cost per Linear Foot</i>	<i>Minimum Fee- Maximum Fee</i>
Sewage Collection Systems	\$0.50	\$650 - \$6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

<i>Project</i>	<i>Cost per Tank or Piping System</i>	<i>Minimum Fee- Maximum Fee</i>
Underground and Aboveground Storage Tank Facility	\$650	\$650 - \$6,500

Exception Requests

<i>Project</i>	<i>Fee</i>
Exception Request	\$500



QUIDDITY

CORE DATA FORM SECTION



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.)		
<input checked="" type="checkbox"/> New Permit, Registration or Authorization (Core Data Form should be submitted with the program application.)		
<input type="checkbox"/> Renewal (Core Data Form should be submitted with the renewal form)	<input type="checkbox"/> 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 604880377		RN

SECTION II: Customer Information

4. General Customer Information		5. Effective Date for Customer Information Updates (mm/dd/yyyy)	
<input checked="" type="checkbox"/> New Customer		<input type="checkbox"/> Update to Customer Information	
<input type="checkbox"/> Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)		<input type="checkbox"/> Change in Regulated Entity Ownership	
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:	
Center for Christian Growth, Inc.			
7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number (if applicable)
0048520101	17516719204	TaxExempt	
11. Type of Customer:	<input checked="" type="checkbox"/> Corporation	<input type="checkbox"/> Individual	Partnership: <input type="checkbox"/> General <input type="checkbox"/> Limited
Government: <input type="checkbox"/> City <input type="checkbox"/> County <input type="checkbox"/> Federal <input type="checkbox"/> State <input type="checkbox"/> Other	<input type="checkbox"/> Sole Proprietorship	<input type="checkbox"/> Other:	
12. Number of Employees		13. Independently Owned and Operated?	
<input type="checkbox"/> 0-20 <input checked="" type="checkbox"/> 21-100 <input type="checkbox"/> 101-250 <input type="checkbox"/> 251-500 <input type="checkbox"/> 501 and higher		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
14. Customer Role (Proposed or Actual) – as it relates to the Regulated Entity listed on this form. Please check one of the following			
<input type="checkbox"/> Owner <input type="checkbox"/> Operator <input checked="" type="checkbox"/> Owner & Operator			
<input type="checkbox"/> Occupational Licensee <input type="checkbox"/> Responsible Party <input type="checkbox"/> Voluntary Cleanup Applicant <input type="checkbox"/> Other:			
15. Mailing Address:	2549 Hwy 46 W		
	City	New Braunfels	State TX ZIP 78132 ZIP + 4
16. Country Mailing Information (if outside USA)		17. E-Mail Address (if applicable)	
		johnmac@tbarm.org	
18. Telephone Number	19. Extension or Code	20. Fax Number (if applicable)	
(830) 620-4263		() -	

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)	
<input checked="" type="checkbox"/> New Regulated Entity <input type="checkbox"/> Update to Regulated Entity Name <input type="checkbox"/> 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.)	
T Bar M Camp Expansion	

23. Street Address of the Regulated Entity: (No PO Boxes)	2549 Hwy 46 W							
	City	New Braunfels	State	TX	ZIP	78132	ZIP + 4	4731
24. County	Comal							

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	The site is located within the city limits of New Braunfels, located off the intersection of SH 46 and FM 1863, approximately 1.45 miles northwest of Loop 337.							
26. Nearest City	State				Nearest ZIP Code			
New Braunfels	TX				78132			
27. Latitude (N) In Decimal:	28. Longitude (W) In Decimal:							
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds			
29	43	18.40	98	11	0.22			
29. Primary SIC Code (4 digits)	30. Secondary SIC Code (4 digits)	31. Primary NAICS Code (5 or 6 digits)	32. Secondary NAICS Code (5 or 6 digits)					
7032	7999	721214	71390					
33. What is the Primary Business of this entity? (Do not repeat the SIC or NAICS description.)								
family and day recreation camp								
34. Mailing Address:	2549 Hwy 46 W							
	City	New Braunfels	State	TX	ZIP	78132	ZIP + 4 4731	
35. E-Mail Address:	johnmac@tbarm.org							
36. Telephone Number	37. Extension or Code		38. Fax Number (if applicable)					
(830) 620-4263			() -					

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.

<input type="checkbox"/> Dam Safety	<input type="checkbox"/> Districts	<input checked="" type="checkbox"/> Edwards Aquifer	<input type="checkbox"/> Emissions Inventory Air	<input type="checkbox"/> Industrial Hazardous Waste
<input type="checkbox"/> Municipal Solid Waste	<input type="checkbox"/> New Source Review Air	<input type="checkbox"/> OSSF	<input type="checkbox"/> Petroleum Storage Tank	<input type="checkbox"/> PWS
<input type="checkbox"/> Sludge	<input checked="" type="checkbox"/> Storm Water	<input type="checkbox"/> Title V Air	<input type="checkbox"/> Tires	<input type="checkbox"/> Used Oil
<input type="checkbox"/> Voluntary Cleanup	<input checked="" type="checkbox"/> Waste Water	<input type="checkbox"/> Wastewater Agriculture	<input type="checkbox"/> Water Rights	<input type="checkbox"/> Other:


SECTION IV: Preparer Information

40. Name:	Darren J. McAfee, P.E.	41. Title:	Project Manager
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(210) 546-0053		() -	dmcafee@quiddity.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.

