TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
WATER POLLUTION ABATEMENT PLAN (WPAP) APPLICATION

FOR

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

Prepared for:

Kevin Byrd
Byrdnest Ventures, LLC.
9410 Vera Cruz Road
Austin, TX 78737

4CUATRO Consultants, LTD
Firm No. F-3524

Prepared by:

Hugo Elizondo, Jr., P.E., C.F.M.
Cuatro Consultants, Ltd.
120 Riverwalk Drive, Suite 208
San Marcos, Texas 78666
(512) 312-5040

March 2024
Revised: April 2024

4CUATRO Consultants, LTD
Firm Registration No. F-3524

March 4, 2024

Leah Whallon, Intake Review
TCEQ
12100 Park 35 Circle, Building A
Austin, TX 78753

RE: OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, HAYS COUNTY, TEXAS, 78666
CCL 23-049

Subject: Water Pollution Abatement Plan (WPAP) Application

Dear Ms. Whallon:

On behalf of our Client, Byrdnest Ventures, LLC, please find one (1) original of the following documents for a Water Pollution Abatement Plan submittal for the referenced Project:

1. Edwards Aquifer Application Cover Page – TCEQ-20705

2. General Information Form – TCEQ-0587
   - Attachment A – Road Map
   - Attachment B – USGS/Edwards Recharge Zone Map
   - Attachment C – Project Description

3. Geologic Assessment Form – TCEQ-0585
   - Attachment A – Geologic Assessment Table
   - Attachment B – Soil Profile and Narrative of Soil Units
   - Attachment C – Stratigraphic Column
   - Attachment D – Narrative of Site Specific Geology
   - Site Geologic Map
   - Table for the position of features latitude/longitude (Not Applicable)

120 Riverwalk Drive, Ste. 208, San Marcos, Texas 78666 Phone 512-312-5040

4. Water Pollution Abatement Plan Application Form – TCEQ 0584
    - Attachment A – Factors Affecting Water Quality
    - Attachment B – Volume and Character of Stormwater
    - Attachment C – Suitability Letter from Authorized Agent (Not Applicable)
    - Attachment D - Exception to the Required Geologic Assessment (Not Applicable)
    - Site Plan

5. Temporary Stormwater Section – TCEQ-0602
    - Attachment A - Spill Response Actions
    - Attachment B - Potential Sources of Contamination
    - Attachment C - Sequence of Major Activities
    - Attachment D - Temporary Best Management Practices and Measures
    - Attachment E - Request to Temporarily Seal a Feature (Not Applicable)
    - Attachment F - Structural Practices
    - Attachment G - Drainage Area Map
    - Attachment H - Temporary Sediment Pond(s) Plans and Calculations (Not Applicable)
    - Attachment I - Inspection and Maintenance for BMPs
    - Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices

6. Permanent Stormwater Section – TCEQ-0600
    - Attachment A - 20% or Less Impervious Cover Waiver, if project is multi-family residential, a school, or a small business and 20% or less impervious cover is proposed for the site (Not Applicable)
    - Attachment B - BMPs for Upgradient Stormwater
    - Attachment C - BMPs for On-site Stormwater
    - Attachment D - BMPs for Surface Streams (Not Applicable)
    - Attachment E - Request to Seal Features (Not Applicable)
    - Attachment F - Construction Plans
    - Attachment G - Inspection, Maintenance, Repair and Retrofit Plan
    - Attachment H - Pilot-Scale Field Testing Plan (Not Applicable)
    - Attachment I -Measures for Minimizing Surface Stream Contamination

7. Agent Authorization – TCEQ-0599;

8. Application Fee Form – TCEQ-0574;

9. WPAP fee in the amount of $6,500.00;

10. Core Data Form – TCEQ-10400; and

120 Riverwalk Drive, Ste. 208, San Marcos, Texas 78666 Phone 512-312-5040

11. CD – Electronic Copy.

Please review and advise if you have any questions.

Sincerely,

Hugo Elizondo, Jr., P.E., C.F.M.
Principal

Attachments

120 Riverwalk Drive, Ste. 208, San Marcos, Texas 78666 Phone 512-312-5040

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: OAK HAVEN PRESERVE						**2. Regulated Entity No.:** N/A			
3. Customer Name: KEVIN BYRD						**4. Customer No.:** N/A			
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):**			31.23
9. Application Fee:	$6,500		**10. Permanent BMP(s):**			N/A			
11. SCS (Linear Ft.):	N/A		**12. AST/UST (No. Tanks):**			N/A			
13. County:	HAYS		**14. Watershed:**			UPPER SAN MARCOS 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.)	X	__	__
Region (1 req.)	__	__	__
County(ies)	__	__	__
Groundwater Conservation District(s)	_x_Edwards Aquifer Authority X Barton Springs/ Edwards Aquifer __Hays Trinity __Plum Creek	__Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	__Austin __Buda __Dripping Springs __Kyle __Mountain City __San Marcos __Wimberley __Woodcreek	__Austin __Bee Cave __Pflugerville __Rollingwood __Round Rock __Sunset Valley __West Lake Hills	__Austin __Cedar Park __Florence __Georgetown __Jerrell __Leander __Liberty Hill __Pflugerville __Round Rock

San Antonio Region					
County:	**Bexar**	**Comal**	**Kinney**	**Medina**	**Uvalde**
Original (1 req.)	__	__	__	__	__
Region (1 req.)	__	__	__	__	__
County(ies)	__	__	__	__	__
Groundwater Conservation District(s)	__ Edwards Aquifer Authority __Trinity-Glen Rose	__Edwards Aquifer Authority	__Kinney	__EAA __Medina	__EAA __Uvalde
City(ies) Jurisdiction	__Castle Hills __Fair Oaks Ranch __Helotes __Hill Country Village __Hollywood Park __San Antonio (SAWS) __Shavano Park	__Bulverde __Fair Oaks Ranch __Garden Ridge __New Braunfels __Schertz	NA	__San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review. HUGO ELIZONDO, JR., P.E., C.F.M. / CUATRO CONSULTANTS, LTD. Print Name of Customer/Authorized Agent Signature of Customer/Authorized Agent 3/4/24 Date

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

General Information Form

Texas Commission on Environmental Quality

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

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

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

Signature

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

Print Name of Customer/Agent: HUGO ELIZONDO, JR., P.E., C.F.M.

Date: 3/4/24

Signature of Customer/Agent:

Project Information

1. Regulated Entity Name: OAK HAVEN PRESERVE
2. County: HAYS
3. Stream Basin: UPPER SAN MARCOS RIVER WATERSHED
4. Groundwater Conservation District (If applicable): BARTON SPRINGS / EDWARD'S AQUIFER CD AND EDWARD'S 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: KEVIN BYRD
Entity: BYRDNEST VENTURES, LLC.
Mailing Address: 9410 VERA CRUZ ROAD
City, State: AUSTIN, TX Zip: 78737
Telephone: (512) 845-2310 FAX: _____
Email Address: kbyrd@bartlettcocke.com

8. Agent/Representative (If any):

Contact Person: HUGO ELIZONDO, JR., P.E., C.F.M.
Entity: CUATRO CONSULTANTS, LTD.
Mailing Address: 120 RIVERWALK DRIVE, STE. 208
City, State: SAN MARCOS, TX Zip: 78666
Telephone: 512-565-9040 FAX: _____
Email Address: hugo@cuatroconsultants.com

9. Project Location:

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

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

Oak Haven Preserve is located at 1775 Hilliard Road, San Marcos, Texas 78666. The Site is on the west side of Hilliard Road, approximately 1.6 miles north of its intersection with Lime Kiln Road. The Project is bound by Hilliard Road to the east, a conservation easement to the west, and undeveloped residential lots to the north and south.

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: 06/01/2024

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:

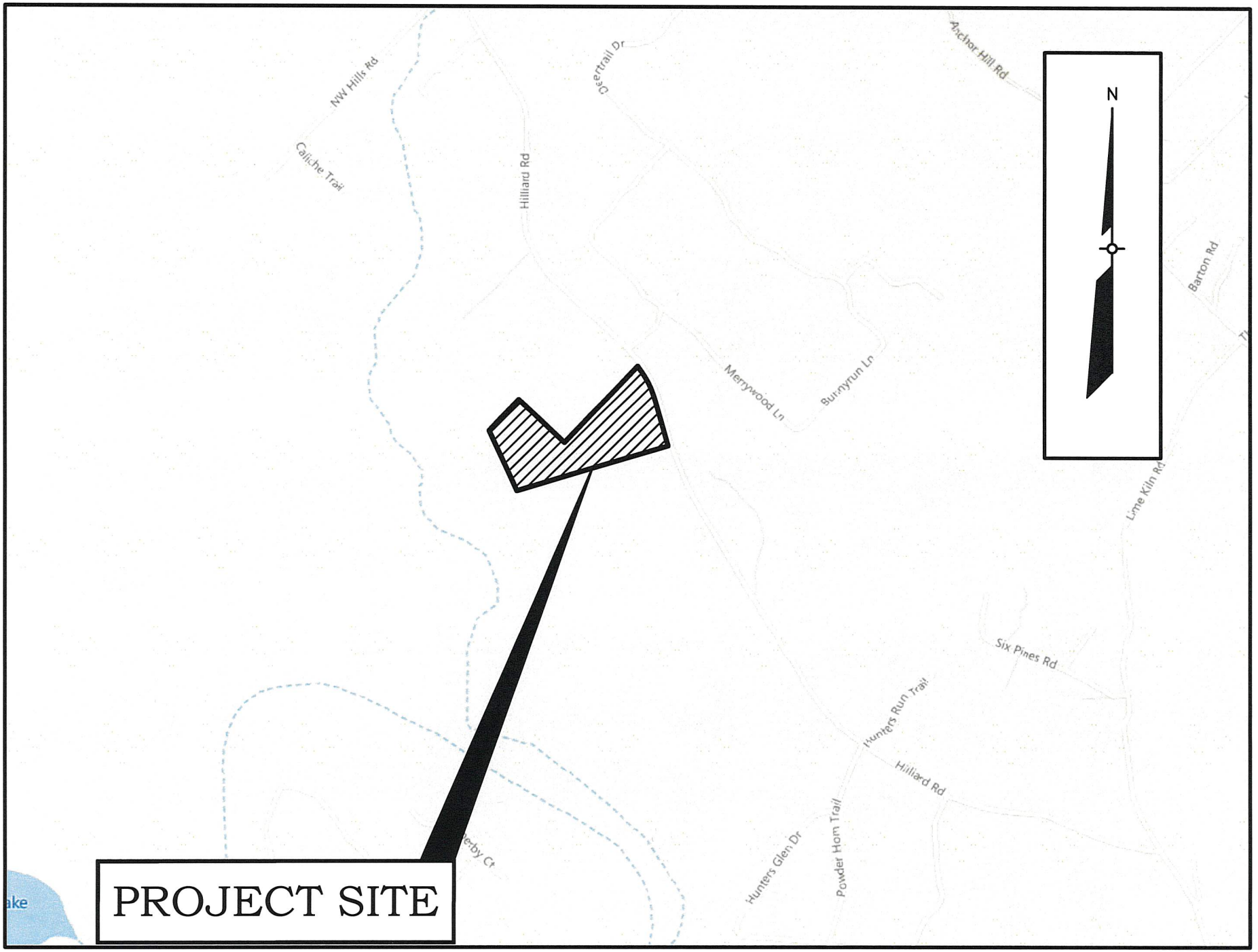
☒ For a Water Pollution Abatement Plan or Modification, the total acreage of the site where regulated activities will occur.
☐ For an Organized Sewage Collection System Plan or Modification, the total linear footage of all collection system lines.
☐ For a UST Facility Plan or Modification or an AST Facility 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.



LOCATION MAP
1"= 1,500'

Attachment B: Edwards Aquifer Map Viewer

1/17/2024, 3:43:24 PM

1:18,056

0 0.13 0.25 0.5 mi

0 0.2 0.4 0.8 km

Edwards Aquifer Label

Edwards Aquifer Boundary

Edwards Aquifer Boundary central line

Groundwater Conservation Districts

Barton Springs/Edwards Aquifer CD

Edwards Aquifer Authority

TX Counties

7.5 Minute Quad Grid

TCEQ_EDWARDS_OFFICIAL_MAPS

TCEQ, Esri Community Maps Contributors, City of Austin, Texas Parks & Wildlife, CONANP, Esri, TomTom, Garmin, Foursquare, SafeGraph,

Web AppBuilder for ArcGIS

TCEQ | Maxar | Esri Community Maps Contributors, City of Austin, City of San Marcos, Texas Parks & Wildlife, © OpenStreetMap, Microsoft, CONANP, Esri, TomTom, Garmin, Foursquare, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census

OAK HAVEN PRESERVE
PROJECT DESCRIPTION

The proposed Oak Haven Preserve facility is located at 1775 Hilliard Road, San Marcos, Texas 78666. The site is on the west side of Hilliard Road, approximately 1.6 miles north of its intersection with Lime Kiln Road. The Oak Haven Preserve facility is a wedding venue with street, water, and wastewater improvements.

There are three (3) onsite Drainage Areas, with four (4) offsite Drainage Areas contributing to stormwater runoff. The Drainage Areas, combined, are approximately 78.01 acres, covered with two existing buildings, a base driveway, and natural brush vegetation. Slopes on site range from 2.5 to 15.1 percent gradient. Stormwater runoff sheet flows, draining from north to south across each Drainage Area. It transitions to shallow concentrated flow after one hundred (100) feet. The center and east drainage areas transition to concentrated flow in the two natural lows that approach the south boundary of the Site.

Trash generated onsite will be handled by Texas Disposal Systems. Since the offsite drainage areas are undeveloped land, there will be very little debris collected. Since this Site is a proposed wedding venue, the grounds will be maintained for aesthetic pleasure and any debris/trash will be collected and properly disposed of.

This Project includes removal of one existing building and construction of three buildings (two wedding chapels) and one detention pond. The proposed pond is for detention only since the Site classifies as a small business and will maintain less than 20 percent impervious cover (See Attachment A in the Permanent Stormwater Section for Waiver). The detention pond reduces the post-construction stormwater to less than or equal to the existing condition. Design of the detention pond is in accordance with the City of Austin Drainage Criteria Manual (adopted by Hays County) to control and reduce peak runoff rates for the 2, 10, 25, and 100-year storm events. Atlas 14 precipitation values are used to determine storm water runoff.

Currently, the total impervious cover on the Site is 1.23 acres (3.94 percent). Following construction, the impervious cover on the Site will be approximately 2.83 acres (9.06 percent).

The entire 31.23 acre tract lies within Hays County, outside the jurisdiction of any municipalities. This Project is designed to meet the Hays County Development Requirements.

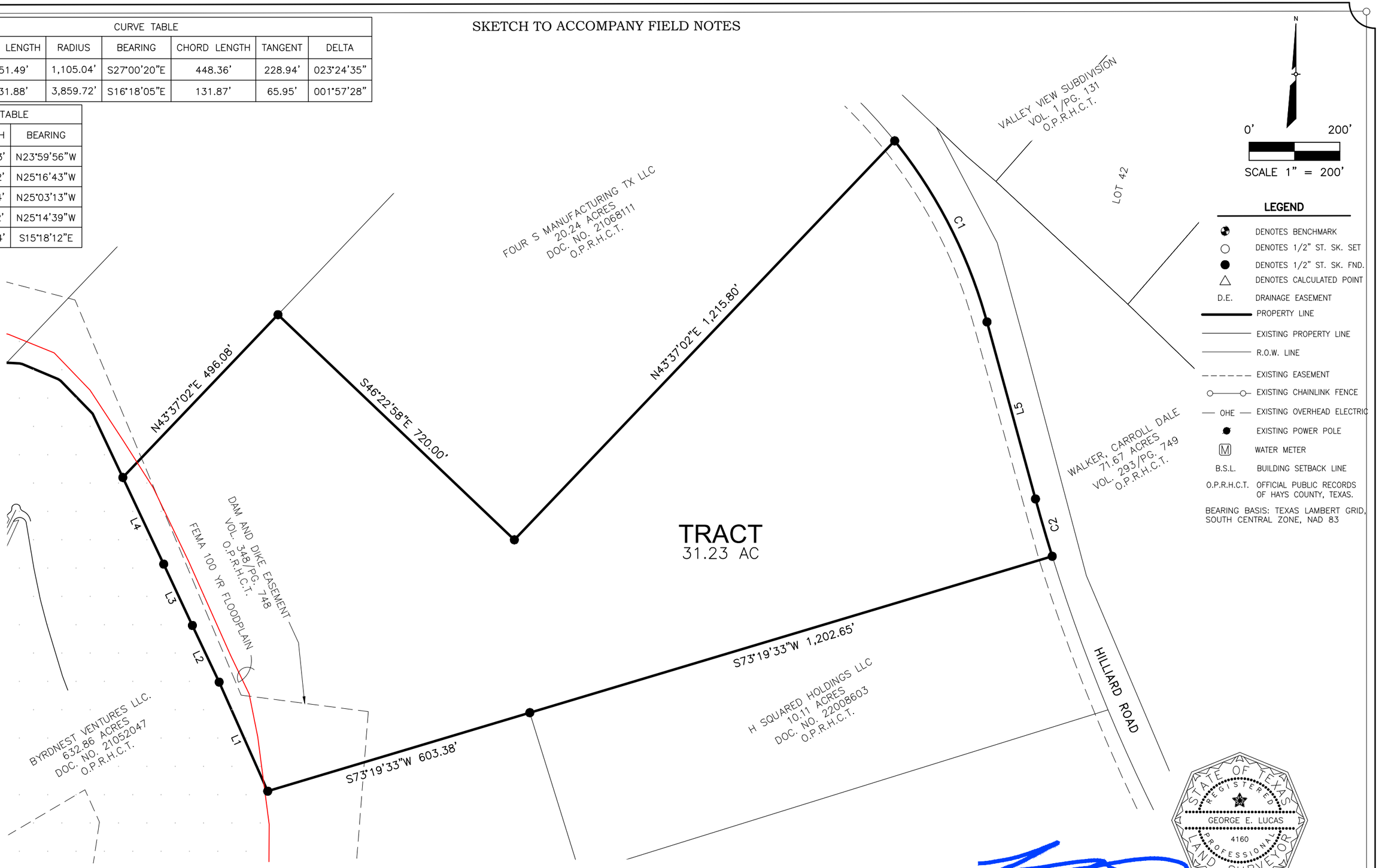
The existing site is a residential tract. The Site is relatively flat with slopes ranging from 2.5 to 15.1 percent, generally draining from north to south. The Site drains to the Upper San Marcos River watershed. The Project Site is bound by Hilliard Road to the east, a conservation easement to the west, and undeveloped residential lots to the north and south.

The Site will be served by an on-site sewage facility (OSSF) designed in accordance with Hays County OSSF Regulations and TAC Chapter 285. The OSSF consists of a pre-treatment, equalization, aerobic treatment unit, and pump tank with a drip field.

SKETCH TO ACCOMPANY FIELD NOTES

CURVE TABLE						
CURVE #	ARC LENGTH	RADIUS	BEARING	CHORD LENGTH	TANGENT	DELTA
C1	451.49'	1,105.04'	S27°00'20"E	448.36'	228.94'	023°24'35"
C2	131.88'	3,859.72'	S16°18'05"E	131.87'	65.95'	001°57'28"

LINE TABLE		
LINE #	LENGTH	BEARING
L1	263.43'	N23°59'56"W
L2	138.22'	N25°16'43"W
L3	149.34'	N25°03'13"W
L4	211.32'	N25°14'39"W
L5	404.84'	S15°18'12"E



N

0' 200'

SCALE 1" = 200'

LEGEND

◉	DENOTES BENCHMARK
○	DENOTES 1/2" ST. SK. SET
●	DENOTES 1/2" ST. SK. FND.
△	DENOTES CALCULATED POINT
D.E.	DRAINAGE EASEMENT
———	PROPERTY LINE
———	EXISTING PROPERTY LINE
———	R.O.W. LINE
– – – –	EXISTING EASEMENT
○——○	EXISTING CHAINLINK FENCE
— OHE —	EXISTING OVERHEAD ELECTRIC
●	EXISTING POWER POLE
Ⓜ	WATER METER
B.S.L.	BUILDING SETBACK LINE
O.P.R.H.C.T.	OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS.

BEARING BASIS: TEXAS LAMBERT GRID, SOUTH CENTRAL ZONE, NAD 83

LEGAL DESCRIPTION

BEING THE REMAINING 31.23 ACRE TRACT OF LAND, OUT OF THE ELIJAH CLARK SURVEY, ABSTRACT NO 84, IN HAYS COUNTY TEXAS, BEING A PORTION OF THE 844.44 ACRES CONVEYED BY SPECIAL WARRANTY DEED TO BYRDNEST VENTURES, LLC RECORDED IN DOCUMENT NO. 21052047 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS.

STATE OF TEXAS
REGISTERED
GEORGE E. LUCAS
4160
PROFESSIONAL
LAND SURVEYOR

DATE: 1-5-2024

GEORGE E. LUCAS
REGISTERED PROFESSIONAL LAND SURVEYOR NO. 4160
CELCO SURVEYING, FIRM REGISTRATION NO. 10193975
18018 OVERLOOK LOOP, SUITE 105
SAN ANTONIO, TEXAS 78259
OFFICE (512) 635-4857

FIELD NOTE DESCRIPTION FOR A 31.23 ACRE TRACT OF LAND, SITUATED IN HAYS COUNTY, TEXAS:

BEING 31.23 ACRES OF LAND OUT OF THE ELIJAH CLARK SURVEY, ABSTRACT NO. 84, IN HAYS COUNTY, TEXAS, BEING A PORTION OF THE 844.44 ACRES CONVEYED BY SPECIAL WARRANTY DEED TO BYRDNEST VENTURES, LLC, RECORDED IN DOCUMENT NO. 21052047 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS, AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2" iron rod found, lying in the west right-of-way line of Hilliard Road, A public road, marking the northeast corner of a 10.11 acre tract of land, conveyed by Warranty Deed with Vendor's Lien to H Squared Holdings, LLC, as recorded in Document No. 22008603 of the Official Public Records of Hays County, Texas, common with the remaining 632.86 acres of said Byrdnest Ventures, LLC tract, for the south east corner of this tract;

THENCE, South 73°19'33" West, along the south line of this tract, common with the north line of said H Squared Holdings, LLC tract, a distance of 1,202.65 feet, to a 1/2" iron rod found, marking the northwest corner of said H Squared Holdings, LLC tract, common with an angle corner of said Byrdnest Ventures, LLC tract, for an angle corner of this tract;

THENCE, through and across said Byrdnest Ventures, LLC tract, the following five (5) courses and distances:

1) South 73°19'33" West, a distance of 603.38 feet, to a 1/2" iron rod found, for the southwest corner of this tract;

2) North 23°59'56" West, a distance of 263.43 feet, to a 1/2" iron rod found, for an angle corner of this tract;

3) North 25°16'43" West, a distance of 138.22 feet, to a 1/2" iron rod found, for an angle corner of this tract;

4) North 25°03'13" West, a distance of 149.34 feet, to a 1/2" iron rod found, for an angle corner of this tract;

5) North 25°14'39" West, a distance of 211.32 feet, to a 1/2" iron rod found, marking the southwest corner of a 13.89 acre tract of land, conveyed by General Warranty Deed to David Nathaniel and Jill Powell as recorded in Document No. 22002847 of the Official Public Records of Hays County, Texas, common with an angle corner of said Byrdnest Ventures, LLC tract, for an angle corner of this tract;

THENCE, North 43°37'02" East, along the south line of said Powell tract, common with a north line of said Byrdnest Ventures, LLC tract, a distance of 496.08 feet, to a 1/2" iron rod found, marking the northwest corner of a 20.24 acre tract of land, conveyed by General Warranty Deed to Four S Manufacturing Tx LLC, as recorded in Document No. 21068111 of the Official Public Records of Hays County, Texas, for an angle corner of this tract;

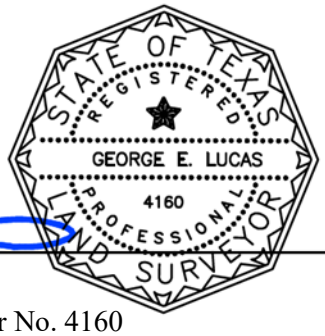
THENCE, South 46°22'58" East, along the west line of said Four S Manufacturing Tx LLC tract, common with an east line of said Byrdnest Ventures, LLC tract, a distance of 720.00 feet, to a 1/2" iron rod found, marking the southwest corner of said Four S Manufacturing Tx LLC tract, common with an angle corner of said Byrdnest Ventures, LLC tract, for an angle corner of this tract;

THENCE, North 43°37'02” East, along the north line of this tract, common with the south line of said Four S Manufacturing Tx LLC tract, common with a north line of said Byrdnest Ventures, LLC tract, a distance of 1,215.80 feet, to a 1/2” iron rod found, lying in the west right-of-way line of said Hilliard Road, marking the east corner of said Four S Manufacturing Tx LLC tract, common with a northeast corner of said Byrdnest Ventures, LLC tract, at the point-of-curvature of a curve to the right, for the north corner of this tract;

THENCE, Along said curve to the right, an arc of 451.49 feet, said curve having a radius of 1,105.04 feet, a chord which bears South 27°00'20” East, for a distance of 448.36 feet, to a 1/2” iron rod found, at the point-of-tangency of said curve, marking an angle corner of said for an angle corner of this tract;

THENCE, South 15°18'12” East, along the east line of this tract, common with the west right-of-way line of said Hilliard Road, common with the east line of said Byrdnest Ventures, LLC tract, a distance of 404.84 feet, to a 1/2” iron rod found, marking an angle corner of the west right-of-way line of said Hilliard Road, common with the east line of said Byrdnest Ventures, LLC tract, at the point-of-curvature of a curve to the left, for an angle corner of this tract;

THENCE, Along said curve to the left, an arc of 131.88 feet, said curve having a radius of 3,859.72 feet, a chord which bears South 16°18'05” East, for a distance of 131.87 feet, to the POINT OF BEGINNING, containing 31.23 acres of land, more or less.



George E. Lucas
Registered Professional Land Surveyor No. 4160
Celco Surveying, Firm Registration No. 10193975
18018 Overlook Loop, Suite 105
San Antonio, Texas 78259
Date: January 5, 2024

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: Kristin M. Miller Telephone: 512-415-6986

Date: 1/22/2024 Fax: _____

Representing: Escarpment Environmental (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:

Kristin M Miller

Regulated Entity Name: 31.23 acres,Oak Haven Preserve, 1775 Hilliard Rd, San Marcos, Texas,

Project Information

1. Date(s) Geologic Assessment was performed: 1/14/2024
2. Type of Project:
   - ☒ WPAP
   - ☒ SCS
   - ☐ AST
   - ☐ UST
3. Location of Project:
   - ☒ Recharge Zone
   - ☐ Transition Zone
   - ☐ Contributing Zone within the Transition Zone

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

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

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness(feet)

Soil Name	Group*	Thickness(feet)
Rumple-Comfort Association – undulating (RUD)	C	1

** Soil Group Definitions (Abbreviated)*

A. *Soils having a high infiltration rate when thoroughly wetted.*
B. *Soils having a moderate infiltration rate when thoroughly wetted.*
C. *Soils having a slow infiltration rate when thoroughly wetted.*
D. *Soils having a very slow infiltration rate when thoroughly wetted.*

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

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

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

   Applicant's Site Plan Scale: 1" = n/a'
   Site Geologic Map Scale: 1" = 80'
   Site Soils Map Scale (if more than 1 soil type): 1" = 400'

9. Method of collecting positional data:

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

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

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

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

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

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

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

    ☒ There are 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 Chapter 76.

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

Administrative Information

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

Appendix A

Geologic Assessment Table

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: 21-acre Oak Haven Preserve JOB NUMBER: E240003

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	NOT SENSITIVE	SENSITIVE	CATCHMENT AREAS (ACRES)		TOPOGRAPHY
	*DATUM: HDD/ WGS 84					X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	N 29.934106°	W -97.954072°	SC	20	Ked	1	1	2	N20E	10			F	20	50		Yes	x		Hillside
S-2	N 29.934444°	W -97.954167°	MB	20	Ked	15	3	2.5		0			F	10	30	No		x		Hilltop
S-3	N 29.933780°	W -97.956860°	CD	5	Ked	150	299	7		0			F	20	25	No		x		Drainage
S-4	N 29.934037°	W -97.956063°	MB	20	Ked	0.2	0.2	3		0			F	15	35	No		x		Hilltop
S-5	W 29.933054°	W -97.958000°	CD	5	Ked	15	10	2	N 55 E	10			F	10	25	No		x		Floodplain
S-6	N 29.933042°	W -97.958756°	SC	20	Ked	6	2	2	N 55 E	10			F	35	65		Yes		5	Floodplain
S-7	N 29.933180°	W -97.958765°	FRZ	30	Ked	25	39	4	N 55 E	10			F	35	75		Yes			Floodplain
S-8	N 29.932911°	W -97.958763°	SHZ	30	Ked	85	85		N 55 E	10			F	35	75		Yes		5	Floodplain
S-9	N 29.932887°	W -97.958883°	SH	29	Ked	30	20	3.5	N 55 E	10			F	35	74		Yes		5	Floodplain
S-10	N 29.932989°	W -97.958850°	SHZ	30	Ked	125	85	5	N 55 E	10			F	35	75		Yes		5	Floodplain
S-11	N 29.933268°	W -97.958993°	SFZ	30	Ked	100	75	2	N 55 E	10			F	35	75		Yes		5	Floodplain
S-12	N 29.933056°	W -97.958766°	SH	20	Ked	20	25	5	N 55 E	10			F	35	65		Yes		5	Floodplain
S-13	N 29.933242°	W -97.959046°	SFZ	30	Ked	100	100	6	N 55 E	10			F	35	75		Yes		5	Floodplain
S-14	N 29.932672°	W -97.958367°	CD	5	Ked	10	19	1.5		0			F	15	20	No		x		Floodplain
S-15	N 29.935073°	W -97.960629°	SH	20	Ked	30	20	2		0			C	35	55	No		x		Floodplain
S-16	N 29.934784°	W -97.959887°	MB	20	Ked	1200	215	18		0			F	30	50		Yes		16	hillside
S-17	N 29.934211°	W-97.954773°	F	20	Ked	inferred			N 30 E	10			F	9	39	No			10	hilltop
S-18	N 29.933944°	W-97.954547°	F	20	Ked	inferred			N 30 W	10			F	9	39	No			10	hilltop
S-19	N 29.935424°	W -97.953875°	CD	20	Ked	0.333	0.58	1		0			F	15	35	No		x		hilltop
Well No. 1	N 29.934128°	W -97. 956631°	MB	20	Ked	0.5	0.5	?		0			X	5	25	No		x		hilltop

*DATUM: Decimal Degrees/ WGS 84

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

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

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

8B RELATIVE INFILTRATION RATE	
HIGH	> 35
INTERMEDIATE	20 TO 34
LOW	5 TO 19

I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The information presented here complies with that document and is a true representation of the conditions observed in the field.
My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.
The seal appearing on this document was authorized by Kristin M. White, P.G. 1720 on: 1/22/2024

For Escarpment Environmental,

Kristin M. Miller

Signature

1/22/2024
Date

STATE OF TEXAS
KRISTIN M. MILLER
GEOLOGY
No. 1720
LICENSED
PROFESSIONAL GEOSCIENTIST

Appendix B

Geologic Stratigraphic Column

ESCARPMENT ENVIRONMENTAL
Geologic & Environmental Consulting for Land Development

Geologic Stratigraphic Column

System	Hydrologic Subdivision	Group or Formation	Member	Thickness in feet	Symbol	Description
Cretaceous	Upper Confining Unit	Del Rio Clay		50 to 60	Kdr	Dark gray to olive brown clay, pyritic, gypsiferous, calcareous clay with abundant "rams horns", a fossilized oyster *Ilymatogyra arietina* (formerly *Exogyra arietina*). No porosity or permeability. Primary upper confining unit of Edwards Aquifer.
Cretaceous	I	Georgetown Formation		40 to 60	Kgt	Reddish-brown, gray to light tan, interbedded, nodular-weathering, hard, fine-grained limestone, marly limestone, and marl, containing abundant fossil shells *Waconella wacoensis*. Low porosity and permeability. Forms solution cavities, but does not typically form caves.
Cretaceous	II	Person Formation of the Edwards Group	Cyclic Marine	0 to 70	Kpcm	Light tan, massive mudstone to packstone and *miliolid* grainstone with boxwork vugs.
Cretaceous	III	Person Formation of the Edwards Group	Leached and Collapsed	30 to 80	Kplc	Light gray, bioturbated iron-stained beds separated by thick limestone composed of crystalline limestone, mudstone to wackestone and *miliolid* grainstone; chert; collapsed breccia. One of the most porous and permeable. Many developed caves.
Cretaceous	IV	Person Formation of the Edwards Group	Regional Dense	20 to 30	Kprd	Light tan, wispy dense, argillaceous mudstone. Low permeability and acts as a vertical barrier.
Cretaceous		Kainer Formation of	Grainstone	45 to 60	Kkg	Light gray, *miliolid*, crossbedded grainstone; mudstone to wackestone;

System	Hydrologic Subdivision	Group or Formation	Member	Thickness in feet	Symbol	Description
		the Edwards Group				chert. Reduced permeability due to recrystallization.

Appendix C

Geologic Description

ESCARPMENT ENVIRONMENTAL
Geologic & Environmental Consulting for Land Development

Geologic Description
31.23-acre tract
Oak Haven Preserve
1775 Hilliard Road
San Marcos, Texas

Potential Recharge Features and Buffer Zones

Potential Recharge features are described on the Geologic Assessment Table (Appendix A) and in photo documentation (Appendix F). Features that are identified as potentially sensitive or within a zone identified as sensitive on the Geologic Assessment Table score a total of 40 or more points. These features should be protected by leaving the area surrounding them in natural vegetation to protect siltation from clearing activities. The natural buffer around a feature should extend a minimum of 50 feet in all directions. Where the boundary of the drainage area to the feature lies more than 50 feet from the feature, the buffer should extend to the boundary of the drainage area or 200 feet, whichever is less. Recommended buffer areas are identified on the Site Geologic Map.

A 75-foot setback is recommended from Feature S-1, which encompasses a 25-foot catchment area and adds a 50-foot buffer from the edge of the catchment. 150-foot buffer from the edge of the fractured rock/sinkhole zone surrounding features S-6 through 13, which encompasses an estimated 100-foot catchment area upslope of the features. Additionally, a minimum 50-foot buffer zone of natural vegetation should be considered along the slope edges of the quarry area that is found on adjacent property along the western boundary of the property. A buffer of natural vegetation should be left in place in the buffer zone to help reduce erosion during major storm events and to prevent siltation of potential recharge features. Native grasses and trees or seeding with native vegetation is encouraged in buffer zone areas where clearing has already taken place.

It is recommended that the buffers around a point recharge feature or cluster of contiguous point recharge features be maintained in a natural state to the maximum practical extent. This implies a construction-free zone. Activities and structures allowed within buffer zones are limited. Hiking trails are compatible in buffer zones as long as they are at least 50 feet from a feature. The "natural state" of a buffer should typically be a combination of dense native grasses and forbs in a mosaic of shrubs and trees.

Temporary runoff protection measures should be installed during any construction activities within the drainage area of the feature. Temporary erosion control measures such as silt fencing should be placed as near the construction as possible to minimize disturbance within the buffer zones and drainage areas.

If any solution cavities and caves, are discovered by excavation during the construction phase of a project, the features encountered at this phase of a project must be protected to ensure that water quality and the stability of the utility trench or structure installation is protected.

If a void is discovered during construction, all regulated activities near the sensitive feature must be suspended immediately. The holder of an approved Edwards Aquifer protection plan must immediately notify the appropriate regional office of any sensitive features encountered during construction, per 30 TAC 213.5(f)(2). This notice must be given before continuing construction. Regulated activities near the sensitive feature may not proceed until the TCEQ has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards Aquifer from potentially adverse impacts on water quality.

Potential solution cavities were identified in the attached Geotechnical Survey in the vicinity of the feature identified as S-4 and boring B-2. Excavation plans in that area are reportedly less than than one foot and appropriate construction techniques will be used to stabilize the building in those areas according to Edwards Aquifer Rules (Feature S-4). No surface expression of a potential recharge feature is visible in that area in that area. No more than one foot of excavation is planned in the vicinity of S-4 and the adjacent geotechnical borings described as group B-2 in Appendix G.

Geology

Field investigation and review of existing literature shows the site is underlain by Person Formation of the Edwards Limestone (Blome, 2010). Two inferred normal faults (S-17 and S-19) are present on the northeast portion of the property and are shown on the Site Geologic Map and Figure 4 Area Geologic Map.

Person Formation of the Edwards Group

The Person Formation is subdivided into 3 informal members by Rose (1972). These members are called the Regional Dense Member, Leached and Collapsed Member (Undivided), and Cyclic and Marine Cyclic Member (Undivided). The Person Formation is about 170 feet thick. The lithology of the Person Formation includes a dense, argillaceous mudstone and dolomitic wackestone, with collapsed breccias, burrowed mudstones, and stromatolitic limestone. The Person Formation consists of upward-grading mudstone to grainstone. The Person Formation forms a wedge (south of the Colorado River, Austin, Texas) that thickens to about 170 feet toward the southwest in Bexar County (Rose, 1972).

Regional Dense Member (Kprd)

The Regional Dense Member of the Person Formation (Hydrologic Subdivision IV of the Edwards Group) is described as light tan, dense, argillaceous mudstone and may be identified by its characteristic wispy iron-oxide stains (Rose, 1972). It is about 20 to 24 feet thick in Hays County (Hanson and Small, 1995). Primary field identification characteristics of the Regional Dense Member include wispy iron-oxide stains and the presence of fossils such as the common *Pleuromya knowltoni* (clam) and in the upper half, *Ceratostreon texanum* (oyster). Most permeability in this member is associated with faulting or fracturing, as observed in the vicinity of the fractured rock zone that encompasses features S-6, S-7, S-9, S`10, S-11, S-12, S-13, and S-14.

Leached and Collapsed Member (Undivided) (Kplc)

The Leached and Collapsed Member (Undivided) of the Person Formation (Hydrologic Subdivision III of the Edwards Group) overlies the Regional Dense Member and was mapped as one unit because neither unit can be easily distinguished as separate members (Small et al., 1996). The Leached and Collapsed Member (Undivided) is described as light gray to light tan wackestone, with some burrowed mudstone, grainstone, and crystalline limestone. This member is about 80 to 100 feet thick in Hays County (Hanson and Small, 1995). The common collapsed zones within this member were the result of a collapse of the overlying limestone into the voids created by dissolved evaporite lenses and layers (Rose, 1972). Primary field identification characteristics of the Leached and Collapsed Member (Undivided) include *Toucasia* sp. (rudist), *Chondrodonta* sp. (pelecypod), *miliolid*, and bioturbated, iron-stained beds separated by massive limestone beds (Small et al., 1996). The base of this member is fossiliferous and contains packstones to grainstones. The Leached and Collapsed Member (Undivided) is one of the most porous and permeable members of the Edwards Group (Small et al., 1996). This member is known to have vugular and burrow porosity and permeability associated with burrowed zones, breccia, and caves. Permeability and porosity are associated with collapsed zones where evaporites have been dissolved and in areas where faulting or fractures occur. Most caves that develop in the Leached and Collapsed Member (Undivided) are horizontally positioned above the overlying Regional Dense Member. The lower 15 feet of the Leached and Collapsed Member commonly contain a large collapsed zone (Small et al., 1996). Water Well No. 1, as well as Feature Nos. S-3 (excavated livestock pond) S-15 and S-16 (quarry) are underlain by Kplc member.

Cyclic and Marine Member (Undivided) (Kpcm)

The Cyclic and Marine Member (Undivided) of the Person Formation (Hydrologic Subdivision II of the Edwards Group) overlies the Leached and Collapsed Member (Undivided) and was mapped as 1 unit because neither unit can be distinguished as separate members (Small et al., 1996). It is described as having “moldic and vugular porosity and permeability associated with rudist zones” (Small et al., 1996). It is about 80 to 100 feet thick in Hays County (Hanson and Small, 1995). In northeastern Hays and southwestern Travis counties, the lower part of the Cyclic and Marine Member (Undivided) consists of light gray-tan, medium-thick to thick-bedded, variably vugular, and fossiliferous mudstone to packstone with lenses of *Miliolid* grainstone. Primary field identification characteristics include boxwork vugs, *Caprinid* sp. (rudist), and sometimes biostromes. *Toucasia* sp. (rudist) and are common locally near the contact with the overlying Georgetown Formation. Chert nodules are common throughout this member. In Travis County, the Marine Member contains *Miliolid*, *Toucasia*, *Chondorodonta*, and *Caprinid*

(rudist) packstone to a bored, oxidized, *Miliolid*, *Toucasia*, and *Caprinid* wackestone. Moldic and vugular porosity and permeability within the Cyclic and Marine Member (Undivided) is associated with rudist zones and faulting (Small et al., 1996). In Hays County, this member is as porous and permeable as the Leached and Collapsed Member. Features S-1 (Solutionally enlarged bedding plan cavity/animal burrow), S-2 (a manmade soil test pit) and S-19 (closed depression) are underlain by Kpcm.

Georgetown limestone (Kgt)

The Georgetown Formation is described as gray to light-tan, marly, fossiliferous limestone that often contains oyster-like clams (pectins), brachiopods (*Waconella wacoensis*), small forams (*Globergerina* sp.), and oysters (*Texigryphaea washitaensis)*. Primary distinguishing characteristics include the presence of wispy iron-oxide stains, *Arcotostrea carinata* (oyster), and ammonites (Rose, 1972 and Small et al., 1996). It is about 4 10 to 40 feet thick in Hays County (Hanson and Small, 1995). The boundary between the Edwards and Georgetown Formations is pitted and bored and often contains iron-oxide staining with common *Toucasia* sp. fossils (Rose, 1972).

Del Rio Formation (Kdr)

The Del Rio Clay Formation overlies the Georgetown Formation and forms the upper confining unit of the Edwards Aquifer (Small et al., 1996). The Del Rio Formation is described as described as dark bluish-gray, calcareous, pyritic, bentonitic, and fossiliferous clay, with some thin, lenticular, calcareous, siltstone beds (shale) (Rose, 1972). It is about 40 to 50 feet thick in Hays County (Hanson and Small, 1995). The Del Rio is described as having no porosity, low permeability, and no cavern development (mall et al., 1996). The primary marker fossils for Del Rio Clay are pecten-type fossil clams and an abundance of ram's horns also known as the fossilized oyster *Ilymatogyra arietina* (formerly *Exogyra arietina*) (Rose, 1972).

References

Abbott, P.L and Woodruff, C.M., Jr. (eds.), 1986, The Balcones Escarpment: Geological Society of America Guidebook, 200 p., "Also available by Online URL: [https://www.lib.utexas.edu/geo/balcones_escarpment/balconesescarpment.html]

Blome, C.D., J.R. Faith, D.E. Pedraza, G. B. Ozuna, J.C. Cole, A.K. Clark, T.A., and R.R. Morris, US Department of the Interior, US Geological Survey, Scientific Investigations Map 2873, Version 1.1, Geologic Map of the Edwards Aquifer Recharge Zone, South-Central Texas, 2005.

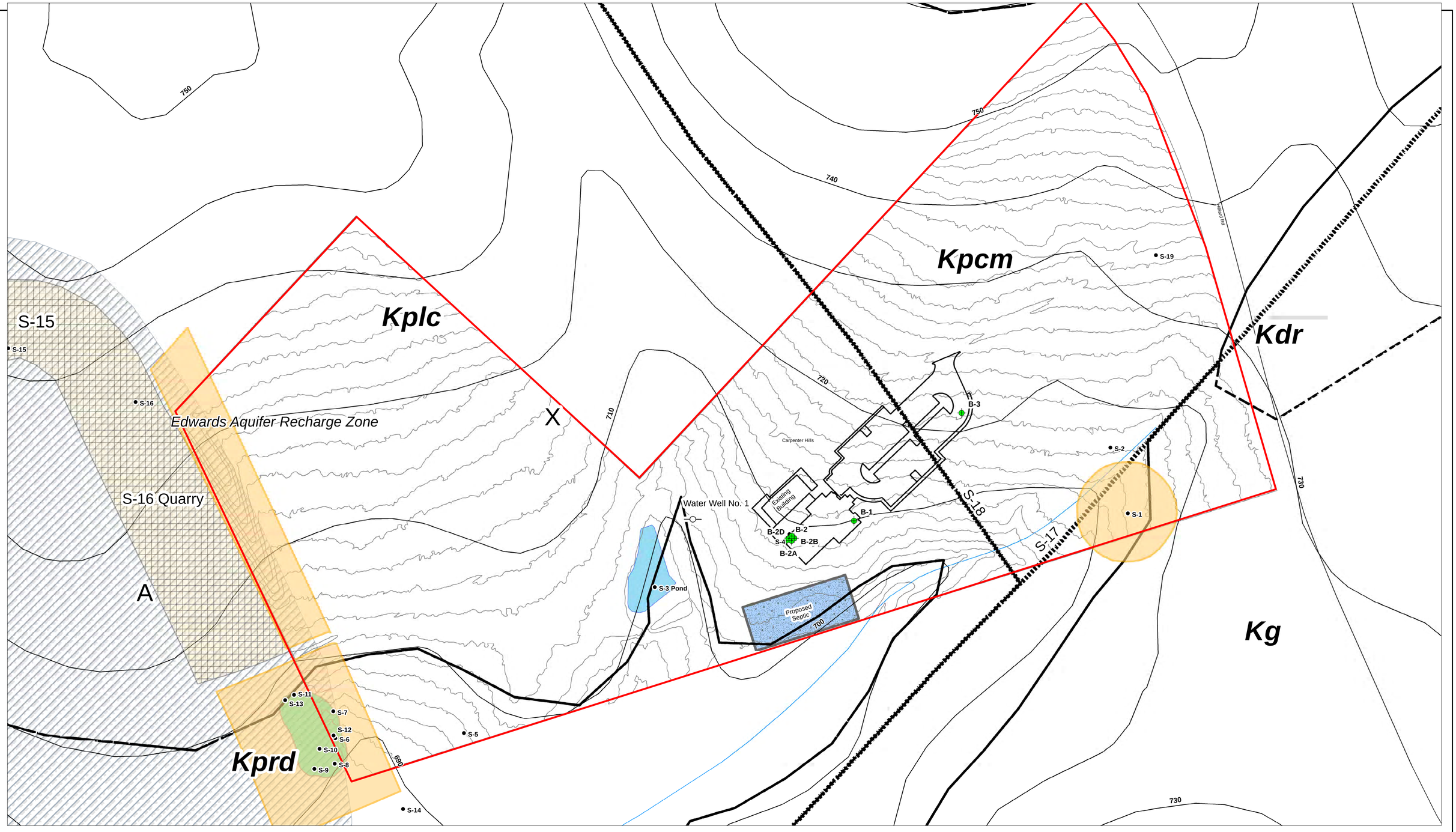
(Garner et al.) Garner, L. E., K. P. Young, P. U. Rodda, G. L. Dawe, and M. A. Rogers, Geologic Map of the Austin Area, Plate VII, Reprinted 1992, from Garner, L. E., and K. P. Young, Environmental Geology of the Austin Area: An Aid to Urban Planning, *Report of Investigations* 86, The University of Texas at Austin, Bureau of Economic Geology, reprinted 1992, 1976.

Rose, P.R, 1972, Edwards Group, surface and subsurface, central Texas: Austin, Texas, University of Texas, Bureau of Economic Geology, Report of Investigations 74.

Small, Ted A., John A. Hanson, and Nico M. Hauwert, 1996, Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Outcrop (Barton Springs Segment), Northeastern Hays and Southwestern Travis Counties, Texas, *US Geological Survey (USGS) Water Resources Investigations Report* 96-4306.

Appendix D

Site Geologic Map



Geology: Blome et al., 2005
Recharge Zone Boundary: TCEQ, 2006.
Topography: CAPCOG, 2022

Legend

- Site Boundary
- S-1 Catchment
- S-1 Setback
- Buffer Zone S-6 to S-13
- S-16 Buffer
- Potential Recharge Feature
- Geotechnical Bornings
- Project Layout
- Water Well No. 1
- Normal Fault (Inferred)
- Fractured Rock Zone Catchment
- Limestone Quarry
- Edwards Aquifer Recharge Zone
- Proposed Septic System
- Kdr - Del Rio clay
- Kg - Georgetown formation
- Kpcm - Cyclic and marine member of the Person formation
- Kplc - Leached and collapsed member of Person formation
- Kprd - Regional dense member of the Person formation
- Stream (USGS NHD, 1999)
- Topographic Contour - Index (feet)
- Topographic Contour - Intermediate (feet)
- Project Layout
- Zone A Flood
- Zone AE Floodplain

ESCARPMENT ENVIRONMENTAL
Geologic & Environmental Consulting for Land Development

STATE OF TEXAS
KRISTIN M. MILLER
GEOLOGY
No. 1720
LICENSED
PROFESSIONAL GEOSCIENTIST

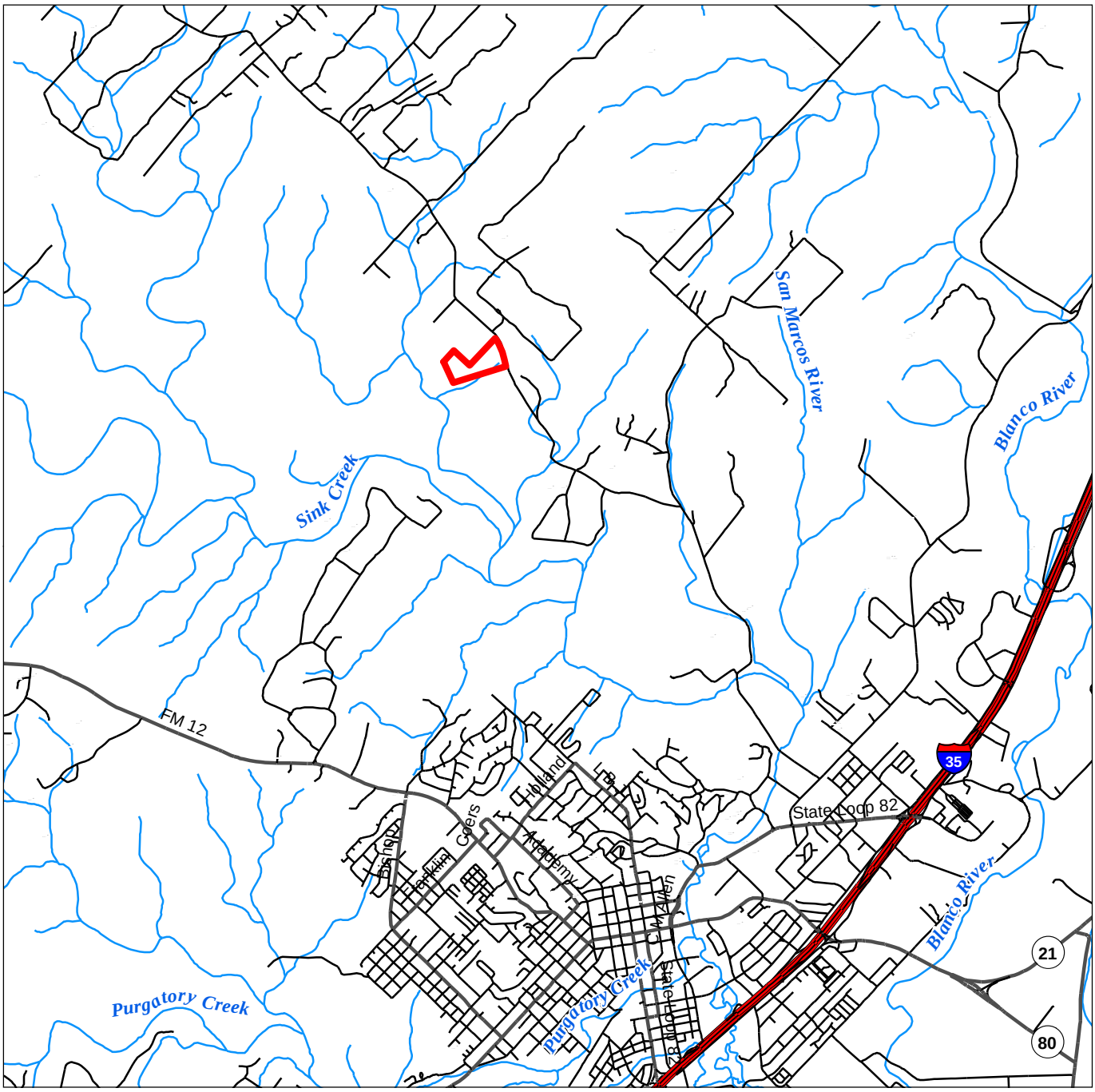
The seal appearing on this document was authorized by Kristin M. Miller, P.G. # 1720 January 22, 2024.

1 inch = 80 feet
0 40 80
Feet

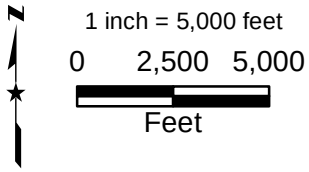
Site Geologic Map
31.23-acre tract
Oak Haven Preserve
1775 Hilliard Road
San Marcos, Texas

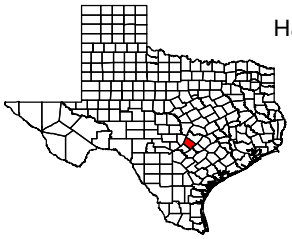
Appendix E

Maps



Basemap, USGS, San Marcos North, Texas, Quadrangle Topographic Map.
Recharge Zone Boundary: TCEQ, 2006.



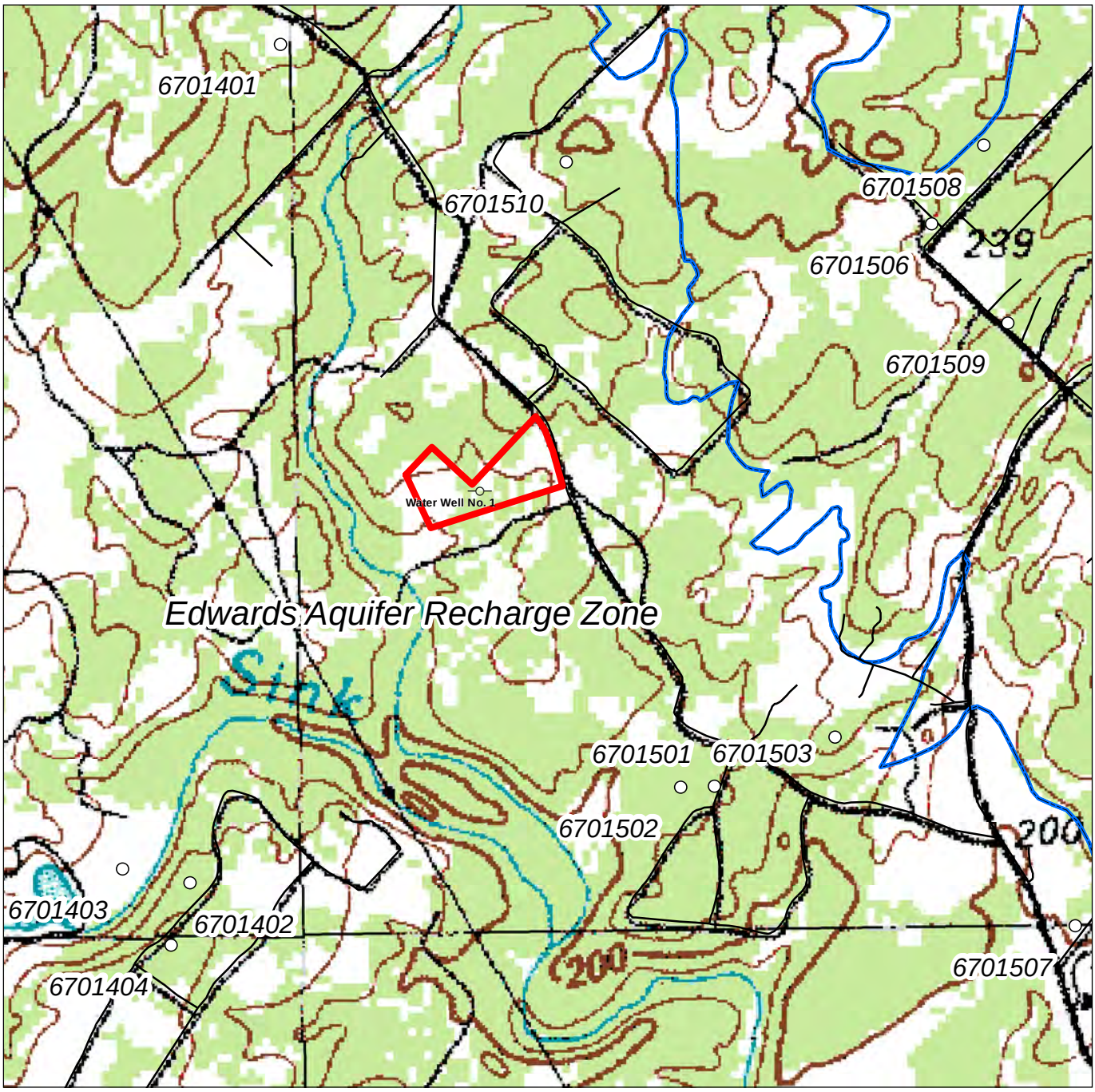


Legend

Property Boundary

ESCARPMENT ENVIRONMENTAL
Geologic & Environmental Consulting for Land Development

Figure 1
Location Map
31.23-acre tract
Oak Haven Preserve
1775 Hilliard Road
San Marcos, Texas



Basemap, USGS, San Marcos North, Texas, Quadrangle Topographic Map.
Recharge Zone Boundary: TCEQ, 2006.

