Technical Package Cover Page

This file contains the following documents:

1. Summary of application (in plain language)
   - English
   - Alternative Language (Spanish)
2. First notice (NORI-Notice of Receipt of Application and Intent to Obtain a Permit)
   - English
   - Alternative Language (Spanish)
3. Second notice (NAPD-Notice of Preliminary Decision)
   - English
   - Alternative Language (Spanish)
4. Application materials *
5. Draft permit *
6. Technical summary or fact sheet *

Portada de Paquete Técnico

Este archivo contiene los siguientes documentos:

1. Resumen de la solicitud (en lenguaje sencillo)
   - Inglés
   - Idioma alternativo (español)
2. Primer aviso (NORI, Aviso de Recepción de Solicitud e Intención de Obtener un Permiso)
   - Inglés
   - Idioma alternativo (español)
3. Segundo aviso (NAPD, Aviso de Decisión Preliminar)
   - Inglés
   - Idioma alternativo (español)
4. Materiales de la solicitud **
5. Proyecto de permiso **
6. Resumen técnico u hoja de datos **

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

PLAIN LANGUAGE SUMMARY FOR TPDES OR TLAP PERMIT APPLICATIONS

Plain Language Summary Template and Instructions for Texas Pollutant Discharge Elimination System (TPDES) and Texas Land Application (TLAP) Permit Applications

Applicants should use this template to develop a plain language summary as required by Title 30, Texas Administrative Code (30 TAC), Chapter 39, Subchapter H. Applicants may modify the template as necessary to accurately describe their facility as long as the summary includes the following information: (1) the function of the proposed plant or facility; (2) the expected output of the proposed plant or facility; (3) the expected pollutants that may be emitted or discharged by the proposed plant or facility; and (4) how the applicant will control those pollutants, so that the proposed plant will not have an adverse impact on human health or the environment.

Fill in the highlighted areas below to describe your facility and application in plain language. Instructions and examples are provided below. Make any other edits necessary to improve readability or grammar and to comply with the rule requirements.

If you are subject to the alternative language notice requirements in 30 TAC Section 39.426, **you must provide a translated copy of the completed plain language summary in the appropriate alternative language as part of your application package**. For your convenience, a Spanish template has been provided below.

ENGLISH TEMPLATE FOR TPDES or TLAP NEW/RENEWAL/AMENDMENT APPLICATIONS DOMESTIC WASTEWATER/STORMWATER

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 TAC Chapter 39. The information provided in this summary may change during the technical review of the application and is not a federal enforceable representation of the permit application.

Firefly Partners LLC (CN605877835) proposes to operate Firefly WWTF (5. Enter Regulated Entity Number here (i.e., RN1########)), a domestic wastewater treatment facility. The facility will be located at approximately 0.52 miles southwest of the intersection of FM 1376 and OK Corral Drive, in Fredericksburg, Gillespie County, Texas 78624. The applicant is currently applying to the Texas Commission on Environmental Quality for a Texas Land Application Permit (TLAP) to utilize a maximum of 20,000 gallons per day of treated domestic wastewater from the proposed onsite Wastewater Treatment Facility for landscape irrigation.

Discharges from the facility are expected to contain no pollutants. Domestic wastewater will be treated by MBR (membrane bioreactor) treatment technology. The facility will include an influent pumping station, fine screening, anoxic, oxic and membrane cells with ultraviolet disinfection and a sludge press. The resulting Type 1 reclaimed water will be evaporated via the use of two (2) 10,000 GPD mechanical evaporation units. Use of these mechanical evaporators has been approved by the TCEQ.

PLANTILLA EN ESPAÑOL PARA SOLICITUDES NUEVAS/RENOVACIONES/ENMIENDAS DE TPDES o TLAP

AGUAS RESIDUALES DOMÉSTICAS /AGUAS PLUVIALES

El siguiente resumen se proporciona para esta solicitud de permiso de calidad del agua pendiente que está siendo revisada por la Comisión de Calidad Ambiental de Texas según lo requerido por el Capítulo 39 del Código Administrativo de Texas 30. La información proporcionada en este resumen puede cambiar durante la revisión técnica de la solicitud y no es una representación ejecutiva fedérale de la solicitud de permiso.

Firefly Partners LLC (605877835) propone operar Firefly WWTF 5. Introduzca el número de entidad regulada aquí (es decir, RN1########), una instalación de tratamiento de aguas residuales domésticas. La instalación estará ubicada en aproximadamente 0,52 millas al suroeste de la intersección de FM 1376 y OK Corral Drive, en Fredericksburg, Condado de Gillespie, Texas 78624. El solicitante actualmente está solicitando a la Comisión de Calidad Ambiental de Texas un Permiso de Solicitud de Tierras de Texas (TLAP) para utilizar un máximo de 20.000 galones por día de aguas residuales domésticas tratadas de la Instalación de Tratamiento de Aguas Residuales propuesta en el sitio para riego paisajístico.

Se espera que las descargas de la instalación contengan no contaminantes. Las aguas residuales domésticas. estará tratado por la tecnología de tratamiento MBR (biorreactor de membrana). La instalación incluye una estación de bombeo de afluente, cribado fino, células anóxicas, óxicas y de membrana con desinfección ultravioleta y una prensa de lodos. El agua recuperada Tipo 1 resultante se evaporará mediante el uso de dos (2) unidades de evaporación mecánica de 10.000 GPD. El uso de estos evaporadores mecánicos ha sido aprobado por la TCEQ..