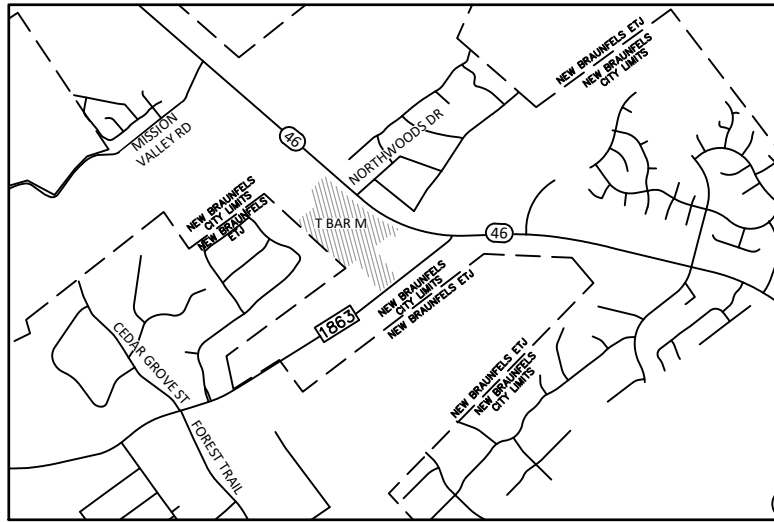
Company:	Center for Christian Growth, Inc.	Job Title:	President
Name (In Print):	John MacDonald	Phone:	(830) 620- 4263

Signature:		Date:	11/10/23
------------	--	-------	----------



QUIDDITY

PRELIMINARY PLAT



LOCATION MAP
NOT-TO-SCALE

LEGEND

CCMPR	COMAL COUNTY MAP & PLAT RECORDS
CCOPR	COMAL COUNTY OFFICIAL PUBLIC RECORDS
EGTC	ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT
ESMT	EASEMENT
DE	DRAINAGE EASEMENT
PUE	PUBLIC UTILITY EASEMENT
Ac.	ACRE
CB	COUNTY BLOCK
VOL	VOLUME
PG.	PAGE
R.O.W.	RIGHT-OF-WAY
O	1/2" IRON ROD

NEW BRAUNFELS UTILITY NOTES:

1. MAINTENANCE OF DEDICATED UTILITY EASEMENTS IS THE RESPONSIBILITY OF THE PROPERTY OWNER. ANY USE OF AN EASEMENT, OR ANY PORTION OF IT, INCLUDING LANDSCAPING OR DRAINAGE FEATURES, IS SUBJECT TO AND SHALL NOT CONFLICT WITH THE TERMS AND CONDITIONS IN THE EASEMENT, MUST NOT ENDANGER OR INTERFERE WITH THE RIGHTS GRANTED BY THE EASEMENT TO NEW BRAUNFELS UTILITIES, ITS SUCCESSORS AND ASSIGNS, AND SHALL BE SUBJECT TO APPLICABLE PERMIT REQUIREMENTS OF THE CITY OF NEW BRAUNFELS OR ANY OTHER GOVERNING BODY. THE PROPERTY OWNER MUST OBTAIN, IN ADVANCE, WRITTEN AGREEMENT WITH THE UTILITIES TO UTILIZE THE EASEMENT, OR ANY PART OF IT.
2. UTILITIES WILL POSSESS A 5' WIDE SERVICE EASEMENT TO THE DWELLING ALONG THE SERVICE LINE TO THE SERVICE ENTRANCE. THIS EASEMENT WILL VARY DEPENDING UPON LOCATION OF DWELLING AND SERVICE.
3. UTILITIES SHALL HAVE ACCESS TO THE METER LOCATIONS FROM THE FRONT YARD AND METER LOCATIONS SHALL NOT BE LOCATED WITHIN A FENCED AREA.
4. EACH LOT MUST HAVE ITS OWN WATER AND SEWER SERVICE AT THE OWNERS/DEVELOPER'S EXPENSE.
5. DO NOT COMBINE ANY NEW UTILITY EASEMENTS (U.E.) WITH DRAINAGE EASEMENTS (D.E.) OR MAKE CHANGES IN GRADE WITHIN THE UTILITY EASEMENTS (U.E.) WITHOUT WRITTEN APPROVAL FROM NEW BRAUNFELS UTILITIES.
6. NBU IS NOT RESPONSIBLE FOR DAMAGES TO PROPERTY IMPROVEMENTS (I.E. LANDSCAPING, TREES, PAVEMENT, SIGNS, DRAINAGE STRUCTURES, PRIVATE UTILITIES, ETC.) THAT ARE PLACED IN ANY TYPE OF UTILITY EASEMENT. TO ENSURE NO CONFLICTS EXIST WITH UTILITY INFRASTRUCTURE IN THE EASEMENT, ALL SUCH IMPROVEMENTS PLACED IN ANY TYPE OF UTILITY EASEMENT MUST BE REVIEWED AND APPROVED THROUGH THE NBU EASEMENT ENCROACHMENT PROCESS. NBU DEVELOPMENT SERVICES FACILITATES THE EASEMENT ENCROACHMENT APPLICATION PROCESS.

OWNER/DEVELOPER:
CENTER FOR CHRISTIAN GROWTH, INC.
2549 WEST STATE HIGHWAY 46
NEW BRAUNFELS, TEXAS 78132

CIVIL ENGINEER & SURVEYOR:
QUIDDITY ENGINEERING
4350 LOCKHILL-SELMA ROAD SUITE 100
SAN ANTONIO, TEXAS 78249

STATE OF TEXAS
COUNTY OF COMAL

I, HEREBY CERTIFY THAT PROPER ENGINEERING CONSIDERATION HAS BEEN GIVEN TO THIS PLAT TO THE MATTERS OF STREETS, LOTS AND DRAINAGE LAYOUT, TO THE BEST OF MY KNOWLEDGE THIS PLAT CONFORMS TO ALL REQUIREMENTS OF THE UNIFIED DEVELOPMENT CODE, EXCEPT FOR THOSE VARIANCES GRANTED BY THE CITY OF SEGUIN.

