

**Chapel Hill Phase 1 Water
Pollution Abatement Plan
Exception Request**

Water Pollution Abatement Plan
Exception Request



Prepared for:
TCEQ
Austin Regional Office

Prepared by:
Paul Hames, P.E.



TBPE No. F-6324
TBPLS No. 1019423C

8/28/2024

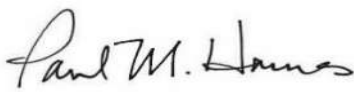
A handwritten signature in cursive script that reads "Paul M. Hames".

Project #222012278

August 28, 2024

Sign-off Sheet

This document entitled **Chapel Hill Phase 1 Water Pollution Abatement Plan Exception Request** was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of **The Duke Companies** (the "Client"). Any reliance on this document by any third-party is strictly prohibited. The material in it reflects Stantec's professional judgment considering the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not consider any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third-party makes of this document is the responsibility of such third-party. Such third-party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third-party as a result of decisions made or actions taken based on this document.

Prepared by 
(signature)

Paul Hames, P.E.

Reviewed by 
(signature)

Zhongyue Mao, P.E.

CHAPEL HILL PHASE 1 WATER POLLUTION ABATEMENT PLAN EXCEPTION REQUEST

August 28, 2024

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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: Chapel Hill-Phase I					2. Regulated Entity No.:				
3. Customer Name: AMFP V Chapel Hill II LLC					4. Customer No.:				
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):		0.68	
9. Application Fee:			10. Permanent BMP(s):			Wet pond			
11. SCS (Linear Ft.):			12. AST/UST (No. Tanks):			0			
13. County:	Williamson		14. Watershed:			Brushy Creek			

Application Distribution

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

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

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

Austin Region			
County:	Hays	Travis	Williamson
Original (1 req.)	—	—	_x_
Region (1 req.)	—	—	_x_
County(ies)	—	—	_x_
Groundwater Conservation District(s)	___ Edwards Aquifer Authority ___ Barton Springs/ Edwards Aquifer ___ Hays Trinity ___ Plum Creek	___ Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	___ Austin ___ Buda ___ Dripping Springs ___ Kyle ___ Mountain City ___ San Marcos ___ Wimberley ___ Woodcreek	___ Austin ___ Bee Cave ___ Pflugerville ___ Rollingwood ___ Round Rock ___ Sunset Valley ___ West Lake Hills	___ Austin ___ Cedar Park ___ Florence _x_ 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.	
Paul M. Hames, P.E.	
Print Name of Customer/Authorized Agent <i>Paul M. Hames</i>	8/28/2024
Signature of Customer/Authorized Agent	Date

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

General Information Form

Texas Commission on Environmental Quality

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

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

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

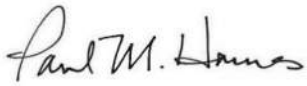
Signature

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

Print Name of Customer/Agent: Paul M. Hames, P.E.

Date: 8/28/2024

Signature of Customer/Agent:



Project Information

1. Regulated Entity Name: Chapel Hill Apartments
2. County: Williamson
3. Stream Basin: Brushy Creek
4. Groundwater Conservation District (If applicable): N/A
5. Edwards Aquifer Zone:
 - ☒ Recharge Zone
 - ☒ Transition Zone
6. Plan Type:
 - ☒ WPAP
 - ☐ SCS
 - ☐ Modification
 - ☐ AST
 - ☐ UST
 - ☒ Exception Request

7. Customer (Applicant):

Contact Person: Erik Boraks

Entity: AMFP V Chapel Hill II LLC

Mailing Address: 13740 Midway Road #804

City, State: Dallas, TX

Zip: 75244

Telephone: 972-385-1676

FAX: _____

Email Address: Erik.Boraks@dukecompanies.com

8. Agent/Representative (If any):

Contact Person: Paul M. Hames, P.E.

Entity: Stantec Consulting Services Inc.

Mailing Address: 6080 Tennyson Parkway, Suite 200

City, State: Plano, TX

Zip: 75024

Telephone: 214-538-2483

FAX: _____

Email Address: Paul.Hames@stantec.com

9. Project Location:

- ☒ The project site is located inside the city limits of Georgetown, TX.
- ☐ 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.

North side of Westinghouse Rd, 0.5 miles east of the intersection of Interstate 35 and Westinghouse Rd.

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

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

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

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

☒ Survey staking will be completed by this date: TBD

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.

Owner Authorization Form

Texas Commission on Environmental Quality
for Required Signature
Edwards Aquifer Protection Program
Relating to 30 TAC Chapter 213
Effective June 1, 1999

Land Owner Authorization

I, David Munk of
Land Owner Signatory Name

City of Georgetown
Land Owner Name (Legal Entity or Individual)

am the owner of the property located at
501 Westinghouse Road

Legal description of the property referenced in the application

and am duly authorized in accordance with §213.4(c)(2) and §213.4(d)(1) or §213.23(c)(2) and §213.23(d) relating to the right to submit an application, signatory authority, and proof of authorized signatory.

I do hereby authorize AMFP V Chapel Hill II LLC
Applicant Name (Legal Entity or Individual)

to conduct the construction of a deceleration lane and associated storm sewer improvements
Description of the proposed regulated activities

at 501 Westinghouse Road
Precise location of the authorized regulated activities

Land Owner Acknowledgement

I understand that the City of Georgetown
Land Owner Name (Legal Entity or Individual)

Is ultimately responsible for compliance with the approved or conditionally approved Edwards Aquifer protection plan and any special conditions of the approved plan through all phases of plan implementation even if the responsibility for compliance and the right to possess and control the property referenced in the application has been contractually assumed by another legal entity. I further understand that any failure to comply with any condition of the executive director's approval is a violation is subject to administrative rule or orders and penalties as provided under §213.10 (relating to Enforcement). Such violation may also be subject to civil penalties and injunction.

Land Owner Signature

David Muak

Land Owner Signature

8/21/24

Date

THE STATE OF § Texas

County of § Williamson

BEFORE ME, the undersigned authority, on this day personally appeared David Muak 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 21 day of August

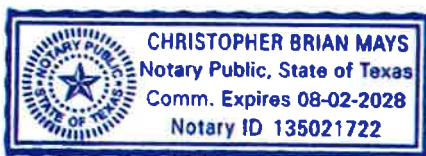
Christopher Brian Mays

NOTARY PUBLIC

Christopher Brian Mays

Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 8-2-2028



Attached: (Mark all that apply)

- ☐ Lease Agreement
- ☐ Signed Contract
- ☐ Deed Recorded Easement
- ☒ Other legally binding document

Applicant Acknowledgement

I, Michael Sano of AMFP V Chapel Hill II LLC
Applicant Signatory Name Applicant Name (Legal Entity or Individual)

acknowledge that the City of Georgetown

Land Owner Name (Legal Entity or Individual)

has provided AMFP V Chapel Hill II LLC

Applicant Name (Legal Entity or Individual)

with the right to possess and control the property referenced in the Edwards Aquifer protection plan.

I understand that AMFP V Chapel Hill II LLC

Applicant Name (Legal Entity or Individual)

is contractually responsible for compliance with the approved or conditionally approved Edwards Aquifer protection plan and any special conditions of the approved plan through all phases of plan implementation. I further understand that failure to comply with any condition of the executive director's approval is a violation is subject to administrative rule or orders and penalties as provided under §213.10 (relating to Enforcement). Such violation may also be subject to civil penalties and injunction.

Applicant Signature

[Signature]
Applicant Signature

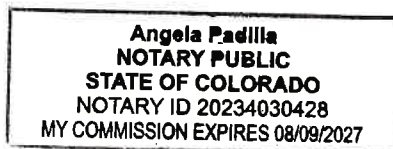
8/22/2024
Date

THE STATE OF § Colorado

County of § Denver

BEFORE ME, the undersigned authority, on this day personally appeared Michael Sano 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 22 day of August.



Angela Padilla
NOTARY PUBLIC

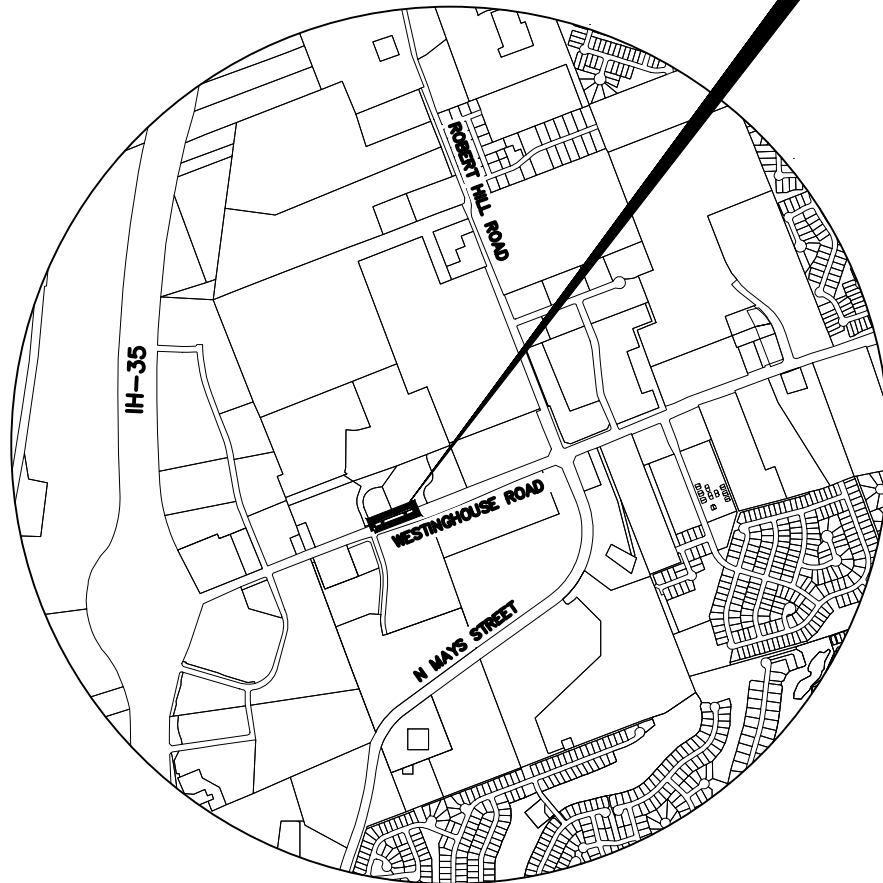
Angela Padilla
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 8/09/2027

Attachment A – Road Map



**PROJECT
SITE**



SITE LOCATION MAP

N.T.S.



Stantec

1905 Aldrich Street, Suite 300
Austin, Texas 78723-3544
Tel. (512) 328-0011 Fax (512) 328-0325
TBPE # F-6324 TBPLS # F-10194230
Copyright © 7/24/2024

401 WESTINGHOUSE ROAD
GEORGETOWN, TEXAS, 78626

DUKE, INC.

SITE LOCATION MAP

DATE: 8/28/2024

SCALE: N.T.S.

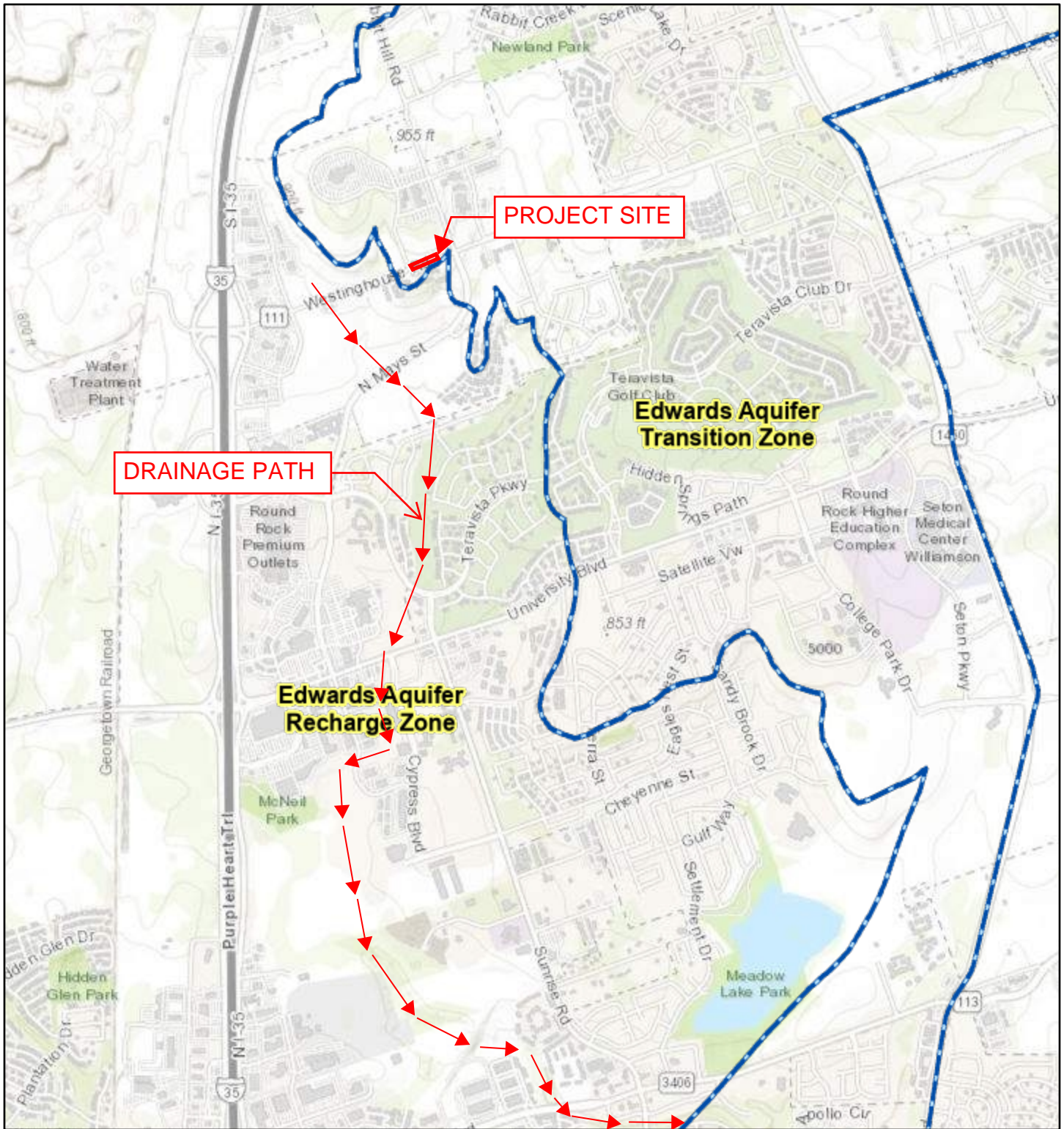
DRAWN BY: ZM

FILE:

PROJECT No. 222012278

Attachment B – USGS/Edwards Recharge Zone Map

Chapel Hill Phase 1 Exception



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 7; &RXQWLHV
 ^ ~ 0LQXWH 4XDG *ULG
 7&(4B(':\$5'6B2)),&,\$/B0\$36
 \$XVWLQ &RPPQLW\ &ROOHJH &LW\ RI \$XVWLQ &RXQW\ RI :LOOLDPVRQ 7H[DV 3DUNV :LOGOLIH (VUL +(5(*DUPLQ *HR7HFKQROR.
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Attachment 1C – Project Description

There is a pre-approved WPAP addressing the increase in Total Suspended Solids (TSS) caused by the development of the 28.89-acre Chapel Hill Subdivision Section One which consist of 13 apartment buildings and an amenity center on Lot 1 with associated drives, sidewalks, parking, drainage, and utilities located on the north side of Westinghouse Road, east of the intersection of Interstate 35 and Westinghouse Road in Georgetown, Texas. The proposed site work for this exception is to add a deceleration lane on Westinghouse Road approaching the driveway entrance at Boseli Way. Sidewalk is also redesigned along the proposed curb. A total addition of 8,058 SF impervious cover is proposed.

The Chapel Hill Phase 1 site is currently fully built and occupied. Permanent water quality control is currently provided for this site by a wet pond located on lot 3. The pond was designed to remove 85% of the increased TSS from the contributing drainage basins, as stipulated by the City of Georgetown UDC, which exceeds the required removal rate of 80% mandated by TCEQ. The wet pond has been designed for the future impervious cover associated with Lots 1, 2, 3, and 4, as well as 1.61 acres of the adjacent tract of land to the west currently owned by Bill Nations (Drainage Area WQ-3 on the Water Quality Drainage Area Map found in Attachment 6F of this report).

Temporary water quality controls will be provided during construction of the site improvements and will consist of silt fence, rock berms, inlet protection, a temporary sediment pond, concrete truck washout pits, stabilized construction entrances, and dust control.

The Stormwater runoff at the proposed deceleration lane and sidewalk does not directly contribute to the wet pond designed and built in Phase 1. The Stormwater runoff generated due to proposed construction for this exception is accounted in the design of the existing water quality pond as overtreatment. Thus, the existing water quality pond has enough capacity to handle additional 8,058 SF impervious cover.

The total limits of construction for this project, including the offsite water and wastewater, is approximately 36 acres.

Section II

Geologic Assessment Form (TCEQ-0585)



**Narrative Description of Site Specific Geology for the
Approximately 54-acre Chapel Hill Tract and Offsite
Water and Wastewater Utility Lines, Williamson
County, Texas**

Prepared for:

Halff Associates, Inc

Prepared by:

Cambrian Environmental

April 22nd, 2020

**NARRATIVE DESCRIPTION OF SITE SPECIFIC GEOLOGY FOR THE
APPROXIMATELY 54-ACRE CHAPEL HILL TRACT AND OFFSITE WATER AND
WASTERWATER UTILITY LINES, WILLIAMSON COUNTY, TEXAS**

Prepared for

HALFF ASSOCIATES, INC.

9500 Amberglen Boulevard
Building F, Suite 125
Austin, Texas 78729

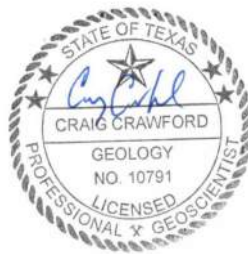
Prepared by

Craig Crawford, P.G.

CAMBRIAN ENVIRONMENTAL

4422 Pack Saddle Pass
Suite 204
Austin, Texas 78745

Texas Geoscience Firm Registration # 50484



As a licensed professional geoscientist I attest that the contents of this report are complete and accurate to the best of my knowledge.

April 22nd, 2020

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: Craig Crawford, PG

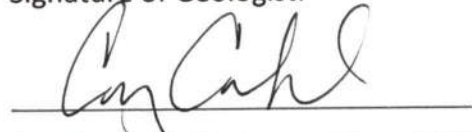
Telephone: 512.705.5541

Date: 22 April 2020

Fax: _____

Representing: Cambrian Environmental (Tx Geo Firm # 50484) (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:



Regulated Entity Name: Chapel Hill (54-acre Tract and Offsite Wastewater Line)

Project Information

1. Date(s) Geologic Assessment was performed: 16 May & 21 August 2019, 10 March 2020

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)
Austin-Whitewright	C	< 4
Ferris-Heiden	D	> 5
Heiden	D	> 5
Houston	D	> 5

* 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" = 40'
 Site Geologic Map Scale: 1" = 40'
 Site Soils Map Scale (if more than 1 soil type): 1" = 1000'
9. Method of collecting positional data:
☒ Global Positioning System (GPS) technology.
☐ Other method(s). Please describe method of data collection: _____
10. ☒ The project site and boundaries are clearly shown and labeled on the Site Geologic Map.
11. ☒ Surface geologic units are shown and labeled on the Site Geologic Map.

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 3 (#) 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.



NARRATIVE DESCRIPTION OF SITE SPECIFIC GEOLOGY FOR THE APPROXIMATELY 54-ACRE CHAPEL HILL TRACT AND OFFSITE WATER AND WASTEWATER UTILITY LINES, WILLIAMSON COUNTY, TEXAS

PROJECT DESCRIPTION

This narrative Geologic Assessment accompanies the Texas Commission on Environmental Quality (TCEQ) Geologic Assessment form TCEQ-0585 completed for the approximately 54-acre Chapel Hill tract. The project site is located on the north side of Westinghouse Road, approximately 0.35 miles east of Interstate Highway (IH) 35. Additionally, this report covers an offsite wastewater line associated with this project. This utility line runs south-southeast from Westinghouse Road, and extends past North Mays Street towards an existing development along Centerbrook Place (see Project Location Map).

METHODOLOGY

Two Cambrian Environmental Registered Professional Geoscientists (License #s 10791 & 1350) and two karst technicians conducted a field survey for a Geologic Assessment on May 16th 2019, and a second site visit to complete the field survey for the wastewater line portion of the project occurred on August 21st 2019. A third site visit and survey were conducted on March 20th 2020 to survey the alignment of the offsite waterline. The pedestrian survey was completed by walking parallel transects spaced approximately 50 feet apart as directed by the TCEQ in the Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones (Rev. 10-01-04). Closer spacing was used where vegetation inhibited clear observation. All potential karst features, including depressions, holes, and animal burrows, were carefully examined for evidence of subsurface extent. A number of techniques were used for this effort, including probing with a digging implement to determine the thickness and consistency of fill material and feeling for the presence of air flow, which may indicate the presence of a sub-surface void space. Other techniques included making observations of any notable characteristics of the feature site such as the presence of various types of vegetation or a semi-circular burrow mound produced by the activities of small mammals. The locations of any discovered features were recorded with a handheld GPS unit and were also marked on-site with pink flagging tape. Cambrian also conducted due diligence activities as called for under the City of Georgetown Edwards Aquifer Recharge Zone Water Quality Ordinance (“the Ordinance”).

RESULTS

Soils

Soils mapped within the project area include the Austin-Whitewright complex (AwC2), Ferris-Heiden complex (FhE), Heiden (HeD2, HsE), and Houston (HuB, HuC2) series soils (see Site Soils Map).¹ The Austin-Whitewright series soils are within the “C” classification of the hydrologic soil groups. Type “C” soils have a slow infiltration rate (high runoff potential) when thoroughly wet. The Ferris-Heiden, Heiden, and Houston series soils are within the “D” classification of the hydrologic soil groups. Type “D” soils have a very slow infiltration rate (very high runoff potential) when thoroughly wet.

¹ United States Department of Agriculture, Soil Conservation Service, Soil Survey of Williamson County, Texas, 1983.

Geology

The project site is located partially within the Edwards Aquifer Recharge Zone, and partially within the Edwards Aquifer Transition Zone. Generally, the Recharge Zone is the area where the stratigraphic units constituting the Edwards Aquifer are outcropping at the surface, and where permeable features create the potential for recharge of surface waters into the aquifer. The Transition Zone is where geologic formations outcrop in proximity to the Recharge Zone, and where geologic features may present possible avenues of recharge of surface waters to the aquifer. The Transition Zone includes portions of the Del Rio Clay, Buda Limestone, Eagle Ford Group, and Austin Chalk.

The bedrock lithologies underlying and outcropping in the 54-acre portion of the project area are Cretaceous in age and consist of the Eagle Ford Group, the Buda Limestone, and the Del Rio Clay, which are stratigraphically above the units that comprise the Edwards Aquifer (see Project Geologic Map, Sheet 1 of 3). The bedrock lithologies underlying the wastewater line portion of the project area consist of the Del Rio Clay and the Georgetown Limestone (see Project Geologic Map, Sheets 2 & 3). The geology of this area has been mapped most recently at a useful scale by Collins (2005), and we find his interpretation of the geology to be generally accurate.²

Recharge into the aquifer primarily occurs in areas where the Edwards Group and Georgetown Formation are exposed at the surface, and both of these units are absent in outcrop on the property. Most recharge is from direct infiltration via precipitation and streamflow loss. Recharge occurs predominantly along secondary porosity features such as faults, fractures, and karst features (caves, solution cavities, sinkholes, etc.). Karst features are commonly formed along joints, fractures, and bedding plane surfaces in the Edwards Group. No karst features on any type were discovered during the pedestrian survey, and very little outcropping bedrock was observed due to the generally thick soil cover. The alignment of one mapped fault crosses through the wastewater line portion of the project (see Project Geologic Map, Sheet 3 of 3), however no trace of this fault was observable in the field. This portion of the project area has a thick layer of clayey soil (Houston Black clay) over the bedrock, and the location of this fault was not able to be verified.

Three wells were discovered during the pedestrian survey. However, a review of the Texas Water Development Board's online Groundwater Data Viewer³ did not produce any results or data regarding any documented ground water wells located on this the property.

Site Hydrogeologic Assessment

In the absence of discrete recharge features, the likelihood of surface water infiltrating on this property and contributing to the main body of the aquifer is thought to be very low. This is further supported by the lack of the Edwards Limestone and Georgetown Limestone outcrop on the property. While the likelihood is low, should any karst features be discovered during the construction phase of the project, they should be reported to TCEQ and have appropriate mitigation measures emplaced.

² Collins, E.W., 2005, Geologic Map of the West Half of the Taylor 30x60 Quadrangle: Central Texas Urban Corridor, Encompassing Round Rock, Georgetown, Salado, Briggs, Liberty Hill, and Leander. Bureau of Economic Geology, The University of Texas at Austin. Austin, Texas 78713-8924.

³ <https://www2.twdb.texas.gov/apps/waterdatainteractive/groundwaterdataviewer>

City of Georgetown Ordinance

No springs were identified on the property during the pedestrian survey, and therefore no occupied site protection, or spring buffer protection measures will be required for this property. One mapped stream occurs in the wastewater line portion of the project area (see Project Geologic Map, sheets 2 & 3), however this channel appears to have been highly modified in the past by the installation two impoundment ponds are present near the headwaters of this draw. This mapped stream consists of a very shallow drainage that was dry and overgrown with vegetation during both site visits, and no flowing water was observed during either site visit in spite of recent rain events. It appears that this drainage may only flow if the two upstream impoundment ponds overflow. Any water that may potentially flow in this short section of this drainage draw, flows to the south into an existing series stormwater control structures and ponds associated with the existing subdivision to the south of this project. In accordance with the Ordinance, the construction of certain improvements may be subject to stated restrictions. This includes wastewater facilities, provided that the wastewater utility shall not be located below the normal highwater elevation within the channel of a stream, except at crossings of the stream.

All regulated activities within the recharge zone must follow water quality best management practices, and development of the property will need to comply with the water quality protection measures as outlined in Section 8 of the Ordinance.

Feature Descriptions

- F-1** The feature consists of a water well. It is unknown if the well is still actively in use, or if it will be utilized during the proposed development of the tract. The depth of this well is unknown. If the well is not intended to be utilized, it should be properly abandoned by a licensed well driller prior to the construction phase of the project. (GPS: 30.58142, -97.68533)
- F-2** The feature consists of a closed depression that measures approximately 10 feet in diameter by less than 1 foot deep. The feature is lined with limestone cobbles, bricks, and concrete; appears to be a relic of past land clearing, or other activities, associated with the existing homestead on the property. The feature does not appear to be karst in origin. (GPS: 30.58129, -97.68481)
- F-3** The feature consists of limestone block cistern, and appears to have been used in the past for livestock or in association with the homestead. (GPS: 30.58184, -97.68411)
- F-4** The feature consists of a water well. It is unknown if the well is still actively in use, or if it will be utilized during the proposed development of the tract. The depth of this well is unknown. If the well is not intended to be utilized, it should be properly abandoned by a licensed well driller prior to the construction phase of the project. (GPS: 30.58169, -97.68427)
- F-5** The feature consists of a water well. It is unknown if the well is still actively in use, or if it will be utilized during the proposed development of the tract. The depth of this well is unknown. If the well is not intended to be utilized, it should be properly abandoned by a licensed well driller prior to the construction phase of the project. (GPS: 30.58105, -97.68548)

Fault One fault is mapped as crossing through the wastewater line portion of the project area. No traces of this fault were directly observable in the field, and therefore the location was not verifiable during the survey. This portion of the project area is underlain with thick clayey soils of the Houston Black series. Beneath the thick soil cover, the bedrock geology is mapped as the Del Rio Clay on east (downthrown) side of the fault, and the Georgetown Limestone on the west side of the fault, however no bedrock outcrop was observed in this portion of the project area. (inferred GPS: 30.57435, -97.68161)

Stratigraphic Column for the Approximately 54-acre Chapel Hill Tract

*Shaded areas represent lithologies underlying the project area

Upper Cretaceous	Kef	Eagle Ford (~50 feet)	Edwards Aquifer
	Kbu	Buda Limestone (~20 feet)	
	Kdr	Del Rio Clay (60 feet)	
	Kgt	Georgetown Limestone (100 feet)	
Lower Cretaceous	Ked	Edwards Limestone (90-100 feet)	
	Kcp	Comanche Peak Limestone (~40 feet)	
	Kwa	Walnut Formation (~130 feet)	



Feature F-1, water well



Feature F-2, non-karst closed depression lined with limestone cobbles.