1 inch = 2,000 feet

0 1,000 2,000

Feet

Hays County

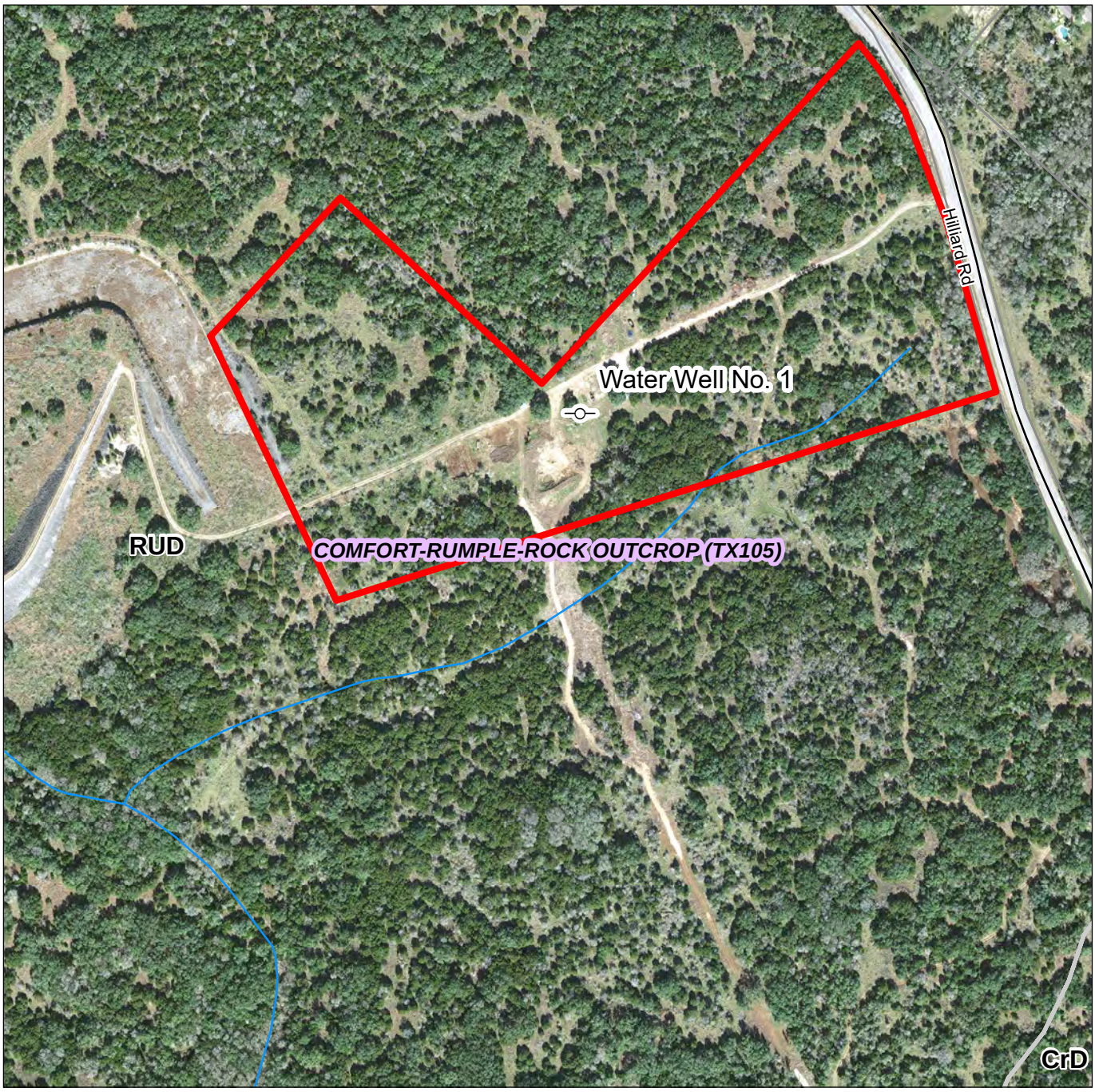
Legend

- Property Boundary
- Edwards Aquifer Recharge Zone
- Water Well (TWDB, 2023)

ESCARPMENT ENVIRONMENTAL

Geologic & Environmental Consulting for Land Development

Figure 2
Boundary Map
31.23-acre tract
Oak Haven Preserve
1775 Hilliard Road
San Marcos, Texas



Basemap, USGS, San Marcos North, Texas, Quadrangle Topographic Map.
Recharge Zone Boundary: TCEQ, 2006.

Legend

Property Boundary

Water Well (TWDB, 2023)

1 inch = 400 feet

0 200 400

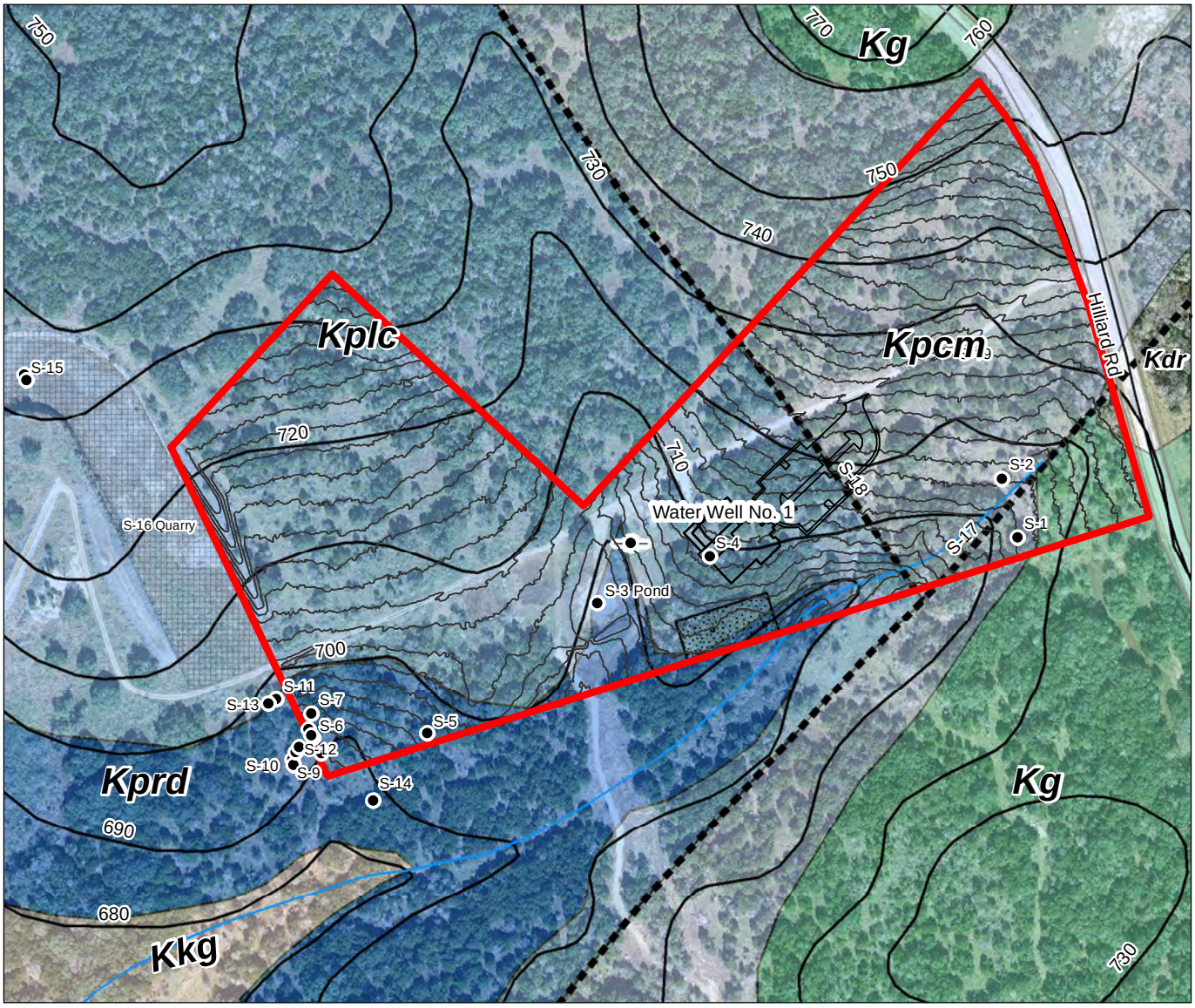
Feet

Hays County

NRCS Soil Types:
Rumple-Comfort Association – undulating (RUD)

ESCARPMENT ENVIRONMENTAL
Geologic & Environmental Consulting for Land Development

Figure 2
Soils Map
31.23-acre tract
Oak Haven Preserve
1775 Hilliard Road
San Marcos, Texas



Basemap, USGS, San Marcos North, Texas, Aerial Photo, CAPCOG, 2022
Geology: Blome et al., 2005
Recharge Zone Boundary: TCEQ, 2006.

1 inch = 350 feet
0 175 350
Feet

The seal appearing on this document was authorized by Kristin M. Miller, P.G. # 1720 January 22, 2024.

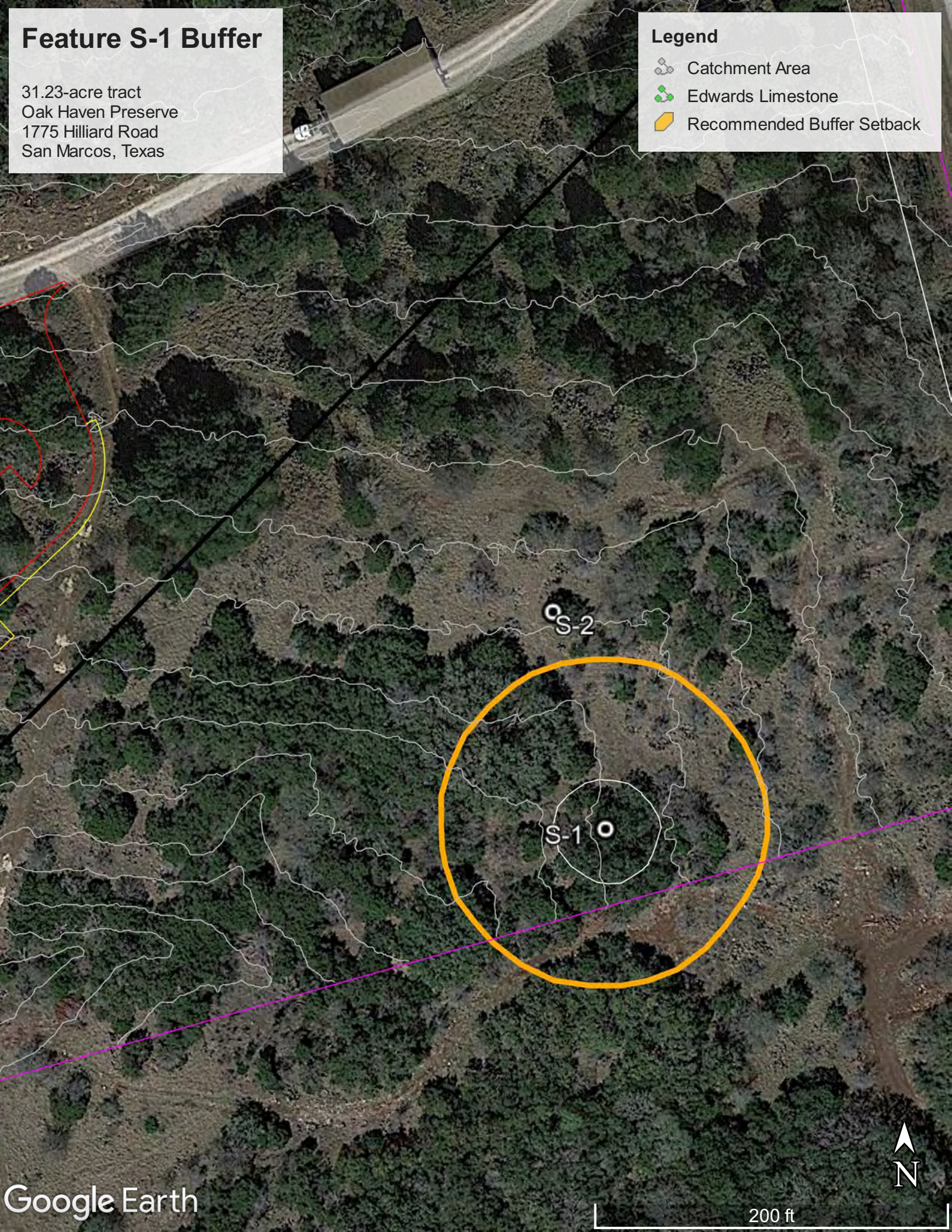
STATE OF TEXAS
KRISTIN M. MILLER
GEOLOGY
No. 1720
LICENSED
PROFESSIONAL GEOSCIENTIST

Legend

- Property Boundary
- Potential Recharge Feature
- Fractured Rock Zone
- Limestone Quarry
- Proposed Septic System
- Water Well No. 1
- Stream (USGS NHD, 1999)
- Normal Fault (Inferred)
- Kdr - Del Rio clay
- Kg - Georgetown formation
- Kpcm - Cyclic and marine member of the Person forma
- Kplc - Leached and collapsed member of Person formation
- Kprd - Regional dense member of the Person formation
- Kkg - Grainstone member of the Kainer formation

ESCARPMENT ENVIRONMENTAL
Geologic & Environmental Consulting for Land Development

Figure 4
Geologic Map
31.23-acre tract
Oak Haven Preserve
1775 Hilliard Road
San Marcos, Texas

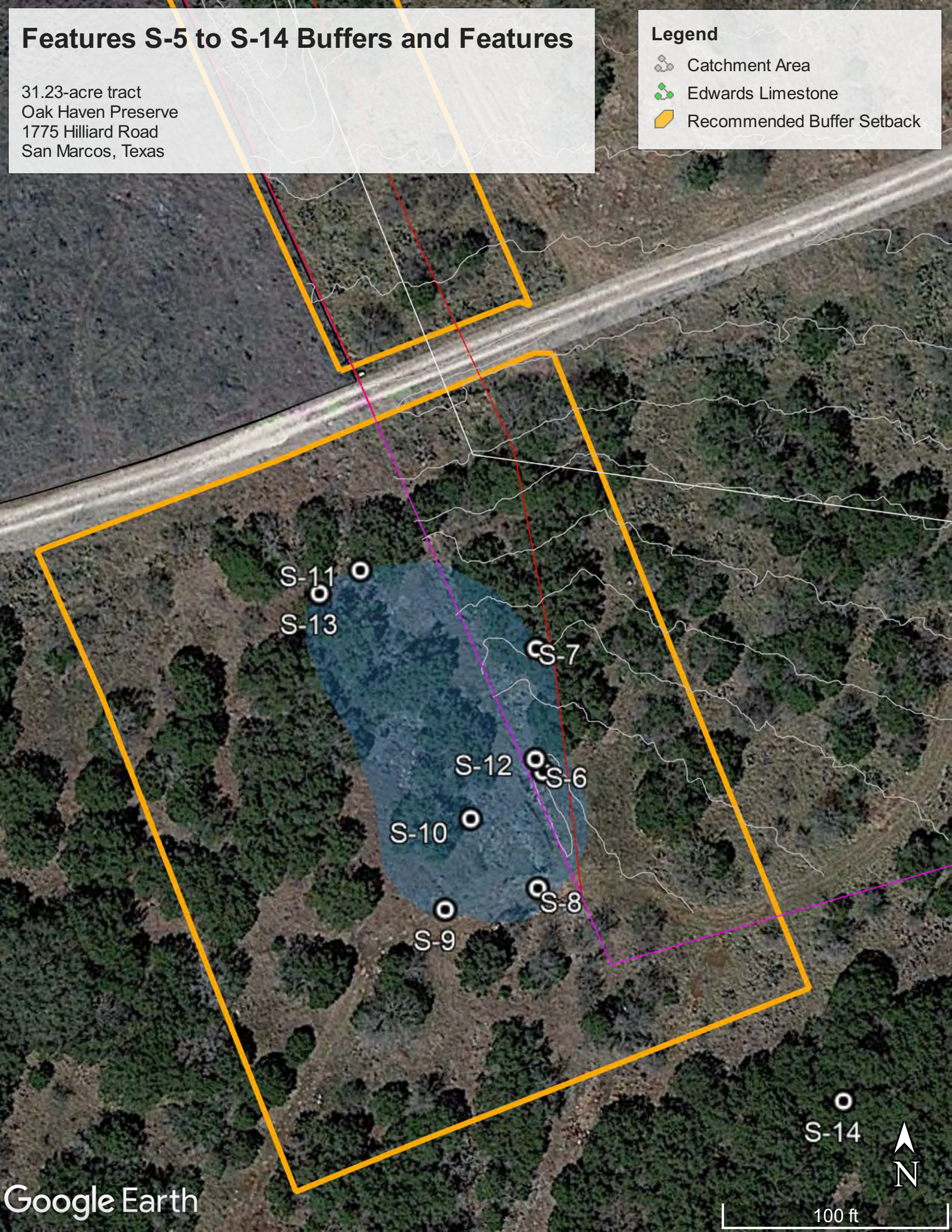

Feature S-1 Buffer
31.23-acre tract
Oak Haven Preserve
1775 Hilliard Road
San Marcos, Texas
Legend
Catchment Area
Edwards Limestone
Recommended Buffer Setback
S-2
S-1
N
Google Earth
200 ft

Features S-5 to S-14 Buffers and Features

31.23-acre tract
Oak Haven Preserve
1775 Hilliard Road
San Marcos, Texas

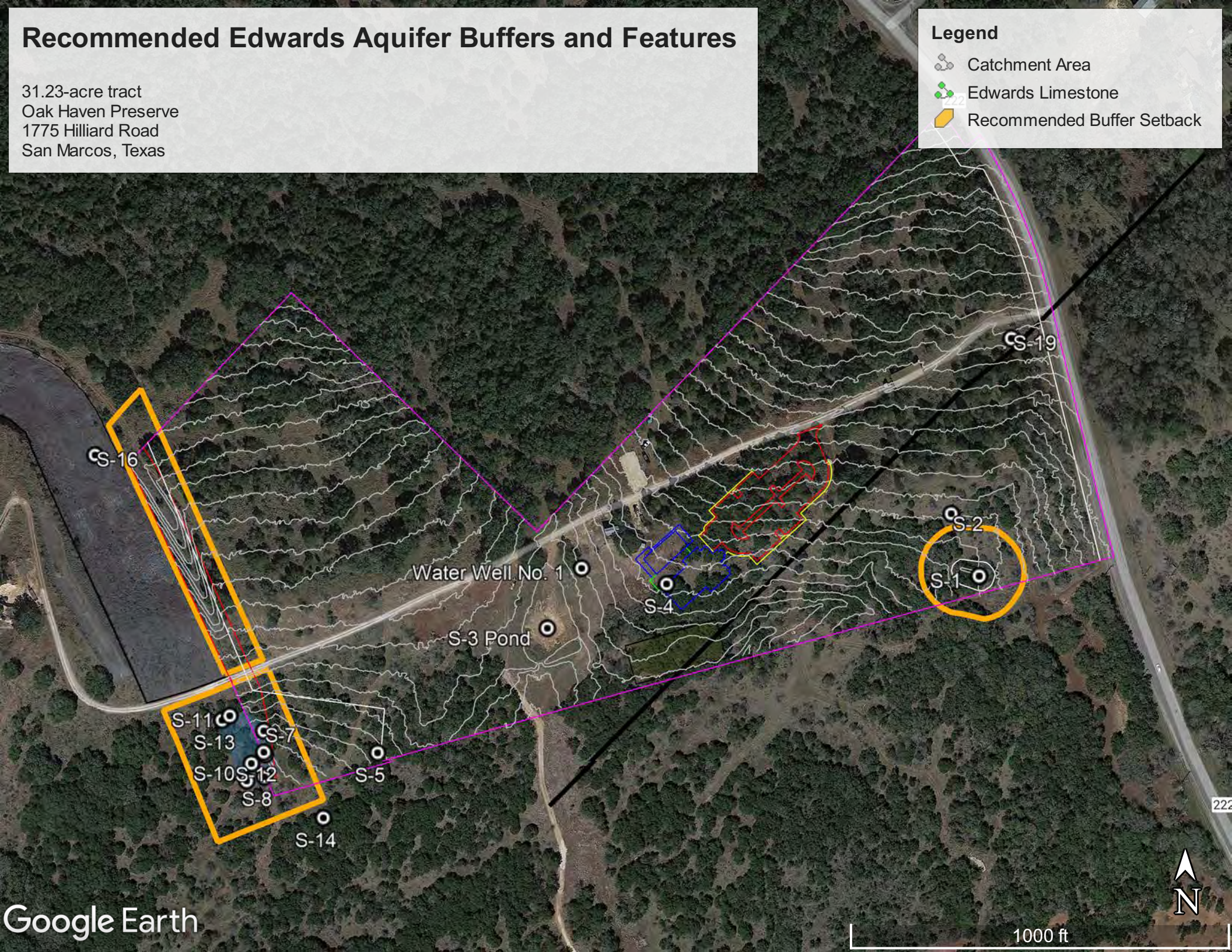
Legend

- Catchment Area
- Edwards Limestone
- Recommended Buffer Setback



Recommended Edwards Aquifer Buffers and Features

31.23-acre tract
Oak Haven Preserve
1775 Hilliard Road
San Marcos, Texas



Appendix F

Photos

ESCARPMENT ENVIRONMENTAL
Geologic & Environmental Consulting for Land Development

Photo 1: Feature S-1 Solution cavity formed along a betting plane along the edge of a poorly defined drainage channel (Kpcm geologic formation). Approximately 1 foot in diameter and extends about 4 feet horizontally along a solid limestone bed and dark soil. The bedding plane parting is lifted by tree roots. No obvious internal drainaige (facing northeast). (N 29.934106° W -97.954072°)

Photo 2: S-2 Soil test pit (facing southwest), approximately 12 feet long and 3.5 feet deep through calcareous soil and limestone cobbles. (N 29.934444° W -97.954167°)

Photo 3: Feature S-3 excavated pond and berm. (N 29.933780° W -97.956860°)

Photo 4: Feature S-4 Geotechnical borings general location. No GPS data was available from these borings. Tree 2009 in the vicinity of borings that identified subsurface voids (Appendix G). No surface evidence of potential recharge features or catchment drainage areas was observed in the area. (N 29.934037° W -97.956063°)

Photo 5: Feature S-5 non-karst closed depression. (N 29.933054°W -97.958000°)

Photo 6: Feature S-06 Solution cavity/sinkhole. (N 29.933042° W -97.958756°)

Photo 7: Feature S-07 Fractured Rock Zone with Dipping beds.
(N 29.933180° W -97.958765°)

Photo 8: Feature S-08 Sinkhole within Fracture Rock Zone.
(N 29.932911° W -97.958763°)

Photo 9: Feature S-9 Sinkhole within Fracture Rock Zone.
(N 29.932887° W -97.958883°)

Photo 10: Feature S-10 Edge of quarry with Sinkhole within Fracture Rock Zone.
(N 29.932989° W -97.958850°)

Photo 11 Fractured Rock Zone with Dipping Beds (N 29.933268° W -97.958993°)

Photo 12 Feature S-12 Fracture Rock Zone with Dipping Beds and Geologic Contact (N 29.933056° W -97.958766°)

Photo 13: Feature S-13 Fractured Rock Zone with Dipping Beds (N 29.933242° W -97.959046°)

Photo 14 Feature S-14 Non-Karst Closed Depression (N 29.932672° -97.958367°)

Photo 15 Feature S-15 Sinkhole Zone within a quarry (N 29.935073° W -97.960629°)

Photo 16 Quarry (N 29.934784° W -97.959887°)

Photo 17: Feature S-19 Closed Depression (N 29.935424° W -97.953875°)

Photo 18: Water Well No. 1 (N 29.934128° W -97. 956631°)

Appendix G

Geotechnical Report

MLA Geotechnical "put us to the test"

A Division of MLA Labs, Inc.

GEOTECHNICAL INVESTIGATION
FOUNDATION AND PAVEMENT RECOMMENDATIONS

1775 Hilliard Road
San Marcos, Texas

Report For:

ByrdNest Ventures, LLC
1621 Churchwood Cove
Austin, Texas 78746

November 2023

Engineer's Job # 23106100.144

MLA Geotechnical TBPE FIRM # F-2684
Geotechnical Engineering and
Construction Materials Testing
"put us to the test"

Christopher P. Elliott
Vice President

Timothy R. Weston, P.E.
President
11/29/23

STATE OF TEXAS
TIMOTHY R. WESTON
87938
LICENSED
PROFESSIONAL ENGINEER

Nicholas J. Page, P.E.
Director of Engineering

TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION
Foundation and Pavement Recommendations

1775 Hilliard Road
San Marcos, Texas

BACKGROUND

This report presents the results of a soil analysis for the proposed project at *1775 Hilliard Road* located in San Marcos, Texas. Authorization to perform this analysis was by Agreement for Engineering Services with Mr. Kevin Byrd of ByrdNest Ventures, LLC on September 27, 2023.

The purposes of this investigation were to determine the soil profile, the engineering characteristics of the foundation soil, and to provide criteria for use by the design engineers in preparing foundation and parking pavement designs. The scope included a review of geologic literature, a reconnaissance of the immediate site, the subsurface exploration, field and laboratory testing, and an engineering analysis and evaluation of the foundation materials.

The exploration and analysis of the subsurface conditions reported herein is considered sufficient in detail and scope to form a reasonable basis for the foundation and pavement designs. The recommendations submitted are based on the available soil information and the assumed preliminary design for the proposed structures and pavements. Any revision in the plans for the proposed structure from those stated in this report should be brought to the attention of the Geotechnical Engineer so that he may determine if changes in the foundation and/or pavement recommendations are required. Site work and foundation construction should be monitored by the Geotechnical Engineer that prepared this report or approved third party testing agency so that these recommendations may be verified, and so that deviations from expected conditions can be properly evaluated.

This report has been prepared for the exclusive use of the client and their design professionals for specific application to the proposed project in accordance with generally accepted soils and foundation engineering practice. This report is not intended to be used as a specification

or construction contract document, but as a guide and information source to those qualified professionals who prepare such documents.

ARCHITECTURAL AND STRUCTURAL ASSUMPTIONS

The proposed structure is an event center building with a foundation footprint of approximately 9,200 square feet. This structure is assumed to be single story with steel and wood framing elements and masonry veneer. Point loads are assumed to be less than 150 kips and line loads less than 4 kips per linear foot. Parking and maneuvering lanes are also included in this project. If these assumptions are not valid, the Geotechnical Engineer should be notified to determine whether modifications to the recommendations presented herein are necessary.

FIELD AND LABORATORY INVESTIGATION

Seven borings were drilled to various depths spaced at locations as shown on the enclosed Logs of Boring and Plan of Borings using a truck-mounted drilling rig. The additional borings, B-2A through B-2D, were placed to gather more information on the potential for voids in the subsurface limestone. The field investigation included completing the soil borings, performing field tests, and recovering samples. Water was not introduced into the borings. Representative soil samples were selected for laboratory index tests including Atterberg Limits and moisture content tests. The results of these tests and stratigraphy are presented on the Logs of Boring found in ***Appendix A***. A key to the Soil Classification and symbols is located behind the last Log of Boring. See ***Appendix B*** for details of field and laboratory procedures, as applicable.

SITE TOPOGRAPHY, DRAINAGE, AND VEGETATION

The site topography can be described as sloping with slopes ranging from approximately 3 to 7 percent. This site appears to drain to the south and southwest. The native vegetation at the site included primarily grasses and small trees.

SUBSURFACE CONDITIONS AND LOCAL GEOLOGY

Soil Profiles

The soil profile identified in some borings consists of an upper layer of dark reddish brown high plasticity clay (CH) underlain by limestone. Other borings revealed brown to light reddish brown low plasticity clay (CL) underlain by limestone. The limestone bedrock at this site is variable. It consists of severely weathered and fractured zones that contain clay layers and zones of hard to very hard limestone. Clay zones and voids were encountered in the limestone profiles in some borings. Please see the Logs of Boring for additional information. The soils at this site have the potential for volume change with respect to varying soil moisture contents. This potential is taken into consideration for the foundation recommendations.

Geology

The local geologic map indicates the Pearson Formation, *Kep*, underlaying this site [1,2]. The Person Formation is from the Lower Cretaceous period and is a significant member of the Edwards Group. In typical geologic sequence the Person is overlain by the Georgetown Formation, *Kgt*, and underlain by the Kainer Formation, *Kk*, the latter being a member of the Edwards Group. This formation outcrops along the Balcones Fault zone in a band stretching from San Antonio up into the Austin area where it is mapped collectively with the Edwards Formation. The Person is predominately a limestone formation but has zones of dolomitic limestone and argillaceous (clay containing) limestone with cherty zones being common. It was deposited cyclically in a shallow marine environment. It displays the characteristic karst honey-combing common to the limestones of the Edwards Plateau. Pockets of red clay commonly infill these karst features and collect along fractures and bedding planes. Fossils include pelecypodes, gastropods, and rudistids. Reference material generally equates this formation with the Segovia Formation of the eastern Edwards Plateau. The approximate thickness of the Person ranges from 130 feet to 150 feet.

Faults

Published geologic maps indicate the presence of non-seismically faults near the site but non-uniform geotechnical subsurface conditions typical of faulted zones were not present in the borings. The effects of non-uniformity due to such faults are considered in this report.

Ground Water

Ground water was not noted in any of the borings during this investigation. However, this formation can produce varying quantities of ground water depending upon the antecedent rainfall conditions. It should be noted that groundwater may be encountered at other times, depths and locations depending on the antecedent rainfall and changes in land use.

CONCLUSIONS

1. Excavation and site work:

   a. Excavation may be performed using ordinary power equipment through the surface soils and with some difficulty through the severely weathered and fractured limestone. In general, excavations in the limestone will require heavy-duty construction equipment designed for rock excavation.

   b. All excavations should be braced and shored according to applicable law and building code. Consultation on excavations can be provided by the Geotechnical Engineer upon request. If shoring is required on this project, specific design recommendations can be developed upon analysis of the application.

   c. Ground water is possible in shallow and likely in some deep excavations depending on antecedent rainfall. During periods of high rainfall, perched ground water may cause the surface soils to become soft and difficult to compact.

2. Settlement potential:

   a. The potential for settlement greater than 1 inch on this site for the proposed structure is considered low.

   b. Structures with loads greater than assumed for this project will require analysis beyond the scope of this report.

3. Expansive soil potential:

   The soils at this project site were tested to reveal plasticity indices ranging from 18 to 35. Point estimates of the potential vertical rise, PVR, of the soil profile, starting in a dry condition, range from less than 1 inch to approximately 2 ½ inches [(3)]. Thus, the potential for disruptive foundation movements due to expansive soils may be categorized as ranging from low to high. Other magnitudes of PVR may be estimated by other methods and at other locations with varying results. However, the TxDOT Method is widely used and

should be considered an index property of the site. PVR is considered in the final foundation recommendations.

4. Foundation Type:

Two types of foundations are appropriate for this site: continuous and spread footings or auger-drilled piers. Each of these foundation types includes a compacted fill supported, reinforced, uniform-thickness slab. If recommendations for other foundation types are desired, please contact the Geotechnical Engineer.

5. Faults:

Published geologic maps indicate the presence of non-seismically faults near the site but non-uniform geotechnical subsurface conditions typical of faulted zones were not present in the borings. The effects of non-uniformity due to such faults are considered in this report.

6. Slab Moisture:

The recommendations in this report are not intended to address the environmental effects of moisture migration through slabs. The Client and the Contractor should address moisture retardant schemes and the requirements of this project.

7. Variability:

Variability in subsurface conditions should be expected at this site. This geologic formation is known for variability in the subsurface. This means that hard limestone may be encountered at subsurface elevations different from those encountered in the borings. This variability is often encountered during pier drilling and should be anticipated. In contrast, it is possible that pier drilling may reveal an area where no limestone is encountered. If an area where no limestone is encountered during pier drilling, the contractor should contact the geotechnical engineer. Please also note that the weathered limestone layers indicated on the Logs of Boring often have hard limestone layers

interbedded with clayey, softer layers. As such, these hard layers can provide significant resistance during pier drilling.

RECOMMENDATIONS - FOUNDATIONS

Due to the presence of shallow voids under the proposed building pad, we recommend moving the building away from the zone where voids were encountered in the borings. The minimum recommended offset is 30 feet, see the Plan of Borings in Appendix A. Shallow voids could still be encountered during construction in other locations. Please contact our office if additional geotechnical exploration is desired for this project.

We recommend retaining our firm to evaluate the subgrade conditions during construction. If drilled shafts are planned for this project, our firm should be retained to monitor pier drilling to evaluate the geotechnical impact of any voids that may be encountered. In any event, an environmental engineer should be consulted to evaluate the voids encountered on this site to determine the necessary environmental course of action.

Two types of foundations are appropriate for this site: continuous and spread footings or auger-drilled piers. Each of these foundation types includes a compacted fill supported, reinforced, uniform-thickness slab. The performance characteristics of these foundation systems as recommended are comparable. Using a combination of these foundation types is generally not recommended without special consideration by the structural engineer. Recommendations for these foundations systems are presented below.

Option 1: Spread and Continuous Footing System

1. Prepare the building pad as per *Building Pad Preparation...* on page 9.
2. Footings may be cut into fractured/weathered limestone, intact limestone, or compacted select fill. Footing sizing, spacing, and reinforcing should be as per structural analysis with consideration of the local standard of practice.
3. Footings established a minimum of 12 inches into fractured/weathered limestone or compacted select fill should be sized for allowable bearing pressures of 4,000 psf.

Option 2: Drilled Pier System

1. Prepare the building pad as per *Building Pad Preparation...* on page 9.
2. The foundation elements should be supported by drilled straight-shaft concrete piers embedded a minimum depth as required by structural analysis to achieve the required load capacity with skin friction alone.
3. An allowable skin friction along the pier shaft may be taken as 2,000 psf within the limestone stratum beginning beyond an embedment depth of 1 pier diameter into limestone.
4. The minimum diameter of pier shafts should be 18 inches. Larger diameter piers may be necessary for large loads, as determined by the Structural Engineer.
5. The minimum area of vertical steel reinforcement shall be as required by structural analysis, considering the building's live and dead loads, but not less than 0.5%. Reinforcing should extend the entire length of the pier.
6. Any piers that may be in tension should be checked for pullout resistance.
7. Casing may be required to install drilled piers in the event that groundwater is encountered. Contract documents should provide for an add/deduct line item for the provision of temporary steel casing.

Building Pad Preparation, Slab Design, and General Recommendations

1. Remove all of the existing dark brown to dark reddish brown surface clay from beneath the proposed building. The removal of existing material and placement of fill should be done in the area of the proposed foundation, with an overbuild extending 5 feet beyond the foundation envelope. The removal process may be discontinued if weathered or intact limestone bedrock is encountered. During the removal process, topsoil, surface organics, and vegetation should be stripped from beneath the building area.
2. Proof-roll the subgrade as per TxDOT Item 216[(4)].

3. Replace the removed material and make up desired grades with material selected and placed in accordance with the enclosed ***Select Fill Recommendations***. The floor slab must be formed on a minimum of 8 inches of compacted select fill.
4. A moisture retardant layer of sealed, overlapping plastic sheeting should be provided between the subgrade and all slab areas to retard the transmission of moisture upward through the slab. ASTM 1745 can be used as a guideline [(5)]. The Client and the Contractor should address moisture retardant schemes and the requirements of this project.
5. The uniform thickness (floor) slab for the buildings should be reinforced as per structural analysis.
6. Concrete should be placed in the footings or piers as soon as possible after the approval of the bearing strata by the Geotechnical Engineer or his designate.
7. Drainage should be maintained away from the foundation, both during and after construction. Water should not be allowed to pond near the foundation. The following items should provide for positive drainage of water away from the foundation: sidewalks and other concrete flatwork, parking areas, driveways and other surface drainage features, and landscaping.
8. Upon completion of the plans and <u>prior</u> to construction, the Geotechnical Engineer should be given an opportunity to review the plans to assure that these recommendations have been properly included into the plans. During construction, it is recommended that the Geotechnical Engineer be given the opportunity to inspect the construction of the foundation to verify that these recommendations are followed.

RECOMMENDATIONS - PARKING AND DRIVING LANE PAVEMENTS

No truck traffic loads or frequencies were available at the time this report was written. Therefore, pavement thickness sections are based on primarily passenger cars and light trucks with an average of ten heavy-duty trucks per day. No specific tests (such as CBRs or resilient moduli) were performed for this study.

A. Subgrade and Foundation Soil Preparation

1. Strip and remove from the construction area all topsoil, organics, and vegetation to a minimum depth of 6 inches.
2. Proof-roll the subgrade in accordance with TxDOT Item 216(4) to reveal soft spots. Soft areas should be reworked and compacted until they can be successfully proof-rolled. The success of the pavement system will very much depend on the care taken to provide a sound subgrade.

B. Base Course

1. Base material shall be Type A, Grade 2 or better, according to the Texas Department of Transportation Specification Item 247.
2. Thickness of the base course should be in accordance with Table 1.
3. Base course compaction should be 100 percent of TxDOT TEX-113-E. Density control by means of field density determinations shall be exercised. The base course should be within 3 percent of optimum moisture at time of compaction.
4. Proof-roll the base course in accordance with TxDOT Item 216.
5. After compaction, testing and curing of the base material, the surface should be primed using an Asphalt Emulsion prime coat meeting TxDOT Specification Item 310.
6. The full thickness of the base course should be extended 2 feet beyond the back of curb line.

C. Flexible Pavement - Hot Mixed Asphalt Concrete (HMAC)

1. Surfacing shall consist of hot mix asphaltic concrete meeting the requirements of TxDOT Item 340, Type D mixture. The HMAC should be compacted to a minimum of 91 to 96 percent of the maximum theoretical density with all rolling completed before the HMAC temperature drops below 175° F.
2. The thickness of the HMAC should be in accordance with Table 1.
3. A flexible pavement system is not recommended in areas that will be subject to significant truck traffic. See Table 1 notes.

D. Rigid Pavement - Jointed, Reinforced Portland Cement Concrete (JRPCC)

1. Concrete paving shall consist of thickness as given in Table 1.
2. The concrete should develop a minimum 28-day flexural strength of 500 psi with 4 to 6 percent entrained air. The 28-day compressive strength of concrete required to achieve 500 psi of flexural strength may be approximated using the following formula taken from ACI 330R: $M_r = 2.3f_c^{(2/3)}$ where M_r = flexural strength of concrete in psi, fc = compressive strength of concrete in psi.
3. Contraction, control, and expansion jointing should be as per ACI 330-R [(6)]. As an alternative, an accepted local practice that has been proven to work satisfactorily in similar circumstances may be used. The success of this pavement system will be strongly dependent on adequacy of the jointing. Minimum reinforcing should be No. 3 bars at 18 inches on center each way, centered in the slab or as determined by the ACI "Drag Formula."
4. ACI 330-R contains material, construction, inspection and testing, and maintenance recommendations that are appropriate for this project. They are recommended.
5. Concrete paving should be used for dumpster pads and around dumpster loading areas as per Heavy Duty Truck Lanes.

6. Contraction joint spacing is typically 15 feet on center each way. Contraction joint spacing should not exceed 20 feet on center without engineering consultation.
7. Full depth, full width isolation joints with bituminous fiber or preformed joint filler should be installed at all rigid structure interfaces, such as light pole bases, planters and buildings or older sections of pavement.
8. All expansion joints and crack control joints should be sealed to prevent the infiltration of water into the subsurface. This is particularly important around irrigated landscaping and along the drainage path of roof downspouts.

E. General Conditions

1. Should at any stage in the construction of the pavement a non-stable or weaving condition of the subgrade or base course be noted under the wheel loads of construction equipment, such areas should be delineated and the Geotechnical Engineer consulted for remediation before completing the pavement section.
2. Seepage areas or unusual foundation soil conditions should be similarly brought to the Geotechnical Engineer's attention before proceeding with pavement completion.
3. Landscaped islands should be backfilled with low plasticity clays to reduce water intrusion into the subsurface pavement structures. Curbs should be provided with weep holes in landscaped areas to reduce the build up of hydrostatic pressure and to reduce the intrusion of water into the subsurface materials.
4. Trenches beneath pavements should be backfilled with borrow or suitable material excavated from the trench and free of stone or rock over 4 inches in diameter. The backfill should be compacted to 95 percent of the maximum dry density when determined by TxDOT test method Tex-114-E. The moisture content should be within 3 percent of the optimum moisture content at the time of compaction.

5. If ground water or seepage is encountered at the time of construction, French drains may be required to drain or intercept the flow of water from the subsurface pavement materials. These drains should be sloped a minimum of 0.5 percent to provide positive drainage to daylight.

Table 1: Recommended Pavement Section Thickness, Inches

Expected Traffic	Average Daily Truck Traffic	Flexible Pavement		Rigid Pavement	
		HMAC	CLB	JRPCC	CLB
Passenger Vehicles	1	2	8	6	-
Heavy Duty Trucks*	Up to 10	2	10	6	-

Notes:

- Abbreviations: HMAC - Hot Mixed Asphalt Concrete, CLB - Crushed Limestone Base, JRPCC - Jointed, Reinforced Portland Cement Concrete
- *Heavy-duty truck parking, loading, unloading, and turning areas should use the rigid pavement option.
- The pavement thicknesses above, once complete, will be capable of supporting a total vehicle live load of 80,000 pounds and meets the HS-20 (16 kips per wheel) load carrying capacity required.
- Average Daily Truck Traffic excludes pickup and panel trucks.
- Inadequate drainage of the pavement system will accelerate pavement distress and result in increased maintenance costs. Adequate drainage should be provided for the pavement system. Adequate drainage consists of a curb and gutter or a shoulder and bar ditch system.
- These pavement thickness designs are intended to transfer the load from the anticipated traffic conditions. Deep seated soil swelling or settlement of fill materials may cause long wave surface roughness. The recommendations above are intended to reduce maintenance costs and increase the serviceable lifespan of the pavement system.

SELECT FILL RECOMMENDATIONS

1. **GENERAL**: Select fill, if called for on the plans, shall be placed over prepared compacted foundation soil to the dimensions shown on the plans.

2. **MATERIAL**: Select fill material shall be composed of hard durable particles of gravel or crushed stone and shall meet the following criteria:

   A. Gradation shall be as follows:

Sieve Size	Percent Finer by Weight
1-3/4"	100
1-1/2"	85 - 100
3/4"	45 - 75
No. 4	25 - 70
No. 40	10 - 40

   B. Material passing the No. 40 sieve shall meet the following:

Percent Passing No. 40	Max. PI	Min. PI
25 - 40	15	3
10 - 25	20	4

   C. Maximum liquid limit of the minus no. 40 material shall be 35.

   D. No organic matter is permitted.

3. **PLACEMENT AND COMPACTION**: Compaction should be to 95 percent of maximum laboratory density determined in accordance with American Society of Testing Materials, Method ASTM D 698. Material should be within three percentage points of optimum moisture at time of compaction.

   Placement should be in lifts not exceeding six inches after compaction. Each compacted lift should be inspected and tested for density compliance prior to placing the next lift.

   After completion, not less than plan thickness of select, compacted fill as herein recommended shall exist beneath any portion of the foundation, even if additional excavation of existing ground is required to meet this requirement.

4. **INSPECTION, TESTING AND CONTROL**: A 110 lb. sample of proposed fill material should be submitted to the Engineer for approval and for determination of Moisture-Density Relationship, at least seven days in advance of placement. Fill placement operations will be inspected and tested for uniformity, acceptable material and field densities, at the Engineer's option. Testing and inspection will be at the Owner's expense or paid by allowance.

QUALITY ASSURANCE CONSIDERATIONS

Type of Work	Item	Sample Frequency	Sample Size	Minimum Testing
General Earthwork and Fill Material	Soil	1 per Soil Type	110 lbs.	♦ Sieve ♦ P.I. ♦ Moisture Density Relationship
	Compaction	1 per 5000 ft^2 per lift (min. of 3 per lift)		Field Density Test
Select Under-slab Fill	Select Fill Material	1 per type per 1000 cu. yds. Min. one per job	110 lbs.	♦ Sieve ♦ P.I. ♦ Moisture Density Relationship
	Compaction	1 per 2000 ft^2 per lift (min. of 3 per lift)		Field Density Test
Concrete or HMAC	Mix Design	1 per concrete class		♦ Review & approval with confirmatory cylinders ♦ Plant & materials approval, testing, if questionable
Concrete or HMAC	Aggregates (coarse & fine)	1 per 500 cu. yd. Min. 1 per job	30 lbs.	Sieve, organic impurities, specific gravity
	Cement	1 per 1000 cu. yds. Min. 1 per job	10 lbs.	♦ Fineness ♦ Chemical compound ♦ See mill reports
	Concrete Placement	1 per 50 cu. yds. Or each day's pour (if less)		♦ Slump ♦ Air Test ♦ 5 compressive cylinder tests, test 2 at 7 days, 2 at 28 days, 1 hold
HMAC Surface Course	HMAC	1 per 500 tons or each day's laydown		♦ 3 cores for density ♦ Extraction/gradation tests ♦ Stability tests ♦ Thickness ♦ Temperature
Pier or Footing Inspection	Inspection and verification of bearing	Each Pier or Slab Footing		Qualified Inspector with Engineer's Review
	Concrete & Steel Placement	Each Pier or Slab Footing		Qualified Inspector
	Inspection of Reinforcing	Slab Pre-pour and Cable Stressing		Qualified Inspector

REFERENCES

1. Local geologic maps published by The Bureau of Economic Geology. Austin, Texas including:
   "Geologic Atlas of Texas" 1-degree quads, geospatial data www.tnris.org.
   "Geologic Map of the Austin Area, Texas 1992" Geology of Austin Area Plate VII.
   "Geologic Map of the West Half of Taylor Texas, 30 x 60 min quad. 2005. misc. map 43
   "Grimshaw, T.W., in review, Geologic Map of the San Marcos North Quadrangle and Adjacent Portions of the Mountain City and San Marcos South Quadrangles, Hays, Caldwell and Guadalupe Counties, Texas, scale 1:24,000."

2. "The Geology of Texas, Volume I, Stratigraphy", The University of Texas Bulletin No. 3232: August 22, 1932, The University of Texas, Austin, Texas, 1981.

3. "Method for Determining Potential Vertical Rise, PVR, Test Method Tex-124-E", Manual of Testing Procedures, Texas Department of Transportation Materials and Tests Division, September 1995.

4. Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges. Item 216 – Proof Rolling. Texas Department of Transportation. June 1, 2004. (http://www.dot.state.tx.us/)

5. "Standard Specification for Plastic Water Vapor Retarders Use in Contact with Soil or Granular Fill under Concrete Slabs." ASTM E 1745. 100 Barr Harbor Dr., West Conshohocken, PA 19428.

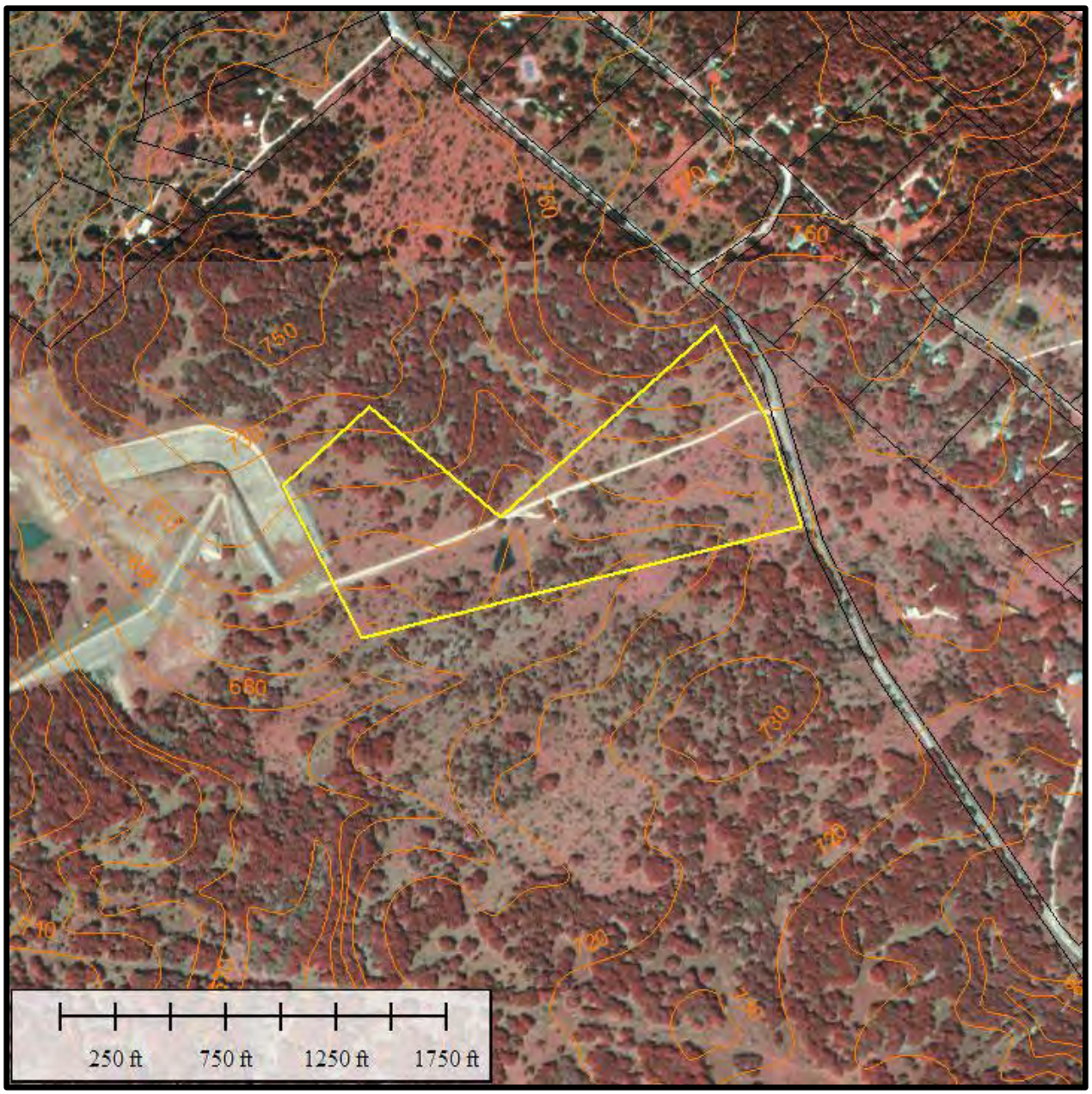
6. "ACI Committee Report 330R - Guide for Design and Construction of Concrete Parking Lots", ACI Manual of Concrete Practice - Part 2, American Concrete Institute, Farmington Hills, MI; 1996.

LIMITATIONS OF REPORT

Conditions of the site at locations other than the boring locations are not expressed or implied, and conditions may be different at different times from the time of borings. Contractors or others desiring more complete information are advised to secure their own supplemental borings. This investigation and report, do not, and are not intended to determine the environmental conditions or evaluate possible hazardous or toxic waste conditions on this site or adjacent sites. Interested persons requiring this information are advised to contact MLA Geotechnical. The recommendations in this report are not intended to address the environmental effects of moisture migration through slabs. The Client is responsible for addressing the requirements of this project with respect to moisture migration through slab on ground foundations. The analysis and recommendations contained herein are based on the available data as shown in this report and the writer's professional expertise, experience and training, and no other warranty is expressed or implied concerning the satisfactory use of these recommendations or data.