LICENSED PROFESSIONAL ENGINEER
DARREN J. MCAFEE P.E.
LICENSE NUMBER 137808

STATE OF TEXAS

I, THE UNDERSIGNED, TROY A. TROBAUGH, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF TEXAS, HEREBY CERTIFY THAT THIS PLAT IS TRUE AND CORRECTLY MADE UNDER MY SUPERVISION AND IN COMPLIANCE WITH CITY AND STATE SURVEY REGULATIONS AND LAWS AND MADE ON THE GROUND AND THAT THE CORNER MONUMENTS WERE PROPERLY MADE UNDER MY SUPERVISION.

REGISTERED PROFESSIONAL LAND SURVEYOR
TROY A. TROBAUGH
LICENSE NUMBER 6241

GENERAL NOTES

1. ALL LOTS WITHIN THE SUBDIVISION WILL BE PROVIDED WATER, SEWER AND ELECTRIC SERVICE BY NEW BRAUNFELS UTILITIES. TELEPHONE AND CABLE SERVICES FOR THE SUBDIVISION WILL BY PROVIDED BY XXX.
2. ALL BEARINGS AND COORDINATES SHOWN HEREON ARE BASED UPON THE TEXAS
3. MONUMENTS WERE FOUND AT
4. THIS SUBDIVISION IS WITHIN THE EDWARDS AQUIFER RECHARGE ZONE.
5. THIS SUBDIVISION IS WITHIN THE CITY LIMITS OF NEW BRAUNFELS, TEXAS.
6. THIS SUBDIVISION IS WITHIN THE NEW BRAUNFELS INDEPENDENT SCHOOL DISTRICT.
7. NO PORTION OF THIS SUBDIVISION IS LOCATED WITHIN ANY SPECIAL FLOOD HAZARD AREA (100 YR. FLOOD), AS DEFINED BY THE COMAL COUNTY, TEXAS, FLOOD INSURANCE RATE MAP NUMBER 48091C0435F, EFFECTIVE DATE SEPTEMBER 2, 2009 AS PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
8. NO STRUCTURES, WALLS OR OTHER OBSTRUCTIONS OF ANY KIND SHALL BE PLACED WITHIN THE LIMITS OF THE DRAINAGE EASEMENTS SHOWN ON THIS PLAT. NO LANDSCAPING, FENCES, OR OTHER TYPE OF MODIFICATIONS WHICH ALTER THE CROSS SECTIONS OF THE DRAINAGE EASEMENTS OR DECREASE THE HYDRAULIC CAPACITY OF THE EASEMENT, AS APPROVED, SHALL BE ALLOWED WITHOUT THE APPROVAL OF THE CITY ENGINEER. THE CITY OF NEW BRAUNFELS SHALL HAVE THE RIGHT OF INGRESS AND EGRESS OVER GRANTOR'S ADJACENT PROPERTY TO REMOVE ANY OBSTRUCTIONS PLACED WITHIN THE LIMITS OF SAID DRAINAGE EASEMENTS AND TO MAKE ANY MODIFICATIONS OR IMPROVEMENTS WITHIN SAID DRAINAGE EASEMENTS.

9. FUTURE DEVELOPMENT IS SUBJECT TO CHAPTER 114 (STREETS, SIDEWALKS AND OTHER PUBLIC SPACES) OF THE NEW BRAUNFELS CODE OF ORDINANCES.
10. THE ELEVATION OF THE LOWEST FLOOR OF A STRUCTURE SHALL BE AT LEAST 10 INCHES ABOVE THE FINISHED GRADE OF THE SURROUNDING GROUND, WHICH SHALL BE SLOPED IN A FASHION SO AS TO DIRECT STORMWATER AWAY FROM THE STRUCTURE. PROPERTIES ADJACENT TO STORMWATER CONVEYANCE STRUCTURES MUST HAVE A FLOOR SLAB ELEVATION OR BOTTOM OF FLOOR JOISTS A MINIMUM OF ONE FOOT ABOVE THE 100-YEAR WATER R FLOW ELEVATION IN THE STRUCTURE. DRIVEWAYS SERVING HOUSES ON THE DOWNHILL SIDE OF THE STREET SHALL HAVE A PROPERLY SIZED CROSS SWALE PREVENTING RUNOFF FROM ENTERING THE GARAGE AND SHALL PREVENT WATER FROM LEAVING THE STREET.
11. NON-RESIDENTIAL SUBDIVISIONS ARE NOT SUBJECT TO PARK LAND DEDICATION AND DEVELOPMENT REQUIREMENTS. HOWEVER AT SUCH TIME ANY DWELLING UNITS ARE CONSTRUCTED, THE OWNER OF THE LOT SHALL CONTACT THE CITY AND COMPLY WITH THE ORDINANCE FOR EACH DWELLING UNIT.
12. ALL DRAINAGE EASEMENTS WITHIN THE LOTS WILL BE OWNED AND MAINTAINED BY PROPERTY OWNER.
13. PERMANENT WATER QUALITY CONTROLS ARE REQUIRED FOR THIS SUBDIVISION PLAT IN ACCORDANCE WITH THE CITY OF NEW BRAUNFELS DRAINAGE AND EROSION CONTROL DESIGN MANUAL.
14. PROPOSED LAND USES: FAMILY AND DAY CAMP.

