TCEQ TPDES PERMIT APPLICATION

CIELO RANCH
WASTEWATER TREATMENT PLANT

Prepared For:

Wilco MUD 45 WWTP, LLC

Prepared by:
Green Civil Design, LLC.
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Green Civil Design
Engineering & Consulting

APP000001

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Texas Registered Engineering Firm F-17563

February 9, 2022

Texas Commission on Environmental Quality
Applications Review and Processing Team (MC 158)
P.O. Box 13087
Austin, Texas 78711-3087

Re: TPDES Permit Application
Wilco MUD 45 WWTP, LLC.
Cielo Ranch Wastewater Treatment Plant

To Whom it May Concern,

The attached application is for a new TPDES permit for Wilco MUD 45 WWTP, LLC's proposed Cielo Ranch Wastewater Treatment Plant (WWTP). The proposed WWTP is located approximately 1.56-miles southeast of the FM 3349 and County Road 404 intersection in Hutto, TX. The proposed permit includes four (4) phases, with an ultimate capacity of up to 3,000,000-gpd for the treatment and discharge of treated effluent. Proposed effluent parameters are provided in Attachment H.

If you have any questions, or need additional information, please do not hesitate to contact me. My address and phone number are listed above, and my email is mbev@greencivildesign.com.

Sincerely,
Green Civil Design, LLC

Michael E. Bevilacqua, P.E.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

DOMESTIC WASTEWATER PERMIT APPLICATION CHECKLIST

Complete and submit this checklist with the application.

APPLICANT: Wilco MUD 45 WWTP, LLC

PERMIT NUMBER: Click here to enter text

Indicate if each of the following items is included in your application.

	Y	N		Y	N
Administrative Report 1.0	☒	☐	Original USGS Map	☒	☐
Administrative Report 1.1	☒	☐	Affected Landowners Map	☒	☐
SPIF	☒	☐	Landowner Disk or Labels	☒	☐
Core Data Form	☒	☐	Buffer Zone Map	☒	☐
Technical Report 1.0	☒	☐	Flow Diagram	☒	☐
Technical Report 1.1	☒	☐	Site Drawing	☒	☐
Worksheet 2.0	☒	☐	Original Photographs	☒	☐
Worksheet 2.1	☐	☒	Design Calculations	☒	☐
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Worksheet 3.2	☐	☒			
Worksheet 3.3	☐	☒			
Worksheet 4.0	☐	☒			
Worksheet 5.0	☐	☒			
Worksheet 6.0	☐	☒			
Worksheet 7.0	☐	☒			

For TCEQ Use Only

Segment Number _____County _____
Expiration Date _____Region _____
Permit Number _____

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

APPLICATION FOR A DOMESTIC WASTEWATER PERMIT ADMINISTRATIVE REPORT 1.0

If you have questions about completing this form please contact the Applications Review and Processing Team at 512-239-4671.

Section 1. Application Fees (Instructions Page 29)

Indicate the amount submitted for the application fee (check only one).

Flow	New/Major Amendment	Renewal
<0.05 MGD	$350.00 ☐	$315.00 ☐
≥0.05 but <0.10 MGD	$550.00 ☐	$515.00 ☐
≥0.10 but <0.25 MGD	$850.00 ☐	$815.00 ☐
≥0.25 but <0.50 MGD	$1,250.00 ☐	$1,215.00 ☐
≥0.50 but <1.0 MGD	$1,650.00 ☐	$1,615.00 ☐
≥1.0 MGD	$2,050.00 ☒	$2,015.00 ☐

Minor Amendment (for any flow) $150.00 ☐

Payment Information:

Mailed Check/Money Order Number: 3144

Check/Money Order Amount: $2,050.00

Name Printed on Check: InSite Development LLC

EPAY Voucher Number: Click here to enter text

Copy of Payment Voucher enclosed? Yes ☐

Section 2. Type of Application (Instructions Page 29)

☒ New TPDES ☐ New TLAP

☐ Major Amendment *with* Renewal ☐ Minor Amendment *with* Renewal

☐ Major Amendment *without* Renewal ☐ Minor Amendment *without* Renewal

☐ Renewal without changes ☐ Minor Modification of permit

For amendments or modifications, describe the proposed changes: Click here to enter text.

For existing permits:

Permit Number: WQ00 Click here to enter text

EPA I.D. (TPDES only): TX Click here to enter text

Expiration Date: Click here to enter text.

Section 3. Facility Owner (Applicant) and Co-Applicant Information (Instructions Page 29)

A. The owner of the facility must apply for the permit.

What is the Legal Name of the entity (applicant) applying for this permit?

Wilco MUD 45 WWTP, LLC

(The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal documents forming the entity.)

If the applicant is currently a customer with the TCEQ, what is the Customer Number (CN)? You may search for your CN on the TCEQ website at http://www15.tceq.texas.gov/crpub/

CN: Click here to enter text.

What is the name and title of the person signing the application? The person must be an executive official meeting signatory requirements in *30 TAC § 305.44*.

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Todd

Credential (P.E, P.G., Ph.D., etc.): McCullough

Title: Manager

B. Co-applicant information. Complete this section only if another person or entity is required to apply as a co-permittee.

What is the Legal Name of the co-applicant applying for this permit?

Click here to enter text.

(The legal name must be spelled exactly as filed with the TX SOS, with the County, or in the legal documents forming the entity.)

If the co-applicant is currently a customer with the TCEQ, what is the Customer Number (CN)? You may search for your CN on the TCEQ website at: http://www15.tceq.texas.gov/crpub/

CN: Click here to enter text.

What is the name and title of the person signing the application? The person must be an executive official meeting signatory requirements in *30 TAC § 305.44*.

Prefix (Mr., Ms., Miss): Click here to enter text.

First and Last Name: Click here to enter text.

Credential (P.E, P.G., Ph.D., etc.): Click here to enter text.

Title: Click here to enter text.

Provide a brief description of the need for a co-permittee: Click here to enter text.

C. Core Data Form

Complete the Core Data Form for each customer and include as an attachment. If the customer type selected on the Core Data Form is **Individual**, complete **Attachment 1** of Administrative Report 1.0.

Attachment: A

Section 4. Application Contact Information (Instructions Page 30)

This is the person(s) TCEQ will contact if additional information is needed about this application. Provide a contact for administrative questions and technical questions.

A. Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Michael Bevilacqua

Credential (P.E, P.G., Ph.D., etc.): P.E.

Title: Project Manager

Organization Name: Green Civil Design, LLC

Mailing Address: 301 Denali Pass, Suite 3

City, State, Zip Code: Cedar Park, TX 78613

Phone No.: 512-640-6590 Ext.: 1003 Fax No.: 512-551-4255

E-mail Address: mbev@greencivildesign.com

Check one or both: ☒ Administrative Contact ☒ Technical Contact

B. Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Todd McCullough

Credential (P.E, P.G., Ph.D., etc.): Click here to enter text.

Title: Manager

Organization Name: Wilco MUD 45 WWTP, LLC

Mailing Address: 3300 Bee Caves Road, Suite 650-1233

City, State, Zip Code: West Lake Hills, TX 78746

Phone No.: 512-222-7418 Ext.: Click here to enter text. Fax No.: Click here to enter text.

E-mail Address: todd@insite-austin.com

Check one or both: ☒ Administrative Contact ☐ Technical Contact

Section 5. Permit Contact Information (Instructions Page 30)

Provide two names of individuals that can be contacted throughout the permit term.

A. Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Todd McCullough

Credential (P.E, P.G., Ph.D., etc.): Click here to enter text

Title: Manager

Organization Name: Wilco MUD 45 WWTP, LLC

Mailing Address: 3300 Bee Caves Road, Suite 650-1233

City, State, Zip Code: West Lake Hills, TX 78746

Phone No.: 512-222-7418 Ext.: Click here to enter text Fax No.: Click here to enter text

E-mail Address: todd@insite-austin.com

B. Prefix (Mr., Ms., Miss): Ms.

First and Last Name: Nancy Carter

Credential (P.E, P.G., Ph.D., etc.): Click here to enter text

Title: Lawyer

Organization Name: The Muller Law Group, PLLC

Mailing Address: 202 Century Square Blvd

City, State, Zip Code: Sugar Land, TX 77478

Phone No.: 281-500-4686 Ext.: Click here to enter text Fax No.: Click here to enter text

E-mail Address: nancy@mullerlawgroup.com

Section 6. Billing Information (Instructions Page 30)

The permittee is responsible for paying the annual fee. The annual fee will be assessed to permits ***in effect on September 1 of each year***. The TCEQ will send a bill to the address provided in this section. The permittee is responsible for terminating the permit when it is no longer needed (using form TCEQ-20029).

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Todd McCullough

Credential (P.E, P.G., Ph.D., etc.): Click here to enter text

Title: Manager

Organization Name: Wilco MUD 45 WWTP, LLC

Mailing Address: 3300 Bee Caves Road, Suite 650-1233

City, State, Zip Code: West Lake Hills, TX 78746

Phone No.: 512-222-7418 Ext.: Click here to enter text Fax No.: Click here to enter text

E-mail Address: todd@insite-austin.com

Section 7. DMR/MER Contact Information (Instructions Page 31)

Provide the name and complete mailing address of the person delegated to receive and submit Discharge Monitoring Reports (EPA 3320-1) or maintain Monthly Effluent Reports.

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Todd McCullough

Credential (P.E, P.G., Ph.D., etc.): Click here to enter text.

Title: Manager

Organization Name: Wilco MUD 45 WWTP, LLC

Mailing Address: 3300 Bee Caves Road, Suite 650-1233

City, State, Zip Code: West Lake Hills, TX 78746

Phone No.: 512-222-7418 Ext.: Click here to enter text. Fax No.: Click here to enter text.

E-mail Address: todd@insite-austin.com

DMR data is required to be submitted electronically. Create an account at: https://www.tceq.texas.gov/permitting/netdmr/netdmr.html.

Section 8. Public Notice Information (Instructions Page 31)

A. Individual Publishing the Notices

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Michael Bevilacqua

Credential (P.E, P.G., Ph.D., etc.): P.E.

Title: Project Manager

Organization Name: Green Civil Design, LLC

Mailing Address: 301 Denali Pass, Suite 3

City, State, Zip Code: Cedar Park, TX 78613

Phone No.: 512-640-6590 Ext.: 1003 Fax No.: 512-551-4255

E-mail Address: mbev@greencivildesign.com

B. Method for Receiving Notice of Receipt and Intent to Obtain a Water Quality Permit Package

Indicate by a check mark the preferred method for receiving the first notice and instructions:

☒ E-mail Address

☐ Fax

☐ Regular Mail

C. Contact person to be listed in the Notices

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Michael Bevilacqua

Credential (P.E, P.G., Ph.D., etc.): P.E.

Title: Project Manager

Organization Name: Green Civil Design, LLC

Phone No.: 512-640-6590 Ext.: 1003

E-mail: mbev@greencivildesign.com

D. Public Viewing Information

If the facility or outfall is located in more than one county, a public viewing place for each county must be provided.

Public building name: Georgetown Public Library

Location within the building: Lobby

Physical Address of Building: 402 W. 8th Street

City: Georgetown, TX 78626 County: Williamson

Contact Name: Shelia Gauntt – Library Assistant

Phone No.: 512-930-3551 Ext.: Click here to enter text.

E. Bilingual Notice Requirements:

This information **is required** for **new, major amendment, and renewal applications**. It is not required for minor amendment or minor modification applications.

This section of the application is only used to determine if alternative language notices will be needed. Complete instructions on publishing the alternative language notices will be in your public notice package.

Please call the bilingual/ESL coordinator at the nearest elementary and middle schools and obtain the following information to determine whether an alternative language notices are required.

1. Is a bilingual education program required by the Texas Education Code at the elementary or middle school nearest to the facility or proposed facility?

   ☒ Yes ☐ No

   If **no**, publication of an alternative language notice is not required; **skip to** Section 9 below.

2. Are the students who attend either the elementary school or the middle school enrolled in a bilingual education program at that school?

   ☒ Yes ☐ No

3. Do the students at these schools attend a bilingual education program at another location?

   ☐ Yes ☐ No

4. Would the school be required to provide a bilingual education program but the school has waived out of this requirement under 19 TAC §89.1205(g)?

   ☐ Yes ☐ No

5. If the answer is yes to question 1, 2, 3, or 4, public notices in an alternative language are required. Which language is required by the bilingual program? Click here to enter text

Section 9. Regulated Entity and Permitted Site Information (Instructions Page 33)

A. If the site is currently regulated by TCEQ, provide the Regulated Entity Number (RN) issued to this site. **RN** Click here to enter text

Search the TCEQ's Central Registry at http://www15.tceq.texas.gov/crpub/ to determine if the site is currently regulated by TCEQ.

B. Name of project or site (the name known by the community where located):

Cielo Ranch Wastewater Treatment Plant

C. Owner of treatment facility: Wilco MUD 45 WWTP, LLC

Ownership of Facility: ☐ Public ☒ Private ☐ Both ☐ Federal

D. Owner of land where treatment facility is or will be:

Prefix (Mr., Ms., Miss): Cielo Ranch Land Partners, LLC

First and Last Name: Ms. Bethany Ross

Mailing Address: 311 Westwood Terrace

City, State, Zip Code: Austin, TX 78746

Phone No.: Click here to enter text E-mail Address: Click here to enter text

If the landowner is not the same person as the facility owner or co-applicant, attach a lease agreement or deed recorded easement. See instructions.

Attachment: B

E. Owner of effluent disposal site:

Prefix (Mr., Ms., Miss): Click here to enter text

First and Last Name: Click here to enter text

Mailing Address: Click here to enter text

City, State, Zip Code: Click here to enter text

Phone No.: Click here to enter text E-mail Address: Click here to enter text

If the landowner is not the same person as the facility owner or co-applicant, attach a lease agreement or deed recorded easement. See instructions.

Attachment: Click here to enter text

F. Owner of sewage sludge disposal site (if authorization is requested for sludge disposal on property owned or controlled by the applicant):

Prefix (Mr., Ms., Miss): Click here to enter text.

First and Last Name: Click here to enter text.

Mailing Address: Click here to enter text.

City, State, Zip Code: Click here to enter text.

Phone No.: Click here to enter text. E-mail Address: Click here to enter text.

If the landowner is not the same person as the facility owner or co-applicant, attach a lease agreement or deed recorded easement. See instructions.

Attachment: Click here to enter text.

Section 10. TPDES Discharge Information (Instructions Page 34)

A. Is the wastewater treatment facility location in the existing permit accurate?

☐ Yes ☒ No

If **no**, **or a new permit application**, please give an accurate description:

The wastewater treatment facility is located approximately 1.56 miles southeast of the intersection of FM 3349 and County Road 404 in Hutto, TX

B. Are the point(s) of discharge and the discharge route(s) in the existing permit correct?

☐ Yes ☒ No

If **no**, **or a new or amendment permit application**, provide an accurate description of the point of discharge and the discharge route to the nearest classified segment as defined in 30 TAC Chapter 307:

Treated effluent is discharged to an Unnamed Tributary, thence to Boggy Creek, thence to the classified segment of Brushy Creek (Segment ID 1244)

City nearest the outfall(s): Hutto

County in which the outfalls(s) is/are located: Williamson

Outfall Latitude: 30.51 Longitude: -97.47

C. Is or will the treated wastewater discharge to a city, county, or state highway right-of-way, or a flood control district drainage ditch?

☐ Yes ☒ No

If **yes**, indicate by a check mark if:

☐ Authorization granted ☐ Authorization pending

For **new and amendment** applications, provide copies of letters that show proof of contact and the approval letter upon receipt.

Attachment: Click here to enter text.

D. For all applications involving an average daily discharge of 5 MGD or more, provide the names of all counties located within 100 statute miles downstream of the point(s) of discharge.

Click here to enter text.

Section 11. TLAP Disposal Information (Instructions Page 36)

A. For TLAPs, is the location of the effluent disposal site in the existing permit accurate?

☐ Yes ☐ No

If **no, or a new or amendment permit application**, provide an accurate description of the disposal site location:

Click here to enter text.

B. City nearest the disposal site: Click here to enter text.

C. County in which the disposal site is located: Click here to enter text.

D. Disposal Site Latitude: Click here to enter text. Longitude: Click here to enter text.

E. For **TLAPs**, describe the routing of effluent from the treatment facility to the disposal site:

Click here to enter text.

F. For **TLAPs**, please identify the nearest watercourse to the disposal site to which rainfall runoff might flow if not contained:

Click here to enter text.

Section 12. Miscellaneous Information (Instructions Page 37)

A. Is the facility located on or does the treated effluent cross American Indian Land?

☐ Yes ☒ No

B. If the existing permit contains an onsite sludge disposal authorization, is the location of the sewage sludge disposal site in the existing permit accurate?

☐ Yes ☐ No ☒ Not Applicable

If No, or if a new onsite sludge disposal authorization is being requested in this permit

application, provide an accurate location description of the sewage sludge disposal site.

Click here to enter text

C. Did any person formerly employed by the TCEQ represent your company and get paid for service regarding this application?

☐ Yes ☒ No

If yes, list each person formerly employed by the TCEQ who represented your company and was paid for service regarding the application:

Click here to enter text

D. Do you owe any fees to the TCEQ?

☐ Yes ☒ No

If **yes**, provide the following information:

Account number: Click here to enter text Amount past due: Click here to enter text

E. Do you owe any penalties to the TCEQ?

☐ Yes ☒ No

If **yes**, please provide the following information:

Enforcement order number: Click here to enter text Amount past due: Click here to enter text

Section 13. Attachments (Instructions Page 38)

Indicate which attachments are included with the Administrative Report. Check all that apply:

☒ Lease agreement or deed recorded easement, if the land where the treatment facility is located or the effluent disposal site are not owned by the applicant or co-applicant.

☒ Original full-size USGS Topographic Map with the following information:

- Applicant's property boundary
- Treatment facility boundary
- Labeled point of discharge for each discharge point (TPDES only)
- Highlighted discharge route for each discharge point (TPDES only)
- Onsite sewage sludge disposal site (if applicable)
- Effluent disposal site boundaries (TLAP only)
- New and future construction (if applicable)
- 1 mile radius information

- 3 miles downstream information (TPDES only)
- All ponds.

☐ Attachment 1 for Individuals as co-applicants

☐ Other Attachments. Please specify: Click here to enter text.

Section 14. Signature Page (Instructions Page 39)

If co-applicants are necessary, each entity must submit an original, separate signature page.

Permit Number:

Applicant: WILCO MUD 45 WWTP, LLC

Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code § 305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signatory name (typed or printed): S. TODD MCCULLOUGH

Signatory title: MANAGER

Signature: _____ Date: JANUARY 31, 2022

(Use blue ink)

Subscribed and Sworn to before me by the said Manager (S. Todd Mccullough)

on this 31 day of Jan, 2022.

My commission expires on the 7 day of June, 2025.

_____

Notary Public

AMBER LEWIS
Notary ID #130908525
My Commission Expires
June 7, 2025

[SEAL]

Travis

County, Texas

DOMESTIC ADMINISTRATIVE REPORT 1.1

The following information is required for new and amendment applications.

Section 1. Affected Landowner Information (Instructions Page 41)

A. Indicate by a check mark that the landowners map or drawing, with scale, includes the following information, as applicable:

- ☒ The applicant's property boundaries
- ☒ The facility site boundaries within the applicant's property boundaries
- ☐ The distance the buffer zone falls into adjacent properties and the property boundaries of the landowners located within the buffer zone
- ☒ The property boundaries of all landowners surrounding the applicant's property (Note: if the application is a major amendment for a lignite mine, the map must include the property boundaries of all landowners adjacent to the new facility (ponds).)
- ☒ The point(s) of discharge and highlighted discharge route(s) clearly shown for one mile downstream
- ☒ The property boundaries of the landowners located on both sides of the discharge route for one full stream mile downstream of the point of discharge
- ☐ The property boundaries of the landowners along the watercourse for a one-half mile radius from the point of discharge if the point of discharge is into a lake, bay, estuary, or affected by tides
- ☐ The boundaries of the effluent disposal site (for example, irrigation area or subsurface drainfield site) and all evaporation/holding ponds within the applicant's property
- ☐ The property boundaries of all landowners surrounding the effluent disposal site
- ☐ The boundaries of the sludge land application site (for land application of sewage sludge for beneficial use) and the property boundaries of landowners surrounding the applicant's property boundaries where the sewage sludge land application site is located
- ☐ The property boundaries of landowners within one-half mile in all directions from the applicant's property boundaries where the sewage sludge disposal site (for example, sludge surface disposal site or sludge monofill) is located

B. ☒ Indicate by a check mark that a separate list with the landowners' names and mailing addresses cross-referenced to the landowner's map has been provided.