APPENDIX A

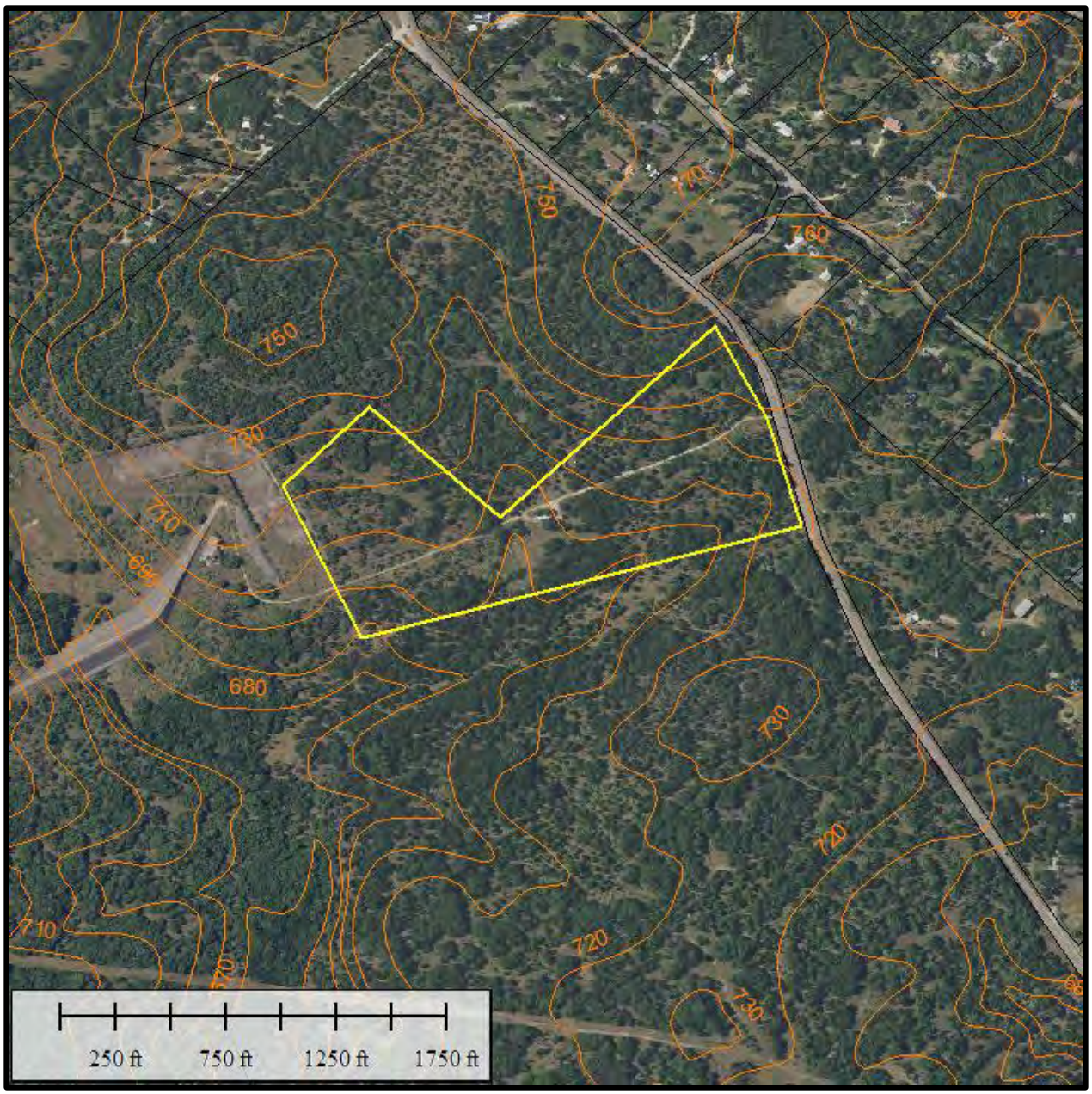
GEOTECHNICAL DATA



Approximate outline of site in yellow.
CAPCOG contours (2008) in orange
City of San Marcos parcels in black

NAPP Aerial Photograph of Site – 1995

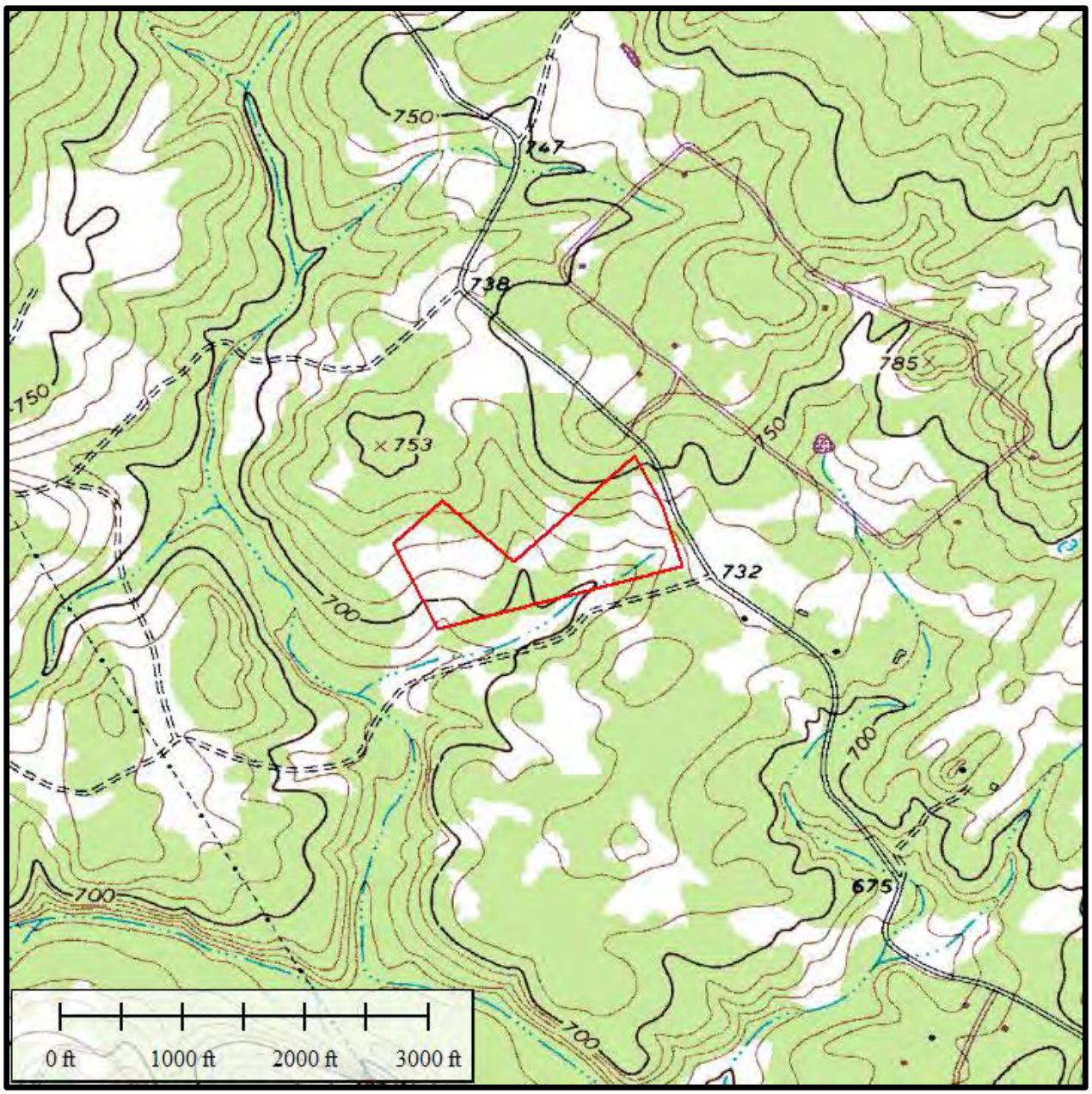
Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM
3.75-minute DOQQ. 1-meter ground resolution. apx. date 1995-6
(http://www.tnris.state.tx.us/digital.htm)



Approximate outline of site in yellow
CAPCOG contours (2008) in orange
City of San Marcos parcels in black

Aerial Photograph of Site – 2020

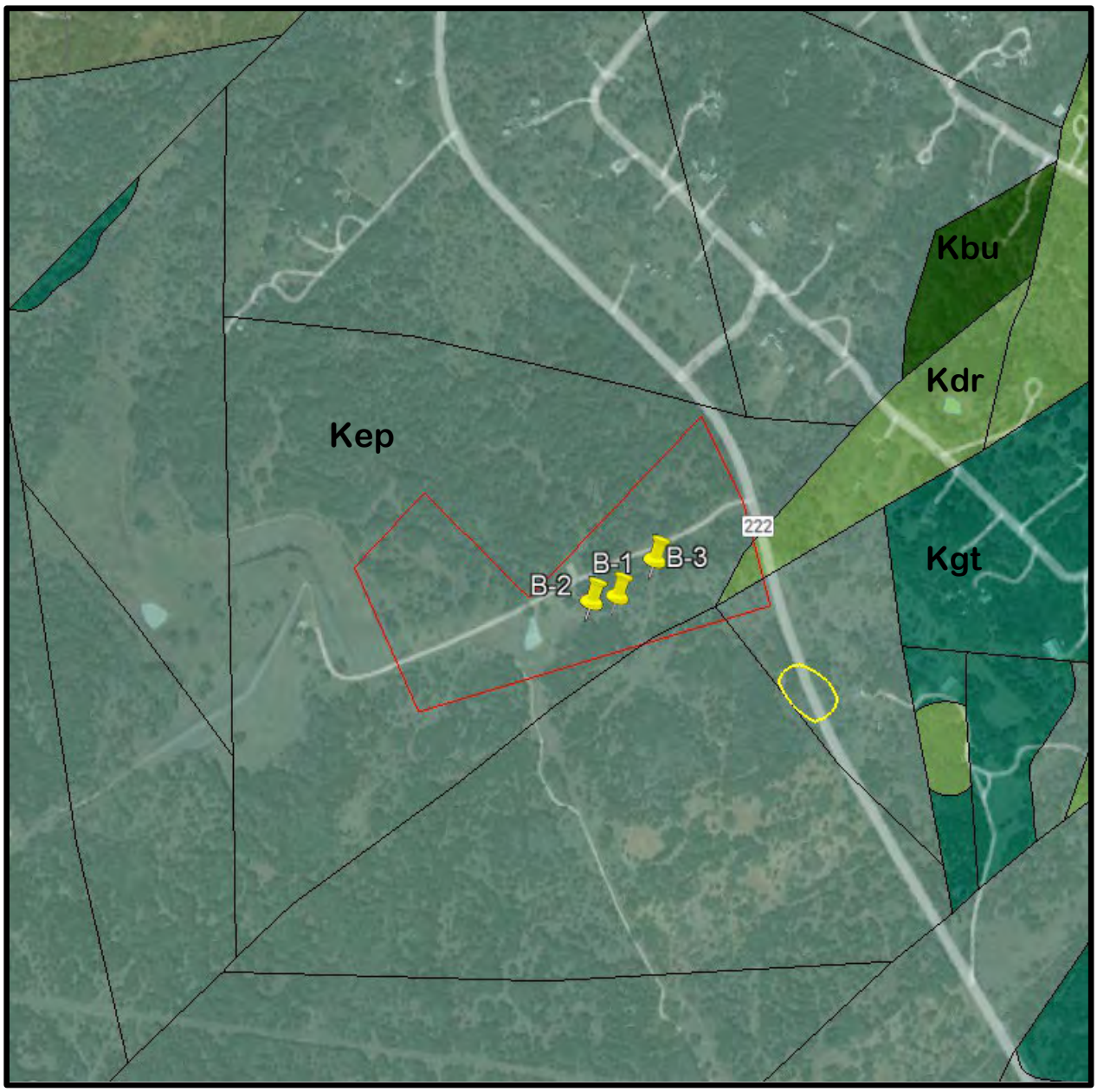
Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM
County Level aerial imagery



Approximate outline of site in red

U.S. 7.5 Minute Series Topographic Map
San Marcos North Quadrangle, Texas
Contour Interval = 10 feet

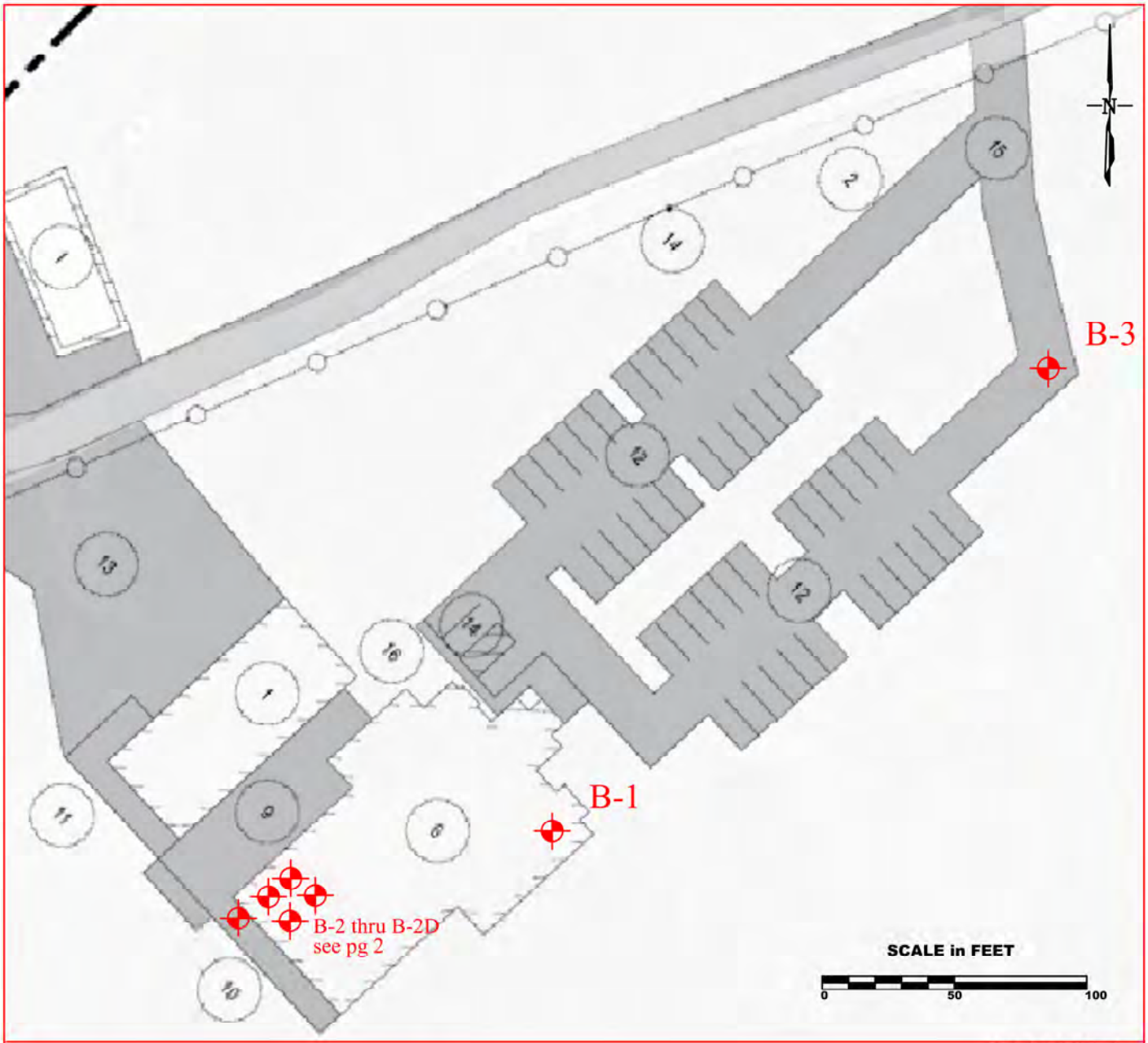
Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM
(http://www.tnris.state.tx.us/digital.htm)



Approximate outline of site in red
Approximate boring locations in yellow push pins

Geologic Setting of Site

Source: Grimshaw, T.W., in review, Geologic Map of the San Marcos North Quadrangle and Adjacent Portions of the Mountain City and San Marcos South Quadrangles, Hays, Caldwell and Guadalupe Counties, Texas, scale 1:24,000.



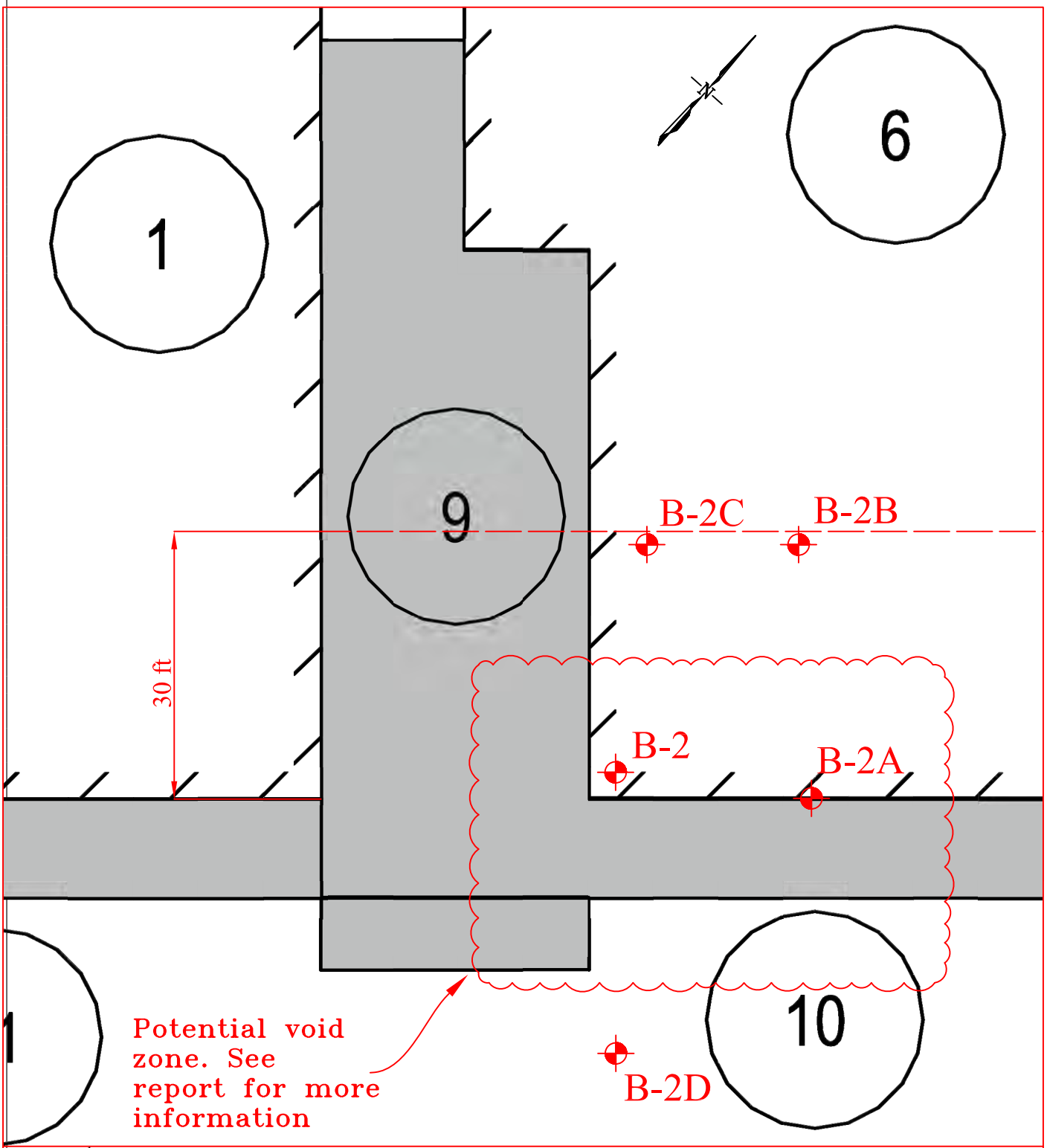
PLAN OF BORINGS

1775 Hilliard Road
San Marcos, Texas
Job. No.: 23106100.144
Client: ByrdNest Ventures, LLC

LEGEND

B-#	Boring Number
⊕	Approx. Boring Location

VICINITY MAP



SCALE = $\frac{1}{16}$" = 1'

PLAN OF BORINGS

1775 Hilliard Road
San Marcos, Texas
Job. No.: 23106100.144
Client: ByrdNest Ventures, LLC

LEGEND

B-#	Boring Number
⊕	Approx. Boring Location

MLA Geotechnical

"put us to the test"

LOG OF BORING

Boring B-1
PAGE 1 OF 1

Job Name: 1775 Hilliard Road
Job Location: San Marcos, Texas
Engineer's Job #: 23106100.144
Client: ByrdNest Ventures, LLC

Drill Date: October 13, 2023
Hole Size: 4.5 in.
Ground Elevation: n/a

Ground Water Levels:
AT TIME OF DRILLING: ---
AT END OF DRILLING: ---
AFTER DRILLING: ---

Notes:

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL (0 20 40 60 80 100)	Plasticity Index, %
0		CLAY, light reddish brown, silty, with limestone fragments, dry	CL			18
		LIMESTONE, pale yellow to white, fractured with clay layers, dry N_{TCP} = 100/2" at 1.2'				
5		LIMESTONE, pale yellow to white, hard, dry N_{TCP} = 100/0" at 5.0'	Kep			
		Termination Depth: 8.4 feet				
10						
15						
20						
25						
30						

23106100.144 - 1775 HILLIARD ROAD-LOGS.GPJ 11/29/23

MLA Geotechnical

"put us to the test"

LOG OF BORING

Boring B-2
PAGE 1 OF 1

Job Name: 1775 Hilliard Road
Job Location: San Marcos, Texas
Engineer's Job #: 23106100.144
Client: ByrdNest Ventures, LLC

Drill Date: October 13, 2023
Hole Size: 4.5 in.
Ground Elevation: n/a

Ground Water Levels:
AT TIME OF DRILLING: ---
AT END OF DRILLING: ---
AFTER DRILLING: ---

Notes:

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL (0 20 40 60 80 100)	Plasticity Index, %
0		CLAY, dark reddish brown, with limestone fragments, dry	CH			
		LIMESTONE, pale yellow to white, severely weathered and fractured, with clay layers ...hard layer 2.0' to 2.7', dry				
5		VOID, no recovery 3.0' to 5.5'				
		CLAY, red to reddish brown, with thin fractured limestone layers, damp	CL-CH	2.0	● PL–LL	29
10		LIMESTONE, white, hard, dry	Kep			
15		Termination Depth: 14.7 feet				
20						
25						
30						

23106100.144 - 1775 HILLIARD ROAD-LOGS.GPJ 11/29/23

MLA Geotechnical

"put us to the test"

LOG OF BORING

Job Name: 1775 Hilliard Road
Job Location: San Marcos, Texas
Engineer's Job #: 23106100.144
Client: ByrdNest Ventures, LLC

Boring B-2A
PAGE 1 OF 1

Drill Date: November 20, 2023
Hole Size: 4.5 in.
Ground Elevation: n/a

Ground Water Levels:
AT TIME OF DRILLING: ---
AT END OF DRILLING: ---
AFTER DRILLING: ---

Notes:

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
0		CLAY, brown to reddish brown, dry, with limestone fragments	CL			
		LIMESTONE, pale brown to white, hard, dry				
5		LIMESTONE, fractured and severely weathered with clay layers and thin hard limestone layers, with thin voids, dry ...no recovery below 5.0'				
10						
15		LIMESTONE, hard to very hard	Kep			
		Termination Depth: 17.4 feet				
20						
25						
30						

23106100.144 - 1775 HILLIARD ROAD-LOGS.GPJ 11/29/23

MLA Geotechnical

"put us to the test"

LOG OF BORING

Boring B-2B
PAGE 1 OF 1

Job Name: 1775 Hilliard Road
Job Location: San Marcos, Texas
Engineer's Job #: 23106100.144
Client: ByrdNest Ventures, LLC

Drill Date: November 20, 2023
Hole Size: 4.5 in.
Ground Elevation: n/a

Ground Water Levels:
AT TIME OF DRILLING: ---
AT END OF DRILLING: ---
AFTER DRILLING: ---

Notes:

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
0		CLAY, dark reddish brown to red, damp	CH			
		...with fractured and hard limestone layers 2' to 4'				
5		LIMESTONE, light reddish brown to pale brown, severely weathered and fractured, with hard layers, dry				
10		LIMESTONE, very pale reddish brown to white, hard, dry	Kep			
		Termination Depth: 13.0 feet				
15						
20						
25						
30						

23106100.144 - 1775 HILLIARD ROAD-LOGS.GPJ 11/29/23

MLA Geotechnical

"put us to the test"

LOG OF BORING

Job Name: 1775 Hilliard Road
Job Location: San Marcos, Texas
Engineer's Job #: 23106100.144
Client: ByrdNest Ventures, LLC

Boring B-2C
PAGE 1 OF 1

Drill Date: November 20, 2023
Hole Size: 4.5 in.
Ground Elevation: n/a

Ground Water Levels:
AT TIME OF DRILLING: ---
AT END OF DRILLING: ---
AFTER DRILLING: ---

Notes:

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
0		CLAY, brown, damp	CL			
		LIMESTONE, light reddish brown to white, severely weathered and fractured, with hard layers, dry				
5		LIMESTONE, white, hard to very hard, dry				
10			Kep			
		Termination Depth: 12.2 feet				
15						
20						
25						
30						

23106100.144 - 1775 HILLIARD ROAD-LOGS.GPJ 11/29/23

MLA Geotechnical

"put us to the test"

LOG OF BORING

Boring B-2D
PAGE 1 OF 1

Job Name: 1775 Hilliard Road
Job Location: San Marcos, Texas
Engineer's Job #: 23106100.144
Client: ByrdNest Ventures, LLC

Drill Date: November 20, 2023
Ground Elevation: n/a
Hole Size: 4.5 in.

Notes:

Ground Water Levels:
AT TIME OF DRILLING: ---
AT END OF DRILLING: ---
AFTER DRILLING: ---

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
0		CLAY, dark reddish brown, medium-stiff, damp to moist	CH	1.0		
		LIMESTONE, light reddish brown, severely weathered to weathered and fractured, with clay, dry				
5		LIIMESTONE, hard				
10		LIMESTONE, light reddish brown, severely weathered to weathered and fractured, with clay, dry				
15		VOID, no recovery				
		LIMESTONE, hard to very hard	Kep			
20		Termination Depth: 20.0 feet				
25						
30						

23106100.144 - 1775 HILLIARD ROAD-LOGS.GPJ 11/29/23

MLA Geotechnical

"put us to the test"

LOG OF BORING

Boring B-3
PAGE 1 OF 1

Job Name: 1775 Hilliard Road
Job Location: San Marcos, Texas
Engineer's Job #: 23106100.144
Client: ByrdNest Ventures, LLC

Drill Date: October 13, 2023
Hole Size: 4.5 in.
Ground Elevation: n/a

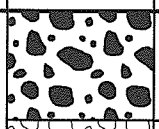
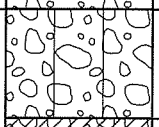
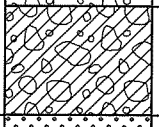
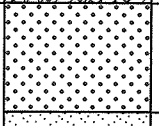
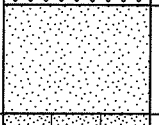
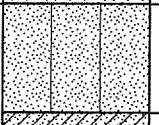
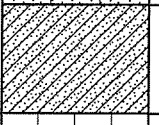
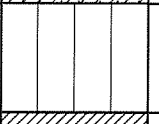
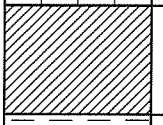
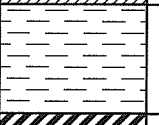
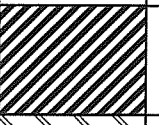
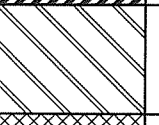
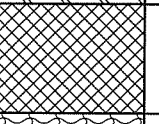
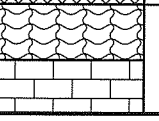
Ground Water Levels:
AT TIME OF DRILLING: ---
AT END OF DRILLING: ---
AFTER DRILLING: ---

Notes:

DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	POCKET PEN. (tsf)	-2um ★ -#200 □ -#4 ▲ ● Moisture Content, % PL LL 0 20 40 60 80 100	Plasticity Index, %
0		CLAY, dark reddish brown, with limestone fragments, dry	CH			35
		LIMESTONE, pale yellow, severely weathered, soft, dry				
5		LIMESTONE, white, hard, dry	Kep			
		Termination Depth: 7.3 feet				
10						
15						
20						
25						
30						

23106100.144 - 1775 HILLIARD ROAD-LOGS.GPJ 11/29/23

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	CLAYS	LIQUID LIMIT GREATER THAN 50		CH	INORGANIC CLAYS OF HIGH PLASTICITY
SOILS OF MODERATE PLASTICITY				CL-CH	LOW PI CLAYS WITH APPRECIABLE HIGH PI MOTTLING, CLAY WITH BORDERLINE CLASSIFICATION
OTHER MATERIALS				FILL	MATERIAL NOT NATURALLY DEPOSITED
				LS	WEATHERED LIMESTONE INTACT LIMESTONE

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Key to Terms and Abbreviations

Descriptive Terms Characterizing Soils and Rock	Standard Description Abbreviations and Terms	Symbols and Abbreviations for Test Data
Argillaceous – having appreciable amounts of clay in the soil or rock mass. Used most often in describing limestones, occasionally sandstones. **Calcareous** – containing appreciable quantities of calcium carbonate. Can be either nodular or "powder." **Crumbly** – cohesive soils which break into small blocks or crumbs on drying. **Evaporite** – deposits of salts and other soluble compounds. Most commonly calcium carbonate or gypsum. May be in either "powder" or visible crystal form. **Ferruginous** – having deposits of iron or nodules, typically oxidized and dark red in color. **Ferrous** – see Ferruginous **Fissured** – containing shrinkage cracks frequently filled with fine sand or silt, usually more or less vertical. **Fossiliferous** – containing appreciable quantities of fossils, fossil fragments, or traces of fossils **Laminated** – composed of thin layers of varying color or texture. Layers are typically distinct and varying in composition from sand to silt and clay. **Mottled** – characterized as having multiple colors organized in a marbled pattern. **Slickensided** – having inclined planes of weakness that are slick and glossy in appearance. **Varved** – see Laminated.	brn = brown dk = dark lt = light wx = weathered calc = calcareous sw = severely weathered cw = completely weathered n/a = not available b. = below **Engineering Units** pcf = pounds per cubic foot psf = pounds per square foot tsf = tons per square foot pF = picofarad psi = pounds per square inch kips = thousand pounds (force) ksf = kips per square foot	LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index (LL-PL) NP = non-plastic γ_d = dry unit weight q_u = unconfined compressive strength q_c = confined compressive strength SPT = standard penetration test TCP = Texas cone penetration test (Texas Highway Department) N or N_{SPT} = blows per foot from SPT N_{TCP} = blows per foot from TCP SCR = standard core recovery RQD = rock quality designation RQI = see RQD

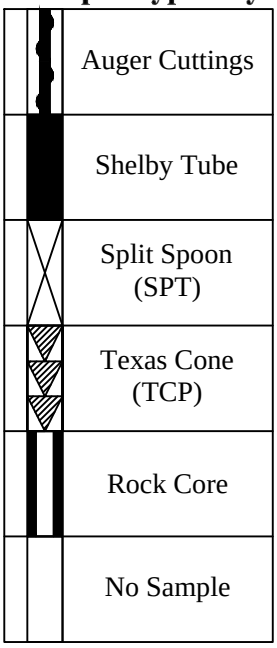
Terms Describing Consistency of Soil and Rock

COARSE GRAINED MATERIAL		SEDIMENTARY ROCK	
DESCRIPTIVE TERM	BLOWS/FT (SPT)	DESCRIPTIVE TERM	STRENGTH, TSF
very loose	0 – 4	soft	4 – 8
loose	4 – 10	medium	8 – 15
firm (medium)	10 – 30	hard	15 – 50
dense	30 – 50	very hard	over 50
very dense	over 50		

Describing Consistency of Fine Grained Soil

DESCRIPTIVE TERM	BLOWS/FT (SPT)	UNCONFINED COMPRESSION, TSF
very soft	< 2	< 0.25
soft	2 – 4	0.25 – 0.50
medium stiff	4 – 8	0.50 – 1.00
stiff	8 – 15	1.00 – 2.00
very stiff	15 – 30	2.00 – 4.00
hard	over 30	over 4.00

Sample Type Key



Revised: October 2018

APPENDIX B

STANDARD FIELD AND LABORATORY PROCEDURES

STANDARD FIELD AND LABORATORY PROCEDURES

STANDARD FIELD PROCEDURES

Drilling and Sampling

Borings and test pits are typically staked in the field by the drillers, using simple taping or pacing procedures and locations are assumed to be accurate to within several feet. Unless noted otherwise, ground surface elevations (GSE) when shown on logs are estimated from topographic maps and are assumed to be accurate to within a foot. A Plan of Borings or Plan of Test Pits showing the boring locations and the proposed structures is provided in the Appendix.

A log of each boring or pit is prepared as drilling and sampling progressed. In the laboratory, the driller's classification and description is reviewed by a Geotechnical Engineer. Individual logs of each boring or pit are provided in the Appendix. Descriptive terms and symbols used on the logs are in accordance with the Unified Soil Classification System (ASTM D-2487). A reference key is also provided. The stratification of the subsurface material represents the soil conditions at the actual boring locations, and variations may occur between borings. Lines of demarcation represent the approximate boundary between the different material types, but the transition may be gradual.

A truck-mounted rotary drill rig utilizing rotary wash drilling or continuous flight hollow or solid stem auger procedures is used to advance the borings, unless otherwise noted. A backhoe provided by others is used to place test pits. Test pits are advanced to the required depth, refusal (typically bedrock) or to the limits of the equipment. Samples of soil are obtained from the borings or test pit spoils for subsequent laboratory study. Samples are sealed in plastic bags and marked as to depth and boring/pit locations in the field. Cores are wrapped in a polyethylene wrap to preserve field moisture conditions, placed in core boxes and marked as to depth and core runs. Unless notified to the contrary, samples and cores will be stored for 90 days, then discarded.

Standard Penetration Test and Split-Barrel Sampling of Soils (ASTM D-1586) (SPT)

This sampling method consists of driving a 2 inch outside diameter split barrel sampler using a 140 pound hammer freely falling through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven an additional 12 inches. The number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance. The results of the SPT is recorded on the boring logs as "N" values.

Thin-Walled Tube Sampling of Soils (ASTM D-1587) (Shelby Tube Sampling)

This method consists of pushing thin walled steel tubes, usually 3 inches in diameter, into the soils to be sampled using hydraulic pressure or other means. Cohesive soils are usually sampled in this manner and relatively undisturbed samples are recovered.

Soil Investigation and Sampling by Auger Borings (ASTM D-1452)

This method consists of auguring a hole and removing representative soil samples from the auger flight or bit at intervals or with each change in the substrata. Disturbed samples are obtained and this method is, therefore, limited to situations where it is satisfactory to determine the approximate subsurface profile and obtain samples suitable for Index Property testing.

Diamond Core Drilling for Site Investigation (ASTM D-2113)

This method consists of advancing a hole into hard strata by rotating a single or double tube core barrel equipped with a cutting bit. Diamond, tungsten carbide, or other cutting agents may be used for the bit. Wash water or air is used to remove the cuttings and to cool the bit. Normally, a 3 inch outside diameter by 2-1/8 inch inside diameter coring bit is used unless otherwise noted. The rock or hard material recovered within the core barrel is examined in the field and in the laboratory and the cores are stored in partitioned boxes. The intactness of all rock core specimens is evaluated in two ways. The first method is the Standard Core Recovery (SCR) expressed as the length of the total core recovered divided by the length of the core run, expressed as a percentage:

$$SCR = \frac{\text{total core length recovered}}{\text{length of core run}} \times 100\%$$

This value is exhibited on the boring logs as the Standard Core Recovery (SCR).

The second procedure for evaluating the intactness of the rock cores is by Rock Quality Designation (RQD). The RQD provides an additional qualitative measure of soundness of the rock. This index is determined by measuring the intact recovered core unit which exceed four inches in length divided by the total length of the core run:

$$RQD = \frac{\text{all core lengths greater than 4”}}{\text{length of core run}} \times 100\%$$

The RQD is also expressed as a percentage and is shown on the boring logs.

Vane Shear Tests

In-situ vane shear tests may be used to determine the shear strength of soft to medium cohesive soil. This test consists of placing a four-bladed vane in the undisturbed soil and determining the torsional force applied at the ground surface required to cause the cylindrical perimeter surface of the vane to be sheared. The torsional force sufficient to cause shearing is converted to a unit of shearing resistance or cohesion of the soil surrounding the cylindrical surface.

THD Cone Penetrometer Test

The THD Cone Penetrometer Test is a standard field test to determine the relative density or consistency and load carrying capacity of foundation soils. This test is performed in much the same manner as the Standard Penetration Test described above. In this test, a 3 inch diameter penetrometer cone is used in place of a split-spoon sampler. This test calls for a 170-pound weight falling 24 inches. The actual test in hard materials consists of driving the penetrometer cone and accurately recording the inches of penetration for the first and second 50 blows for a total of 100 blows. These results are then correlated using a table of load capacity vs. number of inches penetrated per 100 blows.

Pocket Penetrometer Test

A pocket penetrometer or hand penetrometer is a small device used to estimate the shear capacity or unconfined compressive strength of a soil sample. The device consists of a spring-loaded probe which measures the pressure required to penetrate the probe into a soil sample for specified depth. This test can only be performed on cohesive soil samples. This pressure is reported in tons per square foot (tsf) on the Logs of Boring. A hyphen (-) indicates that the soil sample was too loose or too soft to perform the test. This test is considered rudimentary and too inaccurate to be used for direct design parameters; however, this test is useful for correlations among soil strata and general stiffness descriptions.

Ground Water Observation

Ground moisture observations are made during the operations and are reported on the logs of boring or pit. Moisture condition of cuttings are noted, however, the use of water for circulation precludes direct observation of wet conditions. Water levels after completing the borings or pits are noted. Seasonal variations, temperatures and recent rainfall conditions may influence the levels of the ground water table and water may be present in excavations, even though not indicated on the logs.

STANDARD LABORATORY PROCEDURES

To adequately characterize the subsurface material at this site, some or all of the following laboratory tests are performed. The results of the actual tests performed are shown graphically on the Logs of Boring or Pit.

Moisture Content - ASTM D-2216

Natural moisture contents of the samples (based on dry weight of soil) are determined for selected samples at depths shown on the respective boring logs. These moisture contents are useful in delineating the depth of the zone of moisture change and as a gauge of correlation between the various index properties and the engineering properties of the soil. For example, the relationship between the plasticity index and moisture content is a source of information for the correlation of shear strength data.

Dry Density - ASTM D-7263

The dry density, γ_d, (bulk density or unit weight) of the samples is determined for selected samples at depths shown on the respective boring logs using Method B of the aforementioned ASTM standard. The in-situ density was determined from undisturbed SPT samples and the dry density was calculated using moisture content results. These dry density values are useful for calculating other characteristic values such as porosity, void ratio, and mass composition of soil. Additionally, these values can also be used to assess the degree of compaction or consolidation of fill materials.

Atterberg Limits - ASTM D-4318

The Atterberg Limits are the moisture contents at the time the soil meets certain arbitrarily defined tests. At the moisture content defined as the plastic limit, Pw, the soil is assumed to change from a semi-solid state to a plastic state. By the addition of more moisture, the soil may be brought up to the moisture content defined as the liquid limit, Lw, or that point where the soil changes from a plastic state to a liquid state. A soil existing at a moisture content between these two previously described states is said to be in a plastic state. The difference between the liquid limit, Lw, and the plastic limit, Pw, is termed the plasticity index, Iw. As the plasticity index increases, the ability of a soil to attract water and remain in a plastic state increases. The Atterberg Limits that were determined are plotted on the appropriate log.

The Atterberg Limits are quite useful in soil exploration as an indexing parameter. Using the Atterberg Limits and grain size analysis, A. Casagrande developed the Unified Soils Classification System (USCS) which is widely used in the geotechnical engineering field. This system related the liquid limit to the plasticity index by dividing a classification chart into various zones according to degrees of plasticity of clays and silts. Although the Atterberg Limits are an indexing parameter, K. Terzaghi has related these limits to various engineering properties of a soil. Some of these relationships are as follows:

1. As the grain size of the soil decreases, the Atterberg Limits increase.
2. As the percent clay in the soil increases, the Atterberg Limits increase.
3. As the shear strength increases, the Atterberg Limits decrease.
4. As the compressibility of a soil increases, the Atterberg Limits increase.

Free Swell Test - ASTM D-4546-96

The free swell test assesses the potential for swell of soil. This value is useful for the design of various structures such as slab-on-ground foundations, piers and piles, and underground utilities. Method B of the aforementioned ASTM standard determines the amount of swell (vertical heave) of a sample. This is done by placing the sample in a consolidometer under a seating load equal to the overburden pressure and giving the sample free access to water. The height is measured and the swell is calculated as the vertical displacement divided by the original height of the specimen. The results of these tests are presented on the Logs of Boring at the depth of the samples tested.

Swell Pressure Test - ASTM D-4546-96

The swell pressure test assesses the potential for swell of soil. This value is useful for the design of various structures such as slab-on-ground foundations, piers and piles, and underground utilities. Method C of the aforementioned ASTM standard determines the pressure required to keep a soil sample at equilibrium under swelling conditions. This is done by placing the sample in a consolidometer under a seating load and giving the sample free access to water. A constant height of the sample is maintained and the vertical pressure on the sample is adjusted until equilibrium is reached. The vertical pressure on the sample at equilibrium is reported as the swell pressure. The results of these tests are presented on the Logs of Boring at the depth of the samples tested.

Soil Suction Test - ASTM D-5298-94

Soil suction (potential) tests are performed to determine both the matric and total suction values for the samples tested. Soil suction measures the free energy of the pore water in a soil. In a practical sense, soil suction is an indication of the affinity of a given soil sample to retain water. Soil suction provides useful information on a variety of characteristics of the soil that are affected by the soil water including volume change, deformation, and strength.

Soil suction tests are performed using the filter paper method per ASTM D-5298. Results of these tests are shown graphically on the logs of boring and tabulated in summary sheet of laboratory data.

For matric suction values found using this method, it should be noted that when the soil is in a dry state adequate contact between the filter paper and the soil may not be possible. This lack of contact may result in the determination of total suction instead of matric suction.

Triaxial Shear Test - ASTM D-2850-70

Triaxial tests may be performed on samples that are approximately 2.83 inches in diameter, unless a smaller diameter sample was necessary to achieve a more favorable length:diameter (L:D) ratio. A minimum length to diameter ratio (L:D) of 2.0 is maintained to reduce end effects.

The triaxial tests are typically unconsolidated-undrained using nitrogen gas for chamber confining pressure. Confining pressures are selected to conform to in-situ hydrostatic pressure considering the earth to be a fluid of 120 pcf. In this test, undisturbed Shelby tube samples are trimmed so that their ends are square and then pressed in a triaxial compression machine. The load at which failure occurs is the compressive strength. The results of the triaxial tests and the correlated hand penetrometer strengths can be utilized to develop soil shear strength values. These test provide the confined compressive strength, q_c, which are presented on the Logs of Boring at the depth of the samples tested.

Unconfined Compressive Strength of Rock Cores - ASTM D-2938

The unconfined compressive strength, q_u, is a valuable parameter useful in the design of foundation footings. This value, qu, is related to the shearing resistance of the rock and thus to the capacity of the rock to support a load. In completing this test it is imperative that the length:diameter ratio of the core specimens are maintained at a minimum of 2:1. This ratio is set so that the shear plane will not extend through either of the end caps. If the ratio is less than 2.0 a correction is applied to the result.

Grain Size Analysis - ASTM D-421 and D-422

Grain size analysis tests are performed to determine the particle size and distribution of the samples tested. The grain size distribution of the soils coarser than the Standard Number 200 sieve is determined by passing the sample through a standard set of nested sieves, and the distribution of sizes smaller than the No. 200 sieve is determined by a sedimentation process, using a hydrometer. The results are given on the log of Boring/Pit or on Grain Size Distribution semi-log graphs within the report.

Slake Durability Test - ASTM D-4644

The slake durability test provides an index for the durability of a shale, or similar rock, considering the effects of wetting, drying, and abrasion. This index is used to quantify the strength of weak rock formations when exposed to natural wetting and drying cycles, especially in the context of underground tunneling and excavation. The index, $I_d(2)$, represents the percentage, by mass, of rock material retained after two wetting and drying cycles. These cycles are simulated by oven drying the sample followed by ten minutes of tumbling and soaking in water within a drum and trough apparatus. After tumbling and soaking, the sample is oven-dried and the mass of the sample is recorded. The results of these tests are presented on the Logs of Boring at the depth of the samples tested.

Brazilian Tensile Strength - ASTM D-3967

The Brazilian (splitting) tensile strength, σ_t, is useful in rock mechanics design, especially in regard to tunneling. This value is an indirect representation of the true uniaxial tensile strength. The Brazilian test is typically used more commonly than direct tensile strength tests because it is less difficult, more cost effective, and more represented of in-situ conditions. The test is conducted by mechanically compressing a rock core sample along its vertical diameter, causing the sample to fail due to tension along the horizontal diameter caused by the Poisson effect.

CERCHAR Abrasivity Index (CAI) Test - ASTM D-7625

The CERCHAR Abrasivity Index (CAI) is used to determine the abrasivity of rocks. This is particularly useful in assessing the potential wearing on cutting tools during excavation. The CAI of a rock is determined by the CERCHAR test, which consists of scraping steel pins across a rock surface and measuring the wear of each pin. The rock specimen is held in a mechanical vice, while a conical steel pin fastened to a 15-pound head is drug across the face of the specimen using a lever being pulled 1 centimeter in 1 second. The CAI is calculated based on the resultant diameter on the end of the pin.

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: HUGO ELIZONDO, JR., P.E., C.F.M.

Date: 3/4/24

Signature of Customer/Agent:

Regulated Entity Name: OAK HAVEN PRESERVE

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): 31.23

3. Estimated projected population: 300

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	18,699	÷ 43,560 =	0.44
Parking	49,379	÷ 43,560 =	1.13
Other paved surfaces	8,852	÷ 43,560 =	0.20
Total Impervious Cover	76,930	÷ 43,560 =	1.77

Total Impervious Cover 76,930 **÷ Total Acreage** 31.23 **X 100 =** 5.66 **% Impervious Cover**

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

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

For Road Projects Only

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

7. Type of project:

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

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

   ☐ Concrete
   ☐ Asphaltic concrete pavement
   ☐ Other: _____

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

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

10. Length of pavement area: _____ feet.

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

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

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

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

Stormwater to be generated by the Proposed Project

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

Wastewater to be generated by the Proposed Project

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

100 % Domestic	1,500 Gallons/day
_____ % Industrial	_____ Gallons/day
_____ % Commingled	_____ Gallons/day
TOTAL gallons/day _____	

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 _____ (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" = _____'.

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): _____

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.

FACTORS AFFECTING WATER QUALITY

Waste Disposal

All waste materials will be collected and stored in a securely lidded metal dumpster rented from a local waste management company which must be a solid waste management company licensed to do business in the State of Texas and Travis or Hays County. The dumpster will comply with all local and state solid waste management regulations.

All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied as required, and the trash will be hauled to a landfill approved by the State of Texas and Hays County. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal. Notices stating these practices will be posted in the job site construction office trailer, and the job site superintendent will be responsible for seeing that these procedures are followed.

Sanitary Waste

All sanitary waste will be collected from the portable units by a licensed portable facility provider in complete compliance with local and state regulations.

Off-Site Vehicle Tracking

A stabilized construction exit will be provided to help reduce vehicle tracking of sediments. The paved street adjacent to the site entrance will be inspected daily and swept as necessary to remove any excess mud, dirt, or rock tracked from the site. Dump trucks hauling material from the construction site will be covered with a tarpaulin. The job site superintendent will be responsible for seeing that these procedures are followed.

Concrete Waste From Concrete Trucks

A. Emptying of excess concrete and/or washout from concrete delivery trucks will be allowed on the job site, but only in either specifically designated diked areas which have been prepared to prevent contact between the concrete and/or washout and stormwater which will be discharged from the site or in locations where waste concrete can be poured into forms to make riprap or other useful concrete products.

B. The hardened residue from the concrete washout diked areas will be disposed of in accordance with the procedures given in the Spill Prevention Control and Countermeasures (SPCC) Plan and in accordance with applicable state and federal regulations. The job site superintendent will be responsible for seeing that these procedures are followed.

Hazardous Substances and Hazardous Waste

A. All hazardous waste materials will be disposed of in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products. Site personnel will be instructed in these practices by the job site superintendent, who will also be responsible for seeing that these practices are followed. Material Safety Data Sheets (MSDS's) for each substance with hazardous properties that is used on the job site will be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of each MSDS will be maintained in the SWPPP file at the job site construction trailer office. Each employee who must handle a substance with hazardous properties will be instructed on the use of MSDS sheets and the specific

information in the applicable MSDS for the product he/she is using, particularly regarding spill control techniques.

B. The contractor will implement the Spill Prevention Control and Countermeasures (SPCC) Plan found within this SWPPP and will train all personnel in the proper cleanup and handling of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with stormwater discharges. If such contact occurs, the stormwater discharge will be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated stormwater. It shall be the responsibility of the job site superintendent to properly train all personnel in the use of the SPCC plan.

C. Any spills of hazardous materials which are in quantities in excess of Reportable Quantities as defined by EPA regulations shall be immediately reported to the EPA National Response Center 1-800-424-8802.

D. In order to minimize the potential for a spill of hazardous materials to come into contact with stormwater, the following steps will be implemented:

1. All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, cleaning solvents, additives for soil stabilization, concrete curing compounds and additives, etc.) will be stored in a secure location, under cover, when not in use.

2. The minimum practical quantity of all such materials will be kept on the job site.

3. A spill control and containment kit (containing, for example, absorbent such as kitty litter or sawdust, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles plastic and metal trash containers, etc.) will be provided at the storage site.

4. All of the product in a container will be used before the container is disposed of. All such containers will be triple-rinsed with water prior to disposal. The rinse water used in these containers will be disposed of in a manner in compliance with state and federal regulations and will not be allowed to mix with stormwater discharges.

5. All products will be stored in and used from the original container with the original product label.

6. All products will be used in strict compliance with instructions on the product label.

7. The disposal of excess or used products will be in strict compliance with instructions on the product label.

Contaminated Soils

A. Any contaminated soils (resulting from spills of materials with hazardous properties) which may result from construction activities will be contained and cleaned up immediately in accordance with the procedures given in the Spill Prevention Control and Countermeasures (SPCC) Plan and in accordance with applicable state and federal regulations.

B. The job site superintendent will be responsible for seeing that these procedures are followed.

VOLUME AND CHARACTER OF STORMWATER

The existing volume of the stormwater runoff for the Project Site for a 25-year storm is 355.48 cubic feet per second. The proposed volume of the stormwater runoff for the Project Site for a 25-year storm is 352.48 cubic feet per second. The Site is for a small business and proposes 9.06 percent impervious cover, including future phases. The runoff composite curve number for pre-construction and post-construction are 76.1 and 77.3, respectively.

SUITABILITY LETTER FROM AUTHORIZED AGENT

See attached.

Hays County Development Services

2171 Yarrington Road, Suite 100, Kyle TX 78640
512-393-2150 main / 512-493-1915 fax

February 22, 2024

To Whom It May Concern:

Re: On Site Sewage Facility Suitability (OSSF) for the Oak Haven Preserve wedding venue located at 1775 Hilliard Road, San Marcos, Texas 78666, parcel ID: R13252 per Hays Central Appraisal District.

I have completed my preliminary review of the initial planning materials submitted in support of the above referenced development in Hays County. I concur with Hugo Elizondo, Jr., P.E., findings that this tract of land can be adequately served by individual on-site sewage facilities. The proposed number of occupants will require a public water supply.

This review does not authorize the start of any construction and all Hays County development authorizations and subdivision requirements must be obtained before the start of any development.

Please contact me if you have any questions concerning this matter.

Sincerely,

Eric Van Gaasbeek, R.S., C.F.M.
Chief Environmental Health Specialist
Floodplain Administrator
OS# 0028967

EXCEPTION TO THE REQUIRED GEOLOGIC ASSESSMENT

Not Applicable

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: HUGO ELIZONDO, JR., P.E., C.F.M. / CUATRO CONSULTANTS, LTD.

Date: 3/4/24

Signature of Customer/Agent:

Regulated Entity Name: OAK HAVEN PRESERVE

Project Information

Potential Sources of Contamination

Examples: Fuel storage and use, chemical storage and use, use of asphaltic products, construction vehicles tracking onto public roads, and existing solid waste.

1. Fuels for construction equipment and hazardous substances which will be used during construction:

   ☐ The following fuels and/or hazardous substances will be stored on the site: _____

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

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

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

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

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

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

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

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

Sequence of Construction

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

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

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

6. ☑ Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: UPPER SAN MARCOS RIVER

Temporary Best Management Practices (TBMPs)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

    ☑ N/A

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

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

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

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

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

Soil Stabilization Practices

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

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

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

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

Administrative Information

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

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

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

SPILL RESPONSE ACTIONS

The following measures are to be taken to contain any spill of hydrocarbons or hazardous substances:

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, and substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from storm water run-on during rainfall to the extent that It doesn't compromise cleanup activities.
- Do not bury or wash spills with water.
- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Keep waste storage areas clean, well-organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs In this section for specific Information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
- Contain the spread of the spill.
- Recover spilled materials.
- Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.
- Spills should be cleaned up immediately:
- Contain spread of the spill.
- Notify the project foreman immediately.
- If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
- If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
- If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that are in reportable quantities:
- Notify the TCEQ by telephone as soon as possible and within 24 hours at 512-339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM.
- After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
- For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800} 424-8802.
- Notification should first be made by telephone and followed up with a written report.
- The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
- Other agencies which may need to be consulted include, but are not limited to, the
- City Police Department, County Sheriff Office, Fire Departments, etc.
- More information on spill rules and appropriate responses is available on the TCEQ website at:
  http://www.tnrcc.state.tx.us/enforcement/emergency_response.html

Reportable Quantities

The RQ depends on the substance released and where released. Use this table to determine whether you must report and under what rule.

In Texas, upon determining that a reportable discharge or spill has occurred, the responsible person must notify the state. The threshold quantity that triggers the requirement to report a spill is called the reportable quantity (RQ). The reportable quantity depends on the type of substance released and where released (e.g. into water vs. on land); different kinds of spills are subject to different provisions of state and federal rules.

Kind of spill	Where discharged	Reportable quantity	Rule, statute, or responsible agency
Hazardous substance	onto land	"Final RQ" In Table 302.4 In 40 CFR 302.4 (PDF)	30 TAC 327
	into water	"Final RQ" or 100 lbs, whichever Is **less**	
Any oil	coastal waters	as required by the Texas General Land Office	Texas General Land Office
Crude oil, oil that Is neither a petroleum product nor used oil	onto land	210 gallons (five barrels)	30 TAC 327
	directly Into water	enough to create a sheen	
Petroleum product, used oil	onto land, from an exempt PST facility	210 gallons (five barrels)	30 TAC 327
	onto land, or onto land from a non-exempt PST facility	25 gallons	
	directly Into water	enough to create a sheen	
Associated with the exploration, development and production of oil, gas, or geothermal resources	under the jurisdiction of the Railroad Commission of Texas	as required by the Railroad Commission of Texas	Railroad Commission of Texas
Industrial solid waste or other substances	Into water	100 lbs	30 TAC 327
From petroleum storage tanks, underground or aboveground	Into water	enough to create a sheen on water	30 TAC 334.75-81
From petroleum storage tanks, underground or aboveground	onto land	25 gallons or equal to the RQ under 40 CFR 302 .	30 TAC 327
Other substances that may be useful or valuable and are not ordinarily considered to be waste, but will cause pollution if discharged Into water In the state	Into water	100 lbs	30 TAC 327

TCEQ Form 0602 Attachment A- Spill Response Actions

A. Any contaminated soils (resulting from spills of materials with hazardous properties) which may result from construction activities will be contained and cleaned up immediately in accordance with the procedures given in the Spill Prevention Control and Countermeasures (SPCC) Plan and in accordance with applicable state and federal regulations.

B. The job site superintendent will be responsible for seeing that these procedures are followed.

TCEQ Form 0602 Attachment A- Spill Response Actions

POTENTIAL SOURCES OF CONTAMINATION

Waste Disposal

All waste materials will be collected and stored in a securely lidded metal dumpster rented from a local waste management company which must be a solid waste management company licensed to do business in the State of Texas and Travis or Hays County. The dumpster will comply with all local and state solid waste management regulations.

All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied as required, and the trash will be hauled to a landfill approved by the State of Texas and Hays County. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal. Notices stating these practices will be posted in the job site construction office trailer, and the job site superintendent will be responsible for seeing that these procedures are followed.

Sanitary Waste

All sanitary waste will be collected from the portable units by a licensed portable facility provider in complete compliance with local and state regulations.

Off-Site Vehicle Tracking

A stabilized construction exit will be provided to help reduce vehicle tracking of sediments. The paved street adjacent to the site entrance will be inspected daily and swept as necessary to remove any excess mud, dirt, or rock tracked from the site. Dump trucks hauling material from the construction site will be covered with a tarpaulin. The job site superintendent will be responsible for seeing that these procedures are followed.

Concrete Waste From Concrete Trucks

A. Emptying of excess concrete and/or washout from concrete delivery trucks will be allowed on the job site, but only in either specifically designated diked areas which have been prepared to prevent contact between the concrete and/or washout and stormwater which will be discharged from the site or in locations where waste concrete can be poured into forms to make riprap or other useful concrete products.

B. The hardened residue from the concrete washout diked areas will be disposed of in accordance with the procedures given in the Spill Prevention Control and Countermeasures (SPCC) Plan and in accordance with applicable state and federal regulations. The job site superintendent will be responsible for seeing that these procedures are followed.

Hazardous Substances and Hazardous Waste

A. All hazardous waste materials will be disposed of in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products. Site personnel will be instructed in these practices by the job site superintendent, who will also be responsible for seeing that these practices are followed. Material Safety Data Sheets (MSDS's) for each substance with hazardous properties that is used on the job site will be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of each MSDS will be maintained in the SWPPP file at the job site construction trailer office. Each employee who must handle a substance with hazardous properties will be instructed on the use of MSDS sheets and the specific

information in the applicable MSDS for the product he/she is using, particularly regarding spill control techniques.

B. The contractor will implement the Spill Prevention Control and Countermeasures (SPCC) Plan found within this SWPPP and will train all personnel in the proper cleanup and handling of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with stormwater discharges. If such contact occurs, the stormwater discharge will be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated stormwater. It shall be the responsibility of the job site superintendent to properly train all personnel in the use of the SPCC plan.

C. Any spills of hazardous materials which are in quantities in excess of Reportable Quantities as defined by EPA regulations shall be immediately reported to the EPA National Response Center 1-800-424-8802.

D. In order to minimize the potential for a spill of hazardous materials to come into contact with stormwater, the following steps will be implemented:

1. All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, cleaning solvents, additives for soil stabilization, concrete curing compounds and additives, etc.) will be stored in a secure location, under cover, when not in use.

2. The minimum practical quantity of all such materials will be kept on the job site.

3. A spill control and containment kit (containing, for example, absorbent such as kitty litter or sawdust, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles plastic and metal trash containers, etc.) will be provided at the storage site.