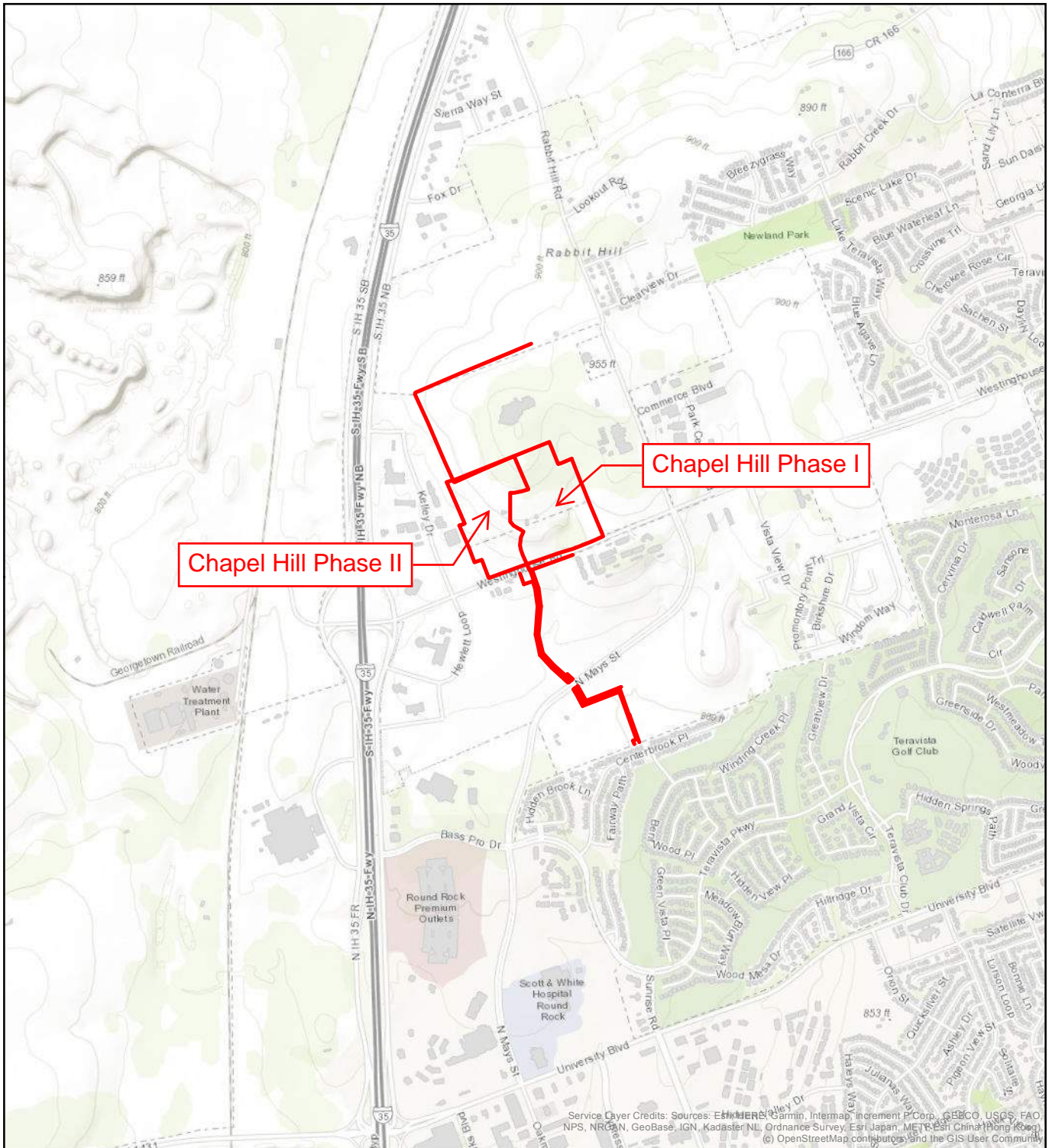
Feature F-3, cistern



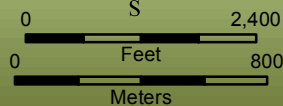
Feature F-4, well and pressure tank



Feature F-5, well (located inside structure)

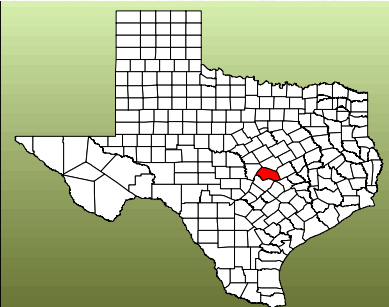


Project Location Map

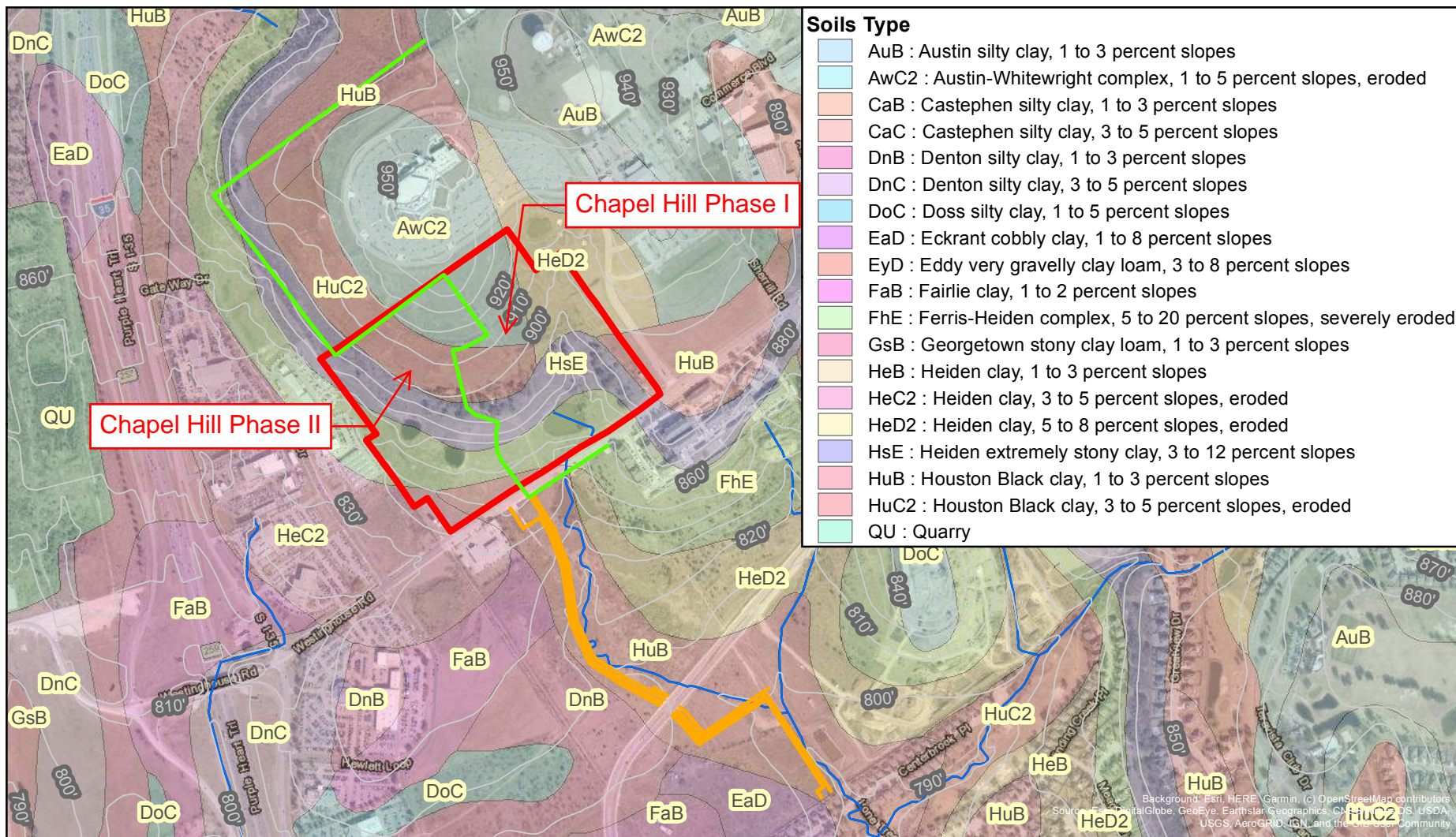


Map Key

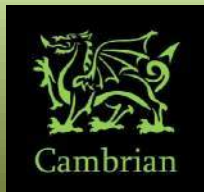
Project Area



Williamson County, Texas



Soils of the Project Area



Map Key

- Project Area
- Wastewater Alignment
- Waterline
- Stream
- Contour Line

Chapel Hill Project
11/11/2019

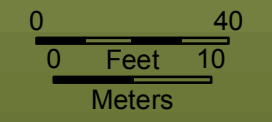


Project Geologic Map

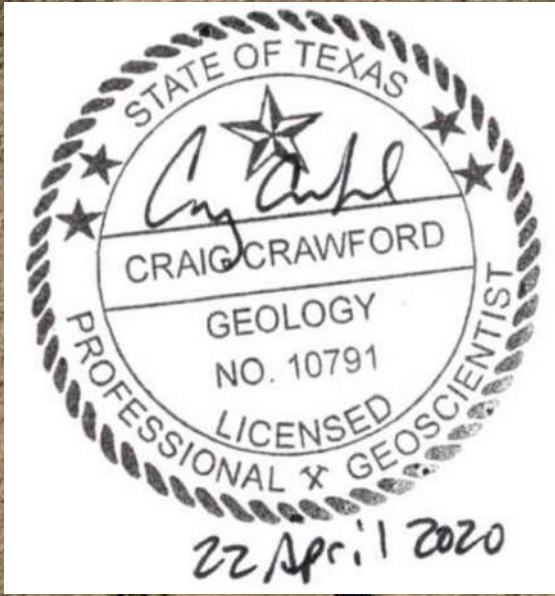


- Map Key**
- Project Area
 - Wastewater Alignment
 - Waterline
 - Geologic Unit
 - Kgt - Georgetown Limestone
 - Kdr - Del Rio Clay
 - 10-Foot Elevation Contour
 - Stream

SHEET 2 OF 4



1 inch = 40 feet





Project Geologic Map



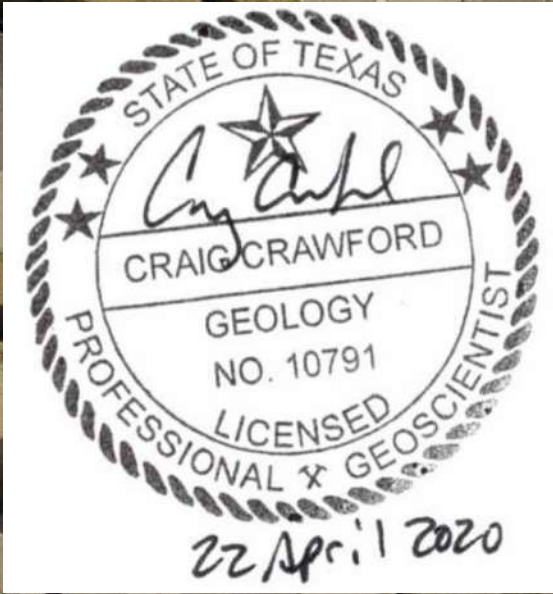
- Map Key**
- Wastewater Alignment
 - Geologic Unit
 - Kgt - Georgetown Limestone
 - Kdr - Del Rio Clay
 - Fault
 - 10-Foot Elevation Contour
 - Stream

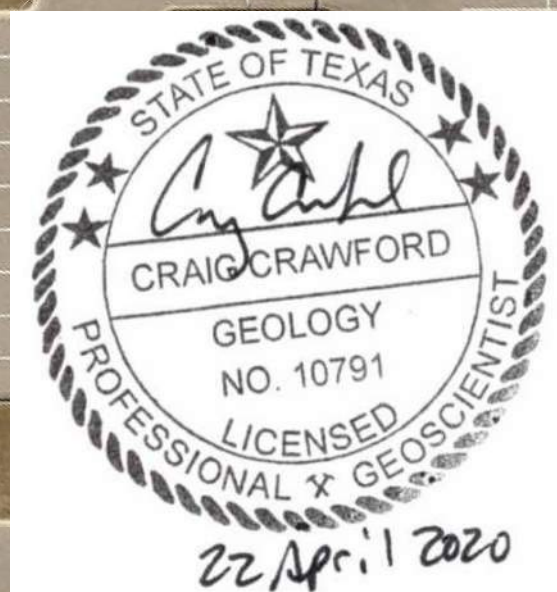
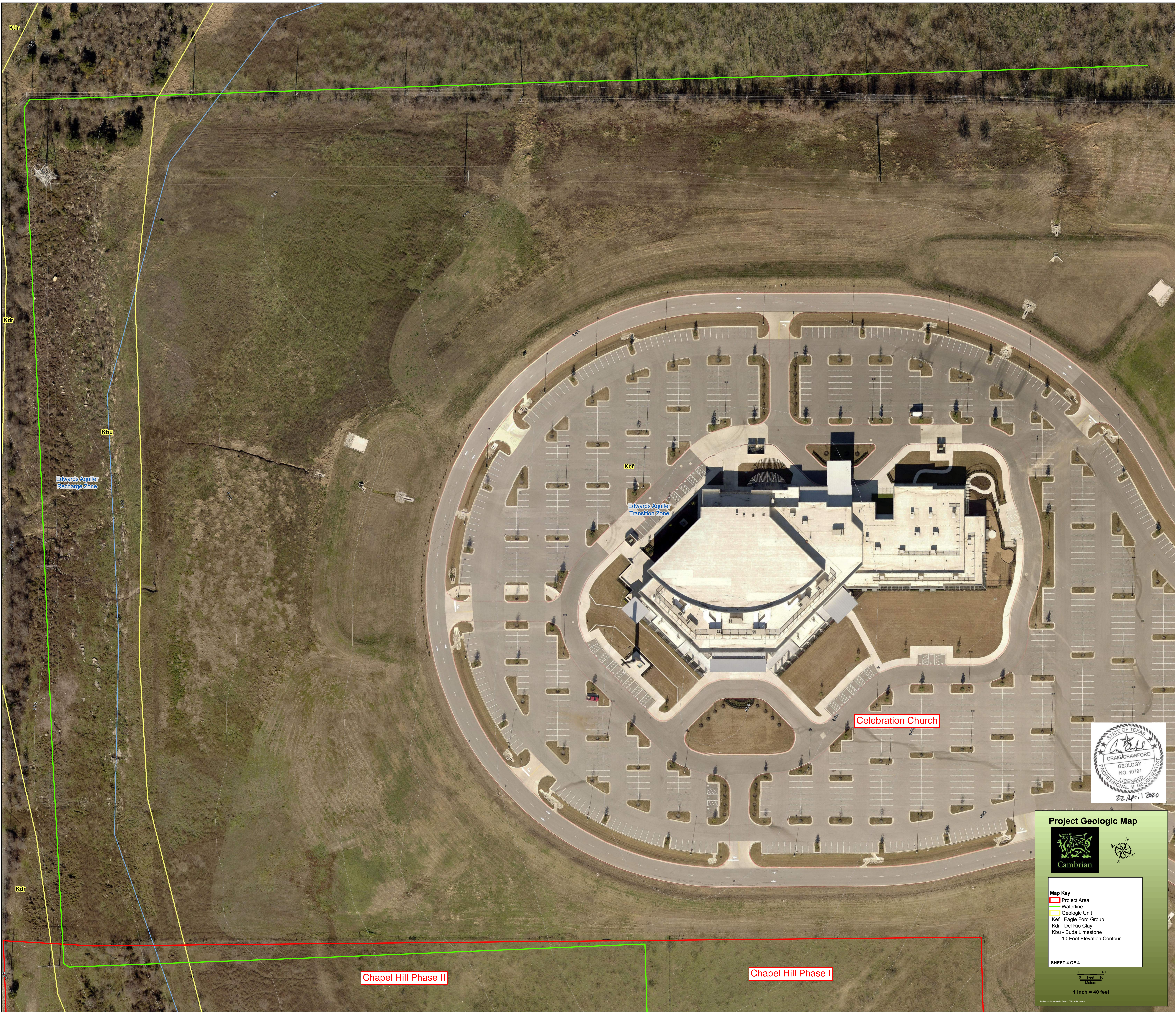
SHEET 3 OF 4

0 40
0 Feet 10
Meters



1 inch = 40 feet

Background Layer Credits: Source: ESRI Aerial Imagery





Project Geologic Map



Map Key

- Project Area
- Waterline
- Geologic Unit
- Kef - Eagle Ford Group
- Kdr - Del Rio Clay
- Kbu - Budia Limestone
- 10-Foot Elevation Contour

SHEET 4 OF 4

0 10 20 40
Feet
0 10 20
Meters

1 inch = 40 feet

Background: Open Streets. Source: CNR Aerial Imagery

Recharge and Transition Zone Exception Request Form

Texas Commission on Environmental Quality

30 TAC §213.9 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.

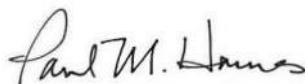
Signature

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 **Recharge and Transition Zone Exception Request Form** is hereby submitted for TCEQ review and executive director approval. The request was prepared by:

Print Name of Customer/Agent: Paul Hames, P.E.

Date: 8/28/2024

Signature of Customer/Agent:



Regulated Entity Name: Chapel Hill Apartments

Exception Request

1. ☒ **Attachment A - Nature of Exception.** A narrative description of the nature of each exception requested is attached. All provisions of 30 TAC §213 Subchapter A for which an exception is being requested have been identified in the description.
2. ☒ **Attachment B - Documentation of Equivalent Water Quality Protection.** Documentation demonstrating equivalent water quality protection for the Edwards Aquifer is attached.

Administrative Information

3. ☒ 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.
4. ☒ The applicant understands that no exception will be granted for a prohibited activity in Chapter 213.
5. ☒ The applicant understands that prior approval under this section must be obtained from the executive director for the exception to be authorized.

Attachment A– Nature of Exception

The site has been developed into residential apartment buildings and amenity center with associated roads, drainage, utilities and a water quality wet pond. The pre-approved WPAP address the increase in Total Suspended Solids (TSS) caused by increase in impervious cover from rainfall events. The proposed site work for this exception is to add a deceleration lane on Westinghouse Road approaching the driveway entrance at Boseli Way. Sidewalk is also redesigned along the proposed curb. A total addition of 8,058 SF impervious cover is proposed. Factors contributing to the contamination of surface and groundwater are generated from man-made pollutants such as pesticides, fertilizers, loose trash and debris, and automotive fluids.

The Stormwater runoff at the proposed deceleration lane and sidewalk does not directly contribute to the wet pond designed and built in Phase 1. The Stormwater runoff generated due to the deceleration lane addition is accounted in the design of the water quality pond as overtreatment. Thus, the existing water quality pond has enough capacity to handle additional 8,058 SF impervious cover.

Attachment B – Documentation of Equivalent Water Quality Protection

A total addition of 8,058 SF impervious cover is proposed. The Stormwater runoff at the proposed deceleration lane and sidewalk does not directly contribute to the wet pond designed and built in Phase 1. Please refer to Chapel Hill Phase 2 Off-Site Paving & Drainage Plan sheet for drainage patterns. The Stormwater runoff generated due to the deceleration lane addition is accounted in the design of the water quality pond as overtreatment. Thus, the existing water quality pond has enough capacity to handle additional 8,058 SF impervious cover. Please refer to Chapel Hill Phase 2 Off-Site Erosion Sedimentation Control Plan Sheet for temporary Best Management Practices. The Pond Calculations sheet shows the approved condition of the TSS removal calculation and pond sizing based on Phase 1 development. The approval letter of Chapel Hill Phase 1 from TCEQ on October 22, 2020 is also attached. The Edwards Aquifer Protection Program ID Number is 11002100, and the Regulated Entity Number is RN111065629. The TCEQ Calculation Sheet reflected the overtreatment due to the addition of 8,058 SF impervious cover.

Jon Niermann, *Chairman*
Emily Lindley, *Commissioner*
Bobby Janecka, *Commissioner*
Toby Baker, *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

October 22, 2020

Ms. Kim Vowell
AMFP IV Chapel Hill LLC.
100 Park Avenue, Suite 3500
New York, NY 10017

Re: Edwards Aquifer, Williamson County

NAME OF PROJECT: Chapel Hill Apartments, Located 0.2 mi NE of Kelly Dr. and Westinghouse Rd., Georgetown, Texas

TYPE OF PLAN: Request for Approval of a Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer

Edwards Aquifer Protection Program ID No. 11002100; Regulated Entity No. RN111065629

Dear Ms. Vowell:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the WPAP Application for the above-referenced project submitted to the Austin Regional Office by Half Associates, Inc. on behalf of AMFP IV Chapel Hill LLC. on July 3, 2020. Final review of the WPAP was completed after additional material was received on October 12, 2020. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) were selected and construction plans were prepared by a Texas Licensed Professional Engineer to be in general compliance with the requirements of 30 TAC Chapter 213. These planning materials were sealed, signed and dated by a Texas Licensed Professional Engineer. Therefore, based on the engineer's concurrence of compliance, the planning materials for construction of the proposed project and pollution abatement measures are hereby approved subject to applicable state rules and the conditions in this letter. The applicant or a person affected may file with the chief clerk a motion for reconsideration of the executive director's final action on this Edwards Aquifer Protection Plan. A motion for reconsideration must be filed no later than 23 days after the date of this approval letter. *This approval expires two (2) years from the date of this letter unless, prior to the expiration date, more than 10 percent of the construction has commenced on the project or an extension of time has been requested.*

PROJECT DESCRIPTION

The proposed WPAP project will have an area of approximately 28.89 acres. It includes 13 apartment buildings, an amenity center, drives, utilities and associated appurtenances. The impervious cover will be 10.06 acres (34.8 percent). Project wastewater will be disposed of by conveyance to the existing San Gabriel Wastewater Treatment Plant.

PERMANENT POLLUTION ABATEMENT MEASURES

To prevent the pollution of stormwater runoff originating on-site or upgradient of the site and potentially flowing across and off the site after construction, a wet basin, designed using the TCEQ technical guidance document, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005), will be constructed to treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 8,971 pounds of TSS generated from the 10.06 acres of impervious cover. The approved measures meet the required 80 percent removal of the increased load in TSS caused by the project.

The proposed water quality basin is sized for future development and is designed to remove 14,886 pounds of TSS to treat stormwater runoff from a maximum of 16.45 acres of impervious cover.

GEOLOGY

According to the Geologic Assessment (GA) included with the application, the site includes Austin-Whitewright complex, Heiden clay, Heiden extremely stony clay and Ferris-Heiden complex. The surficial geologic units are Eagle Ford Group, Buda limestone, Austin chalk, and Del Rio clay. No sensitive features were identified on the site. The TCEQ site assessment conducted on August 20, 2020 revealed the site to be generally in accordance with the description included in the GA.

SPECIAL CONDITIONS

- I. All permanent pollution abatement measures shall be operational prior to occupancy of the facility.
- II. All sediment and/or media removed from the water quality basin during maintenance activities shall be properly disposed of according to 30 TAC 330 or 30 TAC 335, as applicable.

STANDARD CONDITIONS

1. Pursuant to Chapter 7 Subchapter C of the Texas Water Code, any violations of the requirements in 30 TAC Chapter 213 may result in administrative penalties.
2. The holder of the approved Edwards Aquifer protection plan must comply with all provisions of 30 TAC Chapter 213 and all best management practices and measures contained in the approved plan. Additional and separate approvals, permits, registrations and/or authorizations from other TCEQ Programs (i.e., Stormwater, Water Rights, UIC) can be required depending on the specifics of the plan.
3. In addition to the rules of the Commission, the applicant may also be required to comply with state and local ordinances and regulations providing for the protection of water quality.

Prior to Commencement of Construction:

4. Within 60 days of receiving written approval of an Edwards Aquifer Protection Plan, the applicant must submit to the Austin Regional Office, proof of recordation of notice in the county deed records, with the volume and page number(s) of the county deed records of the county in which the property is located. A description of the property boundaries shall be included in the deed recordation in the county deed records. A suggested form (Deed Recordation Affidavit, TCEQ-0625) that you may use to deed record the approved WPAP is enclosed.
5. All contractors conducting regulated activities at the referenced project location shall be provided a copy of this notice of approval. At least one complete copy of the approved WPAP and this notice of approval shall be maintained at the project location until all regulated activities are completed.
6. Modification to the activities described in the referenced WPAP application following the date of approval may require the submittal of a plan to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval prior to initiating construction of the modifications.
7. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation of the referenced project. Notification must be submitted to the Austin Regional Office no later than 48 hours prior to commencement of the regulated activity. Written notification must include the date on which the regulated activity will commence, the name of the approved plan and program ID number for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person. The executive director will use the notification to determine if the approved plan is eligible for an extension.
8. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved WPAP, must be installed prior to construction and maintained during construction. Temporary E&S controls may be removed when vegetation is established and the construction area is stabilized. If a water quality pond is proposed, it shall be used as a sedimentation basin during construction. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.
9. All borings with depths greater than or equal to 20 feet must be plugged with non-shrink grout from the bottom of the hole to within three (3) feet of the surface. The remainder of the hole must be backfilled with cuttings from the boring. All borings less than 20 feet must be backfilled with cuttings from the boring. All borings must be backfilled or plugged within four (4) days of completion of the drilling operation. Voids may be filled with gravel.

During Construction:

10. During the course of regulated activities related to this project, the applicant or agent shall comply with all applicable provisions of 30 TAC Chapter 213, Edwards Aquifer. The applicant shall remain responsible for the provisions and conditions of this approval until such responsibility is legally transferred to another person or entity.
11. This approval does not authorize the installation of temporary aboveground storage tanks on this project. If the contractor desires to install a temporary aboveground storage tank

for use during construction, an application to modify this approval must be submitted and approved prior to installation. The application must include information related to tank location and spill containment. Refer to Standard Condition No. 6, above.

12. If any sensitive feature (caves, solution cavities, sink holes, etc.) is discovered during construction, all regulated activities near the feature must be suspended immediately. The applicant or his agent must immediately notify the Austin Regional Office of the discovery of the feature. Regulated activities near the feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the feature and the aquifer from potentially adverse impacts to water quality. The plan must be sealed, signed, and dated by a Texas Licensed Professional Engineer.
13. All water wells, including injection, dewatering, and monitoring wells must be in compliance with the requirements of the Texas Department of Licensing and Regulation under Title 16 TAC Chapter 76 (relating to Water Well Drillers and Pump Installers) and all other locally applicable rules, as appropriate.
14. If sediment escapes the construction site, the sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain). Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50 percent. Litter, construction debris, and construction chemicals shall be prevented from becoming stormwater discharge pollutants.
15. Intentional discharges of sediment laden water are not allowed. If dewatering becomes necessary, the discharge will be filtered through appropriately selected best management practices. These may include vegetated filter strips, sediment traps, rock berms, silt fence rings, etc.
16. The following records shall be maintained and made available to the executive director upon request: the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.
17. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.

After Completion of Construction:

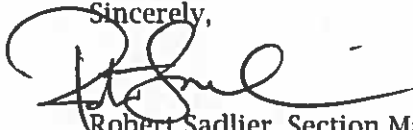
18. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the Austin Regional Office within 30 days of site completion.
19. The applicant shall be responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (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. The regulated entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred. A copy of the transfer of responsibility must be filed with the executive

director through Austin Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.

20. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Edwards Aquifer protection plan. If the new owner intends to commence any new regulated activity on the site, a new Edwards Aquifer protection plan that specifically addresses the new activity must be submitted to the executive director. Approval of the plan for the new regulated activity by the executive director is required prior to commencement of the new regulated activity.
21. An Edwards Aquifer protection plan approval or extension will expire and no extension will be granted if more than 50 percent of the total construction has not been completed within ten years from the initial approval of a plan. A new Edwards Aquifer protection plan must be submitted to the Austin Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.
22. At project locations where construction is initiated and abandoned, or not completed, the site shall be returned to a condition such that the aquifer is protected from potential contamination.