C. Indicate by a check mark in which format the landowners list is submitted:

☒ Readable/Writeable CD ☐ Four sets of labels

D. Provide the source of the landowners' names and mailing addresses: Williamson County Appraisal District

E. As required by *Texas Water Code § 5.115*, is any permanent school fund land affected by this application?

☐ Yes ☒ No

If **yes**, provide the location and foreseeable impacts and effects this application has on the land(s):

Click here to enter text.

Section 2. Original Photographs (Instructions Page 44)

Provide original ground level photographs. Indicate with checkmarks that the following information is provided.

☒ At least one original photograph of the new or expanded treatment unit location

☒ At least two photographs of the existing/proposed point of discharge and as much area downstream (photo 1) and upstream (photo 2) as can be captured. If the discharge is to an open water body (e.g., lake, bay), the point of discharge should be in the right or left edge of each photograph showing the open water and with as much area on each respective side of the discharge as can be captured.

☐ At least one photograph of the existing/proposed effluent disposal site

☒ A plot plan or map showing the location and direction of each photograph

Section 3. Buffer Zone Map (Instructions Page 44)

A. Buffer zone map. Provide a buffer zone map on 8.5 x 11-inch paper with all of the following information. The applicant's property line and the buffer zone line may be distinguished by using dashes or symbols and appropriate labels.

- The applicant's property boundary;
- The required buffer zone; and
- Each treatment unit; and
- The distance from each treatment unit to the property boundaries.

B. Buffer zone compliance method. Indicate how the buffer zone requirements will be met. Check all that apply.

☐ Ownership

☒ Restrictive easement

☐ Nuisance odor control

☐ Variance

C. Unsuitable site characteristics. Does the facility comply with the requirements regarding unsuitable site characteristic found in 30 TAC § 309.13(a) through (d)?

☒ Yes ☐ No

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

SUPPLEMENTAL PERMIT INFORMATION FORM (SPIF)

FOR AGENCIES REVIEWING DOMESTIC TPDES WASTEWATER PERMIT APPLICATIONS

TCEQ USE ONLY:

Application type: ____Renewal ____Major Amendment ____Minor Amendment ____New

County: _____ Segment Number: _____

Admin Complete Date: _____

Agency Receiving SPIF:

_____ Texas Historical Commission _____ U.S. Fish and Wildlife

_____ Texas Parks and Wildlife Department _____ U.S. Army Corps of Engineers

This form applies to TPDES permit applications only. (Instructions, Page 53)

The SPIF must be completed as a separate document. The TCEQ will mail a copy of the SPIF to each agency as required by the TCEQ agreement with EPA. If any of the items are not completely addressed or further information is needed, you will be contacted to provide the information before the permit is issued. Each item must be completely addressed.

Do not refer to a response of any item in the permit application form. Each attachment must be provided with this form separately from the administrative report of the application. The application will not be declared administratively complete without this form being completed in its entirety including all attachments.

The following applies to all applications:

1. Permittee: Wilco MUD 45 WWTP, LLC

   Permit No. WQ00 Click here to enter text EPA ID No. TX Click here to enter text

   Address of the project (or a location description that includes street/highway, city/vicinity, and county):

   The wastewater treatment facility is located approximately 1.56 miles southeast of the intersection of FM 3349 and County Road 404 in Hutto, TX

Provide the name, address, phone and fax number of an individual that can be contacted to answer specific questions about the property.

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Todd McCullough

Credential (P.E, P.G., Ph.D., etc.): Click here to enter text.

Title: Manager

Mailing Address: 3300 Bee Caves Road, Suite 650-1233

City, State, Zip Code: West Lake Hills, TX 78746

Phone No.: 512-222-7418 Ext.: Click here to enter text. Fax No.: Click here to enter text.

E-mail Address: todd@insite-austin.com

2. List the county in which the facility is located: Williamson
3. If the property is publicly owned and the owner is different than the permittee/applicant, please list the owner of the property.

Click here to enter text.

4. Provide a description of the effluent discharge route. The discharge route must follow the flow of effluent from the point of discharge to the nearest major watercourse (from the point of discharge to a classified segment as defined in 30 TAC Chapter 307). If known, please identify the classified segment number.

Treated effluent is discharged to an Unnamed Tributary, thence to Boggy Creek, thence to the classified segment of Brushy Creek (Segment ID 1244)

5. Please provide a separate 7.5-minute USGS quadrangle map with the project boundaries plotted and a general location map showing the project area. Please highlight the discharge route from the point of discharge for a distance of one mile downstream. (This map is required in addition to the map in the administrative report).

Provide original photographs of any structures 50 years or older on the property.

Does your project involve any of the following? Check all that apply.

- ☒ Proposed access roads, utility lines, construction easements
- ☐ Visual effects that could damage or detract from a historic property's integrity
- ☐ Vibration effects during construction or as a result of project design
- ☒ Additional phases of development that are planned for the future
- ☐ Sealing caves, fractures, sinkholes, other karst features

☐ Disturbance of vegetation or wetlands

6. List proposed construction impact (surface acres to be impacted, depth of excavation, sealing of caves, or other karst features):

The proposed construction is anticipated to impact approximately 5-acres. Existing vegetation is anticipated to be removed. The depth of excavation is anticipated to be a maximum of 15-ft. Cave and/or other karst features are not known to be present on site

7. Describe existing disturbances, vegetation, and land use:

The existing site is undeveloped and is currently used for harvesting crops.

THE FOLLOWING ITEMS APPLY ONLY TO APPLICATIONS FOR NEW TPDES PERMITS AND MAJOR AMENDMENTS TO TPDES PERMITS

8. List construction dates of all buildings and structures on the property:

No existing buildings or structures are present at the WWTP property. Construction is anticipated to begin January 2023.

9. Provide a brief history of the property, and name of the architect/builder, if known.

The site has historically been used for harvesting crops. The proposed builder is currently not known.

WATER QUALITY PERMIT

PAYMENT SUBMITTAL FORM

Use this form to submit the Application Fee, if the mailing the payment.

- Complete items 1 through 5 below.
- Staple the check or money order in the space provided at the bottom of this document.
- **Do not mail this form with the application form.**
- Do not mail this form to the same address as the application.
- Do not submit a copy of the application with this form as it could cause duplicate permit entries.

Mail this form and the check or money order to:

BY REGULAR U.S. MAIL

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
P.O. Box 13088
Austin, Texas 78711-3088

BY OVERNIGHT/EXPRESS MAIL

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, Texas 78753

Fee Code: WQP **Waste Permit No:** Click here to enter text

1. Check or Money Order Number: 3144
2. Check or Money Order Amount: $2,050.00
3. Date of Check or Money Order: 1/31/2022
4. Name on Check or Money Order: InSite Development LLC
5. APPLICATION INFORMATION

   Name of Project or Site: Cielo Ranch Wastewater Treatment Plant

   Physical Address of Project or Site: Approximately 1.56 miles southeast of the intersection of FM 3349 and County Road 404 in Hutto, TX

   If the check is for more than one application, attach a list which includes the name of each Project or Site (RE) and Physical Address, exactly as provided on the application.

Staple Check or Money Order in This Space

THIS PAGE INTENTIONALLY LEFT BLANK

CHECKLIST OF COMMON DEFICIENCIES

Below is a list of common deficiencies found during the administrative review of domestic wastewater permit applications. To ensure the timely processing of this application, please review the items below and indicate by checking Yes that each item is complete and in accordance applicable rules at 30 TAC Chapters 21, 281, and 305. If an item is not required this application, indicate by checking N/A where appropriate. Please do not submit the application until the items below have been addressed.

Core Data Form (TCEQ Form No. 10400) ☒ Yes
(Required for all applications types. Must be completed in its entirety and signed. Note: Form may be signed by applicant representative.)

Correct and Current Industrial Wastewater Permit Application Forms ☒ Yes
(TCEQ Form Nos. 10053 and 10054. Version dated 6/25/2018 or later.)

Water Quality Permit Payment Submittal Form (Page 19) ☒ Yes
(Original payment sent to TCEQ Revenue Section. See instructions for mailing address.)

7.5 Minute USGS Quadrangle Topographic Map Attached ☒ Yes
(Full-size map if seeking "New" permit. 8 ½ x 11 acceptable for Renewals and Amendments)

Current/Non-Expired, Executed Lease Agreement or Easement Attached ☐ N/A ☒ Yes

Landowners Map ☐ N/A ☒ Yes
(See instructions for landowner requirements)

Things to Know:

- All the items shown on the map must be labeled.
- The applicant's complete property boundaries must be delineated which includes boundaries of contiguous property owned by the applicant.
- The applicant cannot be its own adjacent landowner. You must identify the landowners immediately adjacent to their property, regardless of how far they are from the actual facility.
- If the applicant's property is adjacent to a road, creek, or stream, the landowners on the opposite side must be identified. Although the properties are not adjacent to applicant's property boundary, they are considered potentially affected landowners. If the adjacent road is a divided highway as identified on the USGS topographic map, the applicant does not have to identify the landowners on the opposite side of the highway.

Landowners Cross Reference List ☐ N/A ☒ Yes
(See instructions for landowner requirements)

Landowners Labels or CD-RW attached ☐ N/A ☒ Yes
(See instructions for landowner requirements)

Original signature per 30 TAC § 305.44 – Blue Ink Preferred ☒ Yes
(If signature page is not signed by an elected official or principle executive officer, a copy of signature authority/delegation letter must be attached)

ATTACHMENT A

CORE DATA FORM

TCEQ Core Data Form

TCEQ Use Only

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

SECTION I: General Information

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

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

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

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

SECTION II: Customer Information

4. General Customer Information	5. Effective Date for Customer Information Updates (mm/dd/yyyy)	2/9/2022

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

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

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

6. Customer Legal Name *(If an individual, print last name first: eg: Doe, John)*	*If new Customer, enter previous Customer below:*
Wilo MUD 45 WWTP, 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)*
0804409287	32082930119		

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

Government: ☐ City ☐ County ☐ Federal ☐ State ☐ Other ☐ Sole Proprietorship ☒ Other: Limited Liability Company

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

13. Independently Owned and Operated?
☒ **Yes** ☐ **No**

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

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

15. Mailing Address:							
	3300 Bee Caves Road						
	Suite 650-1233						
	City	West Lake Hills	**State**	TX	**ZIP**	78746	**ZIP + 4**

16. Country Mailing Information *(if outside USA)*	17. E-Mail Address *(if applicable)*

18. Telephone Number	19. Extension or Code	20. Fax Number *(if applicable)*
(512) 222-7418		( ) -

SECTION III: Regulated Entity Information

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

☒ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information

The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency Data Standards (removal of organizational endings such as Inc, LP, or LLC).

22. Regulated Entity Name (*Enter name of the site where the regulated action is taking place.*)

Cielo Ranch Wastewater Treatment Plant

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

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	Approximately 1.56 miles southeast of the intersection of FM 3349 and County Road 404				
26. Nearest City			**State**	**Nearest ZIP Code**	
Hutto			TX	76574	
27. Latitude (N) In Decimal:	30.5099		**28. Longitude (W) In Decimal:**	-97.4672	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
30	30	35.64	-97	28	1.92

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)
4952		221320	

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

Collect, Treat, and Dispose of domestic wastewater

34. Mailing Address:								
	City		**State**	**TX**	**ZIP**		**ZIP + 4**	
35. E-Mail Address:								

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

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

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

SECTION IV: Preparer Information

40. Name:	Michael Bevilacqua, P.E.	**41. Title:**	Project Manager

42. Telephone Number	**43. Ext./Code**	**44. Fax Number**	**45. E-Mail Address**
(512) 640-6590	1003	(512) 551-4255	mbev@greencivildesign.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:	Green Civil Design, LLC	**Job Title:**	Project Manager
Name *(In Print):*	Michael Bevilacqua	**Phone:**	(512) 640- **6590**
Signature:	Michael Bevilacqua	**Date:**	

ATTACHMENT B

WASTEWATER TREATMENT PLANT & EFFLUENT DISCHARGE EASEMENT

ATTACHMENT C

USGS MAPS

FILE: P:\Projects\1146 – Insite Dev\001 – Hobbs Tract TCEQ Permit\CAD\Exhibits\ATTACHMENT C – USGS MAP.dwg TAB: USGS (1 OF 2) PLOTTED: 2/7/2022 10:29 AM BY: MIKE BEV

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

The National Map US Topo

TAYLOR QUADRANGLE
TEXAS - WILLIAMSON COUNTY
7.5-MINUTE SERIES

APPLICANT'S WWTP BOUNDARY

1-MILE RADIUS (FROM WWTP BOUNDARY)

DISCHARGE ROUTE

DISCHARGE ROUTE - 1 MILE DOWNSTREAM

WWTP

DISCHARGE POINT

DOMESTIC WELL #5829801

DOMESTIC WELL #5837202

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

Imagery	NAIP,	September 2016 - November 2016
Roads	U.S. Census Bureau,	2015
Names	GNIS,	1979 - 2018
Hydrography	National Hydrography Dataset,	2002 - 2018
Contours	National Elevation Dataset,	2002 - 2004
Boundaries	Multiple sources; see metadata file	2016 - 2017
Wetlands	FWS National Wetlands Inventory	1982

MN GN 3°31' 63 MILS 0°48' 14 MILS
UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
PU
Grid Zone Designation 14R

SCALE 1:24 000
1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 MILES 1
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

TEXAS
QUADRANGLE LOCATION

ADJOINING QUADRANGLES
1 Weir
2 Granger
3 Granger Lake
4 Hutto
5 Thrall
6 Pflugerville East
7 Coupland
8 Structure

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

TAYLOR, TX
2019

Green Civil Design
GCD
Engineering & Consulting
301 Denali Pass Dr., Suite 3
Cedar Park, Texas 78613
(512) 640-6590
Texas Registered Engineering Firm F-17563

WILCO MUD 45 WWTP, LLC
CIELO RANCH WWTP

ATTACHMENT C - USGS MAP (1 OF 2)

APP000030

DOMESTIC WELL #5829801

DOMESTIC WELL #5837202

1-MILE RADIUS (FROM WWTP BOUNDARY)

DISCHARGE ROUTE

DISCHARGE ROUTE - 3 MILE DOWNSTREAM

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

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COUPLAND QUADRANGLE
TEXAS
7.5-MINUTE SERIES

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North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid:Universal Transverse Mercator, Zone 14R

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Contours.....National Elevation Dataset, 2002 - 2004
Boundaries.....Multiple sources; see metadata file 2016 - 2017

Wetlands.....FWS National Wetlands Inventory 1982 - 1984

MN
GN
3°31'
63 MILS
0°48'
14 MILS
UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
PU
Grid Zone Designation
14R

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

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TEXAS
QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

1 Hutto
2 Taylor
3 Thrall
4 Pflugerville East
5 Structure
6 Manor
7 Elgin West
8 Elgin East

ADJOINING QUADRANGLES

ROAD CLASSIFICATION

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

COUPLAND, TX
2019

Green Civil Design
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Engineering & Consulting
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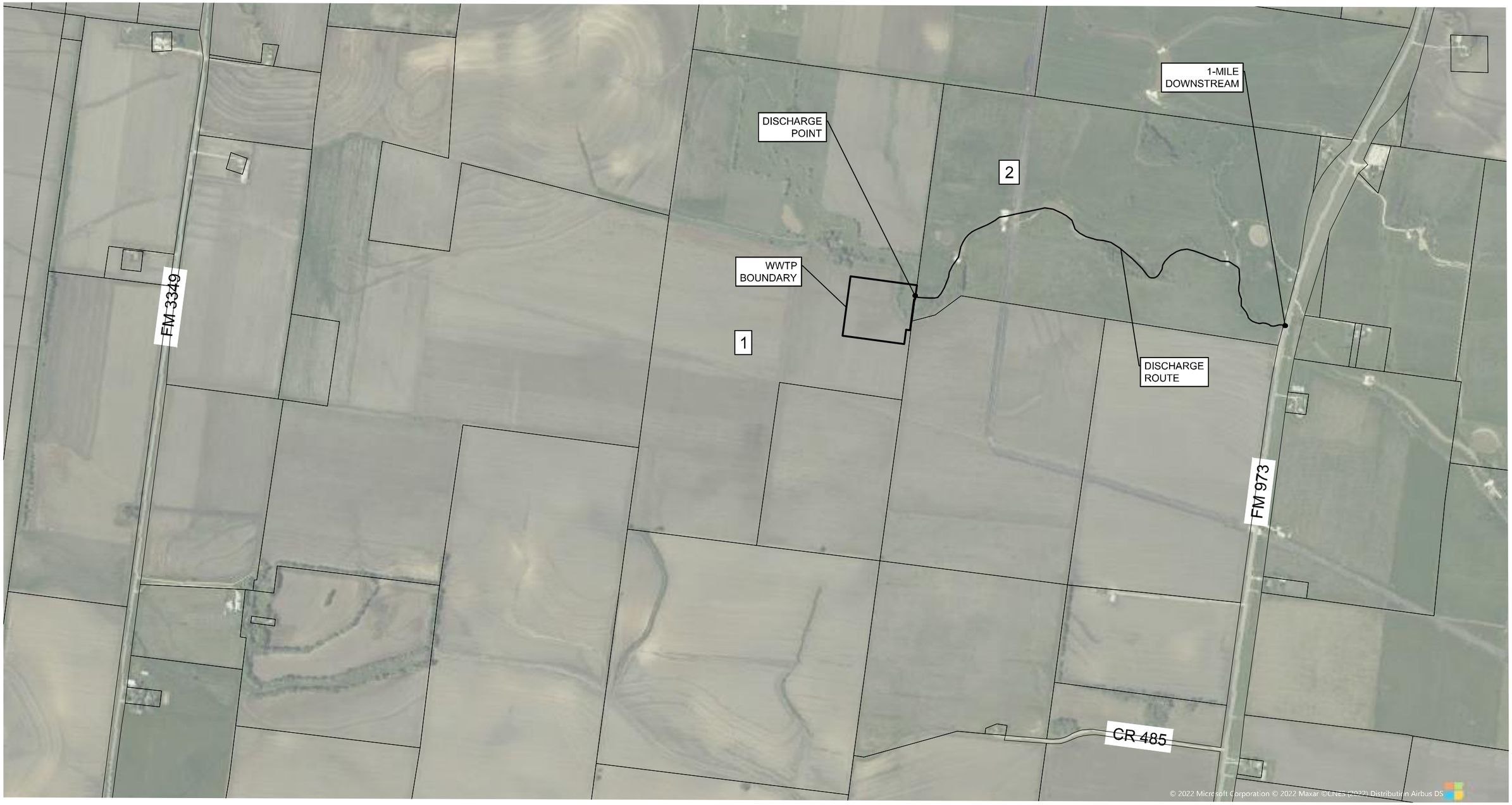
Cedar Park, Texas 78613
(512) 640-6590
Texas Registered Engineering Firm F-17563

WILCO MUD 45 WWTP, LLC
CIELO RANCH WWTP

ATTACHMENT C - USGS MAP (2 OF 2)

ATTACHMENT D

AFFECTED LANDOWNERS MAP



0' 1,000' 2,000'

SCALE: 1"=1,000'

N

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GCD
Engineering & Consulting
Texas Registered Engineering Firm F-17563

301 Denali Pass Dr., Suite 3
Cedar Park, Texas 78613
(512) 640-6590

WILCO MUD 45 WWTP, LLC
CIELO RANCH WWTP

ATTACHMENT D - AFFECTED LANDOWNERS MAP

APP000033

FILE: ATTACHMENT D – AFFECTED LANDOWNERS MAP.dwg TAB: EXHIBIT-11X17-L PLOTTED: 2/7/2022 12:53 PM BY: MIKE BEV

WILCO MUD 45 WWTP, LLC
CIELO RANCH WWTP
Attachment D - Affected Landowners List

NUMBER	OWNER NAME	MAILING ADDRESS
1	CIELO RANCH LAND PARTNERS, LLC	311 WESTWOOD TERRACE AUSTIN, TX 78746
2	ROBERT M & CARRIE TIEMANN	21100 CARRIES RANCH ROAD PFLUGERVILLE, TX 78660

ATTACHMENT E

ORIGINAL PHOTOGRAPHS

FILE: ATTACHMENT E – PHOTO PLOT.dwg TAB: ATTACHMENT E – PHOTO PLOT MAP PLOTTED: 2/7/2022 12:55 PM BY: MIKE BEV

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Engineering & Consulting
Texas Registered Engineering Firm F-17563