4. All of the product in a container will be used before the container is disposed of. All such containers will be triple-rinsed with water prior to disposal. The rinse water used in these containers will be disposed of in a manner in compliance with state and federal regulations and will not be allowed to mix with stormwater discharges.

5. All products will be stored in and used from the original container with the original product label.

6. All products will be used in strict compliance with instructions on the product label.

7. The disposal of excess or used products will be in strict compliance with instructions on the product label.

SEQUENCE OF MAJOR EVENTS

No clearing or rough grading may be done until the approved erosion and sedimentation controls are in place.

1. Install temporary erosion and sedimentation controls and stabilized construction entrance.
    a. 6.46 ac.
2. Hold Pre-Construction Conference.
3. Demo all existing improvements to be removed.
    a. 0.54 ac.
4. Complete excavation and grading of site.
    a. 6.46 ac.
5. Install all utilities.
    a. 1.49 ac.
6. Re-grade and compact subgrade. Meet with Engineer's Representative and Geotechnical Engineer to determine areas of differing pavement section thickness or subgrade preparation if called for in the Geotechnical Report.
    a. 1.49 ac.
7. Conduct proofroll of subgrade.
    a. 1.49 ac.
8. Insure all underground utility crossings are in place including sleeves for dry utilities.
    a. 1.49 ac.
9. Install first course of base.
    a. 1.49 ac.
10. Install curbs, rip-rap, and miscellaneous concrete.
    a. 1.49 ac.
11. Install second course of base.
    a. 1.49 ac.
12. Final grade any ditches and parkways.
    a. 0.56 ac.
13. Re-vegetate all disturbed areas. Dispose of spoil in an approved manner.
    a. 6.46 ac.
14. Schedule a Final Inspection with Engineer's Representative and Local Inspector, as applicable.
15. After acceptance of construction, temporary erosion controls shall be removed.
    a. 6.46 ac.

TEMPORARY BEST MANAGEMENT PRACTICES AND MEASURES

Stabilization Practices

Stabilization practices for this site include:

A. Land clearing activities shall be done only in areas where earthwork will be performed and shall progress as earthwork is needed

B. Frequent watering of excavation and fill areas to minimize wind erosion during construction.

C. Use of stabilization fabric for all slopes having a slope of 1V:3H or greater.

D. Permanent seeding and planting of all unpaved areas using the planting of grass seed, grass sod, or shrubs.

Structural Practices

Structural practices for this site include:

A. Inlet protection silt fences and outlet protection using rock berms
B. Intermittent silt fence along low side of Blocks
C. Natural waterway protection with silt fence and rock berms
D. Stabilized construction exit points

Sequence of Major Activities

The Contractor will be responsible for implementing the following erosion control and stormwater management control structures. The Contractor may designate these tasks to certain subcontractors and the builders of individual homes as he sees fit, but the ultimate responsibility for implementing these controls and ensuring their proper functioning remains with the Contractor. The order of activities will be as follows (refer to Stormwater Pollution Prevention Plan Sheet contained in this SWPPP for details):

A. Construct temporary construction exits at locations shown on the SWPPP plan sheet.

B. Install silt fences and rock berms in the locations shown on the SWPPP plan sheet.

C. Begin clearing, grubbing, and topsoil removal operations. Clearing and grubbing shall be done only in areas where earthwork will be performed and only in areas where homesteads are planned to commence within 14 days after clearing and grubbing.

D. Frequent watering of the excavation and fill areas shall be done to minimize wind erosion.

E. Install storm sewer piping and drainage structures.

F. Install protective silt fences at the locations of all grate inlets, curb inlets and at the ends of all exposed storm sewer pipes.

G. Begin site grading operations and road subgrade preparation.

H. Finalize pavement subgrade preparation, install base material. Construct all grate inlets, curb inlets, headwalls, and sloped end treatments. Inlet protection silt fences may be removed temporarily for this construction.

I. Install all underground utility lines.

J. Install base material as required for pavement.

K. Carry out final grading and seeding and revegetation.

L. Remove silt fencing only after all paving is complete and exposed surfaces are stabilized.

M. Remove temporary construction exits only prior to pavement construction in these areas. (These areas are to be paved last)

N. Install final pavement as shown on the plans.

REQUEST TO TEMPORARILY SEAL A FEATURE

Not Applicable

STRUCTURAL PRACTICES

Structural practices for this site include:

A. Inlet protection silt fences and outlet protection using rock berms
B. Intermittent silt fence along low side of Blocks
C. Natural waterway protection with silt fence and rock berms
D. Stabilized construction exit points

DRAINAGE AREA MAP

See attachment F in Permanent Stormwater Section.

TEMPORARY SEDIMENT POND(S) PLANS AND CALCULATIONS

Not Applicable

INSPECTION AND MAINTENANCE FOR BMPS

Erosion and Sediment Control Maintenance and Inspection Practices

A. The following is a list of erosion and sediment controls to be used on this site during construction practice:

1. Stabilization practices for this site include:

Land clearing activities shall be done only in areas where earthwork will be performed and shall progress, as earthwork is needed.

Frequent watering of excavation and fill areas to minimize wind erosion during construction.

- Dust Control
  - When dust is evident during dry weather, reapply dust control BMPs.

Use of stabilization fabric for all slopes having a slope of 1V:3H or greater.

- Slope Protection
  - Blankets and matting should be inspected weekly and after each rain event to locate and repair any damage. Apply new material if necessary to restore function.

Permanent seeding and planting of all unpaved areas using the hydro-mulching grass seeding technique.

- Seeding as Erosion Control
  - Blankets and matting should be inspected weekly and after each rain event to locate and repair any damage. Apply new material if necessary to restore function.

2. Structural practices for this site include:

Natural Waterway Protection using silt fences and Rock Berms.

- Silt Fence
  - Inspect all fencing weekly, and after any rainfall.
  - Remove sediment when buildup reaches 6 inches.
  - Replace any torn fabric or install a second line of fencing parallel to the torn section.
  - Replace or repair any sections crushed or collapsed in the course of construction activity. If a section of fence is obstructing vehicular access, consider relocating it to a spot where it will provide equal protection, but will not obstruct vehicles. A triangular filter dike may be preferable to a silt fence at common vehicle access points.
  - When construction is complete, the sediment should be disposed of in a manner that will not cause additional siltation and the prior location of the silt fence should be revegetated. The fence itself should be disposed of in an approved landfill.
- Rock Berms
  - Inspection should be made weekly and after each rainfall by the responsible party. For installations in streambeds, additional daily inspections should be made.
  - Remove sediment and other debris when buildup reaches 6 inches and dispose of the accumulated silt in an approved manner that will not cause any additional siltation.

- Repair any loose wire sheathing.
- The berm should be reshaped as needed during inspection.
- The berm should be replaced when the structure ceases to function as intended due to silt accumulation among the rocks, washout, construction traffic damage, etc.
- The rock berm should be left in place until all upstream areas are stabilized and accumulated silt removed.

Inlet protection using silt fences and outlet protection using rock berms

- Inlet Protection
  - Inspection should be made weekly and after each rainfall. Repair or replacement should be made promptly as needed by the contractor.
  - Remove sediment when buildup reaches a depth of 3 inches. Removed sediment should be deposited in a suitable area and in such a manner that it will not erode.
  - Check placement of device to prevent gaps between device and curb.
  - Inspect filter fabric and patch or replace if torn or missing.
  - Structures should be removed and the area stabilized only after the remaining drainage area has been properly stabilized.

Silt fence protection for graded bar ditch sections

Stabilized construction exit points

- Temporary Construction Entrance/Exit
  - The entrance should be maintained in a condition, which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment.
  - All sediment spilled, dropped, washed or tracked onto public rights-of-way should be removed immediately by contractor.
  - When necessary, wheels should be cleaned to remove sediment prior to entrance onto public right-of-way.
  - When washing is required, it should be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin.
  - All sediment should be prevented from entering any storm drain, ditch or water course by using approved methods.

Concrete Washout Area

B. The following inspection and maintenance practices will be used to maintain erosion and sediment controls:

1. All control measures will be inspected at least once each week and following any storm event of 0.5 inches.

2. All measures will be maintained in good working order; if repairs are found to be necessary they will be initiated within 24 hours of report.

3. Built up sediment will be removed from silt fence when it has reached one-third the height of the fence.

4. Silt fences will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are securely in the ground.

5. Built up sediment will be removed from rock berms when it has reached one-third the height of the berm.

6. Temporary and permanent seeding will be inspected for bare spots, washouts, and healthy growth.

7. A maintenance inspection report will be made after each inspection. Copies of the report forms to be completed by the inspector are included in this SWPPP.

8. The job site superintendent will be responsible for selecting and training the individuals who will be responsible for these inspections, maintenance and repair activities, and filling out inspection and maintenance reports.

9. Personnel selected for the inspection and maintenance responsibilities will receive training from the job site superintendent. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls that are used onsite in good working order. They will also be trained in the completion of, initiation of actions required by, and the filing of the inspection forms. Certification of the training of inspectors shall be provided, in writing, to the Owner and the Engineer by the Contractor.

Inspection and Maintenance Report Forms

Once installation of any required or optional erosion control device or measure has been implemented, weekly inspections of each measure shall be performed by the Contractor's inspection personnel. The Inspection and Maintenance Reports found in this SWPPP (or other forms which the Contractor desires to use that have been approved by the Engineer) shall be used by the inspectors to inventory and report the condition of each measure to assist in maintaining the erosion and sediment control measures in good working order .

These report forms shall become an integral part of the SWPPP and shall be made readily accessible to EPA inspection officials, the Civil Engineering Consultant, and the Owner for review upon request during visits to the project site. In addition, copies of the reports shall be provided to any of these persons, upon request, via mail or facsimile transmission.

The Contractor shall notify the Owner and the Engineer in writing that training of inspectors for purposes of compliance with this SWPPP has been performed.

The following forms shall be utilized by inspectors to report on the incremental status and condition of the control measures used on the site:

STORMWATER POLLUTION PREVENTION PLAN
SUMMARY OF EROSION AND SEDIMENT CONTROL MAINTENANCE/INSPECTION PROCEDURES

- All control measures will be inspected at least once each week and following any storm event of 0.5 inches or greater.
- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report.
- Built-up sediment will be removed from silt fences and rock berms when it has reached one-third the height of the device.
- Silt fences will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.
- A maintenance inspection report will be made after each inspection. A copy of the report forms to be used are included in this SWPPP.
- The job site superintendent will select the individuals who will be responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance reports.
- Personnel selected for inspection and maintenance responsibilities will receive training from the job site superintendent. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

STORMWATER POLLUTION PREVENTION PLAN
CONSTRUCTION/IMPLEMENTATION CHECKLIST

1. Maintain Records of Construction Activities, including:

- Dates when major grading activities occur
- Dates when construction activities temporarily cease on a portion of the site
- Dates when construction activities permanently cease on a portion of the site
- Dates when stabilization measures are initiated on the site

2. Prepare Inspection Reports summarizing:

- Name of inspector
- Qualifications of inspector
- Measures/areas inspected
- Observed conditions
- Changes necessary to the SWPPP

3. Report Releases of Reportable Quantities of Oil or Hazardous Materials (if they occur):

- Notify National Response Center (1-800-424-8802) immediately
- Notify permitting authority in writing within 14 days
- Modify the pollution prevention plan to include:
    - -the date of release
    - -circumstances leading to the release
    - -steps taken to prevent reoccurrence of the release

4. Modify Pollution Prevention Plan as necessary to:

- Comply with the minimum permit requirements when notified by EPA that the plan does not comply
- Address a change in design, construction operation, or maintenance which has an effect on the potential for discharge of pollutants
- Prevent reoccurrence of reportable quantity releases of a hazardous material or oil

FINAL STABILIZATION/TERMINATION CHECKLIST

1. All soil disturbing activities are complete.

2. Temporary erosion and sediment control measures have been removed or will be removed at an appropriate time.

3. All areas of the construction site not otherwise covered by a permanent pavement or structure have been stabilized with a uniform perennial vegetative cover with a density of 70% or equivalent measures have been employed.

STORMWATER POLLUTION PREVENTION PLAN
INSPECTION AND MAINTENANCE REPORT FORM

STABILIZATION MEASURES

INSPECTOR:_____ DATE:_____

QUALIFICATIONS OF INSPECTOR:_____

_____

DAYS SINCE LAST RAINFALL: _____ AMOUNT OF LAST RAINFALL:_____

AREA	DATE SINCE LAST RAINFALL	DATE OF NEXT DISTURBANCE	STABILIZED (YES/NO)	STABILIZED WITH	CONDITION

STABILIZATION
REQUIRED:_____

_____

TO BE PERFORMED BY:_____ ON OR BEFORE:_____

STORMWATER POLLUTION PREVENTION PLAN
INSPECTION AND MAINTENANCE REPORT FORM

SILT FENCE

INSPECTOR: _____ DATE: _____

QUALIFICATIONS OF
INSPECTOR:_____

_____

DAYS SINCE LAST RAINFALL: _____ AMOUNT OF LAST RAINFALL:_____

IS THE BOTTOM OF THE FABRIC STILL BURIED?_____

IS THE FABRIC TORN OR SAGGING?_____

ARE THE POSTS TIPPED OVER?_____

HOW DEEP IS THE SEDIMENT?_____

MAINTENANCE REQUIRED FOR SILT FENCE:_____

TO BE PERFORMED BY:_____

ON OR BEFORE:_____

SCHEDULE OF INTERIM AMD PERMANENT SOIL STABILIZATION PRACTICES

The Contractor will be responsible for implementing the following erosion control and stormwater management control structures. The Contractor may designate these tasks to certain subcontractors and the builders of individual homes as he sees fit, but the ultimate responsibility for implementing these controls and ensuring their proper functioning remains with the Contractor. The order of activities will be as follows (refer to Stormwater Pollution Prevention Plan Sheet contained in this SWPPP for details):

Note: Bare Soil should be seed or otherwise stabilized within 14 calendar days after final grading or where construction activity has temporarily ceased for more than 21 days.

A. Construct temporary construction exits at locations shown on the SWPPP plan sheet.

B. Install silt fences and rock berms in the locations shown on the SWPPP plan sheet. Contractor shall conduct a pre-construction meeting including City and/or County representatives, Engineer of record and Contractor/Subcontractor/ Superintendent.

C. Begin clearing, grubbing, and topsoil removal operations. Clearing and grubbing shall be done only in areas where earthwork will be performed and only in areas where homesteads are planned to commence within 14 days after clearing and grubbing.

D. Frequent watering of the excavation and fill areas shall be done to minimize wind erosion.

E. Install storm sewer piping and drainage structures.

F. Install protective silt fences at the locations of all grate inlets, curb inlets and at the ends of all exposed storm sewer pipes.

G. Begin site grading operations and road subgrade preparation.

H. Finalize pavement subgrade preparation, install base material. Construct all grate inlets, curb inlets, headwalls and sloped end treatments. Inlet protection silt fences may be removed temporarily for this construction.

I. Install all underground utility lines.

J. Install base material as required for pavement.

K. Carry out final grading and seeding and revegetation.

L. Remove silt fencing only after all paving is complete and exposed surfaces are stabilized.

M. Remove temporary construction exits only prior to pavement construction in these areas
(These areas are to be paved last).

N. Install final pavement as shown on the plans.

Permanent Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(C), (D)(Ii), (E), and (5), Effective June 1, 1999

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

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

Signature

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

Print Name of Customer/Agent: HUGO ELIZONDO, JR., P.E., C.F.M. / CUATRO CONSULTANTS, LTD.

Date: 3/4/24

Signature of Customer/Agent

Regulated Entity Name: OAK HAVEN PRESERVE

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

20% OR LESS IMPERVIOUS COVER WAIVER

TCEQ requirements allows a waiver for permanent BMP's for small business sites with less than twenty (20) percent impervious cover. Oak Haven Preserve will have less than 100 employees and have a gross annual income of less than $1,000,000. The proposed impervious cover for this Site is 9.06 percent, including future phases. Therefore, a waiver to construct permanent BMP's on this Site is formally requested.

BMP'S FOR UPGRADIENT STORMWATER

Upgradient offsite areas which drain storm water towards the Site is conveyed though the property. Offsite areas which drain to the proposed detention pond are detained to reduce peak runoff. No permanent BMP's are proposed. The Site qualifies as a small business and proposes less than 20 percent impervious cover.

BMP'S FOR ON-SITE STORMWATER

Not Applicable

BMP'S FOR SURFACE STREAMS

Not Applicable

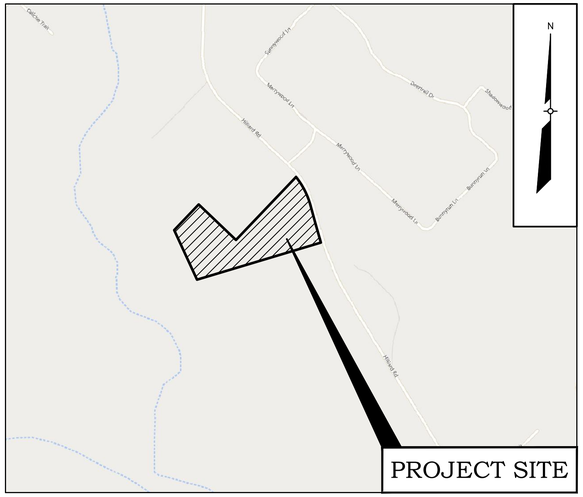
REQUEST TO SEAL FEATURES

Not Applicable

CONSTRUCTION PLAN

OAK HAVEN PRESERVE
31.23 ACRES
SITE DEVELOPMENT PLAN

1775 HILLIARD ROAD
HAYS COUNTY, TEXAS



LOCATION MAP
1"= 1000'

HAYS COUNTY COMMISSIONERS:

RUBEN BECERRA	- HAYS COUNTY JUDGE
DEBBIE INGALSBE	- COMMISSIONER, PRECINCT 1
MICHELLE COHEN	- COMMISSIONER, PRECINCT 2
LON SHELL	- COMMISSIONER, PRECINCT 3
WALT SMITH	- COMMISSIONER, PRECINCT 4

HAYS COUNTY STAFF:

ERIC VANGAASBEEK	- CHIEF ENVIRONMENTAL HEALTH SPECIALIST
MARCUS PACHECO	- DIRECTOR OF DEVELOPMENT SERVICES
COLBY MACHACEK	- SENIOR PLANNER

REVISIONS:

REVISIONS/ CORRECTIONS

NO.	DESCRIPTION	REVISE (R) ADD (A) VOID (V) SHEET No.'S	TOTAL NO. SHEETS IN PLAN SET	NET CHANGE IMP. COVER (sq.ft.)	TOTAL SITE IMP. COVER (sq.ft.)/ %	CITY OF AUSTIN APPROVAL/ DATE	DATE IMAGED

NOTES TO CONTRACTOR:

1. BY THE ACT OF SUBMITTING A BID FOR THIS PROPOSED CONTRACT, THE BIDDER WARRANTS THAT THE BIDDER, AND ALL SUBCONTRACTORS AND MATERIAL SUPPLIERS HE INTENDS TO USE, HAVE CAREFULLY AND THOROUGHLY REVIEWED THE DRAWINGS, SPECIFICATIONS AND ALL OTHER CONTRACT DOCUMENTS AND HAVE FOUND THEM COMPLETE AND FREE FROM ANY AMBIGUITIES AND SUFFICIENT FOR THE PURPOSE INTENDED. THE BIDDER FURTHER WARRANTS THAT TO THE BEST OF HIS OR HER SUBCONTRACTORS' AND MATERIAL SUPPLIERS' KNOWLEDGE ALL MATERIALS AND PRODUCTS SPECIFIED OR INDICATED HEREIN ARE ACCEPTABLE FOR ALL APPLICABLE CODES AND AUTHORITIES.
2. THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THESE PLANS HAS BEEN BASED UPON RECORD INFORMATION ONLY AND MAY NOT MATCH LOCATIONS AND/OR DEPTHS AS CONSTRUCTED. THE CONTRACTOR SHALL CONTACT THE OWNER OF EACH INDIVIDUAL UTILITY FOR ASSISTANCE IN DETERMINING EXISTING UTILITY LOCATIONS AND DEPTHS PRIOR TO BEGINNING ANY CONSTRUCTION. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL UTILITY CROSSINGS PRIOR TO BEGINNING ANY CONSTRUCTION.

PROJECT DATA:

SUBDIVISION PLAT NUMBER:	N/A
SUBMITTAL DATE:	JANUARY, 2024
PROJECT ADDRESS:	1775 HILLIARD ROAD
ZONING:	N/A
USE	WEDDING VENUE

LEGAL DESCRIPTION:

BEING 31.23 ACRES OF LAND OUT OF THE ELIJAH CLARK SURVEY, ABSTRACT NO. 84, IN HAYS COUNTY, TEXAS, BEING A PORTION OF THE 844.44 ACRES CONVEYED BY SPECIAL WARRANTY DEED TO BYRDNEST VENTURES, LLC, RECORDED IN DOCUMENT NO. 21052047 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS.

BENCHMARKS:

TBM–1: 60 D NAIL LOCATED APPROXIMATELY 160' SOUTHEAST OF THE NORTHWESTERN PROPERTY BOUNDARY.

NORTHING: 13,888,779.7423

EASTING: 2,299,121.8486

GENERAL NOTES:

1. THIS SITE IS LOCATED WITHIN THE UPPER SAN MARCOS RIVER WATERSHED.
2. THIS SITE LIES OVER THE EDWARDS AQUIFER RECHARGE ZONE.
3. ACCORDING TO THE NATIONAL FLOOD INSURANCE RATE MAP (FIRM) NO. 48209C0387F, DATED SEPTEMBER 2, 2005, A PORTION OF THE PROPERTY IS LOCATED IN THE SPECIAL FLOOD HAZARD AREA ZONE 'A'.
4. CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
5. THERE ARE NO UNDERGROUND FUEL STORAGE TANKS ON THIS PROJECT.
6. WATER SHALL BE PROVIDED BY A PUBLIC WATER SYSTEM APPROVED BY THE TCEQ.
7. WASTEWATER SHALL BE PROVIDED BY A ON–SITE SEWAGE FACILITY, APPROVED BY HAYS COUNTY.

SHEET INDEX:

PREPARED BY:

HUGO ELIZONDO, JR., P.E., CFM.
CUATRO CONSULTANTS, LTD.
120 RIVERWALK DRIVE, SUITE 208
SAN MARCOS, TEXAS 78666.
(512) 312–5040
(512) 565–9040 (M)

STATE OF TEXAS · HUGO ELIZONDO, JR. · 69781 · LICENSED PROFESSIONAL ENGINEER

2/21/24

DATE:

OWNER:

BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TX 78737

DATE:

REVIEWED BY:

HAYS COUNTY FIRE MARSHAL'S OFFICE
DEVELOPMENT SERVICES DEPARTMENT

DATE:

HAYS COUNTY DEVELOPMENT
PERMIT NUMBER

DATE:

REVISION	DESCRIPTION	BY:	DATE:

CUATRO Consultants, LTD.
Registration No. F-5324
120 Riverwalk Drive, Suite 208 Phone: (512) 312-5040 Fax: (512) 312-5959
San Marcos, Texas 78666 e-mail: cuatro@cuatroconsultants.com

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23–049
DRAWING'S NAME: 01_HWY_COVER SHEET
DESIGN: DR | CHECKED:
DRAWN: DR | APPROVED: HE Jr.
SHEET: 1 OF 26

GENERAL NOTES

1. SEVENTY–TWO (72) HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION, THE DEVELOPER SHALL ARRANGE A PRE–CONSTRUCTION CONFERENCE WITH ALL PERTINENT PARTIES.
2. ALL ROADWAY AND DRAINAGE IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HAYS COUNTY SPECIFICATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS FROM HAYS COUNTY ROAD AND BRIDGE DEPARTMENT PRIOR TO BEGINNING ANY ON–SITE CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING THE NECESSARY INSPECTIONS FROM THE HAYS COUNTY ROAD AND BRIDGE DEPARTMENT. ALL REPAIRS TO IMPROVEMENTS CAUSED BY CONTRACTOR'S FAILURE TO INSTALL IMPROVEMENTS IN ACCORDANCE WITH HAYS COUNTY SPECIFICATIONS AND THESE CONSTRUCTION PLANS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
   HAYS COUNTY ROAD AND BRIDGE DEPARTMENT'S ACCEPTANCE OF THE IMPROVEMENTS ARE CONTINGENT ON REPAIRS BEING MADE TO HAYS COUNTY'S SATISFACTION. DELAYS CAUSED BY REPAIRS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
3. CONTRACTOR SHALL ENSURE THAT VEHICLES LEAVING THE CONSTRUCTION SITE ONTO PUBLICLY MAINTAINED ROADWAYS ARE CLEAR OF MUD AND DEBRIS.
4. NO EXPLOSIVES SHALL BE USED FOR THIS PROJECT WITHOUT TCEQ APPROVAL.
5. ALL HOLES, TRENCHES AND OTHER HAZARDOUS AREAS SHALL BE ADEQUATELY PROTECTED BY BARRICADES, FENCING, LIGHTS AND/OR OTHER PROTECTIVE DEVICES AT ALL TIMES.
6. CONTRACTOR SHALL COMPLY WITH CONSTRUCTION SEQUENCING WHICH MAY BE SPECIFIED SOMEWHERE IN THE CONSTRUCTION PLANS.
7. PERMIT IS REQUIRED FOR CONSTRUCTION IN 'RIGHT OF WAY' :ORDINANCE 7.10. NO DRIVEWAY,
   UTILITY CONSTRUCTION, MAILBOXES, LANDSCAPING OR ANY OTHER ENCROACHMENT INTO RIGHT–OF–WAY OR EASEMENT
   SHALL BE ALLOWED WITHOUT FIRST OBTAINING A PERMIT FROM THE HAYS COUNTY ROAD AND BRIDGE DEPARTMENT.
8. PRIOR TO THE INSTALLATION OF ANY ROAD BUILDING MATERIAL THE SUBGRADE SHALL BE INSPECTED BY HAYS COUNTY. PRIOR TO PAVING, BASE MATERIAL SHALL BE INSPECTED BY HAYS COUNTY. THE OWNER OR HIS AGENT SHALL NOTIFY THE HAYS COUNTY ROAD DIRECTOR FORTY–EIGHT (48) HOURS PRIOR TO THE TIME WHEN THE INSPECTION IS NEEDED :ORDINANCE 1.05; 2.06.
   AT THE TIME A FINAL INSPECTION AND RELEASE OF PERFORMANCE SECURITY IS REQUESTED; THE DESIGN ENGINEER SHALL PROVIDE A COMPLETE SET OF "AS–BUILT" RECORD DRAWINGS IN PDF FORMAT (300DPI) ON A VIRUS FREE DISK AND SHALL CERTIFY THAT ALL ROAD AND DRAINAGE CONSTRUCTION HAS BEEN COMPLETED IN SUBSTANTIAL ACCORDANCE WITH PREVIOUSLY APPROVED PLANS AND SPECIFICATIONS, EXCEPT AS NOTED. NO PERFORMANCE SECURITY WILL BE RELEASED WITHOUT THESE EXHIBITS.

SEQUENCE OF CONSTRUCTION

THE CONTRACTOR WILL BE RESPONSIBLE FOR IMPLEMENTING THE FOLLOWING EROSION CONTROL AND STORMWATER MANAGEMENT CONTROL STRUCTURES. THE ULTIMATE RESPONSIBILITY FOR IMPLEMENTING THESE CONTROLS AND ENSURING THEIR ACTIVITIES WILL BE AS FOLLOWS (REFER TO STORMWATER POLLUTION PREVENTION PLAN SHEET CONTAINED IN THIS SWPPP FOR DETAILS):

A. CONSTRUCT TEMPORARY CONSTRUCTION EXITS AT LOCATIONS SHOWN ON THE SWPPP PLAN SHEET.

B. INSTALL SILT FENCES AND ROCK BERMS IN THE LOCATION SHOWN ON THE SWPPP PLAN SHEET. CONTRACTOR SHALL CONDUCT A PRE–CONSTRUCTION MEETING INCLUDING CITY AND/OR COUNTY REPRESENTATIVES AND CONTRACTOR/ SUBCONTRACTOR SUPERINTENDENT.

C. BEGIN CLEARING, GRUBBING, AND TOPSOIL REMOVAL OPERATIONS. CLEARING AND GRUBBING SHALL BE DONE ONLY IN AREAS WHERE EARTHWORK WILL BE PERFORMED WITHIN 14 DAYS AFTER CLEARING AND GRUBBING.

D. FREQUENT WATERING OF THE EXCAVATION AND FILL AREAS SHALL BE DONE TO MINIMIZE WIND EROSION.

E. INSTALL STORM SEWER PIPING AND DRAINAGE STRUCTURES.

F. INSTALL PROTECTIVE SILT FENCES AT THE LOCATIONS OF ALL GRATE INLETS, CURB INLETS AND AT THE ENDS OF ALL EXPOSED STORM SEWER PIPES.

G. BEGIN SITE GRADING OPERATIONS AND ROAD SUBGRADE PREPARATION.

H. FINALIZE PAVEMENT SUBGRADE PREPARATION, INSTALL BASE MATERIAL. CONSTRUCT ALL GRATE INLETS, CURB INLETS, HEADWALLS AND SLOPED END TREATMENTS. INLET PROTECTION SILT FENCES MAY BE REMOVED TEMPORARILY FOR THIS CONSTRUCTION.

I. INSTALL BASE MATERIAL AS REQUIRED FOR PAVEMENT.

J. CARRY OUT FINAL GRADING, SEEDING AND REVEGETATION.

K. REMOVE SILT FENCING ONLY AFTER ALL PAVING IS COMPLETE AND EXPOSED SURFACES ARE STABILIZED.

L. REMOVE TEMPORARY CONSTRUCTION EXITS ONLY PRIOR TO PAVEMENT CONSTRUCTION.

M. INSTALL FINAL PAVEMENT AS SHOWN ON THE PLANS.

TPDES STORMWATER POLLUTION PREVENTION PLAN GENERAL NOTES

(TO COMPLY WITH TPDES REQUIREMENTS)

1. SEE COVER SHEET OF THE PLANS FOR A GENERAL LOCATION MAP.
2. THE NATURE OF THE CONSTRUCTION ACTIVITY CONSISTS OF COMMERCIAL DEVELOPMENT. THE MAIN POTENTIAL SOURCE OF POLLUTION FROM THE CONSTRUCTION IS SEDIMENT FROM THE DISTURBED AREAS.
3. FOR SEQUENCE OF CONSTRUCTION, SEE "CONSTRUCTION SEQUENCE" NOTES THIS SHEET.
4. THE CONSTRUCTION SITE DISTURBED AREA IS ESTIMATED TO BE 6.46 ACRES.
5. THE RUNOFF COEFFICIENT AFTER CONSTRUCTION WILL BE THE SAME AS THE EXISTING CONDITION AND DRAINAGE PATTERNS WILL BE UNCHANGED FROM EXISTING.
6. THE EXISTING QUALITY OF STORMWATER DISCHARGING FROM THE SITE IS CHARACTERISTIC OF AN UNDEVELOPED SITE. POST–DEVELOPMENTAL QUALITY WILL NOT BE SIGNIFICANTLY CHANGED UPON STABILIZATION OF THE SITE.
7. THE RECEIVING BODY OF WATER IS UPPER SAN MARCOS RIVER. WETLANDS OR AQUATIC SITES AS DESCRIBED UNDER 40 CFR 230.3 (q–1) WILL NOT BE DISTURBED OR RECEIVE DISCHARGES FROM DISTURBED AREAS OF THE PROJECT.
8. NO DESIGNATED CRITICAL HABITAT OCCURS WITHIN THE PROXIMITY OF THE CONSTRUCTION ACTIVITY. LISTED ENDANGERED OR THREATENED SPECIES DO NOT OCCUR WITHIN THE PROXIMITY OF THE CONSTRUCTION ACTIVITY.
9. PROPERTY LISTED OR ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER OF HISTORIC PLACES DOES NOT OCCUR WITHIN THE PROXIMITY OF THE CONSTRUCTION ACTIVITY.
10. SEE CONSTRUCTION CONTRACT FOR A COPY OF THE STORM WATER GENERAL PERMIT AND FOR CONSTRUCTION ACTIVITY IN REGION 6.
11. SOILS ON THE SITE CONSIST OF RUMPLE–COMFORT ASSOCIATION, THAT BELONG TO THE "D" HYDROLOGIC GROUP.
12. FOR DEVELOPED CONDITION DRAINAGE PATTERNS REFER TO THE SWPPP OR DRAINAGE AREA MAP SHEET. GRADING WILL BE UNCHANGED FROM THE EXISTING CONDITION.
13. THE "EROSION/SEDIMENTATION CONTROL PLAN" INDICATED THE AREA TO BE DISTURBED BY THE LIMITS OF CONSTRUCTION LINE, LOCATIONS OF STABILIZATION MEASURES, CONTROLS, CONTRACTOR STAGING AREAS, AND TEMPORARY MATERIAL STOCKPILING, AND ANY ADJACENT WATERWAYS.
14. THE PERMITTEE MUST POST A NOTICE NEAR THE MAIN ENTRANCE OF THE CONSTRUCTION SITE WITH THE FOLLOWING INFORMATION:
    * TPDES PERMIT NUMBER OR A COPY OF THE NOI IF NO NUMBER HAS BEEN ASSIGNED
    * NAME AND PHONE NUMBER OF A LOCAL CONTACT, AND
    * A BRIEF PROJECT DESCRIPTION AND LOCATION OF THE SWPPP IF NOT LOCATED ON THE CONSTRUCTION SITE.

CONTROLS

STRUCTURAL EROSION CONTROL MEASURES TO BE USED DURING CONSTRUCTION CONSIST OF SILT FENCE AND ROCK BERM. THE TIMING FOR THE INSTALLATION OF THESE CONTROLS IS CONTAINED IN THE "SEQUENCE OF CONSTRUCTION" NOTES INCLUDED IN THESE PLANS. RESPONSIBLE PARTY FOR IMPLEMENTATION, INSPECTION, AND MAINTENANCE OF CONTROLS IS THE CONTRACTOR.

1. GOALS AND CRITERIA FOR EROSION/SEDIMENTATION CONTROLS
   A. THE CONSTRUCTION PHASE EROSION AND SEDIMENT CONTROLS SHOULD BE DESIGNED TO RETAIN SEDIMENT ON SITE TO THE EXTENT PRACTICABLE.

   B. ALL CONTROL MEASURES MUST BE PROPERLY SELECTED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND GOOD ENGINEERING PRACTICES. IF PERIODIC INSPECTIONS OR OTHER INFORMATION INDICATES A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INCORRECTLY, THE PERMITEE MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS.

   C. IF SEDIMENT ESCAPES THE CONSTRUCTION SITE, OFFSITE ACCUMULATION OF SEDIMENT MUST BE REMOVED AT A FREQUENCY SUFFICIENT TO MINIMIZE OFFSITE IMPACTS. (E.G. SEDIMENT IN STREET IS WASHED INTO STORMSEWER)

   D. SEDIMENT MUST BE REMOVED FROM SEDIMENT TRAPS OR SEDIMENTATION PONDS WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50%.

   E. LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BECOMING A POLLUTANT SOURCE.

   F. SPOIL MATERIAL DISPOSED OR STOCKPILE MATERIAL STORED AT AN OFFSITE LOCATION THAT IS USED SOLELY BY THE PERMITTED PROJECT IS CONSIDERED PART OF THE PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR REVISING THE SWPPP TO COVER THIS ACTIVITY.

2. STABILIZATION PRACTICES: THE PERMANENT EROSION CONTROLS NOTES INCLUDED IN THE GENERAL NOTES SPECIFY THE CRITERIA FOR REVEGETATION OF DISTURBED AREAS. THE EROSION/SEDIMENTATION CONTROL PLAN, INCLUDED AS PART OF THESE CONSTRUCTION PLANS, PROVIDES PROTECTION OF ADJACENT VEGETATION BY DEFINITION OF A LIMITS OF CONSTRUCTION AND ANY APPROPRIATE TREE PROTECTION ONSITE.
   A. STABILIZATION (SEEDING, SODDING, MULCHING, ETC.): DISTURBED AREA WHERE CONSTRUCTION HAS PERMANENTLY OR TEMPORARILY CEASED MUST BE STABILIZED WITHIN 14 DAYS OF THE LAST DISTURBANCE. (AREAS WHICH WILL BE REDISTURBED WITHIN 21 DAYS DO NOT HAVE TO BE STABILIZED.)

   B. IN ARID AREAS, AREAS EXPERIENCING DROUGHT, AND IN AREAS EXPERIENCING FROZEN GROUND CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE.

3. STRUCTURAL PRACTICES:
   A. PERMANENT CONTROLS SHALL CONSIST OF AN EXISTING WATER QUALITY POND, AND DETENTION POND.

   B. STORMWATER MANAGEMENT: STORMWATER SHALL BE DIRECTED TO NATURAL SWALES OR PROPOSED DITCHES. ALL LOW POINTS LEAVING THE SITE SHALL HAVE TEMPORARY EROSION CONTROLS, I.E., SILT FENCE, OR ROCK BERM.

- OTHER CONTROLS:
  1. NO SOLID MATERIALS, INCLUDING BUILDING MATERIALS, SHALL BE DISCHARGED TO THE RECEIVING WATERS.
  2. OFFSITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST SHALL BE MINIMIZED.
  3. APPLICATION OF THE SWPPP SHALL BE CONSISTENT WITH OTHER LOCAL AND STATE REGULATIONS.

4. RELEASES OF REPORTABLE QUANTITIES: THE TCEQ HAS ISSUED REGULATIONS THAT DEFINE WHAT REPORTABLE QUANTITY LEVELS ARE FOR OIL AND HAZARDOUS SUBSTANCES. THESE REGULATIONS ARE FOUND IN TAC CHAPTER 327 AND TABLE 302.4 IN 40 CFR 302.4. IF THERE IS A RQ RELEASE DURING THE CONSTRUCTION PERIOD, THEN THE FOLLOWING STEPS MUST BE TAKEN:
   * NOTIFY STATE EMERGENCY RESPONSE COMMISSION (SERC) IMMEDIATELY AT 1–800–832–8224
   * WITHIN 14 DAYS, MODIFY THE SWPPP WITH A WRITTEN DESCRIPTION OF THE RELEASE AND THE STEPS TO BE TAKEN TO PREVENT ANOTHER RELEASE.

5. INSPECTION: THE SWPP GENERAL PERMIT REQUIRES WRITTEN INSPECTIONS EVERY 14 DAYS OR WITHIN 24 HOURS OF A STORM OF 0.5 INCHES OR MORE IN DEPTH. ALL DISTURBED AREAS OF THE SITE, AREAS FOR MATERIAL STORAGE, LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE, AND ALL OF THE EROSION AND SEDIMENT CONTROLS THAT WERE IDENTIFIED AS PART OF THE PLAN MUST BE INSPECTED. CONTROLS MUST BE IN GOOD OPERATING CONDITION UNTIL THE AREA THEY PROTECT HAS BEEN COMPLETELY STABILIZED AND THE CONSTRUCTION ACTIVITY IS FINISHED.

6. MAINTENANCE/REPAIRS: IF SITE SPECIFICS AND OPERATION OF THE CONTROLS INDICATE MODIFICATIONS ARE REQUIRED, THEN SUCH MODIFICATIONS SHALL BE INDICATED ON THE SWPPP WITH ASSOCIATED DESCRIPTION AS TO NEED FOR THE ADDITIONAL CONTROLS. REVISIONS TO THE SWPPP SHALL BE COMPLETED WITHIN 7 CALENDAR DAYS FOLLOWING INSPECTION. IF EXISTING BMP'S NEED TO BE MODIFIED OF ADDITIONAL BMP'S ADDED IMPLEMENTATION SHALL BE COMPLETED BEFORE THE NEXT ANTICIPATED STORM EVENT. IF THIS IS IMPRACTICABLE, THEY SHALL BE IMPLEMENTED AS SOON AS POSSIBLE. THE INSPECTOR MUST RECORD ANY DAMAGES OR DEFICIENCIES IN THE CONTROL MEASURES ON AN INSPECTION REPORT FORM. THESE REPORTS DOCUMENT THE INSPECTION OF THE POLLUTION PREVENTION MEASURES. RECORDS SHALL BE KEPT TO INDICATE THAT CORRECTION OF DAMAGE OR DEFICIENCIES WERE MADE.

7. RECORD KEEPING: IN ADDITION TO THE INSPECTION AND MAINTENANCE RECORDS, THE OPERATOR SHOULD KEEP RECORDS OF THE CONSTRUCTION ACTIVITY ON THE SITE. IN PARTICULAR, THE OPERATOR SHOULD KEEP A RECORD OF THE FOLLOWING INFORMATION:
   * THE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR IN A PARTICULAR AREA.
   * THE DATES WHEN CONSTRUCTION ACTIVITIES CEASE IN AN AREA, TEMPORARILY OR PERMANENTLY.
   * THE DATES WHEN AN AREA IS STABILIZED, TEMPORARILY OR PERMANENTLY.
   * A COPY OF THE SWPPP AND NPDES PERMIT (OR NOI FORM) MUST BE KEPT AT THE CONSTRUCTION SITE FROM THE TIME CONSTRUCTION BEGINS UNTIL THE SITE IS FINALLY STABILIZED.

8. RETENTION OF RECORDS: RETENTION OF RECORDS: RETENTION OF RECORDS REQUIRES THAT COPIES OF THE SWPPP AND ALL OTHER REPORTS REQUIRED BY THE PERMIT, AS WELL AS ALL OF THE DATA USED TO COMPLETE THE N.O.I. BE RETAINED FOR 3 YEARS AFTER THE COMPLETION OF FINAL SITE STABILIZATION.

9. NOTICE OF TERMINATION: THE NOT IS A ONE–PAGE FORM WHICH SHOULD BE COMPLETED AND SUBMITTED TO EPA WHEN A SITE HAS BEEN FINALLY STABILIZED OR WHEN AN OPERATOR OF A CONSTRUCTION ACTIVITY CHANGES.

604S.1 DESCRIPTION

THIS ITEM SHALL GOVERN THE PREPARATION OF A SEED BED TO THE LINES AND GRADES INDICATED ON THE DRAWINGS, SOWING OF SEEDS, FERTILIZING, MULCHING WITH STRAW, CELLULOSE FIBER WOOD CHIPS, RECYCLED PAPER MULCH AND OTHER MANAGEMENT PRACTICES ALONG AND ACROSS SUCH AREAS AS INDICATED IN THE DRAWING OR AS DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.

THIS SPECIFICATION IS APPLICABLE FOR PROJECTS OR WORK INVOLVING EITHER INCH–POUND OF SI UNITS. WITHIN THE TEXT, INCH–POUND UNITS ARE GIVEN PREFERENCE WITH SI UNITS SHOWN WITHIN PARENTHESIS.

604S.2 SUBMITTALS

THE SUBMITTAL REQUIREMENTS FOR THIS SPECIFICATION ITEM SHALL INCLUDE:
A. IDENTIFICATION OF THE TYPE, SOURCE, MIXTURE, PLS AND RATE OF APPLICATION OF THE SEED TYPE OF MULCH.
B. TYPE OF TACKING AGENT.
C. TYPE AND RATE OF APPLICATION OF FERTILIZER.

604S.3 MATERIALS

A. SEED
   ALL SEED MUST MEET THE REQUIREMENTS OF THE TEXAS SEED LAW INCLUDING THE LABELING REQUIREMENTS FOE SHOWING PURE LIVE SEED(PLS), NAME AND TYPE OF SEED. THE SEED FURNISHED SHALL BE OF THE PREVIOUS SEASONS CROP AND THE DATE OF ANALYSIS SHOWN ON EACH BAG SHALL BE WITHIN NINE MONTHS OF THE TIME OF DELIVERY TO THE PROJECT. EACH VARIETY OF SEED SHALL BE FURNISHED AND DELIVERED IN SEPARATE BAGS OR CONTAINERS. A SAMPLE OF EACH VARIETY OF SEED SHALL BE FURNISHED FOR ANALYSIS AND TESTING WHEN DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
   THE AMOUNT OF SEED PLANTED PER ACRE (HECTARE) SHALL BE OF THE TYPE SPECIFIED IN SECTIONS 604S.5 AND 604S.6

B. WATER
   WATER SHALL BE CLEAN AND FREE OF INDUSTRIAL WASTES AND OTHER SUBSTANCES HARMFUL TO THE GROWTH OF GRASS OR THE AREA IRRIGATED.

C. TOPSOIL
   TOPSOIL SHALL CONFORM TO STANDARD SPECIFICATION ITEM NO. 601S.3(A).

D. FERTILIZER
   THE FERTILIZER SHALL CONFORM TO STANDARD SPECIFICATION ITEM NO. 606S, "FERTILIZER".

E. STRAW AND MULCH OR HAY MULCH
   STRAW MULCH SHALL BE OAT, WHEAT OR RICE STRAW. HAY MULCH SHALL BE PRAIRIE GRASS, BERMUDA GRASS, OR OTHER HAY APPROVED BY ENGINEER OR DESIGNATED REPRESENTATIVE. THE STRAW OR HAY SHALL BE FREE OF JOHNSON GRASS OR OTHER NOXIOUS WEEDS AND FOREIGN MATERIALS. IT SHALL BE KEPT IN A DRY CONDITION AND SHALL NOT BE MOLDED OR ROTTED.

F. TACKING AGENTS
   THE TACKING AGENT SHALL BE A BIODEGRADABLE TACKING AGENT, APPROVED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.

G. CELLULOSE FIBER MULCH (NATURAL WOOD)
   CELLULOSE FIBER MULCH SHALL BE NATURAL CELLULOSE FIBER MULCH PRODUCED FROM GRINDING CLEAN WHOLE WOOD CHIPS. THE MULCH SHALL BE DESIGNED FOR USE IN CONVENTIONAL MECHANICAL PLANTING, HYDRAULIC PLANTING OF SEED OR HYDRAULIC MULCHING OF GRASS SEED, EITHER ALONE OR WITH FERTILIZERS AND OTHER ADDITIVES. THE MULCH SHALL BE SUCH, THAT WHEN APPLIED, THE MATERIAL FORM A STRONG, MOISTURE–RETAINING MAT WITHOUT THE NEED OF AN ASPHALT BINDER.

H. RECYCLED PAPER MULCH
   RECYCLED PAPER MULCH SHALL BE SPECIFICALLY MANUFACTURED FROM POST–CONSUMER PAPER AND SHALL CONTAIN A MINIMUM OF 85% RECYCLED PAPER CONTENT BY WEIGHT, SHALL CONTAIN NO MORE THAN 15% MOISTURE AND 1.6% ASH, AND SHALL CONTAIN NO GROWTH INHIBITING MATERIAL OR WEED SEEDS. THE RECYCLED PAPER SHALL BE MIXED WITH GRASS SEED AND FERTILIZER FOR HYDRO–SEEDING/MULCHING, EROSION CONTROL, AND A BINDER OVER STRAW MULCH. THE MULCH, WHEN APPLIED, SHALL FORM A STRONG, MOISTURE–RETAINING MAT OF A GREEN COLOR WITHOUT THE NEED OF AN ASPHALT BINDER.

604S.4 CONSTRUCTION METHODS

A. PREPARING SEED BED AFTER THE DESIGNATED AREAS HAVE BEEN ROUGH GRADED TO THE LINES, GRADES AND TYPICAL SECTIONS INDICATED IN THE DRAWINGS OR AS PROVIDED FOR IN OTHER ITEMS OF THIS CONTRACT AND FOR ANY OTHER SOIL AREA DISTURBED BY THE CONSTRUCTION, A SUITABLE SEEDBED SHALL BE PREPARED. THE SEEDBED SHALL CONSIST OF A MINIMUM OF EITHER 4" (100MILLIMETERS) OF APPROVED TOPSOIL OR 4" (100 MILLIMETERS) OF APPROVED SALVAGED TOPSOIL, CULTIVATED AND ROLLED SUFFICIENTLY TO REDUCE THE SOIL TO A STATE OF GOOD TILTH, WHEN THE SOIL PARTICLES ON THE SURFACE ARE SMALL ENOUGH AND LIE CLOSELY ENOUGH TOGETHER TO PREVENT THE SEED FROM BEING COVERED TOO DEEPLY FOR OPTIMUM GERMINATION. THE OPTIMUM DEPTH FOR SEEDING SHALL BE $\frac{1}{4}$" (6 MILLIMETERS). WATER SHALL BE GENTLY APPLIED AS REQUIRED TO PREPARE THE SEEDBED PRIOR TO THE PLANTING OPERATION EITHER BY BROADCAST SEEDING OR HYDRAULIC PLANTING.
   SEEDING SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS HEREINAFTER DESCRIBED.

B. WATERING
   ALL WATERING SHALL COMPLY WITH CITY ORDINANCES. BROADCAST SEEDED AREAS SHALL IMMEDIATELY BE WATERED WITH A MINIMUM OF 5 GALLONS OF WATER PER SQUARE YARD (22.5 LITERS OF WATER PER SQUARE METER) OR AS NEEDED AND IN THE MANNER AND QUANTITY AS DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. HYDRAULIC SEEDED AREAS AND NATIVE GRASS SEEDED AREAS SHALL BE WATERED COMMENCING AFTER THE TACKIFIER HAS DRIED WITH A MINIMUM OF 5 GALLONS OF WATER PER SQUARE YARD (22.5 LITERS OF WATER PER SQUARE METER) OR AS NEEDED TO KEEP THE SEEDBED IN A WET CONDITION FAVORABLE FOR THE GROWTH OF THE GRASS.
   WATERING APPLICATIONS SHALL CONSTANTLY MAINTAIN THE SEEDBED IN A WET CONDITION FAVORABLE FOR THE GROWTH OF GRASS. WATERING SHALL CONTINUE UNTIL THE GRASS IS UNIFORMLY 1 $\frac{1}{2}$" (40MM) IN HEIGHT AND ACCEPTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. WATERING CAN BE POSTPONED IMMEDIATELY AFTER A $\frac{1}{2}$" (12.5MM) OR GREATER RAINFALL ON THE SITE BUT SHALL BE RESUMED BEFORE THE SOIL DRIES OUT.

604S.5 NON-NATIVE SEEDING

A. METHOD A – BROADCAST SEEDING. THE SEED OR SEED MIXTURE IN THE QUANTITY SPECIFIED SHALL BE UNIFORMLY DISTURBED OVER THE PREPARED SEED AREAS INDICATED ON THE DRAWINGS OR WHERE DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. IF THE SOWING OF SEED IS BY HAND, RATHER THAN BY MECHANICAL METHODS, THE SEED SHALL BE SOWN IN TWO DIRECTIONS AT RIGHT ANGLES TO EACH OTHER. IF MECHANICAL EQUIPMENT IS USED, ALL VARIETIES OF SEED, AS WELL AS FERTILIZER, MAY BE DISTRIBUTED AT THE SAME TIME, PROVIDED THAT EACH COMPONENT IS UNIFORMLY APPLIED AT THE SPECIFIED RATE. AFTER PLANTING, THE PLANTED AREA SHALL BE ROLLED WITH A CORRUGATED ROLLER OF THE "CULTIPACKER" TYPE. ALL ROLLING OF THE SLOPE AREAS SHALL BE ON THE CONTOUR.

   SEED MIXTURE AND RATE OF APPLICATION FOR BROADCAST SEEDING:

   FROM SEPTEMBER 15 TO MARCH 1, SEEDING SHALL BE WITH A COMBINATION OF UNHULLED BERMUDA GRASS AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET (1.0 KILOGRAMS PER 100 SQUARE METERS) AND COOL SEASON COVER CROP (SEE TABLE 4) AT A RATE OF 1.5 POUNDS PER 1000 SQUARE FEET (0.75 KILOGRAMS PER 100 SQUARE METERS).
   FROM MARCH 1 TO SEPTEMBER 15, SEEDING SHALL BE WITH HULLED BERMUDA GRASS AT A PLS=0.83. FERTILIZER SHALL BE APPLIED AND SHALL CONFORM TO ITEM NO.606S, "FERTILIZER".

B. METHOD B – HYDRAULIC PLANTING. THE SEEDBED SHALL BE PREPARED AS SPECIFIED ABOVE AND HYDRAULIC PLANTING EQUIPMENT, WHICH IS CAPABLE OF PLACING ALL MATERIALS IN A SINGLE OPERATION, SHALL BE USED.

   MARCH 1 TO SEPTEMBER 15
   HYDRAULIC PLANTING MIXTURE AND MINIMUM RATE OF APPLICATION POUNDS PER 1000 SQUARE FEET (KILOGRAMS PER 100 SQUARE METERS)

TABLE 1: NON–NATIVE GRASS			
HULLED BERMUDA SEED (PLS=0.83)	FIBER MULCH		SOIL TACKIFIER
	CELLULOSE	WOOD	
1 LBS/1000FT^2 (0.5 KGS/100 M^2)	45.9 LBS/100 FT^2 (22.5 KGS/100M^2)		1.4LBS/1000 FT^2 (0.7KGS\100M^2)
		57.4LBS/1000 FT^2 (28.01KGS/100M^2)	1.5LBS/1000 FT^2 (0.75KGS/100M^2)

   SEPTEMBER 15 TO MARCH 1
   ADD 1.5 POUNDS PER 1000 SQUARE FEET (0.75 KILOGRAMS PER 100 SQUARE METERS) OF COOL SEASON COVER CROP (SEE TABLE 4) TO ABOVE MIXTURE. THE FERTILIZER SHALL CONFORM TO CITY OF AUSTIN STANDARD SPECIFICATION ITEM NO. 606S, "FERTILIZER".

604S.7 MULCH

A. STRAW MULCH
   STRAW MULCH SHALL BE SPREAD UNIFORMLY OVER THE AREA INDICATED OR AS DESIGNATED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE AT THE RATE OF 2 TO 2 $\frac{1}{2}$ TONS OF STRAW PER ACRE (4.5 TO 5.6 MEGAGRAMS OF STRAW PER HECTARE). THE ACTUAL RATE OF APPLICATION WILL BE DESIGNATED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. STRAW MAY BE HAND OR MACHINE PLACED AND ADEQUATELY SECURED.

B. FIBER MULCH
   CELLULOSE AND WOOD FIBER MULCH SHALL BE SPREAD UNIFORMLY OVER THE AREA INDICATED OR AS DESIGNATED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE AT A RATE THAT WILL PROVIDE 100% COVERAGE.

D. SHREDDED BRUSH MULCH
   SMALL BRUSH OR TREE LIMBS EXCEPT JUNIPER, WHICH HAVE BEEN SHREDDED, MAY BE USED FOR MULCHING NATIVE GRASS SEEDING.

- OWNER INFORMATION:

NAME: BYRDNEST VENTURES, LLC

ADDRESS: 9410 VERA CRUZ ROAD
AUSTIN, TX 78737

PHONE: (512) 326–4223

- DESIGN ENGINEER: REPRESENTATIVE RESPONSIBLE FOR PLAN CHANGES.

NAME: HUGO ELIZONDO, JR. P.E., C.F.M.
C/O CUATRO CONSULTANTS, LTD

ADDRESS: 120 RIVERWALK DRIVE, SUITE 208
SAN MARCOS, TEXAS 78666

PHONE: (512) 312–5040
FAX: (512) 312–5399

TRAFFIC CONTROL NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SIGNAGE FOR ALL WORK IN R.O.W.
2. THE CONTRACTOR SHALL NOTIFY ALL OTHER GOVERNMENTAL AGENCIES WHOSE RIGHT–OF–WAYS ARE AFFECTED BY HIS WORK ZONE TRAFFIC CONTROLS. THE CONTRACTOR SHALL PROVIDE ANY ADDITIONAL TRAFFIC CONTROL DEVICES THAT THEY MAY REQUIRE.
3. THE CONTRACTOR SHALL MAINTAIN TWO–WAY TRAFFIC AT ALL TIMES WHILE CROSSING EXISTING ROADWAYS UNLESS OTHERWISE NOTED ON THE PLANS.
4. THE CONTRACTOR SHALL MAINTAIN DRIVEWAY ACCESS AT ALL TIMES. IF ACCESS CANNOT BE MAINTAINED, AT LEAST 24 HOUR WRITTEN NOTICE WILL BE GIVEN TO AFFECTED PROPERTY OWNERS.
5. ALL TRENCHES SHALL BE EITHER BACKFILLED, PLATED OR FENCED WITH SAFETY FENCING.
6. THE CONTRACTOR SHALL MAKE INSPECTION OF ALL TRAFFIC CONTROL DEVICES AT LEAST TWO TIMES A DAY (ONCE AT THE BEGINNING OF THE DAY AND ONCE AT THE END OF THE WORK DAY), INCLUDING NON WORKING DAYS TO INSURE THAT ALL DEVICES ARE IN PROPER WORKING ORDER.
7. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE CURRENT EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
8. ALL SIGNS USED AT NIGHT SHALL BE REFLECTORIZED AND SHALL HAVE A TYPE A FLASHING LIGHT.