This action is taken under authority delegated by the Executive Director of the Texas Commission on Environmental Quality. If you have any questions or require additional information, please contact Bob Castro, P.E. of the Edwards Aquifer Protection Program of the Austin Regional Office at (512) 339-2929.

Sincerely,



Robert Sadlier, Section Manager
Edwards Aquifer Protection Program
Texas Commission on Environmental Quality

RCS/rbc

Enclosure: Deed Recordation Affidavit, Form TCEQ-0625
Change in Responsibility for Maintenance of Permanent BMPs, Form TCEQ-10263

Deed Recordation Affidavit
Edwards Aquifer Protection Plan

THE STATE OF TEXAS §

County of _____ §

BEFORE ME, the undersigned authority, on this day personally appeared _____ who, being duly sworn by me, deposes and says:

- (1) That my name is _____ and that I own the real property described below.
- (2) That said real property is subject to an EDWARDS AQUIFER PROTECTION PLAN which was required under the 30 Texas Administrative Code (TAC) Chapter 213.
- (3) That the EDWARDS AQUIFER PROTECTION PLAN for said real property was approved by the Texas Commission on Environmental Quality (TCEQ) on _____.

A copy of the letter of approval from the TCEQ is attached to this affidavit as Exhibit A and is incorporated herein by reference.

- (4) The said real property is located in _____ County, Texas, and the legal description of the property is as follows:

LANDOWNER-AFFIANT

SWORN AND SUBSCRIBED TO before me, on this __ day of _____, _____

NOTARY PUBLIC

THE STATE OF _____ §

County of _____ §

BEFORE ME, the undersigned authority, on this day personally appeared _____ 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 __ day of _____, _____

NOTARY PUBLIC

Typed or Printed Name of Notary

MY COMMISSION EXPIRES: _____

**Change in Responsibility for Maintenance
on Permanent Best Management Practices and Measures**

The applicant is no longer responsible for maintaining the permanent best management practice (BMP) and other measures. The project information and the new entity responsible for maintenance is listed below.

Customer: _____

Regulated Entity Name: _____

Site Address: _____

City, Texas, Zip: _____

County: _____

Approval Letter Date: _____

BMPs for the project: _____

New Responsible Party: _____

Name of contact: _____

Mailing Address: _____

City, State: _____ Zip: _____

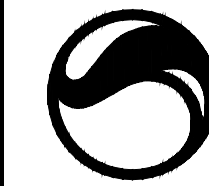
Telephone: _____ FAX: _____

Signature of New Responsible Party Date

I acknowledge and understand that I am assuming full responsibility for maintaining all permanent best management practices and measures approved by the TCEQ for the site, until another entity assumes such obligations in writing or ownership is transferred.

If you have questions on how to fill out this form or about the Edwards Aquifer protection program, please contact us at 210/490-3096 for projects located in the San Antonio Region or 512/339-2929 for projects located in the Austin Region.

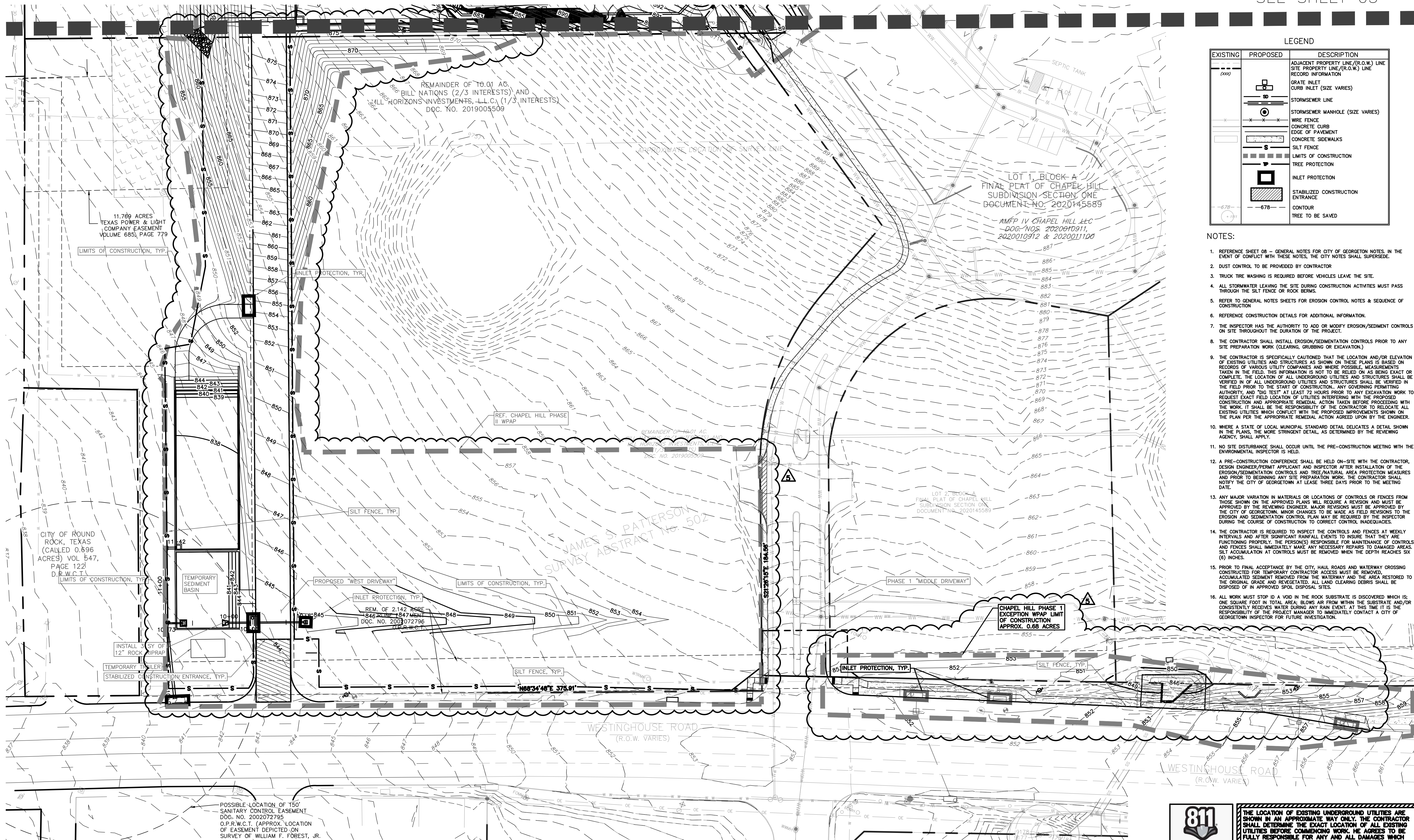
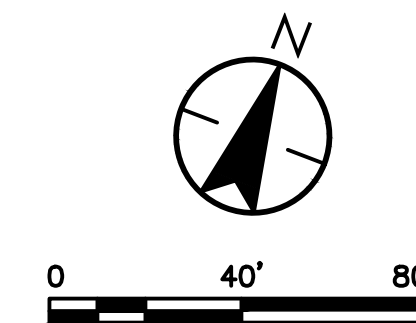
Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, contact us at 512/239-3282.














The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.



MATCHLINE
SEE SHEET 05



LEGEND		
EXISTING	PROPOSED	DESCRIPTION
(000)		ADJACENT PROPERTY LINE (R.O.W.) LINE
		SITE PROPERTY LINE (R.O.W.) LINE
		RECORD INFORMATION
		GRATE INLET
		CURB INLET (SIZE VARIIES)
		STORMSEWER LINE
		STORMSEWER MANHOLE (SIZE VARIIES)
		WIRE FENCE
		CONCRETE CURB
		EDGE OF PAVEMENT
		CONCRETE SIDEWALKS
		SILT FENCE
		LIMITS OF CONSTRUCTION
		TREE PROTECTION
		INLET PROTECTION
		STABILIZED CONSTRUCTION ENTRANCE
		CONTOUR
		TREE TO BE SAVED

NOTES:

1. REFERENCE SHEET 08 - GENERAL NOTES, CITY OF GEORGETOWN NOTES, IN THE EVENT OF CONFLICT WITH THESE NOTES, THE CITY NOTES SHALL SUPERSEDE.
2. TRUCK TRAIL TO BE PROVIDED BY CONTRACTOR
3. DUST CONTROL TO BE MAINTAINED BY CONTRACTOR
4. TRUCK TIRE WASHING IS REQUIRED BEFORE VEHICLES LEAVE THE SITE.
5. ALL STORMWATER LEAVING THE SITE DURING CONSTRUCTION ACTIVITIES MUST PASS THROUGH THE SILT FENCE OR ROCK BERM.
6. REFER TO GENERAL NOTES SHEETS FOR EROSION CONTROL, SITES & SEQUENCE OF CONSTRUCTION
7. REFERENCE CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.
8. THE INSPECTOR HAS THE AUTHORITY TO ADD OR MODIFY EROSION/SEDIMENTATION CONTROLS ON SITE THROUGHOUT THE DURATION OF THE PROJECT.
9. THE CONTRACTOR SHALL INSTALL EROSION/SEDIMENTATION CONTROLS PRIOR TO ANY SITE PREPARATION WORK (GRADING, GRUBBING OR EXCAVATION.)
10. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF ANY UTILITY UTILITIES (UNDERGROUND OR SURFACE) ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE, MEASUREMENTS MADE IN THE FIELD. THE FIELD LOCATION OF ANY UTILITY IS BEING REMIT TO CONTRACTOR TO COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE LOCATED BY ALL UNDERGROUND UTILITY LOCATING DEVICES USED IN THE FIELD PRIOR TO THE START OF CONSTRUCTION. ANY GOVERNING PERMITTING AGENCIES, AND TWO (2) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO BE COMPLETED, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DEVELOP A CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWING ON THE PLAN PER THE APPROPRIATE REMEDIAL ACTION AGREED UPON BY A DESIGNER.
11. WHERE A STATE OF LOCAL MUNICIPAL STANDARD DETAIL, DELEGATES A DETAIL, SHOWS NO DETAIL, THE MORE STRINGENT DETAIL, AS DETERMINED BY THE REVIEWING AGENCY, SHALL APPLY.
12. NO SITE DISTURBANCE SHALL OCCUR UNTIL THE PRE-CONSTRUCTION MEETING WITH THE ENVIRONMENTAL INSPECTOR IS HELD.
13. A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD ON-SITE WITH THE CONTRACTOR, DESIGN ENGINEER, PERMIT APPLICANT AND INSPECTOR AFTER INSTALLATION OF THE EROSION/SEDIMENTATION CONTROLS AND TREE/NATURAL AREA PROTECTION MEASURES AND PRIOR TO BEGINNING ANY SITE PREPARATION WORK. THE CONTRACTOR SHALL NOTIFY THE CITY OF GEORGETOWN AT LEAST THREE DAYS PRIOR TO THE MEETING DATE.
14. ANY MAJOR VARIATION IN MATERIALS OR LOCATIONS OF CONTROLS OR FENCES FROM THOSE SHOWN ON THE APPROVED PLANS WILL REQUIRE A REVISION AND MUST BE APPROVED BY THE REVIEWING AGENCY. ANY CHANGES TO THE LOCATION OF CONTROLS AND FENCES SHALL IMMEDIATELY MAKE ANY NECESSARY REPAIRS TO DAMAGED AREAS. SILT ACCUMULATION AT CONTROLS MUST BE REMOVED WHEN THE DEPTH REACHES SIX (6) INCHES.
15. PRIOR TO FINAL ACCEPTANCE BY THE CITY, HALL, ROADWAYS AND WATERWAY CROSSING CONSTRUCTED FOR TEMPORARY CONTRACTOR ACCESS MUST BE DEPOSED, SLOPE STABILIZATION, EROSION/SEDIMENTATION CONTROLS MUST BE RESTORED TO THE ORIGINAL GRADE AND REVEGETATED. ALL LAND CLEARING DEBRIS SHALL BE DEPOSED OF IN APPROVED SOLID DISPOSAL SITES.
16. ANY WORK MUST STOP IF A VOID IN THE ROCK SUBSTRATE IS DISCOVERED WHICH IS: (a) NOT AVOIDED BY THE CONTRACTOR WITHIN THE SUBSTRATE AND (b) CONSISTENTLY RECEIVES WATER DURING ANY RAIN EVENT. AT THIS TIME IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO IMMEDIATELY CONTACT A CITY OF GEORGETOWN INSPECTOR FOR FURTHER INVESTIGATION.

Consultant

[illegible]

Permit/Seal



Client/Project
DUKE, INC.

CHAPEL HILL PHASE 2

403 WESTINGHOUSE ROAD,
GEORGETOWN, TEXAS 78626

Project No.: 222012278			
File Name: 222012278EST04_WPAP_EXCEPTION			
Scale:			
			7.24.2024
Dwn.	Dign.	Chkd.	YYYY.MM.DD
Title			
OFF-SITE EROSION & SEDIMENTATION CONTROL PLAN			
Revision:0		Sheet: 06 of 42	
Drawing No.			

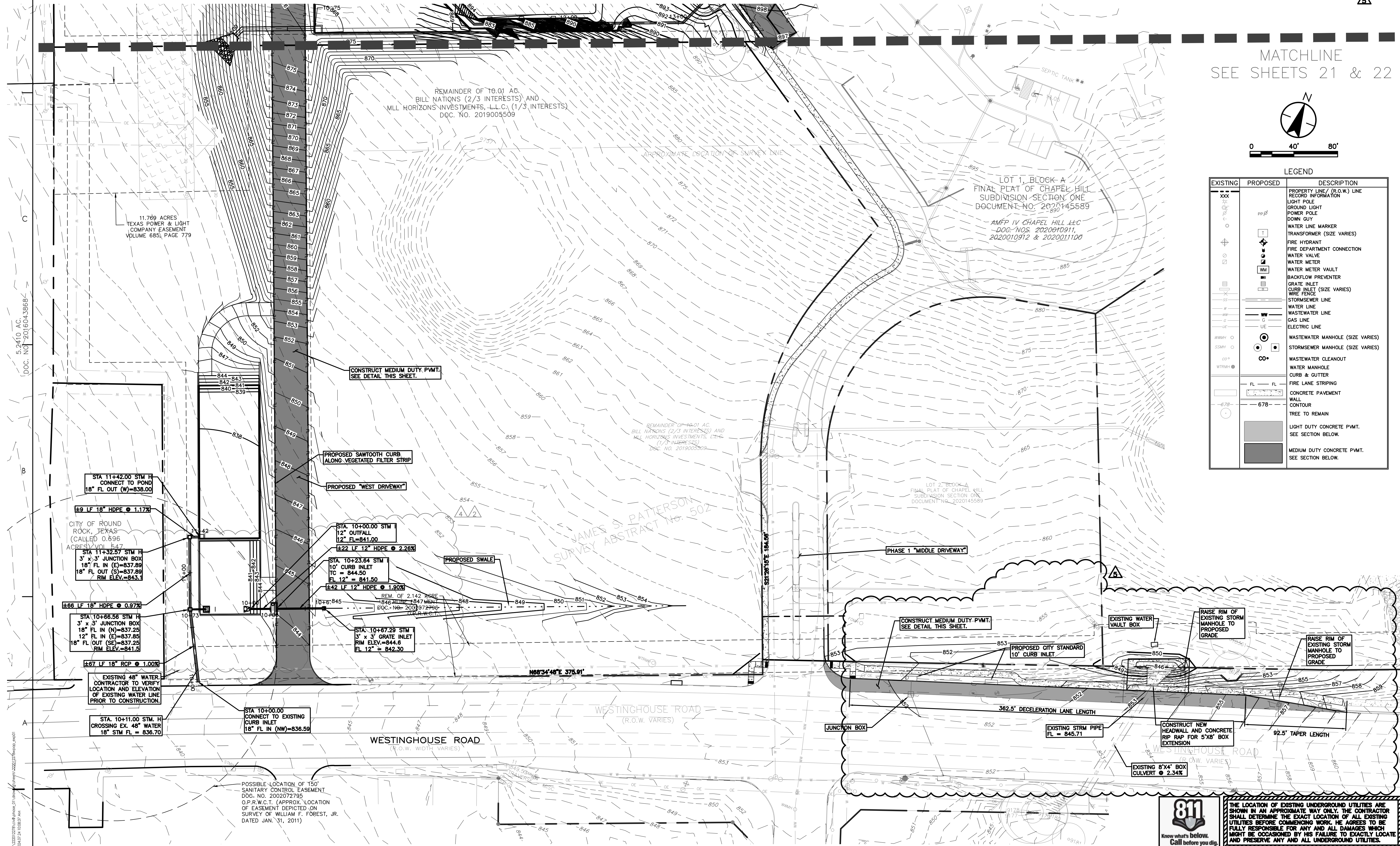
06

2021-65-SDP



A compass rose with a circle and tick marks. The letter 'N' is at the top. A black arrow points towards the top-left, labeled '10°'.

EXISTING	PROPOSED	DESCRIPTION
XXX		PROPERTY LINE (R.O.W.) LINE
XX		RECORD INFORMATION
○		LIGHT POLE
○		GROUND LIGHT
○	pp ^β	POWER POLE
○		DOWN GUY
		WATER LINE MARKER
+	T	TRANSFORMATION (SIZE VARIES)
+	◆	FIRE HYDRANT
+	⚡	FIRE DEPARTMENT CONNECTION
+	⚡	WATER VALVE
+	⚡	WATER METER
+	WM	WATER METER VAULT
+		BACKFLOW PREVENTER
+	CS	GRATE INLET
+		CURB INLET (SIZE VARIES)
+		WIRE FENCE
+		STORMSEWER LINE
+		WATER LINE
+	WW	WASTEWATER LINE
+	G	GAS LINE
+	UE	ELECTRIC LINE
WMH	○	WASTEWATER MANHOLE (SIZE VARIES)
SMH	○	STORMSEWER MANHOLE (SIZE VARIES)
CO ^h	○	WASTEWATER CLEANOUT
WITHH	○	WATER MANHOLE
		CURB & GUTTER
	FL — FL	FIRE LANE STRIPPING
		CONCRETE PAVEMENT
		WALL
		CONTOUR
-678-	-678-	TREE TO REMAIN
○		LIGHT DUTY CONCRETE P.W.M.T.
		SEE SECTION BELOW.
		MEDIUM DUTY CONCRETE P.W.M.T.
		SEE SECTION BELOW.



Know what's below.
Call before you dig.

THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Chapel Hill**
Date Prepared: **4/30/2020**

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

Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.

Characters shown in red are data entry fields.

Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

Characters shown in green (Bold) are revised for 85% TSS removal Per City of Georgetown

1. The Required Load Reduction for the total project:

Calculations from RG-348

Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_{44} = 28.9(A_{44} \times P)$

where:

L_{44} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load

A_{44} = Net increase in impervious area for the project

P = Average annual precipitation, inches

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

County = **Williamson**

Total project area included in plan = **28.89** acres

Predevelopment impervious area within the limits of the plan = **0.37** acres

Total post-development impervious area within the limits of the plan = **10.06** acres

Total post-development impervious cover fraction = **0.35**

P = **32** inches

L_{44} TOTAL PROJECT = **8971** lbs.

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

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

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

Drainage Basin/Outfall Area No. = **1**

Total drainage basin/outfall area = **63.03** acres

Predevelopment impervious area within drainage basin/outfall area = **0.37** acres

Post-development impervious area within drainage basin/outfall area = **29.53** acres

Post-development impervious fraction within drainage basin/outfall area = **0.47**

L_{44} THIS BASIN = **26995** lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Wet Basin**

Removal efficiency = **93** percent

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

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

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

where:

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

A_i = Impervious area proposed in the BMP catchment area

A_p = Pervious area remaining in the BMP catchment area

L_R = TSS Load removed from this catchment area by the proposed BMP

A_C = **30.51** acres

A_i = **16.45** acres

A_p = **14.06** acres

L_R = **17164** lbs

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

Desired L_{44} THIS BASIN = **14886** lbs.

F = **0.87**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Calculations from RG-348

Pages 3-34 to 3-36

Rainfall Depth = **1.44** inches
Post Development Runoff Coefficient = **0.38**
On-site Water Quality Volume = **60616** cubic feet

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

Off-site area draining to BMP = **32.52** acres
Off-site Impervious cover draining to BMP = **13.08** acres
Impervious fraction of off-site area = **0.40**
Off-site Runoff Coefficient = **0.31**
Off-site Water Quality Volume = **52347** cubic feet

Storage for Sediment = **22593**

Total Capture Volume (required water quality volume(s) x 1.20) = **139555** cubic feet

11. Wet Basins

Designed as Required in RG-348

Pages 3-66 to 3-71

Required capacity of Permanent Pool = **135555** cubic feet
Required capacity at WQV Elevation = **196171** cubic feet

Permanent Pool Capacity is 1.20 times the WQV
Total Capacity should be the Permanent Pool Capacity plus a second WQV.

CHAPEL HILL TOTAL POND STAGE-STORAGE TABLE				
STAGE	PROPOSED AREA	PROPOSED STORAGE		NOTE
	AVG AREA (SF)	TOTAL VOLUME (CF)	TOTAL VOLUME (AC-FT)	
850.0	836.81			
850.5	4177.37	418	0.010	
851.0	10948.93	2,507	0.058	
851.5	17864.72	7,982	0.183	
852.0	21536.64	16,914	0.388	
852.5	23512.74	27,682	0.635	
853.0	25470.24	39,439	0.905	
853.5	27528.50	52,174	1.198	
854.0	29680.83	65,938	1.514	
854.5	31927.48	80,778	1.854	
855.0	34459.96	96,742	2.221	
855.5	36861.79	113,972	2.616	
856.0	38911.51	132,403	3.040	
856.5	40994.23	151,859	3.486	
857.0	47160.37	172,356	3.957	PERMANENT POOL VOLUME
857.5	55392.95	195,936	4.498	
858.0	59555.59	223,633	5.134	
858.2	61826.06	235,544	5.407	WATER QUALITY VOLUME
858.5	64063.60	254,091	5.833	
859.0	66075.52	286,123	6.568	
859.5	68084.69	319,161	7.327	
860.0	70119.18	353,203	8.108	
860.5	72178.99	388,263	8.913	
861.0	74264.14	424,352	9.742	
861.5	76374.61	461,485	10.594	
862.0	78519.85	499,672	11.471	
862.5		538,932	12.372	

CHAPEL HILL WATER QUALITY POND SUMMARY TABLE			
STAGE	PROPOSED STORAGE		NOTE
	TOTAL PROPOSED VOLUME (CF)	TOTAL REQUIRED VOLUME PER TCEQ RG-348 (CF)	
857.0	172,356	135,555	PERMANENT POOL VOLUME
858.2	235,544	196,171	WATER QUALITY VOLUME

INVERTED DISCHARGE PIPE CALCULATIONS													
				FRICTION LOSS COEFFICIENT CALCULATION, $K_f = 29 * L * n^2 / R^{1.33}$				PARAMETERS OF DISCHARGE PIPE					
ACCELERATION DUE TO GRAVITY, g (FT/SEC ²)	DEPTH FROM 100-YEAR WATER SURFACE ELEVATION, h (FT)	ENTRANCE LOSS COEFFICIENT, K _e	BEND LOSSES, K _b	DISCHARGE PIPE LENGTH, L (FT)	MANNING'S ROUGHNESS COEFFICIENT, n	HYDRAULIC RADIUS, R = D/4 (FT)	FRICTION LOSS COEFFICIENT, K _f	DIAMETER OF PIPE, D (IN)	AREA OF PIPE, A = (π/4)D ² (FT ²)	FLOW IN THE INVERTED DISCHARGE PIPE (CFS), Q = A((2gh)/(1+K _e +K _b +K _f)) ^{0.5}	VOLUME DISCHARGED IN 24 HOURS (CF)	TOTAL PROPOSED WATER QUALITY VOLUME (CF)	TOTAL TIME TO DRAIN (HR)
32.2	3.9	0.70	0.62	128.66	0.011	0.13	7.17	6	0.20	1.01	87,593	235,544	64.5

CHAPEL HILL FOREBAY 1 STAGE-STORAGE TABLE				
STAGE	PROPOSED AREA		PROPOSED STORAGE	
	FOREBAY 1	AVG AREA (SF)	TOTAL VOLUME (CF)	TOTAL VOLUME (AC-FT)
851.5	721.20	1242.34		
852.0	1,763.47	1956.77	621	0.014
852.5	2,150.06	2361.19	1,600	0.037
853.0	2,572.32	2800.53	2,780	0.064
853.5	3,028.74	3274.38	4,180	0.096
854.0	3,520.01	3783.08	5,818	0.134
854.5	4,046.14	4326.64	7,709	0.177
855.0	4,607.14	4937.97	9,872	0.227
855.5	5,268.79	5485.46	12,341	0.283
856.0	5,702.13	5924.56	15,084	0.346
856.5	6,146.99	6375.19	18,046	0.414
857.0	6,603.38		21,234	0.487
FOREBAY 1 VOLUME SHALL BE 15%-25% OF THE REQUIRED PERMANENT POOL VOLUME				
FOREBAY 1 TOTAL VOLUME (CF) = 21,234 CF REQUIRED PERMANENT POOL VOLUME (CF) = 135,555 CF = 15.66%				

CHAPEL HILL FOREBAY 2 STAGE-STORAGE TABLE				
STAGE	PROPOSED AREA		PROPOSED STORAGE	
	FOREBAY 2	AVG AREA (SF)	TOTAL VOLUME (CF)	TOTAL VOLUME (AC-FT)
851.5	643.16	1201.57		
852.0	1,759.97	2063.65	601	0.014
852.5	2,367.32	2573.17	1,633	0.037
853.0	2,779.02	3008.62	2,919	0.067
853.5	3,238.21	3483.09	4,423	0.102
854.0	3,727.97	3988.15	6,165	0.142
854.5	4,248.32	4523.78	8,159	0.187
855.0	4,799.24	5114.49	10,421	0.239
855.5	5,429.73	5680.23	12,978	0.298
856.0	5,930.73	6188.61	15,818	0.363
856.5	6,446.49	6711.74	18,913	0.434
857.0	6,976.99		22,269	0.511
FOREBAY 2 VOLUME SHALL BE 15%-25% OF THE REQUIRED PERMANENT POOL VOLUME				
FOREBAY 2 TOTAL VOLUME (CF) = 22,269 CF REQUIRED PERMANENT POOL VOLUME (CF) = 135,555 CF = 16.43%				



HALFF ASSOCIATES, INC.
9500 AMBERGLEN BLVD.
BUILDING F, SUITE 125
DALLAS, TEXAS 75249
TEL (512) 775-4829
FAX (512) 252-9141
TPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION



11/20/2020

PROJECT NO: 33984.003
ISSUED: 11/20/2020
DRAWN BY: BLPH
CHECKED BY: RWS

SHEET TITLE:

POND CALCULATIONS

61 OF 145

SHEET NUMBER:



Know what's below.
Call before you dig.

THE INFORMATION SHOWN ON THESE DRAWINGS INDICATING SIZE, TYPE AND LOCATION OF UNDERGROUND, SURFACE, AND AERIAL UTILITIES IS NOT GUARANTEED TO BE EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT THE GEORGETOWN AREA TONE CALL SYSTEM AT 1-800-364-8377 (ONE TESSIE) HOURS PRIOR TO BEGINNING ANY EXCAVATION FOR EXISTING UTILITY LOCATIONS. THE CONTRACTOR SHALL ALSO BE FULLY RESPONSIBLE FOR FIELD VERIFYING LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES AFFECTED BY CONSTRUCTION FOR THIS PROJECT IN ORDER TO AVOID DAMAGING THOSE UTILITIES, AND SHALL IMMEDIATELY ARRANGE FOR REPAIR AND RESTORATION OF CONTRACTOR-DAMAGED UTILITIES TO THE UTILITY COMPANY'S APPROVAL, AT THE EXPENSE OF THE CONTRACTOR.

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2/26/24 10:51:07 AM

ORIGINAL SHEET - ARCH'D

EXISTING CHAPEL HILL PHASE 1 WET POND

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Chapel Hill Phase 1 Exception**
Date Prepared: **7/26/2024**

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

1. The Required Load Reduction for the total project:

Calculations from RG-348

Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_{d1} = 28.9(A_{d1} \times P)$

where:
 L_{d1} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 85% of increased load
 A_{d1} = Net increase in impervious area for the project
 P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project
County = **Williamson**
Total project area included in plan = **28.89** acres
Predevelopment impervious area within the limits of the plan = **0.37** acres
Total post-development impervious area within the limits of the plan = **10.06** acres
Total post-development impervious cover fraction = **0.35**
 P = **32** inches

L_{d1} TOTAL PROJECT = **8961** lbs.