WILCO MUD 45 WWTP, LLC
CIELO RANCH WWTP

ATTACHMENT E - PHOTO PLOT MAP

APP000036

Photo #1 – WWTP, facing Northwest: Aeration & Clarifiers

Photo #2 – WWTP, facing North: Aeration, & Tertiary Filters

Photo #3 – WWTP, facing Northwest: Headworks & Aeration

Photo #4 – WWTP, facing Northeast: Headworks & Sludge Holding

Photo #5 – WWTP, facing East: Tertiary Filters & Disinfection Basins

Photo #6 – WWTP, facing Northwest: Sludge Holding & Dewatering Facility

Photo #7 – WWTP, facing South: Clarifiers

Photo #8 – WWTP, facing Southeast: Sludge Holding & Dewatering Facility

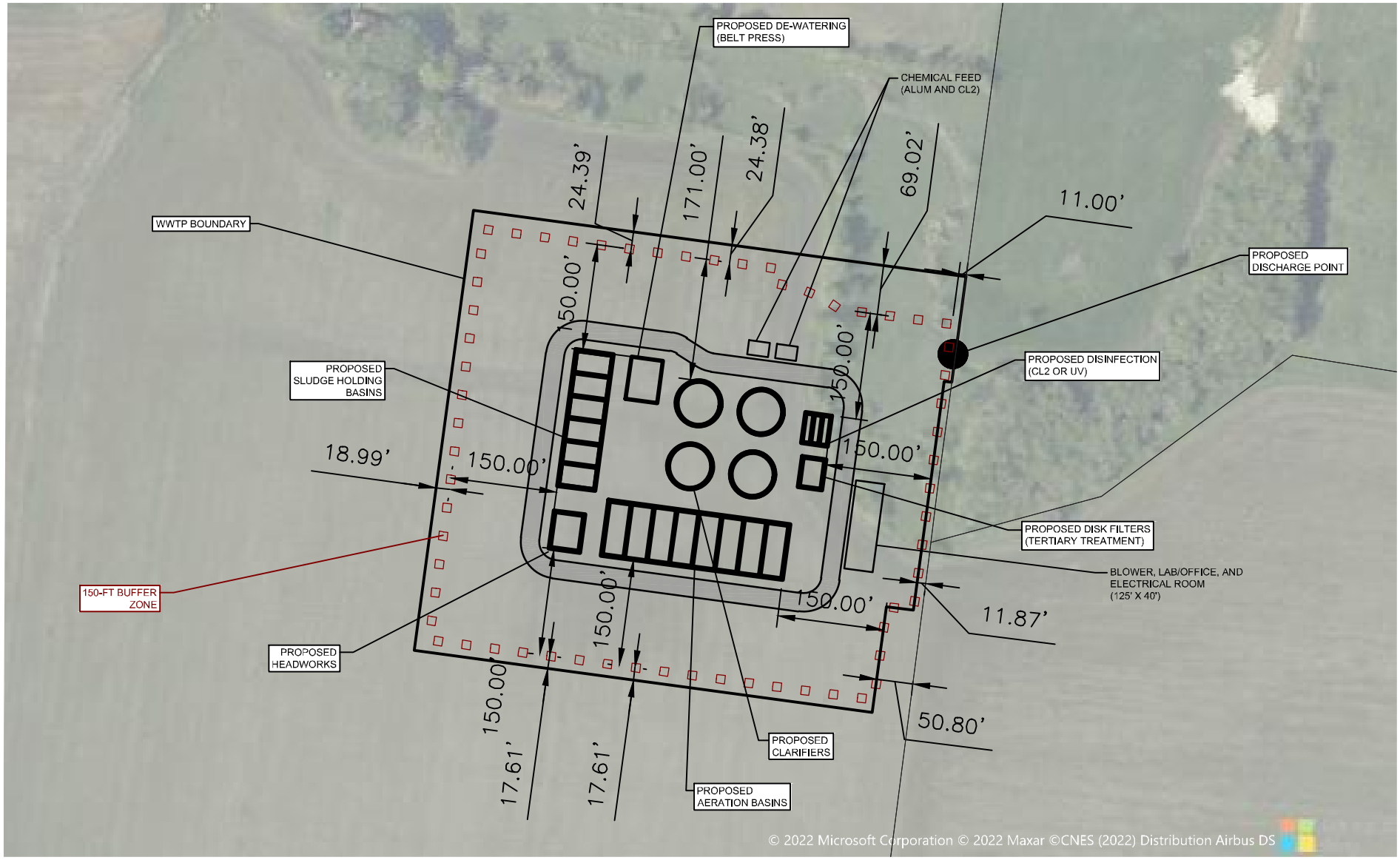
Photo #9 – Discharge Point (facing North)

Photo #10 – Discharge, facing Upstream (Northwest)

Photo #11 – Discharge, facing Downstream (East)

ATTACHMENT F

BUFFER ZONE MAP



N

0' 200' 400'

SCALE: 1"=200'

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Cedar Park, Texas 78613
(512) 640-6590
Engineering & Consulting
Texas Registered Engineering Firm F-17563

WILCO MUD 45 WWTP, LLC
CIELO RANCH WWTP

ATTACHMENT F - BUFFER ZONE MAP

APP000045

FILE: ATTACHMENT F – BUFFER ZONE MAP.dwg TAB: EXHIBIT–8.5X11–L PLOTTED: 2/7/2022 12:57 PM BY: MIKE BEV

ATTACHMENT G

SPIF USGS MAPS

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

The National Map US Topo

TAYLOR QUADRANGLE
TEXAS - WILLIAMSON COUNTY
7.5-MINUTE SERIES

APPLICANT'S WWTP BOUNDARY

1-MILE RADIUS (FROM WWTP BOUNDARY)

DISCHARGE ROUTE

DISCHARGE ROUTE - 1 MILE DOWNSTREAM

WWTP

DISCHARGE POINT

DOMESTIC WELL #5829801

DOMESTIC WELL #5837202

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UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
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Grid Zone Designation
14R

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 MILES 1
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

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A metadata file associated with this product is draft version 0.6.18

TEXAS
QUADRANGLE LOCATION

1 2 3
4 5
6 7 8
ADJOINING QUADRANGLES

1 Weir
2 Granger
3 Granger Lake
4 Hutto
5 Thrall
6 Pflugerville East
7 Coupland
8 Structure

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

TAYLOR, TX
2019

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WILCO MUD 45 WWTP, LLC
CIELO RANCH WWTP

ATTACHMENT G - SPIF USGS MAP (1 OF 2)

USGS science for a changing world

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

The National Map US Topo

COUPLAND QUADRANGLE
TEXAS
7.5-MINUTE SERIES

DOMESTIC WELL #5829801

DOMESTIC WELL #5837202

1-MILE RADIUS (FROM WWTP BOUNDARY)

DISCHARGE ROUTE

DISCHARGE ROUTE - 3 MILE DOWNSTREAM

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
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U.S. National Grid
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Grid Zone Designation
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SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
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1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
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CONTOUR INTERVAL 10 FEET
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TEXAS
QUADRANGLE LOCATION

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ADJOINING QUADRANGLES
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6 Manor
7 Elgin West
8 Elgin East

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

COUPLAND, TX
2019

Green Civil Design GCD *Engineering & Consulting* Texas Registered Engineering Firm F-17563 301 Denali Pass Dr., Suite 3 Cedar Park, Texas 78613 (512) 640-6590	WILCO MUD 45 WWTP, LLC CIELO RANCH WWTP ATTACHMENT G - SPIF USGS MAP (2 OF 2)

APP000048

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

DOMESTIC WASTEWATER PERMIT APPLICATION

DOMESTIC TECHNICAL REPORT 1.0

The Following Is Required For All Applications

Renewal, New, And Amendment

Section 1. Permitted or Proposed Flows (Instructions Page 51)

A. Existing/Interim I Phase

Design Flow (MGD): See Attachment H

2-Hr Peak Flow (MGD): Click here to enter text

Estimated construction start date: Click here to enter text

Estimated waste disposal start date: Click here to enter text

B. Interim II Phase

Design Flow (MGD): See Attachment H

2-Hr Peak Flow (MGD): Click here to enter text

Estimated construction start date: Click here to enter text

Estimated waste disposal start date: Click here to enter text

C. Final Phase

Design Flow (MGD): See Attachment H

2-Hr Peak Flow (MGD): Click here to enter text

Estimated construction start date: Click here to enter text

Estimated waste disposal start date: Click here to enter text

D. Current operating phase: N/A – New Permit

Provide the startup date of the facility: Click here to enter text

Section 2. Treatment Process (Instructions Page 51)

A. Treatment process description

Provide a detailed description of the treatment process. **Include the type of**

treatment plant, mode of operation, and all treatment units. Start with the plant's head works and finish with the point of discharge. Include all sludge processing and drying units. **If more than one phase exists or is proposed in the permit, a description of *each phase* must be provided**. Process description:

See Attachment H

Port or pipe diameter at the discharge point, in inches: 36"

B. Treatment Units

In Table 1.0(1), provide the treatment unit type, the number of units, and dimensions (length, width, depth) **of each treatment unit, accounting for *all* phases of operation**.

Table 1.0(1) – Treatment Units

Treatment Unit Type	Number of Units	Dimensions (L x W x D)
See Attachment H		

C. Process flow diagrams

Provide flow diagrams for the existing facilities and **each** proposed phase of construction.

Attachment: I

Section 3. Site Drawing (Instructions Page 52)

Provide a site drawing for the facility that shows the following:

- The boundaries of the treatment facility;
- The boundaries of the area served by the treatment facility;
- If land disposal of effluent, the boundaries of the disposal site and all storage/holding ponds; and
- If sludge disposal is authorized in the permit, the boundaries of the land application or disposal site.

Attachment: J

Provide the name and a description of the area served by the treatment facility.

The Cielo Ranch WWTP will serve approximately 2,369-acres of the proposed Cielo Ranch Development and surrounding tracts. The area served will consist of approximately 10,000-LUEs consisting of residential and commercial development. The service area is shown in Attachment J.

Section 4. Unbuilt Phases (Instructions Page 52)

Is the application for a renewal of a permit that contains an unbuilt phase or phases?

Yes ☐ No ☒

If yes, does the existing permit contain a phase that has not been constructed within five years of being authorized by the TCEQ?

Yes ☐ No ☐

If yes, provide a detailed discussion regarding the continued need for the unbuilt phase. Failure to provide sufficient justification may result in the Executive Director recommending denial of the unbuilt phase or phases.

Click here to enter text

Section 5. Closure Plans (Instructions Page 53)

Have any treatment units been taken out of service permanently, or will any units be taken out of service in the next five years?

Yes ☐ No ☒

If yes, was a closure plan submitted to the TCEQ?

Yes ☐ No ☐

If yes, provide a brief description of the closure and the date of plan approval.

Click here to enter text

Section 6. Permit Specific Requirements (Instructions Page 53)

For applicants with an existing permit, check the *Other Requirements* or *Special Provisions* of the permit.

A. Summary transmittal

Have plans and specifications been approved for the existing facilities and each proposed phase?

Yes ☐ No ☒

If yes, provide the date(s) of approval for each phase: Click here to enter text

Provide information, including dates, on any actions taken to meet a requirement or provision pertaining to the submission of a summary transmittal letter. Provide a copy of an approval letter from the TCEQ, if applicable.

Click here to enter text

B. Buffer zones

Have the buffer zone requirements been met?

Yes ☒ No ☐

Provide information below, including dates, on any actions taken to meet the conditions of the buffer zone. If available, provide any new documentation

relevant to maintaining the buffer zones.

Easement. See Attachment B.

C. Other actions required by the current permit

Does the *Other Requirements* or *Special Provisions* section in the existing permit require submission of any other information or other required actions? Examples include Notification of Completion, progress reports, soil monitoring data, etc.

Yes ☐ No ☒

If yes, provide information below on the status of any actions taken to meet the conditions of an *Other Requirement* or *Special Provision*.

Click here to enter text.

D. Grit and grease treatment

1. Acceptance of grit and grease waste

Does the facility have a grit and/or grease processing facility onsite that treats and decants or accepts transported loads of grit and grease waste that are discharged directly to the wastewater treatment plant prior to any treatment?

Yes ☐ No ☒

If No, stop here and continue with Subsection E. Stormwater Management.

2. Grit and grease processing

Describe below how the grit and grease waste is treated at the facility. In your description, include how and where the grit and grease is introduced to the treatment works and how it is separated or processed. Provide a flow diagram showing how grit and grease is processed at the facility.

Click here to enter text.

3. Grit disposal

Does the facility have a Municipal Solid Waste (MSW) registration or permit for grit disposal?

Yes ☐ No ☐

If No, contact the TCEQ Municipal Solid Waste team at 512-239-0000. Note: A registration or permit is required for grit disposal. Grit shall not be combined with treatment plant sludge. See the instruction booklet for additional information on grit disposal requirements and restrictions.

Describe the method of grit disposal.

Click here to enter text.

4. Grease and decanted liquid disposal

Note: A registration or permit is required for grease disposal. Grease shall not be combined with treatment plant sludge. For more information, contact the TCEQ Municipal Solid Waste team at 512-239-0000.

Describe how the decant and grease are treated and disposed of after grit separation.

Click here to enter text.

E. Stormwater management

1. Applicability

Does the facility have a design flow of 1.0 MGD or greater in any phase?

Yes ☒ No ☐

Does the facility have an approved pretreatment program, under 40 CFR Part 403?

Yes ☐ No ☒

If no to both of the above, then skip to Subsection F, Other Wastes Received.

2. MSGP coverage

Is the stormwater runoff from the WWTP and dedicated lands for sewage disposal currently permitted under the TPDES Multi-Sector General Permit (MSGP), TXR050000?

Yes ☐ No ☒

If yes, please provide MSGP Authorization Number and skip to Subsection F, Other Wastes Received:

TXR05 Click here to enter text. or TXRNE Click here to enter text.

If no, do you intend to seek coverage under TXR050000?

Yes ☒ No ☐

3. Conditional exclusion

Alternatively, do you intend to apply for a conditional exclusion from permitting based TXR050000 (Multi Sector General Permit) Part II B.2 or TXR050000 (Multi Sector General Permit) Part V, Sector T 3(b)?

Yes ☐ No ☒

If yes, please explain below then proceed to Subsection F, Other Wastes Received:

Click here to enter text.

4. Existing coverage in individual permit

Is your stormwater discharge currently permitted through this individual TPDES or TLAP permit?

Yes ☐ No ☐

If yes, provide a description of stormwater runoff management practices at the site that are authorized in the wastewater permit then skip to Subsection F, Other Wastes Received.

Click here to enter text.

5. Zero stormwater discharge

Do you intend to have no discharge of stormwater via use of evaporation or other means?

Yes ☐ No ☒

If yes, explain below then skip to Subsection F. Other Wastes Received.

Click here to enter text.

Note: If there is a potential to discharge any stormwater to surface water in the state as the result of any storm event, then permit coverage is required under the MSGP or an individual discharge permit. This requirement applies to all areas of facilities with treatment plants or systems that treat, store, recycle, or reclaim domestic sewage, wastewater or sewage sludge (including dedicated lands for sewage sludge disposal located within the onsite property boundaries) that meet the applicability criteria of above. You have the option of obtaining coverage under the MSGP for direct discharges, (recommended), or obtaining coverage under this individual permit.

6. Request for coverage in individual permit

Are you requesting coverage of stormwater discharges associated with your treatment plant under this individual permit?

Yes ☐ No ☒

If yes, provide a description of stormwater runoff management practices at the site for which you are requesting authorization in this individual wastewater permit and describe whether you intend to comingle this discharge with your treated effluent or discharge it via a separate dedicated stormwater outfall. Please also indicate if you intend to divert stormwater to the treatment plant headworks and indirectly discharge it to water in the state.

Click here to enter text.

Note: Direct stormwater discharges to waters in the state authorized through this individual permit will require the development and implementation of a stormwater pollution prevention plan (SWPPP) and will be subject to additional monitoring and reporting requirements. Indirect discharges of stormwater via headworks recycling will require compliance with all individual permit requirements including 2-hour peak flow limitations. All stormwater discharge authorization requests will require additional information during the technical review of your application.

F. Discharges to the Lake Houston Watershed

Does the facility discharge in the Lake Houston watershed?
Yes ☐ No ☒

If yes, a Sewage Sludge Solids Management Plan is required. See Example 5 in the instructions.

G. Other wastes received including sludge from other WWTPs and septic waste

1. Acceptance of sludge from other WWTPs

Does the facility accept or will it accept sludge from other treatment plants at the facility site?
Yes ☐ No ☒

If yes, attach sewage sludge solids management plan. See Example 5 of the instructions.

In addition, provide the date that the plant started accepting sludge or is anticipated to start accepting sludge, an estimate of monthly sludge acceptance (gallons or millions of gallons), an estimate of the BOD_5 concentration of the sludge, and the design BOD_5 concentration of the influent from the collection system. Also note if this information has or has not changed since the last permit action.

Click here to enter text.

Note: Permits that accept sludge from other wastewater treatment plants may be required to have influent flow and organic loading monitoring.

2. Acceptance of septic waste

Is the facility accepting or will it accept septic waste?

Yes ☐ No ☒

If yes, does the facility have a Type V processing unit?

Yes ☐ No ☒

If yes, does the unit have a Municipal Solid Waste permit?

Yes ☐ No ☒

If yes to any of the above, provide a the date that the plant started accepting septic waste, or is anticipated to start accepting septic waste, an estimate of monthly septic waste acceptance (gallons or millions of gallons), an estimate of the BOD_5 concentration of the septic waste, and the design BOD_5 concentration of the influent from the collection system. Also note if this information has or has not changed since the last permit action.

Click here to enter text.

Note: Permits that accept sludge from other wastewater treatment plants may be required to have influent flow and organic loading monitoring.

3. Acceptance of other wastes (not including septic, grease, grit, or RCRA, CERCLA or as discharged by IUs listed in Worksheet 6)

Is the facility accepting or will it accept wastes that are not domestic in nature excluding the categories listed above?

Yes ☐ No ☒

If yes, provide the date that the plant started accepting the waste, an estimate how much waste is accepted on a monthly basis (gallons or millions of gallons), a description of the entities generating the waste, and any distinguishing chemical or other physical characteristic of the waste. Also note if this information has or has not changed since the last permit action.

Click here to enter text.

Section 7. Pollutant Analysis of Treated Effluent (Instructions Page 58)

Is the facility in operation?

Yes ☐ No ☒

If no, this section is not applicable. Proceed to Section 8.

If yes, provide effluent analysis data for the listed pollutants. ***Wastewater treatment facilities*** complete Table 1.0(2). W***ater treatment facilities*** discharging filter backwash water, complete Table 1.0(3).

Note: The sample date must be within 1 year of application submission.

Table 1.0(2) - Pollutant Analysis for Wastewater Treatment Facilities

Pollutant	**Average Conc.**	**Max Conc.**	**No. of Samples**	**Sample Type**	**Sample Date/Time**
$CBOD_5$, mg/l					
Total Suspended Solids, mg/l					
Ammonia Nitrogen, mg/l					
Nitrate Nitrogen, mg/l					
Total Kjeldahl Nitrogen, mg/l					
Sulfate, mg/l					
Chloride, mg/l					
Total Phosphorus, mg/l					
pH, standard units					
Dissolved Oxygen*, mg/l					
Chlorine Residual, mg/l					
E.coli (CFU/100ml) freshwater					
Entercocci (CFU/100ml)					

Pollutant	Average Conc.	Max Conc.	No. of Samples	Sample Type	Sample Date/Time
saltwater					
Total Dissolved Solids, mg/l					
Electrical Conductivity, µmohs/cm, †					
Oil & Grease, mg/l					
Alkalinity ($CaCO_3$)*, mg/l					

*TPDES permits only

†TLAP permits only

Table 1.0(3) - Pollutant Analysis for Water Treatment Facilities

Pollutant	Average Conc.	Max Conc.	No. of Samples	Sample Type	Sample Date/Time
Total Suspended Solids, mg/l					
Total Dissolved Solids, mg/l					
pH, standard units					
Fluoride, mg/l					
Aluminum, mg/l					
Alkalinity ($CaCO_3$), mg/l					

Section 8. Facility Operator (Instructions Page 60)

Facility Operator Name: Crossroads Utility Services

Facility Operator's License Classification and Level: Operations Company

Facility Operator's License Number: OC0000182

Section 9. Sewage Sludge Management and Disposal (Instructions Page 60)

A. Sludge disposal method

Identify the current or anticipated sludge disposal method or methods from the

following list. Check all that apply.

☒ Permitted landfill

☒ Permitted or Registered land application site for beneficial use

☐ Land application for beneficial use authorized in the wastewater permit

☒ Permitted sludge processing facility

☐ Marketing and distribution as authorized in the wastewater permit

☐ Composting as authorized in the wastewater permit

☐ Permitted surface disposal site (sludge monofill)

☐ Surface disposal site (sludge monofill) authorized in the wastewater permit

☐ Transported to another permitted wastewater treatment plant or permitted sludge processing facility. If you selected this method, a written statement or contractual agreement from the wastewater treatment plant or permitted sludge processing facility accepting the sludge must be included with this application.