FIRE PREVENTION NOTES:

1. HYDRANTS MUST BE INSTALLED WITH THE CENTER OF THE 4 1/2 INCH OPENING AT LEAST EIGHTEEN (18) INCHES ABOVE FINISHED GRADE. THE 4 1/2 INCH OPENING MUST FACE THE DRIVEWAY ON STREET WITH 4" – 6" SETBACK FROM SIDEWALK. NO OBSTRUCTION IS ALLOWED WITHIN THREE (3) FEET OF ANY HYDRANT AND THE 4 1/2 INCH OPENING MUST BE TOTALLY UNOBSTRUCTED FROM THE STREET (USE NST THREADS).
2. ALL UNDERGROUND FIRE SPRINKLER LINES SHALL REQUIRE A PLAN/DRAWING TO BE SUBMITTED BY AN RME TO THE KYLE FIRE MARSHAL'S OFFICE FOR REVIEW AND PERMIT. ANY UNDERGROUND FIRE SPRINKLER LINE CAN ONLY BE INSTALLED BY A COMPANY THAT IS REGISTERED BY THE STATE FIRE MARSHAL'S OFFICE FOR UNDERGROUND SPRINKLER PIPE INSTALLATION.

GENERAL CONCRETE NOTES (6/19/18):

1. ALL STRUCTURAL CONCRETE SHALL BE CLASS C STONE AGGREGATE CONCRETE UNLESS NOTED OTHERWISE. MINIMUM CONCRETE COMPRESSIVE STRENGTH FOR STRUCTURAL CONCRETE SHALL BE 3,600 P.S.I. WHEN TESTED AT 28 DAYS.

   MISCELLANEOUS NON–STRUCTURAL CONCRETE SHALL BE CLASS A STONE AGGREGATE CONCRETE MINIMUM COMPRESSIVE STRENGTH OF 3,000 P.S.I. AT 28 DAYS.

   IF TEMPERATURE IS ABOVE 80° F AT POURING, CONTRACTOR SHALL APPLY A COAT OF CURING COMPOUND.
2. HORIZONTAL CONSTRUCTION JOINTS IN CONCRETE POURS SHALL BE PERMITTED ONLY WHERE INDICATED ON THE DRAWINGS. ALL CONSTRUCTION JOINTS SHALL BE MADE IN THE CENTER OF SPANS. SEE DRAWINGS FOR TYPICAL DETAIL. THE LOCATION OF CONSTRUCTION JOINTS SHALL BE AS APPROVED BY THE STRUCTURAL ENGINEER. ADDITIONAL REINFORCING AT CONSTRUCTION JOINTS SHALL BE AS SPECIFIED BY THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL SUBMIT PROPOSED LOCATIONS FOR CONSTRUCTION JOINTS NOT SHOWN ON DRAWINGS FOR APPROVAL BY THE STRUCTURAL ENGINEER.

   CONTRACTION JOINTS SHALL BE INSTALLED AT MAXIMUM 10'–0" SPACING. ALL SAWCUTS SHALL BE 1/8" BY T/4" OR 1" DEEP AND BE COMPLETED WITHIN 4 TO 6 HOURS AFTER POUR IS COMPLETE.
3. ALL PIPE SLEEVES IN CONCRETE MEMBERS SHALL BE SCHEDULE 40, PVC PIPE UNLESS SHOWN OTHERWISE ON THE STRUCTURAL DRAWINGS. LOCATION OF SLEEVES SHALL BE AS APPROVED BY THE STRUCTURAL ENGINEER.
4. REINFORCING STEEL SHALL CONFORM TO ACI 318 AND 315, LATEST EDITION. REINFORCING STEEL SHALL BE DEFORMED NEW BILLET STEEL BARS IN ACCORDANCE WITH ASTM SPECIFICATION A615 GRADE 60.
5. DETAILING OF REINFORCING STEEL SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE DETAILING MANUAL.
6. PROVIDE 2– #5 X 4' – 0" "L" SHAPED BARS TOP AND BOTTOM AT ALL CORNERS AND "T" INTERSECTIONS OF BEAMS.
7. ALL HOOKS AND BENDS IN REINFORCING BARS SHALL CONFORM TO ACI STANDARDS UNLESS SHOWN OTHERWISE.
8. LAP CONTINUOUS UNSCHEDULED REINFORCING BARS 36 BAR DIAMETERS, UNLESS NOTED OTHERWISE. TOP BARS SHALL HAVE A BAR LAP OF 50 BAR DIAMETERS.
9. ALL INTERSECTIONS OF STEEL SHALL BE TIED.
10. PROVIDE REINFORCING BARS IN ACCORDANCE WITH THE BAR BENDING DIAGRAM IF BAR TYPE ARE SPECIFIED. IN UNSCHEDULED BEAMS, SLABS, COLUMNS AND WALLS DETAIL REINFORCING IS AS FOLLOWS:
    - LAP TOP REINFORCING BARS AT MID SPAN.
    - LAP BOTTOM REINFORCING BARS AT THE SUPPORTS.
    - LAP VERTICAL BARS IN COLUMNS AND WALLS ONLY AT FLOOR LINES, UNLESS NOTED OTHERWISE.
    - LAP REINFORCING BARS 36 BAR DIAMETERS MINIMUM, UNLESS NOTED OTHERWISE.
    - PROVIDE STANDARD HOOKS IN TOP BARS AT CANTILEVER AND DISCONTINUOUS
    - ENDS OF BEAMS, WALL, AND SLABS.
    - PROVIDE CORNER BARS FOR ALL HORIZONTAL BARS AT THE INSIDE AND OUTSIDE FACES OF INTERSECTING BEAMS OR WALLS. CORNER BARS ARE NOT REQUIRED IF TOP, BOTTOM, OR HORIZONTAL BARS ARE HOOKED.
11. TACK WELDING ON REINFORCING STEEL WILL NOT BE PERMITTED.
12. HEAT SHALL NOT BE USED IN THE FABRICATION OR INSTALLATION OF REINFORCEMENT.
13. REINFORCING STEEL MINIMUM CLEARANCE SHALL BE AS FOLLOWS:

A) FOOTINGS 1 1/2 " TOP, 3" BOTTOM, 2" SIDE FORMED, 3" SIDE AGAINST EARTH
B) B) WALLS 2"

14. HORIZONTAL WALL REINFORCEMENT SHALL BE CONTINUOUS AROUND BENDS.
15. CONTRACTOR SHALL PROVIDE 1" CHAMFER ON ALL EXPOSED EDGES AND A RUBBED FINISH ON ALL EXPOSED FACES UNLESS OTHERWISE SPECIFIED.
16. PROVIDE POURABLE URETHANE SEALANT AT ALL JOINTS.
17. USE SPACING CHAIRS TO MAINTAIN MINIMUM CLEARANCE AT REINFORCING STEEL OFF SUBGRADE. THE USE OF ROCK, BLOCK, WOOD, BRICK, ETC. SHALL NOT BE PERMITTED.
18. CONCRETE FORM WORK AND REINFORCEMENT SHALL BE INSPECTED BY CUATRO CONSULTANTS, LTD. PRIOR TO THE POURING OF CONCRETE.
19. CONCRETE SHALL HAVE A BROOM FINISH, UNLESS OTHERWISE NOTED ON PLAN.
20. SELECT FILL: SELECT FILL SHALL CONSIST OF MATERIAL WHICH HAS A P.I. BETWEEN 7 AND 17. SELECT FILL MAY BE APPROVED FLEXIBLE BASE MATERIAL (C.O.A. OR TXDOT SPECIFICATION), CRUSHED, ANGULAR 3/8" STONE, OR COMPACTED SOIL MATERIAL WITH P.I. BETWEEN 7 AND 17. COMPACTION OF SUBGRADE: 95 PERCENT. COMPACTION OF SELECT FILL: 95 PERCENT.
21. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL DIMENSIONS WITH ARCHITECTURAL PLANS BEFORE COMMENCING ANY WORK, THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE WORK.
22. EMBEDDED CONDUITS, PIPES, AND SLEEVES SHALL MEET THE REQUIREMENTS OF ACI 318–98, SECTION 6.3, INCLUDING THE FOLLOWING:
    - CONDUITS AND PIPES EMBEDDED WITHIN A SLAB, WALL OR BEAM (OTHER THAN THOSE PASSING THROUGH) SHALL NOT BE LARGER IN OUTSIDE DIMENSION THAN 1/3 THE OVERALL THICKNESS OF THE SLAB, WALL OR BEAM IN WHICH THEY ARE EMBEDDED.
    - CONDUITS, PIPES AND SLEEVES SHALL NOT BE SPACED CLOSER THAN THREE DIAMETERS OR WIDTHS ON CENTER.

REVISION	DESCRIPTION	BY:	DATE:

STATE OF TEXAS
HUGO ELIZONDO, JR.
69781
LICENSED PROFESSIONAL ENGINEER
2/20/24

CUATRO Consultants, LTD.
Registration No. F-3524
120 Riverwalk Drive, Suite 208 Phone: (512) 312-5040 Fax: (512) 312-5399
San Marcos, Texas 78666 e-mail: cuatro@cuatroconsultants.com

GENERAL NOTES

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023	
PROJECT: 23–049	
DRAWING'S NAME: 03_HWV_GNOTES	
DESIGN: DR	CHECKED: CDE
DRAWN: AWE	APPROVED: HE Jr.

Texas Commission on Environmental Quality
Water Pollution Abatement Plan
General Construction Notes

Edwards Aquifer Protection Program Construction Notes – Legal Disclaimer

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

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

2. All contractors conducting regulated activities associated with this project must be provided with complete copies of the approved Water Pollution Abatement Plan (WPAP) and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors are required to keep on-site copies of the approved plan and approval letter.

3. If any sensitive feature(s) (caves, solution cavity, sink hole, etc.) is discovered during construction, all regulated activities near the sensitive feature must be suspended immediately. The appropriate TCEQ regional office must be immediately notified of any sensitive features encountered during construction. Construction activities may not be resumed until the TCEQ has reviewed and approved the appropriate protective measures in order to protect any sensitive feature and the Edwards Aquifer from potentially adverse impacts to water quality.

4. No temporary or permanent hazardous substance storage tank shall be installed within 150 feet of a water supply source, distribution system, well, or sensitive feature.

5. Prior to beginning any construction activity, all temporary erosion and sedimentation (E&S) control measures must be properly installed and maintained in accordance with the approved plans and manufacturers specifications. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. These controls must remain in place until the disturbed areas have been permanently stabilized.

6. Any sediment that 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.

7. Sediment must be removed from the sediment traps or sedimentation basins not later than

when it occupies 50% of the basin's design capacity.

8. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from being discharged offsite.

9. All spoils (excavated material) generated from the project site must be stored on-site with proper E&S controls. For storage or disposal of spoils at another site on the Edwards Aquifer Recharge Zone, the owner of the site must receive approval of a water pollution abatement plan for the placement of fill material or mass grading prior to the placement of spoils at the other site.

10. If portions of the site will have a temporary or permanent cease in construction activity lasting longer than 14 days, soil stabilization in those areas shall be initiated as soon as possible prior to the 14th day of inactivity. If activity will resume prior to the 21st day, stabilization measures are not required. If drought conditions or inclement weather prevent action by the 14th day, stabilization measures shall be initiated as soon as possible.

11. The following records shall 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.

12. The holder of any approved Edward Aquifer protection plan 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 water pollution abatement structure(s), including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;

   B. any change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;

   C. any development of land previously identified as undeveloped in the original water pollution abatement plan.

Austin Regional Office 12100 Park 35 Circle, Building A Austin, Texas 78753-1808 Phone (512) 339-2929 Fax (512) 339-3795	San Antonio Regional Office 14250 Judson Road San Antonio, Texas 78233-4480 Phone (210) 490-3096 Fax (210) 545-4329

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

Texas Commission on Environmental Quality
Organized Sewage Collection System
General Construction Notes

Edwards Aquifer Protection Program Construction Notes – Legal Disclaimer

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

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

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

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

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

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

6. If any sensitive features are discovered during the wastewater line trenching activities, all regulated activities near the sensitive feature must be suspended immediately. The applicant must immediately notify the appropriate regional office of the TCEQ of the feature discovered. A geologist's assessment of the location and extent of the feature discovered must be reported to that regional office in writing and the applicant must submit a plan for ensuring the structural integrity of the sewer line or for modifying the proposed collection system alignment around the feature. The regulated activities near the sensitive feature may not proceed until the

executive director has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards Aquifer from any potentially adverse impacts to water quality while maintaining the structural integrity of the line.

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

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

9. All manholes constructed or rehabilitated on this project must have watertight size on size resilient connectors allowing for differential settlement. If manholes are constructed within the 100-year floodplain, the cover must have a gasket and be bolted to the ring. Where gasketed manhole covers are required for more than three manholes in sequence or for more than 1500 feet, alternate means of venting will be provided. Bricks are not an acceptable construction material for any portion of the manhole.

   The diameter of the manholes must be a minimum of four feet and the manhole for entry must have a minimum clear opening diameter of 30 inches. These dimensions and other details showing compliance with the commission's rules concerning manholes and sewer line/manhole inverts described in 30 TAC §217.55 are included on Plan Sheet __ of __.

   It is suggested that entrance into manholes in excess of four feet deep be accomplished by means of a portable ladder. The inclusion of steps in a manhole is prohibited.

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

11. Where sewers lines deviate from straight alignment and uniform grade all curvature of sewer pipe must be achieved by the following procedure which is recommended by the pipe manufacturer: _____.

    If pipe flexure is proposed, the following method of preventing deflection of the joint must be used: _____.

    Specific care must be taken to ensure that the joint is placed in the center of the trench and properly bedded in accordance with 30 TAC §217.54.

12. New sewage collection system lines must be constructed with stub outs for the connection of anticipated extensions. The location of such stub outs must be marked on the ground such that their location can be easily determined at the time of connection of the extensions. Such stub outs must be manufactured wyes or tees that are compatible in size and material with both the sewer line and the extension. At the time of original construction, new stub-outs must be constructed sufficiently to extend beyond the end of the street pavement. All stub-outs must be sealed with a manufactured cap to prevent leakage. Extensions that were not anticipated at the time of original construction or that are to be connected to an existing sewer line not furnished with stub outs must be connected using a manufactured saddle and in accordance with accepted plumbing techniques.

If no stub-out is present an alternate method of joining laterals is shown in the detail on Plan Sheet __ of __. (For potential future laterals).

The private service lateral stub-outs must be installed as shown on the plan and profile sheets on Plan Sheet __ of __ and marked after backfilling as shown in the detail on Plan Sheet __ of __.

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

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

15. All sewer lines must be tested in accordance with 30 TAC §217.57. The engineer must retain copies of all test results which must be made available to the executive director upon request. The engineer must certify in writing that all wastewater lines have passed all required testing to the appropriate regional office within 30 days of test completion and prior to use of the new collection system. Testing method will be:

(a) For a collection system pipe that will transport wastewater by gravity flow, the design must specify an infiltration and exfiltration test or a low-pressure air test. A test must conform to the following requirements:

(1) *Low Pressure Air Test.*

(A) A low pressure air test must follow the procedures described in American Society For Testing And Materials (ASTM) C-828, ASTM C-924, or ASTM F-1417 or other procedure approved by the executive director, except as to testing times as required in Table C.3 in subparagraph (C) of this paragraph or Equation C.3 in subparagraph (B)(ii) of this paragraph.

(B) For sections of collection system pipe less than 36 inch average inside diameter, the following procedure must apply, unless a pipe is to be tested as required by paragraph (2) of this subsection.

(i) A pipe must be pressurized to 3.5 pounds per square inch (psi) greater than the pressure exerted by groundwater above the pipe.

(ii) Once the pressure is stabilized, the minimum time allowable for the pressure to drop from 3.5 psi gauge to 2.5 psi gauge is computed from the following equation:

Equation C.3 $$T = \frac{0.085 \times D \times K}{Q}$$

Where:

T = time for pressure to drop 1.0 pound per square inch gauge in seconds
K = 0.000419 X D X L, but not less than 1.0
D = average inside pipe diameter in inches

L = length of line of same size being tested, in feet
Q = rate of loss, 0.0015 cubic feet per minute per square foot internal surface

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

Pipe Diameter *(inches)*	Minimum Time *(seconds)*	Maximum Length for Minimum Time *(feet)*	Time for Longer Length *(seconds/foot)*
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369
33	1870	72	25.856

(D) An owner may stop a test if no pressure loss has occurred during the first 25% of the calculated testing time.

(E) If any pressure loss or leakage has occurred during the first 25% of a testing period, then the test must continue for the entire test duration as outlined above or until failure.

(F) Wastewater collection system pipes with a 27 inch or larger average inside diameter may be air tested at each joint instead of following the procedure outlined in this section.

(G) A testing procedure for pipe with an inside diameter greater than 33 inches must be approved by the executive director.

(2) *Infiltration/Exfiltration Test.*

(A) The total exfiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch of diameter per mile of pipe per 24 hours at a minimum test head of 2.0 feet above the crown of a pipe at an upstream manhole.

(B) An owner shall use an infiltration test in lieu of an exfiltration test when pipes are installed below the groundwater level.

(C) The total exfiltration, as determined by a hydrostatic head test, must not exceed 50 gallons per inch diameter per mile of pipe per 24 hours at a minimum test head of two feet above the crown of a pipe at an upstream manhole, or at least two feet above existing groundwater level, whichever is greater.

(D) For construction within a 25-year flood plain, the infiltration or exfiltration must not exceed 10 gallons per inch diameter per mile of pipe per 24 hours at the same minimum test head as in subparagraph (C) of this paragraph.

(E) If the quantity of infiltration or exfiltration exceeds the maximum quantity specified, an owner shall undertake remedial action in order to reduce

the infiltration or exfiltration to an amount within the limits specified. An owner shall retest a pipe following a remediation action.

(b) If a gravity collection pipe is composed of flexible pipe, deflection testing is also required. The following procedures must be followed:

(1) For a collection pipe with inside diameter less than 27 inches, deflection measurement requires a rigid mandrel.

(A) *Mandrel Sizing.*

(i) A rigid mandrel must have an outside diameter (OD) not less than 95% of the base inside diameter (ID) or average ID of a pipe, as specified in the appropriate standard by the ASTMs, American Water Works Association, UNI-BELL, or American National Standards Institute, or any related appendix.

(ii) If a mandrel sizing diameter is not specified in the appropriate standard, the mandrel must have an OD equal to 95% of the ID of a pipe. In this case, the ID of the pipe, for the purpose of determining the OD of the mandrel, must equal be the average outside diameter minus two minimum wall thicknesses for OD controlled pipe and the average inside diameter for ID controlled pipe.

(iii) All dimensions must meet the appropriate standard.

(B) *Mandrel Design.*

(i) A rigid mandrel must be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed.

(ii) A mandrel must have nine or more odd number of runners or legs.

(iii) A barrel section length must equal at least 75% of the inside diameter of a pipe.

(iv) Each size mandrel must use a separate proving ring.

(C) *Method Options.*

(i) An adjustable or flexible mandrel is prohibited.

(ii) A test may not use television inspection as a substitute for a deflection test.

(iii) If requested, the executive director may approve the use of a deflectometer or a mandrel with removable legs or runners on a case-by-case basis.

(2) For a gravity collection system pipe with an inside diameter 27 inches and greater, other test methods may be used to determine vertical deflection.

(3) A deflection test method must be accurate to within plus or minus 0.2% deflection.

(4) An owner shall not conduct a deflection test until at least 30 days after the final backfill.

(5) Gravity collection system pipe deflection must not exceed five percent (5%).

(6) If a pipe section fails a deflection test, an owner shall correct the problem and conduct a second test after the final backfill has been in place at least 30 days.

16. All manholes must be tested to meet or exceed the requirements of 30 TAC §217.58.

(a) All manholes must pass a leakage test.

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

(1) Hydrostatic Testing.

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

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

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

(2) Vacuum Testing.

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

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

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

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

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

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

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

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

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

Austin Regional Office 12100 Park 35 Circle, Building A Austin, Texas 78753-1808 Phone (512) 339-2929 Fax (512) 339-3795	San Antonio Regional Office 14250 Judson Road San Antonio, Texas 78233-4480 Phone (210) 490-3096 Fax (210) 545-4329

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

REVISION	DESCRIPTION	BY:	DATE:

4QUATRO Consultants, LTD.
Registration No. F-3524
1120 Roosevelt Drive, Suite 208 Phone (512) 392-5040 Fax (512) 392-5949
San Marcos, Texas 78666 e-mail: cuatro@cuatroconsultants.com

TCEQ NOTES

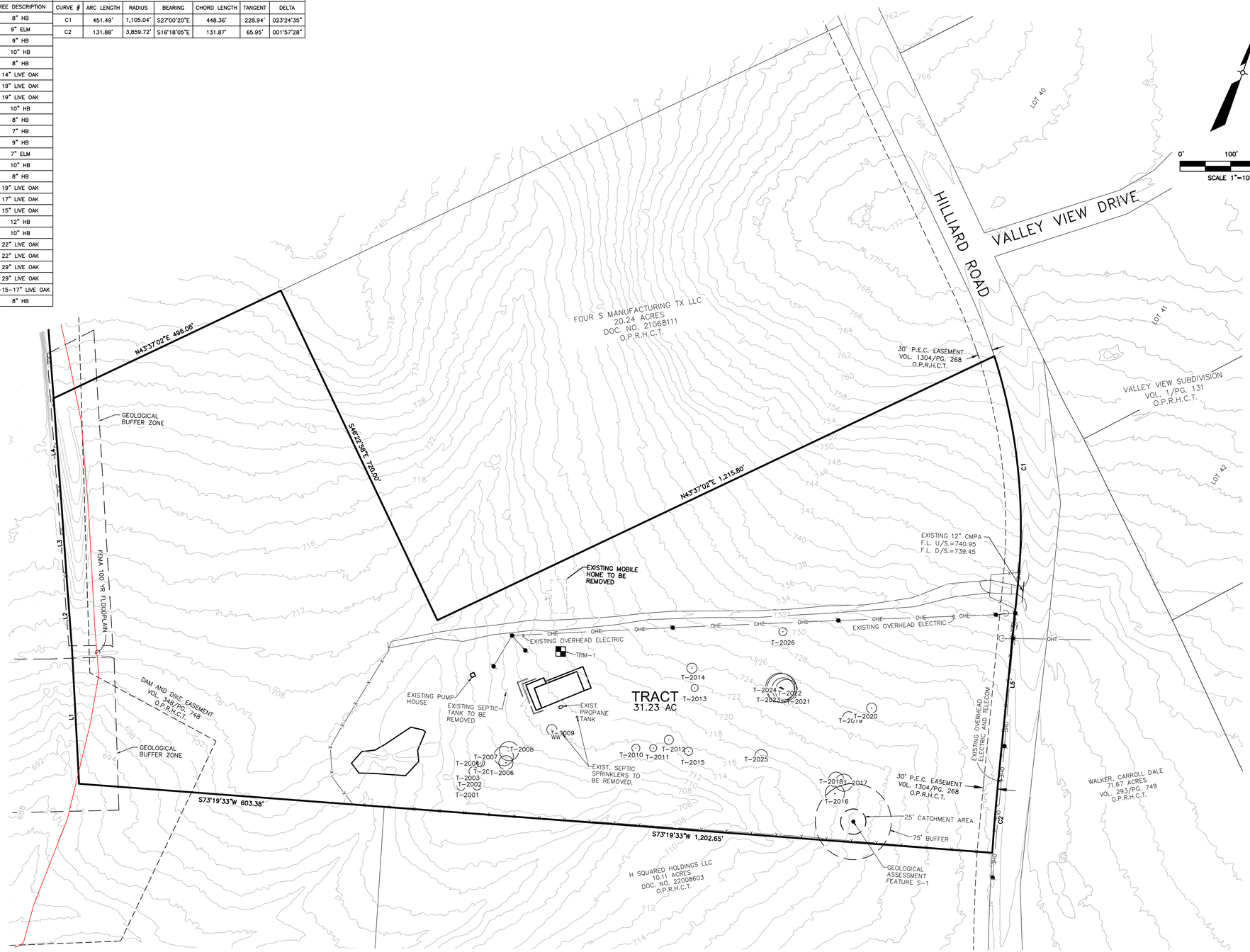
OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 04_HWY_TCEQ NOTES
DESIGN: DR | CHECKED: CDE
DRAWN: DR | APPROVED: HE Jr.
SHEET: 4 OF 26

TREE TABLE – TO REMAIN	
TREE TAG	TREE DESCRIPTION
T–2001	8" HB
T–2002	9" ELM
T–2003	9" HB
T–2004	10" HB
T–2005	8" HB
T–2006	14" LIVE OAK
T–2007	19" LIVE OAK
T–2008	19" LIVE OAK
T–2009	10" HB
T–2010	8" HB
T–2011	7" HB
T–2012	9" HB
T–2013	7" ELM
T–2014	10" HB
T–2015	8" HB
T–2016	19" LIVE OAK
T–2017	17" LIVE OAK
T–2018	15" LIVE OAK
T–2019	12" HB
T–2020	10" HB
T–2021	22" LIVE OAK
T–2022	22" LIVE OAK
T–2023	29" LIVE OAK
T–2024	29" LIVE OAK
T–2025	12–15–17" LIVE OAK
T–2026	8" HB

CURVE TABLE						
CURVE #	ARC LENGTH	RADIUS	BEARING	CHORD LENGTH	TANGENT	DELTA
C1	451.49'	1,105.04'	S27°00'20"E	448.36'	228.94'	023°24'35"
C2	131.88'	3,859.72'	S16°18'05"E	131.87'	65.95'	001°57'28"



LEGAL DESCRIPTION:

BEING THE REMAINING 31.23 ACRE TRACT OF LAND OUT OF THE ELIJAH CLARK SURVEY, ABSTRACT NO. 80 IN HAYS COUNTY, TEXAS, CONVEYED BY SPECIAL WARRANTY DEED TO BYRDNEST VENTURES LLC., RECORDED IN DOCUMENT NO. 21052047 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS.

TEMPORARY BENCHMARK:

TBM-1: 60 D NAIL LOCATED APPROXIMATELY 160' SOUTHEAST OF THE NORTHWESTERN PROPERTY BOUNDARY.

NORTHING: 13,888,779.7423

EASTING: 2,299,121.8486

SOURCE:

TOPOGRAPHIC INFORMATION SHOWN ON THIS DRAWING IS BASED ON LIDAR FROM TEXAS NATURAL RESOURCES INFORMATION SYSTEMS.

LEGEND

EXISTING	DESCRIPTION
	BOUNDARY LINE
	EASEMENT BOUNDARY
915	CONTOURS
	LOT LINE
	CENTER LINE OF DITCH
TEL	TELEPHONE LINE
	TELEPHONE PEDESTAL
W	WATER LINE
	WATER VALVE
	FIRE HYDRANT
	WATER METER
WW	WASTEWATER LINE
FM	FORCE MAIN
	WASTEWATER MANHOLE
C.O.	WASTEWATER CLEANOUT
	WASTEWATER SERVICE
F.V.	FLUSH VALVE
	AIR RELEASE VALVE
	EXISTING GAS RISER
V	EXISTING IRRIGATION VALVE
OHE	OVER HEAD ELECTRIC
OHT	OVER HEAD TELEPHONE
	POWER POLE
	GUY WIRE
SS	STORM SEWER
	CMP/ RCP PIPES
ATT	AT&T LINE
	FIBER OPTIC CABLE
	PAVEMENT
	CONCRETE
	LIGHT POLE
	EXISTING TREE TO REMAIN
	EXISTING TREE TO BE REMOVED
	CHAIN LINK FENCE
	WOOD FENCE
	BARB WIRE FENCE
	TRAFFIC FLOW
	TXDOT MONUMENT

DATE:	BY:	DESCRIPTION	REVISION

STATE OF TEXAS
HUGO ELIZONDO, JR.
69781
LICENSED PROFESSIONAL ENGINEER

CUATRO Consultants, LTD.
Registration No.: F-3424
128 Rowell Drive, Suite 208 Phone: (512) 312-5900 Fax: (512) 312-5959
San Marcos, Texas 78666 e-mail: contact@cuatroconsultants.com

OVERALL EXISTING CONDITIONS

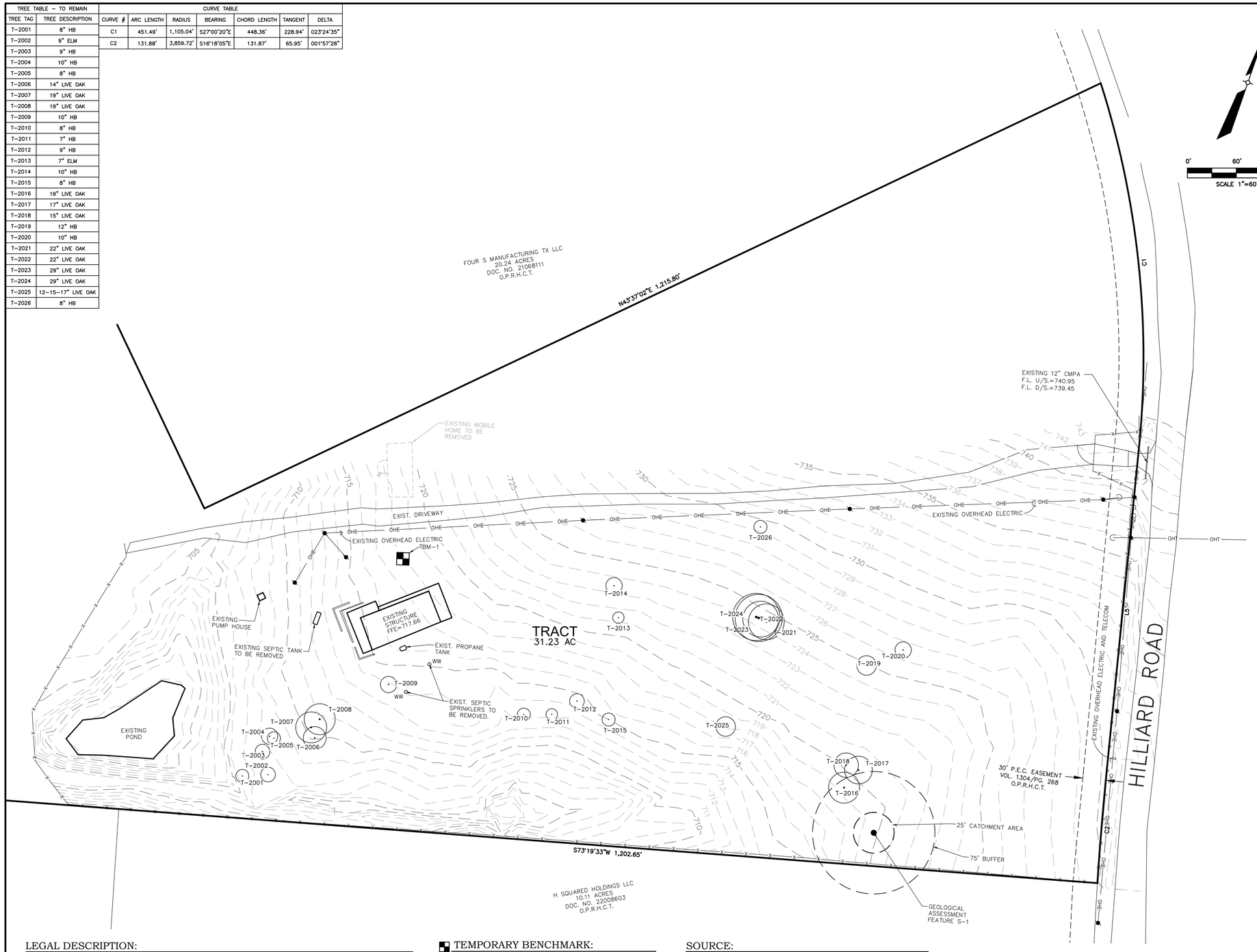
OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23–049
DRAWING'S NAME: 05_HWY_OVERALL EXISTING CONDITIONS
DESIGN: DR | CHECKED: CDE
DRAWN: DR | APPROVED: HE Jr.
SHEET: **5 OF 26**

TREE TABLE – TO REMAIN	
TREE TAG	TREE DESCRIPTION
T–2001	8" HB
T–2002	9" ELM
T–2003	9" HB
T–2004	10" HB
T–2005	8" HB
T–2006	14" LIVE OAK
T–2007	19" LIVE OAK
T–2008	19" LIVE OAK
T–2009	10" HB
T–2010	8" HB
T–2011	7" HB
T–2012	9" HB
T–2013	7" ELM
T–2014	10" HB
T–2015	8" HB
T–2016	19" LIVE OAK
T–2017	17" LIVE OAK
T–2018	15" LIVE OAK
T–2019	12" HB
T–2020	10" HB
T–2021	22" LIVE OAK
T–2022	22" LIVE OAK
T–2023	29" LIVE OAK
T–2024	29" LIVE OAK
T–2025	12–15–17" LIVE OAK
T–2026	8" HB

CURVE TABLE						
CURVE #	ARC LENGTH	RADIUS	BEARING	CHORD LENGTH	TANGENT	DELTA
C1	451.49'	1,105.04'	S27°00'20"E	448.36'	228.94'	023°24'35"
C2	131.88'	3,859.72'	S16°18'05"E	131.87'	65.95'	001°57'28"



LEGAL DESCRIPTION:

BEING THE REMAINING 31.23 ACRE TRACT OF LAND OUT OF THE ELIJAH CLARK SURVEY, ABSTRACT NO. 80 IN HAYS COUNTY, TEXAS, CONVEYED BY SPECIAL WARRANTY DEED TO BYRDNEST VENTURES LLC., RECORDED IN DOCUMENT NO. 21052047 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS.

TEMPORARY BENCHMARK:

TBM-1: 60 D NAIL LOCATED APPROXIMATELY 160' SOUTHEAST OF THE NORTHWESTERN PROPERTY BOUNDARY.

NORTHING: 13,888,779.7423

EASTING: 2,299,121.8486

SOURCE:

TOPOGRAPHIC SURVEY PERFORMED ON 5/1/2023 BY CELCO SURVEYING, FIRM REGISTRATION NO. 10193975.

LEGEND

EXISTING	DESCRIPTION
	BOUNDARY LINE
	EASEMENT BOUNDARY
915	CONTOURS
	LOT LINE
	CENTER LINE OF DITCH
TEL	TELEPHONE LINE
	TELEPHONE PEDESTAL
W	WATER LINE
	WATER VALVE
	FIRE HYDRANT
	WATER METER
WW	WASTEWATER LINE
FM	FORCE MAIN
	WASTEWATER MANHOLE
C.O.	WASTEWATER CLEANOUT
	WASTEWATER SERVICE
F.V.	FLUSH VALVE
	AIR RELEASE VALVE
	EXISTING GAS RISER
V	EXISTING IRRIGATION VALVE
OHE	OVER HEAD ELECTRIC
OHT	OVER HEAD TELEPHONE
	POWER POLE
	GUY WIRE
SS	STORM SEWER
	CMP/ RCP PIPES
ATT	AT&T LINE
	FIBER OPTIC CABLE
	PAVEMENT
	CONCRETE
	LIGHT POLE
	EXISTING TREE TO REMAIN
	EXISTING TREE TO BE REMOVED
	CHAIN LINK FENCE
	WOOD FENCE
	BARB WIRE FENCE
	TRAFFIC FLOW
	TXDOT MONUMENT

DATE:	BY:	DESCRIPTION	REVISION

STATE OF TEXAS
HUGO ELIZONDO, JR.
69781
LICENSED PROFESSIONAL ENGINEER
8/24/23

EQUATRO Consultants, LTD.
Registration No. F-3524
128 Rowell Drive, Suite 208 Phone: (512) 312-5900 Fax: (512) 312-5959
San Marcos, Texas 78666 e-mail: customerservice@equatro.com

SITE SPECIFIC EXISTING CONDITIONS

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE:	AUGUST, 2023
PROJECT:	23–049
DRAWING'S NAME:	06_HWY_SITE EXISTING CONDITIONS
DESIGN: DR	CHECKED: CDE
DRAWN: DR	APPROVED: HE Jr.
SHEET:	6 OF 26

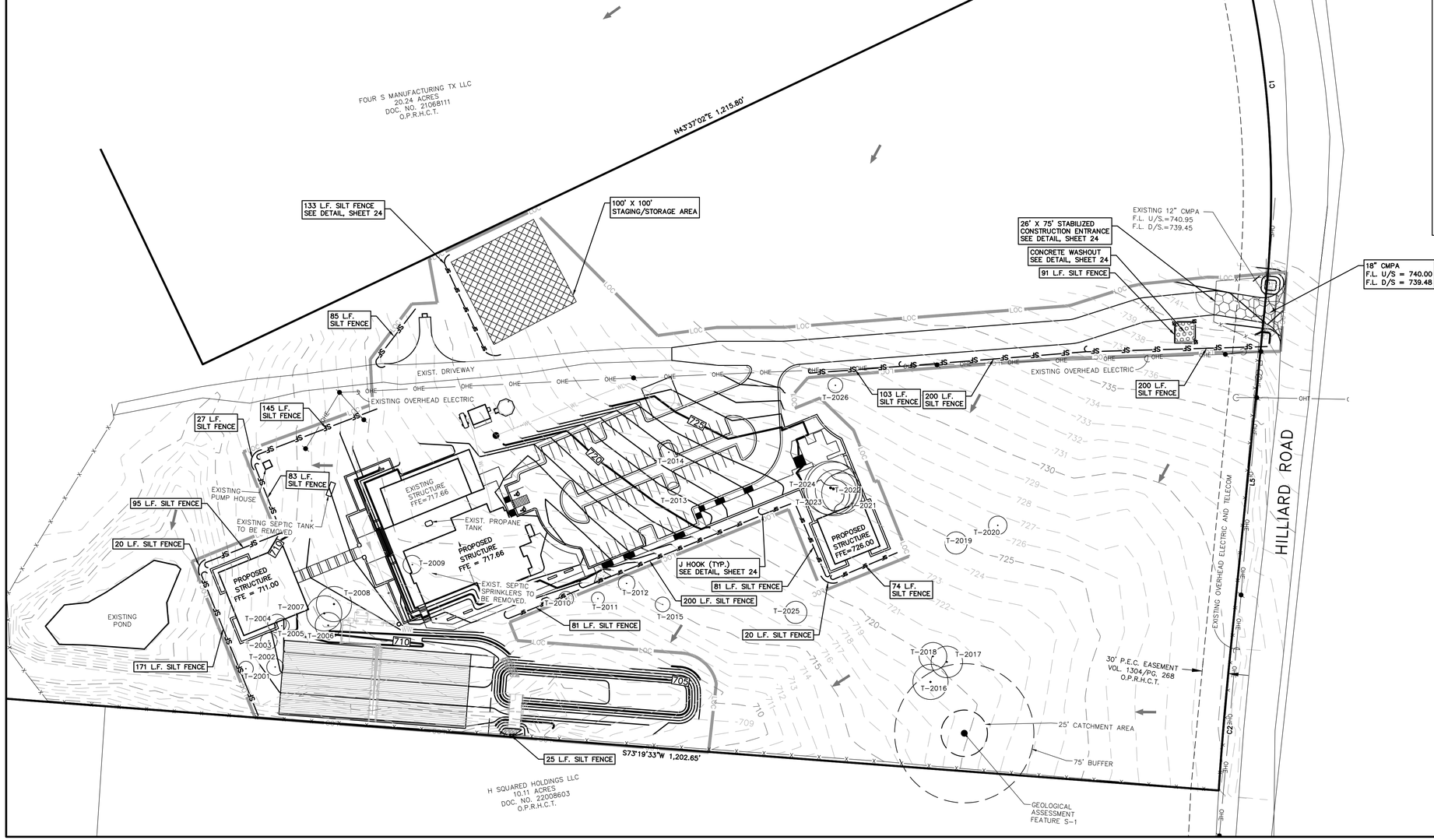
SEQUENCE OF CONSTRUCTION:

NO CLEARING OR ROUGH GRADING MAY BE DONE UNTIL THE APPROVED EROSION AND SEDIMENTATION CONTROLS ARE IN PLACE.

1. INSTALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS AND STABILIZED CONSTRUCTION ENTRANCE.
2. HOLD PRE-CONSTRUCTION CONFERENCE.
3. COMPLETE MASS EXCAVATION AND GRADING OF SITE.
4. INSTALL ALL UTILITIES IN RIGHTS-OF-WAY AND UNDER PROPOSED PAVEMENT/ CURB.
5. RE-GRADE AND COMPACT SUBGRADE. MEET WITH ENGINEER'S REPRESENTATIVE AND GEOTECHNICAL ENGINEER TO DETERMINE AREAS OF DIFFERING PAVEMENT SECTION THICKNESS OR SUBGRADE PREPARATION IF CALLED FOR IN THE GEOTECHNICAL REPORT.
6. CONDUCT PROOFROLL OF SUBGRADE.
7. INSURE ALL UNDERGROUND UTILITY CROSSINGS ARE IN PLACE INCLUDING SLEEVES FOR DRY UTILITIES AND INSTALL FIRST COURSE OF BASE.
8. CONSTRUCT URBAN TAPER AND TXDOT DRIVEWAY.
9. INSTALL CURBS, RIP-RAP AND MISCELLANEOUS CONCRETE.
10. INSTALL SECOND COURSE OF BASE.
11. LAY ASPHALT OR CONCRETE PAVEMENT.
12. FINAL GRADE ANY DITCHES AND PARKWAYS.
13. RE-VEGETATE ALL DISTURBED AREAS. DISPOSE OF SPOILS IN AN APPROVED MANNER.
14. SCHEDULE A FINAL INSPECTION WITH ENGINEER'S REPRESENTATIVE AND LOCAL INSPECTOR, AS APPLICABLE.
15. AFTER ACCEPTANCE OF CONSTRUCTION, TEMPORARY EROSION CONTROLS SHALL BE REMOVED.

EROSION CONTROL NOTES:

1. CONTRACTOR SHALL INSTALL AND MAINTAIN SCE THROUGHOUT PROJECT. PRIOR TO BASE INSTALLATION IN THIS AREA, REMOVE ROCK ENTRANCE AND PLACE BASE. SITE SHOULD BE PAVED AS SOON AS PRACTICALLY POSSIBLE.
2. SEE SWPPP, PREPARED FOR THIS PROJECT BY OTHERS FOR OTHER TPDES PERMIT REQUIREMENTS.
3. SEE SEEDING FOR EROSION CONTROL, SHEET 3 AND FOR DETAILS SEE SHEET 24.
4. LOCATION OF CONTROLS IS SHOWN FOR SCHEMATIC REPRESENTATION ONLY. CONTRACTOR IS RESPONSIBLE FOR INSTALLING FENCE WITHIN PROJECT SITE AND AT EFFECTIVE LOCATIONS.
5. CONCRETE WASHOUT AREA SHALL HAVE A PLASTIC LINER, AND MUST BE CLEANED OUT WHEN FILLED TO GROUND LEVEL OR ONCE FILLED TO THE TOP OF THE ABOVE GRADE FRAME.
6. CONCRETE WASHOUT PIT SHALL HAVE A SIGN INDICATING "CONCRETE WASHOUT PIT".
7. CONTRACTOR SHALL INSTALL SILT FENCE AT UPSTREAM CULVERT HEADWALLS AFTER INSTALLATION.
8. ANY DISTURBED AREAS ARE TO BE REVEGETATED.



REFERENCE NOTES:

1. FOR MASTER DRAINAGE PLAN, SEE SHEET 9.
2. FOR SITE PLAN, SEE SHEET 10.
3. FOR GRADING PLAN, SEE SHEETS 14 AND 15.

N

0' 60' 120'

SCALE 1"=60'

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		BOUNDARY LINE
		EASEMENT BOUNDARY
915	915	CONTOURS
		LOT LINE
		CENTER LINE OF DITCH
WL	WL	WATER LINE
		WATER VALVE
		FIRE HYDRANT
FV	FV	WATER METER
FV	FV	FLUSH VALVE
		AIR RELEASE VALVE
		WASTEWATER LINE
		FORCE MAIN
C.O.	C.O.	MANHOLE
C.O.	C.O.	WASTEWATER CLEANOUT
		WASTEWATER SERVICE
OHE	OHE	OVERHEAD ELECTRIC
UE	UE	UNDERGROUND ELECTRIC
		TRANSFORMER BOX
L.P.	L.P.	LIGHT POLE
		POWER POLE
		GUY WIRE
		STORM SEWER
		CMP/ RCP PIPES
TEL	TEL	OVER HEAD TELEPHONE
FOC	FOC	FIBER OPTIC CABLE
GAS	GAS	GAS LINE
		PAVEMENT (HMAC)
		CONCRETE
		CHAIN LINK FENCE
		WOOD FENCE
		BARBED WIRE FENCE
		TRAFFIC FLOW
		HANDICAP SPACE
	LOC	LIMITS OF CONSTRUCTION
	SF	SILT FENCE
		STABILIZED CONSTRUCTION ENTRANCE
		STAGING/STORAGE AREA
		INLET PROTECTION
		ROCK BERM
		DRAINAGE FLOW

DATE:	BY:	DESCRIPTION	REVISION

STATE OF TEXAS
HUGO ELIZONDO, JR.
69781
LICENSED
PROFESSIONAL
ENGINEER
8-31-2023

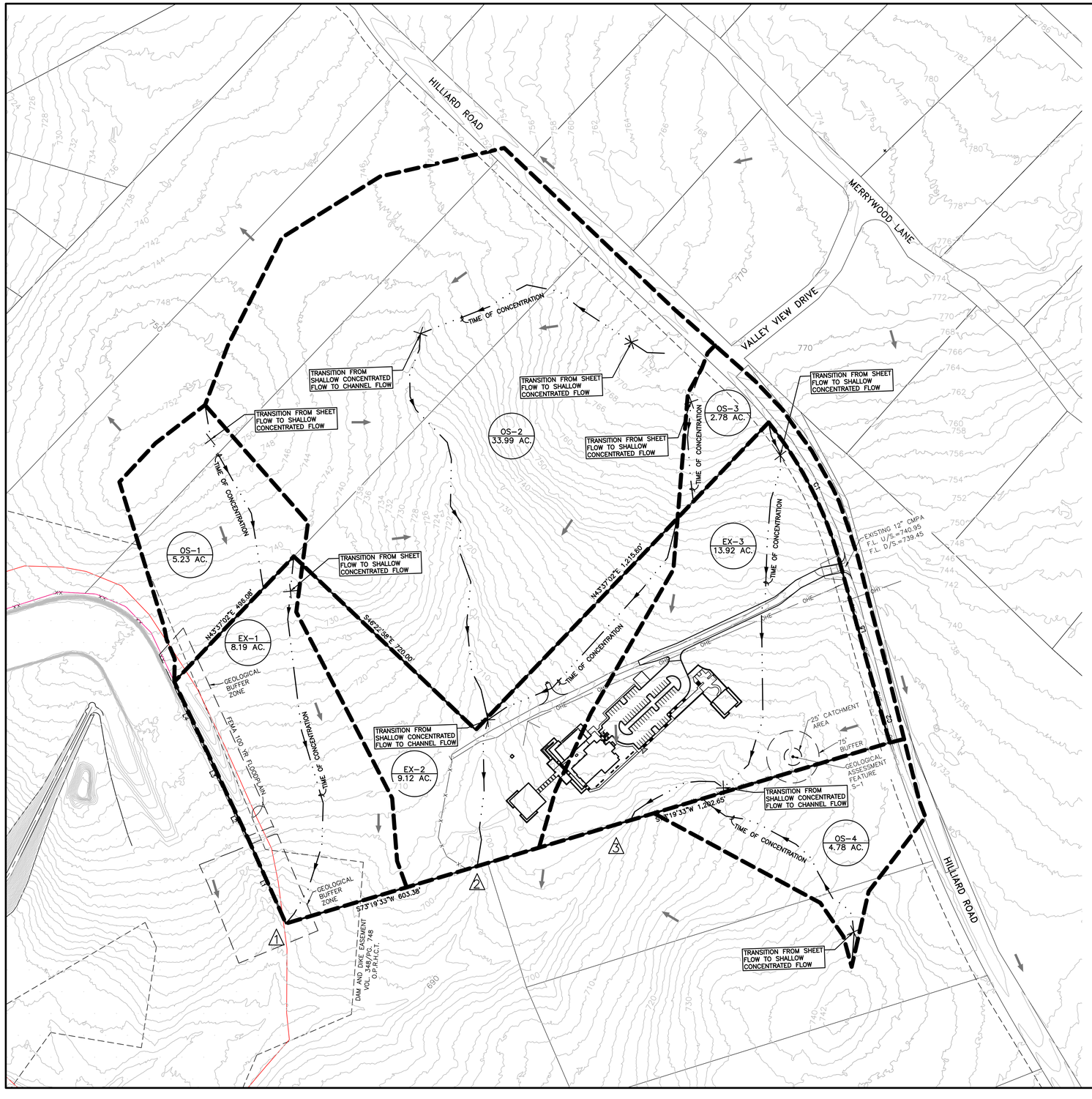
CUATRO Consultants, LTD.
Registration No. F-3524
135 Rowena, Suite 208 Phone: (512) 912-5000 Fax: (512) 912-5999
San Marcos, Texas 78666 E-mail: contact@cuatroconsultants.com

EROSION AND SEDIMENTATON CONTROL

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRONEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE:	AUGUST, 2023
PROJECT:	23-049
DRAWING'S NAME:	07_HWY_EROSION AND SEDIMENTATION CONTROL
DESIGN: DR	CHECKED: CDE
DRAWN: DR	APPROVED: HE Jr.
SHEET:	7 OF 26



N

0' 150' 300'

SCALE 1"=150'

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		BOUNDARY LINE
		EASEMENT BOUNDARY
915	915	CONTOURS
		LOT LINE
		CENTER LINE OF DITCH
WL	WL	WATER LINE
		WATER VALVE
		FIRE HYDRANT
		WATER METER
FV	FV	FLUSH VALVE
		AIR RELEASE VALVE
		WASTEWATER LINE
		FORCE MAIN
C.O.	C.O.	MANHOLE
C.O.	C.O.	WASTEWATER CLEANOUT
		WASTEWATER SERVICE
OHE	OHE	OVERHEAD ELECTRIC
UE	UE	UNDERGROUND ELECTRIC
		TRANSFORMER BOX
L.P.	L.P.	LIGHT POLE
		POWER POLE
		GUY WIRE
		STORM SEWER
		CMP/ RCP PIPES
TEL	TEL	OVER HEAD TELEPHONE
FOC	FOC	FIBER OPTIC CABLE
GAS	GAS	GAS LINE
		PAVEMENT (HMAC)
		CONCRETE
		CHAIN LINK FENCE
		WOOD FENCE
		BARBED WIRE FENCE
		DRAINAGE BOUNDARY
		TIME OF CONCENTRATION
		DRAINAGE FLOW DIRECTION
		PROPOSED DRAINAGE EASEMENT
DA-1 XX.XX AC.	DA-1 XX.XX AC.	DRAINAGE AREA
1	1	POINT OF CONCENTRATION

ATLAS 14 PRECIPITATION FREQUENCY

Run-off Values	PRECIPITATION (INCHES)
2 Year	4.18
10 Year	6.97
25 Year	9.13
100 Year	13.30

EXISTING DRAINAGE CALCULATIONS

Time of Concentration (TR-55 method) & Run-off Values (SCS Method)

Subbasin		OS-1	OS-2	OS-3	OS-4	EX-1	EX-2	EX-3
Area	sf	227,819	1,480,604	121,097	208,217	356,756	397,267	606,355
	ac	5.23	33.99	2.78	4.78	8.19	9.12	13.92
	sq mi	0.00817	0.05311	0.00434	0.00747	0.01280	0.01425	0.02175
Impervious	sf	0	19,454	37,484	3,331	6,143	32,373	15,035
Impervious	%	0.00%	1.31%	30.95%	1.60%	1.72%	8.15%	2.48%
Pervious	Cn	73	73	73	73	77	77	73
Composite	Cn	73	73	81	73	77	79	74
Retention	in	3.70	3.64	2.39	3.62	2.93	2.70	3.58
Initial Abstraction	in	0.740	0.727	0.477	0.725	0.585	0.541	0.717
Sheet Flow								
Slope	ft/ft	0.015	0.025	0.010	0.035	0.060	0.080	0.060
Length	ft.	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Roughness	n	0.28	0.28	0.28	0.28	0.15	0.15	0.15
P2 (Atlas-14)	in	4.18	4.18	4.18	4.18	4.18	4.18	4.18
Time	min.	15.85	12.92	18.64	11.29	5.52	4.92	5.52
Shallow Concentrated								
Slope	ft/ft	0.045	0.048	0.054	0.044	0.044	0.051	0.048
Length	ft.	1374.70	687.17	1119.16	681.71	989.00	721.95	1001.34
Paved?	p/u	u	u	u	u	u	u	u
Time	min.	6.69	3.24	4.99	3.36	4.90	3.30	4.72
Channel Flow								
Slope	ft/ft	0.000	0.024	0.025	0.021	0.000	0.019	0.026
Hydraulic Radius	ft.	0.0000	1.1955	0.8972	0.8972	0.0000	1.0480	0.8972
Roughness	n	0.060	0.060	0.060	0.060	0.060	0.060	0.060
Velocity	fps	0.00	4.37	3.66	3.32	0.00	3.52	3.72
Length	ft.	0.00	1600.13	278.35	194.16	0.00	423.20	309.08
Time	min.	0.00	6.10	1.27	0.98	0.00	2.00	1.39
Summary								
Tc	min.	22.54	22.26	24.90	15.62	10.42	10.23	11.63
Lag Time	min.	13.52	13.36	14.94	9.37	6.25	6.14	6.98
Run-off Values								
2 Year	cfs	6.10	40.77	4.52	6.41	14.38	17.00	20.67
10 Year	cfs	14.87	98.00	9.00	15.42	31.38	35.82	48.48
25 Year	cfs	22.11	145.24	12.63	22.86	44.94	50.83	71.29
100 Year	cfs	36.35	238.07	19.75	37.49	71.14	80.28	115.95

Notes:

1. Atlas 14 precipitation values are used to determine storm water runoff.
2. Values below are from the City of Austin Drainage Criteria Manual.
   - Pervious CN value of 73 is based on brush cover in good condition and 77 is based on brush cover in fair conditionin, both in Type D soil.
   - Sheet flow roughness values of 0.15 is based on short grass-praire.
   - Sheet flow roughness values of 0.28 is based on a 50/50 mixture of short grass-praire and light underbrush.
   - Channel roughness value of 0.06 is based on native grasses and vegetation not regularly mowed.