TXDOT NOTES:

1. FOR RESIDENTIAL DEVELOPMENT DIRECTLY ADJACENT TO STATE RIGHT-OF-WAY, THE DEVELOPER SHALL BE RESPONSIBLE FOR ADEQUATE SETBACK AND/OR SOUND ABATEMENT MEASURES FOR FUTURE NOISE MITIGATION.
2. THE OWNER/DEVELOPER IS RESPONSIBLE FOR PREVENTING ANY ADVERSE IMPACT TO THE EXISTING DRAINAGE SYSTEM WITHIN THE HIGHWAY RIGHT-OF-WAY. OUTFALLS FOR WATER QUALITY AND/OR DETENTION PONDS TREATING IMPERVIOUS COVER RELATED TO THE DEVELOPMENT AND STRUCTURE FOR REDUCTION IN DISCHARGE VELOCITY WILL NOT ENCR OACH BY STRUCTURE OR GRADING INTO ROW OR INTO AREAS OF ROW RESERVATION OR DEDICATION. FOR PROJECTS IN THE EDWARD'S AQUIFER RECHARGE, TRANSITION, CONTRIBUTING ZONES, PLACEMENT OF PERMANENT STRUCTURAL BEST MANAGEMENT PRACTICE DEVICES OR VEGETATIVE FILTER STRIPS WITHIN STATE ROW OR INTO AREAS OF ROW RESERVATION OR DEDICATION WILL NOT BE ALLOWED. NO NEW EASEMENTS OF ANY TYPE SHOULD BE LOCATED IN AREAS OF ROW RESERVATION OR DEDICATION.
3. MAXIMUM ACCESS POINTS TO STATE HIGHWAY FROM THIS PROPERTY WILL BE REGULATED AS DIRECTED BY TXDOT'S, "ACCESS MANAGEMENT MANUAL" AND DETERMINED BASED ON AN APPROVED TRAFFIC IMPACT ANALYSIS. INTERNAL ACCESS SHOULD BE PROVIDED BETWEEN THE LOTS. WHERE TOPOGRAPHY OR OTHER EXISTING CONDITIONS MAKE IT INAPPROPRIATE OR NOT FEASIBLE TO CONFORM TO THE CONNECTION SPACING INTERVALS, THE LOCATION OF REASONABLE ACCESS WILL BE DETERMINED WITH CONSIDERATION GIVEN TO TOPOGRAPHY, ESTABLISHED PROPERTY OWNERSHIP, UNIQUE PHYSICAL LIMITATION, AND/OR PHYSICAL DESIGN CONSTRAINTS. THE SELECTED LOCATION SHOULD SERVE AS MANY PROPERTIES AND INTERESTS AS POSSIBLE TO REDUCE THE NEED FOR ADDITIONAL DIRECT ACCESS TO THE HIGHWAY. IN SELECTING LOCATIONS FOR FULL MOVEMENT INTERSECTIONS, PREFERENCE WILL BE GIVEN TO PUBLIC ROADWAYS THAT ARE ON LOCAL THOROUGHFARE PLANS.
4. IF SIDEWALKS ARE REQUIRED BY APPROPRIATE CITY ORDINANCE, A SIDEWALK PERMIT MUST BE APPROVED BY TXDOT, PRIOR TO CONSTRUCTION WITHIN STATE RIGHT-OF-WAY. LOCATIONS OF SIDEWALKS WITHIN STATE RIGHT-OF-WAY SHALL BE AS DIRECTED BY TXDOT.
5. ANY TRAFFIC CONTROL MEASURES (LEFT-TURN LANE, RIGHT-TURN SIGNAL, ETC.) FOR ANY ACCESS FRONTING A STATE MAINTAINED ROADWAY SHALL BE THE RESPONSIBILITY OF THE DEVELOPER/OWNER.

PRELIMINARY PLAT ESTABLISHING
T BAR M CAMP EXPANSION

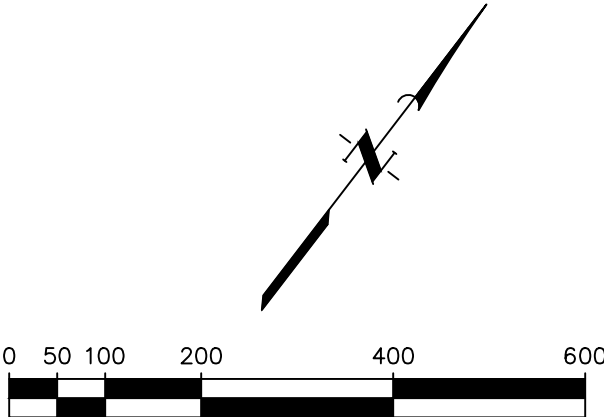
BEING A TOTAL OF 28.957 ACRES OF LAND OUT OF THE CHRISTIAN PAPE SURVEY NO. 831, ABSTRACT NO. 777, CITY OF NEW BRAUNFELS COMAL COUNTY, TEXAS; CONTAINING ALL OF THAT CERTAIN CALLED 15.033 ACRE TRACT CENTER FOR CHRISTIAN GROWTH, INC. DOC. NO. 201706001413; AND ALL OF THE CALLED 4.721 ACRE TRACT CENTER FOR CHRISTIAN GROWTH, INC. DOC. NO. 201606028096; AND A PORTION OF THE CALLED 61.423 ACRE TRACT CENTER FOR CHRISTIAN GROWTH, INC. DOC NO. 201506007095 RECORDED IS THE OFFICIAL PUBLIC RECORDS OF COMAL COUNTY, TEXAS.



QUIDDITY

Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290 & 10046100
4350 Lockhill-Selma Road, Suite 100 • San Antonio, Texas 78249 • 210.494.5511

DATE OF PRINT: 4/1/2024



STATE OF TEXAS
COUNTY OF _____
I (WE) THE UNDERSIGNED OWNER(S) OF THE LAND SHOWN ON THIS PLAT, AND DESIGNATED HEREIN AS THE _____ SUBDIVISION TO THE CITY OF NEW BRAUNFELS, COUNTY OF COMAL, TEXAS, AND WHOSE NAME IS SUBSCRIBED HERETO, DO HEREBY SUBDIVIDE SUCH PROPERTY AND DEDICATE TO THE USE OF THE PUBLIC ALL STREETS, ALLEYS, PARKS, DRAINS, EASEMENTS, AND PUBLIC PLACES THEREON SHOWN FOR THE PURPOSES AND CONSIDERATION THEREIN EXPRESSED.