☐ Other: click here to enter text

B. Sludge disposal site

Disposal site name: Walker Aero Environmental

TCEQ permit or registration number: 2310

County where disposal site is located: Travis

C. Sludge transportation method

Method of transportation (truck, train, pipe, other): Truck

Name of the hauler: Sheridan Environmental LLC

Hauler registration number: 24220

Sludge is transported as a:

Liquid ☒ semi-liquid ☒ semi-solid ☐ solid ☐

Section 10. Permit Authorization for Sewage Sludge Disposal (Instructions Page 60)

A. Beneficial use authorization

Does the existing permit include authorization for land application of sewage sludge for beneficial use?

Yes ☐ No ☒

If yes, are you requesting to continue this authorization to land apply sewage sludge for beneficial use?

Yes ☐ No ☐

If yes, is the completed **Application for Permit for Beneficial Land Use of Sewage Sludge (TCEQ Form No. 10451)** attached to this permit application (see the instructions for details)?

Yes ☐ No ☐

B. Sludge processing authorization

Does the existing permit include authorization for any of the following sludge processing, storage or disposal options?

Sludge Composting	Yes ☐	No ☒
Marketing and Distribution of sludge	Yes ☐	No ☒
Sludge Surface Disposal or Sludge Monofill	Yes ☐	No ☒
Temporary storage in sludge lagoons	Yes ☐	No ☒

If yes to any of the above sludge options and the applicant is requesting to continue this authorization, is the completed **Domestic Wastewater Permit Application: Sewage Sludge Technical Report (TCEQ Form No. 10056)** attached to this permit application?

Yes ☐ No ☐

Section 11. Sewage Sludge Lagoons (Instructions Page 61)

Does this facility include sewage sludge lagoons?

Yes ☐ No ☒

If yes, complete the remainder of this section. If no, proceed to Section 12.

A. Location information

The following maps are required to be submitted as part of the application. For each map, provide the Attachment Number.

- Original General Highway (County) Map:

  Attachment: Click here to enter text.
- USDA Natural Resources Conservation Service Soil Map:

  Attachment: Click here to enter text.
- Federal Emergency Management Map:

  Attachment: Click here to enter text.
- Site map:

  Attachment: Click here to enter text.

Discuss in a description if any of the following exist within the lagoon area. Check all that apply.

- ☐ Overlap a designated 100-year frequency flood plain
- ☐ Soils with flooding classification
- ☐ Overlap an unstable area
- ☐ Wetlands
- ☐ Located less than 60 meters from a fault
- ☐ None of the above

Attachment: Click here to enter text.

If a portion of the lagoon(s) is located within the 100-year frequency flood plain, provide the protective measures to be utilized including type and size of protective structures:

Click here to enter text.

B. Temporary storage information

Provide the results for the pollutant screening of sludge lagoons. These results are in addition to pollutant results in Section 7 of Technical Report 1.0.

Nitrate Nitrogen, mg/kg: Click here to enter text.

Total Kjeldahl Nitrogen, mg/kg: Click here to enter text.

Total Nitrogen (=nitrate nitrogen + TKN), mg/kg: Click here to enter text.

Phosphorus, mg/kg: Click here to enter text.

Potassium, mg/kg: Click here to enter text.

pH, standard units: Click here to enter text.

Ammonia Nitrogen mg/kg: Click here to enter text.

Arsenic: Click here to enter text.

Cadmium: Click here to enter text.

Chromium: Click here to enter text.

Copper: Click here to enter text.

Lead: Click here to enter text.

Mercury: Click here to enter text.

Molybdenum: Click here to enter text.

Nickel: Click here to enter text.

Selenium: Click here to enter text.

Zinc: Click here to enter text.

Total PCBs: Click here to enter text.

Provide the following information:

Volume and frequency of sludge to the lagoon(s): Click here to enter text.

Total dry tons stored in the lagoons(s) per 365-day period: Click here to enter text.

Total dry tons stored in the lagoons(s) over the life of the unit: Click here to enter text.

C. Liner information

Does the active/proposed sludge lagoon(s) have a liner with a maximum hydraulic conductivity of $1x10^{-7}$ cm/sec?

Yes ☐ No ☐

If yes, describe the liner below. Please note that a liner is required.

Click here to enter text.

D. Site development plan

Provide a detailed description of the methods used to deposit sludge in the

lagoon(s):

Click here to enter text

Attach the following documents to the application.

- Plan view and cross-section of the sludge lagoon(s)

  Attachment: Click here to enter text

- Copy of the closure plan

  Attachment: Click here to enter text

- Copy of deed recordation for the site

  Attachment: Click here to enter text

- Size of the sludge lagoon(s) in surface acres and capacity in cubic feet and gallons

  Attachment: Click here to enter text

- Description of the method of controlling infiltration of groundwater and surface water from entering the site

  Attachment: Click here to enter text

- Procedures to prevent the occurrence of nuisance conditions

  Attachment: Click here to enter text

E. Groundwater monitoring

Is groundwater monitoring currently conducted at this site, or are any wells available for groundwater monitoring, or are groundwater monitoring data otherwise available for the sludge lagoon(s)?

Yes ☐ No ☐

If groundwater monitoring data are available, provide a copy. Provide a profile of soil types encountered down to the groundwater table and the depth to the shallowest groundwater as a separate attachment.

Attachment: Click here to enter text

Section 12. Authorizations/Compliance/Enforcement

(Instructions Page 63)

A. Additional authorizations

Does the permittee have additional authorizations for this facility, such as reuse authorization, sludge permit, etc?

Yes ☐ No ☒

If yes, provide the TCEQ authorization number and description of the authorization:

Click here to enter text

B. Permittee enforcement status

Is the permittee currently under enforcement for this facility?

Yes ☐ No ☒

Is the permittee required to meet an implementation schedule for compliance or enforcement?

Yes ☐ No ☒

If yes to either question, provide a brief summary of the enforcement, the implementation schedule, and the current status:

Click here to enter text

Section 13. RCRA/CERCLA Wastes (Instructions Page 63)

A. RCRA hazardous wastes

Has the facility received in the past three years, does it currently receive, or will it receive RCRA hazardous waste?

Yes ☐ No ☒

B. Remediation activity wastewater

Has the facility received in the past three years, does it currently receive, or will it receive CERCLA wastewater, RCRA remediation/corrective action wastewater or other remediation activity wastewater?

Yes ☐ No ☒

C. Details about wastes received

If yes to either Subsection A or B above, provide detailed information concerning these wastes with the application.

Attachment: Click here to enter text

Section 14. Laboratory Accreditation (Instructions Page 64)

All laboratory tests performed must meet the requirements of *30 TAC Chapter 25, Environmental Testing Laboratory Accreditation and Certification*, which includes the following general exemptions from National Environmental Laboratory Accreditation Program (NELAP) certification requirements:

- The laboratory is an in-house laboratory and is:
  - periodically inspected by the TCEQ; or
  - located in another state and is accredited or inspected by that state; or
  - performing work for another company with a unit located in the same site; or
  - performing pro bono work for a governmental agency or charitable organization.
- The laboratory is accredited under federal law.
- The data are needed for emergency-response activities, and a laboratory accredited under the Texas Laboratory Accreditation Program is not available.
- The laboratory supplies data for which the TCEQ does not offer accreditation.

The applicant should review *30 TAC Chapter 25* for specific requirements.

The following certification statement shall be signed and submitted with every application. See the *Signature Page* section in the Instructions, for a list of designated representatives who may sign the certification.

CERTIFICATION:

I certify that all laboratory tests submitted with this application meet the requirements of *30 TAC Chapter 25, Environmental Testing Laboratory Accreditation and Certification.*

Printed Name: S. Todd McCullough

Title: Manager

Signature: Todd

Date: January 31, 2022

DOMESTIC TECHNICAL REPORT 1.1

The following is required for new and amendment applications

Section 1. Justification for Permit (Instructions Page 66)

A. Justification of permit need

Provide a detailed discussion regarding the need for any phase(s) not currently permitted. Failure to provide sufficient justification may result in the Executive Director recommending denial of the proposed phase(s) or permit.

The proposed wastewater treatment plant is required to serve the proposed development as well as providing service to adjacent tracts in an effort to promote regionalization. There are no existing operating facilities within 3-miles. The proposed wastewater treatment plant is not located in an existing wastewater CCN.

B. Regionalization of facilities

Provide the following information concerning the potential for regionalization of domestic wastewater treatment facilities:

1. Municipally incorporated areas

If the applicant is a city, then Item 1 is not applicable. Proceed to Item 2 Utility CCN areas.

Is any portion of the proposed service area located in an incorporated city?

Yes ☐ No ☒ Not Applicable ☐

If yes, within the city limits of: Click here to enter text.

If yes, attach correspondence from the city.

Attachment: Click here to enter text.

If consent to provide service is available from the city, attach a justification for the proposed facility and a cost analysis of expenditures that includes the cost of connecting to the city versus the cost of the proposed facility or expansion attached.

Attachment: Click here to enter text.

2. Utility CCN areas

Is any portion of the proposed service area located inside another utility's CCN area?

Yes ☐ No ☒

If yes, attach a justification for the proposed facility and a cost analysis of expenditures that includes the cost of connecting to the CCN facilities versus the cost of the proposed facility or expansion.

Attachment: Click here to enter text.

3. Nearby WWTPs or collection systems

Are there any domestic permitted wastewater treatment facilities or collection systems located within a three-mile radius of the proposed facility?

Yes ☐ No ☒

If yes, attach a list of these facilities that includes the permittee's name and permit number, and an area map showing the location of these facilities.

Attachment: Click here to enter text.

If yes, attach copies of your certified letters to these facilities **and** their response letters concerning connection with their system.

Attachment: Click here to enter text.

Does a permitted domestic wastewater treatment facility or a collection system located within three (3) miles of the proposed facility currently have the capacity to accept or is willing to expand to accept the volume of wastewater proposed in this application?

Yes ☐ No ☒

If yes, attach an analysis of expenditures required to connect to a permitted wastewater treatment facility or collection system located within 3 miles versus the cost of the proposed facility or expansion.

Attachment: Click here to enter text.

Section 2. Organic Loading (Instructions Page 67)

Is this facility in operation?

Yes ☐ No ☒

If no, proceed to Item B, Proposed Organic Loading.

If yes, provide organic loading information in Item A, Current Organic Loading

A. Current organic loading

Facility Design Flow (flow being requested in application): Click here to enter text

Average Influent Organic Strength or BOD_5 Concentration in mg/l: Click here to enter text

Average Influent Loading (lbs/day = total average flow X average BOD_5 conc. X 8.34): Click here to enter text

Provide the source of the average organic strength or BOD_5 concentration.

Click here to enter text

B. Proposed organic loading

This table must be completed if this application is for a facility that is not in operation or if this application is to request an increased flow that will impact organic loading.

Table 1.1(1) – Design Organic Loading

Source	Total Average Flow (MGD)	Influent BOD_5 Concentration (mg/l)
Municipality		
Subdivision	2.25	300
Trailer park – transient		
Mobile home park		
School with cafeteria and showers		

Source	Total Average Flow (MGD)	Influent BOD_5 Concentration (mg/l)
School with cafeteria, no showers		
Recreational park, overnight use		
Recreational park, day use		
Office building or factory	0.50	300
Motel		
Restaurant	0.25	300
Hospital		
Nursing home		
Other		
TOTAL FLOW from all sources	3.0	
AVERAGE BOD_5 from all sources		300

Section 3. Proposed Effluent Quality and Disinfection (Instructions Page 68)

A. Existing/Interim I Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: See Attachment H

Total Suspended Solids, mg/l: Click here to enter text

Ammonia Nitrogen, mg/l: Click here to enter text

Total Phosphorus, mg/l: Click here to enter text

Dissolved Oxygen, mg/l: Click here to enter text

Other: Click here to enter text

B. Interim II Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: See Attachment H

Total Suspended Solids, mg/l: Click here to enter text

Ammonia Nitrogen, mg/l: Click here to enter text

Total Phosphorus, mg/l: Click here to enter text

Dissolved Oxygen, mg/l: Click here to enter text

Other: Click here to enter text

C. Final Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: See Attachment H

Total Suspended Solids, mg/l: Click here to enter text

Ammonia Nitrogen, mg/l: Click here to enter text

Total Phosphorus, mg/l: Click here to enter text

Dissolved Oxygen, mg/l: Click here to enter text

Other: Click here to enter text

D. Disinfection Method

Identify the proposed method of disinfection.

☒ Chlorine: 1 mg/l after 20 minutes detention time at peak flow

Dechlorination process: Click here to enter text

☒ Ultraviolet Light: 30 to 180 seconds contact time at peak flow

☐ Other: Click here to enter text

Section 4. Design Calculations (Instructions Page 68)

Attach design calculations and plant features for each proposed phase. Example 4 of the instructions includes sample design calculations and plant features.

Attachment: K

Section 5. Facility Site (Instructions Page 68)

A. 100-year floodplain

Will the proposed facilities be located above the 100-year frequency flood level?

Yes ☒ No ☐

If no, describe measures used to protect the facility during a flood event. Include a site map showing the location of the treatment plant within the 100-year frequency flood level. If applicable, provide the size and types of protective structures.

Click here to enter text

Provide the source(s) used to determine 100-year frequency flood plain.

FEMA FIRM Map – See Attachment L

For a new or expansion of a facility, will a wetland or part of a wetland be filled?

Yes ☐ No ☒

If yes, has the applicant applied for a US Corps of Engineers 404 Dredge and Fill Permit?

Yes ☐ No ☐

If yes, provide the permit number: Click here to enter text

If no, provide the approximate date you anticipate submitting your application to the Corps: Click here to enter text

B. Wind rose

Attach a wind rose. **Attachment**: M

Section 6. Permit Authorization for Sewage Sludge Disposal (Instructions Page 69)

A. Beneficial use authorization

Are you requesting to include authorization to land apply sewage sludge for beneficial use on property located adjacent to the wastewater treatment facility under the wastewater permit?

Yes ☐ No ☒

If yes, attach the completed Application for Permit for Beneficial Land Use of Sewage Sludge (TCEQ Form No. 10451)

Attachment: Click here to enter text.

B. Sludge processing authorization

Identify the sludge processing, storage or disposal options that will be conducted at the wastewater treatment facility:

☐ Sludge Composting

☐ Marketing and Distribution of sludge

☐ Sludge Surface Disposal or Sludge Monofill

If any of the above sludge options are selected, attach a completed DOMESTIC WASTEWATER PERMIT APPLICATION: SEWAGE SLUDGE TECHNICAL REPORT (TCEQ Form No. 10056).

Attachment: Click here to enter text.

Section 7. Sewage Sludge Solids Management Plan (Instructions Page 69)

Attach a solids management plan to the application.

Attachment: N

The sewage sludge solids management plan must contain the following information:

- Treatment units and processes dimensions and capacities
- Solids generated at 100, 75, 50, and 25 percent of design flow
- Mixed liquor suspended solids operating range at design and projected actual flow
- Quantity of solids to be removed and a schedule for solids removal
- Identification and ownership of the ultimate sludge disposal site
- For facultative lagoons, design life calculations, monitoring well locations and depths, and the ultimate disposal method for the sludge from the facultative lagoon

An example of a sewage sludge solids management plan has been included as Example 5 of the instructions.

DOMESTIC TECHNICAL REPORT WORKSHEET 2.0

RECEIVING WATERS

The following is required for all TPDES permit applications

Section 1. Domestic Drinking Water Supply (Instructions Page 73)

Is there a surface water intake for domestic drinking water supply located within 5 miles downstream from the point or proposed point of discharge?

Yes ☐ No ☒

If yes, provide the following:
Owner of the drinking water supply: Click here to enter text.

Distance and direction to the intake: Click here to enter text.

Attach a USGS map that identifies the location of the intake.

Attachment: Click here to enter text.

Section 2. Discharge into Tidally Affected Waters (Instructions Page 73)

Does the facility discharge into tidally affected waters?

Yes ☐ No ☒

If yes, complete the remainder of this section. If no, proceed to Section 3.

A. Receiving water outfall

Width of the receiving water at the outfall, in feet: Click here to enter text.

B. Oyster waters

Are there oyster waters in the vicinity of the discharge?

Yes ☐ No ☐

If yes, provide the distance and direction from outfall(s).

Click here to enter text.

C. Sea grasses

Are there any sea grasses within the vicinity of the point of discharge?

Yes ☐ No ☐

If yes, provide the distance and direction from the outfall(s).

Click here to enter text

Section 3. Classified Segments (Instructions Page 73)

Is the discharge directly into (or within 300 feet of) a classified segment?

Yes ☐ No ☒

If yes, this Worksheet is complete.

If no, complete Sections 4 and 5 of this Worksheet.

Section 4. Description of Immediate Receiving Waters (Instructions Page 75)

Name of the immediate receiving waters: Unnamed Tributary

A. Receiving water type

Identify the appropriate description of the receiving waters.

☐ Stream

☐ Freshwater Swamp or Marsh

☐ Lake or Pond

Surface area, in acres: Click here to enter text

Average depth of the entire water body, in feet: Click here to enter text

Average depth of water body within a 500-foot radius of discharge point, in feet: Click here to enter text

☐ Man-made Channel or Ditch

☐ Open Bay

☐ Tidal Stream, Bayou, or Marsh

☒ Other, specify: Unnamed Tributary (intermittent stream)

B. Flow characteristics

If a stream, man-made channel or ditch was checked above, provide the following. For existing discharges, check one of the following that best characterizes the area *upstream* of the discharge. For new discharges, characterize the area *downstream* of the discharge (check one).

☒ Intermittent - dry for at least one week during most years

☐ Intermittent with Perennial Pools - enduring pools with sufficient habitat to maintain significant aquatic life uses

☐ Perennial - normally flowing

Check the method used to characterize the area upstream (or downstream for new dischargers).

☐ USGS flow records

☐ Historical observation by adjacent landowners

☒ Personal observation

☐ Other, specify: Click here to enter text.

C. Downstream perennial confluences

List the names of all perennial streams that join the receiving water within three miles downstream of the discharge point.

Boggy Creek

D. Downstream characteristics

Do the receiving water characteristics change within three miles downstream of the discharge (e.g., natural or man-made dams, ponds, reservoirs, etc.)?

Yes ☒ No ☐

If yes, discuss how.

The discharge route changes from mainly open pastureland (for 2.21-miles) to medium vegetated creek (for 0.79 miles).

E. Normal dry weather characteristics

Provide general observations of the water body during normal dry weather conditions.

Dry (no water present) with natural vegetation.

Date and time of observation: 1/10/2022, approximately 2 PM

Was the water body influenced by stormwater runoff during observations?

Yes ☐ No ☒

Section 5. General Characteristics of the Waterbody (Instructions Page 74)

A. Upstream influences

Is the immediate receiving water upstream of the discharge or proposed discharge site influenced by any of the following? Check all that apply.

- ☐ Oil field activities
- ☐ Urban runoff
- ☐ Upstream discharges
- ☒ Agricultural runoff
- ☐ Septic tanks
- ☐ Other(s), specify Click here to enter text.

B. Waterbody uses

Observed or evidences of the following uses. Check all that apply.

- ☒ Livestock watering
- ☐ Contact recreation
- ☐ Irrigation withdrawal
- ☐ Non-contact recreation
- ☐ Fishing
- ☐ Navigation

☐ Domestic water supply ☐ Industrial water supply

☐ Park activities ☒ Other(s), specify No activity. Used for conveyance of rainwater

C. Waterbody aesthetics

Check one of the following that best describes the aesthetics of the receiving water and the surrounding area.