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

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

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

Drainage Basin/Outfall Area No. = **1**

Total drainage basin/outfall area = **63.03** acres
Predevelopment impervious area within drainage basin/outfall area = **0.37** acres
Post-development impervious area within drainage basin/outfall area = **29.53** acres
Post-development impervious fraction within drainage basin/outfall area = **0.47**
 L_{d1} THIS BASIN = **26967** lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Wet Basin**
Removal efficiency = **93** percent

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

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

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

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

A_c = **30.51** acres
 A_p = **16.45** acres
 A_p = **14.06** acres
 L_R = **17164** lbs

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

Desired L_{d1} THIS BASIN = **14886** lbs.

F = **0.87**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Calculations from RG-348

Pages 3-34 to 3-36

Rainfall Depth = **1.44** inches
Post Development Runoff Coefficient = **0.38**
On-site Water Quality Volume = **60616** cubic feet

Calculations from RG-348

Pages 3-36 to 3-37

Off-site area draining to BMP = **32.70** acres
Off-site Impervious cover draining to BMP = **13.26** acres
Impervious fraction of off-site area = **0.41**
Off-site Runoff Coefficient = **0.31**
Off-site Water Quality Volume = **52907** cubic feet

Storage for Sediment = **22705**

Total Capture Volume (required water quality volume(s) x 1.20) = **136227** cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

11. Wet Basins

Designed as Required in RG-348

Pages 3-66 to 3-71

Required capacity of Permanent Pool = **136227** cubic feet
Required capacity at WQV Elevation = **196843** cubic feet
Permanent Pool Capacity is 1.20 times the WQV
Total Capacity should be the Permanent Pool Capacity plus a second WQV.

CHAPEL HILL WATER QUALITY POND SUMMARY TABLE			
STAGE	TOTAL PROPOSED VOLUME (CF)	TOTL REQUIRED VOLUME PER TCEQ RG-348 (CF)	NOTE
857	172,356	136,227	PERMANENT POOL VOLUME
858.2	235,544	196,843	WATER QUALITY VOLUME

LEGEND		
EXISTING	PROPOSED	DESCRIPTION
XXX		PROPERTY LINE / (R.O.W.) LINE
		RECORD INFORMATION
		LIGHT POLE
		GROUND LIGHT
		POWER POLE
		DOWN GUY
		WATER LINE MARKER
		TRANSFORMER (SIZE VARIES)
		FIRE HYDRANT
		FIRE DEPARTMENT CONNECTION
		WATER VALVE
		WATER METER
		WATER METER VAULT
		BACKFLOW PREVENTER
		GRATE INLET
		CURB INLET (SIZE VARIES)
		WIRE FENCE
		STORMSEWER LINE
		WATER LINE
		WASTEWATER LINE
		GAS LINE
		ELECTRIC LINE
		WASTEWATER MANHOLE (SIZE VARIES)
		STORMSEWER MANHOLE (SIZE VARIES)
		WASTEWATER CLEANOUT
		WATER MANHOLE
		CURB & GUTTER
		CONCRETE SIDEWALKS
		WALL
		CONTOUR
		TREE TO REMAIN
		ROW
		EASEMENT
		TELECOMMUNICATION LINE

Consultant

Permit/Seal



Client/Project
DUKE, INC.

CHAPEL HILL PHASE 1 EXCEPTION

401 WESTINGHOUSE ROAD,
GEORGETOWN, TEXAS 78626

Project No.: 222012278

File Name: 222012278WQVPEX01

Scale:

7.24.2024

Dwn. Dsgn. Chkd. YYYY.MM.DD

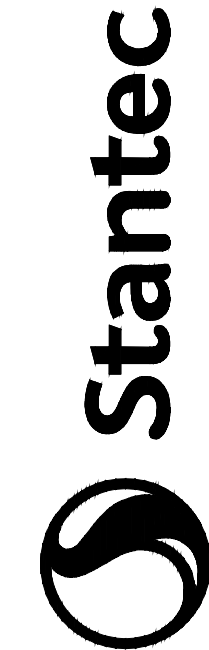
Title
TCEQ WATER QUALITY
CALCULATIONS

Revision:0 Sheet: 3 of 42

Drawing No.

EHX 1

2021-65-SDP



Stantec Consulting Services Inc.
1905 CONGRESS BLVD 300
AUSTIN TX 78723-3544
Tel: (512) 328-0011
www.stantec.com

TBPE # E-6324
TBPLS # 1074230

The Contractor will verify and be responsible for all dimensions. DO NOT scale the drawing.
The Contractor will verify and be responsible for all dimensions. DO NOT scale the drawing.
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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: Paul M. Hames, P.E.

Date: 8/28/2024

Signature of Customer/Agent:



Regulated Entity Name: Chapel Hill Phase Apartment

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: Potential for diesel fuel, gasoline, lubricants, and paint.

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: Brushy Creek

Temporary Best Management Practices (TBMPs)

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

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

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

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

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

☐ N/A

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

Soil Stabilization Practices

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

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

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

Administrative Information

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

Attachment 5A – Spill Response Actions

No spills of hydrocarbons or hazardous substances are expected. However, in the event such an incidence does occur, the contractor should carefully follow the TCEQ guidelines outlined below:

Cleanup:

- (1) Clean up leaks and spills immediately.
- (2) Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.
- (3) Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly.

Minor Spills:

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

Semi-Significant Spills:

Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities. Spills should be cleaned up immediately:

- (1) Contain spread of the spill.
- (2) Notify the project foreman immediately.
- (3) If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
- (4) If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
- (5) If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills:

From any event, the Reportable Quantity (RQ) = for highly toxic materials the RQ>25 gals. For petroleum/hydrocarbon liquids, spills the RQ>250 gallons (on land) or that which creates "a sheen" on water. Only certified Hazmat teams will be responsible for handling the material at the site.

For significant or hazardous spills that are in reportable quantities:

(1) Notify the TCEQ by telephone as soon as possible and within 24 hours at 512-339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor's responsibility to have all emergency phone numbers at the construction site. Additionally in the event of a hazardous material spill, local Williamson County and/or City of Georgetown police, fire and potentially EMS should be contacted in order to initiate the hazardous material response team.

(2) For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110, 119, and 302, the contractor should notify the National Response Center at (800) 424-8802.

(3) Notification should first be made by telephone and followed up with a written report of which one copy is to be kept onsite in the report binder and one copy provided to the TCEQ.

(4) The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.

(5) Other agencies which may need to be consulted include, but 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.tceq.state.tx.us/response/spills.html>

Attachment 5B – Potential Sources of Contamination

No particular activity or process during construction of the facility is anticipated to present a significant risk of being a potential source of contamination. However, during regular construction operations, several common and minor risks of contamination are anticipated. Should the unforeseeable mishap occur during construction or regular operation of the facility, the contractor shall follow the guidelines set forth in "Attachment 6A – Spill Response Plan."

Potential sources of sediment to stormwater runoff:

- Clearing and grubbing
- Grading and excavation
- Vehicle Tracking
- Topsoil stripping and stockpiling
- Landscaping

Potential pollutants and sources, other than sediment, to stormwater runoff:

- Combined Staging Area – small fueling, minor equipment maintenance, sanitary facility.
- Materials Storage Area – solvents, adhesives, paving materials, aggregates, trash, etc.
- Construction Activities – paving, concrete pouring
- Concrete washout area

Potential onsite pollutants:

- Fertilizer
- Concrete
- Glue, adhesives
- Gasoline, diesel fuel, hydraulic fluids, antifreeze
- Sanitary toilets

Attachment 5C – Sequence of Major Activities

1. Temporary erosion and sedimentation controls are to be installed as indicated on the approved site plan or subdivision construction plan and in accordance with the stormwater pollution prevention plan (SWPPP) that is required to be posted on the site. Install tree protection and initiate tree mitigation measures. Estimated quantities of each are below:

- 3,000 LF of Silt Fence, 1,550 LF of Tree Protection, 1,300 LF of Inlet Protection

2. The environmental project manager, and/or site supervisor, and/or designated responsible party, and the general contractor will follow the storm water pollution prevention plan (SWPPP) posted on the site. Temporary erosion and sedimentation controls will be revised, if needed, to comply with city inspectors' directives, and revised construction schedule relative to the water quality plan requirements and the erosion and sedimentation control plan. Estimated quantities of each are below:

- 3,000 LF of Silt Fence, 1,550 LF of Tree Protection, 1,300 LF of Inlet Protection

3. Temporary erosion and sedimentation controls will be inspected and maintained in accordance with the storm water pollution prevention plan (SWPPP) posted on the site. Estimated quantities of each are below:

- 3,000 LF of Silt Fence, 1,550 LF of Tree Protection, 1,300 LF of Inlet Protection

4. Begin site clearing/construction (or demolition) activities.

- 36.00 acres (limits of construction including offsite utilities)

5. Complete construction, including excavation, filling, utilities, paving, and buildings, and start re-vegetation and landscaping of the site.

- 36.00 acres

6. Upon completion of the site construction and re-vegetation of a project site, the design engineer shall submit an engineer's letter of concurrence to Williamson County indicating that construction, including re-vegetation, is complete and in substantial conformity with the approved plans. After receiving this letter, a final inspection will be scheduled by the appropriate city inspector.

- 36.00 acres

7. After construction is complete and all disturbed areas have been re-vegetated per plan to at least 90 percent established, remove the temporary erosion and sedimentation controls and complete any necessary final re-vegetation resulting from removal of the controls. Conduct any maintenance and rehabilitation of the water quality ponds or controls.

- 36.00 acres

Attachment 5D – Temporary Best Management Practices and Measures

Prior to the commencement of any construction activity whatsoever, the contractor shall install the silt fencing, the stabilized construction entrance, the concrete washout controls, temporary sediment pond, and inlet protection per the Erosion and Sedimentation Control Plan. All BMPs shall be installed per TCEQ and local requirements. The proposed temporary BMP's, such as silt fencing, tree protection fencing, inlet protection, and a temporary sediment pond, are intended to control increased TSS from construction activities in the following manner:

Additional notes regarding temporary BMP's:

A. Some upgradient flows will merge with stormwater onsite and will be treated with the existing onsite BMPs. Most of the upgradient drainage, coming from the north of the site, will be treated by the temporary sediment pond. The upgradient drainage will be conveyed to the pond through an existing natural drainageway. However, once infrastructure construction commences, the upgradient drainage will reach the temporary sediment pond via a manmade ditch and a proposed storm sewer system. Silt fencing, inlet protection, and rock berms will aid in the temporary sedimentation and filtration efforts. See Drainage Area Maps for upgradient flows.

B. The temporary BMPs proposed during construction activities will prevent pollution of surface water by filtering the increased sediment loads and other pollutant sources listed in "Attachment 5B, Potential Sources of Contamination". The primary method of treating sediment-laden stormwater runoff is through silt control fencing and a stabilized construction entrance. The silt control fencing will be placed per plan along the downslope edges of the project area to filter runoff before passing offsite and in strategic locations of drainage. The stabilized construction entrance will assist in removing debris and sediment caught up within construction vehicles tires exiting the site. Rock berms will be used to retain sediment from concentrated flows as they exit stormwater outfall structures, as well as to decrease the velocity of concentrated flows. As a final measure to mitigate stormwater contamination, inlet protection for proposed inlets will be implemented. A concrete washout area will be located on the site to prevent contaminated rinse water from concrete trucks from leaving the site.

C. The entrance point to the existing box culvert under Westinghouse Road on the south side of the site will have temporary BMP's in place to aid in treating the runoff from the site before it leaves the limits of construction. The control measures in place are silt fences, a temporary sediment pond, rock berms, and inlet protection for upgradient storm sewer systems. Stabilized construction exits will supplement the control of off-site tracking of material. After construction is complete, the site will be stabilized by permanent landscaping vegetation throughout the project area.

D. According to the geologic assessment, there are no naturally-occurring features identified on this site that need stormwater runoff to be maintained.

Attachment 5E – Request to Temporarily Seal a Feature

No temporary sealing of naturally-occurring sensitive features on the site are proposed.

Section not applicable to this project.

Attachment 5F – Structural Practices

The following temporary BMP structural practices will be employed on the site:

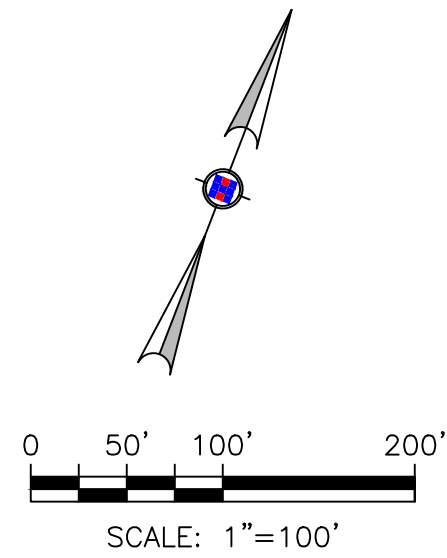
- A. Silt Fence – used as barrier protection around the downslope perimeter of the project. The fence retains sediment primarily by retarding flow and promoting deposition on the uphill side of the slope. Runoff is filtered as it passes through the geotextile.
- B. Inlet Protection – will be provided around all existing and proposed storm sewer inlets during construction. Locations are indicated on the construction plans. These measures will trap and settle out pollutants from the onsite runoff before the runoff enters into the storm drain system and exits the site.
- C. Tree Protection Fence – will be used to protect the tree and root system by keeping out all detrimental construction activity.
- D. Stabilized Construction Exits - Anti-tracking pads consisting of stone will be installed at the exit to each phase of construction to prevent the off-site transport of sediment by construction vehicles. The anti-tracking pads will be at least 50 feet long, a minimum width to match the entrance, with transitions at each side, and will consist of a minimum 8-inch-thick layer of crushed stone. The crushed stone will be placed over a layer of geotextile filter fabric to reduce the mitigation of sediment from the underlying soil.
- E. Rock Berms – Serve as a check dam in areas of concentrated flow. The berm retains sediment by retarding flow in areas where the volumetric flow rate of runoff is too high for silt fence.
- F. Concrete Washout Area – Prevent or reduce the discharge of pollutants from concrete waste by designating a specific armored area to perform onsite concrete washouts.

The placement of structural practices in the floodplain has been avoided.

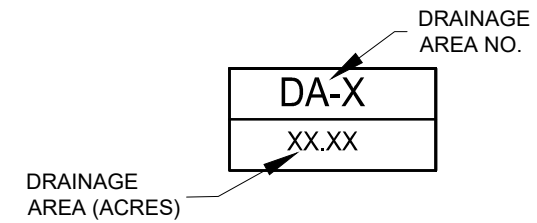
Attachment 5G – Drainage Area Map

A proposed drainage area map for the project area and encompassing basin are provided in the construction documents.

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- LEGEND**
- XXX --- EXISTING MAJOR CONTOUR
 - XXX --- EXISTING MINOR CONTOUR
 - >--->---> DRAINAGE FLOW DIRECTION
 - DRAINAGE AREA BOUNDARY
 - TIME OF CONCENTRATION PATH
 - DRAINAGE REACH PATH



- NOTES:**
- SEE SHEET 57 FOR DRAINAGE AREA CALCULATIONS.

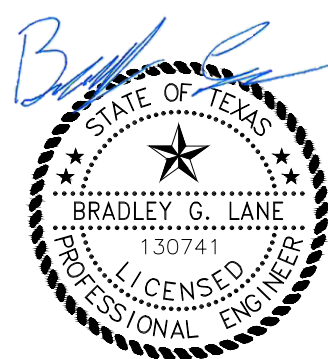
CHAPEL HILL APARTMENTS

401 WESTINGHOUSE ROAD
GEORGETOWN, TEXAS 78626



HALFF ASSOCIATES, INC.
9500 AMBERGLEN BLVD.
BUILDING F, SUITE 125
DALLAS, TEXAS 75243
TEL: (512) 775-4829
FAX: (512) 252-9141
TPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION



PROJECT NO:	33984.003
ISSUED:	11/20/2020
DRAWN BY:	BL/PH
CHECKED BY:	RWS

SHEET TITLE:	EXISTING DRAINAGE AREA MAP (1 OF 2)
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47 OF 145
SHEET NUMBER:



THE INFORMATION SHOWN ON THESE DRAWINGS INDICATING SIZE, TYPE AND LOCATION OF UNDERGROUND, SURFACE, AND AERIAL UTILITIES IS NOT GUARANTEED TO BE EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT THE GEORGETOWN AREA TONE CALL SYSTEM AT 1-800-364-8377 (DND) THREE HOURS PRIOR TO BEGINNING ANY EXCAVATION FOR EXISTING UTILITY LOCATIONS. THE CONTRACTOR SHALL ALSO BE FULLY RESPONSIBLE FOR FIELD VERIFYING LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES AFFECTED BY CONSTRUCTION FOR THIS PROJECT IN ORDER TO AVOID DAMAGING THOSE UTILITIES, AND SHALL IMMEDIATELY ARRANGE FOR REPAIR AND RESTORATION OF CONTRACTOR-DAMAGED UTILITIES TO THE UTILITY COMPANY'S APPROVAL, AT THE EXPENSE OF THE CONTRACTOR.

MATCHLINE SEE SHEET 50

CP/BM 512

EX-OFF-1
18.87

START EX-OFF-1 REACH #1

EX-OFF-1 REACH #1
TRIANGULAR CHANNEL
L = 314 LF
SLOPE = 3.0%
N-VALUE = 0.022
SIDE SLOPE: 3:1
MAX. DEPTH = 2 FT

END EX-OFF-1 REACH #1
START EX-OFF-1 REACH #2

EX-OFF-1 REACH #2
CIRCULAR PIPE
L = 868 LF
SLOPE = 3.0%
N-VALUE = 0.013
PIPE DIAMETER = 42 INCHES

END EX-OFF-1 REACH #2
START EX-OFF-1 REACH #3

EX-OFF-1 REACH #3
TRIANGULAR CHANNEL
L = 338 LF
SLOPE = 1.0%
N-VALUE = 0.022
SIDE SLOPE: 0.1:1
MAX. DEPTH = 3 FT

END EX-OFF-1 REACH #3
START EX-OFF-1 REACH #4

EX-OFF-1 REACH #4
TRIANGULAR CHANNEL
L = 319 LF
SLOPE = 4.3%
N-VALUE = 0.03
SIDE SLOPE: 8:1
MAX. DEPTH = 2 FT

DA-3
2.97

LOT 1
BLOCK A
18.92 ACRES

BLDG 1 (TYPE 1)

BLDG 2 (TYPE 3)

BLDG 3 (TYPE 1)

BLDG 4 (TYPE 1A)

BLDG 5 (TYPE 1)

BLDG 6 (TYPE 1A)

BLDG 7 (TYPE 1)

BLDG 8 (TYPE 3A)

BLDG 9 (TYPE 1)

BLDG 10 (TYPE 1A)

BLDG 11 (TYPE 3)

BLDG 12 (TYPE 2)

BLDG 13 (TYPE 1A)

CLUBHOUSE

LOT 2
BLOCK A
1.79 ACRES

LOT 3
BLOCK A
4.60 ACRES

LOT 4
BLOCK A
3.51 ACRES

DA-4
1.61

DA-1
37.30

DA-2
2.27

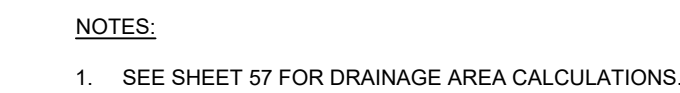
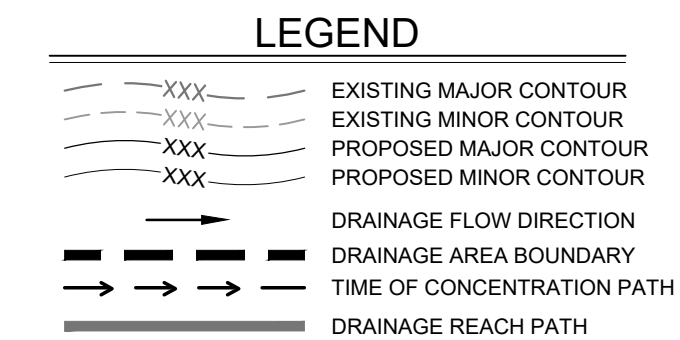
END EX-OFF-1 REACH #4

CP/BM 504

STUDY POINT 1
351.89 CFS

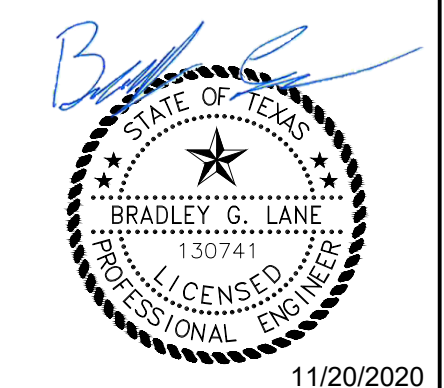
WESTINGHOUSE ROAD
(R.O.W. WIDTH VARIES)

DA-4 SHALL DRAIN TO
THE PROPOSED POND
IN THE FUTURE STATE

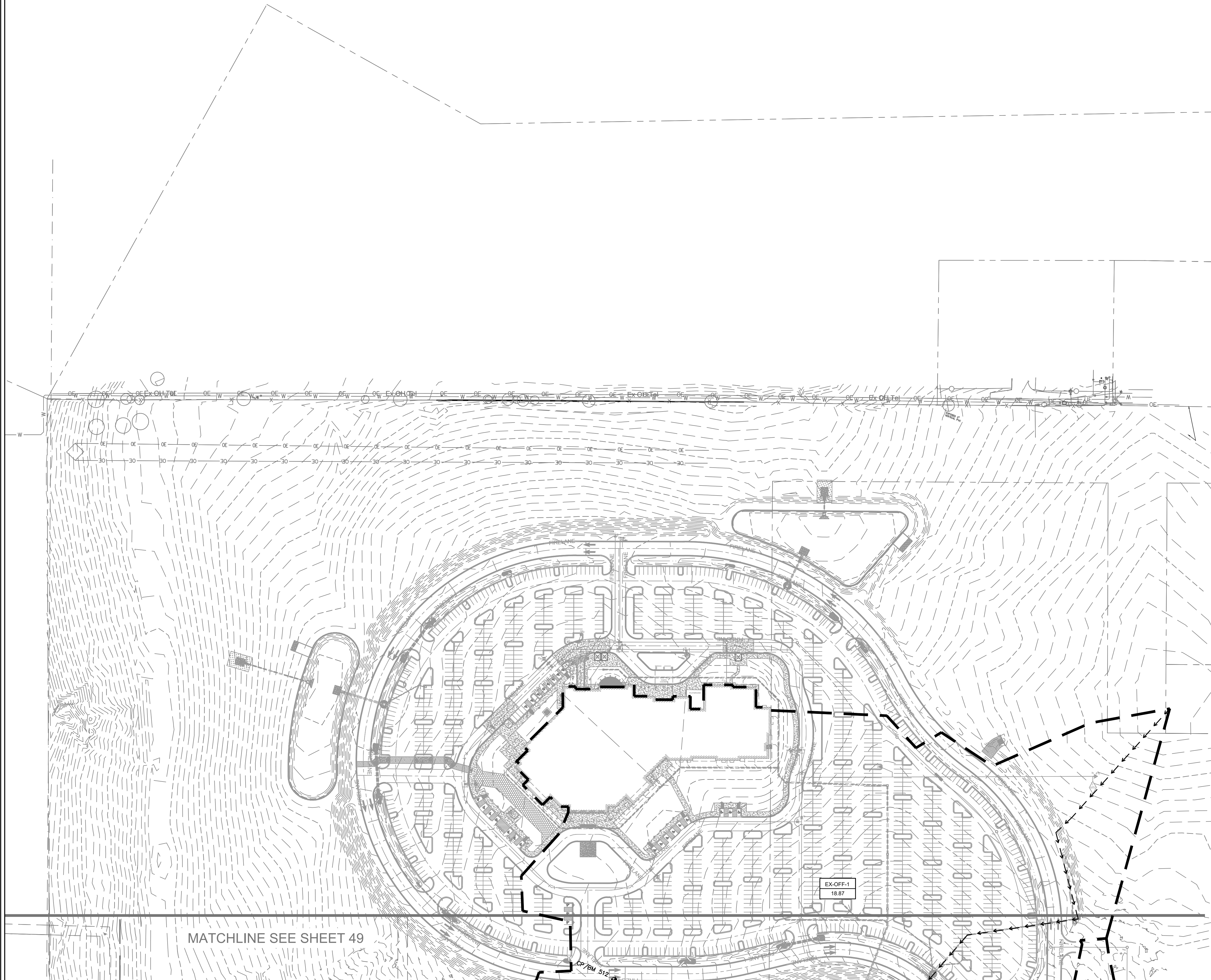
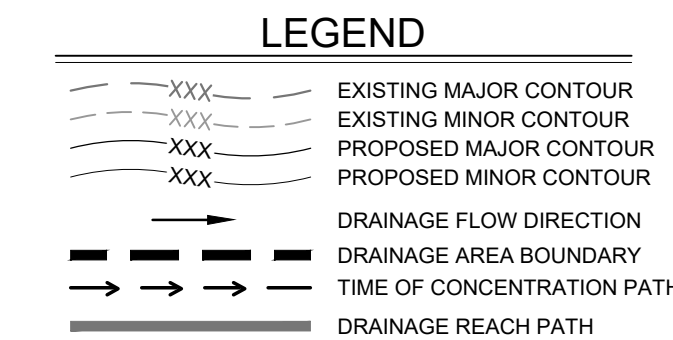


 **HALFF**

HALFF ASSOCIATES, INC.
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AUSTIN, TEXAS 78729
TEL (512) 777-4600
FAX (512) 252-8141
TBPELS ENGINEERING FIRM #312

[illegible]

PROJECT NO:	33984.003
ISSUED:	11/20/2020
DRAWN BY:	BL,PH
CHECKED BY:	RWS
SHEET TITLE:	
PROPOSED DRAINAGE AREA MAP (1 OF 2)	
49 OF 145	
SHEET NUMBER:	



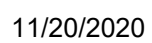
EX-OFF-1
18.87

Know what's below.
Call before you dig.