EXISTING DISCHARGE SUMMARY TABLE

Run-off Values		POC-1	POC-2	POC-3
2 Year	cfs	19.65	54.48	31.02
10 Year	cfs	44.66	126.39	71.81
25 Year	cfs	64.92	185.26	105.30
100 Year	cfs	104.37	300.48	170.98

REFERENCE NOTES:

1. FOR MASTER DRAINAGE PLAN, SEE SHEET 9.
2. FOR POND LAYOUT AND CALCULATIONS, SEE SHEET 22.

REVISION	DESCRIPTION	BY:	DATE:

HUGO ELIZONDO, JR. 69781 LICENSED PROFESSIONAL ENGINEER

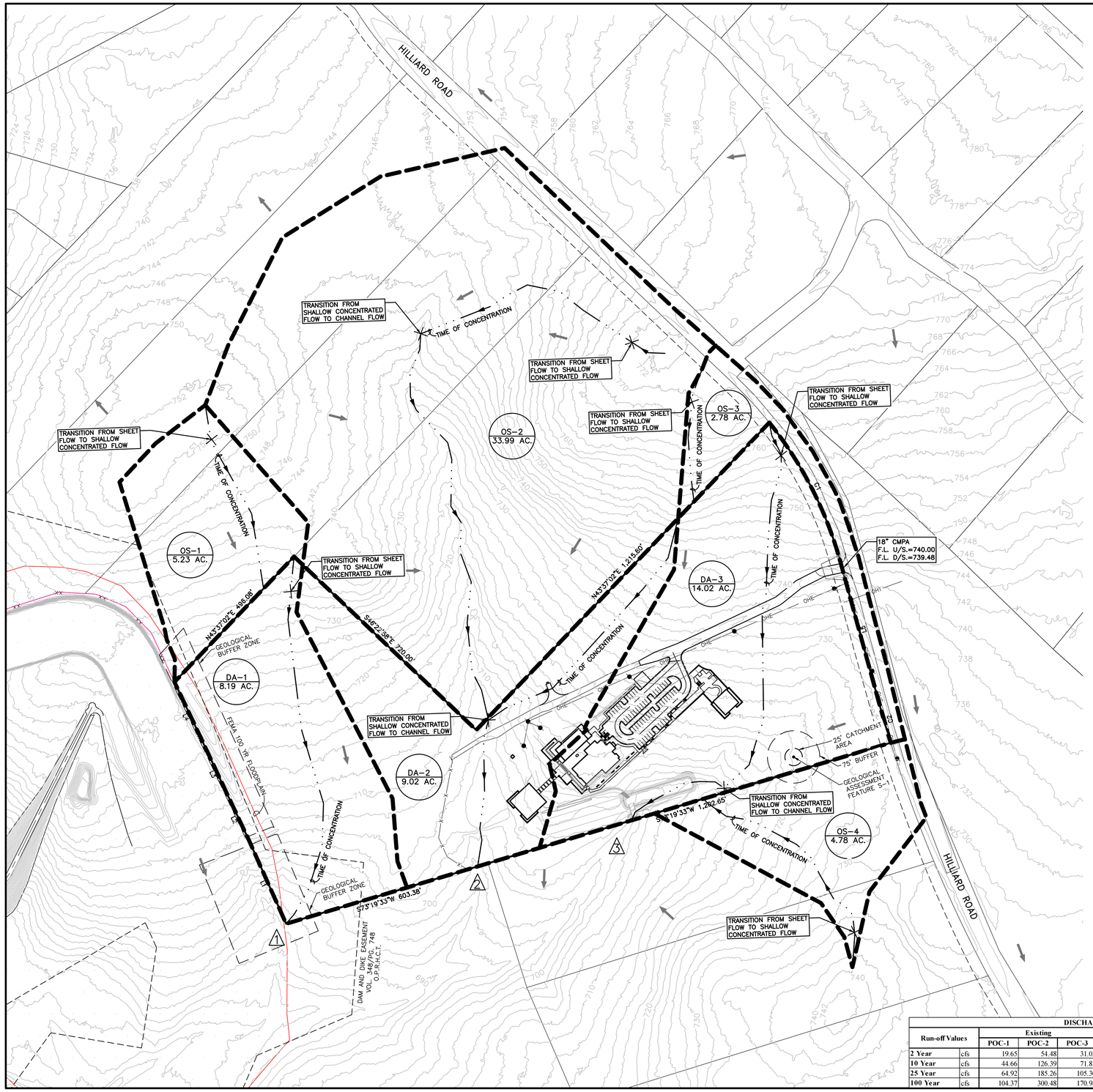
CUATRO Consultants, LTD.
Registration No. F-3524
128 Rowena, Dr., Suite 208 Phone: (512) 312-5500 Fax: (512) 312-5599
San Marcos, Texas 78666 e-mail: contact@cuatroconsultants.com

EXISTING DRAINAGE CONDITIONS

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 08_HWY_EXISTING DRAINAGE CONDITIONS
DESIGN: KAB | CHECKED: KAB
DRAWN: KAB | APPROVED: HE Jr.
SHEET: 8 OF 26



N

0' 150' 300'

SCALE 1"=150'

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		BOUNDARY LINE
		EASEMENT BOUNDARY
915	915	CONTOURS
		LOT LINE
		CENTER LINE OF DITCH
WL	WL	WATER LINE
		WATER VALVE
		FIRE HYDRANT
		WATER METER
FV	FV	FLUSH VALVE
		AIR RELEASE VALVE
		WASTEWATER LINE
		FORCE MAIN
C.O.	C.O.	MANHOLE
C.O.	C.O.	WASTEWATER CLEANOUT
		WASTEWATER SERVICE
OHE	OHE	OVERHEAD ELECTRIC
UE	UE	UNDERGROUND ELECTRIC
		TRANSFORMER BOX
L.P.	L.P.	LIGHT POLE
		POWER POLE
		GUY WIRE
		STORM SEWER
		CMP/ RCP PIPES
TEL	TEL	OVER HEAD TELEPHONE
FOC	FOC	FIBER OPTIC CABLE
GAS	GAS	GAS LINE
		PAVEMENT (HMAC)
		CONCRETE
		CHAIN LINK FENCE
		WOOD FENCE
		BARBED WIRE FENCE
		DRAINAGE BOUNDARY
		TIME OF CONCENTRATION
		DRAINAGE FLOW DIRECTION
		PROPOSED DRAINAGE EASEMENT
DA-1 XXXX AC	DA-1 XXXX AC	DRAINAGE AREA
		POINT OF CONCENTRATION

ATLAS 14 PRECIPITATION FREQUENCY

Run-off Values	PRECIPITATION (INCHES)
2 Year	4.18
10 Year	6.97
25 Year	9.13
100 Year	13.30

PROPOSED DRAINAGE CALCULATIONS

Time of Concentration (TR-55 method) & Run-off Values (SCS Method)

Subbasin		OS-1	OS-2	OS-3	OS-4	DA-1	DA-2	DA-3
Area	sf	227,819	1,480,604	121,097	208,217	356,756	392,911	610,711
	ac	5.23	33.99	2.78	4.78	8.19	9.02	14.02
	sq mi	0.00817	0.05311	0.00434	0.00747	0.01280	0.01409	0.02191
Impervious	sf	0	19,454	37,484	3,331	6,143	25,539	91,607
Impervious	%	0.00%	1.31%	30.95%	1.60%	1.72%	6.50%	15.00%
Pervious	Cn	73	73	73	73	77	77	73
Composite	Cn	73	73	81	73	77	78	77
Retention	in	3.70	3.64	2.39	3.62	2.93	2.76	3.03
Initial Abstraction	in	0.740	0.727	0.477	0.725	0.585	0.552	0.606
Sheet Flow								
Slope	ft/ft	0.015	0.025	0.010	0.035	0.060	0.080	0.060
Length	ft.	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Roughness	n	0.28	0.28	0.28	0.28	0.15	0.15	0.15
P2 (Atlas-14)	in.	4.18	4.18	4.18	4.18	4.18	4.18	4.18
Time	min.	15.85	12.92	18.64	11.29	5.52	4.92	5.52
Shallow Concentrated								
Slope	ft/ft	0.045	0.048	0.054	0.044	0.044	0.051	0.048
Length	ft.	1374.70	687.17	1119.16	681.71	989.00	721.95	1001.34
Paved?	p/u	u	u	u	u	u	u	u
Time	min.	6.69	3.24	4.99	3.36	4.90	3.30	4.72
Channel Flow								
Slope	ft/ft	0.000	0.024	0.025	0.021	0.000	0.019	0.026
Hydraulic Radius	ft.	0.0000	1.1955	0.8972	0.8972	0.0000	1.0480	0.8972
Roughness	n	0.060	0.060	0.060	0.060	0.060	0.060	0.060
Velocity	fps	0.00	4.37	3.66	3.32	0.00	3.52	3.72
Length	ft.	0.00	1600.13	278.35	194.16	0.00	423.20	309.08
Time	min.	0.00	6.10	1.27	0.98	0.00	2.00	1.39
Summary								
Tc	min.	22.54	22.26	24.90	15.62	10.42	10.23	11.63
Lag Time	min.	13.52	13.36	14.94	9.37	6.25	6.14	6.98
Run-off Values								
2 Year	cfs	6.10	40.77	4.52	6.41	14.38	16.56	24.46
10 Year	cfs	14.87	98.00	9.00	15.42	31.38	35.20	52.40
25 Year	cfs	22.11	145.24	12.63	22.86	44.94	50.05	75.15
100 Year	cfs	36.35	238.07	19.75	37.49	71.14	79.17	119.69

Notes:

1. Atlas 14 precipitation values are used to determine storm water runoff.
2. Values below are from the City of Austin Drainage Criteria Manual.
   - Pervious CN value of 73 is based on brush cover in good condition and 77 is based on brush cover in fair conditionin, both in Type D soil.
   - Sheet flow roughness values of 0.15 is based on short grass-praire.
   - Sheet flow roughness values of 0.28 is based on a 50/50 mixture of short grass-praire and light underbrush.
   - Channel roughness value of 0.06 is based on native grasses and vegetation not regularly mowed.

DISCHARGE SUMMARY TABLE

Run-off Values		Existing			Proposed			Proposed-Routed		
		POC-1	POC-2	POC-3	POC-1	POC-2	POC-3	POC-1	POC-2	POC-3
2 Year	cfs	19.65	54.48	31.02	19.65	54.15	34.81	19.65	54.15	30.43
10 Year	cfs	44.66	126.39	71.81	44.66	125.92	75.73	44.66	125.92	71.81
25 Year	cfs	64.92	185.26	105.30	64.92	184.66	109.17	64.92	184.66	102.90
100 Year	cfs	104.37	300.48	170.98	104.37	299.66	174.72	104.37	299.66	165.45

REFERENCE NOTES:

1. FOR EXISTING DRAINAGE CONDITIONS, SEE SHEET 8.
2. FOR POND LAYOUT AND CALCULATIONS, SEE SHEET 20.

DATE:	BY:	DESCRIPTION	REVISION

HUGO ELIZONDO, JR. 69781 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

CUATRO Consultants, LTD.
Registration No. F-3524
128 Rowell Drive, Suite 208 Phone: (512) 312-5500 Fax: (512) 312-5599
San Marcos, Texas 78666 e-mail: cuatroconsultants@att.net

MASTER DRAINAGE PLAN

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRONEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

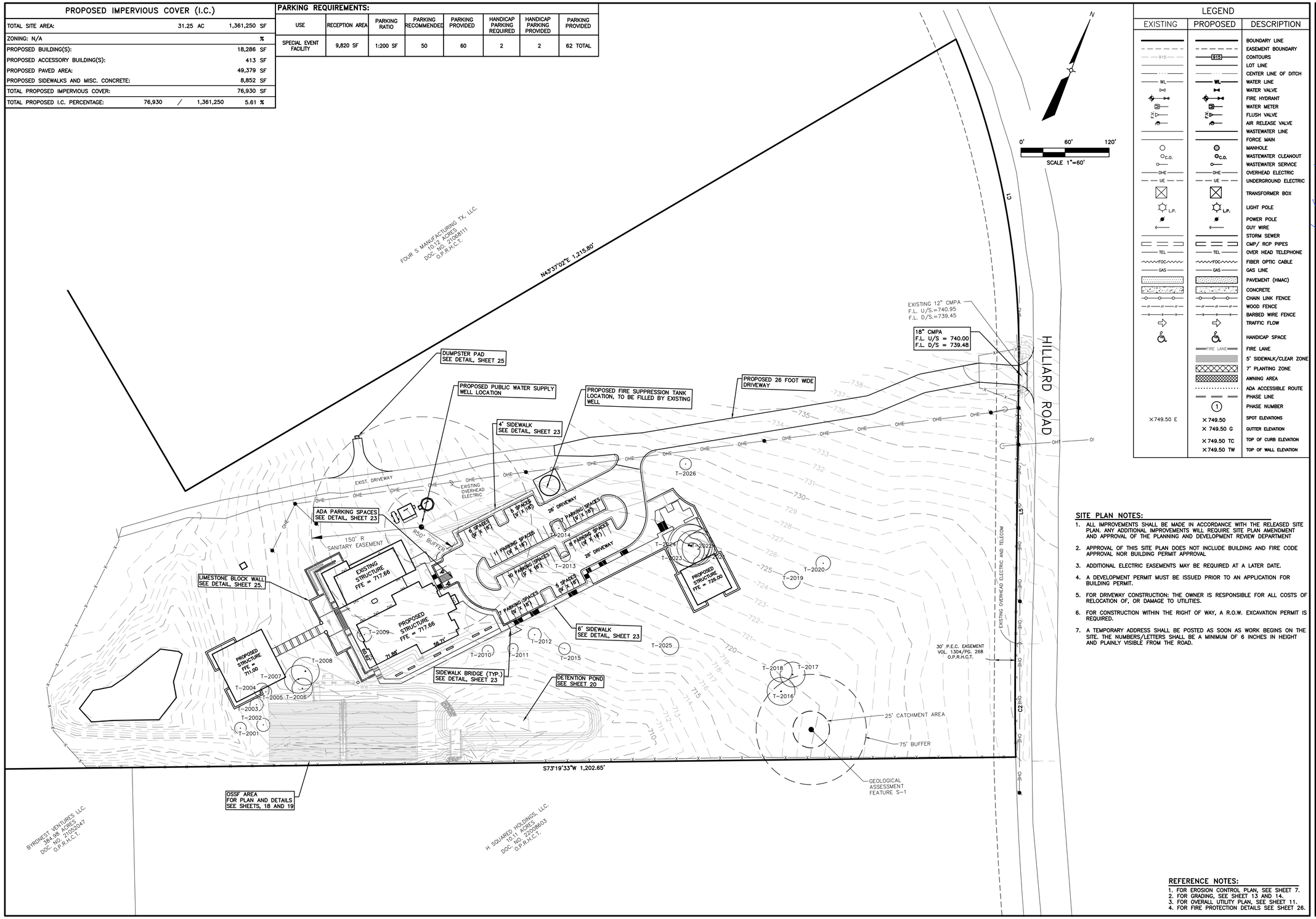
DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 09_HWV_MASTER DRAINAGE PLAN
DESIGN: KAB | CHECKED: KAB
DRAWN: KAB | APPROVED: HE Jr.
SHEET: 9 OF 26

PROPOSED IMPERVIOUS COVER (I.C.)

TOTAL SITE AREA:	31.25 AC		1,361,250 SF
ZONING: N/A			%
PROPOSED BUILDING(S):			18,286 SF
PROPOSED ACCESSORY BUILDING(S):			413 SF
PROPOSED PAVED AREA:			49,379 SF
PROPOSED SIDEWALKS AND MISC. CONCRETE:			8,852 SF
TOTAL PROPOSED IMPERVIOUS COVER:			76,930 SF
TOTAL PROPOSED I.C. PERCENTAGE:	76,930 /	1,361,250	5.61 %

PARKING REQUIREMENTS:

USE	RECEPTION AREA	PARKING RATIO	PARKING RECOMMENDED	PARKING PROVIDED	HANDICAP PARKING REQUIRED	HANDICAP PARKING PROVIDED	PARKING PROVIDED
SPECIAL EVENT FACILITY	9,820 SF	1:200 SF	50	60	2	2	62 TOTAL



LEGEND

EXISTING	PROPOSED	DESCRIPTION
		BOUNDARY LINE
		EASEMENT BOUNDARY
915	915	CONTOURS
		LOT LINE
		CENTER LINE OF DITCH
WL	WL	WATER LINE
		WATER VALVE
		FIRE HYDRANT
		WATER METER
F.V.	F.V.	FLUSH VALVE
		AIR RELEASE VALVE
		WASTEWATER LINE
		FORCE MAIN
		MANHOLE
C.O.	C.O.	WASTEWATER CLEANOUT
		WASTEWATER SERVICE
OHE	OHE	OVERHEAD ELECTRIC
UE	UE	UNDERGROUND ELECTRIC
		TRANSFORMER BOX
L.P.	L.P.	LIGHT POLE
		POWER POLE
		GUY WIRE
		STORM SEWER
		CMP/ RCP PIPES
TEL	TEL	OVER HEAD TELEPHONE
FOC	FOC	FIBER OPTIC CABLE
GAS	GAS	GAS LINE
		PAVEMENT (HMAC)
		CONCRETE
		CHAIN LINK FENCE
		WOOD FENCE
		BARBED WIRE FENCE
		TRAFFIC FLOW
		HANDICAP SPACE
	FIRE LANE	FIRE LANE
		5' SIDEWALK/CLEAR ZONE
		7' PLANTING ZONE
		AWNING AREA
		ADA ACCESSIBLE ROUTE
		PHASE LINE
	1	PHASE NUMBER
×749.50 E	×749.50	SPOT ELEVATIONS
	×749.50 G	GUTTER ELEVATION
	×749.50 TC	TOP OF CURB ELEVATION
	×749.50 TW	TOP OF WALL ELEVATION

SITE PLAN NOTES:

1. ALL IMPROVEMENTS SHALL BE MADE IN ACCORDANCE WITH THE RELEASED SITE PLAN. ANY ADDITIONAL IMPROVEMENTS WILL REQUIRE SITE PLAN AMENDMENT AND APPROVAL OF THE PLANNING AND DEVELOPMENT REVIEW DEPARTMENT
2. APPROVAL OF THIS SITE PLAN DOES NOT INCLUDE BUILDING AND FIRE CODE APPROVAL NOR BUILDING PERMIT APPROVAL
3. ADDITIONAL ELECTRIC EASEMENTS MAY BE REQUIRED AT A LATER DATE.
4. A DEVELOPMENT PERMIT MUST BE ISSUED PRIOR TO AN APPLICATION FOR BUILDING PERMIT.
5. FOR DRIVEWAY CONSTRUCTION: THE OWNER IS RESPONSIBLE FOR ALL COSTS OF RELOCATION OF, OR DAMAGE TO UTILITIES.
6. FOR CONSTRUCTION WITHIN THE RIGHT OF WAY, A R.O.W. EXCAVATION PERMIT IS REQUIRED.
7. A TEMPORARY ADDRESS SHALL BE POSTED AS SOON AS WORK BEGINS ON THE SITE. THE NUMBERS/LETTERS SHALL BE A MINIMUM OF 6 INCHES IN HEIGHT AND PLAINLY VISIBLE FROM THE ROAD.

REFERENCE NOTES:

1. FOR EROSION CONTROL PLAN, SEE SHEET 7.
2. FOR GRADING, SEE SHEET 13 AND 14.
3. FOR OVERALL UTILITY PLAN, SEE SHEET 11.
4. FOR FIRE PROTECTION DETAILS SEE SHEET 26.

DATE:	BY:	DESCRIPTION	REVISION

STATE OF TEXAS
HUGO ELIZONDO, JR.
69781
LICENSED
PROFESSIONAL
ENGINEER
8/31/23

CUATRO Consultants, LTD.
Registration No. F-5324
1235 Roswell, Drive, Suite 208 Phone: (512) 312-5900 Fax: (512) 312-5939
San Marcos, Texas 78666 E-mail: customerservice@cuatroltd.com

SITE PLAN

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

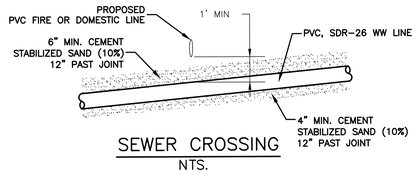
CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE:	AUGUST, 2023
PROJECT:	23-049
DRAWING'S NAME:	10_HWV_SITE PLAN
DESIGN: KAB	CHECKED: CDE
DRAWN: DR	APPROVED: HE Jr.
SHEET:	10 OF 26

PER CHAPTER 290.44 (E)(4)(B)

(IV) WHERE A NEW POTABLE WATERLINE CROSSES A NEW, PRESSURE RATED WASTEWATER MAIN OR LATERAL, ONE SEGMENT OF THE WATERLINE PIPE SHALL BE CENTERED OVER AND SHALL BE PERPENDICULAR TO THE WASTEWATER LINE SUCH THAT THE JOINTS OF THE WATERLINE PIPE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTER LINE OF THE WASTEWATER MAIN OR LATERAL. THE POTABLE WATERLINE SHALL BE AT LEAST SIX INCHES ABOVE THE WASTEWATER MAIN OR LATERAL. WHENEVER POSSIBLE, THE CROSSING SHALL BE CENTERED BETWEEN THE JOINTS OF THE WASTEWATER MAIN OR LATERAL. THE WASTEWATER PIPE SHALL HAVE A MINIMUM PRESSURE RATING OF AT LEAST 150 PSI. THE WASTEWATER MAIN OR LATERAL SHALL BE EMBEDDED IN CEMENT STABILIZED SAND (SEE CLAUSE (V) OF THIS SUBPARAGRAPH) FOR THE TOTAL LENGTH OF ONE PIPE SEGMENT PLUS 12 INCHES BEYOND THE JOINT ON EACH END.

(V) WHERE CEMENT STABILIZED SAND BEDDING IS REQUIRED, THE CEMENT STABILIZED SAND SHALL HAVE A MINIMUM OF 10% CEMENT PER CUBIC YARD OF CEMENT STABILIZED SAND MIXTURE, BASED ON LOOSE DRY WEIGHT VOLUME (AT LEAST 2.5 BAGS OF CEMENT PER CUBIC YARD OF MIXTURE). THE CEMENT STABILIZED SAND BEDDING SHALL BE A MINIMUM OF SIX INCHES ABOVE AND FOUR INCHES BELOW THE WASTEWATER MAIN OR LATERAL. THE USE OF BROWN COLORING IN CEMENT STABILIZED SAND FOR WASTEWATER MAIN OR LATERAL BEDDING IS RECOMMENDED FOR THE IDENTIFICATION OF PRESSURE RATED WASTEWATER MAINS DURING FUTURE CONSTRUCTION.



SEWER CROSSING
NTS.

WASTEWATER CONSTRUCTION NOTES:

A. IF A COLLECTION SYSTEM PARALLELS A PUBLIC WATER SUPPLY PIPE THE FOLLOWING REQUIREMENTS APPLY.

I. IF A COLLECTION SYSTEM PIPE MUST BE CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC MEETING ASTM SPECIFICATIONS WITH AT LEAST A 150 POUNDS PER SQUARE INCH (PSI) PRESSURE RATING FOR BOTH THE PIPE AND JOINTS.
II. A VERTICAL SEPARATION MUST BE AT LEAST 2 FEET BETWEEN THE OUTSIDE DIAMETERS OF THE PIPES.
III. A HORIZONTAL SEPARATION MUST BE AT LEAST 4 FEET BETWEEN OUTSIDE DIAMETERS OF THE PIPES.
IIII. A COLLECTION SYSTEM PIPE MUST BE BELOW A PUBLIC WATER SUPPLY PIPE.

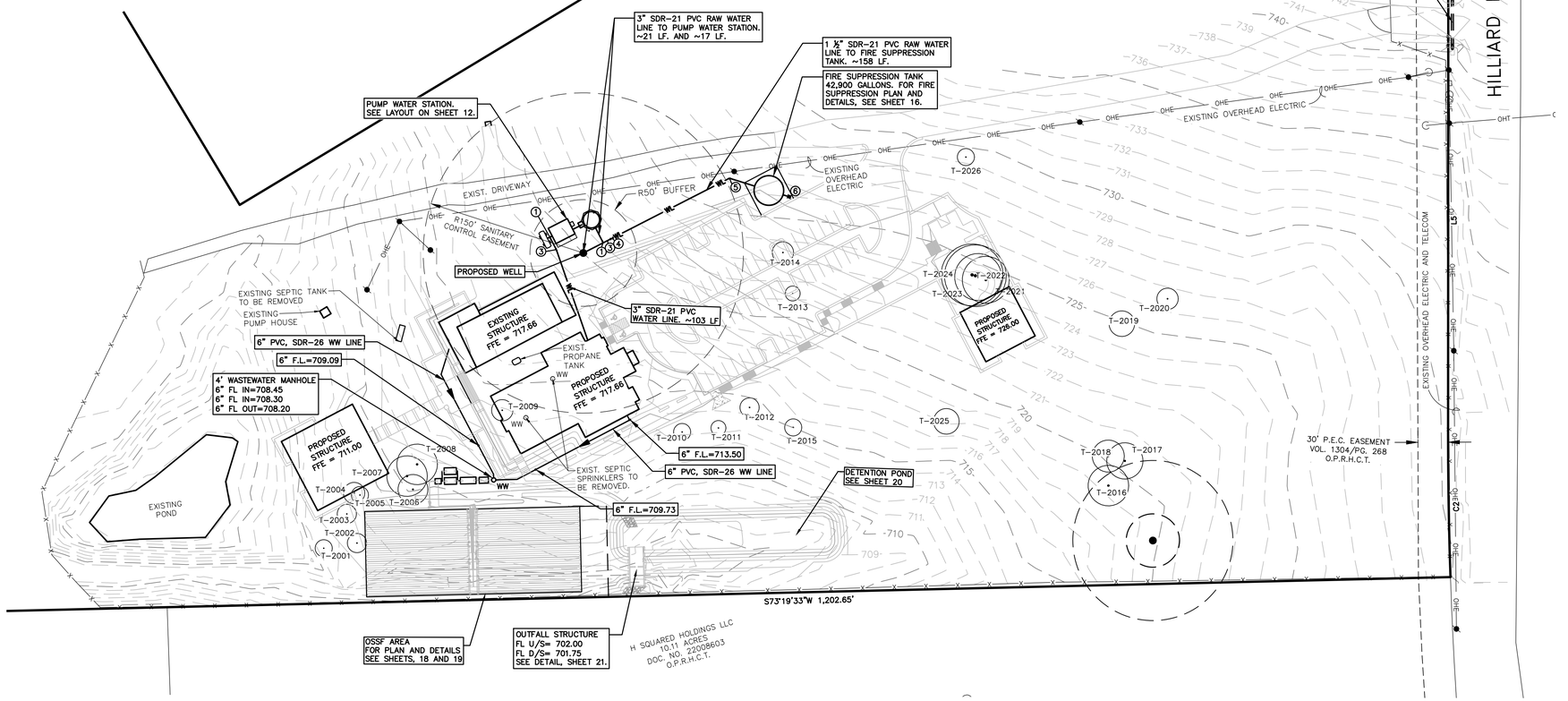
B. IF A COLLECTION SYSTEM PIPE CROSSES A PUBLIC WATER SUPPLY PIPE, THE FOLLOWING REQUIREMENTS APPLY:
I. IF A COLLECTION SYSTEM IS CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC WITH A MINIMUM PRESSURE RATING OF 150 PSI, THE FOLLOWING REQUIREMENTS APPLY:
   A. A MINIMUM SEPARATION DISTANCE IS 6" BETWEEN OUTSIDE DIAMETERS OF THE PIPES
   B. A COLLECTION SYSTEM PIPE MUST BE BELOW A PUBLIC WATER SUPPLY PIPE.
   C. COLLECTION SYSTEM PIPE JOINTS MUST BE LOCATED AS FAR AS POSSIBLE FROM AN INTERSECTION WITH A PUBLIC WATER SUPPLY LINE.

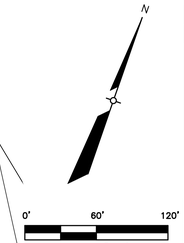
II. IF A COLLECTION SYSTEM PIPE CROSSES UNDER A PUBLIC WATER SUPPLY PIPE AND THE COLLECTION SYSTEM PIPE IS CONSTRUCTED OF ACRYLONITRILE BUTADIENE STYRENE (ABS) TRUSS PIPE, SIMILAR SEMI-RIGID PLASTIC COMPOSITE PIPE, CLAY PIPE, OR CONCRETE PIPE WITH GASKETED JOINTS, THE FOLLOWING REQUIREMENTS APPLY:

   A. A MINIMUM SEPARATION DISTANCE IS 2 FEET.
   B. IF A COLLECTION SYSTEM PIPE IS WITHIN 9 FEET OF A PUBLIC WATER SUPPLY PIPE, THE INITIAL BACKFILL AROUND THE COLLECTION SYSTEM PIPE MUST BE:
      1. SAND STABILIZER WITH 2 OR MORE 80 POUND BAGS OF CEMENT PER CUBIC YARD OF SAND FOR ANY SECTION OF COLLECTION SYSTEM PIPE WITH IN 9 FEET OF A PUBLIC WATER SUPPLY PIPE.
      2. INSTALLED FROM ONE QUARTER OF THE DIAMETER OF THE COLLECTION SYSTEM PIPE BELOW THE CENTERLINE OF THE COLLECTION SYSTEM PIPE TO ONE PIPE DIAMETER (BUT NOT LESS THAN 12") ABOVE THE TOP OF THE COLLECTION SYSTEM PIPE.

III. IF A COLLECTION SYSTEM CROSSES OVER A PUBLIC WATER SUPPLY PIPE, ONE OF THE FOLLOWING PROCEDURES MUST BE FOLLOWED:

(a). EACH PORTION OF A COLLECTION SYSTEM PIPE WITHIN 9 FEET OF A PUBLIC WATER SUPPLY PIPE MUST BE CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC PIPE WITH AT LEAST A 150 PSI PRESSURE RATING USING APPROPRIATE ADAPTERS.
(b). A COLLECTION SYSTEM PIPE MUST BE ENCASED IN A JOINT OA AT LEAST 150 PSI PRESSURE CLASS PIPE THAT IS:
   1. CENTERED ON THE CROSSING;
   2. SEALED AT BOTH ENDS WITH CEMENT GROUT OR MANUFACTURED SEAL;
   3. AT LEAST 18 FEET LONG;
   4. AT LEAST 2 NOMINAL SIZES LARGER THAN THE WASTEWATER COLLECTION PIPE;
   5. SUPPORTED BY SPACERS BETWEEN THE COLLECTION SYSTEM PIPE AND THE ENCASING PIPE AT A MINIMUM OF 5 FOOT INTERVALS.





LEGEND

EXISTING	PROPOSED	DESCRIPTION
		PROPERTY LINE
		EASEMENT BOUNDARY
915	915	CONTOURS
		LOT LINE
		CENTER LINE OF DITCH
TEL	TEL	TELEPHONE LINE
W	W	WATER LINE
		WATER VALVE
		FIRE HYDRANT
		WATER METER
		TRANSFORMER BOX
WW	WW	WASTEWATER LINE
FM	FM	FORCE MAIN
C.O.	C.O.	WASTEWATER MANHOLE
		WASTEWATER CLEANOUT
		WASTEWATER SERVICE
FV	FV	FLUSH VALVE
		AIR RELEASE VALVE
OHE	OHE	OVER HEAD ELECTRIC
UE	UE	UNDERGROUND ELECTRIC
OHT	OHT	OVER HEAD TELEPHONE
		POWER POLE
		GUY WIRE
SS		CMP/ RCP/ HDPE PIPES
ATT	ATT	AT&T LINE
FOC	FOC	FIBER OPTIC CABLE
GAS	GAS	GAS LINE
		PAVEMENT
		CONCRETE
L.P.	L.P.	LIGHT POLE
		CHAIN LINK FENCE
		WOOD FENCE
		BARB WIRE FENCE
		TRAFFIC FLOW
		HANDICAP SPACE

WATER FITTING SCHEDULE

1. 3" TEE, M.J.
2. 3" X 1 ½" PVC ELBOW, S.W.
3. 3" X 1 ½" REDUCER, M.J.
4. 1 ½" GATE VALVE WITH VALVE BOX, M.J.
5. 1 ½" X 45° PVC ELBOW, S.W.
6. TANK DISCHARGE CONNECTION

REFERENCE NOTES:

1. FOR MASTER DRAINAGE PLAN, SEE SHEET 9.
2. FOR PUMP WATER STATION, SEE SHEET 12.
3. FOR OSSF PLAN AND DETAILS, SEE SHEETS 18 AND 19.
4. FOR WATER AND WASTEWATER DETAILS, SEE SHEET 24.

DATE:	BY:	DESCRIPTION	REVISION

STATE OF TEXAS · HUGO ELIZONDO, JR. · 69781 · LICENSED PROFESSIONAL ENGINEER · 8/31/2023

CUATRO Consultants, LTD.
Registration No. F-3424
1351 Roosevelt, Drive, Suite 208 Phone: (512) 912-5900 Fax: (512) 912-5959
San Marcos, Texas 78666 e-mail: contact@cuatroconsultants.com

UTILITY LAYOUT

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE:	AUGUST, 2023
PROJECT:	23-049
DRAWING'S NAME:	11_HWV_UTILITY LAYOUT
DESIGN: KAB	CHECKED: KAB
DRAWN: DR	APPROVED: HE Jr.
SHEET:	11 OF 26

TCEQ HYDROPNEUMATIC PRESSURE TANK GENERAL CONSTRUCTION NOTES

1. These hydropneumatic pressure facilities must be constructed in accordance with the Texas Commission on Environmental Quality (TCEQ) Rules and Regulations for Public Water Systems 30 Texas Administrative Code (TAC) Chapter 290 Subchapter D. When conflicts are noted with local standards, the more stringent requirement shall be applied. At a minimum, construction for public water systems must always meet TCEQ's "Rules and Regulations for Public Water Systems."

2. All hydropneumatic tanks must be located wholly above grade and must be of steel construction with welded seams except as providing in note № 12 of these construction notes.

3. Metal thickness for pressure tanks shall be sufficient to withstand the highest expected working pressures with a four to one factor of safety. Tanks for 1000 gallon capacity or larger must meet the standards of the American Society of Mechanical Engineers (ASME) Section VIII, Division 1 Codes and Construction Regulations and must have an access port of periodic inspections. An ASME name plate must be permanently attached to those tanks. Tanks installed before July 1, 1988, are exempt from the ASME coding requirement, but all new installations must meet this regulation. Exempt tanks can be relocated within a system, but cannot be relocated to another system.

4. All pressure tanks shall be provided with a pressure release device and an easily readable pressure gauge.

5. Facilities shall be provided for maintaining the air-water-volume at the design water level and working pressure. Air injection lines must be equipped with filters or other devices to prevent compressor lubricant and other contaminants from entering the pressure tank. A device to readily determine air-water-volume must be provided for all tanks greater than 1000 gallon capacity. Galvanized tanks which are not provided with the necessary fittings and were installed before July 1, 1988, shall be exempt from this requirement.

6. Hydropneumatic pressure tanks shall be painted, disinfected and maintained in strict accordance with current American Water Works Association (AWWA) standards. Protective paint or coating shall be applied to the inside portion of any pressure tank. However, no temporary coating, wax, grease coating or coating materials containing lead will be allowed. No other coating will be allowed which are not approved for use (as a contact surface with potable water by the United Sates Environmental Protection Agency (EPA), NSF International, The United States Food and Drug Administration (FDA). All newly installed coatings must conform to ANSI/NSF International Standard 61 and must be certified by an organization accredited by ANSI.

7. No pressure tank that has been used to store any material other than potable water may be used in a public water system. A letter from the previous owner or owners must be provided.

8. Pressure tank installations should be equipped with slow closing valves and time delay pump controls to eliminate water hammer to reduce the chance of tank failure.

9. Associated appurtenances including valves pipes and fittings connected to pressure tanks must conform to ANSI/NSF International Standard 61 and shall be thoroughly tight against leakage. Pursuant to 30 TAC §290.44(b)(1), the maximum allowable lead content of pipes, pipe fittings, plumbing fittings, and fixtures is 0.25 percent.

10. Disinfection of water storage facilities shall be in strict accordance with current AWWA Standard C652-11 or most recent.

11. Dechlorination of disinfecting water shall be in strict accordance with current AWWA Standard C655-09 or most recent.

12. Where seamless fiberglass tanks are utilized, they shall not exceed 300 gallons in capacity.

13. No more than three pressure tanks shall be installed at any one site without the prior approval of the executive director.

14. All potable water storage tanks and pressure maintenance facilities must be enclosed by an intruder resistant fence with lockable gates. Pedestal type elevated storage tanks with lockable doors and without external ladders are exempt from this requirement. The gates and doors must be kept locked whenever the facility is unattended.

TCEQ WATER STORAGE TANK GENERAL CONSTRUCTION NOTES

1. The water storage tank must be constructed in accordance with the current Texas Commission on Environmental Quality (TCEQ) Rules and Regulations for Public Water Systems 30 Texas Administrative Code (TAC) Chapter 290 Subchapter D. When conflicts are noted with local standards, the more stringent requirement shall be applied. At a minimum, construction for public water systems must always meet TCEQ's "Rules and Regulations for Public Water Systems."

2. All facilities for potable water storage shall be covered and designed, fabricated, erected, tested and disinfected in strict accordance with current American Water Works Association (AWWA) standards and shall be provided with the minimum number, size and type of roof vents, man ways, drains, sample connections, access ladders, overflows, liquid level indicators on-site, and other appurtenances as specified in these rules.

3. Disinfection of water storage facilities shall be in strict accordance with current AWWA Standard C652-11 or most recent.

4. Dechlorination of disinfecting water shall be in strict accordance with current AWWA Standard C655-09 or most recent.

5. Bolted tanks shall be designed, fabricated, erected and tested in strict accordance with current AWWA Standard D103. Welded tanks shall be designed, fabricated, erected and tested in strict accordance with current AWWA Standard D100. The roof of all metal tanks shall be designed and erected so that no water ponds at any point on the roof and, in addition, no area of the roof shall have a slope of less than 0.75 inch per foot. Concrete tank roofs shall be constructed in strict compliance with their respective AWWA Standard.

6. Roof vents shall be installed in strict accordance with current AWWA standards and shall be equipped with approved screens to prevent entry of animals, birds, insects and heavy air contaminants. Screens shall be fabricated of corrosion resistant material and shall be 16 mesh or finer. Screens shall be securely clamped in place with stainless or galvanized bands or wires and shall be designed to withstand winds of not less than tank design criteria (unless specified otherwise by the engineer).

7. All roof openings shall be designed in accordance with current AWWA standards. If an alternate 30 inch diameter access opening is not provided in a storage tank, the primary roof access opening shall not be less than 30 inches in diameter. Other roof openings required only for ventilating purposes during cleaning, repairing or painting operations shall be not less than 24 inches in diameter or as specified by the licensed professional engineer. An existing tank without a 30-inch in diameter access opening must be modified to meet this requirement when major repair or maintenance is performed on the tank. Each access opening shall have a raised curbing at least four inches in height with a lockable cover that overlaps the curbing at least two inches in a downward direction. Where necessary, a gasket shall be used to make a positive seal when the hatch is closed. All hatches shall remain locked except during inspections and maintenance.

8. Overflows shall be designed in strict accordance with current AWWA standards and shall terminate with a gravity-hinged and weighted cover, an elastomeric duckbill valve, or other approved device to prevent the entrance of insects and other nuisances. The cover shall fit tightly with no gap over 1/16 inches. If the overflow terminates at any point other than the ground level, it shall be located near enough and at a position accessible from a ladder or the balcony for inspection purposes. The overflow(s) shall be sized to handle the maximum possible fill rate without exceeding the capacity of the overflow(s). The discharge opening of the overflow(s) shall be above the surface of the ground and shall not be subject to submergence.

9. All clearwells and water storage tanks shall have a liquid level indicator located at the tank site. The indicator can be a float with a moving target, an ultrasonic level indicator, or a pressure gauge calibrated in feet of water. If an elevated tank or standpipe has a float with moving target indicator, it must also have a pressure indicator located at ground level. Pressure gauges must not be less than three inches in diameter and calibrated at not more than two-foot intervals. Remote reading gauges at the owner's treatment plant or pumping station will not eliminate the requirement for a gauge at the tank site unless the tank is located at the plant or station.

10. Inlet and outlet connections shall be located so as to prevent short circuiting or stagnation of water. Clearwells used for disinfectant contact time shall be appropriately baffled.

11. Clearwells and potable water storage tanks shall be thoroughly tight against leakage, shall be located above the ground water table and shall have no walls in common with any other plant units containing water in the process of treatment. All associated appurtenances including valves, pipes and fittings shall be tight against leakage.

12. Each clearwell or potable water storage tank shall be provided with a means of removing accumulated silt and deposits at all low points in the bottom of the tank. Drains shall not be connected to any waste or sewage disposal system and shall be constructed so that they are not a potential agent in the contamination of the stored water.

13. All clear wells, ground storage tanks, standpipes, and elevated tanks shall be painted, disinfected, and maintained in strict accordance with current AWWA standards. However, no temporary coatings, wax grease coatings, or coating materials containing lead will be allowed. No other coatings will be allowed which are not approved for use (as a contact surface with potable water) by the United States Environmental Protection Agency (EPA), NSF International, or the United States Food and Drug Administration (FDA). All newly installed coatings must conform to ANSI/NSF International Standard 61 and must be certified by an organization accredited by ANSI.

14. No tanks or containers shall be used to store potable water that has previously been used for any non-potable purpose. Where a used tank is proposed for use, a letter from the previous owner or owners must be submitted to the Commission which states the use of the tank.

15. Access manways in the riser pipe, shell area, access tube, bowl area or any other location opening directly into the water compartment shall be located in strict accordance with current AWWA standards. These openings shall not be less than 24 inches in diameter. However, in the case of a riser pipe or access tube of 36 inches in diameter or smaller, the access manway may be 18 inches times 24 inches with the vertical dimension not less than 24 inches. The primary access manway in the lower ring or section of a ground storage tank shall be not less than 30 inches in diameter. Where necessary, for any access manway which allows direct access to the water compartment, a gasket shall be used to make a positive seal when the access manway is closed.

16. Service pump installation taking suction from storage tanks shall provide automatic low water level cutoff devices to prevent damage to the pumps. The service pump circuitry shall also resume pumping automatically once the minimum water level is reached in the tank.

17. Pursuant to 30 TAC §290.44(b)(1), the maximum allowable lead content of pipes, pipe fittings, plumbing fittings, and fixtures is 0.25 percent.

TCEQ PROPOSED WATER WELL GENERAL CONSTRUCTION NOTES

1. These water well facilities must be constructed in accordance with the current Texas Commission on Environmental Quality (TCEQ) Rules and Regulations for Public Water Systems 30 Texas Administrative Code (TAC) Chapter 290 Subchapter D. When conflicts are noted with local standards, the more stringent requirement shall be applied. At a minimum, construction for public water systems must always meet TCEQ's "Rules and Regulations for Public Water Systems.

2. The premises, materials, tools, and drilling equipment shall be maintained so as to minimize contamination of the groundwater during drilling operation.

3. Water used in any drilling operation shall be of safe sanitary quality. Water used in the mixing of drilling fluids or mud shall contain a chlorine residual of at least 0.5 milligrams per liter (mg/l).

4. The slush pit shall be constructed and maintained so as to minimize contamination of the drilling mud.

5. No temporary toilet facilities shall be maintained within 150 feet of the well being constructed unless they are of a sealed, leakproof type.

6. The construction, disinfection, protection, and testing of a well to be used as a public water supply source must meet the following conditions.

   a. The casing material used in the construction of wells for public use shall be new carbon steel, high strength low alloy steel, stainless steel or plastic. The material shall conform to the most recent American Water Works Association (AWWA) standards. The casing shall extend a minimum of 18 inches above the elevation of the finished floor of the pump room or natural ground surface and a minimum of one inch above the sealing block or pump motor foundation block when provided. The casing shall extend at least to the depth of the shallowest water formation to be developed and deeper, if necessary, in order to eliminate all undesirable water bearing strata. Well construction materials containing more than 0.25 percent lead are prohibited.

   b. The space between the casing and drill hole shall be sealed by using enough cement under pressure to completely fill and seal the annular space between the casing and the drill hole. The well casing shall be cemented in this manner from the top of the shallowest formation to be developed to the earth's surface. The driller shall utilize a pressure cementation method in accordance with the AWWA standard for water wells (A100-15) or most recent, Appendix C: Section C.2 (Positive Displacement Exterior Method); Section C.3 (Interior Method Without Plug); Section C.4 (Positive Placement, Interior Method, Drillable Plug); and Section C.5 (Placement Through Float Shoe Attached To Bottom Of Casing).

   c. The grouting mixture used to pressure cement the annular space shall be neat cement as specified in the most recent AWWA Standard for Water Wells and to which a maximum of 6%, by dry weight, bentonite and 2%, by dry weight, calcium chloride may be added. The minimum annular space between the outside diameter of the casing pipe and the borehole shall be no less than 1 1/2 inches in radial thickness or three inches in net diametrical difference and the pressure grouting shall be from the bottom upward utilizing one of the methods listed in this subparagraph for all public water system groundwater well construction.

   d. All gravel shall be of selected and graded quality and shall be thoroughly disinfected with a 50 mg/l chlorine solution as it is added to the well cavity.

   e. Safeguards shall be taken to prevent possible contamination of the water or damage by trespassers following the completion of the well and prior to installation of permanent pumping equipment.

   f. Upon well completion, or after an existing well has been reworked, the well shall be disinfected in accordance with recent AWWA Standard C654-13 or most recent for well disinfection except that the disinfectant shall remain in the well for at least 12-hours.

7. Dechlorination of disinfecting water shall be in strict accordance with current AWWA Standard C655-09 or most recent.

8. The well site shall be fine graded so that the site is free from depressions, reverse grades, or areas too rough for proper ground maintenance so as to ensure that surface water will drain away from the well. In all cases, arrangements shall be made to convey well pump drainage, packing gland leakage, and floor drainage away from the wellhead. Suitable drain pipes located at the outer edge of the concrete floor shall be provided to collect this water and prevent its ponding or collecting around the wellhead. This wastewater shall be disposed of in a manner that will not cause any nuisance from mosquito breeding or stagnation. Drains shall not be directly connected to storm or sanitary sewers.

9. A concrete sealing block extending at least three feet from the well casing in all directions, with a minimum thickness of six inches and sloped to drain away at not less than 0.25 inches per foot shall be provided around the wellhead.

10. Wellheads and pump bases shall be sealed by a gasket or sealing compound and properly vented to prevent the possibility of contaminating the well water. A well casing vent shall be provided with an opening that is covered with 16-mesh or finer corrosion resistant screen, facing downward, elevated and located so as to minimize the drawing of contaminants into the well. Wellheads and well vents shall be at least two feet above the highest known watermark or 100 year flood elevation, if available or adequately protected from possible flood damage by levees.

11. If a well blow off line is provided, its discharge shall terminate in a downward direction and at a point which will not be submerged by flood waters.

12. A suitable sampling cock shall be provided on the discharge pipe of each well pump prior to any treatment.

13. Flow measuring devices shall be provided for each well to measure production yields and provide for the accumulation of water production data. These devices shall be located to facilitate daily reading.

14. All completed well units shall be protected by intruder resistant fences, the gates of which are provided with locks or shall be enclosed in locked, ventilated well houses to exclude possible contamination or damage to the facilities by trespassers. The gates or well houses shall be locked during periods of darkness and when the plant is unattended.

15. An all-weather access shall be provided to each well site.

16. An air release device shall be installed in such a manner as to preclude the possibility of submergence or possible entrance of contaminants. In this respect, all openings to the atmosphere shall be covered with 16-mesh or finer, corrosion resistant screening material or an acceptable equivalent.

REVISION	DESCRIPTION	BY:	DATE:

STATE OF TEXAS · DANIEL RAY ELLIOTT · 69781 · LICENSED PROFESSIONAL ENGINEER

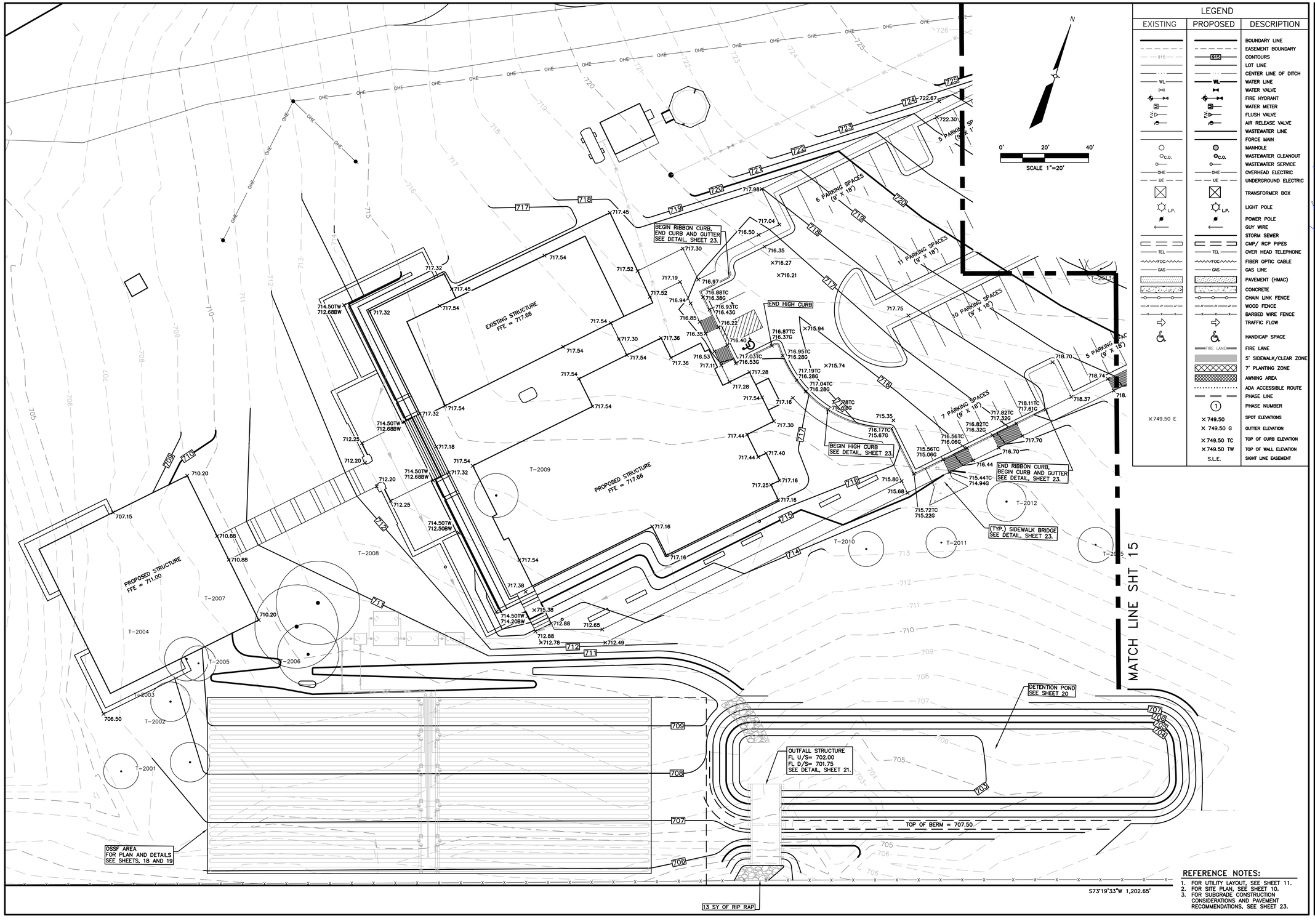
4 QUATRO Consultants, LTD.
Registration No. F-3524
1120 Rosewalk Drive, Suite 208 Phone (512) 392-3040 Fax (512) 392-3949
San Marcos, Texas 78666 e-mail: quatro@quatroconsultants.com

TCEQ PWS CONSTRUCTION NOTES

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 13_HWV_TCEQ PWS CONSTRUCTION NOTES
DESIGN: DR | CHECKED: CDE
DRAWN: DR | APPROVED: HE Jr.
SHEET: 13 OF 26



REFERENCE NOTES:

1. FOR UTILITY LAYOUT, SEE SHEET 11.
2. FOR SITE PLAN, SEE SHEET 10.
3. FOR SUBGRADE CONSTRUCTION CONSIDERATIONS AND PAVEMENT RECOMMENDATIONS, SEE SHEET 23.

DATE:
BY:
DESCRIPTION
REVISION

HUGO ELIZONDO, JR. 69781 LICENSED PROFESSIONAL ENGINEER 8/21/23

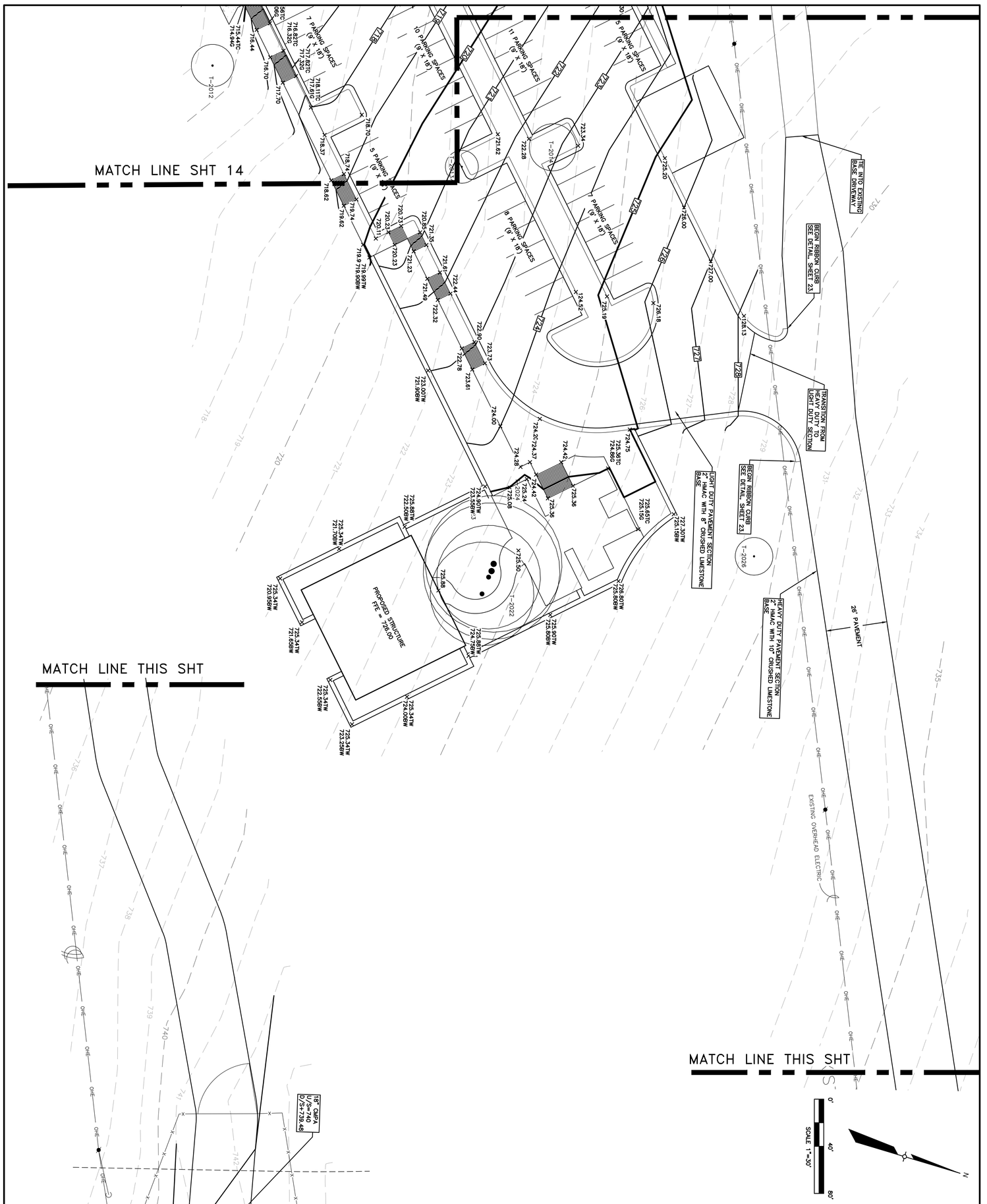
CUATRO Consultants, LTD.
Registration No. F-3524
12345 Rosewall, Drive, Suite 200 Phone: (512) 918-9500 Fax: (512) 918-9599
San Antonio, Texas 78247 e-mail: contact@cuatroconsultants.com

GRADING PLAN 1 OF 2

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 14_HWY_GRADING PLAN 1 OF 2
DESIGN: DR | CHECKED: CDE
DRAWN: CCG | APPROVED: HE Jr.
SHEET: 14 OF 26



REFERENCE NOTES:

1. FOR UTILITY LAYOUT, SEE SHEET 11.
2. FOR SITE PLAN, SEE SHEET 10.
3. FOR SUBGRADE CONSTRUCTION RECOMMENDATIONS, SEE SHEET 23.