☐ Wilderness: outstanding natural beauty; usually wooded or unpastured area; water clarity exceptional

☒ Natural Area: trees and/or native vegetation; some development evident (from fields, pastures, dwellings); water clarity discolored

☐ Common Setting: not offensive; developed but uncluttered; water may be colored or turbid

☐ Offensive: stream does not enhance aesthetics; cluttered; highly developed; dumping areas; water discolored

ATTACHMENT H

PHASING, EFFLUENT PARAMETERS, PROCESS DESCRIPTION AND UNIT SIZING

ATTACHMENT H – PERMIT PHASING, EFFLUENT PARAMETERS, PROCESS DESCRIPTION & UNIT SIZING

PROPOSED PERMIT PHASING

	Interim I Phase	Interim II Phase	Interim III Phase	Final Phase
Design Flow (MGD):	0.30	1.0	2.0	3.0
2-Hr Peak Flow (MGD):	1.20	4.0	8.0	12.00
Estimated Construction Start Date:	01/2023	01/2027	01/2030	01/2033
Estimated Waste Disposal Start Date:	01/2024	01/2028	01/2031	01/2034

PROPOSED EFFLUENT QUALITY PARAMETERS

	Interim I Phase	Interim II Phase	Interim III Phase	Final Phase
Biochemical Oxygen Demand (mg/L):	5	5	5	5
Total Suspended Solids (mg/L):	5	5	5	5
Ammonia Nitrogen (mg/L):	2	2	2	2
Dissolved Oxygen (mg/L):	4	4	4	4

PROPOSED TREATMENT UNIT SIZING SUMMARY

Treatment Basin	No. of Basins Interim I Phase	No. of Basins Interim II Phase	No. of Basins Interim III Phase	No. of Basins Final Phase	Dimensions (all phases)	Anticipated SWD (ft)
Headworks	1	1	2	2	50’ x 20’	5’
Aeration	1	3	6	8	75’ x 30’	12.0’
Sludge Holding	1	2	4	6	50’ x 30’	12.67’
Clarifier	1	2	3	4	60’ Diameter	11.25’
Chlorine Contact or UV	1	2	2	3	40’ x 20’	9.5’
Effluent Filter	1	1	2	2	40’ x 30’	8’

Treatment Process – Interim I Phase

The wastewater treatment plant for the Interim I phase will be an activated sludge process plant. The treatment process will follow the steps below. The number and size of each treatment unit is provided in the table on Page 2.

Activated Sludge Process: Bar-Screen (Headworks) ➡ Aeration Basin ➡ Clarifier ➡ Effluent Filters ➡ Chlorine Contact or UV Disinfection ➡ Discharge Point

Sludge Process: Clarifier ➡ Sludge Holding Basin (or RAS) ➡ TCEQ Permitted Land Application Site/Landfill

Treatment Process – Interim II Phase

The wastewater treatment plant for the Interim II phase will be an activated sludge process plant. The treatment process will follow the steps below. The number and size of each treatment unit is provided in the table on Page 2.

Activated Sludge Process: Bar-Screen (Headworks) ➡ Aeration Basin ➡ Clarifier ➡ Effluent Filters ➡ Chlorine Contact or UV Disinfection ➡ Discharge Point

Sludge Process: Clarifier ➡ Sludge Holding Basin (or RAS) ➡ TCEQ Permitted Land Application Site/Landfill

Treatment Process – Interim III Phase

The wastewater treatment plant for the Interim III phase will be an activated sludge process plant. The treatment process will follow the steps below. The number and size of each treatment unit is provided in the table on Page 2.

Activated Sludge Process: Bar-Screen (Headworks) ➡ Aeration Basin ➡ Clarifier ➡ Effluent Filters ➡ Chlorine Contact or UV Disinfection ➡ Discharge Point

Sludge Process: Clarifier ➡ Sludge Holding Basin (or RAS) ➡ TCEQ Permitted Land Application Site/Landfill

Treatment Process – Final Phase

The wastewater treatment plant for the Final phase will be an activated sludge process plant. The treatment process will follow the steps below. The number and size of each treatment unit is provided in the table on Page 2.

Activated Sludge Process: Bar-Screen (Headworks) → Aeration Basin → Clarifier → Effluent Filters → Chlorine Contact or UV Disinfection → Discharge Point

Sludge Process: Clarifier → Sludge Holding Basin (or RAS) → TCEQ Permitted Land Application Site/Landfill

ATTACHMENT I

FLOW DIAGRAM

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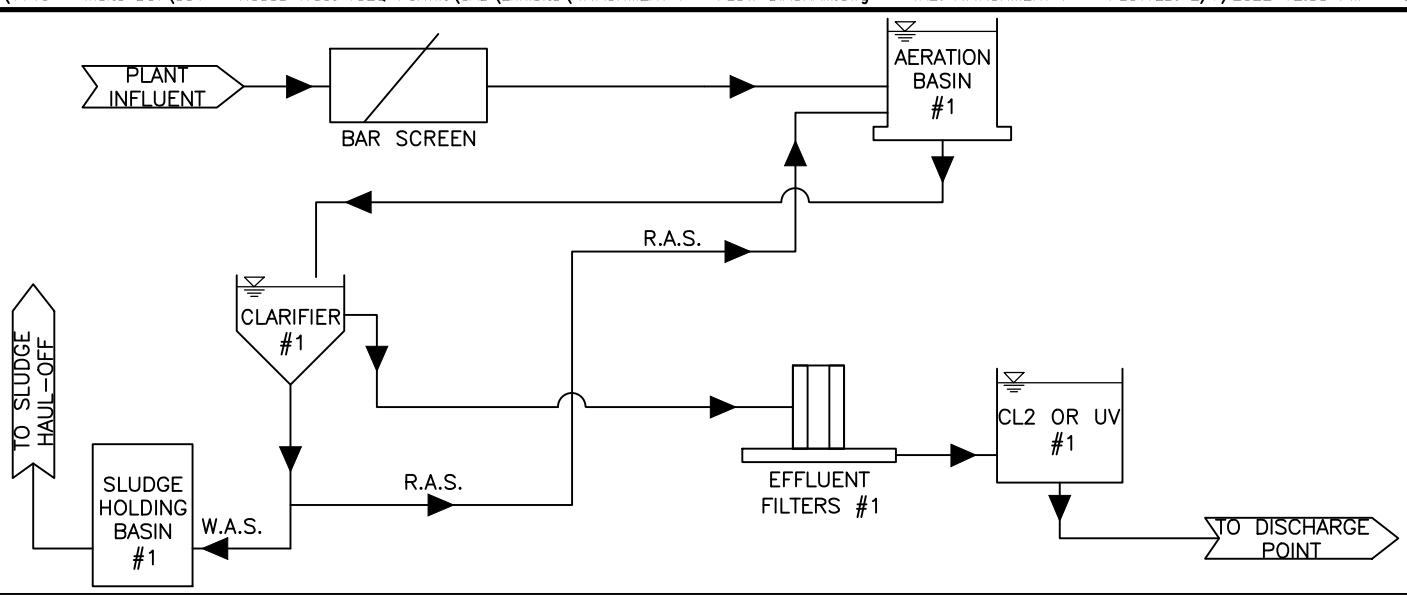
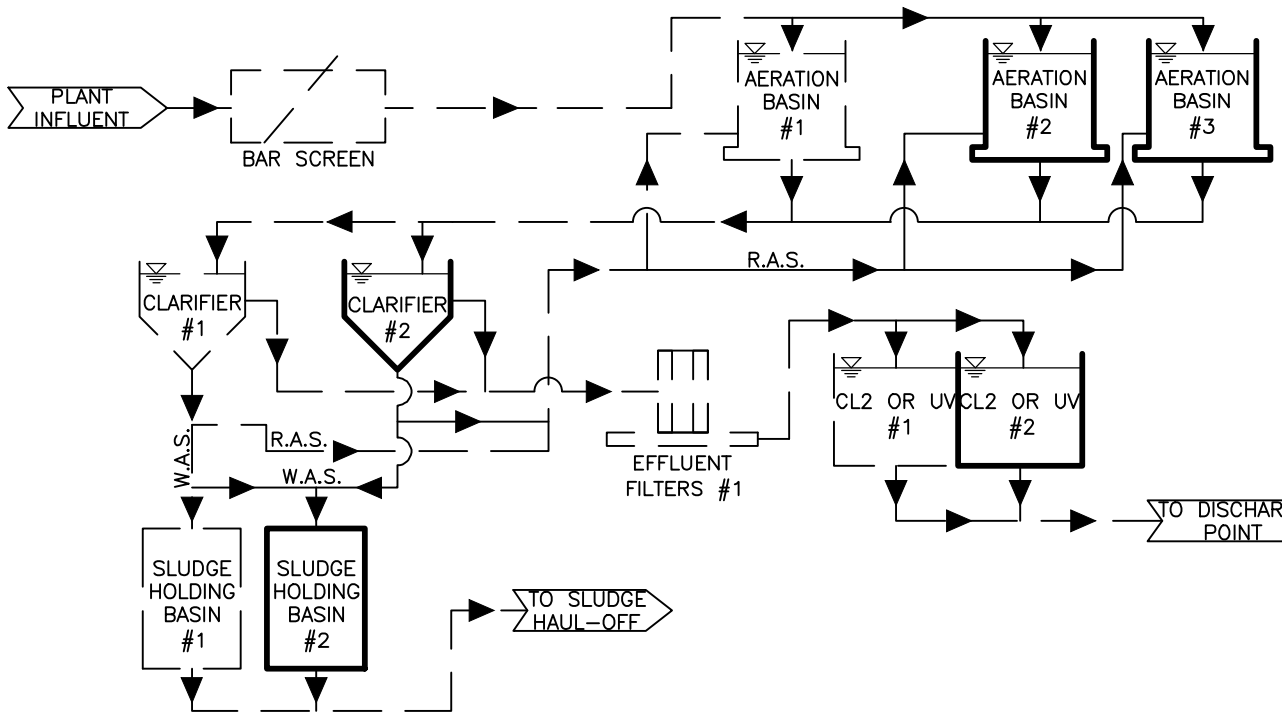
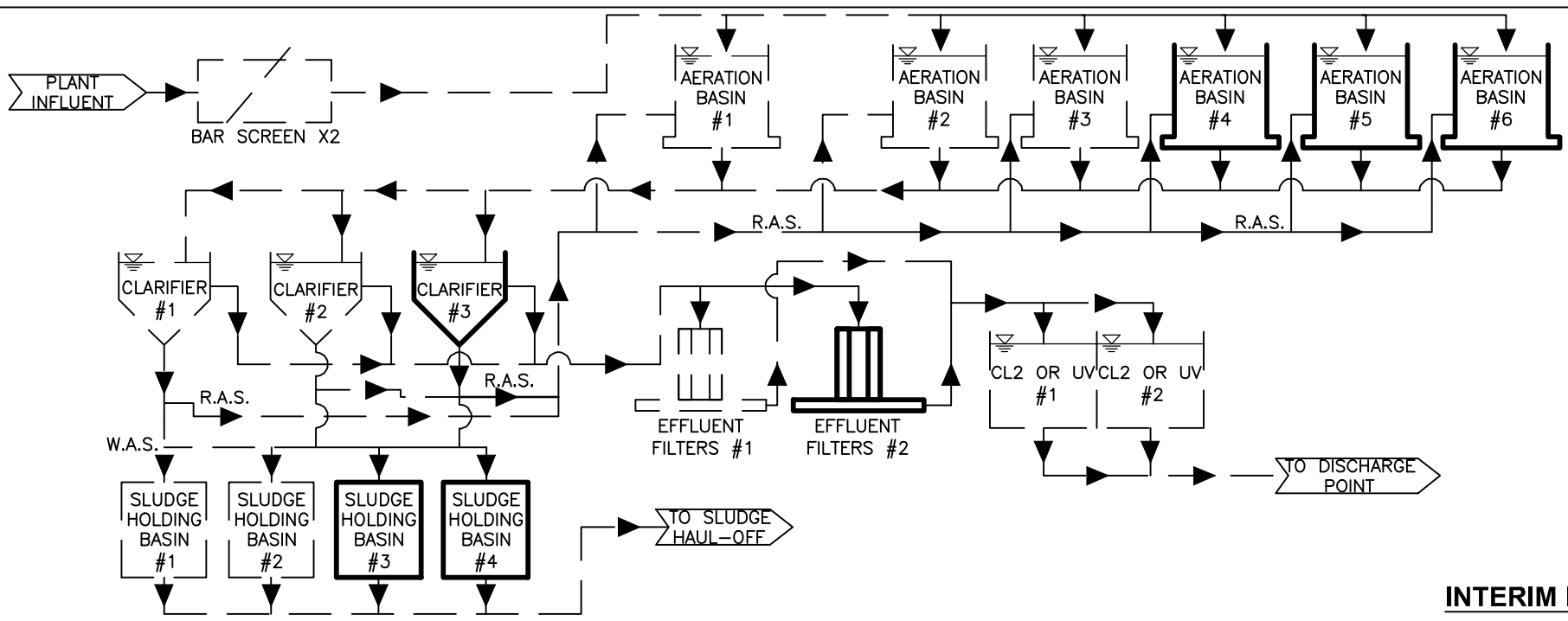


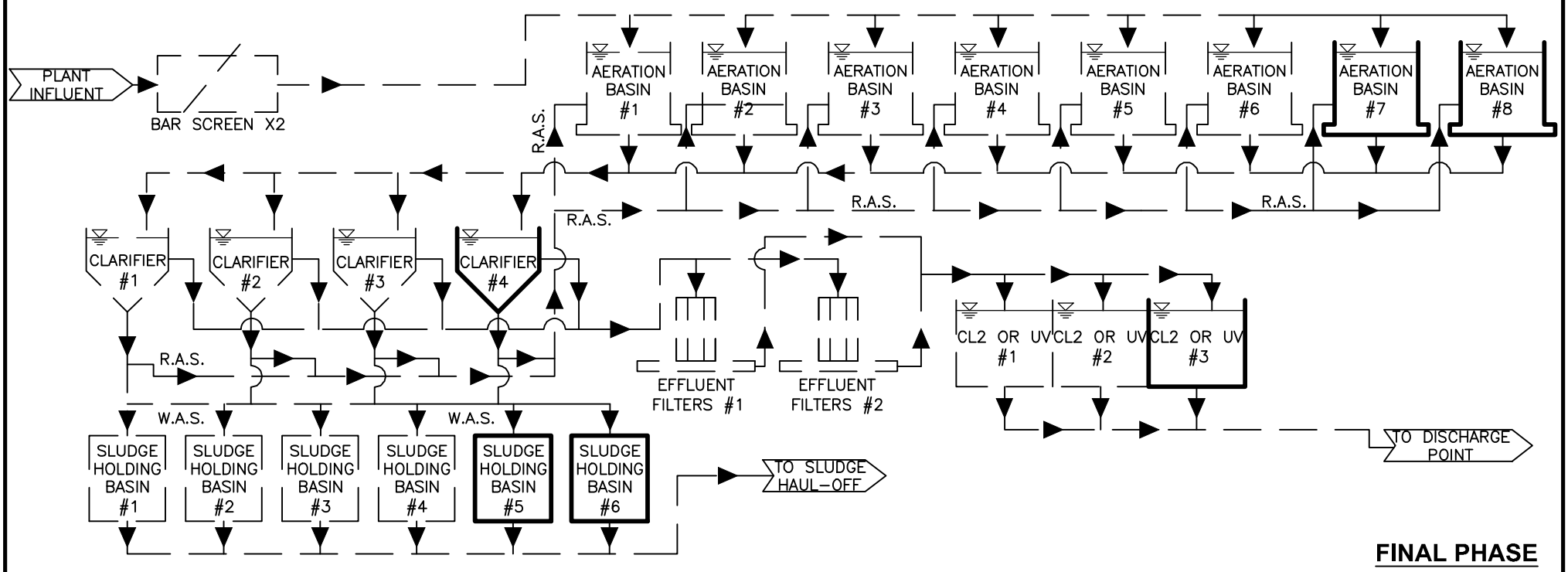
INTERIM I PHASE



INTERIM II PHASE



INTERIM III PHASE



FINAL PHASE

Green Civil Design
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Engineering & Consulting
Texas Registered Engineering Firm F-17563

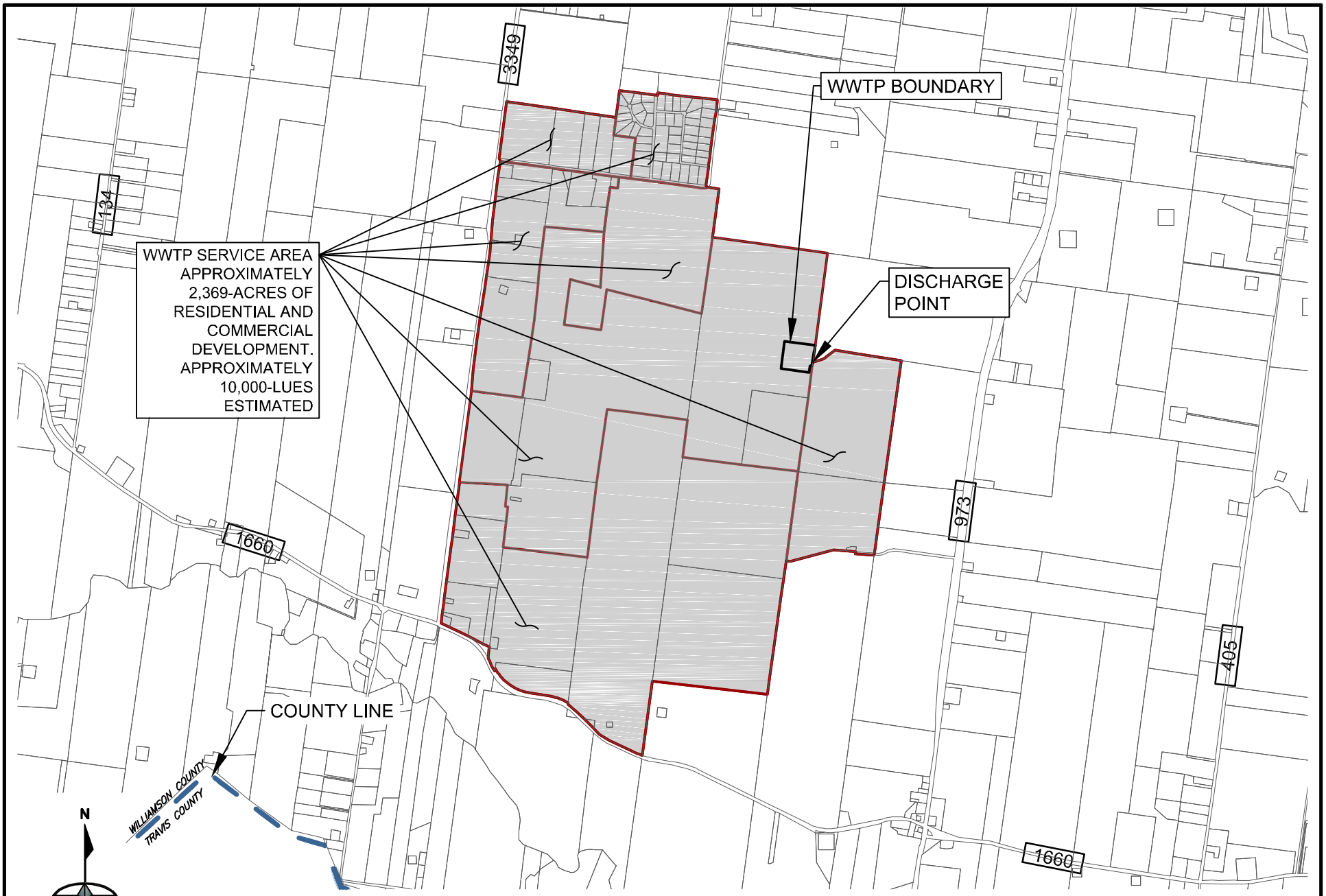
WILCO MUD 45 WWTP, LLC
CIELO RANCH WWTP

ATTACHMENT I - FLOW DIAGRAM

APP000086

ATTACHMENT J

SITE DRAWING



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Engineering & Consulting
Texas Registered Engineering Firm F-17563

WILCO MUD 45 WWTP, LLC
CIELO RANCH WWTP

ATTACHMENT J - SITE DRAWING

APP000088

ATTACHMENT K

DESIGN CALCULATIONS

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
SUMMARY

PARAMETERS

Anticipated Influent Flows:

Average Daily Flow:	300	gpd/connection

Treatment Description:

Conventional activated sludge process mode to treat municipal wastewater.
System to include aeration, clarifier, tertiary filtration, chlorine contact, and sludge holding.