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HALFF ASSOCIATES, INC.
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TEL (512) 777-4500
FAX (512) 252-8141
TBP&S ENGINEERING FIRM #312

[illegible]

PROJECT NO:	33984.003
ISSUED:	11/20/2020
DRAWN BY:	BL,PH
CHECKED BY:	RWS

SHEET TITLE:
PROPOSED DRAINAGE
AREA MAP (2 OF 2)

50 OF 145

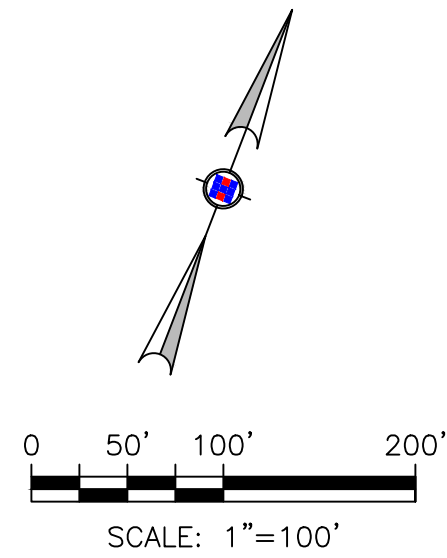
SHEET NUMBER:

SHDRNG-WQ-33984.003.dwg --- 11/23/2020 9:03 AM



MATCHLINE SEE SHEET 52

WESTINGHOUSE ROAD
(R.O.W. WIDTH VARIES)



LEGEND

- XXX --- EXISTING MAJOR CONTOUR
- XXX --- EXISTING MINOR CONTOUR
- XXX --- PROPOSED MAJOR CONTOUR
- XXX --- PROPOSED MINOR CONTOUR
- >--- DRAINAGE FLOW DIRECTION
- - - - - DRAINAGE AREA BOUNDARY

DRAINAGE AREA NO.
DA-X
XX.XX
DRAINAGE AREA (ACRES)

DRAINAGE AREA	WATER QUALITY DRAINAGE AREAS				
	AREA	PRE-DEVELOPED IMPERVIOUS COVER		POST-DEVELOPED IMPERVIOUS COVER	
	ACRES	ACRES	% IMPERVIOUS	ACRES	% IMPERVIOUS
DA-WQ-1	26.63	0.30	1%	14.02	53%
DA-WQ-2	2.27	0.07	3%	1.15	51%
DA-WQ-3	1.61	0.00	0%	1.29	75%
ONSITE TOTAL	30.51	0.37	1%	16.45	54%
OFF-WQ-1	18.87	10.11	54%	10.11	54%
OFF-WQ-2	10.08	2.97	29%	2.97	29%
OFF-WQ-3	0.60	0.00	0%	0.00	0%
OFF-WQ-4	2.97	0.00	0%	0.00	0%
OFFSITE TOTAL	32.52	13.08	40%	13.08	40%
TOTAL	63.03	13.45	21%	29.53	47%



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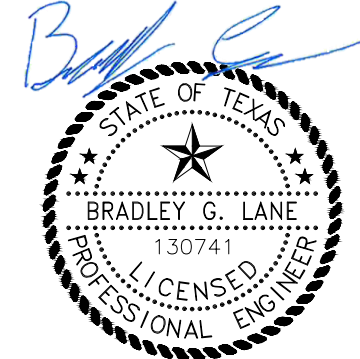
CHAPEL HILL APARTMENTS

401 WESTINGHOUSE ROAD
GEORGETOWN, TEXAS 78626



HALFF ASSOCIATES, INC.
9500 AMBERGLEN BLVD.
BUILDING F, SUITE 125
DALLAS, TEXAS 75243
TEL: (972) 777-4800
FAX: (972) 252-9141
TPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION



11/20/2020

PROJECT NO:	33984.003
ISSUED:	11/20/2020
DRAWN BY:	BLPH
CHECKED BY:	RWS

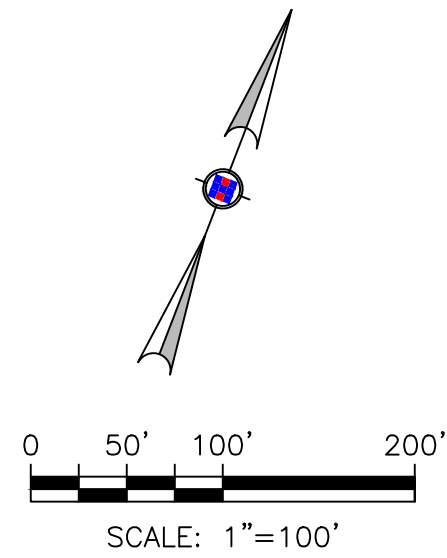
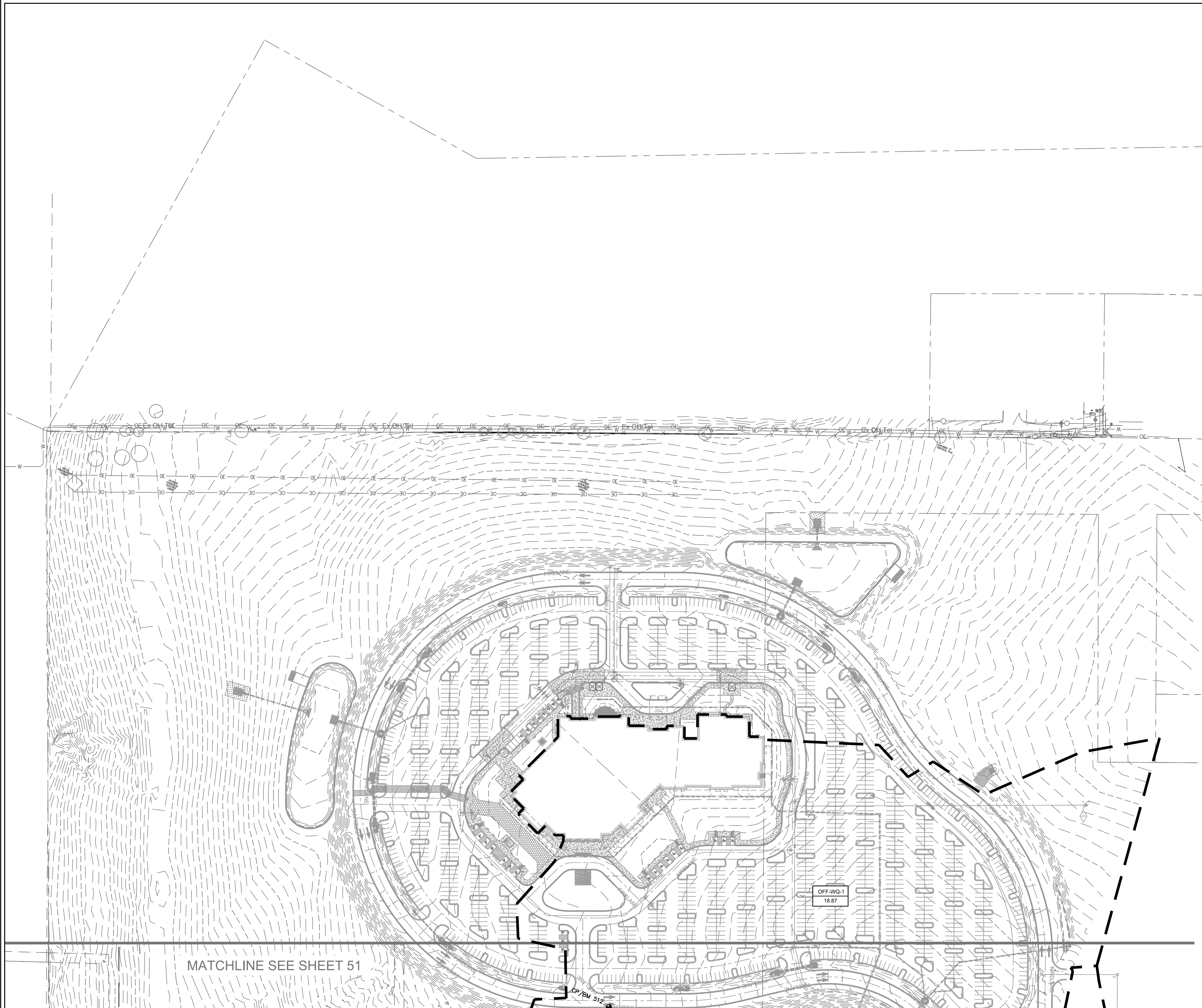
SHEET TITLE:
WATER QUALITY
DRAINAGE AREA MAP
(1 OF 2)

51 OF 145

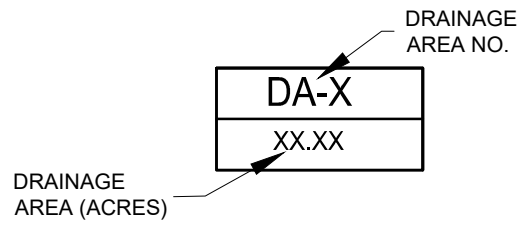
SHEET NUMBER:

SITE DEVELOPMENT CASE NUMBER: 2020-36-SDP

SHDRNG-WQ-33984.003.dwg --- 11/20/2020 2:44 PM



- LEGEND**
- XXX--- EXISTING MAJOR CONTOUR
 - XXX--- EXISTING MINOR CONTOUR
 - XXX--- PROPOSED MAJOR CONTOUR
 - XXX--- PROPOSED MINOR CONTOUR
 - >--- DRAINAGE FLOW DIRECTION
 - DRAINAGE AREA BOUNDARY



MATCHLINE SEE SHEET 51

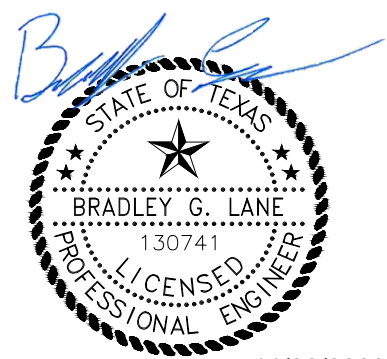


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FAX (512) 252-9141
TPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION



11/20/2020

PROJECT NO:	33984.003
ISSUED:	11/20/2020
DRAWN BY:	BLPH
CHECKED BY:	RWS

SHEET TITLE:
WATER QUALITY
DRAINAGE AREA MAP
(2 OF 2)

52 OF 145

SHEET NUMBER:

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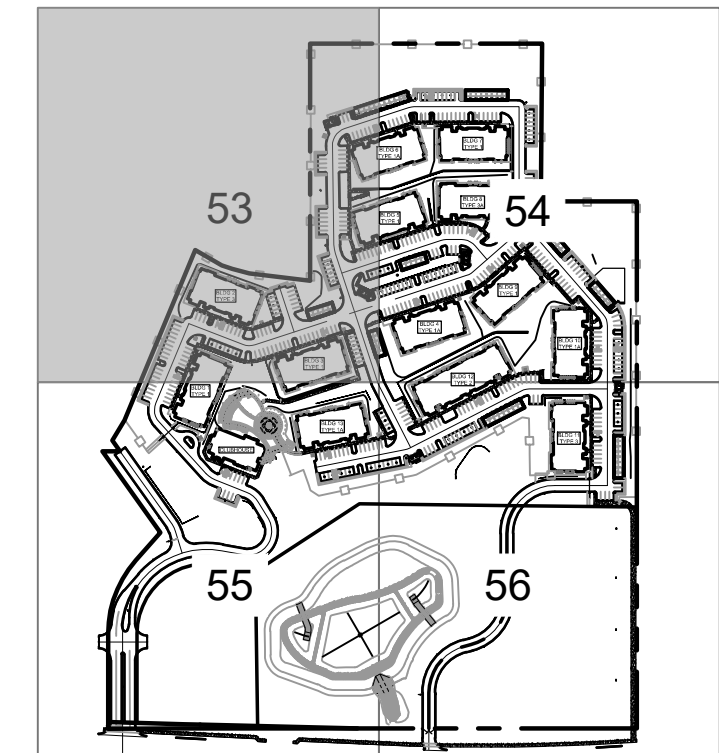
CELEBRATION CHURCH
(CALLED 49.86 ACRES)
DOC. NO. 2005003122
DOC. NO. 2005003123
O.P.R.W.C.T.

TERRI LEANNE WISIAN AND MERRY CAROL RODRIGUEZ,
CO-TRUSTEES OF THE
CARRIE ANN BARTON SMITH SEPARATE PROPERTY REVOCABLE TRUST
REMAINDER OF (CALLED 55.41 ACRES)
DOC. NO. 2017004719
O.P.R.W.C.T.

TERRI LEANNE WISIAN AND MERRY CAROL RODRIGUEZ,
CO-TRUSTEES OF THE
CARRIE ANN BARTON SMITH SEPARATE PROPERTY REVOCABLE TRUST
REMAINDER OF (CALLED 55.41 ACRES)
DOC. NO. 2017004719
O.P.R.W.C.T.

MATCHLINE SEE SHEET 55

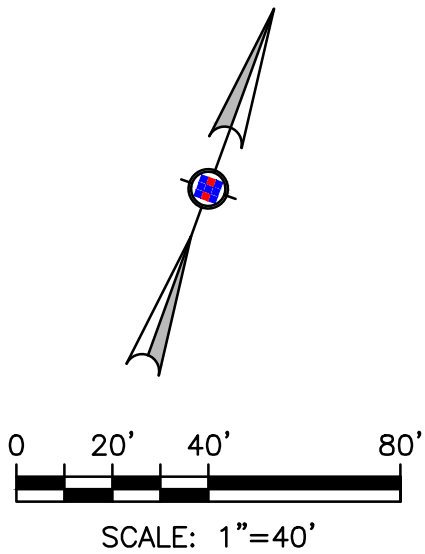
MATCHLINE SEE SHEET 54



KEYMAP

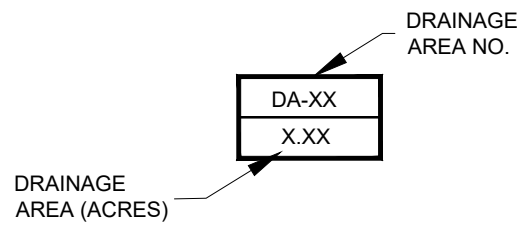


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LEGEND

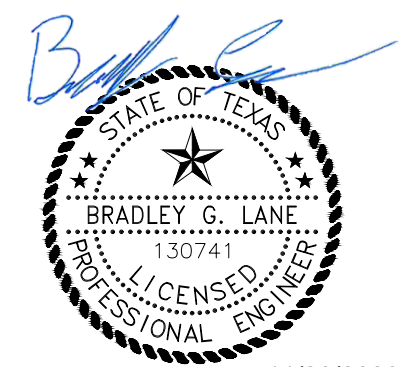
- XXX --- EXISTING MAJOR CONTOUR
- XXX --- EXISTING MINOR CONTOUR
- XXX --- PROPOSED MAJOR CONTOUR
- XXX --- PROPOSED MINOR CONTOUR
- >--- DRAINAGE FLOW DIRECTION
- - - - - DRAINAGE AREA BOUNDARY



CHAPEL HILL
APARTMENTS
401 WESTINGHOUSE ROAD
GEORGETOWN, TEXAS 78626

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TEL: (512) 777-4829
FAX: (512) 252-9141
TPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION



PROJECT NO:	33984.003
ISSUED:	11/20/2020
DRAWN BY:	BLPH
CHECKED BY:	RWS

SHEET TITLE:	SUB-BASIN DRAINAGE AREA MAP (1 OF 4)
--------------	--------------------------------------------

53 OF 145
SHEET NUMBER:

SH:SUDDNG-PROP-33984.003.dwg ----- 11/20/2020 2:47 PM



0 20' 40' 80'

SCALE: 1"=40'

LEGEND

- XXX --- EXISTING MAJOR CONTOUR
- XXX --- EXISTING MINOR CONTOUR
- XXX --- PROPOSED MAJOR CONTOUR
- XXX --- PROPOSED MINOR CONTOUR
- >--- DRAINAGE FLOW DIRECTION
- - - - - DRAINAGE AREA BOUNDARY

DRAINAGE AREA NO.

DA-XX

XXX

DRAINAGE AREA (ACRES)

53 54

55 56

KEYMAP

811

Know what's below.
Call before you dig.

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TPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

11/20/2020

PROJECT NO: 33984.003

ISSUED: 11/20/2020

DRAWN BY: BLPH

CHECKED BY: RWS

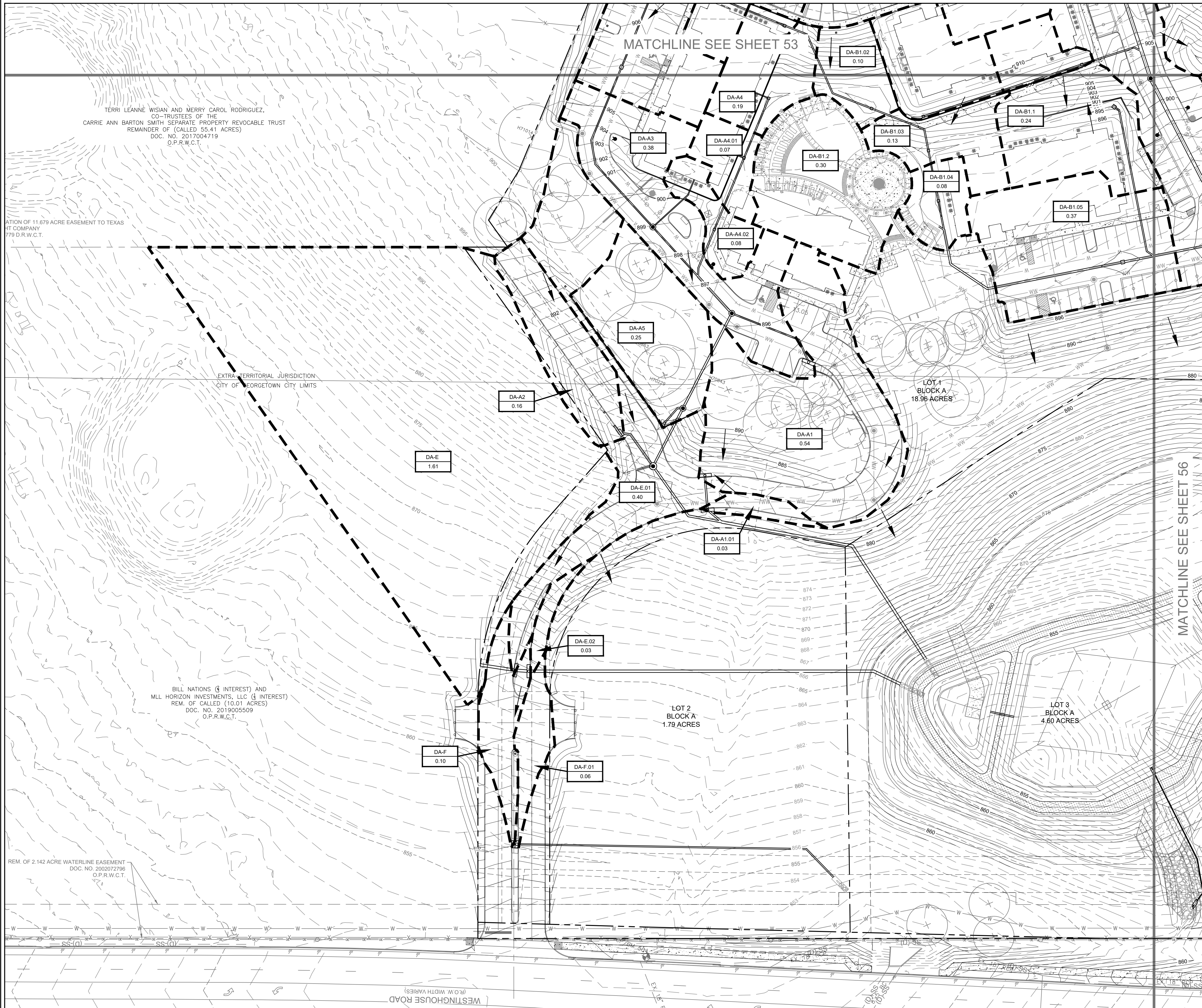
SHEET TITLE:
SUB-BASIN
DRAINAGE AREA
MAP (2 OF 4)

54 OF 145

SHEET NUMBER:

SITE DEVELOPMENT CASE NUMBER: 2020-36-SDP

SH:SUBDRNG-PROP-33984.003.dwg ----- 11/20/2020 2:48 PM



0 20' 40' 80'

SCALE: 1"=40'

LEGEND

- XXX --- EXISTING MAJOR CONTOUR
- XXX --- EXISTING MINOR CONTOUR
- XXX --- PROPOSED MAJOR CONTOUR
- XXX --- PROPOSED MINOR CONTOUR
- > DRAINAGE FLOW DIRECTION
- - - - - DRAINAGE AREA BOUNDARY

DRAINAGE AREA NO.

DA-XX

XXX

DRAINAGE AREA (ACRES)

MATCHLINE SEE SHEET 56

KEYMAP

811
Know what's below.
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TPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION

11/20/2020

PROJECT NO:	33984.003
ISSUED:	11/20/2020
DRAWN BY:	BLPH
CHECKED BY:	RWS

SHEET TITLE:	SUB-BASIN DRAINAGE AREA MAP (3 OF 4)
55 OF 145	

SHEET NUMBER:

SHDRNG-CALC-33984.003.dwg --- 11/20/2020 2:49 PM

EXISTING DRAINAGE CONDITIONS									
EXISTING	DRAINAGE AREA	AREA	GROUND COVER	CN VALUE	ToC	Q-2	Q-10	Q-25	Q-100
		ACRES	% IMPERVIOUS		MIN	CFS	CFS	CFS	CFS
	EX-OFF-1	18.87	54%	89.6	15.55	44.62	78.80	103.80	149.54
	EX-OFF-1 (DETAINED)					10.88	18.33	59.68	125.90
	EX 1	41.36	8%	81.4	16.33	72.78	146.58	202.22	304.87
	STUDY POINT 1					78.54	155.77	213.40	353.17

DRAINAGE SUMMARY TABLE				
	Q-2	Q-10	Q-25	Q-100
	CFS	CFS	CFS	CFS
PRE-DEVELOPED FLOWS AT STUDY POINT 1	78.54	155.77	213.40	353.17
POST-DEVELOPED FLOWS AT STUDY POINT 1	71.50	149.76	209.84	351.89

PROPOSED DRAINAGE CONDITIONS								
	DRAINAGE AREA	AREA	CN VALUE	ToC	Q-2	Q-10	Q-25	Q-100
		ACRES		MIN	CFS	CFS	CFS	CFS
PROPOSED	EX-OFF-1	18.87	90	15.55	44.62	78.80	103.80	149.54
	EX-OFF-1 (DETAINED)				10.88	18.33	59.68	125.90
	DA-1	37.30	88	10.70	89.55	163.62	218.04	317.58
	DA-3	2.97	80	10.24	5.54	11.30	15.66	23.72
	DA-4	1.61	94	5.00	5.11	8.52	11.02	15.61
	PROPOSED POND OUTFALL				68.96	144.87	202.37	338.10
	DA-2	2.27	90	5.00	6.56	11.47	15.06	21.62
	STUDY POINT 1				71.50	149.76	209.84	351.89

100-YEAR STORM SEWER CALCULATIONS LINE SD-A

Line No.	Line ID	Flow Rate	Line Size	Line Length	Invert Dn	Invert Up	Line Slope	HGL Dn	HGL Up	Minor Loss	HGL Jct	DnStm Ln No	Vel Ave
		(cfs)	(in)	(ft)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)		(ft/s)
1	P-SD-A-01	0.00	24	121.597	857.00	863.21	5.11	858.20	864.84	n/a	864.84	Outfall	9.07
2	P-SD-A-02	0.00	24	110.760	863.21	870.90	6.94	864.84	872.53	n/a	872.53	1	7.57
3	P-SD-A-03	0.00	18	28.479	871.40	873.41	7.04	872.53	874.84	n/a	874.84	2	10.48
4	P-SD-A-04	0.00	18	50.795	873.41	875.47	4.06	874.84	876.90	n/a	876.90	3	9.47
5	P-SD-A-05	0.00	18	54.500	875.47	877.70	4.09	876.90	879.10	n/a	879.10	4	8.58
6	P-SD-A-06	0.00	18	89.181	887.00	889.83	3.17	887.90	891.20	n/a	891.20	5	10.16
7	P-SD-A-07	0.00	18	41.793	891.18	891.53	0.83	892.34	892.73	n/a	892.73	6	6.53
8	P-SD-A-08	0.00	12	55.901	892.03	893.00	1.74	893.03	895.15	n/a	895.37	7	9.58
9	P-SD-A-09	0.00	12	71.137	893.00	896.13	4.41	895.37	898.07	n/a	898.91	8	9.58
10	P-SD-A-10	0.00	12	20.254	896.13	897.31	5.83	898.91	899.68	n/a	900.52	9	9.58
11	P-SD-A-11	0.00	12	66.219	897.31	901.17	5.83	900.52	903.04	n/a	903.75	10	9.58
12	P-SD-A-12	0.00	12	110.058	901.17	903.00	1.66	903.75	903.83	n/a	903.85	11	1.44
13	P-SD-A-13	0.00	12	30.031	903.00	903.50	1.66	903.85	903.93	n/a	903.93	12	2.37
14	P-SD-A4-01	0.00	12	7.071	892.03	892.06	0.50	892.73	892.76	n/a	892.85	7	3.78
15	P-SD-A4-02	0.00	12	34.765	892.06	892.24	0.52	892.85	892.95	n/a	893.06	14	3.54
16	P-SD-A4-03	0.00	12	64.796	892.24	892.50	0.40	893.06	893.16	n/a	893.22	15	2.61
17	P-SD-A4-04	0.00	12	53.928	892.50	892.78	0.52	893.22	893.19	n/a	893.19	16	2.38
18	P-SD-A3-01	0.00	12	60.194	890.33	890.63	0.50	891.33	891.93	n/a	892.21	6	4.92
19	P-SD-A3-02	0.00	12	20.506	890.63	890.73	0.49	892.21	892.42	n/a	892.79	18	4.92
20	P-SD-A5-01	0.00	12	4.765	885.51	885.56	1.00	885.90	886.03	n/a	886.03	5	3.89
21	P-SD-A5-02	0.00	12	16.422	885.56	885.72	0.97	886.03	886.19	n/a	886.19	20	3.41
22	P-SD-A2-01	0.00	18	32.397	875.47	877.28	5.59	876.90	877.76	n/a	877.76	4	2.14
23	P-SD-A2-02	0.00	18	8.485	877.28	877.90	7.31	877.76	878.38	n/a	878.38	22	3.34
24	P-SD-A1-01	0.00	12	15.592	871.90	873.69	11.48	872.53	874.56	n/a	874.56	2	7.10
25	P-SD-A1-02	0.00	12	28.886	875.99	876.99	3.46	876.53	877.84	n/a	877.84	24	7.54