LEGEND

DESCRIPTION	PROPOSED	EXISTING
BOUNDARY LINE		
EASEMENT BOUNDARY		
CONTOURS	725	725
LOT LINE		
CENTER LINE OF DITCH		
WATER LINE	W	W
WATER VALVE		
FIRE HYDRANT		
WATER METER		
AIR RELEASE VALVE		
FLUSH VALVE		
WASTEWATER LINE		
MANHOLE		
WASTEWATER CLEANOUT		
WASTEWATER SERVICE		
OVERHEAD ELECTRIC	OHE	OHE
UNDERGROUND ELECTRIC	UE	UE
TRANSFORMER BOX		
LIGHT POLE		
POWER POLE		
GUY WIRE		
STORM SEWER		
OVERHEAD TELEPHONE	OHT	OHT
FIBER OPTIC CABLE		
GAS LINE	GAS	GAS
PAVEMENT (HMAC)		
CONCRETE		
CHAIN LINK FENCE		
WOOD FENCE		
BARBED WIRE FENCE		
TRAFFIC FLOW		
HANDICAP SPACE		
FIRE LANE		
5' SIDEWALK/CLEAR ZONE		
7' PLANTING ZONE		
AMMING AREA		
ADA ACCESSIBLE ROUTE		
PHASE LINE		
PHASE NUMBER		
SPOT ELEVATIONS	X 749.50	X 749.50
GUTTER ELEVATION	X 749.50 G	X 749.50 G
TOP OF CURB ELEVATION	X 749.50 TC	X 749.50 TC
TOP OF WALL ELEVATION	X 749.50 TW	X 749.50 TW
SIGHT LINE EASEMENT	SLE	SLE

SHEET:	15 OF 26
DRAWN:	CCG
APPROVED:	HE Jr.
DESIGN:	CCG
CHECKED:	CDE
PROJECT:	23-049
DRAWING NAME:	15_HW_GRADING PLAN 2 OF 2
DATE:	AUGUST, 2023

CLIENT:

BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

GRADING PLAN 2 OF 2

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

4CUATRO Consultants, LTD.
Registration No. F-5524
120 Riverwalk Drive, Suite 208 Phone: (512) 512-5090 Fax: (512) 512-5599
San Marcos, Texas 78666 e-mail: cuatro@cuatroconsultants.com

STATE OF TEXAS
HUGO ELIZONDO, JR.
69781
LICENSED
PROFESSIONAL ENGINEER
8/21/23

REVISION	DESCRIPTION	BY:	DATE:

TCEQ CHAPTER 285.38 NOTES

ALL TANKS MUST HAVE INSPECTION OR CLEANOUT PORTS LOCATED ON THE TANK TOP OVER ALL INLET AND OUTLET DEVICES. EACH INSPECTION OR CLEANOUT PORT MUST BE OFFSET TO ALLOW FOR PUMPING OF THE TANK. THE PORTS MAY BE CONFIGURED IN ANY MANNER AS LONG AS THE SMALLEST DIMENSION OF THE OPENING IS AT LEAST 12 INCHES, AND IS LARGE ENOUGH TO PROVIDE FOR MAINTENANCE AND EQUIPMENT REMOVAL.

WITH THE EXCEPTION OF SEPTIC TANKS, ALL INSPECTION AND CLEANOUT PORTS SHALL HAVE RISERS OVER THE PORT OPENINGS WHICH EXTEND TO 2" ABOVE THE GROUND SURFACE. A SECONDARY PLUG, CAP, OR OTHER SUITABLE RESTRAINT SYSTEM SHALL BE PROVIDED BELOW THE RISER CAP TO PREVENT TANK ENTRY IF THE CAP IS UNKNOWINGLY DAMAGED OR REMOVED.

ALL SEPTIC TANKS BURIED MORE THAN 12 INCHES BELOW THE GROUND SHALL HAVE RISERS OVER THE PORT OPENINGS. THE RISERS SHALL EXTEND FROM THE TANK SURFACE TO 2" ABOVE THE GROUND. A SECONDARY PLUG, CAP, OR OTHER SUITABLE RESTRAINT SYSTEM SHALL BE PROVIDED BELOW THE RISER CAP TO PREVENT TANK ENTRY IF THE CAP IS UNKNOWINGLY DAMAGED OR REMOVED.

GENERAL NOTES:

1. THIS SITE LIES OVER THE EDWARDS AQUIFER RECHARGE ZONE.
2. ACCORDING TO THE NATIONAL FLOOD INSURANCE RATE MAP (FIRM) NO. 48209C0387F, DATED SEPTEMBER 2, 2005, A PORTION OF THIS PROPERTY IS LOCATED IN THE MINIMAL FLOOD ZONE 'X'.
3. THIS OSSF DESIGN IS COMPLIANT WITH 30 TAC 285 AS ADOPTED ON 6/14/2023.
4. ALL TANK PORTS LARGER THAN 12" IN DIAMETER WILL HAVE RISERS WITH ACCESS RESTRICTION TO 2 INCHES ABOVE GRADE PER 30 TAC 285.38 (EFFECTIVE 9/1/2023).

TEXAS ADMINISTRATIVE CODE CHAPTER 290.44 RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS

5. ALL WATER LINE CROSSINGS OF WASTEWATER MAINS SHALL BE PERPENDICULAR [§290.44(E)(4)(B)].

12. THE CONTRACTOR SHALL MAINTAIN A MINIMUM SEPARATION DISTANCE IN ALL DIRECTIONS OF NINE FEET BETWEEN THE PROPOSED WATERLINE AND WASTEWATER COLLECTION FACILITIES INCLUDING MANHOLES. IF THIS DISTANCE CANNOT BE MAINTAINED, THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE PROJECT ENGINEER FOR FURTHER DIRECTION. SEPARATION DISTANCES, INSTALLATION METHODS, AND MATERIALS UTILIZED MUST MEET §290.44(E)(1)–(4).

13. THE SEPARATION DISTANCE FROM A POTABLE WATERLINE TO A WASTEWATER MAIN OR LATERAL MANHOLE OR CLEANOUT SHALL BE A MINIMUM OF NINE FEET. WHERE THE NINE–FOOT SEPARATION DISTANCE CANNOT BE ACHIEVED, THE POTABLE WATERLINE SHALL BE ENCASED IN A JOINT OF AT LEAST 150 PSI PRESSURE CLASS PIPE AT LEAST 18 FEET LONG AND TWO NOMINAL SIZES LARGER THAN THE NEW CONVEYANCE. THE SPACE AROUND THE CARRIER PIPE SHALL BE SUPPORTED AT FIVE–FOOT INTERVALS WITH SPACERS OR BE FILLED TO THE SPRINGLINE WITH WASHED SAND. THE ENCASEMENT PIPE SHALL BE CENTERED ON THE CROSSING AND BOTH ENDS SEALED WITH CEMENT GROUT OR MANUFACTURED SEALANT

15. SUCTION MAINS TO PUMPING EQUIPMENT SHALL NOT CROSS WASTEWATER MAINS, WASTEWATER LATERALS, OR WASTEWATER SERVICE LINES. RAW WATER SUPPLY LINES SHALL NOT BE INSTALLED WITHIN FIVE FEET OF ANY TILE OR CONCRETE WASTEWATER MAIN, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE [§290.44(E)(7)].

16. WATERLINES SHALL NOT BE INSTALLED CLOSER THAN TEN FEET TO SEPTIC TANK DRAINFIELDS [§290.44(E)(8)].

TCEQ ABANDONMENT NOTES:

[1] SEPTIC SYSTEM SERVING EXISTING STRUCTURE SHALL BE ABANDONED, UPON COMPLETION OF THE PROPOSED SEPTIC SYSTEM, BY FILL MATERIAL PER 30 TAC 285.D.

(a) A TANK THAT IS NOT TO BE USED AGAIN FOR HOLDING SEWAGE SHALL BE ABANDONED.

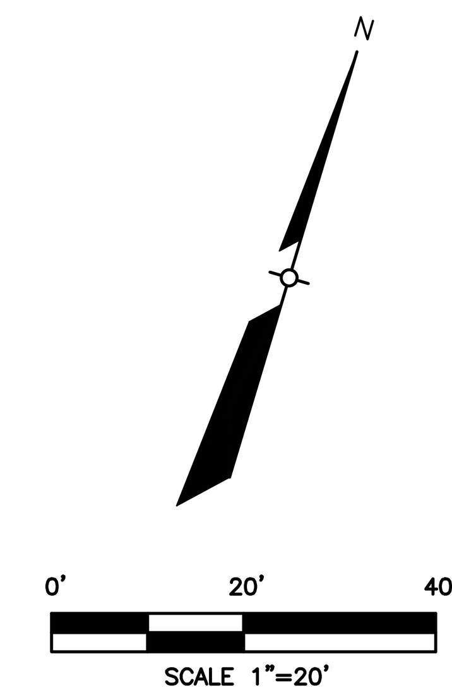
(b) TO PROPERLY ABANDON, THE OWNER SHALL CONDUCT THE FOLLOWING ACTIONS, IN THE ORDER LISTED.

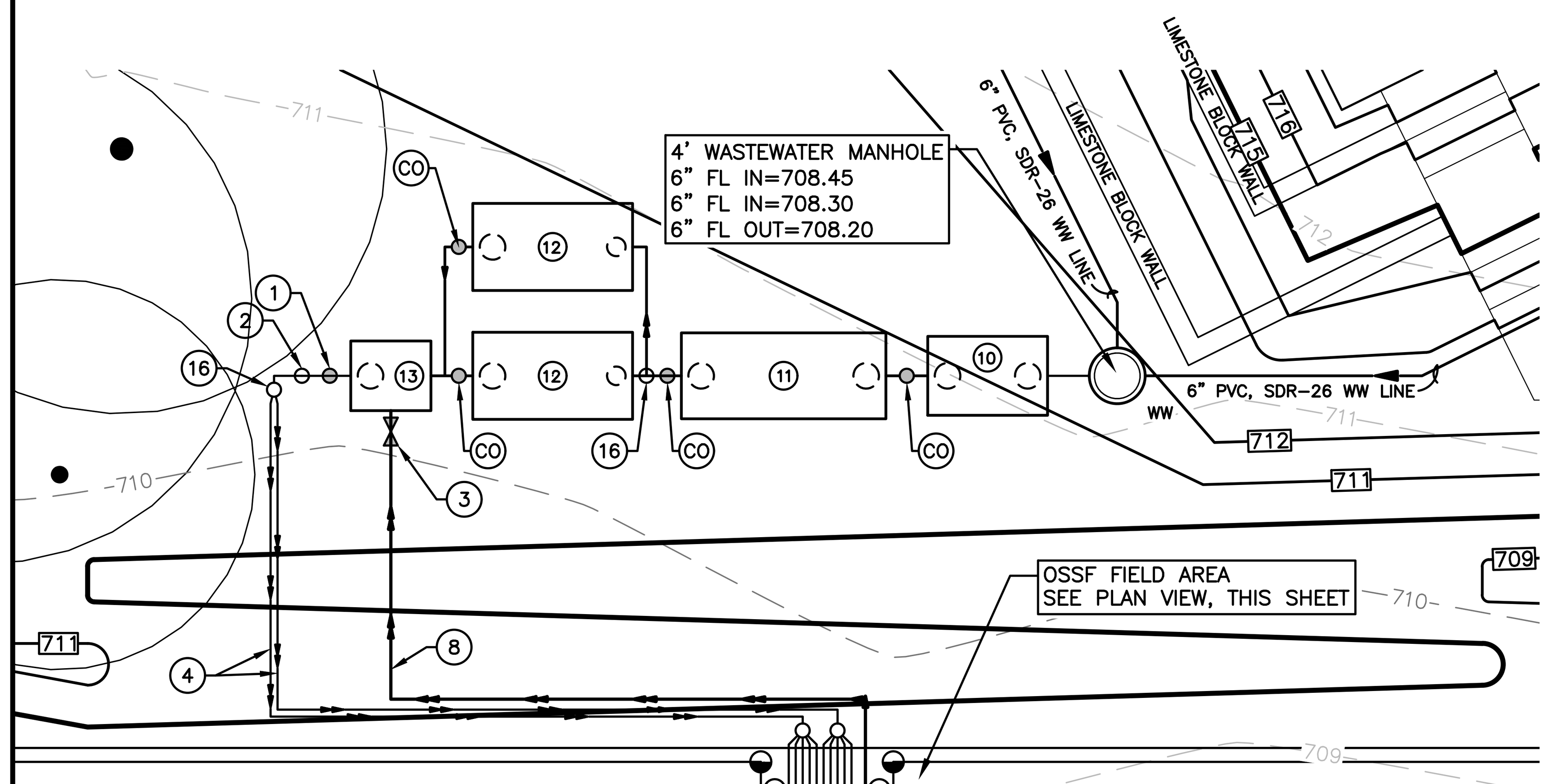
(1) ALL TANKS, BOREHOLES, CESSPOOLS, SEEPAGE PITS, HOLDING TANKS, AND PUMP TANKS SHALL HAVE THE WASTEWATER REMOVED BY A WASTE TRANSPORTER, HOLDING A CURRENT REGISTRATION WITH THE EXECUTIVE DIRECTOR.

(2) ALL TANKS, BOREHOLES, CESSPOOLS, SEEPAGE PITS, HOLDING TANKS, AND PUMP TANKS SHALL BE FILLED TO GROUND LEVEL WITH FILL MATERIAL (LESS THAN THREE INCHES IN DIAMETER) WHICH IS FREE OF ORGANIC AND CONSTRUCTION DEBRIS."

SPECIAL CONSTRUCTION NOTES:

1. ALL SEPTIC AREAS WILL BE PROPERLY GRADED PRIOR TO SEPTIC INSTALLATION.



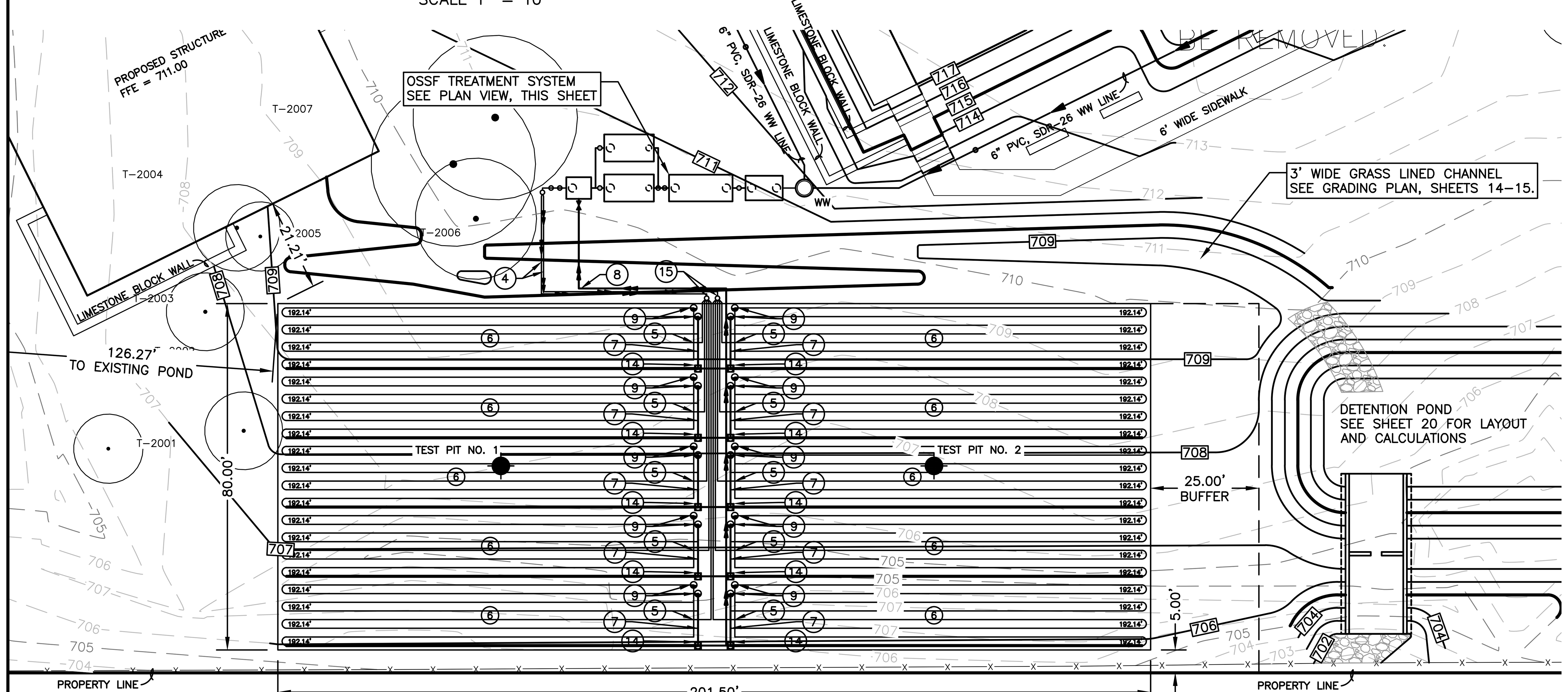


OSSF TREATMENT SYSTEM: PLAN VIEW

SCALE 1" = 10'

FITTING SCHEDULE

SYMBOL	QTY.	DESCRIPTION
1	1	2" SUPER MANUAL DISC FILTER IN 18" DIAMETER PVC VAULT OR BOX
2	1	2" MANUAL FLOW METER
3	1	1" VALVE FOR FLUSHING, PVC.
4	585 LF.	1–1/4" SUPPLY LINE, PVC, SCH. 40 SUPPLY LINE
5	40	DRIP LINE CONNECTIONS TO 1–1/4" SUPPLY LINE
6	7,686 LF.	0.6 GPH NETAFIM UNIBIOLINE DRIP LINE
7	40	DRIP LINE CONNECTION TO 1" FLUSH RETURN LINE
8	175 LF.	1" FLUSH RETURN LINE, PVC, SCH. 40
9	20	VACUUM RELIEF VALVE
10	1	GATCO 750 GALLON SINGLE COMPARTMENT PRE–TREATMENT TANK
11	1	GATCO 2,000 GALLON SINGLE COMPARTMENT FLOW EQUALIZATION TANK
12	2	PRO–FLO 1500 GPD AEROBIC TREATMENT UNITS
13	1	GATCO 800 GALLON PUMP TANK
14	10	2" SWING CHECK VALVE
15	2	K–RAIN 6405 5 ZONE INDEXING VALVE WITH CHECK VALVES ON OUTLETS
16	2	K–RAIN 6402 2 ZONE INDEXING VALVE WITH CHECK VALVES ON OUTLETS



OSSF FIELD AREA: PLAN VIEW

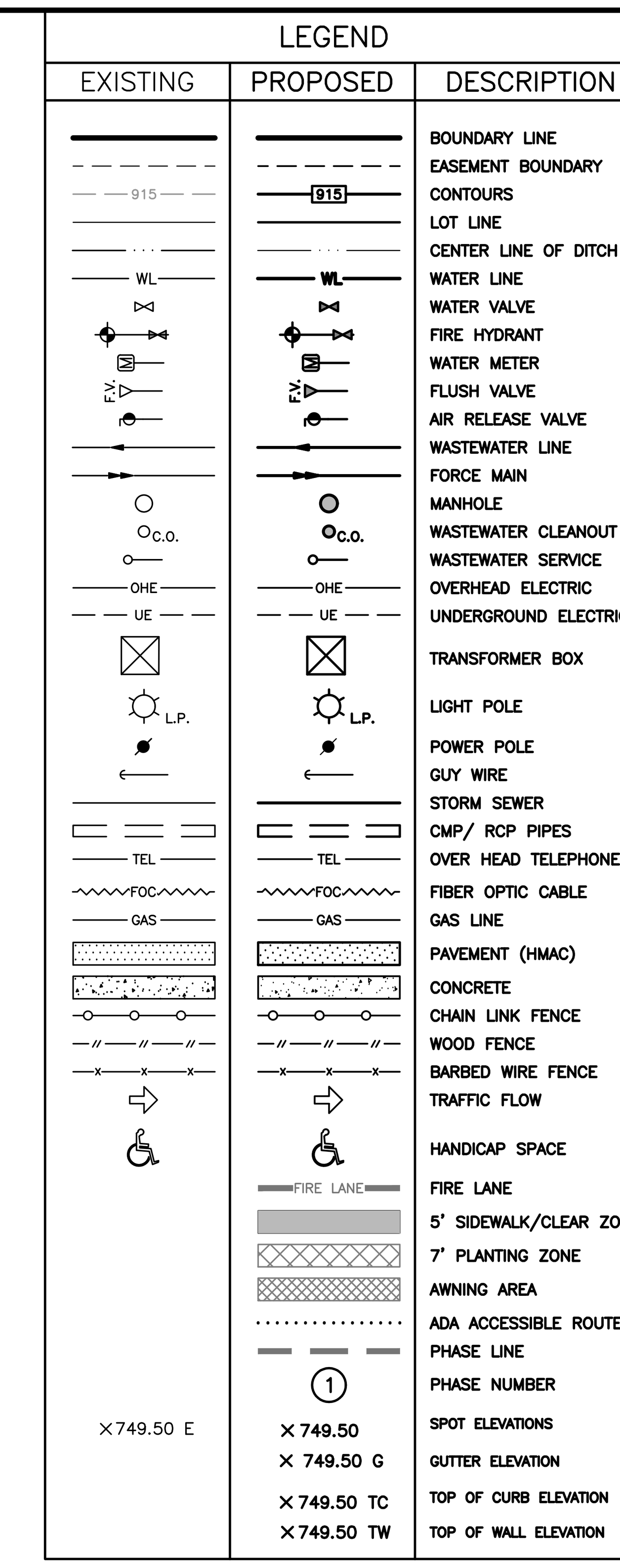
SCALE 1" = 20'

System Data Input

Gallons Per Day	1500
Soil Loading Rate (Gallons / Sq. Ft. / Per Day [GPD])	0.1
Select Emitter Flow Rate (GPH)	0.61
Select Emitter Spacing (inches)	18
Flush Velocity (fps)	2.5
Assumptions	
Estimated Pump Flow Rating (GPM)	15
Inlet Pressure (psi)	35
Inlet Pressure (Feet of Head)	80.85
Row Spacing Between Driplines (feet)	2
Number of Zones	10
Hours Per Day to Use for Dosing	24
Elevation Change from Pump to Dose Tank Outlet (feet)	3.75
Elevation Change from Dose Tank to Drip Field (feet)	2
Length of Supply Line & Supply & Flush Manifolds (feet)	278.8
Type of Pipe - Supply Line & Manifolds	PVC Sch40
Size of Supply & Manifold Pipe (inches)	1.25
Pipe Roughness Constant	150
Inside Diameter of Pipe (inches)	1.38
Number of Daily Dosing Events Per Zone	2

Calculation Outputs

Total System Information	
Application Area Required (square feet)	15000
Total Amount of Bioline® Required (feet)	7500
Total Number of Emitters in the Dripfield	5000
Zone Information	
Number of Zones	10
Amount of Bioline® Per Zone (feet)	750
Number of Emitters Per Zone	500
Minimum Number of Laterals Per Zone	2
Maximum Number of Laterals Per Zone	7
Number of Laterals That Will be Used	4
Maximum Length of Bioline® Laterals Based on Inlet Pressure	272
Flow Rate Per Zone (GPM)	5.08
Holding Capacity of Dripperline Per Zone (Gallons)	9.975
Additional Flow Requirement to Accommodate Flushing Velocity	8
Holding Capacity of Piping	
Holding Capacity (Gallons) of Supply Line & Supply & Flush Manifolds	21.66
Holding Capacity (Gallons per Zone) of Bioline	9.98
Holding Capacity (Gallons) of Supply Line, Manifolds and Dripperline	31.64
Head Loss Data - Dosing & Flushing Cycle	
Friction Loss per 100' (psi) in Supply Line & Manifolds	1.04
Velocity (fps)	2.81
Friction Loss in Supply Line & Supply Manifolds (psi)	2.90
Friction Loss in Supply Line & Supply Manifolds (Feet of Head)	6.69
Additional Pressure Required for Return Manifold and Piping to Tank (psi)	10
Additional Pressure Required for Return Manifold and Piping to Tank (Feet of Head)	23.1
TDH (Total Dynamic Head) in Feet of Head	116.39
Control Settings Information	
Total System Runtime Per Day (Minutes)	295.08
Total Runtime Per Zone Per Day (Minutes)	29.51
Total System Dosing Events Per Day	20.00
Runtime For Each Dose (Minutes)	14.75
Off Time Between Doses in the Same Zone (Minutes)	705.25
Miscellaneous Information	
Dosing Volume Per Emitter Per Dose (gallons)	0.15
Inches Per Week of Dosing	1.12
Volume of a Single Dose (gallons)	75
Pump Selection	
Minimum Pump Flow Rating (GPM)	13.08
Minimum TDH (Total Dynamic Head in Feet of Head)	128.03
Pump Manufacturer	Pentair
Pump Model	20DOMO5221+1



Design Flow	
Number of Occupants	300
Flow per Occupant	4 gpd
Number of Single Family Residence	1
Flow per Cabin/Yurt	240 gpd
Total Daily Flow	1440 gpd
Design Flow	1500 gpd

Oak Haven Preserve

BOD CALCULATIONS

OCCUPANTS	1200 GAL/DAY
SINGLE FAMILY RESIDENCE:	240 GAL/DAY
DESIGN FLOW:	1500 GAL/DAY

Calculated BOD :
.05 lbs BOD/person x 300 people/day = 15 LBS/DAY

Pre-Treatment accounts for 50% removal.
Thus, BOD_5 entering the treatment unit is 7.5 lbs/day or 599.20 mg/L.
This design includes two ATU's rated to treat 3.75 lbs/day each.
The treatment unit has an average BOD_5 removal of 95%.

Therefore, the BOD_5 entering the disposal area is less than 30 mg/L.

REFERENCE NOTES:

1. FOR EXISTING CONDITIONS, SEE SHEETS 5 AND 6.
2. FOR UTILITY LAYOUT, SEE SHEET 11.
3. FOR GRADING PLAN, SEE SHEETS 14 AND 15.
4. FOR OSSF DETAILS, SEE SHEET 19.

DATE:	BY:	DESCRIPTION	REVISION

STATE OF TEXAS
HUGO ELIZONDO, JR.
69781
LICENSED PROFESSIONAL ENGINEER
2/21/24

CUATRO Consultants, LTD.
Registration No. F-3524
120 Riverwalk Drive, Suite 208 Phone: (512) 312-5040 Fax: (512) 312-5399
San Marcos, Texas 78666 e-mail: cuatro@cuatroconsultants.com

OSSF PLAN

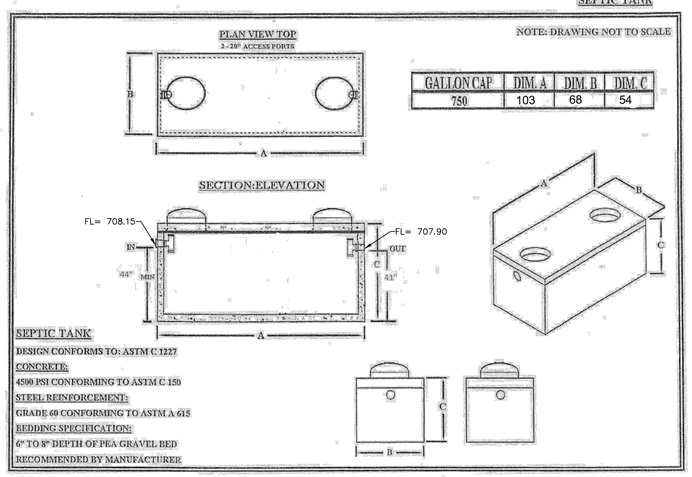
OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE:	AUGUST, 2023
PROJECT:	23–049
DRAWING'S NAME:	18_HWV_OSSF PLAN
DESIGN: KAB	CHECKED: KAB
DRAWN: KAB	APPROVED: HE Jr.
SHEET:	18 OF 26

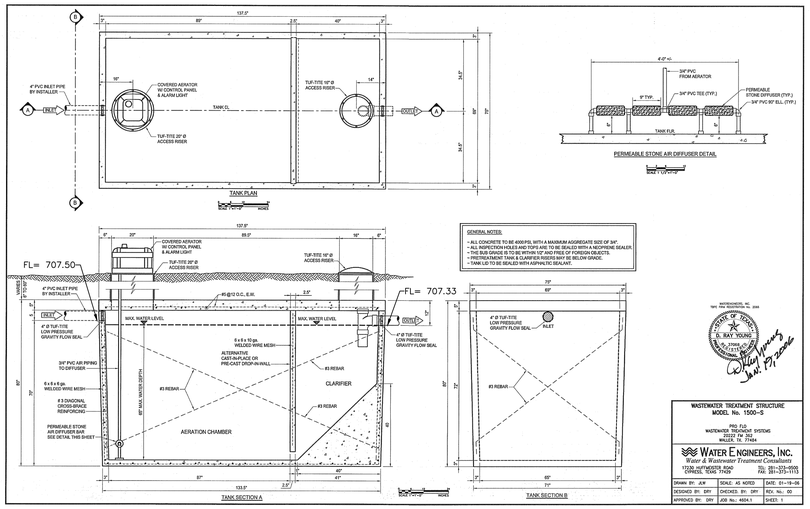
GATCO TREATMENT SYSTEMS
(Formerly Comal Concrete Products)
4222 FM 482 NEW BRAUNFELS, TX 78132
830-608-1699 SA Metro: 830-606-4732 Fax: 830-608-1396

750 GALLON
SEPTIC TANK



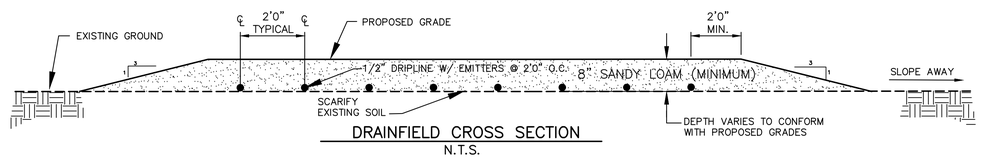
GALLON CAP.	DIM. A	DIM. B	DIM. C
750	103	68	54

PRE-TREATMENT TANK SECTION VIEW
NTS

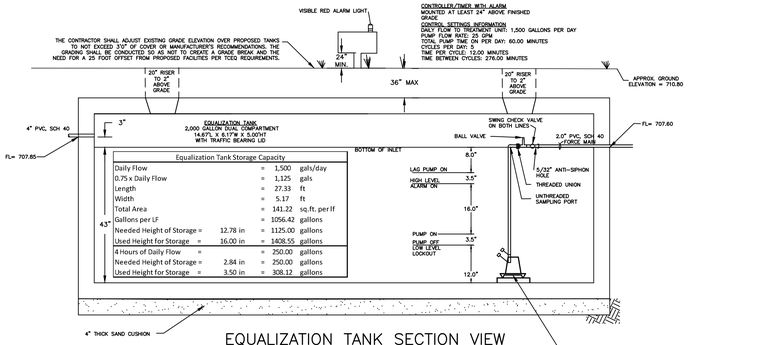


AEROBIC TREATMENT UNIT SECTION VIEW
NTS

A 12" VERTICAL SEPARATION BETWEEN THE BOTTOM OF THE TRENCH AND ANY ROCK OR CALICHE LAYER IS TO BE MAINTAINED AT ALL TIMES. IF ROCK IS ENCOUNTERED WHILE CUTTING THE TRENCHES IT WILL BE NECESSARY TO DIG EXPLORATORY HOLES TO DEMONSTRATE THAT THE 12" SEPARATION IS BEING ADHERED TO. NOTE: MINIMUM SEPARATION FROM BOTTOM OF TRENCH TO GROUNDWATER IS 1'0".



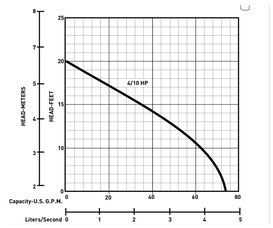
DRAINFIELD CROSS SECTION
N.T.S.



Equalization Tank Storage Capacity				
Daily Flow		=	1,500	gals/day
0.75 x Daily Flow		=	1,125	gals
Length		=	27.33	ft
Width		=	5.17	ft
Total Area		=	141.22	sq.ft. per lf
Gallons per LF		=	1056.42	gallons
Needed Height of Storage =	12.78 in	=	1125.00	gallons
Used Height for Storage =	16.00 in	=	1408.55	gallons
4 Hours of Daily Flow		=	250.00	gallons
Needed Height of Storage =	2.84 in	=	250.00	gallons
Used Height for Storage =	3.50 in	=	308.12	gallons

EQUALIZATION TANK SECTION VIEW
NTS

HYDROMATIC BV-40 GRINDER PUMP

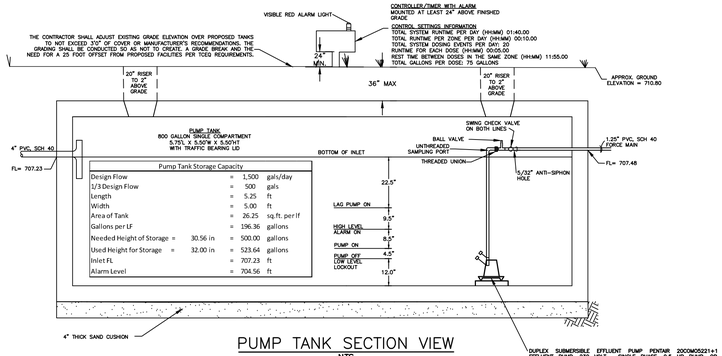


EQUALIZATION TANK PUMP CURVE

DUPLEX SUBMERSIBLE SEWAGE PUMP HYDROMATIC BV-40, 115 VOLT, SINGLE PHASE, 4/10 HP SUBMERSIBLE PUMP, OR ENGINEER APPROVED EQUAL FROM THE PERFORMANCE CURVE, THIS PUMP WILL FLOW 25 GPM AT 16.46 FT. OF HEAD

CONTROL PANEL, USE TIMER CONTROLS, 10 CYCLES/DAY

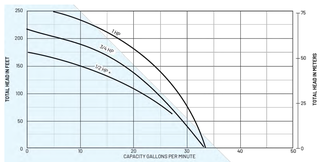
1. "A DUAL PUMP SYSTEM SHALL HAVE THE "ALARM ON" LEVEL BELOW THE "SECOND PUMP ON" LEVEL, AND SHALL HAVE A LOCK-ON FEATURE IN THE ALARM CIRCUIT SO THAT ONCE IT IS ACTIVATED IT WILL NOT GO OFF WHEN THE SECOND PUMP DRAWS THE LIQUID LEVEL BELOW THE "ALARM ON" LEVEL. ALL AUDIBLE AND VISIBLE ALARMS SHALL HAVE A MANUAL "SILENCE" SWITCH. THE PUMP SWITCH-GEAR SHALL BE SET SUCH THAT EACH PUMP OPERATES AS THE FIRST PUMP ON AN ALTERNATING BASIS. ALL PUMPS SHALL BE RATED BY THE MANUFACTURER FOR PUMPING SEWAGE OR SEWAGE EFFLUENT."
2. "THE TANK SHALL BE PROVIDED WITH AN AUDIBLE AND VISIBLE HIGH WATER ALARM. IF AN ELECTRICAL ALARM IS USED, THE POWER CIRCUIT FOR THE ALARM SHALL BE SEPARATE FROM THE POWER CIRCUIT FOR THE PUMP. BATTERIES MAY BE USED FOR BACK-UP POWER SUPPLY ONLY. ALL ELECTRICAL COMPONENTS SHALL BE LISTED AND LABELED BY UNDERWRITERS LABORATORIES (UL)."



Pump Tank Storage Capacity				
Design Flow		=	1,500	gals/day
1/3 Design Flow		=	500	gals
Length		=	5.25	ft
Width		=	5.00	ft
Area of Tank		=	26.25	sq.ft. per lf
Gallons per LF		=	196.36	gallons
Needed Height of Storage =	30.56 in	=	500.00	gallons
Used Height for Storage =	32.00 in	=	523.64	gallons
Inlet Ft.		=	707.23	ft
Alarm Level		=	704.56	ft

PUMP TANK SECTION VIEW
NTS

PENTAIR 20DOM05221+1 EFFLUENT PUMP



PUMP TANK PUMP CURVE

DUPLEX SUBMERSIBLE EFFLUENT PUMP PENTAIR 20DOM05221+1 EFFLUENT PUMP, 230 VOLT, SINGLE PHASE, 0.5 HP PUMP, OR ENGINEER APPROVED EQUAL FROM THE PERFORMANCE CURVE, THIS PUMP WILL FLOW 15 GPM AT 131.40 FT OF HEAD

CONTROL PANEL, USE TIMER CONTROLS 20 CYCLES/DAY

1. "A DUAL PUMP SYSTEM SHALL HAVE THE "ALARM ON" LEVEL BELOW THE "SECOND PUMP ON" LEVEL, AND SHALL HAVE A LOCK-ON FEATURE IN THE ALARM CIRCUIT SO THAT ONCE IT IS ACTIVATED IT WILL NOT GO OFF WHEN THE SECOND PUMP DRAWS THE LIQUID LEVEL BELOW THE "ALARM ON" LEVEL. ALL AUDIBLE AND VISIBLE ALARMS SHALL HAVE A MANUAL "SILENCE" SWITCH. THE PUMP SWITCH-GEAR SHALL BE SET SUCH THAT EACH PUMP OPERATES AS THE FIRST PUMP ON AN ALTERNATING BASIS. ALL PUMPS SHALL BE RATED BY THE MANUFACTURER FOR PUMPING SEWAGE OR SEWAGE EFFLUENT."
2. "THE TANK SHALL BE PROVIDED WITH AN AUDIBLE AND VISIBLE HIGH WATER ALARM. IF AN ELECTRICAL ALARM IS USED, THE POWER CIRCUIT FOR THE ALARM SHALL BE SEPARATE FROM THE POWER CIRCUIT FOR THE PUMP. BATTERIES MAY BE USED FOR BACK-UP POWER SUPPLY ONLY. ALL ELECTRICAL COMPONENTS SHALL BE LISTED AND LABELED BY UNDERWRITERS LABORATORIES (UL)."

CONSTRUCTION NOTES

1. **TANK INSTALLATION:**
   ALL TANKS SHALL BE SET LEVEL ON A PAD OF WASHED SAND OR PEA GRAVEL, WITH A MINIMUM DEPTH OF 4".
   THE INLETS, OUTLETS, SEAMS BETWEEN THE LIDS AND WALLS OF THE TANKS, THE MANHOLE OPENINGS, AND THE MANHOLE RISERS ARE TO BE SEALED WITH MORTAR.
   PIPES ON INLET SIDE OF SEPTIC TANK SHALL HAVE A MINIMUM SLOPE OF 1/8"/FT. SLOPE OF ¼"/FT IS DESIRED.
   ALL INTER-CONNECTING PIPES BETWEEN TANKS ARE TO BE SCHEDULE 40 PVC AND SOLVENT WELDED.
   ALL CHANGES IN DIRECTION IN GRAVITY SYSTEM PIPING UPSTREAM OF SEPTIC TANK SHALL BE MADE WITH A MAXIMUM OF 45-DEGREE BENDS. USE LONG SWEEP RADIUS.
   RISERS MUST BE PRECAST CONCRETE OR RIGID RIBBED FIBERGLASS AND MORTARED INTO PLACE. RISERS SHALL NOT ALLOW GROUND WATER TO SEEP INTO TANK.
   ALL ELECTRICAL CONTROLS AND ALARM SYSTEM SHALL BE INSTALLED TO PREVENT STORM RUNOFF WATER FROM ENTERING THE BOX. SET ALL CONTROLS A MINIMUM OF 1 FOOT ABOVE FLOOD PLAIN ELEVATION.
   ALL WIRING EXTERIOR TO THE TANK SHALL BE IN CONDUIT. THE CONDUIT ENTERING THE MANHOLE RISER SHALL BE SEALED ON THE END TO PREVENT GASES AND WATER FROM ENTERING THE CONDUIT.
   ALL ELECTRICAL AND CONTROL WIRING SHALL BE MADE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE, LATEST REVISION.
   FINAL PLACEMENT OF TANK AND PUMP TANK MAY BE ADJUSTED TO FIELD CONDITIONS. CONTRACTOR SHALL NOTIFY ENGINEER FOR APPROVAL PRIOR TO MAKING ADJUSTMENT.
   CONTRACTOR SHALL PROVIDE RECORD DRAWING WITH DIMENSIONS SHOWING FINAL LOCATION OF ALL FACILITIES.
   ALL TANKS SHALL BE WATER TESTED FOR A MINIMUM OF TWENTY-FOUR HOURS PRIOR TO INSPECTION. WATER LEVEL SHALL BE A MINIMUM OF 6 INCHES ABOVE THE TOP OF ALL PIPES. DO NOT FILL MORE THAN 2 INCHES ABOVE TOP SECTION JOINT. WATER LEVEL SHALL NOT DROP IN 24 HOURS AFTER STABILIZATION.
2. **SYSTEM INSTALLATION:**
   ALL PVC PIPES AND FITTINGS SHALL BE SCHEDULE 40. SOLVENT WELD.
   THE LOCATION OF THE DRIP IRRIGATION AREA SHALL NOT BE SUBJECT TO HEAVY TRAFFIC THAT COULD COMPACT THE SOIL.
   LAND ACCEPTABLE FOR DRIP APPLICATION SHALL HAVE A FLAT TERRAIN (LESS THAN OR EQUAL TO 15% SLOPE) AND SHALL BE COVERED WITH GRASSES, EVERGREEN SHRUBS, BUSHES, TREES, OR LANDSCAPED BEDS CONTAINING MIXED VEGETATION. THERE SHALL BE NOTHING IN THE APPLICATION AREA OR WITHIN TEN FEET OF THE FIELD AREA WHICH INTERFERES WITH THE UNIFORM APPLICATION OF THE EFFLUENT.
   THE MAXIMUM INLET PRESSURE FOR DRIP EMITERS SHALL BE 45 POUNDS PER SQUARE INCH.
   DISTRIBUTION PIPING SHALL BE INSTALLED BELOW THE GROUND SURFACE AND HOSE BIBS SHALL NOT BE CONNECTED TO THE DISTRIBUTION PIPING. AN UNTHREADED SAMPLING PORT SHALL BE PROVIDED IN THE TREATED EFFLUENT LINE IN THE PUMP TANK.
   THE OWNER IS RESPONSIBLE FOR KEEPING APPLICATION AREA MAINTAINED.
   DISTRIBUTION PIPES AND DRIP EMITTERS SHALL PROVIDE UNIFORM DISTRIBUTION OF TREATED EFFLUENT.
   ALL NEW PIPING, FITTINGS, VALVES BOX COVERS AND SPRINKLER TOPS SHALL BE PERMANENTLY COLORED PURPLE TO IDENTIFY SYSTEM AS RECLAIMED WATER SYSTEM.
3. **APPLICATION AND DOSING RATE:**
   FIELD CONSTRUCTION:
   THE SPACING FOR LINES SHALL BE 2'0" MINIMUM FROM CENTER TO CENTER.
   THE SPACING FOR DRIP EMITTERS SHALL BE 2'0" FROM CENTER TO CENTER.
   USE NETAFIM UNIBIOLINE 0.57 INCH, 0.6 GPH (2.3 L/HR) PRESSURE COMPENSATING DRIPPER LINE WITH CONTINUOUS FLUSHING AND BUILT IN CHECK VALVES.
   TO PREPARE FIELD AREA, FIRST, SCARIFY EXISTING SOIL AT GRADE. REMOVE ANY LOOSE STONES OVER 2 INCHES, THEN INSTALL DRIPLINE ON SCARIFIED GRADE. INSTALL 8" OF SANDY LOAM TOPSOIL OVER ENTIRE FIELD AREA, SEE DETAIL, THIS SHEET.
   INSTALL VACUUM BREAKER AT HIGH POINT IN EACH ZONE.
4. **LANDSCAPE PLAN:**
   THE FINISHED GRADE OF THE DRIP IRRIGATION AREA MUST BE GRADED SO THAT NO WATER CAN POND OVER THE FIELD AREA.
   BERM OR SWALE UPHILL OF FIELD AREA TO KEEP SURFACE WATER AWAY. PLANT WITH PERENNIAL GRASSES, BERMUDA (11b per 400sq. ft.) AND RYE (DURING WINTER MONTHS ADD AT 1 lb per 100sq.ft.). VEGETATION SHALL BE EXISTING WITH NO BARE SPOTS OR SEEDED AS DESCRIBED. VEGETATION SHALL BE MAINTAINED AT ALL TIMES.
   NO TREES SHALL BE CUT OR REMOVED WITHOUT THE OWNER'S APPROVAL, OR WITH LOCAL TREE PERMIT REMOVAL REQUIREMENTS.
5. **INSPECTION SCHEDULE:**
   THIS INSPECTION SCHEDULE MUST BE ADHERED TO IN ORDER TO DEMONSTRATE COMPLIANCE. THE ENGINEER CANNOT CERTIFY THAT THIS SYSTEM WAS INSTALLED CORRECTLY WITHOUT INSPECTION AT THE FOLLOWING STAGES. THIS SCHEDULE IS INDEPENDENT OF THE AUTHORIZED AGENTS (HEALTH DEPARTMENT'S) SCHEDULE.
   1ST INSPECTION: ARRANGE TO MEET THE ENGINEER'S REPRESENTATIVE PRIOR TO CONSTRUCTION. WHEN FIELD AREA IS SCARIFIED. WHEN TANKS AND CONNECTING PIPES HAVE BEEN INSTALLED AND FILLED FOR TWENTY-FOUR HOURS.
   2ND INSPECTION: WHEN EMITTER BIOLINE AND SANDY LOAM IS INSTALLED. WHEN PUMP AND ALARM ARE INSTALLED AND OPERATIONAL.
   FINAL INSPECTION: WHEN SYSTEM IS COMPLETE AND LANDSCAPING FINISHED.
6. **DESIGN CALCULATIONS:**

Design Flow	
Number of Occupants	300
Flow per Occupant	4 gpd
Number of Single Family Residence	1
Flow per Cabin/Yurt	240 gpd
Total Daily Flow	1440 gpd
Design Flow	1500 gpd

7. **PUMP:**
   SELECT DUPLEX PENTAIR 20DOM05221+1 SUBMERSIBLE EFFLUENT PUMP, 230 VOLT, SINGLE PHASE, 1/2 HP SUBMERSIBLE PUMP, OR ENGINEER APPROVED EQUAL FROM THE PERFORMANCE CURVE, THIS PUMP WILL FLOW 15 GPM AT 131.40 FT OF HEAD.
8. **CONTROL PANEL AND TIMER:**
   USE RJR CONTROLS ALTDM-2HP-DV CONTROL PANEL FOR THE EQUALIZATION TANK, DOSING AND FOR THE SPECIFIED ELECTRIC VALVES. AN AUDIBLE/VISUAL ALARM ON SEPARATE ELECTRICAL CIRCUIT IS REQUIRED. ALL AUDIBLE AND VISUAL ALARMS SHALL HAVE A MANUAL "SILENCE" SWITCH. CONTROL PANEL SHALL HAVE REPEAT CYCLE WITH RUN INTERVALS FROM SECONDS TO HOURS. THE PUMP OPERATION IS CONTROLLED BY AN OMRON H3CRF8 REPEAT CYCLE TIMER.

REVISION	DESCRIPTION	BY:	DATE:

STATE OF TEXAS · HUGO ELIZONDO, JR. · 69781 · LICENSED PROFESSIONAL ENGINEER · 8-3-23

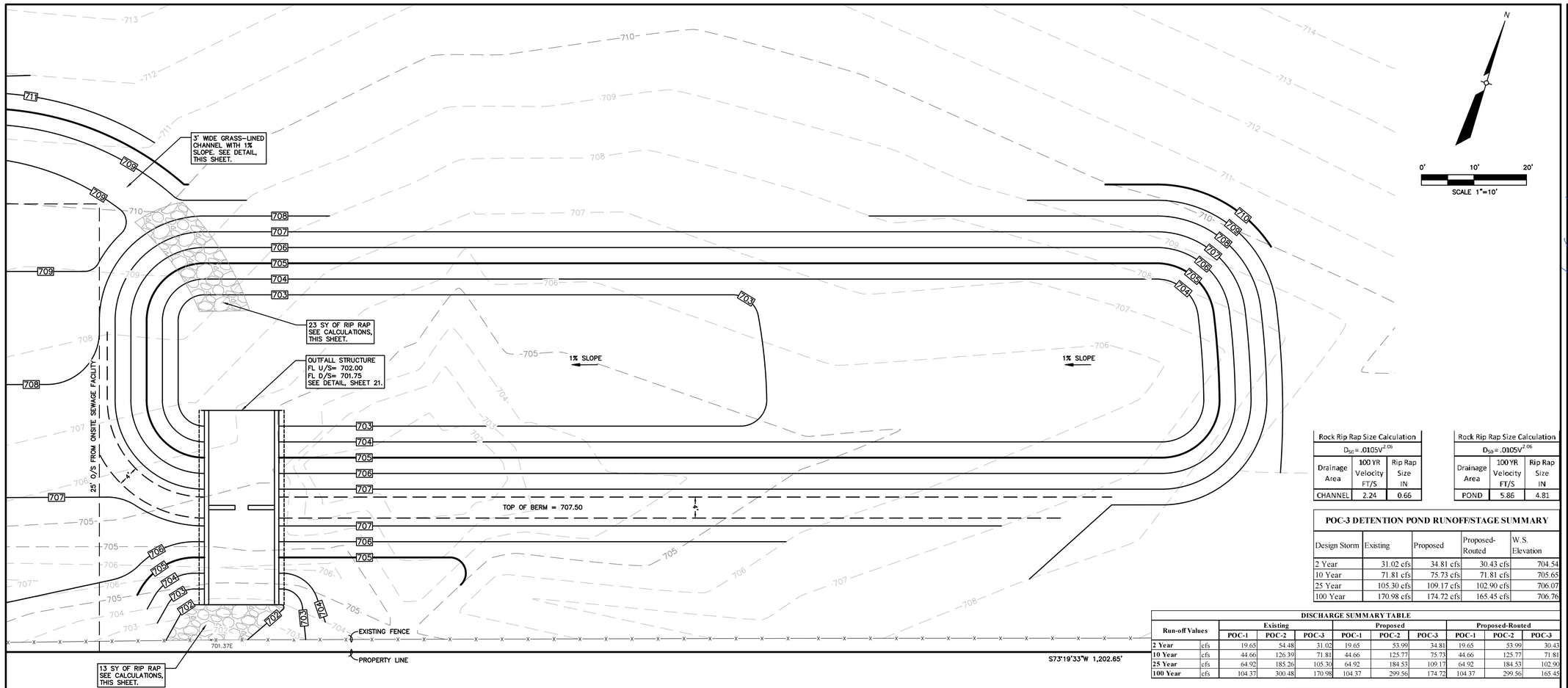
GATCO Consultants, LTD.
Registration No. F-3524
1126 Rummell, Drive, Suite 208 Phone: (512) 912-5900 Fax: (512) 912-5939
San Marcos, Texas 78666 E-mail: contact@gatcoconsultants.com

OSSF DETAILS

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 19_HWY_OSSF DETAILS
DESIGN: KAB | CHECKED: KAB
DRAWN: KAB | APPROVED: HE Jr.
SHEET: 19 OF 26



DETENTION POND: PLAN VIEW

SCALE: 1" = 10'

Rock Rip Rap Size Calculation		
$D_{50} = .0105V^{2.05}$		
Drainage Area	100 YR Velocity FT/S	Rip Rap Size IN
CHANNEL	2.24	0.66

Rock Rip Rap Size Calculation		
$D_{50} = .0105V^{2.06}$		
Drainage Area	100 YR Velocity FT/S	Rip Rap Size IN
POND	5.86	4.81

POC-3 DETENTION POND RUNOFF/STAGE SUMMARY

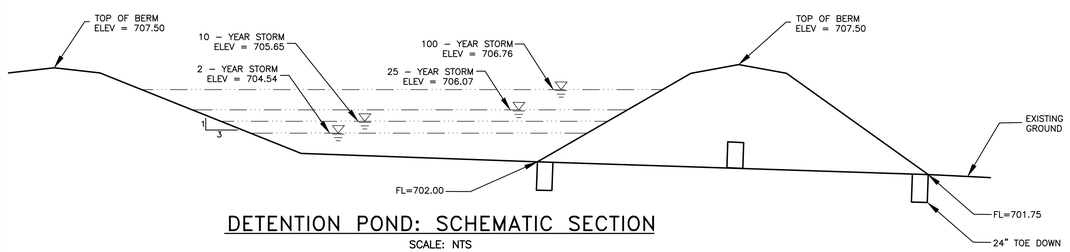
Design Storm	Existing	Proposed	Proposed-Routed	W.S. Elevation
2 Year	31.02 cfs	34.81 cfs	30.43 cfs	704.54
10 Year	71.81 cfs	75.73 cfs	71.81 cfs	705.65
25 Year	105.30 cfs	109.17 cfs	102.90 cfs	706.07
100 Year	170.98 cfs	174.72 cfs	165.45 cfs	706.76

DISCHARGE SUMMARY TABLE

Run-off Values		Existing			Proposed			Proposed-Routed		
		POC-1	POC-2	POC-3	POC-1	POC-2	POC-3	POC-1	POC-2	POC-3
2 Year	cfs	19.65	54.48	31.02	19.65	53.99	34.81	19.65	53.99	30.43
10 Year	cfs	44.66	126.39	71.81	44.66	125.77	75.73	44.66	125.77	71.81
25 Year	cfs	64.92	185.26	105.30	64.92	184.53	109.17	64.92	184.53	102.90
100 Year	cfs	104.37	300.48	170.98	104.37	299.56	174.72	104.37	299.56	165.45

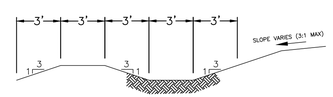
DETENTION POND STAGE/STORAGE SUMMARY

Stage	Area [sf]	Volume [cf]	Cum. Volume [cf]	Cum. Volume [Ac-ft]
702.00	0,000.00	0,000.00	0,000.00	0.00000
703.00	2,764.47	1,382.24	1,382.24	0.03173
704.00	6,077.60	4,421.04	5,803.27	0.13322
705.00	7,437.29	6,757.45	12,560.72	0.28835
706.00	8,853.52	8,145.41	20,706.12	0.47535
707.00	10,326.31	9,589.92	30,296.04	0.69550
707.50	11,083.90	5,352.55	35,648.59	0.81838



DETENTION POND: SCHEMATIC SECTION

SCALE: NTS



GRASS-LINED CHANNEL: SECTION "A-A"

N.T.S.

POND CONSTRUCTION NOTES:

1. POND INTERIOR/ EXTERIOR FILL SLOPES SHALL BE INSTALLED AT 3:1 (H:V). ANY SLOPES GREATER THAN 3:1 NEED STABILIZATION MATTING.
2. ALL POND INTERIOR SLOPES REQUIRE MATTING, PER TXDOT ITEM #169.
3. POND WILL BE PRIVATELY MAINTAINED.
4. EMBANKMENT OF BERMS AND POND SLOPES SHALL BE COMPACTED IN LIFTS TO 95% CONSOLIDATION AND TESTED BY A QUALIFIED MATERIALS TESTING FIRM PRIOR TO FINAL ACCEPTANCE.
5. HAND RAILING OR 4' CHAIN LINK FENCE REQUIRED ON EACH STRUCTURES WHERE DIFFERENCE EXCEEDS 1' 6" DROP

NOTES:

1. ATLAS-14 PRECIPITATION VALUES ARE USED TO DETERMINE STORM WATER RUNOFF.

REFERENCE NOTES:

1. FOR MASTER DRAINAGE PLAN, SEE SHEET 9.
2. FOR SITE PLAN, SEE SHEET 10.
3. FOR GRADING PLAN, SEE SHEETS 14 AND 15.
4. FOR POND DETAILS, SEE SHEET 21.