Design WWTP Influent Flows:

	Interim I	Interim II	Interim III	Final
Average Daily (gpd):	300,000	1,000,000	2,000,000	3,000,000
Peak Daily (2-Hr Peak) (gpd):	1,200,000	4,000,000	8,000,000	12,000,000

Design Influent Loading:

BOD_5 (mg/l)=	300	300	300	300
TSS (mg/l)=	300	300	300	300
NH3N (mg/l)=	35	35	35	35
Total Nitrogen (mg/l)=	70	70	70	70
Total Phosphorus (mg/l)=	10	10	10	10

Design Effluent Water Quality Parameters:

BOD_5 (mg/l)=	5	5	5	5
TSS (mg/l)=	5	5	5	5
NH3N (mg/l)=	2	2	2	2
Chorine Residual (after 20 minutes) (mg/l)=	1	1	1	1
Dissolved Oxygen (mg/l)	4	4	4	4
Total Phosphorus (mg/l)	1	1	1	1

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
SUMMARY

PROPOSED FACILITIES

	Interim I	Interim II	Interim III	Final
Process:				
Total Plant BOD5 Loading (lbs/day):	738.1	2460.3	4920.6	7380.9
TSS Loading (lbs/day):	738.1	2460.3	4920.6	7380.9
MLSS (mg/l):	3,000	3,000	3,000	3,000
Hydraulic Retention Time (days):	0.67	0.61	0.61	0.54
Aerobic Sludge Residence Time (days):	7.61	6.85	6.85	6.09
Food to Mass Ratio:	0.149	0.165	0.165	0.186
Sludge Yield (lbs/day):	664	2,214	4,429	6,643
Sludge Yield (gpd): (1.5%)	5,310	17,700	35,400	53,100
Aeration Basin:				
Max Organic Loading (lbs/day/1,000 cf):	35	35	35	35
Proposed Organic Loading (lbs/day/1,000 cf):	27.34	30.37	30.37	34.17
Minimum Required Volume for BOD (cf):	21,088	70,294	140,589	210,883
Minimum Required Volume for Nitrification (cf):	21,322	71,074	142,147	213,221
Proposed Volume (cf):	27,000	81,000	162,000	216,000

	Interim I	Interim II	Interim III	Final
Clarifier:				
Max Surface Loading at PDF (gpd/sf):	1,200	1,200	1,200	1,200
Proposed Surface Loading at PDF (gpd/sf):	445	742	990	1,113
Max Surface Loading at ADF (gpd/sf):	600	600	600	600
Proposed Surface Loading at ADF (gpd/sf):	111	186	247	278
Min Detention Time at PDF (hrs):	1.8	1.8	1.8	1.8
Proposed Detention Time at PDF (hrs):	4.54	2.72	2.04	1.81
Minimum Required Surface Area (sf):	1,000	3,333	6,667	10,000
Proposed Surface Area (sf):	2,695	5,389	8,084	10,779
Minimum Required Volume (cf):	12,031	40,104	80,209	120,313
Minimum Required Weir Length (ft):	60	200	400	600
Proposed Weir Length (ft):	200	200	400	600
Proposed Volume (cf):	30,315	60,631	90,946	121,262
Stilling Well Diameter (ft)	13	13	13	13
Stilling Well Velocity at PDF (ft/s)	0.014	0.047	0.093	0.140
Chlorine Contact Basin:				
Min Detention Time at PDF (min):	20	20	20	20
Detention Time Provided at PDF (min):	34.11	20.47	20.47	20.47
Minimum Required Volume (cf):	2,228.0	7,426.7	14,853.4	22,280.2
Proposed Volume (cf):	3,800.0	7,600.0	15,200.0	22,800.0
Sludge Holding Basin:				
Minimum Required Volume (cf):	10,648	35,492	70,985	106,477
Proposed Volume (cf):	19,005	38,010	76,020	114,030
Proposed Detention Time (days):	27	16	16	16
Air Supply:				
Min Air Supply - Aeration (scfm):	1,640	5,467	10,935	16,402
Min Air Supply - Digester (scfm):	319	1065	2130	3194
Min Air Supply - Air Lift Pumps (scfm):	210	630	1225	1855
Min Total Air Supply (scfm):	2,170	7,162	14,289	21,451

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
SIZING CALCULATIONS

AERATION BASIN

	Interim I	Interim II	Interim III	Final
Minimum Volume Required:	21,322 cf	71,074 cf	142,147 cf	213,221 cf
No. of Basins:	1	3	6	8
Proposed SWD:	12 ft	12 ft	12 ft	12 ft
Length (Ea. Basin):	75 ft	75 ft	75 ft	75 ft
Width (Ea. Basin):	30 ft	30 ft	30 ft	30 ft
Proposed Volume:	**27,000 cf**	**81,000 cf**	**162,000 cf**	**216,000 cf**

SLUDGE HOLDING

	Interim I	Interim II	Interim III	Final
Minimum Volume Required:	10,648 cf	35,492 cf	70,985 cf	106,477 cf
No. of Basins:	1	2	4	6
Proposed SWD:	12.67 ft	12.67 ft	12.67 ft	12.67 ft
Length (Ea. Basin):	50 ft	50 ft	50 ft	50 ft
Width (Ea. Basin):	30 ft	30 ft	30 ft	30 ft
Proposed Volume:	**19,005 cf**	**38,010 cf**	**76,020 cf**	**114,030 cf**

CLARIFIER

	Interim I	Interim II	Interim III	Final
Minimum Surface Area Required:	1,000 sf	3,333 sf	6,667 sf	10,000 sf
Minimum Volume Required:	12,031 cf	40,104 cf	80,209 cf	120,313 cf
Minimum Weir Length Required:	60 ft	200 ft	400 ft	600 ft
No. of Clarifiers:	1	2	3	4
Proposed SWD:	11.25 ft	11.25 ft	11.25 ft	11.25 ft
Proposed Diameter:	60	60	60	60
Proposed Stilling Well Diameter:	13 ft	13 ft	13 ft	13 ft
Proposed Weir Length:	200 ft	200 ft	400 ft	600 ft
Proposed Area:	**2,695 sf**	**5,389 sf**	**8,084 sf**	**10,779 sf**
Proposed Volume:	**30,315 cf**	**60,631 cf**	**90,946 cf**	**121,262 cf**

CHLORINE CONTACT

	Interim I	Interim II	Interim III	Final
Minimum Volume Required:	2,228.0 cf	7,426.7 cf	14,853.4 cf	22,280 cf
No. of Basins	1	2	2	3
Proposed SWD:	9.5 ft	9.5 ft	9.5 ft	9.5 ft
Width (Ea. Basin):	10 ft	10 ft	20 ft	20 ft
Length (Ea. Basin):	40 ft	40 ft	40 ft	40 ft
Total Volume:	3,800.00 cf	7,600.00 cf	15,200.00 cf	22,800.00 cf
Proposed Volume:	**3,800.00 cf**	**7,600.00 cf**	**15,200.00 cf**	**22,800.00 cf**

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
INTERIM I PHASE

PARAMETERS

Influent:			*Effluent:*		
Q =	300,000	GPD	S =	5	mg/l, BOD_{5eff}
Qp_1 =	1,200,000	GPD to Headworks	TSSeff =	5	mg/l
Qp_2 =	1,200,000	GPD downstream of Infl EQ (N/A)	NH_3N =	2	mg/l
So =	300	mg/l, BOD_5infl	Chlorine Residual =	1	mg/l @ 20 min det
TSSinf =	300	mg/l	Total Phosphorus =	1	mg/l
Chemical Oxygen Demand (COD) =	545	mg/l .3-.8 (BOD/COD), used 0.55			
TKN =	70	mg/l			
NH_3N =	35	mg/l			
Organic $N_{14° C}$ =	35	mg/l			
Winter Temp. Min. =	15	°C			
Summer Temp. Max. =	29	°C			
MLSS =	3,000	mg/l, conc. Of suspended solids in aeration tank			
MLVSS =	70	% of MLSS			
MLVSS (X) =	2100	mg/l, conc. Of volatile suspended solids in aeration tank			

COEFFICIENTS

θc =	30	days, mean cell residence time
Y =	0.4	maximum yield coefficient, range: 0.3 - 0.5 (Metcalf & Eddy Table 8-10)
Y_n =	0.12	g VSS / g NH4-N, range: 0.1 - 0.15 (Metcalf & Eddy Table 8-11)
K_o =	0.5	g / m^3, range: 0.40 - 0.60 (Metcalf & Eddy Table 8-11)
k_d =	0.12	day^-1, endogenous decay coefficient, range: 0.06 - 0.2 (Metcalf & Eddy Table 8-10)
k_d =	1.04	unitless, range: 1.03 - 1.08 (Metcalf & Eddy Table 8-10)
$k_{d,\ 14°C}$ =	0.099	g/g*d
K_{dn} =	0.080	g VSS / g VSS*d, range: 0.05 - 0.15 (Metcalf & Eddy Table 8-10)
K_{dn} =	1.04	unitless, range: 1.03 - 1.08 (Metcalf & Eddy Table 8-11)
$K_{dn,\ 14°C}$ =	0.066	g/g*d
K_n =	0.740	g NH4-N / m^3, range: 0.5 - 1.0 (Metcalf & Eddy Table 8-11)
K_n =	1.053	unitless, range: 1.03 - 1.123 (Metcalf & Eddy Table 8-11)
$K_{n,\ 14°}C$ =	0.572	g / m^3
μ_{mn} =	0.750	g VSS / g VSS*d, range: 0.20 - 0.90 (Metcalf & Eddy Table 8-11)
μ_n =	1.070	unitless, range: 1.06 - 1.123 (Metcalf & Eddy Table 8-11)
$\mu_{m,\ 14°C}$ =	0.535	g /g*d
f_d =	0.150	unitless, range: 0.08 - 0.2 (Metcalf & Eddy Table 8-10)

DESIGN CALCULATIONS

A. BOD_5 Loading

$$F = \frac{8.34 \times Q \times (S_o - S)}{10^6}$$

F = **738.1** lb BOD_5 /day

B. TSS Loading

$$TSS = \frac{8.34 \times Q \times (TSS_{\text{inf}} - TSS_{eff})}{10^6}$$

TSS = **738.1** lb TSS /day

C. Micro-organism Mass in Aeration Basin

$$M_v = F \times \frac{\theta_c \times Y}{1 + (k_d \times \theta_c)}$$

Mv = **1925** lb

D. Aeration Volume

$$V = \frac{Q \times \theta_c}{X} \times \frac{Y \times (S_o - S)}{1 + (k_d \times \theta_c)}$$

Min Volume (gal): 109,937.89
Min Volume (cf): 14,697

TCEQ Max. Organic Loading: 35 lbs BOD5/day/1000 cf (TCEQ Chap. 217.154: Conventional with Nitrification, Temps 715°C)

Min Volume (cf): 21,088

Min Volume (cf): 21,088 For BOD Reduction

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
INTERIM I PHASE

E. Nitrification

pH:	7.2		
DO (mg/L):	2.0	Dissolved Oxygen	
Ko:	0.5	Half-Saturation coefficient for DO (Metcalf & Eddy Table 8-11)	
Temp (°C):	15.0		
Effluent NH3 (mg/L):	2.0		
Temperature Term, Tt:	1.00		Tt=e^(0.098*(T-15))
DO Term, DOt:	0.80		DOt=DO/(Ko+DO)
pH Term, pHt:	1.00		pHt=1-0.833*(7.2-pH)
Kn:	0.40	Half-Saturation coefficient for oxidation of ammonia	Kn=10^(0.051*T-1.158)
NH3 Term, NH3t:	0.83		NH3t=NH3/(Kn+NH3)
Nitrifier Growth Rate (days^-1):	0.33		Growth Rate=0.5*Tt*pHt*DOt*NH3t
Aerobic SRT Required (days):	3.01		SRT=1/Nitrifier Growth Rate
Safety Factor:	2.0	Typical Range: 1.5 - 2.5	
Min Required Aerobic SRT (days):	**6.0**		
Minimum Aerobic Volume (cf):	**21,322.1**	**For Nitrification**	

F. Sludge Yield

	0.9	lbs Sludge / lb BOD
Sludge Yield:	664	lbs/day
Assume Percent Solids =	1.5	%
Q_{sludge} =	**5,310**	**gal/day**

G. Clarifier

Max Surface Loading:	1,200	gpd/sf at Peak Flow	(TCEQ Chap. 217.154: Activated Sludge, Secondary with
Max Surface Loading:	600	gpd/sf at Design Flow	
Min Detention Time:	1.8	hrs at Peak Flow	
Max Weir Loading:	20,000	gpd/lf at Peak Flow	
Minimum Surface Area:	**1,000**	**sf**	
Minimum Volume:	**90,000**	**gallons =**	**12031.3 cf**
Minimum Weir Length:	**60**	**lf**	

H. Return Activated Sludge

Minimum Rate:	**50%**	**of Design Flow =**	**104.2**	**gpm**	
Maximum Rate:	**100%**	**of Design Flow =**	**208.3**	**gpm**	
Provide:	**6**	**6" Air Lift Pumps or**	**3**	**8" Air Lift Pumps**	(If Air Lift Pumps Utilized)

I. Sludge Holding Basin

Max Loading:	200	lbs volatile solids per day / 1,000 cf (TCEQ Chap. 217.249.j.5)
Sludge Yield (lbs/day):	664	
Volatile Portion:	70%	
Min Basin Volume (cf):	2,325	
Minimum Detention Time:	15	days (TCEQ Chap. 217.249.j.4)
Sludge Yield (gpd):	5,310	
Min Basin Volume (cf):	10,648	
Min Required Basin Volume (cf):	**10,647.7**	

J. Chlorine Contact Basin

Minimum Detention Time:	20	minutes at Peak Flow		
Minimum Volume:	**16,666.67**	**gallons =**	**2,228.0**	**cf**

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
INTERIM I PHASE

K. Aeration

1. Aeration Basins

Minimum oxygen requirement = 3,200 scf per lb BOD_5 per day @ 12' submergence and 20 deg C

Diffuser Submergence Depth (ft)	Airflow Correction Factor
8	1.82
10	1.56
12	1.00
15	0.91
18	0.73
20	0.64

Diffuser Submergence Depth = 12 ft
Correction Factor = 1.00

Minimum oxygen requirement = 1,640 scfm @ 20 deg C

2. Digester

Oxygen Requirement = 30 scfm per 1,000 ft^3

Minimum oxygen requirement = 319 scfm

3. Air Lift Pumps

Minimum air requirement = 210 scfm

4. Total

Total Air Flow Requirement = 2,170 scfm

L. Fine Screen

Bar Spacing: 0.25 in
Average Flow Rate: 0.3 MGD
Approximate Volume of Screenings: 13 cf/MG

Anticipated Volume of Screenings: 3.9 cf per day 1.01 CY Per Week

COARSE SCREEN (BYPASS/OVERFLOW BAR SCREEN)

Influent Flow Rate

Average Influent Flow Rate:	0.30	MGD	=	208	gpm	=	0.464	cfs
Peak Influent Flow Rate:	1.20	MGD	=	833	gpm	=	1.857	cfs

Channel Geometry

Channel Width: 2.00 ft
Design Channel Flow Depth: 0.5 ft
Max. Channel Depth: 2.1 ft

Bar Rack Geometry

Bar Size: 0.625 in
Clear Space Between Bars: 0.462 in
Incline Angle: 45 degrees

No. of Bars in Rack: 23
Clear Space: 0.8020833 sf per ft of channel depth

Headloss thru Bar Screen

Channel Area (Avg): 1.0 sf
Channel Area (Max): 4.2 sf
Approach Velocity (Avg): 0.464 fps (using design channel depth)
Approach Velocity (Peak): 0.442 fps (using max. channel depth)

Bar Screen Area (Avg): 0.40 sf
Bar Screen Area (Max): 1.68 sf
Velocity Through Bars (Avg): 1.16 fps (using design channel depth)
Velocity Through Bars (Max): 1.10 fps (using max. channel depth)

$$HeadLoss = \frac{V^2 - v^2}{0.7 \times 2 \times g}$$

V= Velocity of flow through openings in rack
v= Approach velocity
g= Acceleration of gravity, 32.2

Assuming No Clogging:			*Assuming Clogging:*		
			Clogging Factor:	0.500	
Head Loss (Design):	0.0249	ft	Head Loss (Design):	0.100	ft
Head Loss (Max):	0.0226	ft	Head Loss (Max):	0.090	ft

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
INTERIM II PHASE

PARAMETERS

Influent:			*Effluent:*		
Q =	1,000,000	GPD	S =	5	mg/l, BOD_{5eff}
Qp_1 =	4,000,000	GPD to Headworks	TSSeff =	5	mg/l
Qp_2 =	4,000,000	GPD downstream of Infl EQ (N/A)	NH_3N =	2	mg/l
So =	300	mg/l, BOD_5infl	Chlorine Residual =	1	mg/l @ 20 min det
TSSinf =	300	mg/l	Total Phosphorus =	1	mg/l
Chemical Oxygen Demand (COD) =	545	mg/l .3-.8 (BOD/COD), used 0.55			
TKN =	70	mg/l			
NH_3N =	35	mg/l			
Organic $N_{14° C}$ =	35	mg/l			
Winter Temp. Min. =	15	°C			
Summer Temp. Max. =	29	°C			
MLSS =	3,000	mg/l, conc. Of suspended solids in aeration tank			
MLVSS =	70	% of MLSS			
MLVSS (X) =	2100	mg/l, conc. Of volatile suspended solids in aeration tank			

COEFFICIENTS

θc =	30	days, mean cell residence time
Y =	0.4	maximum yield coefficient, range: 0.3 - 0.5 (Metcalf & Eddy Table 8-10)
Y_n =	0.12	g VSS / g NH4-N, range: 0.1 - 0.15 (Metcalf & Eddy Table 8-11)
K_o =	0.5	g / m^3, range: 0.40 - 0.60 (Metcalf & Eddy Table 8-11)
k_d =	0.12	day^-1, endogenous decay coefficient, range: 0.06 - 0.2 (Metcalf & Eddy Table 8-10)
k_d =	1.04	unitless, range: 1.03 - 1.08 (Metcalf & Eddy Table 8-10)
$k_{d,\ 14°C}$ =	0.099	g/g*d
K_{dn} =	0.080	g VSS / g VSS*d, range: 0.05 - 0.15 (Metcalf & Eddy Table 8-10)
K_{dn} =	1.04	unitless, range: 1.03 - 1.08 (Metcalf & Eddy Table 8-11)
$K_{dn,\ 14°C}$ =	0.066	g/g*d
K_n =	0.740	g NH4-N / m^3, range: 0.5 - 1.0 (Metcalf & Eddy Table 8-11)
K_n =	1.053	unitless, range: 1.03 - 1.123 (Metcalf & Eddy Table 8-11)
$K_{n,\ 14°}C$ =	0.572	g / m^3
μ_{mn} =	0.750	g VSS / g VSS*d, range: 0.20 - 0.90 (Metcalf & Eddy Table 8-11)
μ_n =	1.070	unitless, range: 1.06 - 1.123 (Metcalf & Eddy Table 8-11)
$\mu_{m,\ 14°C}$ =	0.535	g /g*d
f_d =	0.150	unitless, range: 0.08 - 0.2 (Metcalf & Eddy Table 8-10)

DESIGN CALCULATIONS

A. BOD_5 Loading

$$F = \frac{8.34 \times Q \times (S_o - S)}{10^6}$$

F = **2460.3** lb BOD_5 /day

B. TSS Loading

$$TSS = \frac{8.34 \times Q \times (TSS_{\text{inf}} - TSS_{eff})}{10^6}$$

TSS = **2460.3** lb TSS /day

C. Micro-organism Mass in Aeration Basin

$$M_v = F \times \frac{\theta_c \times Y}{1 + (k_d \times \theta_c)}$$

Mv = **6418** lb

D. Aeration Volume

$$V = \frac{Q \times \theta_c}{X} \times \frac{Y \times (S_o - S)}{1 + (k_d \times \theta_c)}$$

Min Volume (gal): 366,459.63
Min Volume (cf): 48,989

TCEQ Max. Organic Loading: 35 lbs BOD5/day/1000 cf (TCEQ Chap. 217.154: Conventional with Nitrification, Temps 715°C)

Min Volume (cf): 70,294

Min Volume (cf): 70,294 For BOD Reduction

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
INTERIM II PHASE

E. Nitrification

pH:	7.2		
DO (mg/L):	2.0	Dissolved Oxygen	
Ko:	0.5	Half-Saturation coefficient for DO (Metcalf & Eddy Table 8-11)	
Temp (°C):	15.0		
Effluent NH3 (mg/L):	2.0		
Temperature Term, Tt:	1.00		Tt=e^(0.098*(T-15))
DO Term, DOt:	0.80		DOt=DO/(Ko+DO)
pH Term, pHt:	1.00		pHt=1-0.833*(7.2-pH)
Kn:	0.40	Half-Saturation coefficient for oxidation of ammonia	Kn=10^(0.051*T-1.158)
NH3 Term, NH3t:	0.83		NH3t=NH3/(Kn+NH3)
Nitrifier Growth Rate (days^-1):	0.33		Growth Rate=0.5*Tt*pHt*DOt*NH3t
Aerobic SRT Required (days):	3.01		SRT=1/Nitrifier Growth Rate
Safety Factor:	2.0	Typical Range: 1.5 - 2.5	
Min Required Aerobic SRT (days):	**6.0**		
Minimum Aerobic Volume (cf):	**71,073.7**	**For Nitrification**	