SUB-BASIN DRAINAGE AREA CALCULATIONS														
BASIN	AREA (ACRES)	ToC (Min)	C ₂ -VALUE	C ₁₀ -VALUE	C ₂₅ -VALUE	C ₁₀₀ -VALUE	I ₂ (IN/HR)	I ₁₀ (IN/HR)	I ₂₅ (IN/HR)	I ₁₀₀ (IN/HR)	Q ₂ (CFS)	Q ₁₀ (CFS)	Q ₂₅ (CFS)	Q ₁₀₀ (CFS)
DA-A	0.16	5.00	0.47	0.49	0.52	0.56	6.48	8.64	9.84	11.88	0.48	0.68	0.81	1.06
DA-A.01	0.60	5.00	0.89	0.90	0.90	0.91	6.48	8.64	9.84	11.88	3.47	4.65	5.31	6.46
DA-A1	0.54	5.00	0.55	0.57	0.59	0.63	6.48	8.64	9.84	11.88	1.92	2.68	3.15	4.04
DA-A1.01	0.03	5.00	0.74	0.75	0.76	0.78	6.48	8.64	9.84	11.88	0.15	0.20	0.24	0.29
DA-A2	0.16	5.00	0.71	0.72	0.73	0.76	6.48	8.64	9.84	11.88	0.75	1.02	1.18	1.46
DA-A3	0.38	5.00	0.84	0.85	0.85	0.87	6.48	8.64	9.84	11.88	2.05	2.76	3.16	3.86
DA-A4	0.13	5.00	0.57	0.60	0.61	0.65	6.48	8.64	9.84	11.88	0.47	0.65	0.76	0.97
DA-A4.01	0.07	5.00	0.64	0.66	0.67	0.70	6.48	8.64	9.84	11.88	0.31	0.43	0.49	0.62
DA-A4.02	0.08	5.00	0.60	0.62	0.63	0.67	6.48	8.64	9.84	11.88	0.31	0.43	0.50	0.63
DA-A5	0.25	5.00	0.28	0.32	0.35	0.41	6.48	8.64	9.84	11.88	0.46	0.70	0.87	1.23
DA-B	0.61	5.00	0.30	0.34	0.37	0.43	6.48	8.64	9.84	11.88	1.20	1.80	2.23	3.11
DA-B.01	0.77	5.00	0.73	0.74	0.76	0.78	6.48	8.64	9.84	11.88	3.66	4.97	5.74	7.12
DA-B1	0.05	5.00	0.72	0.73	0.74	0.76	6.48	8.64	9.84	11.88	0.24	0.33	0.38	0.47
DA-B1.01	0.02	5.00	0.60	0.62	0.64	0.67	6.48	8.64	9.84	11.88	0.10	0.13	0.16	0.20
DA-B1.02	0.10	5.00	0.28	0.32	0.35	0.41	6.48	8.64	9.84	11.88	0.18	0.27	0.34	0.47
DA-B1.03	0.13	5.00	0.48	0.51	0.53	0.57	6.48	8.64	9.84	11.88	0.39	0.56	0.66	0.86
DA-B1.04	0.08	5.00	0.46	0.49	0.51	0.56	6.48	8.64	9.84	11.88	0.23	0.33	0.39	0.51
DA-B1.05	0.37	5.00	0.88	0.89	0.89	0.90	6.48	8.64	9.84	11.88	2.13	2.85	3.26	3.97
DA-B1.1	0.24	5.00	0.54	0.56	0.58	0.62	6.48	8.64	9.84	11.88	0.84	1.17	1.38	1.77
DA-B1.2	0.30	5.00	0.91	0.91	0.91	0.92	6.48	8.64	9.84	11.88	1.77	2.37	2.70	3.28
DA-B2	0.97	5.00	0.30	0.34	0.37	0.43	6.48	8.64	9.84	11.88	1.91	2.90	3.55	4.96
DA-B2.01	0.82	5.00	0.85	0.85	0.86	0.87	6.48	8.64	9.84	11.88	4.50	6.06	6.93	8.48
DA-B2.02	0.58	5.00	0.84	0.85	0.85	0.86	6.48	8.64	9.84	11.88	3.15	4.25	4.87	5.95
DA-B2.03	0.51	5.00	0.82	0.83	0.84	0.85	6.48	8.64	9.84	11.88	2.74	3.70	4.24	5.20
DA-B2.04	0.80	5.00	0.81	0.82	0.83	0.84	6.48	8.64	9.84	11.88	4.18	5.64	6.48	7.95
DA-B2.1	0.49	5.00	0.50	0.53	0.55	0.59	6.48	8.64	9.84	11.88	1.59	2.25	2.65	3.44
DA-B2.1.01	0.24	5.00	0.61	0.64	0.65	0.68	6.48	8.64	9.84	11.88	0.95	1.31	1.52	1.92
DA-B2.2	0.71	5.00	0.51	0.54	0.56	0.60	6.48	8.64	9.84	11.88	2.35	3.31	3.89	5.03
DA-B2.3	0.76	5.00	0.88	0.89	0.89	0.90	6.48	8.64	9.84	11.88	4.37	5.86	6.69	8.15
DA-B2.4	1.55	5.00	0.28	0.32	0.35	0.41	6.48	8.64	9.84	11.88	2.81	4.32	5.33	7.54
DA-B2.5	0.42	5.00	0.56	0.58	0.60	0.64	6.48	8.64	9.84	11.88	1.54	2.14	2.51	3.21
DA-B2.5.01	0.40	5.00	0.58	0.60	0.62	0.65	6.48	8.64	9.84	11.88	1.50	2.08	2.44	3.11
DA-B2.5.02	0.09	5.00	0.59	0.61	0.63	0.66	6.48	8.64	9.84	11.88	0.35	0.49	0.57	0.73
DA-B2.6	0.07	5.00	0.63	0.65	0.66	0.69	6.48	8.64	9.84	11.88	0.29	0.39	0.46	0.58
DA-B3	0.16	5.00	0.64	0.67	0.68	0.71	6.48	8.64	9.84	11.88	0.66	0.91	1.05	1.32
DA-B3.01	0.07	5.00	0.67	0.69	0.70	0.73	6.48	8.64	9.84	11.88	0.32	0.44	0.51	0.64
DA-B4	0.17	5.00	0.54	0.57	0.58	0.62	6.48	8.64	9.84	11.88	0.58	0.81	0.96	1.23
DA-B4.01	0.56	5.00	0.80	0.81	0.81	0.83	6.48	8.64	9.84	11.88	2.89	3.90	4.48	5.51
DA-B5	0.83	5.00	0.84	0.84	0.85	0.86	6.48	8.64	9.84	11.88	4.51	6.07	6.95	8.51
DA-B5.01	1.02	5.00	0.81	0.82	0.82	0.84	6.48	8.64	9.84	11.88	5.36	7.23	8.30	10.19
DA-B6	3.11	5.00	0.28	0.32	0.35	0.41	6.48	8.64	9.84	11.88	5.70	8.67	10.78	15.22
DA-C	6.27	14.36	0.47	0.50	0.52	0.57	4.69	6.44	7.48	9.14	25.28	52.95	78.76	122.99
DA-C.01	0.78	5.00	0.47	0.50	0.52	0.57	6.48	8.64	9.84	11.88	2.38	3.39	4.01	5.23
DA-C.02	1.56	5.00	0.47	0.50	0.52	0.57	6.48	8.64	9.84	11.88	4.77	6.78	8.01	10.47
DA-C1	0.15	5.00	0.79	0.80	0.81	0.83	6.48	8.64	9.84	11.88	0.77	1.04	1.20	1.47
DA-C2	0.10	5.00	0.76	0.78	0.78	0.80	6.48	8.64	9.84	11.88	0.51	0.69	0.80	0.99
DA-D	0.12	5.00	0.78	0.79	0.80	0.82	6.48	8.64	9.84	11.88	0.61	0.82	0.94	1.16
DA-D1	1.70	5.00	0.61	0.64	0.65	0.68	6.48	8.64	9.84	11.88	6.77	9.35	10.88	13.76
DA-D2	2.35	5.00	0.74	0.75	0.76	0.78	6.48	8.64	9.84	11.88	11.21	15.25	17.57	21.79
DA-D2.01	0.16	5.00	0.79	0.80	0.81	0.83	6.48	8.64	9.84	11.88	0.82	1.10	1.27	1.56
DA-D2.1	0.09	5.00	0.75	0.76	0.77	0.79	6.48	8.64	9.84	11.88	0.44	0.59	0.68	0.85
DA-E	1.61	5.00	0.83	0.84	0.85	0.86	6.48	8.64	9.84	11.88	8.68	11.70	13.41	16.42
DA-E.01	0.40	5.00	0.57	0.60	0.61	0.65	6.48	8.64	9.84	11.88	1.48	2.05	2.40	3.06
DA-E.02	0.03	5.00	0.97	0.97	0.97	0.97	6.48	8.64	9.84	11.88	0.16	0.21	0.24	0.29
DA-F	0.10	5.00	0.85	0.86	0.86	0.87	6.48	8.64	9.84	11.88	0.56	0.75	0.86	1.05
DA-F.01	0.06	5.00	0.96	0.96	0.96	0.96	6.48	8.64	9.84	11.88	0.38	0.51	0.58	0.70
DA-G	0.83	5.00	0.34	0.38	0.41	0.46	6.48	8.64	9.84	11.88	1.85	2.74	3.32	4.55
DA-G1	0.08	5.00	0.63	0.66	0.67	0.70	6.48	8.64	9.84	11.88	0.34	0.47	0.55	0.69

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100-YEAR STORM SEWER CALCULATIONS LINE SD-B & C

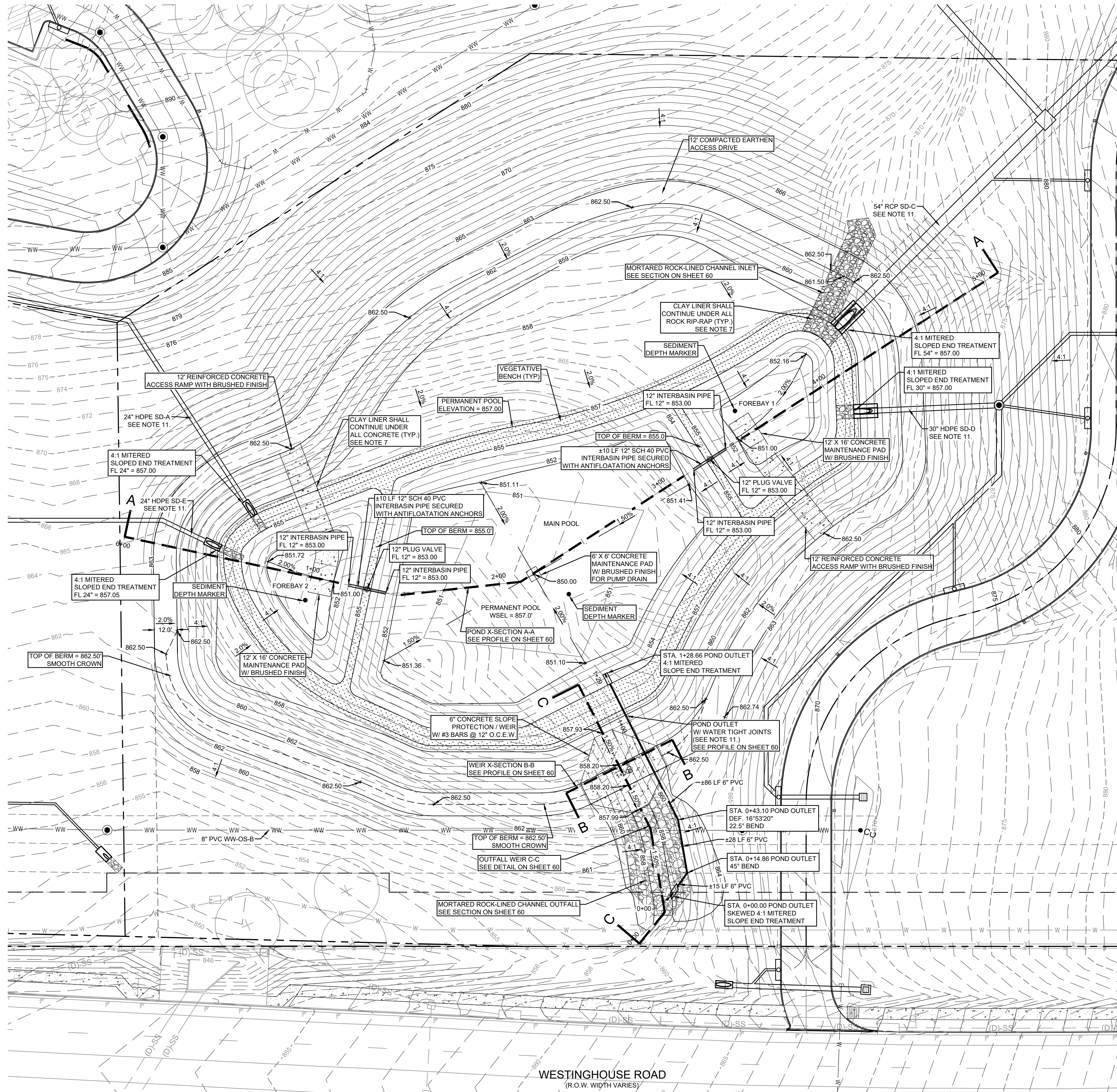
Line No.	Line ID	Flow Rate (cfs)	Line Size (in)	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Line Slope (%)	HGL Dn (ft)	HGL Up (ft)	Minor Loss (ft)	HGL Jnct (ft)	DnStm Ln No	Vel Ave (ft/s)
1	P-SD-C-01	271.98	54	42.000	857.00	857.76	1.81	860.50	862.09	0.70	862.09	Outfall	18.90
2	P-SD-C-02	271.98	54	68.705	857.76	860.25	3.62	862.09	864.58	3.54	864.58	1	17.31
3	P-SD-C-03	270.43	54	44.020	860.25	861.85	3.63	864.58	866.18	n/a	866.18	2	17.21
4	P-SD-B-01A	130.63	42	95.543	865.18	865.99	0.85	868.68	870.05	0.43	870.48	3	13.58
5	P-SD-B-01B	130.63	42	121.407	869.07	873.50	3.65	871.08	876.81	n/a	876.81	4	18.36
6	P-SD-B-02	52.85	30	49.147	886.30	888.00	3.47	887.75	890.34	n/a	890.34	5	14.48
7	P-SD-B-03	52.85	30	105.084	888.00	891.64	3.46	890.34	893.97	n/a	893.97	6	11.09
8	P-SD-B-04	52.85	30	23.961	895.97	896.73	3.14	897.47	899.06	n/a	899.06	7	14.14
9	P-SD-B-05	50.89	30	132.541	896.73	900.89	3.14	899.06	903.20	1.79	903.20	8	10.71
10	P-SD-B-06	25.45	24	50.476	902.89	903.69	1.60	904.27	905.46	0.87	905.46	9	9.82
11	P-SD-B-07	10.23	18	87.228	904.19	908.17	4.56	905.46	909.40	j	909.40	10	6.50
12	P-SD-B-08	10.23	18	64.193	908.17	911.10	4.56	909.40	912.33	j	912.33	11	6.59
13	P-SD-B-09	3.11	12	157.805	911.60	917.25	3.58	912.33	918.01	0.17	918.01	12	4.99
14	P-SD-B-10	3.11	12	83.237	917.25	920.23	3.58	918.01	920.99	j	920.99	13	4.88
15	P-SD-B2-01	66.25	36	24.643	885.35	885.48	0.50	888.35	888.56	1.02	889.59	5	9.37
16	P-SD-B2-02	60.89	36	56.007	885.48	885.76	0.50	889.59	889.99	0.58	890.56	15	8.61
17	P-SD-B2-03	52.94	36	94.254	885.76	887.00	1.32	890.56	891.07	0.44	891.50	16	7.49
18	P-SD-B2-04	47.74	36	33.831	887.00	887.11	0.31	891.50	891.65	0.53	892.18	17	6.75
19	P-SD-B2-05	42.71	30	37.748	887.61	888.48	2.33	892.18	892.53	0.60	893.13	18	8.70
20	P-SD-B2-06	42.71	30	172.101	888.48	892.49	2.33	893.13	894.67	n/a	894.67	19	9.05
21	P-SD-B2-07	34.56	30	145.739	892.49	893.22	0.50	894.99	895.87	0.55	896.42	20	7.04
22	P-SD-B2-08	34.56	30	43.381	893.22	893.43	0.48	896.42	896.68	0.39	897.07	21	7.04
23	P-SD-B2-09	28.61	30	79.972	893.43	893.83	0.50	897.07	897.40	0.53	897.93	22	5.83
24	P-SD-B2-10	21.07	24	156.489	899.25	901.84	1.66	900.44	903.48	n/a	903.48	23	9.19
25	P-SD-B2-11	21.07	24	37.536	901.84	902.46	1.65	903.48	904.10	n/a	904.10	24	7.63
26	P-SD-B2-12	12.59	18	28.389	902.96	903.43	1.66	904.10	904.77	0.68	904.77	25	8.15
27	P-SD-B2-13	5.54	12	28.610	903.93	905.69	6.14	904.77	906.63	0.61	906.63	26	7.56
28	P-SD-B2-14	4.96	12	137.317	905.69	914.11	6.13	906.63	915.03	j	915.03	27	6.53
29	P-SD-B2-15	4.96	12	30.874	914.11	914.42	1.00	915.11	915.62	0.62	916.24	28	6.32
30	P-SD-B2-01	0.58	12	7.071	905.69	906.67	13.85	906.63	906.98	j	906.98	27	1.74
31	P-SD-B2-02	0.58	12	19.632	906.67	909.39	13.86	906.98	909.71	0.12	909.71	30	2.74
32	P-SD-B2-5-01	7.05	18	34.539	903.43	903.61	0.52	904.77	904.86	0.36	905.21	26	4.36
33	P-SD-B2-5-02	6.32	18	148.809	903.61	905.50	1.27	905.21	906.47	j	906.47	32	4.40
34	P-SD-B2-5-03	3.21	12	13.299	906.00	907.41	10.60	906.47	908.18	0.38	908.18	33	6.90
35	P-SD-B4-01	6.74	18	114.758	903.39	904.47	0.94	904.24	905.47	0.22	905.47	9	5.96
36	P-SD-B4-02	1.23	12	12.909	904.97	905.02	0.38	905.48	905.53	0.11	905.64	35	3.05
37	P-SD-B4-03	1.23	12	7.071	905.02	905.05	0.38	905.64	905.65	0.07	905.72	36	2.46
38	P-SD-B4-04	1.23	12	82.134	905.05	905.36	0.38	905.72	905.87	0.12	906.00	37	2.61
39	P-SD-B4-05	1.23	12	27.771	905.36	905.47	0.40	906.00	906.03	0.11	906.15	38	2.52
40	P-SD-B6-01	15.22	24	7.071	903.69	903.83	1.88	905.46	905.23	n/a	905.23	10	5.81
41	P-SD-B6-02	15.22	24	49.870	903.83	904.76	1.86	905.23	906.17	n/a	906.17	40	6.47
42	P-SD-B5-01	18.70	18	70.000	901.39	903.56	3.10	903.20	905.06	0.87	905.93	9	10.58
43	P-SD-B5-02	8.51	18	142.955	903.56	904.16	0.42	905.93	906.73	0.36	907.09	42	4.82
44	P-SD-B3-01	1.96	12	7.071	898.23	898.75	7.36	899.06	899.34	j	899.34	8	3.41
45	P-SD-B3-02	1.96	12	45.941	898.75	902.13	7.36	899.34	902.73	0.12	902.73	44	4.02
46	P-SD-B3-03	1.32	12	139.309	902.13	902.83	0.50	902.73	903.32	0.19	903.32	45	3.10
47	P-SD-B1-01	11.53	18	33.453	886.80	887.38	1.72	887.79	888.67	n/a	888.67	5	8.22
48	P-SD-B1-02	11.53	18	54.456	887.38	888.31	1.72	888.67	889.61	n/a	889.61	47	7.12
49	P-SD-B1-03	9.76	18	26.462	888.31	888.77	1.74	889.61	889.97	j	889.97	48	6.21
50	P-SD-B1-04	5.79	18	115.224	888.77	889.73	0.83	889.97	890.66	j	890.66	49	4.42
51	P-SD-B1-05	5.79	18	36.859	889.73	890.04	0.83	890.66	890.96	0.30	890.96	50	5.04
52	P-SD-B1-06	5.79	18	29.284	890.04	890.28	0.83	890.96	891.21	0.30	891.21	51	5.04
53	P-SD-B1-07	2.51	12	24.545	890.78	890.99	0.86	891.40	891.67	0.15	891.67	52	4.67
54	P-SD-B1-08	2.00	12	42.786	890.99	891.61	1.45	891.67	892.21	j	892.21	53	3.78
55	P-SD-B1-09	1.14	12	18.281	891.61	891.94	1.78	892.21	892.39	j	892.39	54	2.83
56	P-SD-B1-10	1.14	12	47.256	891.94	892.78	1.78	892.39	893.23	n/a	893.23	55	3.34
57	P-SD-B1-11	0.67	12	34.942	892.78	893.91	3.25	893.23	894.26	j	894.26	56	2.39
58	P-SD-B1-12	0.67	12	53.681	893.91	899.47	10.35	894.26	899.81	0.09	899.81	57	2.83
59	P-SD-B1-13	0.67	12	20.000	899.47	901.54	10.35	899.81	901.88	0.06	901.88	58	2.83
60	P-SD-B1-14	0.47	12	68.583	901.54	901.89	0.51	901.88	902.17	0.10	902.17	59	2.28
61	P-SD-B2-4-01	7.54	18	64.688	894.83	895.16	0.51	897.93	898.21	0.28	898.49	23	4.27
62	P-SD-C-04	139.80	48	103.475	872.40	877.55	4.98	874.17	881.06	1.67	881.06	3	19.05
63	P-SD-C-05	139.80	48	69.049	877.55	884.05	9.41	881.06	887.56	2.23	887.56	62	11.97
64	P-SD-C-06	138.69	48	145.721	888.50	890.13	1.12	891.31	893.63	n/a	893.63	63	13.29
65	P-SD-C-07	138.69	48	10.001	890.13	890.24	1.10	893.63	893.74	n/a	893.74	64	11.91
66	P-SD-C-08	138.69	48	7.744	890.24	890.33	1.16	893.74	893.83	n/a	893.83	65	11.91
67	P-SD-C-09	133.46	48	191.848	890.32	892.24	1.00	893.83	895.68	n/a	895.68	66	11.51
68	P-SD-C-10	122.99	48	176.283	892.24	894.01	1.00	895.68	897.34	n/a	897.34	67	10.84
69	P-SD-B2-3-01	8.15	18	141.068	893.49	895.09	1.13	894.67	896.20	j	896.20	20	5.65

Line No.	Line ID	Flow Rate (cfs)	Line Size (in)	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Line Slope (%)	HGL Dn (ft)	HGL Up (ft)	Minor Loss (ft)	HGL Jnct (ft)	DnStm Ln No	Vel Ave (ft/s)
70	P-SD-C2-01	1.11	12	15.000	891.50	891.80	2.00	891.81	892.24	0.17	892.24	63	4.38
71	P-SD-B1.2-01	3.28	12	5.000	890.78	891.59	16.20	891.21	892.36	0.39	892.36	52	7.61
72	P-SD-B1.1-01	1.77	12	7.071	888.81	888.91	1.43	889.61	889.48	0.17	889.48	48	3.26
73	P-SD-B1.1-02	1.77	12	120.221	888.91	890.64	1.43	889.48	891.20	0.17	891.20	72	3.86
74	P-SD-B1.1-03	1.77	12	4.950	890.64	890.71	1.41	891.20	891.28	0.23	891.28	73	3.88
75	P-SD-B2.2-01	5.03	18	58.731	888.61	888.75	0.25	892.18	892.30	0.09	892.39	18	2.85
76	P-SD-B2.2-02	5.03	18	10.861	888.75	888.78	0.28	892.39	892.42	0.13	892.54	75	2.85
77	P-SD-B2.1-01	5.36	18	7.071	886.98	887.07	1.31	889.59	889.60	0.11	889.71	15	3.03
78	P-SD-B2.1-02	5.36	18	112.267	887.07	888.54	1.31	889.71	889.93	0.11	890.05	77	3.08
79	P-SD-B2.1-03	5.36	18	10.285	888.54	888.67	1.26	890.05	890.06	0.08	890.13	78	3.09
80	P-SD-B2.1-04	3.44	18	14.046	888.67	889.76	7.76	890.13	890.47]	n/a	890.47	79	3.08
81	P-SD-C1-01	1.55	12	53.347	863.75	875.43	21.89	864.58	875.96]	n/a	875.96	2	2.95

100-YEAR STORM SEWER CALCULATIONS LINE SD-D

Line No.	Line ID	Flow Rate	Line Size	Line Length	Invert Dn	Invert Up	Line Slope	HGL Dn	HGL Up	Minor Loss	HGL Jnct	DnStm Ln No	Vel Ave
		(cfs)	(in)	(ft)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)			(ft/s)
1	P-SD-D-01	39.12	30	9.200	857.00	857.22	2.37	858.36	859.33	0.28	859.33	Outfall	11.60
2	P-SD-D-02	39.12	30	53.482	857.22	858.49	2.37	859.33	860.60	1.01	860.60	1	8.86
3	P-SD-D-03	25.36	30	14.703	858.49	858.83	2.31	860.60	860.54 j	n/a	860.54	2	6.40
4	P-SD-D-04	1.16	12	46.993	866.62	876.87	21.84	866.79	877.32	0.17	877.32	3	8.11
5	P-SD-D1-01	13.76	18	99.989	859.50	871.52	24.06	860.60	872.89	0.77	872.89	2	9.02
6	P-SD-D1-02	13.76	18	66.598	871.52	878.80	10.93	872.89	880.17	1.02	880.17	5	8.12
7	P-SD-D2-01	24.20	30	7.217	858.83	858.87	0.50	860.54	860.54	0.65	860.54	3	6.84
8	P-SD-D2-02	24.20	30	57.158	858.87	859.16	0.50	860.54	860.83	0.63	860.83	7	6.93
9	P-SD-D2-03	23.35	24	157.639	859.66	860.44	0.50	861.66	863.09	0.60	863.69	8	7.43
10	P-SD-D2-04	23.35	24	44.399	860.44	861.75	2.94	863.69	864.09	0.64	864.74	9	7.43
11	P-SD-D2-05	23.35	24	7.613	861.75	861.97	2.94	864.74	864.81	0.64	865.45	10	7.43
12	P-SD-D2-06	23.35	24	17.161	861.97	862.47	2.91	865.45	865.61	0.43	866.04	11	7.43
13	P-SD-D2-07	21.79	24	45.898	862.47	864.20	3.77	866.04	866.40	0.75	867.15	12	6.94
14	P-SD-D2-1-01	0.85	12	47.424	860.66	868.74	17.04	860.83	869.13	n/a	869.13	8	6.35

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- LEGEND**
- PROPERTY LINE
 - PROPOSED CURB & GUTTER
 - PROPOSED SIDEWALK
 - EASEMENT LINE
 - EXISTING CURB & GUTTER
 - EXISTING OVERHEAD ELECTRIC LINE
 - RECORD INFORMATION
 - OFFICIAL PUBLIC RECORD
 - WILLIAMSON COUNTY TX
 - EXISTING FIRE HYDRANT
 - EXISTING WATER VALVE
 - EXISTING WW MANHOLE
 - EXISTING STORM SEWER MANHOLE
 - EXISTING STORM HEADWALLS
 - EXISTING ELECTRIC METER
 - EXISTING ELECTRIC PULL BOX
 - PROPOSED STORM SEWER MANHOLE
 - PROPOSED STORM SEWER GRATE INLET
 - PROPOSED STORM SEWER CURB INLET
 - PROPOSED STORM SEWER HEADWALL
 - PROPOSED FIRE HYDRANT
 - PROPOSED SANITARY SEWER CLEANOUT
 - PROPOSED SANITARY SEWER MANHOLE