OWNER/DEVELOPER: CENTER FOR CHRISTIAN GROWTH, INC.
2549 WEST STATE HIGHWAY 46
NEW BRAUNFELS, TEXAS, 78132

STATE OF TEXAS
COUNTY OF _____
THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON THIS, _____ DAY
OF _____, 20____, BY _____.

NOTARY PUBLIC, STATE OF TEXAS
MY COMMISSION EXPIRES: _____

APPROVED THIS THE _____ DAY OF _____, 20____, BY THE
PLANNING COMMISSION OF THE CITY OF NEW BRAUNFELS, TEXAS.

APPROVED FOR ACCEPTANCE

DATE	PLANNING DIRECTOR
DATE	CITY ENGINEER
DATE	NEW BRAUNFELS UTILITIES

I, _____ DO HEREBY CERTIFY THAT THE FOREGOING

INSTRUMENT WAS FILED FOR RECORD IN THE MAP AND PLAT RECORDS, Doc # _____

OF COMAL COUNTY ON THE _____ DAY OF _____, 20____, AT _____

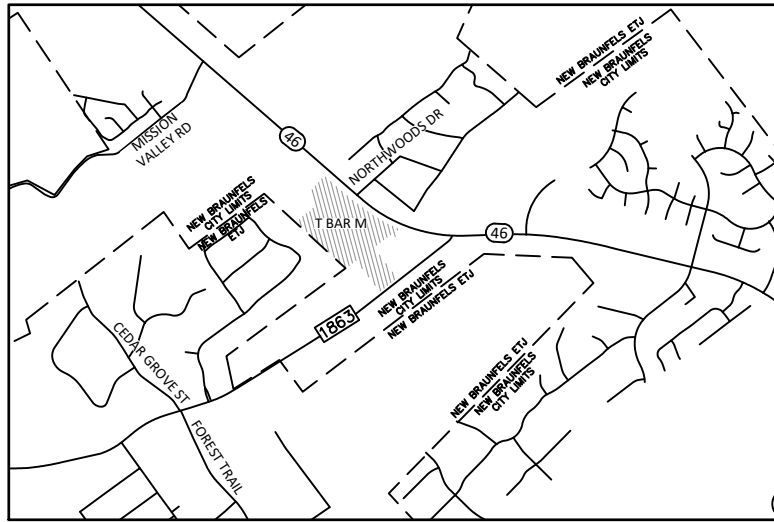
WITNESS MY HAND OFFICIAL SEAL, THIS THE _____ DAY OF _____, 20____.

COUNTY CLERK, COMAL COUNTY, TEXAS

DEPUTY

SEE SHEET 3 OF 3 FOR LINE
AND CURVE TABLES

SHEET 1 OF 3



LOCATION MAP
NOT-TO-SCALE

LEGEND

CCMPR	COMAL COUNTY MAP & PLAT RECORDS
CCOPR	COMAL COUNTY OFFICIAL PUBLIC RECORDS
EGTC	ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT
ESMT	EASEMENT
DE	DRAINAGE EASEMENT
PUE	PUBLIC UTILITY EASEMENT
Ac.	ACRE
CB	COUNTY BLOCK
VOL	VOLUME
PG.	PAGE
R.O.W.	RIGHT-OF-WAY
O	1/2" IRON ROD

NEW BRAUNFELS UTILITY NOTES:

- MAINTENANCE OF DEDICATED UTILITY EASEMENTS IS THE RESPONSIBILITY OF THE PROPERTY OWNER. ANY USE OF AN EASEMENT, OR ANY PORTION OF IT, INCLUDING LANDSCAPING OR DRAINAGE FEATURES, IS SUBJECT TO AND SHALL NOT CONFLICT WITH THE TERMS AND CONDITIONS IN THE EASEMENT, MUST NOT ENDANGER OR INTERFERE WITH THE RIGHTS GRANTED BY THE EASEMENT TO NEW BRAUNFELS UTILITIES, ITS SUCCESSORS AND ASSIGNS, AND SHALL BE SUBJECT TO APPLICABLE PERMIT REQUIREMENTS OF THE CITY OF NEW BRAUNFELS OR ANY OTHER GOVERNING BODY. THE PROPERTY OWNER MUST OBTAIN, IN ADVANCE, WRITTEN AGREEMENT WITH THE UTILITIES TO UTILIZE THE EASEMENT, OR ANY PART OF IT.
- UTILITIES WILL POSSESS A 5' WIDE SERVICE EASEMENT TO THE DWELLING ALONG THE SERVICE LINE TO THE SERVICE ENTRANCE. THIS EASEMENT WILL VARY DEPENDING UPON LOCATION OF DWELLING AND SERVICE.
- UTILITIES SHALL HAVE ACCESS TO THE METER LOCATIONS FROM THE FRONT YARD AND METER LOCATIONS SHALL NOT BE LOCATED WITHIN A FENCED AREA.
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- DO NOT COMBINE ANY NEW UTILITY EASEMENTS (U.E.) WITH DRAINAGE EASEMENTS (D.E.) OR MAKE CHANGES IN GRADE WITHIN THE UTILITY EASEMENTS (U.E.) WITHOUT WRITTEN APPROVAL FROM NEW BRAUNFELS UTILITIES.
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OWNER/DEVELOPER:
CENTER FOR CHRISTIAN GROWTH, INC.
2549 WEST STATE HIGHWAY 46
NEW BRAUNFELS, TEXAS 78132