F. Sludge Yield

	0.9	lbs Sludge / lb BOD
Sludge Yield:	2,214	lbs/day
Assume Percent Solids =	1.5	%
Q_{sludge} =	**17,700**	**gal/day**

G. Clarifier

Max Surface Loading:	1,200	gpd/sf at Peak Flow	(TCEQ Chap. 217.154: Activated Sludge, Secondary with
Max Surface Loading:	600	gpd/sf at Design Flow	
Min Detention Time:	1.8	hrs at Peak Flow	
Max Weir Loading:	20,000	gpd/lf at Peak Flow	
Minimum Surface Area:	**3,333**	**sf**	
Minimum Volume:	**300,000**	**gallons =**	**40104.3 cf**
Minimum Weir Length:	**200**	**lf**	

H. Return Activated Sludge

Minimum Rate:	**50%**	**of Design Flow =**	**347.2**	**gpm**	
Maximum Rate:	**100%**	**of Design Flow =**	**694.4**	**gpm**	
Provide:	**18**	**6" Air Lift Pumps or**	**10**	**8" Air Lift Pumps**	(If Air Lift Pumps Utilized)

I. Sludge Holding Basin

Max Loading:	200	lbs volatile solids per day / 1,000 cf (TCEQ Chap. 217.249.j.5)
Sludge Yield (lbs/day):	2,214	
Volatile Portion:	70%	
Min Basin Volume (cf):	7,750	
Minimum Detention Time:	15	days (TCEQ Chap. 217.249.j.4)
Sludge Yield (gpd):	17,700	
Min Basin Volume (cf):	35,492	
Min Required Basin Volume (cf):	**35,492.3**	

J. Chlorine Contact Basin

Minimum Detention Time:	20	minutes at Peak Flow		
Minimum Volume:	**55,555.56**	**gallons =**	**7,426.7**	**cf**

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
INTERIM II PHASE

K. Aeration

1. Aeration Basins

Minimum oxygen requirement = 3,200 scf per lb BOD_5 per day @ 12' submergence and 20 deg C

Diffuser Submergence Depth (ft)	Airflow Correction Factor
8	1.82
10	1.56
12	1.00
15	0.91
18	0.73
20	0.64

Diffuser Submergence Depth = 12 ft
Correction Factor = 1.00

Minimum oxygen requirement = 5,467 scfm @ 20 deg C

2. Digester

Oxygen Requirement = 30 scfm per 1,000 ft^3

Minimum oxygen requirement = 1065 scfm

3. Air Lift Pumps

Minimum air requirement = 630 scfm

4. Total

Total Air Flow Requirement = 7,162 scfm

L. Fine Screen

Bar Spacing: 0.25 in
Average Flow Rate: 1.0 MGD
Approximate Volume of Screenings: 13 cf/MG

Anticipated Volume of Screenings: 13 cf per day 3.37 CY Per Week

COARSE SCREEN (BYPASS/OVERFLOW BAR SCREEN)

Influent Flow Rate

Average Influent Flow Rate:	1.00	MGD	=	694	gpm	=	1.547	cfs
Peak Influent Flow Rate:	4.00	MGD	=	2778	gpm	=	6.189	cfs

Channel Geometry

Channel Width: 2.00 ft
Design Channel Flow Depth: 1.9 ft
Max. Channel Depth: 2.6 ft

Bar Rack Geometry

Bar Size: 0.625 in
Clear Space Between Bars: 0.462 in
Incline Angle: 45 degrees

No. of Bars in Rack: 23
Clear Space: 0.8020833 sf per ft of channel depth

Headloss thru Bar Screen

Channel Area (Avg): 3.8 sf
Channel Area (Max): 5.2 sf
Approach Velocity (Avg): 0.407 fps (using design channel depth)
Approach Velocity (Peak): 1.190 fps (using max. channel depth)

Bar Screen Area (Avg): 1.52 sf
Bar Screen Area (Max): 2.09 sf
Velocity Through Bars (Avg): 1.02 fps (using design channel depth)
Velocity Through Bars (Max): 2.97 fps (using max. channel depth)

$$HeadLoss = \frac{V^2 - v^2}{0.7 \times 2 \times g}$$

V= Velocity of flow through openings in rack
v= Approach velocity
g= Acceleration of gravity, 32.2

Assuming No Clogging:			*Assuming Clogging:*		
			Clogging Factor:	0.500	
Head Loss (Design):	0.0192	ft	Head Loss (Design):	0.077	ft
Head Loss (Max):	0.1639	ft	Head Loss (Max):	0.656	ft

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
INTERIM III PHASE

PARAMETERS

Influent:			*Effluent:*		
Q =	2,000,000	GPD	S =	5	mg/l, BOD_{5eff}
Qp_1 =	8,000,000	GPD to Headworks	TSSeff =	5	mg/l
Qp_2 =	8,000,000	GPD downstream of Infl EQ (N/A)	NH_3N =	2	mg/l
So =	300	mg/l, BOD_5infl	Chlorine Residual =	1	mg/l @ 20 min det
TSSinf =	300	mg/l	Total Phosphorus =	1	mg/l
Chemical Oxygen Demand (COD) =	545	mg/l .3-.8 (BOD/COD), used 0.55			
TKN =	70	mg/l			
NH_3N =	35	mg/l			
Organic $N_{14° C}$ =	35	mg/l			
Winter Temp. Min. =	15	°C			
Summer Temp. Max. =	29	°C			
MLSS =	3,000	mg/l, conc. Of suspended solids in aeration tank			
MLVSS =	70	% of MLSS			
MLVSS (X) =	2100	mg/l, conc. Of volatile suspended solids in aeration tank			

COEFFICIENTS

θc =	30	days, mean cell residence time
Y =	0.4	maximum yield coefficient, range: 0.3 - 0.5 (Metcalf & Eddy Table 8-10)
Y_n =	0.12	g VSS / g NH4-N, range: 0.1 - 0.15 (Metcalf & Eddy Table 8-11)
K_o =	0.5	g / m^3, range: 0.40 - 0.60 (Metcalf & Eddy Table 8-11)
k_d =	0.12	day^-1, endogenous decay coefficient, range: 0.06 - 0.2 (Metcalf & Eddy Table 8-10)
k_d =	1.04	unitless, range: 1.03 - 1.08 (Metcalf & Eddy Table 8-10)
$k_{d,\ 14°C}$ =	0.099	g/g*d
K_{dn} =	0.080	g VSS / g VSS*d, range: 0.05 - 0.15 (Metcalf & Eddy Table 8-10)
K_{dn} =	1.04	unitless, range: 1.03 - 1.08 (Metcalf & Eddy Table 8-11)
$K_{dn,\ 14°C}$ =	0.066	g/g*d
K_n =	0.740	g NH4-N / m^3, range: 0.5 - 1.0 (Metcalf & Eddy Table 8-11)
K_n =	1.053	unitless, range: 1.03 - 1.123 (Metcalf & Eddy Table 8-11)
$K_{n,\ 14°C}$ =	0.572	g / m^3
μ_{mn} =	0.750	g VSS / g VSS*d, range: 0.20 - 0.90 (Metcalf & Eddy Table 8-11)
μ_n =	1.070	unitless, range: 1.06 - 1.123 (Metcalf & Eddy Table 8-11)
$\mu_{m,\ 14°C}$ =	0.535	g /g*d
f_d =	0.150	unitless, range: 0.08 - 0.2 (Metcalf & Eddy Table 8-10)

DESIGN CALCULATIONS

A. BOD_5 Loading

$$F = \frac{8.34 \times Q \times (S_o - S)}{10^6}$$

F = **4920.6** lb BOD_5 /day

B. TSS Loading

$$TSS = \frac{8.34 \times Q \times (TSS_{\text{inf}} - TSS_{eff})}{10^6}$$

TSS = **4920.6** lb TSS /day

C. Micro-organism Mass in Aeration Basin

$$M_v = F \times \frac{\theta_c \times Y}{1 + (k_d \times \theta_c)}$$

Mv = **12836** lb

D. Aeration Volume

$$V = \frac{Q \times \theta_c}{X} \times \frac{Y \times (S_o - S)}{1 + (k_d \times \theta_c)}$$

Min Volume (gal): 732,919.25
Min Volume (cf): 97,977

TCEQ Max. Organic Loading: 35 lbs BOD5/day/1000 cf (TCEQ Chap. 217.154: Conventional with Nitrification, Temps 715°C)

Min Volume (cf): 140,589

Min Volume (cf): 140,589 For BOD Reduction

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
INTERIM III PHASE

E. Nitrification

pH:	7.2		
DO (mg/L):	2.0	Dissolved Oxygen	
Ko:	0.5	Half-Saturation coefficient for DO (Metcalf & Eddy Table 8-11)	
Temp (°C):	15.0		
Effluent NH3 (mg/L):	2.0		
Temperature Term, Tt:	1.00		Tt=e^(0.098*(T-15))
DO Term, DOt:	0.80		DOt=DO/(Ko+DO)
pH Term, pHt:	1.00		pHt=1-0.833*(7.2-pH)
Kn:	0.40	Half-Saturation coefficient for oxidation of ammonia	Kn=10^(0.051*T-1.158)
NH3 Term, NH3t:	0.83		NH3t=NH3/(Kn+NH3)
Nitrifier Growth Rate (days^-1):	0.33		Growth Rate=0.5*Tt*pHt*DOt*NH3t
Aerobic SRT Required (days):	3.01		SRT=1/Nitrifier Growth Rate
Safety Factor:	2.0	Typical Range: 1.5 - 2.5	
Min Required Aerobic SRT (days):	**6.0**		
Minimum Aerobic Volume (cf):	**142,147.4**	**For Nitrification**	

F. Sludge Yield

	0.9	lbs Sludge / lb BOD
Sludge Yield:	4,429	lbs/day
Assume Percent Solids =	1.5	%
Q_{sludge} =	**35,400**	**gal/day**

G. Clarifier

Max Surface Loading:	1,200	gpd/sf at Peak Flow	(TCEQ Chap. 217.154: Activated Sludge, Secondary with Nitrification)
Max Surface Loading:	600	gpd/sf at Design Flow	
Min Detention Time:	1.8	hrs at Peak Flow	
Max Weir Loading:	20,000	gpd/lf at Peak Flow	
Minimum Surface Area:	**6,667**	**sf**	
Minimum Volume:	**600,000**	**gallons =**	**80208.5 cf**
Minimum Weir Length:	**400**	**lf**	

H. Return Activated Sludge

Minimum Rate:	**50%**	**of Design Flow =**	**694.4**	**gpm**	
Maximum Rate:	**100%**	**of Design Flow =**	**1,388.9**	**gpm**	
Provide:	**35**	**6" Air Lift Pumps or**	**20**	**8" Air Lift Pumps**	(If Air Lift Pumps Utilized)

I. Sludge Holding Basin

Max Loading:	200	lbs volatile solids per day / 1,000 cf (TCEQ Chap. 217.249.j.5)
Sludge Yield (lbs/day):	4,429	
Volatile Portion:	70%	
Min Basin Volume (cf):	15,500	
Minimum Detention Time:	15	days (TCEQ Chap. 217.249.j.4)
Sludge Yield (gpd):	35,400	
Min Basin Volume (cf):	70,985	
Min Required Basin Volume (cf):	**70,984.6**	

J. Chlorine Contact Basin

Minimum Detention Time:	20	minutes at Peak Flow		
Minimum Volume:	**111,111.11**	**gallons =**	**14,853.4**	**cf**

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
INTERIM III PHASE

K. Aeration

1. Aeration Basins

Minimum oxygen requirement = 3,200 scf per lb BOD_5 per day @ 12' submergence and 20 deg C

Diffuser Submergence Depth (ft)	Airflow Correction Factor
8	1.82
10	1.56
12	1.00
15	0.91
18	0.73
20	0.64

Diffuser Submergence Depth = 12 ft
Correction Factor = 1.00

Minimum oxygen requirement = 10,935 scfm @ 20 deg C

2. Digester

Oxygen Requirement = 30 scfm per 1,000 ft^3

Minimum oxygen requirement = 2130 scfm

3. Air Lift Pumps

Minimum air requirement = 1225 scfm

4. Total

Total Air Flow Requirement = 14,289 scfm

L. Fine Screen

Bar Spacing: 0.25 in
Average Flow Rate: 2.0 MGD
Approximate Volume of Screenings: 13 cf/MG

Anticipated Volume of Screenings: 26 cf per day 6.74 CY Per Week

COARSE SCREEN (BYPASS/OVERFLOW BAR SCREEN)

Influent Flow Rate

Average Influent Flow Rate:	2.00	MGD	=	1389	gpm	=	3.094	cfs
Peak Influent Flow Rate:	8.00	MGD	=	5556	gpm	=	12.378	cfs

Channel Geometry

Channel Width: 2.00 ft
Design Channel Flow Depth: 3.3 ft
Max. Channel Depth: 3.3 ft

Bar Rack Geometry

Bar Size: 0.625 in
Clear Space Between Bars: 0.462 in
Incline Angle: 45 degrees

No. of Bars in Rack: 23
Clear Space: 0.80208333 sf per ft of channel depth

Headloss thru Bar Screen

Channel Area (Avg): 6.6 sf
Channel Area (Max): 6.6 sf
Approach Velocity (Avg): 0.469 fps (using design channel depth)
Approach Velocity (Peak): 1.875 fps (using max. channel depth)

Bar Screen Area (Avg): 2.65 sf
Bar Screen Area (Max): 2.65 sf
Velocity Through Bars (Avg): 1.17 fps (using design channel depth)
Velocity Through Bars (Max): 4.68 fps (using max. channel depth)

$$HeadLoss = \frac{V^2 - v^2}{0.7 \times 2 \times g}$$

V= Velocity of flow through openings in rack
v= Approach velocity
g= Acceleration of gravity, 32.2

Assuming No Clogging:			*Assuming Clogging:*		
			Clogging Factor:	0.500	
Head Loss (Design):	0.0254	ft	Head Loss (Design):	0.102	ft
Head Loss (Max):	0.4071	ft	Head Loss (Max):	1.628	ft

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
FINAL PHASE

PARAMETERS

Influent:			*Effluent:*		
Q =	3,000,000	GPD	S =	5	mg/l, BOD_{5eff}
Qp_1 =	12,000,000	GPD to Headworks	TSSeff =	5	mg/l
Qp_2 =	12,000,000	GPD downstream of Infl EQ (N/A)	NH_3N =	2	mg/l
So =	300	mg/l, BOD_5infl	Chlorine Residual =	1	mg/l @ 20 min det
TSSinf =	300	mg/l	Total Phosphorus =	1	mg/l
Chemical Oxygen Demand (COD) =	545	mg/l .3-.8 (BOD/COD), used 0.55			
TKN =	70	mg/l			
NH_3N =	35	mg/l			
Organic $N_{14° C}$ =	35	mg/l			
Winter Temp. Min. =	15	°C			
Summer Temp. Max. =	29	°C			
MLSS =	3,000	mg/l, conc. Of suspended solids in aeration tank			
MLVSS =	70	% of MLSS			
MLVSS (X) =	2100	mg/l, conc. Of volatile suspended solids in aeration tank			

COEFFICIENTS

θc =	30	days, mean cell residence time
Y =	0.4	maximum yield coefficient, range: 0.3 - 0.5 (Metcalf & Eddy Table 8-10)
Y_n =	0.12	g VSS / g NH4-N, range: 0.1 - 0.15 (Metcalf & Eddy Table 8-11)
K_o =	0.5	g / m^3, range: 0.40 - 0.60 (Metcalf & Eddy Table 8-11)
k_d =	0.12	day^-1, endogenous decay coefficient, range: 0.06 - 0.2 (Metcalf & Eddy Table 8-10)
k_d =	1.04	unitless, range: 1.03 - 1.08 (Metcalf & Eddy Table 8-10)
$k_{d,\ 14°C}$ =	0.099	g/g*d
K_{dn} =	0.080	g VSS / g VSS*d, range: 0.05 - 0.15 (Metcalf & Eddy Table 8-10)
K_{dn} =	1.04	unitless, range: 1.03 - 1.08 (Metcalf & Eddy Table 8-11)
$K_{dn,\ 14°C}$ =	0.066	g/g*d
K_n =	0.740	g NH4-N / m^3, range: 0.5 - 1.0 (Metcalf & Eddy Table 8-11)
K_n =	1.053	unitless, range: 1.03 - 1.123 (Metcalf & Eddy Table 8-11)
$K_{n,\ 14°C}$ =	0.572	g / m^3
μ_{mn} =	0.750	g VSS / g VSS*d, range: 0.20 - 0.90 (Metcalf & Eddy Table 8-11)
μ_n =	1.070	unitless, range: 1.06 - 1.123 (Metcalf & Eddy Table 8-11)
$\mu_{m,\ 14°C}$ =	0.535	g /g*d
f_d =	0.150	unitless, range: 0.08 - 0.2 (Metcalf & Eddy Table 8-10)

DESIGN CALCULATIONS

A. BOD_5 Loading

$$F = \frac{8.34 \times Q \times (S_o - S)}{10^6}$$

F = **7380.9** lb BOD_5 /day

B. TSS Loading

$$TSS = \frac{8.34 \times Q \times (TSS_{inf} - TSS_{eff})}{10^6}$$

TSS = **7380.9** lb TSS /day

C. Micro-organism Mass in Aeration Basin

$$M_v = F \times \frac{\theta_c \times Y}{1 + (k_d \times \theta_c)}$$

Mv = **19255** lb

D. Aeration Volume

$$V = \frac{Q \times \theta_c}{X} \times \frac{Y \times (S_o - S)}{1 + (k_d \times \theta_c)}$$

Min Volume (gal): #########
Min Volume (cf): 146,966

TCEQ Max. Organic Loading: 35 lbs BOD5/day/1000 cf (TCEQ Chap. 217.154: Conventional with Nitrification, Temps 715°C)

Min Volume (cf): 210,883

Min Volume (cf): 210,883 For BOD Reduction

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
FINAL PHASE

E. Nitrification

pH:	7.2		
DO (mg/L):	2.0	Dissolved Oxygen	
Ko:	0.5	Half-Saturation coefficient for DO (Metcalf & Eddy Table 8-11)	
Temp (°C):	15.0		
Effluent NH3 (mg/L):	2.0		
Temperature Term, Tt:	1.00		Tt=e^(0.098*(T-15))
DO Term, DOt:	0.80		DOt=DO/(Ko+DO)
pH Term, pHt:	1.00		pHt=1-0.833*(7.2-pH)
Kn:	0.40	Half-Saturation coefficient for oxidation of ammonia	Kn=10^(0.051*T-1.158)
NH3 Term, NH3t:	0.83		NH3t=NH3/(Kn+NH3)
Nitrifier Growth Rate (days^-1):	0.33		Growth Rate=0.5*Tt*pHt*DOt*NH3t
Aerobic SRT Required (days):	3.01		SRT=1/Nitrifier Growth Rate
Safety Factor:	2.0	Typical Range: 1.5 - 2.5	
Min Required Aerobic SRT (days):	**6.0**		
Minimum Aerobic Volume (cf):	**213,221.2**	**For Nitrification**	

F. Sludge Yield

	0.9	lbs Sludge / lb BOD
Sludge Yield:	6,643	lbs/day
Assume Percent Solids =	1.5	%
Q_{sludge} =	**53,100**	**gal/day**

G. Clarifier

Max Surface Loading:	1,200	gpd/sf at Peak Flow	(TCEQ Chap. 217.154: Activated Sludge, Secondary with Nitrification)
Max Surface Loading:	600	gpd/sf at Design Flow	
Min Detention Time:	1.8	hrs at Peak Flow	
Max Weir Loading:	20,000	gpd/lf at Peak Flow	
Minimum Surface Area:	**10,000**	**sf**	
Minimum Volume:	**900,000**	**gallons =**	**120312.8 cf**
Minimum Weir Length:	**600**	**lf**	

H. Return Activated Sludge

Minimum Rate:	**50%**	**of Design Flow =**	**1,041.7**	**gpm**	
Maximum Rate:	**100%**	**of Design Flow =**	**2,083.3**	**gpm**	
Provide:	**53**	**6" Air Lift Pumps or**	**30**	**8" Air Lift Pumps**	(If Air Lift Pumps Utilized)

I. Sludge Holding Basin

Max Loading:	200	lbs volatile solids per day / 1,000 cf (TCEQ Chap. 217.249.j.5)
Sludge Yield (lbs/day):	6,643	
Volatile Portion:	70%	
Min Basin Volume (cf):	23,250	
Minimum Detention Time:	15	days (TCEQ Chap. 217.249.j.4)
Sludge Yield (gpd):	53,100	
Min Basin Volume (cf):	106,477	
Min Required Basin Volume (cf):	**106,476.8**	