- NOTES:**
- THE WET POND SHALL BE STOCKED WITH GAMBUSIA AFFINIS TO SERVE AS A BIOLOGICAL CONTROL FOR MOSQUITOS. THIS POND SHALL BE STOCKED WITH 200 INDIVIDUALS.
 - PRIOR TO FILLING THE POND, AND IMMEDIATELY AFTER INSTALLING THE IMPERMEABLE CLAY LINER, ALL AREAS OF THE POND THAT ARE TO RECEIVE AND SUPPORT VEGETATION MUST HAVE A PROTECTIVE 12-INCH THICK SOIL LAYER ON TOP OF THE LINER. CONTRACTOR SHALL THEN PLACE A MINIMUM OF 45 POUNDS PER 1000 SQUARE FEET OF PLANT LITTER ON TOP OF THE CLAY LINER ON SIDE SLOPES BELOW PERMANENT POOL ELEVATION. THE PLANT LITTER SHALL CONSIST OF STRAW, HAY, LEAF CLIPPINGS, OR OTHER NON-WOODY MATERIAL. ENSURE THAT THE PLANT LITTER WILL NOT FLOAT BY ATTACHING THE LITTER TO THE SLOPES WITH STAPLES OR OTHER APPROPRIATE METHODS.
 - INITIAL FILLING - WHILE THE POND IS IN CONSTRUCTION, IT IS INTENDED THAT STORMWATER RUNOFF, NOT POTABLE WATER, BE USED TO FILL UP THE POND ONCE THE POND LINER IS IN PLACE. HOWEVER, THE POND SHALL BE FILLED WITH WATER WITHIN A REASONABLE AMOUNT OF TIME, PREFERABLY WITHIN ONE WEEK.
 - HAZARDOUS MATERIALS TRAPS - SPILLS OF HAZARDOUS LIQUIDS CAN SEVERELY DAMAGE OR KILL THE BIOTA OF A WET POND. THEREFORE, DEVELOPMENTS WHERE THE TRANSPORTATION, STORAGE, OR DISTRIBUTION OF HAZARDOUS MATERIALS IS ANTICIPATED SHOULD INCLUDE HAZARDOUS MATERIAL TRAPS IN THE DRAINAGE SYSTEM IMMEDIATELY UPSTREAM OF THE WET POND INLET.
 - MAKE-UP WATER SOURCE - A MAKE-UP WATER SOURCE SHALL BE AVAILABLE FOR THE POND DURING TIMES OF DROUGHT. A WATER WELL ON-SITE IS BEST SUITED TO SERVE AS THE MAKE-UP WATER SOURCE. IF USED, IT SHOULD BE TESTED FOR CHEMICAL CONTENT SUITABILITY PRIOR TO USE. POTABLE WATER AND EFFLUENT WATER IS TYPICALLY NOT AN ACCEPTABLE MAKE-UP WATER SOURCE, BUT A FIRE HYDRANT WITH A TEMPORARY CONSTRUCTION METER MAY BE USED IF THE AMOUNT OF MAKE-UP WATER IS SIGNIFICANTLY LESS THAN THE TOTAL VOLUME. EXCESSIVE AMOUNTS OF CHLORINATED WATER MAY HARM THE BIOLOGICAL ELEMENTS OF THE POND, AS WELL AS THE FISH. THE MINIMUM POND LEVEL ACCEPTABLE AT ANY TIME IS 12" BELOW THE PERMANENT POOL (THE LOWER LIMIT OF THE MARSH ZONE).
 - CLAY LINER SHOULD BE INSTALLED, MONITORED, TESTED, AND CERTIFIED IN ACCORDANCE WITH TERRACON GEOTECHNICAL ENGINEERING REPORT FOR CHAPEL HILL APARTMENTS, TERRACON PROJECT NO. 96196167, DATED NOV. 7, 2019 AND THE SUPPLEMENTAL LETTER QAOQC PLAN FOR CLAY LINER, CHAPEL HILL APARTMENTS - PHASE 1". PREPARED BY TERRACON ON APRIL 30, 2020. THE CLAY SHALL BE INSTALLED IN LIFTS NO GREATER THAN SIX INCHES (LOOSE LIFT THICKNESS OF ABOUT 8 INCHES) AND FREE OF ORGANICS, DEBRIS, AND ROCKS OR SOIL CLODS LARGER THAN 1 INCH IN THEIR GREATEST DIMENSION. THE MINIMUM FINAL THICKNESS OF THE IMPERMEABLE CLAY LINER SHALL BE 12 INCHES WITH A PROTECTIVE SOIL COVER LAYER OF 12 INCHES THICKNESS OVER THE CLAY LINER. THE IMPERMEABLE CLAY LINER SHALL BE KEPT MOIST AT ALL TIMES TO AVOID CRACKING DURING AND AFTER CONSTRUCTION. THE GEOTECHNICAL ENGINEER SHALL MONITOR THE INSTALLATION OF THE CLAY LINER AND TEST IT TO CERTIFY THAT IT WILL NOT LEAK. SPECIFICATIONS FOR THE CLAY MATERIAL ARE LISTED ON THE POND DETAILS SHEET. THE CLAY LINER SHALL EXTEND TO A MINIMUM ELEVATION OF 858.70 FT-MSL, WHICH IS ABOVE THE NOMINAL ELEVATION LISTED IN THE TERRACON LETTER. CONTRACTOR SHALL BE HELD ACCOUNTABLE FOR A CLAY LINER UP TO THIS ELEVATION.
 - THE CLAY LINER SHALL EXTEND ABOVE ALL WALL FOOTINGS AND HORIZONTAL CONCRETE ELEMENTS AND SHALL ABUT ALL VERTICAL CONCRETE ELEMENTS, ASSUMING CAST-IN-PLACE WALLS. CLAY LINER SHALL EXTEND UNDERNEATH ALL PERMEABLE AND POTENTIALLY PERMEABLE STRUCTURES, INCLUDING, BUT NOT LIMITED TO ROCK RIPRAP, UP TO AN ELEVATION OF 858.70 FT-MSL. REFER TO AFOREMENTIONED TERRACON QAOQC PLAN FOR ADDITIONAL WATERTIGHT SEALING PROCEDURES FOR STRUCTURES WITHIN THE POND AREA.
 - THE SUBGRADE BELOW THE CLAY LINER SHALL BE COMPACTED TO AT LEAST 95% OF THE MAX. DRY DENSITY DETERMINED BY THE STANDARD PROCTOR TEST, ASTM D 998. IF THE MATERIAL CLASSIFIES AS CH OR CL, IN ACCORDANCE WITH USCS WITH PI GREATER THAN 20, THE MOISTURE CONTENT AT THE TIME OF COMPACTION SHALL BE BETWEEN OPTIMUM AND +4 PERCENTAGE POINTS ABOVE THE OPTIMUM MOISTURE CONTENT. FOR ALL OTHER SOILS MATERIALS, THE MOISTURE CONTENT AT THE TIME OF COMPACTION SHALL BE BETWEEN -3 AND +3 PERCENTAGE POINTS FROM THE OPTIMUM MOISTURE CONTENT.
 - THE IMPERMEABLE CLAY LINER MATERIAL SHALL BE COMPACTED TO AT LEAST 98% OF THE MAX. DRY DENSITY DETERMINED BY THE STANDARD PROCTOR TEST, ASTM D 998. THE MOISTURE CONTENT AT THE TIME OF COMPACTION SHALL BE GREATER THAN OR EQUAL TO +2 PERCENTAGE POINTS ABOVE THE OPTIMUM MOISTURE CONTENT.
 - SEDIMENT FROM UPSTREAM CONSTRUCTION SHALL BE REMOVED FROM THE DETENTION POND PRIOR TO FINAL REVEGETATION OF THE POND.
 - FOR PIPES ENTERING THE POND, ALL PIPES BELOW THE 858.70 FT-MSL ELEVATION MUST HAVE WATER-TIGHT JOINTS AND LIFTING PLUGS SEALS TO REDUCE THE POTENTIAL FOR LEAKAGE. ANY UTILITY TRENCHES CONNECTING INTO THE POND (I.E. PENETRATING THE POND LINER) SHALL BE COMPLETELY BACKFILLED WITH FLOWABLE BACKFILL UP TO A MINIMUM ELEVATION OF 858.70 FT-MSL TO SEAL THE UTILITY TRENCH. EXTREME CARE SHALL BE TAKEN SUCH THAT NO SOIL FILL MATERIAL IS PLACED ABOVE, ALONGSIDE, OR BELOW THE UTILITY LINE AND THAT A PROPER BOND IS ACHIEVED BETWEEN THE FLOWABLE BACKFILL AND THE ADJACENT UTILITY TRENCH SIDEWALLS. COMPACTION OF CLAY LINER UNDERNEATH AND AROUND THE INLET/OUTLET STRUCTURE (I.E. PLACEMENT OF CLAY LINER BEFORE COMPLETION OF THE INLET/OUTLET STRUCTURE) IS REQUIRED IF THE INLET/OUTLET STRUCTURE IS BELOW 858.70 FT-MSL. THE FLOWABLE BACKFILL SHALL CONFORM TO THE REQUIREMENTS OF TxDOT ITEM 401 OR CITY OF AUSTIN ITEM 402S.
 - CONTRACTOR IS RESPONSIBLE FOR GROUNDWATER CONTROL AND SHALL ADHERE TO RECOMMENDATIONS WITHIN THE AFOREMENTIONED TERRACON GEOTECHNICAL ENGINEERING REPORT AND WET POND CLAY LINER QAOQC PLAN.
 - THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ENSURING THE WET POND DOES NOT LEAK AND SHALL TAKE ALL NECESSARY PRECAUTIONS ACCORDINGLY. IF AN IMPERMEABLE GEOSYNTHETIC LINER IS REQUESTED TO BE UTILIZED IN LIEU OF A CLAY LINER, THE GEOTECHNICAL ENGINEER SHALL REVISE THE POND LINER QAOQC PLAN ACCORDINGLY AND CONTRACTOR SHALL ADHERE TO ALL ELEMENTS OF DESIGN, CONSTRUCTION, INSTALLATION, TESTING, AND CERTIFICATION FOR THE GEOSYNTHETIC LINER. MODIFICATIONS TO THE CONSTRUCTION PLANS MAY BE REQUIRED FOR A GEOSYNTHETIC LINER. IF THE CONTRACTOR DESIRES TO ADD ADDITIONAL CLAY LINER THICKNESS TO AID IN THE IMPERMEABILITY OF THE LINER, THE ENGINEER OF RECORD SHALL BE NOTIFIED PRIOR TO CONSTRUCTION AND NO EXTRA COST SHALL BE ASSOCIATED WITH THE ADDITIONAL THICKNESS AFTER INITIAL BIDDING. ALL CONCRETE, ROCK RIPRAP, ETC. WITHIN THE POND LIMITS SHALL HAVE THE FULL THICKNESS OF COMPACTED CLAY LINER UNDERNEATH.
 - INTERBASIN PIPE ANTIFLOATATION DEVICE MAY BE A COMMERCIALY AVAILABLE SCREW/HELICAL ANCHOR DEVICE OR APPROVED ALTERNATE. SUBMIT PRODUCT TO ENGINEER OF RECORD FOR REVIEW.
 - CONCRETE SLOPE PROTECTION SHALL UTILIZE CLASS C 3,600 PSI CONCRETE WITH 18" TOE-DOWNS ON ALL PERIMETERS. REINFORCEMENT SHALL BE #3 BARS AT 12 INCHES EACH WAY.
 - A FIXED VERTICAL SEDIMENT DEPTH MARKER SHALL BE PLACED WITHIN THE MAIN POOL AND FOREBAYS OF THE WET POND TO MEASURE SEDIMENT ACCUMULATION.

CITY OF ROUND ROCK NOTES:

- CITY OF ROUND ROCK TO BE NOTIFIED WHEN ANY CONSTRUCTION INSIDE THE CITY OF ROUND ROCK EASEMENT TAKES PLACE. THE CITY OF ROUND ROCK MAY ELECT TO BE PRESENT DURING ANY CONSTRUCTION INSIDE THE EASEMENT.
- CONTRACTOR TO USE EXTREME CAUTION WHEN WORKING AROUND EXISTING 48-INCH WATERLINE.
- CONTRACTOR TO COORDINATE WITH CITY OF ROUND ROCK TO POT-HOLE THE LOCATION AND ELEVATION OF THE EXISTING 48-INCH WATERLINE PRIOR TO CONSTRUCTION. THE 48-INCH WATERLINE TO BE POT-HOLED AT EACH PROPOSED CROSSING LOCATION.
- CONTRACTOR TO NOTIFY ENGINEER IF EXISTING FIELD ELEVATIONS OF THE 48-INCH WATERLINE DIFFER FROM WHAT HAS BEEN SHOWN ON THE CONSTRUCTION DRAWINGS.



THE INFORMATION SHOWN ON THESE DRAWINGS INDICATING SIZE, TYPE AND LOCATION OF UNDERGROUND, SURFACE, AND AERIAL UTILITIES IS NOT GUARANTEED TO BE EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT THE GEOSTORM AREA TONE CALL SYSTEM AT 1-800-364-8371 (DTS) TUESDAY THROUGH FRIDAY PRIOR TO BEGINNING ANY EXCAVATION FOR EXISTING UTILITY LOCATIONS. THE CONTRACTOR SHALL ALSO BE FULLY RESPONSIBLE FOR FIELD VERIFYING LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES AFFECTED BY CONSTRUCTION FOR THIS PROJECT IN ORDER TO AVOID DAMAGING THOSE UTILITIES, AND SHALL IMMEDIATELY ARRANGE FOR REPAIR AND RESTORATION OF CONTRACTOR-DAMAGED UTILITIES TO THE UTILITY COMPANY'S APPROVAL, AT THE EXPENSE OF THE CONTRACTOR.

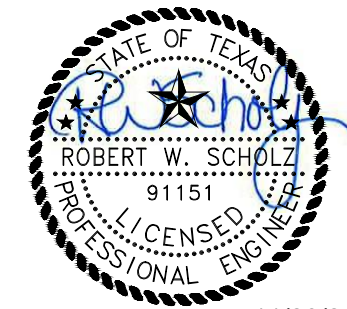
**CHAPEL HILL
APARTMENTS**

401 WESTINGHOUSE ROAD
GEORGETOWN, TEXAS 78626

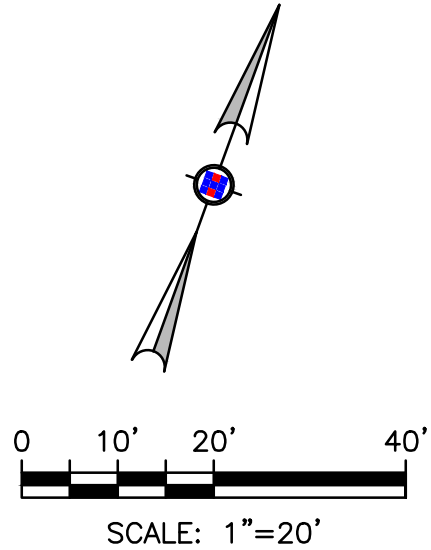


HALFF ASSOCIATES, INC.
9500 AMBERGLEN BLVD.
BUILDING F, SUITE 125
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TPELS ENGINEERING FIRM #312

REVISION NO.	DATE	DESCRIPTION



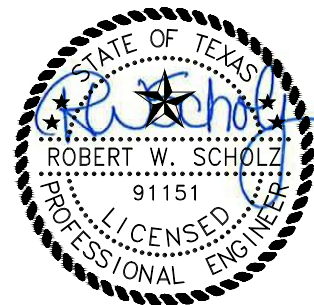
PROJECT NO:	33984.003
ISSUED:	11/20/2020
DRAWN BY:	BLPH
CHECKED BY:	RWS
SHEET TITLE:	POND PLAN
SHEET NUMBER:	59 OF 145






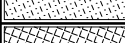


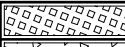

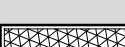





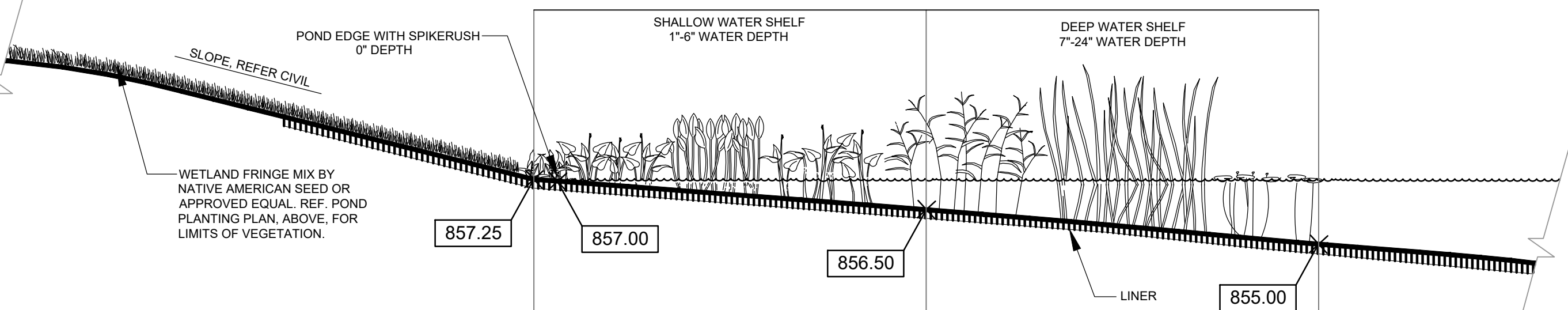
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AQUATIC PLANT SCHEDULE							
KEY	SYMBOL	WET POND QUANTITY	PLANT SPECIES	SIZE	SPACING	PLANTING DEPTH: PERM. POOL DEPTH = 0"	PERCENTAGE OF PROVIDED PLANTINGS
BULRUSH							
MM		60	Marisilea macropoda	1 GALLON	24" O.C.	-3" to 0"	4.7%
HL		100	Hibiscus lasiocarpus	1 GALLON	24" O.C.	-3" to 0"	7.9%
SPA		45	Spilanthes americana	1 GALLON	24" O.C.	0" to 3"	3.6%
SA		84	Scirpus americanus	2 GALLON OR BARE ROOT	30" O.C.	3"	6.6%
SV		162	Scirpus validus	2 GALLON OR BARE ROOT	30" O.C.	3"	12.8%
Total Bulrush Percentage:							35.7%
MARSH DIVERSITY							
JA		90	Justicia americana	1 GALLON OR BARE ROOT	36" O.C.	9"	7.1%
IP		65	Iris pseudacorus	1 GALLON OR BARE ROOT	36" O.C.	9"	5.1%
IV		110	Iris virginica	1 GALLON OR BARE ROOT	36" O.C.	9"	8.7%
Total Marsh Diversity Percentage:							20.9%
SPIKERUSH							
EMS		61	Eleocharis macrostachys	2.5" LINERS OR BARE ROOT	16" O.C.	0" to 6"	4.8%
EMC		74	Eleocharis montevidensis	2.5" LINERS OR BARE ROOT	16" O.C.	0" to 6"	5.8%
Total Spikerush Percentage:							10.7%
ARROWHEAD							
SLT		134	Sagittaria latifolia	1 GALLON OR BARE ROOT	36" O.C.	6"	10.6%
SLC		129	Sagittaria lanceifolia	1 GALLON OR BARE ROOT	36" O.C.	6"	10.2%
Total Arrowhead Percentage:							20.8%
AQUATICS PLANT ZONE							
NO		77	Nymphaea odorata	1 GALLON	Varies, see plan	12" to 24"	6.1%
CC		74	Cabomba caroliniana	1 GALLON	Varies, see plan	12" to 36"	5.8%
Total Deep Water Zone Percentage:							11.9%
REQUIRED NUMBER OF PLANTS							1260
NUMBER OF PLANTS PROVIDED							1265



POND PLANTING

NOT TO SCALE



Know what's below.
Call before you dig

THE INFORMATION SHOWN ON THESE DRAWINGS INDICATING SIZE, TYPE AND LOCATION OF UNDERGROUND, SURFACE, AND AERIAL UTILITIES IS NOT GUARANTEED TO BE EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT THE GEORGETOWN AREA "ONE CALL" SYSTEM AT 1-800-344-8377 (DIG TESS) 48 HOURS PRIOR TO BEGINNING ANY EXCAVATION FOR EXISTING UTILITY LOCATIONS. THE CONTRACTOR SHALL ALSO BE FULLY RESPONSIBLE FOR FIELD VERIFYING LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES AFFECTED BY CONSTRUCTION FOR THIS PROJECT IN ORDER TO AVOID DAMAGING THOSE UTILITIES, AND SHALL IMMEDIATELY ARRANGE FOR REPAIR AND RESTORATION OF CONTRACTOR DAMAGED UTILITIES TO THE UTILITY COMPANY'S APPROVAL AT THE EXPENSE OF THE CONTRACTOR.

PROJECT NO:	33984.003
ISSUED:	11/20/2020
DRAWN BY:	BL,PH
CHECKED BY:	RWS

SHEET TITLE:

POND PLANTING PLAN

62 OF 145

SHEET NUMBER:

SITE DEVELOPMENT CASE NUMBER: 2020-36-SDF

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Attachment 5H – Temporary Sediment Pond(s) Plans and Calculations

A temporary sediment pond is proposed during construction of the site and is indicated in the construction documents. The calculations associated with the temporary sediment pond sizing are attached.

Chapel Hill

Temporary Sediment Basin Design

Purpose: This design is provided to properly size the temporary sediment basin. The proposed permanent BMP will be utilized as a temporary sediment basin during construction. Because the excavation of the permanent BMP will be deeper than the available outfall via gravity, a pump will be required to dewater the temporary sediment basin and the discharge should be filtered through a high service rock berm.

2-year, 24-hour Storm Depth, per Williamson County = 3.40 inches
Drainage Area: 60.75 acres

AutoCAD Hydrographs Software Input:

DRAINAGE AREA	AREA		GROUND COVER			CN VALUE	ToC	Q-2
	SQUARE FEET	ACRES	PERVIOUS (SF)	IMPERVIOUS (SF)	% IMPERVIOUS		MIN	CFS
EX-OFF-1	821977.20	18.87	381477	440500	54%	90	15.55	44.62
EX-OFF-1 (DETAINED)								10.88
DA-1	1624645.22	37.30	920344	704301	43%	88	10.70	89.55
DA-3	129394.64	2.97	129395	0	0%	80	10.24	5.54
DA-4	70175.25	1.61	14035	56140.2	80%	94	5.00	5.11

Volume, using the Type III 5C5 Unit Hydrograph in AutoCAD Hydrographs Software:

476,426 CF

9	SCS Runoff	36.39	3	732	163,768	-----	-----	-----	EX-OFF-1 (PROP STATE)
10	Reservoir	9.658	3	762	161,459	9	916.82	69,225	EX-OFF-1 (DETAINED)
11	Reach	9.660	3	765	161,318	10	-----	-----	EX-OFF-1 #1 (PROP.)
12	Reach	9.422	3	783	161,273	11	-----	-----	EX-OFF-1 #2 (PROP.)
13	Reach	9.423	3	786	161,274	12	-----	-----	EX-OFF-1 #3 (PROP.)
14	Reach	9.423	3	789	161,274	13	-----	-----	EX-OFF-1 #4 (PROP.)
15	SCS Runoff	71.91	3	729	283,359	-----	-----	-----	DA-1
16	SCS Runoff	4.229	3	729	16,791	-----	-----	-----	DA-3
17	SCS Runoff	4.278	3	726	15,003	-----	-----	-----	DA-4
18	Combine	82.46	3	729	476,426	14, 15, 16, 17	-----	-----	DAs TO PROP. POND

Total Excavated Volume Provided from Proposed Pond

Stage-Storage Curve:

CHAPEL HILL POND STAGE-STORAGE TABLE			
STAGE	PROPOSED AREA	PROPOSED STORAGE	
	AVG AREA (5F)	TOTAL VOLUME (CF)	TOTAL VOLUME (AC-FT)
850.0			
	836.81		
850.5		418	0.010
	4177.37		
851.0		2507	0.058
	10948.93		
851.5		7,982	0.183
	17864.72		
852.0		16,914	0.388
	21536.64		
852.5		27,682	0.635
	23512.74		
853.0		39,439	0.905
	25470.24		
853.5		52,174	1.198
	27528.50		
854.0		65,938	1.514
	29680.83		
854.5		80,778	1.854
	31927.48		
855.0		96,742	2.221
	34459.96		
855.5		113,972	2.616
	36861.79		
856.0		132,403	3.040
	38911.51		
856.5		151,859	3.486
	40994.23		
857.0		172,356	3.957
	47160.37		
857.5		195,936	4.498
	55392.95		
858.0		223,633	5.134
	59555.59		
858.2		235,544	5.407
	61826.06		
858.5		254,091	5.833
	64063.60		
859.0		286,123	6.568
	66075.52		
859.5		319,161	7.327
	68084.69		
860.0		353,203	8.108
	70119.18		
860.5		388,263	8.913
	72178.99		
861.0		424,352	9.742
	74264.14		
861.5		461,485	10.594
	76374.61		
862.0		499,672	11.471
	78519.85		
862.5		538,932	12.372

> 476,426 CF OKAY



06/29/2020
TBPELS Engineering Firm
#312

Attachment 5I – Inspection and Maintenance for BMPs

The inspection and maintenance of temporary BMP's will be made according to TCEQ RG-348, Complying with the Edwards Aquifer Rules Technical Guidance on Best Management Practices, July 2005 Revision.

Inspection Personnel:

Inspections shall be conducted by qualified representatives of the contractor acting on behalf of the owner or a designated party if hired separately by the owner. Each operator must delegate authority to the specifically described position or person performing inspections, as provided by 30 TAC 305.128, as an authorized person for signing reports and performing certain activities requested by the director or required by the TPDES general permit. This delegation of authority must be provided to the director of TCEQ in writing and a copy shall be kept along with the signed effective copy of the SWP3.

Inspection Schedule and Procedures - Inspections must comply with the following:

An inspection shall occur weekly and after any rain event.

The authorized party shall inspect all disturbed areas of the site, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site.

Disturbed areas and areas used for storage of materials that are exposed to precipitation or within limits of the 1% annual chance (100 year) floodplain must be inspected for evidence of, or the potential for, pollutants entering the runoff from the site. Erosion and sediment control measures identified in the plan must be observed to ensure that they are operating correctly. Observations can be made during wet or dry weather conditions. Where discharge locations or points are accessible, they must be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. This can be done by inspecting receiving waters to see whether any signs of erosion or sediment are associated with the discharge location. Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking.

Based on the results of the inspection, the site description and the pollution prevention measures identified in the plan must be revised as soon as possible after an inspection that reveals inadequacies. The inspection and plan review process must provide for timely implementation of any changes to the plan with 7 calendar days following the inspection.

An inspection report that summarizes the scope of the inspection, name(s) and qualifications of personnel conducting the inspection, the dates of the inspection, major observations relating to the

implementation of the SWP3. Major observations shall include as a minimum location of discharges of sediment or other pollutants from the site, location of BMPs that need to be maintained, location of BMPs that failed to operate as designed or proved inadequate for a particular location, and locations where BMPs are needed. Actions taken as a result of the inspections must be described within, and retained as a part of, the SWP3. Reports must identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report must contain a certification that the facility or site is in compliance with the SWP3 and the TPDES general permit. The report must be signed by the authorized representative delegated by the operators in accordance with TAC 305.128.

Maintenance and Corrective Actions - Maintenance of erosion control facilities shall consist of the minimum requirements as follows:

- A. In ongoing construction areas inspect erosion control improvements to confirm facilities are in place and operable. Where facilities have been temporarily set aside or damaged due to construction activity, place facilities in service before leaving job site.
- B. If weather forecast predicts possibility of rain, check entire facilities throughout site to assure facilities are in place and operable. If job site weather conditions indicate high probability of rain, make special inspection of erosion control facilities.
- C. After rainfall events review erosion control facilities as soon as site is accessible. Clean rock berms, berm/swales and other structural facilities. Determine where additional facilities or alternative techniques are needed to control sediment leaving site.
- D. After portions of site have been seeded, review these areas on regular basis in accordance with project specifications to assure proper watering until grass is established. Reseed areas where grass is not well established.
- E. Spills are to be handled as specified by the manufacturer of the product in a timely safe manner by personnel. The site superintendent will be responsible for coordinating spill prevention and cleanup operations.
- F. Concrete trucks will discharge extra concrete or wash out drum only at an approved location on site. Residual product shall be properly disposed of.
- G. Inspect vehicle entrance and exits for evidence of off-site tracking and correct as needed.
- H. Remove sediment from traps/ponds no later than when the design capacity has been reduced by 50%.

I. If sediment escapes the site, the contractor where feasible and where access is available shall collect and remove sedimentation material by appropriate non-damaging methods. Additionally, the contractor shall correct the condition causing discharges.

J. If inspections or other information sources reveal a control has been used incorrectly, or that a control is performing inadequately, the contractor must replace, correct or modify the control as soon as practical after discovery of the deficiency.

Attachment 5J – Schedule of Interim and Permanent Soil Stabilization Practices

The schedule of interim and permanent soil stabilization practices will be according to the following general schedule. The contractor shall keep adequate records at the site detailing the dates of 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.

Prior to Disturbance – Install all temporary erosion and sedimentation control features including but not limited to silt fencing, stabilized construction entrances, rock berms, inlet protection, temporary sediment pond, and tree protection fencing.

During Construction – Maintain all temporary erosion and sedimentation control structures. Inspect all temporary erosion and sedimentation control structures on a weekly basis and after rain events. Any stockpiles of topsoil or other earthen piles left undisturbed for 14 days or more must be revegetated.

After Completion of Permanent Erosion and Sediment Controls – Stabilize and restore all areas disturbed during construction. Permanent seeding will be applied immediately after the final design grades are achieved on portions of the site but no later than 14 days after construction activities have permanently ceased. After the entire site is stabilized, any sediment that has accumulated will be removed and hauled off-site for disposal. Construction debris, trash and temporary BMPs including silt fences, material storage areas, sanitary toilets, etc. will also be removed and any areas disturbed during removal will be seeded immediately.

Permanent Stormwater Section

Texas Commission on Environmental Quality

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

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

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

Signature

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

Print Name of Customer/Agent: Paul M. Hames, P.E.

Date: 8/28/2024

Signature of Customer/Agent



Regulated Entity Name: Chapel Hill Apartments

Permanent Best Management Practices (BMPs)

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

1. ☒ Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.
☐ N/A
2. ☒ These practices and measures have been designed, and will be constructed, operated, and maintained to insure that 80% of the incremental increase in the annual mass loading of total suspended solids (TSS) from the site caused by the regulated activity is removed. These quantities have been calculated in accordance with technical guidance prepared or accepted by the executive director.
☒ The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.