CIVIL ENGINEER & SURVEYOR:
QUIDDITY ENGINEERING
4350 LOCKHILL-SELMA ROAD SUITE 100
SAN ANTONIO, TEXAS 78249

STATE OF TEXAS
COUNTY OF COMAL

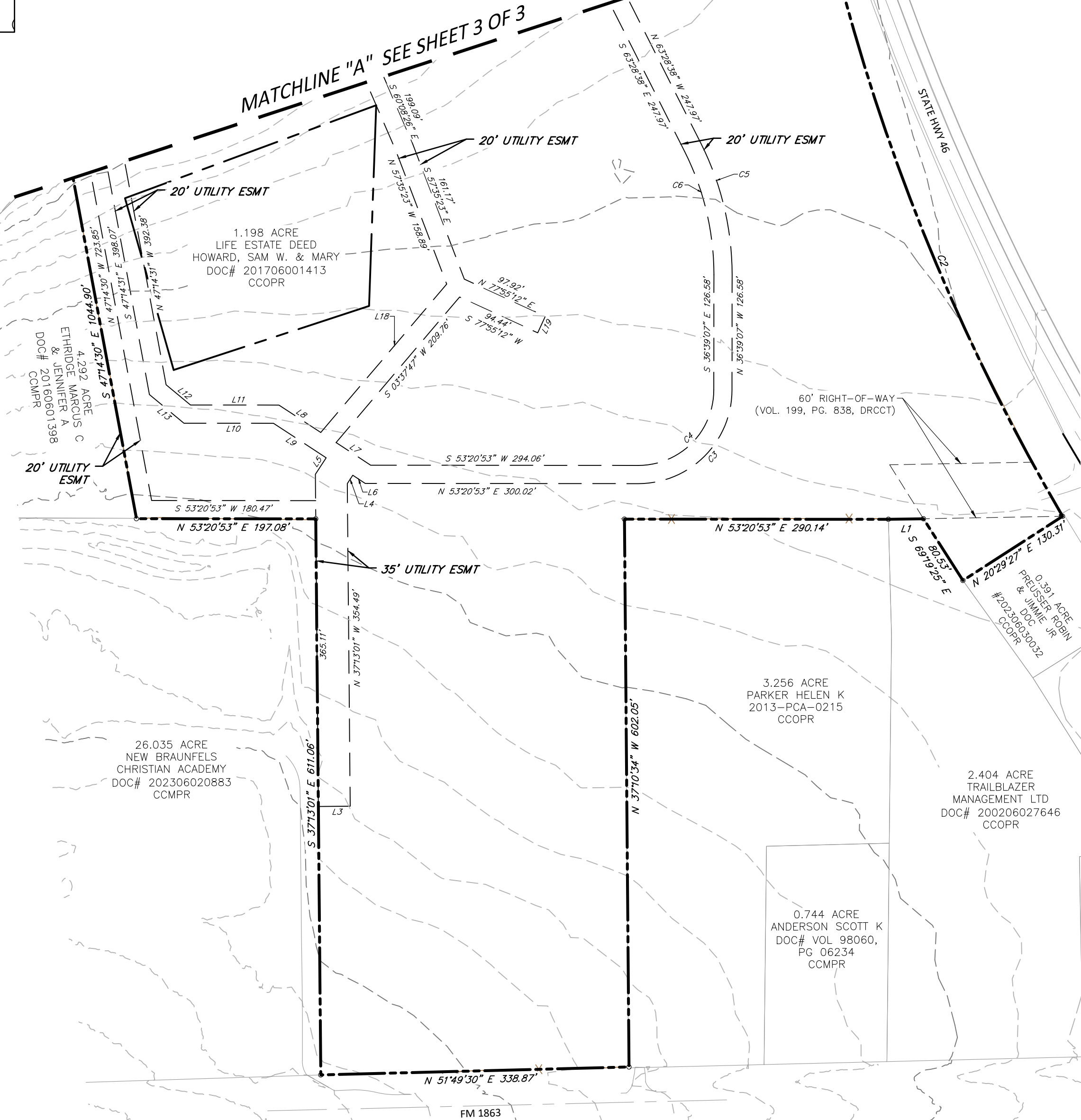
I, HEREBY CERTIFY THAT PROPER ENGINEERING CONSIDERATION HAS BEEN GIVEN TO THIS PLAT TO THE MATTERS OF STREETS, LOTS AND DRAINAGE LAYOUT, TO THE BEST OF MY KNOWLEDGE THIS PLAT CONFORMS TO ALL REQUIREMENTS OF THE UNIFIED DEVELOPMENT CODE, EXCEPT FOR THOSE VARIANCES GRANTED BY THE CITY OF SEGUIN.

LICENSED PROFESSIONAL ENGINEER
DARREN J. MCAFEE P.E.
LICENSE NUMBER 137808

STATE OF TEXAS

I, THE UNDERSIGNED, TROY A. TROBAUGH, A REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF TEXAS, HEREBY CERTIFY THAT THIS PLAT IS TRUE AND CORRECTLY MADE UNDER MY SUPERVISION AND IN COMPLIANCE WITH CITY AND STATE SURVEY REGULATIONS AND LAWS AND MADE ON THE GROUND AND THAT THE CORNER MONUMENTS WERE PROPERLY MADE UNDER MY SUPERVISION.