DATE: | BY: | DESCRIPTION | REVISION

STATE OF TEXAS · HUGO ELIZONDO, JR. · 69781 · LICENSED PROFESSIONAL ENGINEER · 8-31-2023

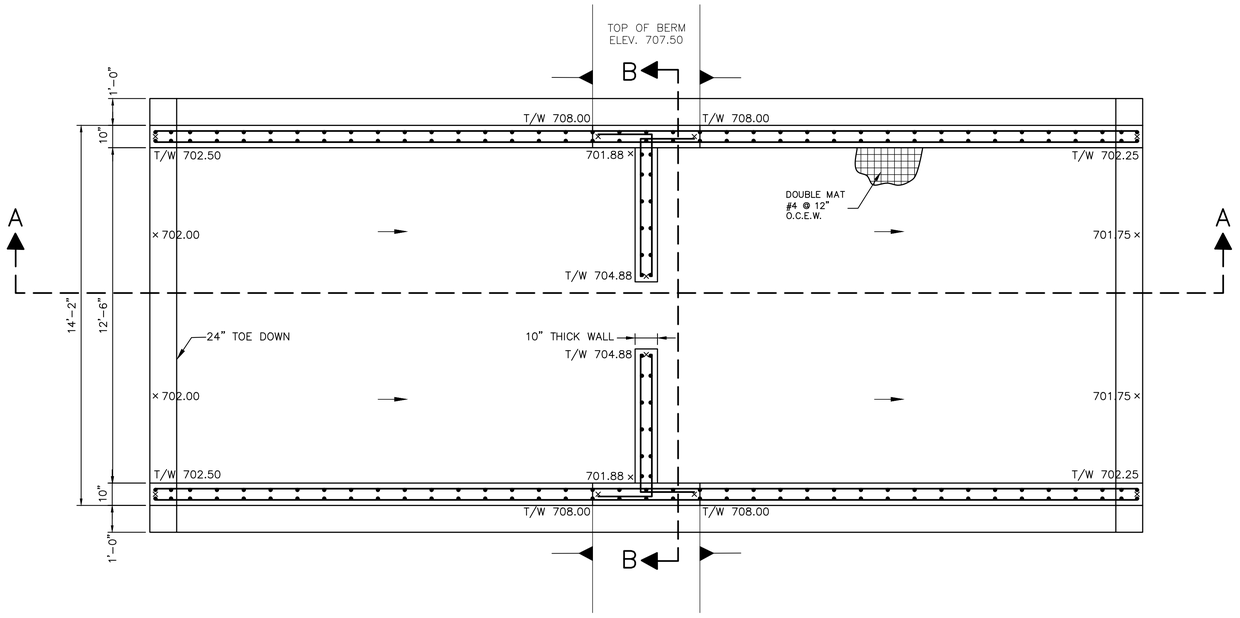
CUATRO Consultants, LTD.
Registration No. F-3524
1326 Rowalt Drive, Suite 208 Phone: (512) 912-5000 Fax: (512) 912-5959
San Marcos, Texas 78666 e-mail: contact@cuatroconsultants.com

POND LAYOUT AND CALCULATIONS

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

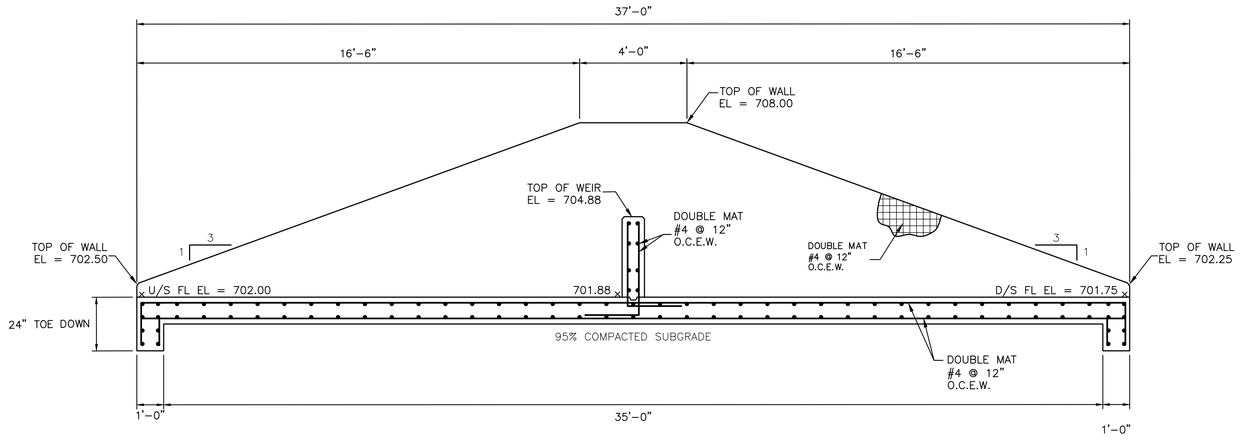
CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 20_HWY_POND LAYOUT AND CALCULATIONS
DESIGN: KAB | CHECKED: KAB
DRAWN: KAB | APPROVED: HE Jr.
SHEET: 20 OF 26



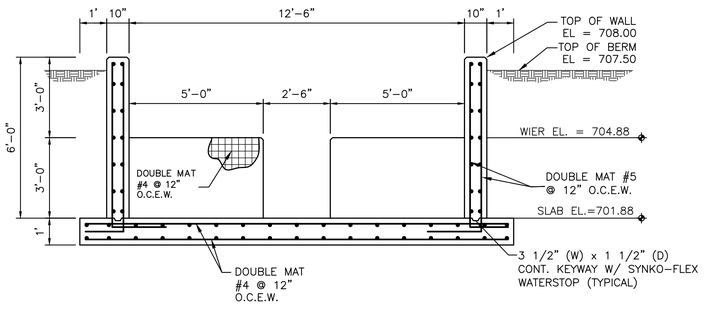
POND OUTLET STRUCTURE : PLAN VIEW

SCALE: 3/8" = 1'



POND OUTLET STRUCTURE : SECTION "A-A"

SCALE: 3/8" = 1'



POND OUTLET STRUCTURE : SECTION "B-B"

SCALE: 3/8" = 1'

GENERAL CONCRETE NOTES (6/19/18):

1. ALL STRUCTURAL CONCRETE SHALL BE CLASS C STONE AGGREGATE CONCRETE UNLESS NOTED OTHERWISE. MINIMUM CONCRETE COMPRESSIVE STRENGTH FOR STRUCTURAL CONCRETE SHALL BE 3,600 P.S.I. WHEN TESTED AT 28 DAYS.

   MISCELLANEOUS NON-STRUCTURAL CONCRETE SHALL BE CLASS A STONE AGGREGATE CONCRETE MINIMUM COMPRESSIVE STRENGTH OF 3,000 P.S.I. AT 28 DAYS.

   IF TEMPERATURE IS ABOVE 80° F AT POURING, CONTRACTOR SHALL APPLY A COAT OF CURING COMPOUND.

2. HORIZONTAL CONSTRUCTION JOINTS IN CONCRETE POURS SHALL BE PERMITTED ONLY WHERE INDICATED ON THE DRAWINGS. ALL CONSTRUCTION JOINTS SHALL BE MADE IN THE CENTER OF SPANS. SEE DRAWINGS FOR TYPICAL DETAIL. THE LOCATION OF CONSTRUCTION JOINTS SHALL BE AS APPROVED BY THE STRUCTURAL ENGINEER. ADDITIONAL REINFORCING AT CONSTRUCTION JOINTS SHALL BE AS SPECIFIED BY THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL SUBMIT PROPOSED LOCATIONS FOR CONSTRUCTION JOINTS NOT SHOWN ON DRAWINGS FOR APPROVAL BY THE STRUCTURAL ENGINEER.

   CONTRACTION JOINTS SHALL BE INSTALLED AT MAXIMUM 10'-0" SPACING. ALL SAWCUTS SHALL BE 1/8" BY T/4" OR 1" DEEP AND BE COMPLETED WITHIN 4 TO 6 HOURS AFTER POUR IS COMPLETE.

3. ALL PIPE SLEEVES IN CONCRETE MEMBERS SHALL BE SCHEDULE 40, PVC PIPE UNLESS SHOWN OTHERWISE ON THE STRUCTURAL DRAWINGS. LOCATION OF SLEEVES SHALL BE AS APPROVED BY THE STRUCTURAL ENGINEER.

4. REINFORCING STEEL SHALL CONFORM TO ACI 318 AND 315, LATEST EDITION. REINFORCING STEEL SHALL BE DEFORMED NEW BILLET STEEL BARS IN ACCORDANCE WITH ASTM SPECIFICATION A615 GRADE 60.

5. DETAILING OF REINFORCING STEEL SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE DETAILING MANUAL.

6. PROVIDE 2- #5 X 4' - 0" "L" SHAPED BARS TOP AND BOTTOM AT ALL CORNERS AND "T" INTERSECTIONS OF BEAMS.

7. ALL HOOKS AND BENDS IN REINFORCING BARS SHALL CONFORM TO ACI STANDARDS UNLESS SHOWN OTHERWISE.

8. LAP CONTINUOUS UNSCHEDULED REINFORCING BARS 36 BAR DIAMETERS, UNLESS NOTED OTHERWISE. TOP BARS SHALL HAVE A BAR LAP OF 50 BAR DIAMETERS.

9. ALL INTERSECTIONS OF STEEL SHALL BE TIED.

10. PROVIDE REINFORCING BARS IN ACCORDANCE WITH THE BAR BENDING DIAGRAM IF BAR TYPE ARE SPECIFIED. IN UNSCHEDULED BEAMS, SLABS, COLUMNS AND WALLS DETAIL REINFORCING IS AS FOLLOWS:
    - LAP TOP REINFORCING BARS AT MID SPAN.
    - LAP BOTTOM REINFORCING BARS AT THE SUPPORTS.
    - LAP VERTICAL BARS IN COLUMNS AND WALLS ONLY AT FLOOR LINES, UNLESS NOTED OTHERWISE.
    - LAP REINFORCING BARS 36 BAR DIAMETERS MINIMUM, UNLESS NOTED OTHERWISE.
    - PROVIDE STANDARD HOOKS IN TOP BARS AT CANTILEVER AND DISCONTINUOUS ENDS OF BEAMS, WALL, AND SLABS.
    - PROVIDE CORNER BARS FOR ALL HORIZONTAL BARS AT THE INSIDE AND OUTSIDE FACES OF INTERSECTING BEAMS OR WALLS. CORNER BARS ARE NOT REQUIRED IF TOP, BOTTOM, OR HORIZONTAL BARS ARE HOOKED.

11. TACK WELDING ON REINFORCING STEEL WILL NOT BE PERMITTED.

12. HEAT SHALL NOT BE USED IN THE FABRICATION OR INSTALLATION OF REINFORCEMENT.

13. REINFORCING STEEL MINIMUM CLEARANCE SHALL BE AS FOLLOWS:

    A) FOOTINGS 1 1/2 " TOP, 3" BOTTOM, 2" SIDE FORMED, 3" SIDE AGAINST EARTH
    B) WALLS 2"

14. HORIZONTAL WALL REINFORCEMENT SHALL BE CONTINUOUS AROUND BENDS.

15. CONTRACTOR SHALL PROVIDE 1" CHAMFER ON ALL EXPOSED EDGES AND A RUBBED FINISH ON ALL EXPOSED FACES UNLESS OTHERWISE SPECIFIED.

16. PROVIDE POURABLE URETHANE SEALANT AT ALL JOINTS.

17. USE SPACING CHAIRS TO MAINTAIN MINIMUM CLEARANCE AT REINFORCING STEEL OFF SUBGRADE. THE USE OF ROCK, BLOCK, WOOD, BRICK, ETC. SHALL NOT BE PERMITTED.

18. CONCRETE FORM WORK AND REINFORCEMENT SHALL BE INSPECTED BY CUATRO CONSULTANTS, LTD. PRIOR TO THE POURING OF CONCRETE.

19. CONCRETE SHALL HAVE A BROOM FINISH, UNLESS OTHERWISE NOTED ON PLAN.

20. SELECT FILL: SELECT FILL SHALL CONSIST OF MATERIAL WHICH HAS A P.I. BETWEEN 7 AND 17. SELECT FILL MAY BE APPROVED FLEXIBLE BASE MATERIAL (C.O.A. OR TXDOT SPECIFICATION), CRUSHED, ANGULAR 3/8" STONE, OR COMPACTED SOIL MATERIAL WITH P.I. BETWEEN 7 AND 17. COMPACTION OF SUBGRADE: 95 PERCENT. COMPACTION OF SELECT FILL: 95 PERCENT.

21. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL DIMENSIONS WITH ARCHITECTURAL PLANS BEFORE COMMENCING ANY WORK, THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING THE WORK.

22. EMBEDDED CONDUITS, PIPES, AND SLEEVES SHALL MEET THE REQUIREMENTS OF ACI 318-98, SECTION 6.3, INCLUDING THE FOLLOWING:
    - CONDUITS AND PIPES EMBEDDED WITHIN A SLAB, WALL OR BEAM (OTHER THAN THOSE PASSING THROUGH) SHALL NOT BE LARGER IN OUTSIDE DIMENSION THAN 1/3 THE OVERALL THICKNESS OF THE SLAB, WALL OR BEAM IN WHICH THEY ARE EMBEDDED.
    - CONDUITS, PIPES AND SLEEVES SHALL NOT BE SPACED CLOSER THAN THREE DIAMETERS OR WIDTHS ON CENTER.

REVISION	DESCRIPTION	BY:	DATE:

STATE OF TEXAS · HUGO ELIZONDO, JR. · 69781 · LICENSED PROFESSIONAL ENGINEER · 5/23/24

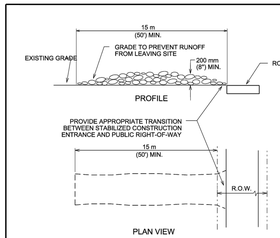
CUATRO Consultants, LTD.
Registration No. F-3524
1235 Rynwall, Drive, Suite 208 Phone: (512) 312-5060 Fax: (512) 312-5959
San Marcos, Texas 78666 E-mail: contact@cuatroconsultants.com

POND DETAILS

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

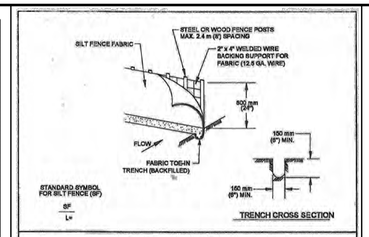
CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE:	AUGUST, 2023
PROJECT:	23-049
DRAWING'S NAME:	21_HWY_POND DETAILS
DESIGN: KAB	CHECKED: KAB
DRAWN: KAB	APPROVED: HE Jr.
SHEET:	21 OF 26



NOTES:
1. STONE SIZE: 75-125 mm (3-5") OPEN GRADED ROCK.
2. LENGTH: AS EFFECTIVE BUT NOT LESS THAN 15 m (50').
3. THICKNESS: NOT LESS THAN 200 mm (8").
4. WIDTH: NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS/EGRESS.
5. WASHING: WHEN NECESSARY, VEHICLE WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE AND DRAINS INTO AN APPROVED TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
6. MAINTENANCE: THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AS WELL AS REPAIR AND CLEAN OUT OF ANY MEASURE DEVICES USED TO TRAP SEDIMENT. ALL SEDIMENTS THAT IS SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY.
7. DRAINAGE: ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT	STABILIZED CONSTRUCTION ENTRANCE	
RECORD COPY SIGNED BY J. PATRICK MURPHY 5/23/00 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 641S-1



1. STEEL OR WOOD POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 300 mm (12 INCHES). IF WOOD POSTS CANNOT ACHIEVE 300 mm (12 Inches) DEPTH, USE STEEL POSTS.

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.

3. THE TRENCH MUST BE A MINIMUM OF 160 mm (8 Inches) DEEP AND 150 mm (8 Inches) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

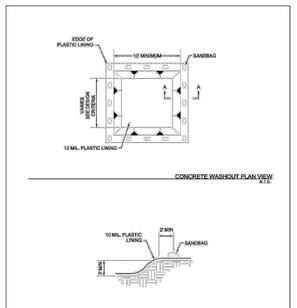
4. SILT FENCE FABRIC SHOULD BE SECURELY FASTENED TO EACH STEEL OR WOOD SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL OR WOOD FENCE POST.

5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

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

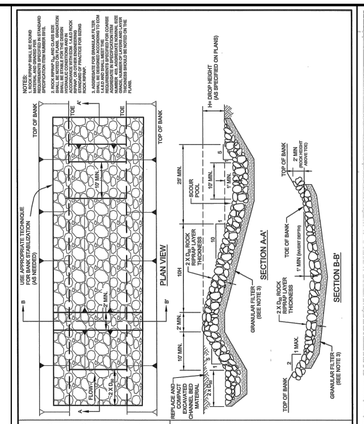
7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150 mm (6 Inches). THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT	SILT FENCE	
9/1/2001 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 642S-1

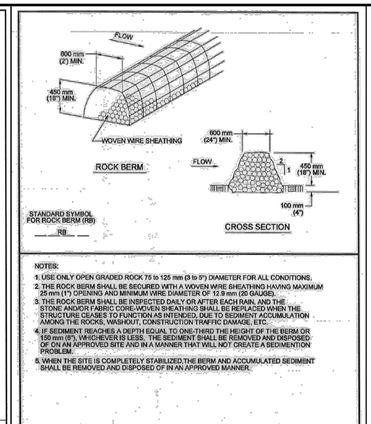


NOTE: SANDBAGS MAY BE REPLACED BY A BOIL BERM TO ANCHOR THE PLASTIC LINING.

Figure 4.1 Schematics of Concrete Washout Containment



CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT	GRADE CONTROL STRUCTURE ROCK RIFFLE WITH PREFORMED SCOUR POOL	
11/14/16	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 625S-2 B



NOTES:
1. USE ONLY OPEN GRADED ROCK 75 to 125 mm (3 to 5") DIAMETER FOR ALL CONDITIONS.
2. THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM 50 mm (1") OPENING AND MINIMUM WIRE DIAMETER OF 12.9 mm (20 GAUGE).
3. THE ROCK BERM SHALL BE INSPECTED DAILY OR AFTER EACH RAIN, AND THE STONE AND/OR FABRIC CORE (WOVEN SHEATHING) SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED, DUE TO SEDIMENT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
4. IF SEDIMENT REACHES A DEPTH EQUAL TO ONE-THIRD THE HEIGHT OF THE BERM OR 150 mm (6"), WHICHEVER IS LESS, THE SEDIMENT SHALL BE REMOVED AND DISPOSED OF ON AN APPROVED SITE AND IN A MANNER THAT WILL NOT CREATE A SEDIMENTION PROBLEM.
5. WHEN THE SITE IS COMPLETELY STABILIZED,THE BERM AND ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

CITY OF AUSTIN WATERSHED PROTECTION DEPARTMENT	ROCK BERM	
8/24/2010 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 639S-1

Recommended Silt Fence Spacing on Sloping Sites

	Soil Type		
Slope angle	Silty	Clays	Sandy
Very steep (1:1)	50 ft.	75 ft.	100 ft.
Steep (2:1)	75 ft.	100 ft.	125 ft.
Moderate (4:1)	100 ft.	125 ft.	150 ft.
Slight (10:1)	125 ft.	150 ft.	200 ft.

J-hook Placement Details

4 SQUATRO Consultants, LTD.
Registration No. F-5524
128 Rowell Drive, Suite 208 Phone: (512) 312-5900 Fax: (512) 312-5939
San Marcos, Texas 78666 E-mail: contact@squatroconsultants.com

NO.	REVISION	DESCRIPTION	BY:	DATE:

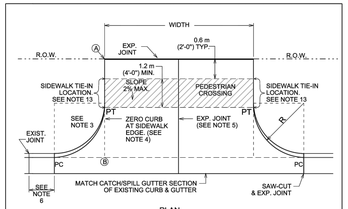
HUGO ELIZONDO, JR. 69781 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS SURVEYING

EROSION AND SEDIMENTATION CONTROL DETAILS

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

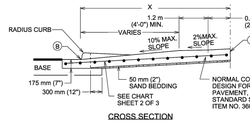
CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 22_HWY_ERO AND SEDI CTRL DETAILS
DESIGN: DR | CHECKED: CDE
DRAWN: DR | APPROVED: HE Jr.
SHEET: **22 OF 26**



PLAN

NOTE: ALL DRIVEWAYS SHALL BE SLOPED TOWARDS THE STREET FROM THE R.O.W. LINE. ELEVATION OF POINT (A)ABOVE POINT(B)S, TYPICALLY A MINIMUM OF 150 mm (6") PLUS 20 mm/m (¼" RISE/FOOT) OVER DISTANCE "X" IN METERS (FEET).



CROSS SECTION

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPE II DRIVEWAY	
RECORD COPY SIGNED BY CUONG TRAN	*02/24/10*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 433S-2
ADOPTED			1 OF 2

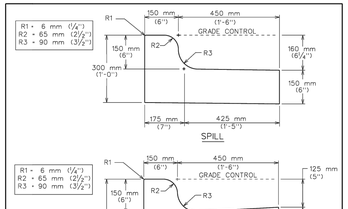
USE	THICKNESS	REINFORCEMENT
DRIVEWAYS FOR PASSENGER VEHICLE PARKING LOTS	150 mm (6") MIN.	125 mm (5") MIN. CONCRETE WITH ONE LAYER OF 13M (#4) BARS PLACED ON CHAIRS AT MIDDEPTH OF SLAB AT NO MORE THAN 450 mm (18") O.C. BOTH DIRECTIONS
ALL OTHERS	175 mm (7") MIN.	125 mm (5") MIN. CONCRETE WITH ONE LAYER OF 13M (#4) BARS PLACED ON CHAIRS AT MIDDEPTH OF SLAB AT NO MORE THAN 450 mm (18") O.C. BOTH DIRECTIONS

ALLOWABLE GRADES

DRIVEWAY VOLUME (ADT)	D=GRADE CHANGE STD	MAX
>1500	0%	3%
500-1500	3%	6%
< 500	6%	15%

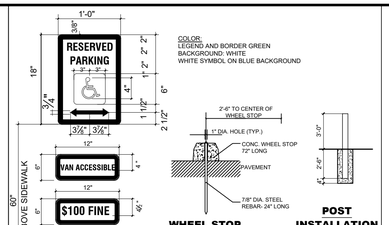
NOTES:
1. ALL TYPE II DRIVEWAYS SHALL HAVE RADIUS ENDS.
2. DRIVEWAY WIDTHS AND RADII DIMENSIONS, ONE/TWO WAY TRAVEL REQUIREMENTS, AND GEOMETRIC LAY-OUT ARE HIGHLY VARIABLE, SUBJECT TO SITE SPECIFIC CONDITIONS AND REQUIREMENTS. SEE TRANSPORTATION CRITERIA MANUAL, SECTION 5 "DRIVEWAYS".
3. THE DRIVEWAY EDGE SHALL BE SMOOTHLY TRANSITIONED INTO THE SIDEWALK TIE-IN LOCATION BEGINNING AT THE RADIUS PC LINE.
4. "ZERO" CURB AT PT OR SIDEWALK EDGE, WHICHEVER IS ENCOUNTERED FIRST.
5. PLACE AN EXPANSION JOINT DOWN THE CENTER OF DRIVEWAYS ALL DRIVEWAYS.
6. IF DIMENSION IS LESS THAN 1.5 METERS (5 FEET), REMOVE CURB AND GUTTER TO EXISTING JOINT AND POUR MONOLITHICALLY WITH DRIVEWAY.
7. IF THE BASE IS OVER-EXCAVATED WHERE THE CURB AND GUTTER WERE REMOVED, BACKFILL WITH CONCRETE MONOLITHICALLY WITH THE DRIVEWAY.
8. TYPE II DRIVEWAYS ARE TO BE LOCATED NO CLOSER TO THE CORNER OF INTERSECTING RIGHT OF WAY THAN 60% OF PARCEL FRONTAGE AT 30 METERS (100 FEET) WHICHEVER IS LESS.
9. DRIVEWAY SHALL NOT BE CONSTRUCTED WITHIN THE CURB RETURN OF A STREET INTERSECTION.
10. WHILE THE PROPERTY OWNER REMAINS RESPONSIBLE FOR GRADE BREAKS WITHIN PRIVATE PROPERTY, THE FIRE DEPARTMENT SHALL BE CONSULTED WHERE THE DRIVEWAY IS ESSENTIAL TO EMERGENCY VEHICLE ACCESS AND "G2" IS GREATER THAN 15%.
11. USE 12 MM (1/2") ASPHALT BOARD OR OTHER APPROVED MATERIAL FOR CURB AND GUTTER EXPANSION JOINTS. SIDEWALK, AT THE R.O.W. LINE AND AT MIDWIDTH, SEE NOTE 5.
12. SEE TRANSPORTATION CRITERIA MANUAL, SECTION 5 FOR OTHER DRIVEWAY REQUIREMENTS.
13. THE SIDEWALK, REGARDLESS OF ITS LOCATION WITH RESPECT TO THE CURB OR PROPERTY LINE, SHALL BE CONNECTED TO THE DRIVEWAY AT THESE LOCATIONS.
14. WATER METER BOXES AND WASTEWATER CLEAN OUTS ARE PROHIBITED FROM BEING LOCATED IN DRIVEWAY AREAS.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		TYPE II DRIVEWAY	
RECORD COPY SIGNED BY CUONG TRAN	*02/24/10*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 433S-2
ADOPTED			2 OF 2



LAYDOWN CURB

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		CURB AND GUTTER SECTION	
RECORD COPY SIGNED BY LINO RIVERA	*9/29/99*	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 430S-1
ADOPTED			

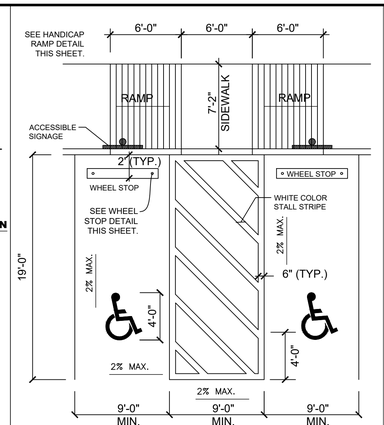


HANDICAP SIGN
NOT TO SCALE

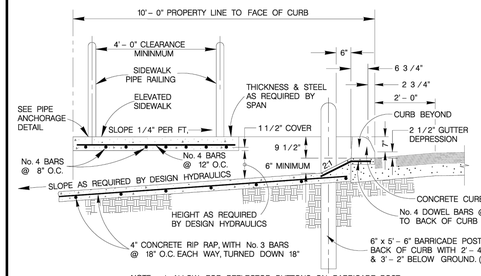
WHEEL STOP
NOT TO SCALE

POST INSTALLATION
NOT TO SCALE

HANDICAP RAMP/ SIDEWALK
NOT TO SCALE



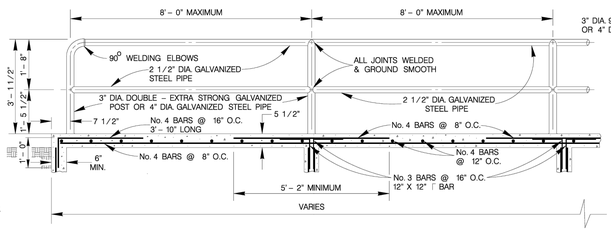
HANDICAP RAMP/ SIDEWALK
NOT TO SCALE



NOTE: 1. ALLOW FOR REFLECTOR BUTTONS ON BARRICADE POST. USE ONE 3 /4" BUTTON PER POST.
2. POST SHALL RECEIVE TWO COATS OF ALUMINUM PAINT.

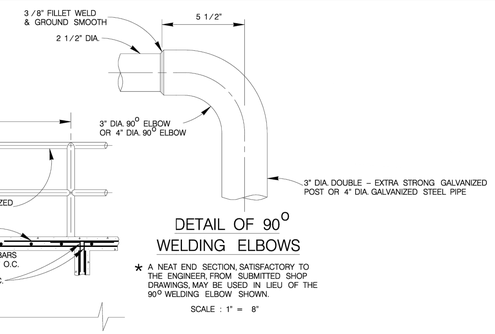
ELEVATED SIDEWALK & DROP CURB DETAILS FOR DRAINAGE CHANNELS

SCALE : 1" = 4'



TYPICAL SIDEWALK BRIDGE & SIDEWALK PIPE RAILING SECTION

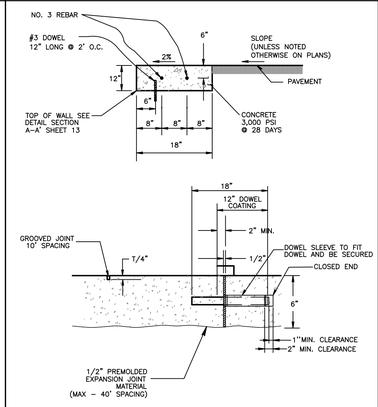
SCALE : 1" = 4'



DETAIL OF 90° WELDING ELBOWS

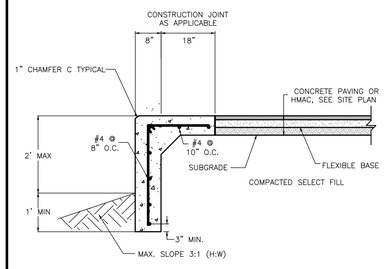
★ A NEAT END SECTION, SATISFACTORY TO THE ENGINEER, FROM SUBMITTED SHOP DRAWINGS, MAY BE USED IN LIEU OF THE 90° WELDING ELBOW SHOWN.

SCALE : 1" = 8"



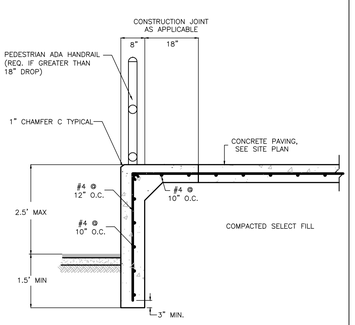
TYPICAL RIBBON CURB

N.T.S



HIGH CURB DETAIL : SOIL ON LOW SIDE

N.T.S.



CONCRETE FOOTING DETAIL: PAVEMENT ON LOW SIDE

N.T.S.

SUBGRADE AND FOUNDATION SOIL PREPARATION
1. STRIP AND REMOVE FROM THE CONSTRUCTION AREA ALL TOPSOIL, ORGANICS, AND VEGETATION TO A MINIMUM DEPTH OF 6 INCHES.
2. PROOF-ROLL THE SUBGRADE IN ACCORDANCE WITH TXDOT ITEM 216(4) TO REVEAL SOFT SPOTS. SOFT AREAS SHOULD BE REWORKED AND COMPACTED UNTIL THEY CAN BE SUCCESSFULLY PROOF ROLLED. THE SUCCESS OF THE PAVEMENT SYSTEM WILL VERY MUCH DEPEND ON THE CARE TAKEN TO PROVIDE A SOUND SUBGRADE.

BASE COURSE
1. BASE MATERIAL SHALL BE TYPE A, GRADE 2 OR BETTER, ACCORDING TO THE TEXAS DEPARTMENT OF TRANSPORTATION SPECIFICATION ITEM 247.
2. THICKNESS OF THE BASE COURSE SHOULD BE IN ACCORDANCE WITH TABLE 1.
3. BASE COURSE COMPACTION SHOULD BE 100 PERCENT OF TXDOT TEX-113-E. DENSITY CONTROL BY MEANS OF FIELD DENSITY DETERMINATIONS SHALL BE EXERCISED. THE BASE COURSE SHOULD BE WITHIN 3 PERCENT OF OPTIMUM MOISTURE AT TIME OF COMPACTION.
4. PROOF-ROLL THE BASE COURSE IN ACCORDANCE WITH TXDOT ITEM 216.
5. AFTER COMPACTION, TESTING AND CURING OF THE BASE MATERIAL, THE SURFACE SHOULD BE PRIMED USING AN ASPHALT EMULSION PRIME COAT MEETING TXDOT SPECIFICATION ITEM 310.
6. THE FULL THICKNESS OF THE BASE COURSE SHOULD BE EXTENDED 2 FEET BEYOND THE BACK OF CURB LINE.

FLEXIBLE PAVEMENT - HOT MIXED ASPHALT CONCRETE (HMAC)
1. SURFACING SHALL CONSIST OF HOT MIX ASPHALTIC CONCRETE MEETING THE REQUIREMENTS OF TXDOT ITEM 340, TYPE D MIXTURE. THE HMAC SHOULD BE COMPACTED TO A MINIMUM OF 91 TO 96 PERCENT OF THE MAXIMUM THEORETICAL DENSITY WITH ALL ROLLING COMPLETED BEFORE THE HMAC TEMPERATURE DROPS BELOW 175° F.
2. THE THICKNESS OF THE HMAC SHOULD BE IN ACCORDANCE WITH TABLE 1.
3. A FLEXIBLE PAVEMENT SYSTEM IS NOT RECOMMENDED IN AREAS THAT WILL BE SUBJECT TO SIGNIFICANT TRUCK TRAFFIC.

GENERAL CONDITIONS
1. SHOULD AT ANY STAGE IN THE CONSTRUCTION OF THE PAVEMENT A NON-STABLE OR WEAVING CONDITION OF THE SUBGRADE OR BASE COURSE BE NOTED UNDER THE WHEEL LOADS OF CONSTRUCTION EQUIPMENT, SUCH AREAS SHOULD BE DELINEATED AND THE GEOTECHNICAL ENGINEER CONSULTED FOR REMEDIATION BEFORE COMPLETING THE PAVEMENT SECTION.
2. SEEPAGE AREAS OR UNUSUAL FOUNDATION SOIL CONDITIONS SHOULD BE SIMILARLY BROUGHT TO THE GEOTECHNICAL ENGINEER'S ATTENTION BEFORE PROCEEDING WITH PAVEMENT COMPLETION.
3. LANDSCAPED ISLANDS SHOULD BE BACKFILLED WITH LOW PLASTICITY CLAYS TO REDUCE WATER INTRUSION INTO THE SUBSURFACE PAVEMENT STRUCTURES. CURBS SHOULD BE PROVIDED WITH WEEP HOLES IN LANDSCAPED AREAS TO REDUCE THE BUILD UP OF HYDROSTATIC PRESSURE AND TO REDUCE THE INTRUSION OF WATER INTO THE SUBSURFACE MATERIALS.
4. TRENCHES BENEATH PAVEMENTS SHOULD BE BACKFILLED WITH BORROW OR SUITABLE MATERIAL EXCAVATED FROM THE TRENCH AND FREE OF STONE OR ROCK OVER 4 INCHES IN DIAMETER. THE BACKFILL SHOULD BE COMPACTED TO 95 PERCENT OF THE MAXIMUM DRY DENSITY WHEN DETERMINED BY TXDOT TEST METHOD TEX-114-E. THE MOISTURE CONTENT SHOULD BE WITHIN 3 PERCENT OF THE OPTIMUM MOISTURE CONTENT AT THE TIME OF COMPACTION.
5. IF GROUND WATER OR SEEPAGE IS ENCOUNTERED AT THE TIME OF CONSTRUCTION, FRENCH DRAINS MAY BE REQUIRED TO DRAIN OR INTERCEPT THE FLOW OF WATER FROM THE SUBSURFACE PAVEMENT MATERIALS. THESE DRAINS SHOULD BE SLOPED A MINIMUM OF 0.5 PERCENT TO PROVIDE POSITIVE DRAINAGE TO DAYLIGHT.

SURFACE COURSE

ALL COMPACTION, SUBGRADE PREPARATION, AND PAVEMENT SECTIONS SHALL BE COMPLETED AS SET FORTH IN GEOTECHNICAL REPORT DATED NOVEMBER 29, 2023, AS PREPARED BY MLA GEOTECHNICAL. CONTRACTOR SHALL OBTAIN FULL COPY OF SAID REPORT PRIOR TO CLEARING AND GRUBBING SITE, PREPARING SUBGRADE AND ANY AND ALL CUT/FILL AREAS ONSITE.

FLEXIBLE PAVEMENT (LIGHT DUTY SECTION)

- SUBGRADE PREPARATION: COMPACT TO 92% PROCTOR DENSITY. PROOF ROLL WITH 25 TON ROLLER OBSERVED BY ENGINEER AND GEOTECHNICAL REPRESENTATIVE.
- FLEXIBLE BASE: 8" CRUSHED STONE BASE, TYPE A, GRADE 2 OR BETTER, TXDOT ITEM 247, COMPACTED TO 100% PROCTOR DENSITY. PROOF ROLL WITH 25 TON ROLLER OBSERVED BY ENGINEER AND GEOTECHNICAL REPRESENTATIVE.
- PAVEMENT: 2" HMAC, TX DOT ITEM 340, TYPE "D", GRADE 2, 91%-96% COMPACTION. PROOF ROLL WITH 25 TON ROLLER OBSERVED BY ENGINEER AND GEOTECHNICAL REPRESENTATIVE.

FLEXIBLE PAVEMENT: HEAVY DUTY SECTION

- SUBGRADE PREPARATION: COMPACT TO 92% PROCTOR DENSITY. PROOF ROLL WITH 25 TON ROLLER OBSERVED BY ENGINEER AND GEOTECHNICAL REPRESENTATIVE.
- FLEXIBLE BASE: 10" CRUSHED STONE BASE, TYPE A, GRADE 2 OR BETTER, TXDOT ITEM 247, COMPACTED TO 100% PROCTOR DENSITY. PROOF ROLL WITH 25 TON ROLLER OBSERVED BY ENGINEER AND GEOTECHNICAL REPRESENTATIVE.
- PAVEMENT: 2" HMAC, TX DOT ITEM 340, TYPE "D", GRADE 2, 91%-96% COMPACTION. PROOF ROLL WITH 25 TON ROLLER OBSERVED BY ENGINEER AND GEOTECHNICAL REPRESENTATIVE.

DATE:	BY:	DESCRIPTION	REVISION

CUATRO Consultants, LTD.
Registration No. F-3524
1126 Rowmill, Dove, Suite 208 Phone: (512) 312-5900 Fax: (512) 312-5939
San Marcos, Texas 78666 e-mail: contact@cuatroconsultants.com

HUGO ELIZONDO, JR. 69781 LICENSED PROFESSIONAL ENGINEER

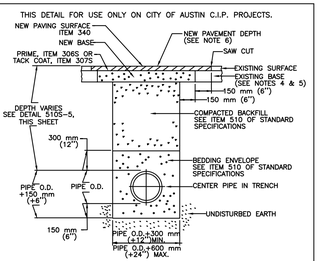
STREET AND DRAINAGE DETAILS

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 23_HWY_STREET AND DRAINAGE DETAILS
DESIGN: DR | CHECKED: CDE
DRAWN: DR | APPROVED: HE Jr.
SHEET: 23 OF 26

THIS DETAIL FOR USE ONLY ON CITY OF AUSTIN C.I.P. PROJECTS.

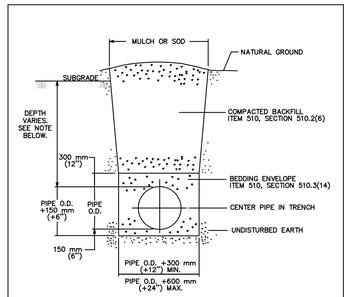


NOTES:

1. THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE A MINIMUM OF 300 mm (12") WIDER THAN THE UNDISTURBED SIDES OF THE TRENCH, SYMETRICAL ABOUT THE CENTER LINE OF THE EXCAVATION.
2. ANY CONCRETE PAVING SHALL BE SAW CUT 150 mm (6") WIDER THAN UNDISTURBED SIDES OF EXCAVATION.
3. IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE, THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RIDING SURFACE WITH COLD MIX OR TEMPORARY HOT MIX ASPHALTIC CONCRETE.
4. ROAD BASE AND SURFACE MATERIALS IN THE TRENCH CUT SHALL BE REPLACED IN KIND OF EQUAL THICKNESS, OR MINIMUM BASE THICKNESS OF 250 mm (10"), WHICHEVER IS GREATER.
5. ALL DAMAGED AREAS OF PAVEMENT OUTSIDE THE TRENCH CUT SHALL BE REMOVED AND REPLACED WITH MINIMUM OF 200 mm (8") OF BASE OR MATCH EXISTING THICKNESS, WHICHEVER IS GREATER.
6. SURFACE PAVEMENT SHALL BE OF THE KIND AND THICKNESS AS EXISTING, OR MINIMUM 50 mm (2"), WHICHEVER IS GREATER.

MODIFIED

CITY OF AUSTIN WATER AND WASTEWATER UTILITY	TYPICAL TRENCH WITH PAVED SURFACE	
ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 510S-3

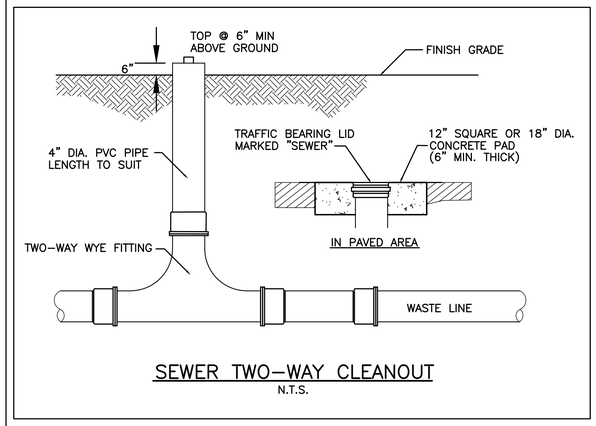


MINIMUM COVER:

- WASTEWATER - GRAVITY: VARIES - 2'0" MIN.
- WASTEWATER - FM: 3'0"
- WATER - 2'6"

MODIFIED

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TYPICAL TRENCH DETAIL WITH UNFINISHED SURFACE	
ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 510S-5



SEWER TWO-WAY CLEANOUT

N.T.S.

REVISION	DESCRIPTION	BY:	DATE:

STATE OF TEXAS · HUGO ELIZONDO, JR. · 69781 · LICENSED PROFESSIONAL ENGINEER · 8/23/2023

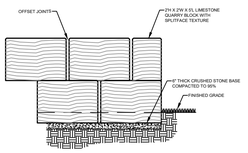
EQUATRO Consultants, LTD.
Registration No. F-3524
120 Riverwalk Drive, Suite 208 Phone: (+12) 312-5060 Fax: (+12) 312-5959
San Marcos, Texas 78666 E-mail: contact@equatroconsultants.com

WATER AND WASTEWATER DETAILS

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

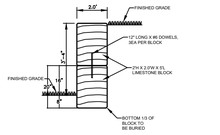
CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 24_HWV_WATER AND WASTEWATER DETAILS
DESIGN: DR | CHECKED: CDE
DRAWN: DR | APPROVED: HE Jr.
SHEET: **24 OF 26**



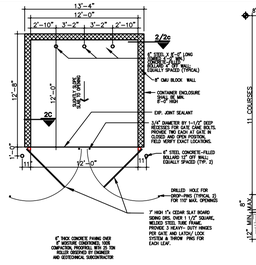
LIMESTONE BLOCK WALL: FRONT

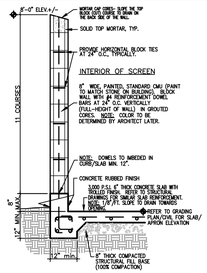
SCALE: NTS



LIMESTONE BLOCK WALL: SECTION

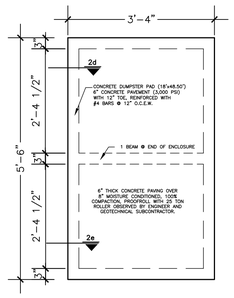
SCALE: NTS





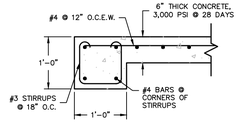
2c SECTION

N.T.S.



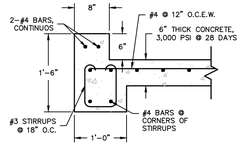
DUMPSTER PAD DETAIL

N.T.S.



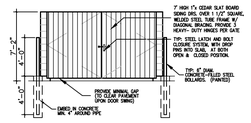
2e SECTION

N.T.S.



2d SECTION

N.T.S.



FRONT ELEVATION

N.T.S.

DUMPSTER PAD/SCREEN DETAIL

QUATRO Consultants, LTD.
Registration No.: F-3524
1251 Roosevelt, Drive, Suite 208 | Phone: (512) 312-5900 | Fax: (512) 312-5959
San Marcos, Texas 78666 | Email: quatroconsultants@att.net

REVISION	DESCRIPTION	BY:	DATE:

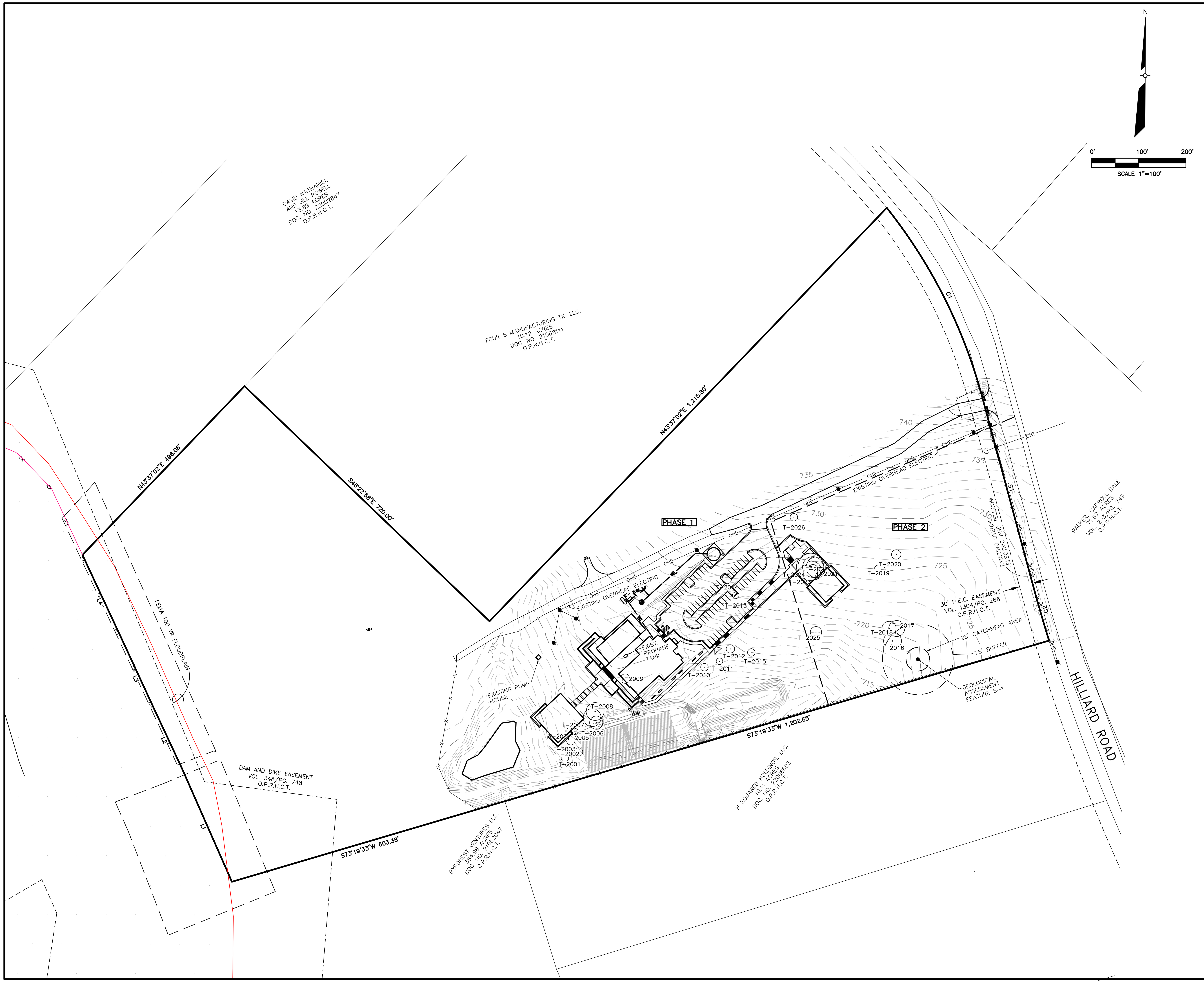
STATE OF TEXAS · HUGO ELIZONDO, JR. · 69781 · LICENSED PROFESSIONAL ENGINEER · 8/3/2023

STRUCTURAL DETAILS

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23-049
DRAWING'S NAME: 25_HWY_STRUCTURAL DETAILS
DESIGN: DR | CHECKED: CDE
DRAWN: DR | APPROVED: HE Jr.
SHEET: 25 OF 26



LEGEND

EXISTING	PROPOSED	DESCRIPTION
		BOUNDARY LINE
		EASEMENT BOUNDARY
915	915	CONTOURS
		LOT LINE
		CENTER LINE OF DITCH
WL	WL	WATER LINE
		WATER VALVE
		FIRE HYDRANT
		WATER METER
F.V.	F.V.	FLUSH VALVE
		AIR RELEASE VALVE
		WASTEWATER LINE
		FORCE MAIN
		MANHOLE
C.O.	C.O.	WASTEWATER CLEANOUT
		WASTEWATER SERVICE
OHE	OHE	OVERHEAD ELECTRIC
UE	UE	UNDERGROUND ELECTRIC
		TRANSFORMER BOX
L.P.	L.P.	LIGHT POLE
		POWER POLE
		GUY WIRE
		STORM SEWER
		CMP/ RCP PIPES
TEL	TEL	OVER HEAD TELEPHONE
FOC	FOC	FIBER OPTIC CABLE
GAS	GAS	GAS LINE
		PAVEMENT (HMAC)
		CONCRETE
		CHAIN LINK FENCE
		WOOD FENCE
		BARBED WIRE FENCE
		TRAFFIC FLOW
		HANDICAP SPACE
	FIRE LANE	FIRE LANE
		5' SIDEWALK/CLEAR ZONE
		7' PLANTING ZONE
		AWNING AREA
		ADA ACCESSIBLE ROUTE
		PHASE LINE
	1	PHASE NUMBER
×749.50 E	×749.50	SPOT ELEVATIONS
	× 749.50 G	GUTTER ELEVATION
	×749.50 TC	TOP OF CURB ELEVATION
	×749.50 TW	TOP OF WALL ELEVATION

REVISION	DESCRIPTION	BY:	DATE:

STATE OF TEXAS
HUGO ELIZONDO, JR.
69781
LICENSED PROFESSIONAL ENGINEER
2/21/24

CUATRO Consultants, LTD.
Registration No. F-3524
120 Riverwalk Drive, Suite 208 Phone: (512) 312-5040 Fax: (512) 312-5399
San Marcos, Texas 78666 e-mail: cuatro@cuatroconsultants.com

PHASING PLAN

OAK HAVEN PRESERVE
1775 HILLIARD ROAD
SAN MARCOS, TEXAS 78666

CLIENT:
BYRDNEST VENTURES, LLC.
9410 VERA CRUZ ROAD
AUSTIN, TEXAS 78737
(512) 326-4223

DATE: AUGUST, 2023
PROJECT: 23–049
DRAWING'S NAME: 26_HWV_PHASING PLAN
DESIGN: DR
CHECKED: CDE
DRAWN: DR
APPROVED: HE Jr.

INSPECTION, MAINTENANCE, REPAIR AND RETROFIT PLAN

Not Applicable

PILOT-SCALE FIELD TESTING PLAN

Not Applicable

MEASURES FOR MINIMIZING SURFACE STREAM CONTAMINATION

Not Applicable

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

I KEVIN BYRD,
Print Name

Managing Member,
Title - Owner/President/Other

of BYRDNEST VENTURES, LLC.,
Corporation/Partnership/Entity Name

have authorized HUGO ELIZONDO, JR., P.E., C.F.M.
Print Name of Agent/Engineer

of CUATRO CONSULTANTS, LTD.
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

02/06/24
Date

THE STATE OF Texas §

County of Travis §

BEFORE ME, the undersigned authority, on this day personally appeared Kevin Byrd 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 6th day of February 2024

DONNA KIRKPATRICK
Notary Public, State of Texas
Comm. Expires 08-31-2026
Notary ID 125794121

Donna Kirkpatrick
NOTARY PUBLIC

Donna Kirkpatrick
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 08/31/26

Application Fee Form

Texas Commission on Environmental Quality
Name of Proposed Regulated Entity: OAK HAVEN PRESERVE
Regulated Entity Location: 1775 HILLIARD RD, SAN MARCOS, TX 78666
Name of Customer: KEVIN BYRD
Contact Person: HUGO ELIZONDO, JR., P.E., C.F.M. Phone: (512) 312-5040
Customer Reference Number (if issued):CN N/A
Regulated Entity Reference Number (if issued):RN N/A

Austin Regional Office (3373)

☑ Hays ☐ Travis ☐ Williamson

San Antonio Regional Office (3362)

☐ Bexar ☐ Medina ☐ Uvalde
☐ Comal ☐ Kinney

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

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

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

Site Location (Check All That Apply):

☑ Recharge Zone ☐ Contributing Zone ☐ Transition Zone

Type of Plan	*Size*	*Fee Due*
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	31.23 Acres	$ 6,500.00
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: 3/4/24

Application Fee Schedule

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

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

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

Organized Sewage Collection Systems and Modifications

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

Underground and Aboveground Storage Tank System Facility Plans and Modifications

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

Exception Requests

Project	*Fee*
Exception Request	$500

Extension of Time Requests

Project	*Fee*
Extension of Time Request	$150

TCEQ Use Only

TCEQ Core Data Form

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

SECTION I: General Information

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

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

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

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

SECTION II: Customer Information

4. General Customer Information | **5. Effective Date for Customer Information Updates** (mm/dd/yyyy)

☒ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)

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

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

BYRDNEST VENTURES, LLC.

7. TX SOS/CPA Filing Number	**8. TX State Tax ID** (11 digits)	**9. Federal Tax ID** (9 digits)	**10. DUNS Number** (*if applicable*)
0804193264	32080609863	87-2265332	

11. Type of Customer: ☒ Corporation ☐ Individual Partnership: ☐ General ☐ Limited
Government: ☐ City ☐ County ☐ Federal ☐ Local ☐ State ☐ Other ☐ Sole Proprietorship ☐ Other:

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

13. Independently Owned and Operated?
☒ **Yes** ☐ **No**

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

☐ Owner ☐ Operator ☒ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ VCP/BSA Applicant ☐ Other:

15. Mailing Address:							
	1937 Rue De St Tropez #5						
City	AUSTIN	**State**	TX	**ZIP**	78746	**ZIP + 4**	

16. Country Mailing Information (*if outside USA*)	**17. E-Mail Address** (*if applicable*)
	kbyrd@bartlettcocke.com

18. Telephone Number	**19. Extension or Code**	**20. Fax Number** (*if applicable*)

(512) 845-2310		( ) -

SECTION III: Regulated Entity Information

21. General Regulated Entity Information *(If 'New Regulated Entity" is selected, a new permit application is also required.)*

☒ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated, in order to meet TCEQ Core Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name *(Enter name of the site where the regulated action is taking place.)*

OAK HAVEN PRESERVE

23. Street Address of the Regulated Entity: ***(No PO Boxes)***	1775 HILLIARD ROAD							
	City	SAN MARCOS	**State**	TX	**ZIP**	78666	**ZIP + 4**	
24. County	HAYS							

If no Street Address is provided, fields 25-28 are required.

25. Description to Physical Location:					
26. Nearest City			**State**		**Nearest ZIP Code**

Latitude/Longitude are required and may be added/updated to meet TCEQ Core Data Standards. (Geocoding of the Physical Address may be used to supply coordinates where none have been provided or to gain accuracy).

27. Latitude (N) In Decimal:			**28. Longitude (W) In Decimal:**		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	**56**	**1.98**	**97**	**57**	**24.97**

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)
7389		812990	

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

Event VENUE

34. Mailing Address:								
	1937 Rue De St Tropez #5							
	City	**Austin**	**State**	**TX**	**ZIP**	**78746**	**ZIP + 4**	
35. E-Mail Address:	**kbyrd@bartlettcocke.com**							

36. Telephone Number	**37. Extension or Code**	**38. Fax Number** *(if applicable)*
(512) 845-2310		( ) -

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

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

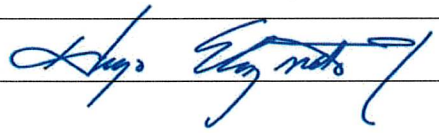
SECTION IV: Preparer Information

40. Name:	HUGO ELIZONDO, JR., P.E., C.F.M.	**41. Title:**	PRINCIPAL

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(512) 565-9040		( ) -	hugo@cuatroconsultants.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:	CUATRO CONSULTANTS	**Job Title:**	PRINCIPAL	
Name *(In Print):*	HUGO ELIZONDO, JR., P.E., C.F.M		**Phone:**	(512) 565- **9040**
Signature:			**Date:**	2/8/2024