- ☐ A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used is: _____
- ☐ N/A
3. ☒ Owners must insure that permanent BMPs and measures are constructed and function as designed. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the appropriate regional office within 30 days of site completion.
- ☐ N/A
4. Where a site is used for low density single-family residential development and has 20 % or less impervious cover, other permanent BMPs are not required. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.
- ☐ The site will be used for low density single-family residential development and has 20% or less impervious cover.
- ☐ The site will be used for low density single-family residential development but has more than 20% impervious cover.
- ☒ The site will not be used for low density single-family residential development.
5. The executive director may waive the requirement for other permanent BMPs for multi-family residential developments, schools, or small business sites where 20% or less impervious cover is used at the site. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.
- ☐ **Attachment A - 20% or Less Impervious Cover Waiver.** The site will be used for multi-family residential developments, schools, or small business sites and has 20% or less impervious cover. A request to waive the requirements for other permanent BMPs and measures is attached.
- ☒ The site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.
- ☐ The site will not be used for multi-family residential developments, schools, or small business sites.
6. ☒ **Attachment B - BMPs for Upgradient Stormwater.**

- ☒ A description of the BMPs and measures that will be used to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site is attached.
 - ☐ No surface water, groundwater or stormwater originates upgradient from the site and flows across the site, and an explanation is attached.
 - ☐ Permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, and an explanation is attached.
7. ☒ **Attachment C - BMPs for On-site Stormwater.**
- ☒ A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff from the site is attached.
 - ☐ Permanent BMPs or measures are not required to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff, and an explanation is attached.
8. ☒ **Attachment D - BMPs for Surface Streams.** A description of the BMPs and measures that prevent pollutants from entering surface streams, sensitive features, or the aquifer is attached. Each feature identified in the Geologic Assessment as sensitive has been addressed.
- ☐ N/A
9. ☒ The applicant understands that to the extent practicable, BMPs and measures must maintain flow to naturally occurring sensitive features identified in either the geologic assessment, executive director review, or during excavation, blasting, or construction.
- ☒ The permanent sealing of or diversion of flow from a naturally-occurring sensitive feature that accepts recharge to the Edwards Aquifer as a permanent pollution abatement measure has not been proposed.
 - ☐ **Attachment E - Request to Seal Features.** A request to seal a naturally-occurring sensitive feature, that includes, for each feature, a justification as to why no reasonable and practicable alternative exists, is attached.
10. ☒ **Attachment F - Construction Plans.** All construction plans and design calculations for the proposed permanent BMP(s) and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. The plans are attached and, if applicable include:
- ☒ Design calculations (TSS removal calculations)
 - ☒ TCEQ construction notes
 - ☒ All geologic features
 - ☒ All proposed structural BMP(s) plans and specifications
- ☐ N/A

11. ☒ **Attachment G - Inspection, Maintenance, Repair and Retrofit Plan.** A plan for the inspection, maintenance, repairs, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan includes all of the following:
- ☒ Prepared and certified by the engineer designing the permanent BMPs and measures
 - ☒ Signed by the owner or responsible party
 - ☒ Procedures for documenting inspections, maintenance, repairs, and, if necessary retrofit
 - ☒ A discussion of record keeping procedures
- ☐ N/A
12. ☐ **Attachment H - Pilot-Scale Field Testing Plan.** Pilot studies for BMPs that are not recognized by the Executive Director require prior approval from the TCEQ. A plan for pilot-scale field testing is attached.
- ☒ N/A
13. ☒ **Attachment I - Measures for Minimizing Surface Stream Contamination.** A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is attached. The measures address increased stream flashing, the creation of stronger flows and in-stream velocities, and other in-stream effects caused by the regulated activity, which increase erosion that results in water quality degradation.
- ☒ N/A

Responsibility for Maintenance of Permanent BMP(s)

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

14. ☒ The applicant is responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. Such entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred.
- ☐ N/A
15. ☒ A copy of the transfer of responsibility must be filed with the executive director at the appropriate regional office within 30 days of the transfer if the site is for use as a multiple single-family residential development, a multi-family residential development, or a non-residential development such as commercial, industrial, institutional, schools, and other sites where regulated activities occur.
- ☐ N/A

Attachment 6A – 20% or Less Impervious Cover Waiver

Improvements proposed for the subject property will increase impervious cover in excess of twenty percent of existing impervious cover.

Section not applicable to this project.

Attachment 6B – BMPs for Upgradient Stormwater

As shown via the existing topography on the Existing Drainage Area Map within the Construction Documents, stormwater originates upgradient of the project site.

A portion of the offsite area west of the subject site (approximately 2.97 acres shown as OFF-WQ-4 on the Water Quality Drainage Area Map) drains to the site via a small berm that was originally created to spread the flow for agricultural reasons. The runoff from this area will continue to be intercepted by the proposed site improvements during its undeveloped state. Once the site is developed in the future, the developer of that property is required to contain that runoff, treat it for water quality, and return it to its existing runoff quantity prior to discharge from the site. The runoff from this area will be collected via a drainage area inlet and storm sewer system, which will convey it to the proposed permanent water quality wet pond.

Approximately 10.68 acres of the Celebration Church site, located upgradient of the project site, currently drains to the project site. Another 18.87 acres of the Celebration Church site drains to an existing detention pond located upgradient of the project site and outfalls to an existing natural swale that continues through the existing Chapel Hill site. Upon development, this offsite runoff will be collected via a proposed drainage channel along the eastern property line, then enter into a storm sewer system which will discharge to the proposed water quality wet pond located on Lot 3. The design of the wet pond can be found in Attachment 6C.

Attachment 6C – BMPs for On-site Stormwater

The subject site is the Chapel Hill Subdivision Section One Block A, Lots 1, 2, 3, and 4 in Georgetown, Texas. The total site area is 28.89 acres. In order to anticipate the potential additional development of Lot 1, an impervious cover of 55% was used for the drainage and water quality analysis. To conservatively design the drainage and to anticipate the future development, the entirety of Lot 2 was calculated to have a total impervious cover of 75%, the portion of Lot 3 to the north of the proposed wet pond was calculated to have an impervious cover of 75%, and the majority of Lot 4 not encompassed by protected trees was calculated to have an impervious cover of 75%. All of these areas and associated impervious cover assumptions make up DA-WQ-1 on the Water Quality Drainage Area Map. The DA-WQ-2 (2.27 acres) shown on the Water Quality Drainage Area Map is the area that is physically unable to be captured by the proposed permanent BMP but the BMP will be oversized to account for this area. A portion of the undeveloped adjacent property to the west of the site (DA-WQ-3, 1.61 acres shown on the Water Quality Drainage Area Map) has been negotiated to be included within the pond design and was calculated to have an impervious cover of 75%. A table comparing the total areas and impervious covers of the onsite drainage areas and lots that will be treated is shown below:

ONSITE WATER QUALITY DRAINAGE AREAS AND LOT AREAS			
DRAINAGE AREA	AREA	POST-DEVELOPED IMPERVIOUS COVER	
	ACRES	ACRES	% IMPERVIOUS
DA-WQ-1	26.63	14.02	53%
DA-WQ-2	2.27	1.15	51%
DA-WQ-3	1.61	1.29	75%
ONSITE TOTAL	30.51	16.45	54%
LOT	AREA	ASSUMED IMPERVIOUS COVER	
	ACRES	ACRES	% IMPERVIOUS
LOT 1	18.92	10.40	55%
LOT 2	1.79	1.43	75%
LOT 3	4.60	0.99	22%
LOT 4	3.51	2.32	66%
DA-WQ-3	1.61	1.29	75%
AREA OF R.O.W. DEDICATION	0.08	0.02	19%
LOT TOTAL	30.51	16.45	54%

There is an existing stock pond located on Lot 3 of the site. The existing pond will be removed and replaced with a proposed water quality wet pond with flood control detention on top. The wet pond

will be designed to treat the runoff from the project site, upgradient offsite areas, and the aforementioned 1.61 acres of the neighboring site to the west.

The Water Quality Drainage Area Map within the construction plans depicts the onsite and offsite areas that are treated by the wet pond. The offsite areas that will be treated by the pond are the areas of the Celebration Church property flowing through the site (OFF-WQ-1, OFF-WQ-2, and OFF-WQ-3) and the offsite area to the northwest (OFF-WQ-4). The wet pond is designed to treat the undeveloped stormwater runoff from OFF-WQ-4 only. Once that area is developed in the future, that developer will need to treat the runoff and return the flow to a quantity equal to existing runoff rates. The onsite and offsite drainage areas that will be treated and were used to design the pond are detailed in the composite table below:

WATER QUALITY DRAINAGE AREAS					
DRAINAGE AREA	AREA	PRE-DEVELOPED IMPERVIOUS COVER		POST-DEVELOPED IMPERVIOUS COVER	
	ACRES	ACRES	% IMPERVIOUS	ACRES	% IMPERVIOUS
DA-WQ-1	26.13	0.30	1%	14.02	54%
DA-WQ-2	2.77	0.07	2%	1.15	41%
DA-WQ-3	1.61	0.00	0%	1.29	75%
ONSITE TOTAL	30.51	0.37	1%	16.45	54%
OFF-WQ-1	18.87	10.11	54%	10.11	54%
OFF-WQ-2	10.08	2.97	29%	2.97	29%
OFF-WQ-3	0.60	0.00	0%	0.00	0%
OFF-WQ-4	2.97	0.00	0%	0.00	0%
OFFSITE TOTAL	32.52	13.08	40%	13.08	40%
TOTAL	63.03	13.45	21%	29.53	47%

Per the City of Georgetown, the required total suspended solids (TSS) removal for a site is 85%. Therefore, the TCEQ RG-348 TSS removal calculation spreadsheet has been adjusted to accommodate this increase in removal. The TSS load that is required to be removed from this proposed development to meet the minimum 85% removal rate is 14,886 lbs.

With overtreatment of runoff generated from addition of deceleration lane with increase of 8,058 SF IC, Per the TCEQ RG-348 TSS removal calculation, the required permanent pool and water quality volumes for the wet pond are 136,227 cubic feet and 196,843 cubic feet, respectively. Due to the topography, ultimate layout and required depths of a wet pond design with two forebays, the wet pond has been designed to exceed this requirement with a permanent pool volume of 172,356 cubic feet and a water quality volume of 235,544 cubic feet. The lowest elevation of the wet pond will be 850.00 and will extend to 857.00, the permanent pool elevation. The water quality volume will then extend to 858.20.

The pond will include two sediment forebays that will accept the runoff from the impervious areas. The forebays will connect hydraulically to the main pool through a 12-inch PVC inter-basin pipe. The main pool will have bottom slopes ranging from 1.50 to 2.00 percent. A 6-inch inverted PVC discharge pipe was designed to achieve a minimum drawdown time of 24 hours and a maximum 72-hour drawdown. The inverted pipe will run under the outfall weir of the detention pond and discharge downstream of the weir within a rock-lined channel outfall.

A partially submerged vegetated bench will be located around the perimeters of the main pool and sediment forebays. The plantings within the vegetated bench are designed in accordance with the TCEQ RG-348 manual. A 12-foot wide maintenance access drive will be located around the perimeter of the pond at an approximate elevation of 862.50. An impermeable clay liner will be installed within the main pool and sediment forebays to contain runoff and prevent excessive seepage. The clay liner will extend to a minimum elevation of 858.70 (6-inches above the water quality volume) and will be installed per the construction plans.

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

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

Page 3-29 Equation 3.3: $L_M = 28.9(A_N \times P)$

where: $L_{M \text{ TOTAL PROJECT}}$ = Required TSS removal resulting from the proposed development = 85% of increased load
 A_N = Net increase in impervious area for the project
 P = Average annual precipitation, inches

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

County =	Williamson
Total project area included in plan *	28.89 acres
Predevelopment impervious area within the limits of the plan *	0.37 acres
Total post-development impervious area within the limits of the plan *	10.06 acres
Total post-development impervious cover fraction *	0.35
P =	32 inches

$L_{M \text{ TOTAL PROJECT}}$ = 8961 lbs.

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

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

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

Drainage Basin/Outfall Area No. =	1
Total drainage basin/outfall area =	63.03 acres
Predevelopment impervious area within drainage basin/outfall area =	0.37 acres
Post-development impervious area within drainage basin/outfall area =	29.53 acres
Post-development impervious fraction within drainage basin/outfall area =	0.47
$L_{M \text{ THIS BASIN}}$ =	26967 lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Wet Basin
Removal efficiency = 93 percent

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

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

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

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

A_C =	30.51	acres
A_i =	16.45	acres
A_p =	14.06	acres
L_R =	17164	lbs

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

Desired $L_{M \text{ THIS BASIN}}$ = 14886 lbs.
 F = 0.87

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

Rainfall Depth =	1.44	inches
Post Development Runoff Coefficient =	0.38	
On-site Water Quality Volume =	60616	cubic feet

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

Off-site area draining to BMP =	32.70	acres
Off-site Impervious cover draining to BMP =	13.26	acres
Impervious fraction of off-site area =	0.41	
Off-site Runoff Coefficient =	0.31	
Off-site Water Quality Volume =	52907	cubic feet

Storage for Sediment = 22705
Total Capture Volume (required water quality volume(s) x 1.20) = 136227 cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

11. Wet Basins Designed as Required in RG-348 Pages 3-66 to 3-71

Required capacity of Permanent Pool = 136227 cubic feet
Required capacity at WQV Elevation = 196843 cubic feet
Permanent Pool Capacity is 1.20 times the WQV
Total Capacity should be the Permanent Pool Capacity plus a second WQV.

Attachment 6D – BMPs for Surface Streams

The majority of the runoff from the onsite and offsite areas will be collected and transported via stormsewer systems and onsite drainage channels to the proposed wet pond located on Lot 3, where 85% of the increase in total suspended solids will be removed. DA-WQ-2, the area of the site to the south of the pond depicted on the Water Quality Drainage Area Map in the construction plans, is unable to drain to it. Therefore, the wet pond is over designed to account for this area.

There are five geologic features identified within the limits of construction. F-1, F-4, and F-5 are water wells that were drilled for the existing property many years ago. F-1 and F-5 will be properly plugged per TCEQ requirements. F-4 will be capped and the developer may use this well for irrigation, wet pond make-up water source, or other functions. No untreated stormwater runoff should affect these three features.

Feature F-2 is a closed depression that has been filled with limestone cobbles, bricks, and concrete. The feature does not appear to be karst in origin, according to the geologic assessment. This feature will be removed at the beginning of construction. As such, no untreated stormwater runoff should affect this feature.

Feature F-3 is a limestone block cistern that appears to have been used in the past for livestock or in association with the homestead, per the geologic assessment. This cistern will be removed and filled and should collect any drainage. As such, no untreated stormwater runoff should affect this feature.

Attachment 6E – Request to Seal Features

The permanent sealing of or diversion of flow from a naturally-occurring “sensitive” or “possibly sensitive” feature that accepts recharge to the Edwards Aquifer as a permanent pollution abatement measure has not been proposed for any naturally-occurring “sensitive” or “possibly sensitive” features on this site.

Section not applicable to this project.

Attachment 6F – Construction Plans

Full-sized copies of the construction plans are submitted separately. Calculations for the BMPs are shown in the construction plans.

Attachment 6G – Inspection, Maintenance, Repair and Retrofit Plan

The following are recommended maintenance procedures as outlined in TCEQ's Edwards Aquifer Technical Guidance Manual:

Water Quality – Wet Basins

A clear requirement for water quality ponds is that a firm commitment be made to carry out both routine and non-routine maintenance tasks. The nature of the maintenance requirements is outlined below:

- **Mowing:** The side-slopes, embankment, and emergency spillway of the basin should be mowed at least twice a year to prevent woody growth and control weeds.
- **Inspections:** Wet basins should be inspected at least twice a year (once during or immediately following wet weather) to evaluate facility operation. When possible, inspections should be conducted during wet weather to determine if the basin is functioning properly. There are many functions and characteristics of these BMPs that should be inspected. The embankment should be checked for subsidence, erosion, leakage, cracking, and tree growth. The condition of the emergency spillway should be checked. The inlet, barrel, and outlet should be inspected for clogging. The adequacy of upstream and downstream channel erosion protection measures should be checked. Stability of the side slopes should be checked. Modifications to the basin structure and contributing watershed should be evaluated. During semi-annual inspections, replace any dead or displaced vegetation. Replanting of various species of wetland vegetation may be required at first, until a viable mix of species is established. Cracks, voids and undermining should be patched/filled to prevent additional structural damage. Trees and root systems should be removed to prevent growth in cracks and joints that can cause structural damage. The inspections should be carried out with as-built pond plans in hand.
- **Debris and Litter Removal:** As part of periodic mowing operations and inspections, debris and litter should be removed from the surface of the basin. Particular attention should be paid to floatable debris around the riser, and the outlet should be checked for possible clogging.
- **Erosion Control:** The basin side slopes, emergency spillway, and embankment all may periodically suffer from slumping and erosion. Corrective measures such as regrading and revegetation may be necessary. Similarly, the riprap protecting the channel near the outlet may need to be repaired or replaced.
- **Nuisance Control:** Most public agencies surveyed indicate that control of insects, weeds, odors, and algae may be needed in some ponds. Nuisance control is probably the most frequent maintenance item demanded by local residents. If the ponds are properly sized and vegetated, these problems should be rare in wet ponds except under extremely dry weather conditions.

Twice a year, the facility should be evaluated in terms of nuisance control (insects, weeds, odors, algae, etc.). Biological control of algae and mosquitoes using fish such as fathead minnows is preferable to chemical applications.

- **Structural Repairs and Replacement:** Eventually, the various inlet/outlet and riser works in the wet basin will deteriorate and must be replaced. Some public works experts have estimated that corrugated metal pipe (CMP) has a useful life of about 25 yr, while concrete barrels and risers may last from 50 to 75 yr. The actual life depends on the type of soil, pH of runoff, and other factors. Polyvinyl chloride (PVC) pipe is a corrosion resistant alternative to metal and concrete pipes. Local experience typically determines which materials are best suited to the site conditions. Leakage or seepage of water through the embankment can be avoided if the embankment has been constructed of impermeable material, has been compacted, and if anti-seep collars are used around the barrel. Correction of any of these design flaws is difficult.
- **Sediment Removal:** Wet ponds will eventually accumulate enough sediment to significantly reduce storage capacity of the permanent pool. As might be expected, the accumulated sediment can reduce both the appearance and pollutant removal performance of the pond. Sediment accumulated in the sediment forebay area should be removed from the facility every two years to prevent accumulation in the permanent pool. Dredging of the permanent pool should occur at least every 20 years, or when accumulation of sediment impairs functioning of the outlet structure.
- **Harvesting:** If vegetation is present on the fringes or in the pond, it can be periodically harvested, and the clippings removed to provide export of nutrients and to prevent the basin from filling with decaying organic matter.

The following are recommended maintenance procedures as outlined in the City of Austin Environmental Criteria Manual 1.6.3.C.4:

Wet Ponds

Due to the nature of wet ponds being full of water when in operation, the need for maintenance is not easily visible. However, when the ponds are built in stable upland areas, the need for maintenance of these ponds should be infrequent. Accumulation of sediment in the basin is the primary reason the pond will require intensive maintenance. Because of this, very careful attention should be paid to adequate, well-maintained erosion and sedimentation controls in the contributing drainage area during construction. This, in combination with the sediment forebay, should prevent the requirement of maintenance of the main pool soon after the pond is put online. The following are guidelines for pond maintenance:

During Site Construction - The sediment load to the sediment forebay shall be closely monitored after every storm event. If heavy sediment loads are detected during an inspection, the source should be corrected. Sediment shall be removed from the sediment forebay when one-third of the forebay volume is lost.

Upon Completion of Site Revegetation - Any sediment build-up (greater than 5% volume loss) shall be removed from the forebay upon completion of site revegetation. The sediment build-up in the main pool shall be checked and if more the ten-percent of the volume is lost, it should be cleaned at that time.

Every Three Months for the First Two Years - During the three month initial inspection cycle, if more than fifteen percent of the volume of the forebay is lost, it shall be cleaned at that time.

Every Three Months - Turf areas around the pond should be mowed. Accumulated paper, trash, and debris shall be removed every three months or as necessary. Cattails, cottonwoods, and willows can quickly colonize shallow water and the edge of the pond. These species or any areas of plant overgrowth may be thinned at this time or as needed.

Annually - The basin should be inspected annually for side slope erosion and deterioration or damage to the structural elements. Any damage shall be repaired. Large areas, which have dead or missing vegetation, shall be replanted.

Every Three Years - The sediment build-up in the sediment forebay shall be checked. The sediment forebay shall be cleaned if more than one-third of the forebay volume is lost.

Every Six Years - The sediment build-up in the main pool shall be checked. Sediment shall be removed from the main pool when twenty percent of the main pool volume is lost.

Record Keeping:

Records of all inspections and maintenance for the facility shall be recorded and maintained for the water quality facility beginning at startup of the facility. Record keeping shall be detailed to provide type of maintenance or repair made, date of the service and detail of the extent of maintenance or repair. The owner or responsible party of the facility is responsible for maintaining the facility as outlined in this plan until such time as another entity assumes responsibility in writing or ownership of the property is transferred. A copy of the transfer of ownership or responsibility must be filed with the Executive Director of TCEQ within 30-days of the transfer.

Owner:

AMFP II Chapel Hill LLC

Benjamin Friedman

Print Name

R. H.

Signature

6/24/20

Date

Attachment 6H – Pilot-Scale Field Testing Plan

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

Section not applicable to this project.

Attachment 6I – Measures for Minimizing Surface Stream Contamination

The project will be utilizing a wet pond to reduce the effect of the increased runoff factor and to mitigate stream flashing, excessive velocities and to control erosion produced by increased imperviousness of the site. To minimize stream bank erosion at the points of discharge and to dissipate the storm water velocities, mortared rock riprap is proposed at the storm sewer outfalls. The proposed detention pond will be placed above the water quality volume elevation of the wet pond to control the runoff during the 2-, 10-, 25-, and 100-year design storms.

Per design of a wet pond, the water quality volume above the permanent pool elevation is oftentimes referred to as the “extended detention volume”. This volume will help minimize potential streambank erosion issues because the release rate of this volume of stormwater is spread over a period of 24 to 72 hours.

I, Robert J. Stone III,
Print Name
Other (Authorized Agent)
Title - Owner/Resident/Other
of AMFP V Chapel Hill II LLC
Corporation/Partnership/Entity Name
have authorized Paul M. Hames, P.E.
Print Name of Agent/Engineer
of Stantec Consulting Services
Print Name of Firm

I also understand that:

- Page 1 of 2

SIGNATURE PAGE:

Robert J. Stone III
Applicant's Signature

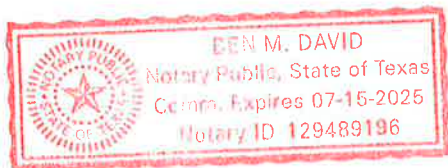
1/12/24
Date

THE STATE OF Texas §

County of Dallas §

BEFORE ME, the undersigned authority, on this day personally appeared Robert J. Stone III 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 12th day of January, 2024



[Signature]
NOTARY PUBLIC

Ben M. David
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 7-15-25

Application Fee Form

Texas Commission on Environmental Quality

Name of Proposed Regulated Entity: Chapel Hill Phase 1 Exception

Regulated Entity Location: 401 Westinghouse Road, Georgetown, Texas 78626

Name of Customer: AMFP V Chapel Hill II LLC

Contact Person: Erik Boraks

Phone: (972) 385-1676

Customer Reference Number (if issued): CN _____

Regulated Entity Reference Number (if issued): RN 111787560

Austin Regional Office (3373)

☐ Hays

☐ Travis

☒ Williamson

San Antonio Regional Office (3362)

☐ Bexar

☐ Medina

☐ Uvalde

☐ Comal

☐ Kinney

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

☒ Austin Regional Office

☐ San Antonio Regional Office

☐ Mailed to: TCEQ - Cashier

☐ Overnight Delivery to: TCEQ - Cashier

Revenues Section

Mail Code 214

P.O. Box 13088

Austin, TX 78711-3088

12100 Park 35 Circle

Building A, 3rd Floor

Austin, TX 78753

(512)239-0357

Site Location (Check All That Apply):

☒ Recharge Zone

☐ Contributing Zone

☒ Transition Zone

<i>Type of Plan</i>	<i>Size</i>	<i>Fee Due</i>
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	\$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	\$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	Acres	\$
Sewage Collection System	L.F.	\$
Lift Stations without sewer lines	Acres	\$
Underground or Aboveground Storage Tank Facility	Tanks	\$
Piping System(s)(only)	Each	\$
Exception	1 Each	\$ 500
Extension of Time	Each	\$

Signature: Paul M. Haines

Date: 8/28/2024

Application Fee Schedule

Texas Commission on Environmental Quality

Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

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

Organized Sewage Collection Systems and Modifications

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

Underground and Aboveground Storage Tank System Facility Plans and Modifications

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

Exception Requests

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

Extension of Time Requests

<i>Project</i>	<i>Fee</i>
Extension of Time Request	\$150



TCEQ Use Only

TCEQ Core Data Form

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

SECTION I: General Information

1. Reason for Submission (If other is checked please describe in space provided.)		
<input checked="" type="checkbox"/> New Permit, Registration or Authorization (Core Data Form should be submitted with the program application.)		
<input type="checkbox"/> Renewal (Core Data Form should be submitted with the renewal form)	<input type="checkbox"/> Other	
2. Customer Reference Number (if issued)	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number (if issued)
CN		RN 111787560

SECTION II: Customer Information

4. General Customer Information		5. Effective Date for Customer Information Updates (mm/dd/yyyy)					
<input checked="" type="checkbox"/> New Customer		<input type="checkbox"/> Update to Customer Information					
<input type="checkbox"/> Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)		<input type="checkbox"/> Change in Regulated Entity Ownership					
The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).							
6. Customer Legal Name (If an individual, print last name first: eg: Doe, John)		If new Customer, enter previous Customer below:					
AMFP V Chapel Hill II 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)				
0804094898	32079527084	88-2779187					
11. Type of Customer:	<input type="checkbox"/> Corporation	<input type="checkbox"/> Individual	Partnership: <input type="checkbox"/> General <input type="checkbox"/> Limited				
Government: <input type="checkbox"/> City <input type="checkbox"/> County <input type="checkbox"/> Federal <input type="checkbox"/> State <input type="checkbox"/> Other	<input type="checkbox"/> Sole Proprietorship	<input checked="" type="checkbox"/> Other: LLC					
12. Number of Employees		13. Independently Owned and Operated?					
<input type="checkbox"/> 0-20 <input type="checkbox"/> 21-100 <input type="checkbox"/> 101-250 <input type="checkbox"/> 251-500 <input type="checkbox"/> 501 and higher		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					
14. Customer Role (Proposed or Actual) – as it relates to the Regulated Entity listed on this form. Please check one of the following							
<input checked="" type="checkbox"/> Owner <input type="checkbox"/> Operator <input type="checkbox"/> Owner & Operator							
<input type="checkbox"/> Occupational Licensee <input type="checkbox"/> Responsible Party <input type="checkbox"/> Voluntary Cleanup Applicant <input type="checkbox"/> Other:							
15. Mailing Address:	3610-2 N. Josey						
	Suite 223						
	City	Carrollton	State	TX	ZIP	75007	ZIP + 4
16. Country Mailing Information (if outside USA)				17. E-Mail Address (if applicable)			
				Erik.Boraks@dukecompanies.com			
18. Telephone Number		19. Extension or Code		20. Fax Number (if applicable)			
(972) 385-1676				() -			

SECTION III: Regulated Entity Information

21. General Regulated Entity Information (If 'New Regulated Entity' is selected below this form should be accompanied by a permit application)	
<input checked="" type="checkbox"/> New Regulated Entity <input type="checkbox"/> Update to Regulated Entity Name <input type="checkbox"/> Update to Regulated Entity Information	
The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency Data Standards (removal of organizational endings such as Inc, LP, or LLC).	
22. Regulated Entity Name (Enter name of the site where the regulated action is taking place.)	
Chapel Hill Phase 2	

23. Street Address of the Regulated Entity: (No PO Boxes)	403 Westinghouse Road							
	City	Georgetown	State	TX	ZIP	78626	ZIP + 4	
24. County	Williamson							

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:								
26. Nearest City	State					Nearest ZIP Code		
27. Latitude (N) In Decimal:	28. Longitude (W) In Decimal:							
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds			
30	34	55.54	97	41	10.62			
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)				
6513	6531	531311		531110				
33. What is the Primary Business of this entity? (Do not repeat the SIC or NAICS description.)								
Multifamily apartment development								
34. Mailing Address:	13740 Midway Road							
	Suite 804							
	City	Dallas	State	TX	ZIP	75244	ZIP + 4	
35. E-Mail Address:	Erik.Boraks@dukecompanies.com							
36. Telephone Number	37. Extension or Code		38. Fax Number (if applicable)					
(972) 385-1687			() -					

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

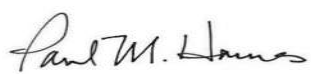
<input type="checkbox"/> Dam Safety	<input type="checkbox"/> Districts	<input type="checkbox"/> Edwards Aquifer	<input type="checkbox"/> Emissions Inventory Air	<input type="checkbox"/> Industrial Hazardous Waste
<input type="checkbox"/> Municipal Solid Waste	<input type="checkbox"/> New Source Review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

SECTION IV: Preparer Information

40. Name:	Paul Hames, P.E.	41. Title:	Principal
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(469) 329-3613		() -	Paul.Hames@stantec.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:	Stantec Consulting Services	Job Title:	Principal
Name (In Print):	Paul M. Hames, P.E.	Phone:	(214) 473- 2483
Signature:		Date:	8/28/2024