REGISTERED PROFESSIONAL LAND SURVEYOR
TROY A. TROBAUGH
LICENSE NUMBER 6241



PRELIMINARY PLAT ESTABLISHING
T BAR M CAMP EXPANSION

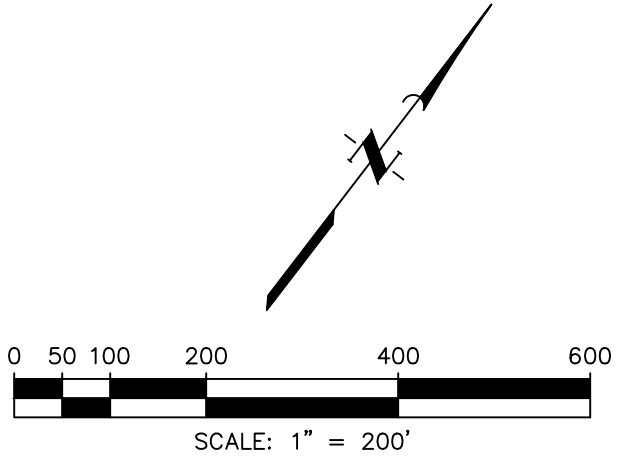
BEING A TOTAL OF 28.957 ACRES OF LAND OUT OF THE CHRISTIAN PAPE SURVEY NO. 831, ABSTRACT NO. 777, CITY OF NEW BRAUNFELS COMAL COUNTY, TEXAS; CONTAINING ALL OF THAT CERTAIN CALLED 15.033 ACRE TRACT CENTER FOR CHRISTIAN GROWTH, INC. DOC. NO. 201706001413; AND ALL OF THE CALLED 4.721 ACRE TRACT CENTER FOR CHRISTIAN GROWTH, INC. DOC. NO. 201606028096; AND A PORTION OF THE CALLED 61.423 ACRE TRACT CENTER FOR CHRISTIAN GROWTH, INC. DOC NO. 201506007095 RECORDED IS THE OFFICIAL PUBLIC RECORDS OF COMAL COUNTY, TEXAS.



QUIDDITY

Texas Board of Professional Engineers and Land Surveyors Reg. No. F-23290 & 10046100
4350 Lockhill-Selma Road, Suite 100 • San Antonio, Texas 78249 • 210.494.5511

DATE OF PRINT: 4/1/2024



STATE OF TEXAS
COUNTY OF _____
I (WE) THE UNDERSIGNED OWNER(S) OF THE LAND SHOWN ON THIS PLAT, AND DESIGNATED HEREIN AS THE _____ SUBDIVISION TO THE CITY OF NEW BRAUNFELS, COUNTY OF COMAL, TEXAS, AND WHOSE NAME IS SUBSCRIBED HERETO, DO HEREBY SUBDIVIDE SUCH PROPERTY AND DEDICATE TO THE USE OF THE PUBLIC ALL STREETS, ALLEYS, PARKS, DRAINS, EASEMENTS, AND PUBLIC PLACES THEREON SHOWN FOR THE PURPOSES AND CONSIDERATION THEREIN EXPRESSED.

OWNER/DEVELOPER: CENTER FOR CHRISTIAN GROWTH, INC.
2549 WEST STATE HIGHWAY 46
NEW BRAUNFELS, TEXAS, 78132

STATE OF TEXAS
COUNTY OF _____
THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON THIS, _____ DAY
OF _____, 20____, BY _____.

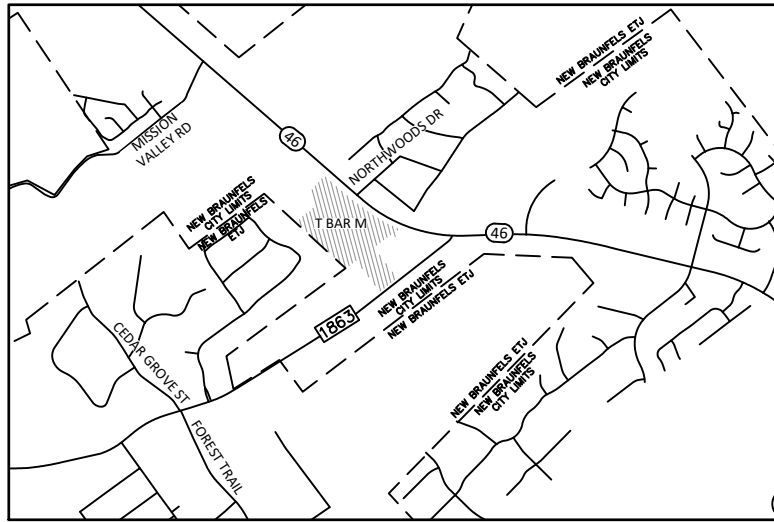
NOTARY PUBLIC, STATE OF TEXAS
MY COMMISSION EXPIRES: _____

APPROVED THIS THE _____ DAY OF _____, 20____, BY THE
PLANNING COMMISSION OF THE CITY OF NEW BRAUNFELS, TEXAS.

APPROVED FOR ACCEPTANCE

DATE	PLANNING DIRECTOR
DATE	CITY ENGINEER
DATE	NEW BRAUNFELS UTILITIES

I, _____ DO HEREBY CERTIFY THAT THE FOREGOING
INSTRUMENT WAS FILED FOR RECORD IN THE MAP AND PLAT RECORDS, Doc # _____
OF COMAL COUNTY ON THE _____ DAY OF _____, 20____, AT _____
WITNESS MY HAND OFFICIAL SEAL, THIS THE _____ DAY OF _____, 20____.
COUNTY CLERK, COMAL COUNTY, TEXAS
DEPUTY