J. Chlorine Contact Basin

Minimum Detention Time:	20	minutes at Peak Flow		
Minimum Volume:	**########**	**gallons =**	**22,280.2**	**cf**

CIELO RANCH WWTP
ATTACHMENT K - DESIGN CALCULATIONS
FINAL PHASE

K. Aeration

1. Aeration Basins

Minimum oxygen requirement = 3,200 scf per lb BOD_5 per day @ 12' submergence and 20 deg C

Diffuser Submergence Depth (ft)	Airflow Correction Factor
8	1.82
10	1.56
12	1.00
15	0.91
18	0.73
20	0.64

Diffuser Submergence Depth = 12 ft
Correction Factor = 1.00

Minimum oxygen requirement = 16,402 scfm @ 20 deg C

2. Digester

Oxygen Requirement = 30 scfm per 1,000 ft^3

Minimum oxygen requirement = 3194 scfm

3. Air Lift Pumps

Minimum air requirement = 1855 scfm

4. Total

Total Air Flow Requirement = 21,451 scfm

L. Fine Screen

Bar Spacing: 0.25 in
Average Flow Rate: 3.0 MGD
Approximate Volume of Screenings: 13 cf/MG

Anticipated Volume of Screenings: 39 cf per day 10.11 CY Per Week

COARSE SCREEN (BYPASS/OVERFLOW BAR SCREEN)

Influent Flow Rate

Average Influent Flow Rate:	3.00	MGD	=	2083	gpm	=	4.642	cfs
Peak Influent Flow Rate:	12.00	MGD	=	8333	gpm	=	18.567	cfs

Channel Geometry

Channel Width: 2.00 ft
Design Channel Flow Depth: 4.7 ft
Max. Channel Depth: 5.0 ft

Bar Rack Geometry

Bar Size: 0.625 in
Clear Space Between Bars: 0.462 in
Incline Angle: 45 degrees

No. of Bars in Rack: 23
Clear Space: 0.8020833 sf per ft of channel depth

Headloss thru Bar Screen

Channel Area (Avg): 9.4 sf
Channel Area (Max): 10.0 sf
Approach Velocity (Avg): 0.494 fps (using design channel depth)
Approach Velocity (Peak): 1.857 fps (using max. channel depth)

Bar Screen Area (Avg): 3.77 sf
Bar Screen Area (Max): 4.01 sf
Velocity Through Bars (Avg): 1.23 fps (using design channel depth)
Velocity Through Bars (Max): 4.63 fps (using max. channel depth)

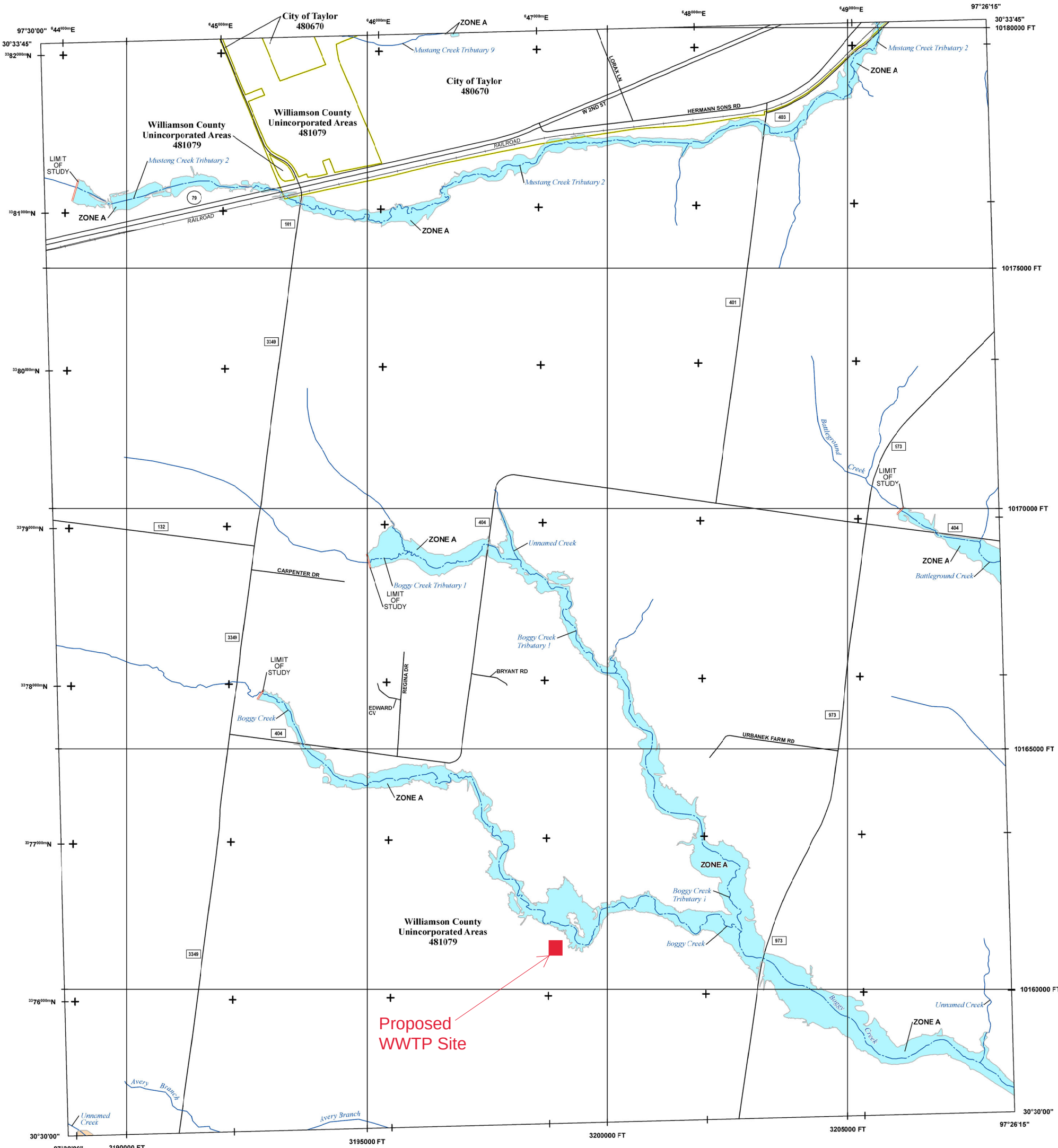
$$HeadLoss = \frac{V^2 - v^2}{0.7 \times 2 \times g}$$

V= Velocity of flow through openings in rack
v= Approach velocity
g= Acceleration of gravity, 32.2

Assuming No Clogging:			*Assuming Clogging:*		
			Clogging Factor:	0.500	
Head Loss (Design):	0.0282	ft	Head Loss (Design):	0.113	ft
Head Loss (Max):	0.3990	ft	Head Loss (Max):	1.596	ft

ATTACHMENT L

FEMA FIRM MAP



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A,V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
	8 Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was derived from digital data obtained from Texas Natural Resource Information Systems (TNRIS), dated 2000; United States Census Bureau, dated 2015; United States Geological Survey, dated 2005; and the Williamson County Geographic Information Systems (GIS) Department, dated 2014 and 2017.

SCALE

N

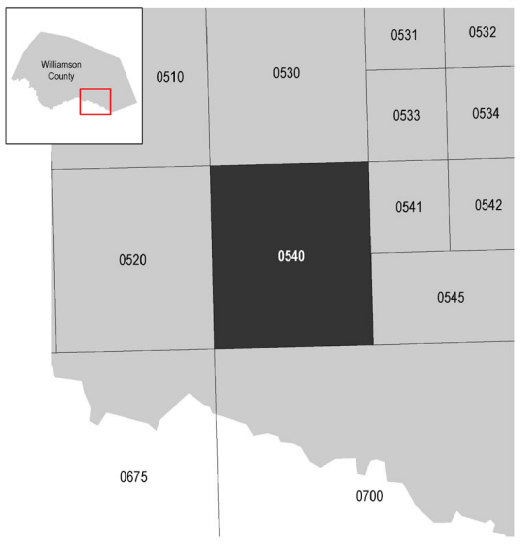
Map Projection:
Texas State Plane Central (FIPS ZONE 4203); North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 feet

0 250 500 1,000 meters

PANEL LOCATOR



National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

WILLIAMSON COUNTY, TEXAS
and Incorporated Areas

PANEL 540 OF 750

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
TAYLOR, CITY OF	480670	0540	F
WILLIAMSON COUNTY	481079	0540	F

VERSION NUMBER
2.3.3.3

MAP NUMBER
48491C0540F

MAP REVISED
DECEMBER 20, 2019

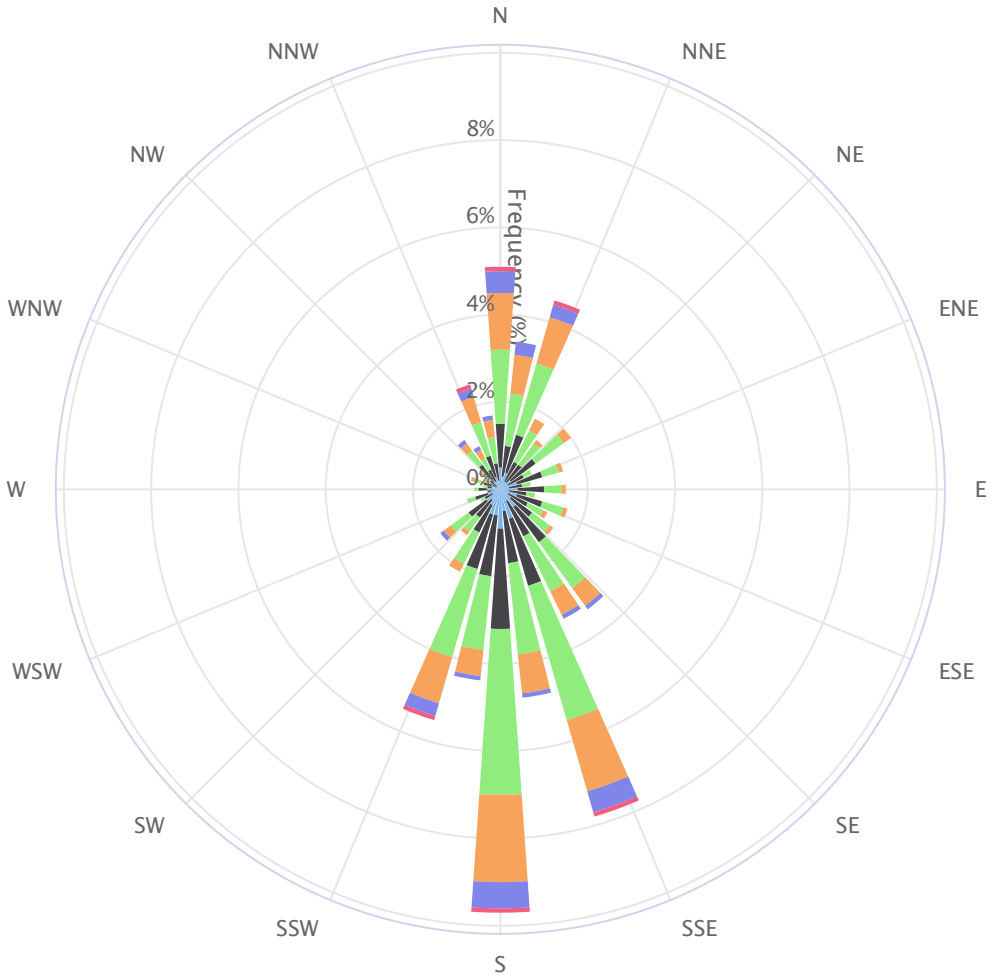
APP000106

ATTACHMENT M

WIND ROSE

AUSTIN BERGSTROM AP (TX) Wind Rose

Oct. 1, 1942 – Oct. 19, 2021
Sub-Interval: Jan. 1 – Dec. 31, 0 – 23



Wind Speed (mph)

- 1.3 – 4
- 4 – 8
- 8 – 13
- 13 – 19
- 19 – 25
- 25 – 32
- 32 – 39
- 39 – 47
- 47 –

Click and drag to zoom

APP000108

ATTACHMENT N

SEWAGE SLUDGE MANAGEMENT PLAN

CIELO RANCH WWTP
ATTACHMENT N - SLUDGE MANAGEMENT PLAN
INTERIM I PHASE

Dimensions and Capacities of Sludge Holding

Average Anticipated Sludge Yield:	5,310	gal/day		
TCEQ Minimum Sludge Retention Time:	15	days		
SRT from Treatment Basins:	7.61	days		
Minimum SRT needed in Sludge Holding:	7.392712	days		
Prop Sludge Holdign Basins:	142,167	gal =	19,005	cubic feet
Proposed Sludge Holding SRT:	26.77	days		
Total Proposed Sludge Retention Time:	34.38	days		

Solids Generated

BOD_5 Removal	Influent concentration =	300	mg/l
	Effluent concentration =	5	mg/l
	Net removal =	295	mg/l

MLSS Operating Range = 3,000 mg/l

BOD_5 removed	738	lbs/day
Dry Sludge Produced	664	lbs/day
Wet Sludge Produced*	443	lbs/day
Wet Sludge Produced*	5,310	gal/day

*Assuming Percent Solids in Sludge: 1.5 % Solids

Length of Sustainded Peak (days)	Peaking Factor	Waste Sludge Mass Loading (lbs/day)	Total Sustained Loading (lb)
1	2.4	1,594	1,594
2	2.1	1,395	2,790
3	1.9	1,262	3,786
4	1.8	1,196	4,783
5	1.7	1,129	5,646
7	1.65	1,096	7,672
14	1.32	877	12,276
15	1.3	864	12,953
365	1	664	242,463

Process:
Conventional activated sludge process will be utilized. Sludge will be wasted from the clarifiers to the sludge holding basin. Sludge will be hauled by a licensed hauler to a TCEQ registered disposal site.

CIELO RANCH WWTP
ATTACHMENT N - SLUDGE MANAGEMENT PLAN
INTERIM II PHASE

Dimensions and Capacities of Sludge Holding

Average Anticipated Sludge Yield:	17,700	gal/day		
TCEQ Minimum Sludge Retention Time:	15	days		
SRT from Treatment Basins:	6.85	days		
Minimum SRT needed in Sludge Holding:	8.153441	days		
Prop Sludge Holding Basins:	284,334	gal =	38,010	cubic feet
Proposed Sludge Holding SRT:	16.06	days		
Total Proposed Sludge Retention Time:	22.91	days		

Solids Generated

BOD_5 Removal	Influent concentration =	300	mg/l
	Effluent concentration =	5	mg/l
	Net removal =	295	mg/l

MLSS Operating Range =	3,000	mg/l
BOD_5 removed	2,460	lbs/day
Dry Sludge Produced	2,214	lbs/day
Wet Sludge Produced*	1,476	lbs/day
Wet Sludge Produced*	17,700	gal/day

*Assuming Percent Solids in Sludge: 1.5 % Solids

Length of Sustainded Peak (days)	Peaking Factor	Waste Sludge Mass Loading (lbs/day)	Total Sustained Loading (lb)
1	2.4	5,314	5,314
2	2.1	4,650	9,300
3	1.9	4,207	12,621
4	1.8	3,986	15,943
5	1.7	3,764	18,821
7	1.65	3,654	25,575
14	1.32	2,923	40,920
15	1.3	2,879	43,178
365	1	2,214	808,209

Process:
Conventional activated sludge process will be utilized. Sludge will be wasted from the clarifiers to the sludge holding basin. Sludge will be hauled by a licensed hauler to a TCEQ registered disposal site.

CIELO RANCH WWTP
ATTACHMENT K - SLUDGE MANAGEMENT PLAN
INTERIM III PHASE

Dimensions and Capacities of Sludge Holding

Average Anticipated Sludge Yield:	35,400	gal/day		
TCEQ Minimum Sludge Retention Time:	15	days		
SRT from Treatment Basins:	6.85	days		
Minimum SRT needed in Sludge Holding:	8.15	days		
Prop Sludge Holding Basins:	568,668	gal =	76,020	cubic feet
Proposed Sludge Holding SRT:	16.06	days		
Total Proposed Sludge Retention Time:	22.91	days		

Solids Generated

BOD_5 Removal	Influent concentration =	300	mg/l
	Effluent concentration =	5	mg/l
	Net removal =	295	mg/l

MLSS Operating Range =	3,000	mg/l
BOD_5 removed	4,921	lbs/day
Dry Sludge Produced	4,429	lbs/day
Wet Sludge Produced*	2,952	lbs/day
Wet Sludge Produced*	35,400	gal/day

*Assuming Percent Solids in Sludge: 1.50 % Solids

Length of Sustainded Peak (days)	Peaking Factor	Waste Sludge Mass Loading (lbs/day)	Total Sustained Loading (lb)
1	2.4	10,628	10,628
2	2.1	9,300	18,600
3	1.9	8,414	25,243
4	1.8	7,971	31,885
5	1.7	7,529	37,643
7	1.65	7,307	51,150
14	1.32	5,846	81,839
15	1.3	5,757	86,357
365	1	4,429	1,616,417

Process:
Conventional activated sludge process will be utilized. Sludge will be wasted from the clarifiers to the sludge holding basin. Sludge will be hauled by a licensed hauler to a TCEQ registered disposal site.

CIELO RANCH WWTP
ATTACHMENT K - SLUDGE MANAGEMENT PLAN
FINAL PHASE

Dimensions and Capacities of Sludge Holding

Average Anticipated Sludge Yield:	53,100	gal/day		
TCEQ Minimum Sludge Retention Time:	15	days		
SRT from Treatment Basins:	6.09	days		
Minimum SRT needed in Sludge Holding:	8.91	days		
Prop Sludge Holding Basins:	853,001	gal =	114,030	cubic feet
Proposed Sludge Holding SRT:	16.06	days		
Total Proposed Sludge Retention Time:	22.15	days		

Solids Generated

BOD_5 Removal	Influent concentration =	300	mg/l
	Effluent concentration =	5	mg/l
	Net removal =	295	mg/l

MLSS Operating Range =	3,000	mg/l
BOD_5 removed	7,381	lbs/day
Dry Sludge Produced	6,643	lbs/day
Wet Sludge Produced*	4,429	lbs/day
Wet Sludge Produced*	53,100	gal/day

*Assuming Percent Solids in Sludge: 1.50 % Solids

Length of Sustainded Peak (days)	Peaking Factor	Waste Sludge Mass Loading (lbs/day)	Total Sustained Loading (lb)
1	2.4	15,943	15,943
2	2.1	13,950	27,900
3	1.9	12,621	37,864
4	1.8	11,957	47,828
5	1.7	11,293	56,464
7	1.65	10,961	76,724
14	1.32	8,769	122,759
15	1.3	8,636	129,535
365	1	6,643	2,424,626

Process:
Conventional activated sludge process will be utilized. Sludge will be wasted from the clarifiers to the sludge holding basin. Sludge will be hauled by a licensed hauler to a TCEQ registered disposal site.

ATTACHMENT O

FLOW PROJECTIONS

CIELO RANCH WWTP

Attachment O - Flow Projections

The Cielo Ranch Wastewater Treatment Plant (the WWTP) is proposing to serve approximately 10,000 Living Unit Equivalents (LUE's). The proposed service area consists of seven (7) tracts totaling 2,369-acres as summarized below.

Cielo Ranch WWTP Service Area and Flow Summary

Tract	Area (acres)	Projected LUEs/Acre	Projected LUE's to be Served	Max Flow per LUE (gpd/LUE)	Projected Max Flow (gpd)
1	762.28	4	3049.12	300	914,736
2	169.75	4	679	300	203,700
3	187.08	4	748.32	300	224,496
4	89.09	4	356.36	300	106,908
5	857.65	4	3430.6	300	1,029,180
6	207.18	4	828.72	300	248,616
7	95.12	4	380.48	300	114,144
TOTAL:	***2368.15***		***9,473***		***2,841,780***

The projected yearly LUE and flow connections are provided below.

Cielo Ranch WWTP Yearly LUE and Flow Projection

Year	LUEs Connected	Cumulative LUE's Connected	Max Monthly Flow (gpd)	WWTP Phase
2024	200	200	60,000	Interim I
2025	200	400	120,000	Interim I
2026	200	600	180,000	Interim I
2027	300	900	270,000	Interim I
2028	500	1400	420,000	Interim II
2029	700	2100	630,000	Interim II
2030	800	2900	870,000	Interim II
2031	1000	3900	1,170,000	Interim III
2032	1100	5000	1,500,000	Interim III
2033	1100	6100	1,830,000	Interim III
2034	1100	7200	2,160,000	Final
2035	1000	8200	2,460,000	Final
2036	1000	9200	2,760,000	Final
2037	800	10000	3,000,000	Final