LOCATION MAP

NOT-TO-SCALE

LEGEND

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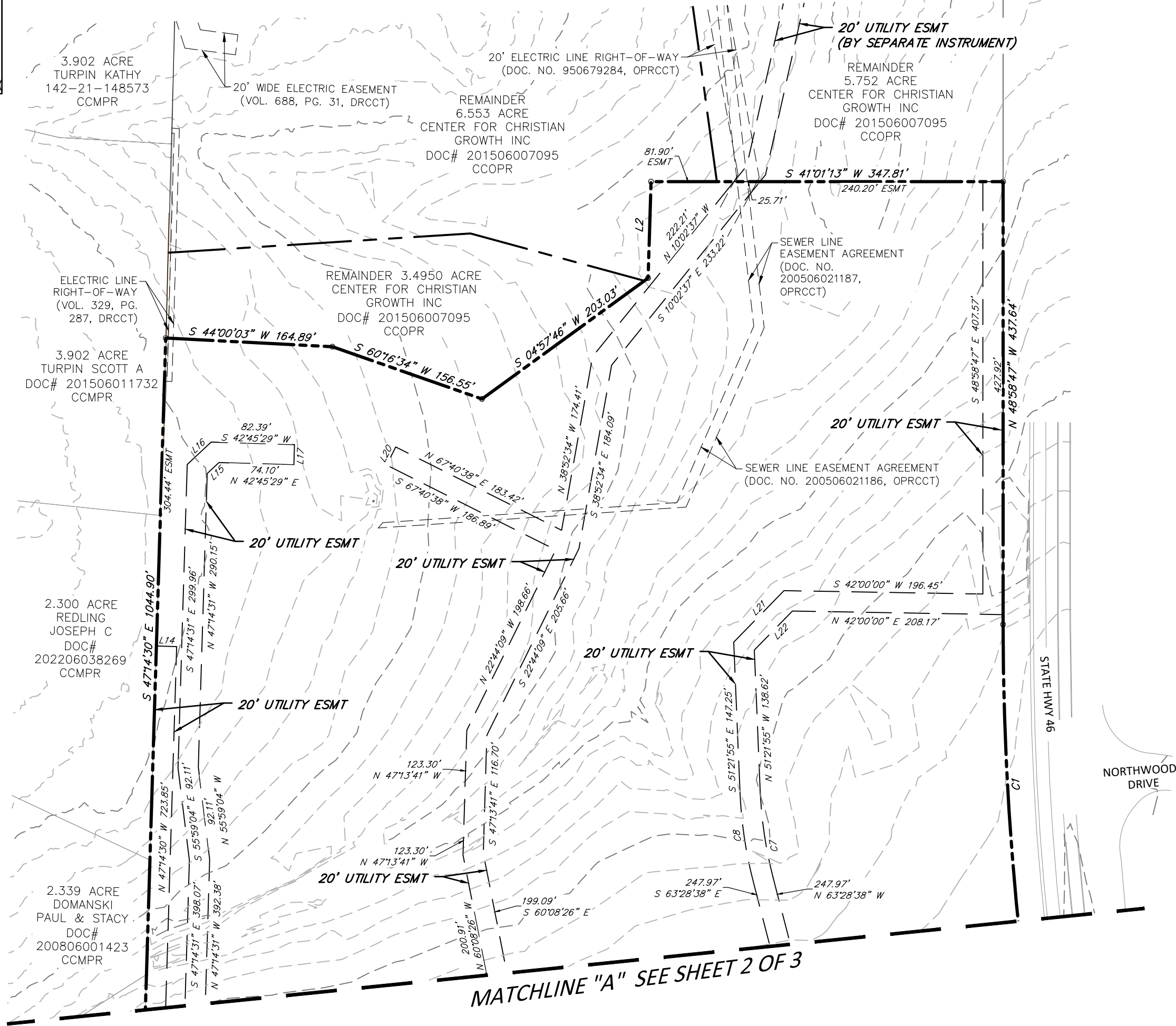
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REGISTERED PROFESSIONAL LAND SURVEYOR
TROY A. TROBAUGH
LICENSE NUMBER 6241



MATCHLINE "A" SEE SHEET 2 OF 3

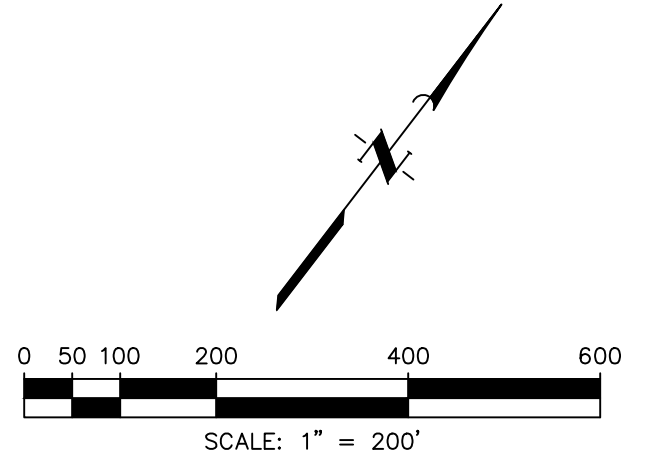
CURVE TABLE						
CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE	TANGENT
C1	2924.79'	367.46'	367.22'	N 52°37'04" W	7°11'55"	183.97'
C2	2342.00'	620.93'	619.12'	N 59°29'18" W	15°11'27"	312.30'
C3	103.00'	161.79'	145.66'	N 08°20'53" E	90°00'00"	103.00'
C4	83.00'	130.38'	117.38'	S 08°20'53" W	90°00'00"	83.00'
C5	320.00'	149.82'	148.46'	N 50°03'53" W	26°49'32"	76.31'
C6	300.00'	140.46'	139.18'	S 50°03'53" E	26°49'32"	71.54'
C7	414.00'	87.52'	87.35'	N 57°25'17" W	12°06'43"	43.92'
C8	434.00'	91.74'	91.57'	S 57°25'17" E	12°06'43"	46.04'

LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 52°22'43" E	38.48'
L2	S 47°14'41" E	95.33'
L3	N 52°46'56" E	35.00'
L4	N 03°27'32" W	10.98'
L5	S 03°27'32" E	21.60'
L6	N 86°32'28" E	16.37'
L7	S 86°32'28" W	45.45'
L8	S 86°32'28" W	54.95'
L9	N 86°32'28" E	69.19'
L10	N 53°20'53" E	98.42'
L11	S 53°20'53" W	97.21'
L12	N 86°56'49" W	34.80'
L13	S 86°56'49" E	49.25'
L14	S 42°45'29" W	20.00'
L15	N 02°14'31" W	15.86'
L16	S 02°14'31" E	32.43'
L17	N 47°14'31" W	20.00'
L18	N 03°37'47" E	213.90'
L19	S 12°04'48" E	20.00'
L20	N 22°19'22" W	20.00'
L21	S 04°40'57" E	71.16'
L22	N 04°40'57" W	53.89'

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DATE _____ NEW BRAUNFELS UTILITIES _____

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DEPUTY _____