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

**NOTICE OF RECEIPT OF APPLICATION AND
INTENT TO OBTAIN WATER QUALITY PERMIT**

PROPOSED PERMIT NO. WQ0016571001

APPLICATION. Firefly Partners, LLC, 200 North Harbor Place, Suite G, Davidson, North Carolina 28036, has applied to the Texas Commission on Environmental Quality (TCEQ) for proposed Texas Land Application Permit (TLAP) No. WQ0016571001 to authorize the disposal of treated wastewater at a volume not to exceed a daily average flow of 20,000 gallons per day via evaporation. The domestic wastewater facility and disposal area will be located at approximately 0.52 miles southwest of the intersection of Farm-to-Market Road 1376 and OK Corral Drive, in the city of Fredericksburg, in Gillespie County, Texas 78624. TCEQ received this application on July 12, 2024. The permit application will be available for viewing and copying at Harper Library, front desk, 23247 West Highway 290, Harper, Texas prior to the date this notice is published in the newspaper. The application, including any updates, and associated notices are available electronically at the following webpage: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications. This link to an electronic map of the site or facility's general location is provided as a public courtesy and not part of the application or notice. For the exact location, refer to the application.
https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.751388,30.171111&level=18

ALTERNATIVE LANGUAGE NOTICE. Alternative language notice in Spanish is available at: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications.
El aviso de idioma alternativo en español está disponible en
https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications.

ADDITIONAL NOTICE. TCEQ's Executive Director has determined the application is administratively complete and will conduct a technical review of the application. After technical review of the application is complete, the Executive Director may prepare a draft permit and will issue a preliminary decision on the application. **Notice of the Application and Preliminary Decision will be published and mailed to those who are on the county-wide mailing list and to those who are on the mailing list for this application. That notice will contain the deadline for submitting public comments.**

PUBLIC COMMENT / PUBLIC MEETING. You may submit public comments or request a public meeting on this application. The purpose of a public meeting is to provide the opportunity to submit comments or to ask questions about the application. TCEQ will hold a public meeting if the Executive Director determines that there is a significant degree of public interest in the application or if requested by a local legislator. A public meeting is not a contested case hearing.

OPPORTUNITY FOR A CONTESTED CASE HEARING. After the deadline for submitting public comments, the Executive Director will consider all timely comments and prepare a response to all relevant and material, or significant public comments. **Unless the application is directly referred for a contested case hearing, the response to comments, and the Executive Director's decision on the application, will be mailed to everyone who submitted public comments and to those persons who are on the mailing list for this application. If comments are received, the mailing will also provide instructions for requesting reconsideration of the Executive Director's decision and for requesting a contested case hearing.** A contested case hearing is a legal proceeding similar to a civil trial in state district court.

TO REQUEST A CONTESTED CASE HEARING, YOU MUST INCLUDE THE FOLLOWING ITEMS IN YOUR REQUEST: your name, address, phone number; applicant's name and proposed permit number; the location and distance of your property/activities relative to the proposed facility; a specific description of how you would be adversely affected by the facility in a way not common to the general public; a list of all disputed issues of fact that you submit during the comment period and, the statement "[I/we] request a contested case hearing." If the request for contested case hearing is filed on behalf of a group or association, the request must designate the group's representative for receiving future correspondence; identify by name and physical address an individual member of the group who would be adversely affected by the proposed facility or activity; provide the information discussed above regarding the affected member's location and distance from the facility or activity; explain how and why the member would be affected; and explain how the interests the group seeks to protect are relevant to the group's purpose.

Following the close of all applicable comment and request periods, the Executive Director will forward the application and any requests for reconsideration or for a contested case hearing to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

The Commission may only grant a request for a contested case hearing on issues the requestor submitted in their timely comments that were not subsequently withdrawn. **If a hearing is granted, the subject of a hearing will be limited to disputed issues of fact or mixed questions of fact and law relating to relevant and material water quality concerns submitted during the comment period.**

MAILING LIST. If you submit public comments, a request for a contested case hearing or a reconsideration of the Executive Director's decision, you will be added to the mailing list for this specific application to receive future public notices mailed by the Office of the Chief Clerk. In addition, you may request to be placed on: (1) the permanent mailing list for a specific applicant name and permit number; and/or (2) the mailing list for a specific county. If you wish to be placed on the permanent and/or the county mailing list, clearly specify which list(s) and send your request to TCEQ Office of the Chief Clerk at the address below.

INFORMATION AVAILABLE ONLINE. For details about the status of the application, visit the Commissioners' Integrated Database at www.tceq.texas.gov/goto/cid. Search the database using the permit number for this application, which is provided at the top of this notice.

AGENCY CONTACTS AND INFORMATION. All public comments and requests must be submitted either electronically at **https://www14.tceq.texas.gov/epic/eComment/**, or in writing to the Texas Commission on Environmental Quality, Office of the Chief Clerk, MC-105, P.O. Box 13087, Austin, Texas 78711-3087. Please be aware that any contact information you provide, including your name, phone number, email address and physical address will become part of the agency's public record. For more information about this permit application or the permitting process, please call the TCEQ Public Education Program, Toll Free, at 1-800-687-4040 or visit their website at www.tceq.texas.gov/goto/pep. Si desea información en Español, puede llamar al 1-800-687-4040.

Further information may also be obtained from Firefly Partners, LLC at the address stated above or by calling Mrs. Kendall Longbotham, P.E., Water Resource Engineer, reUse Engineering Inc, at 512-755-9943.

Issuance Date: August 16, 2024

Comisión de Calidad Ambiental del Estado de Texas

**AVISO DE RECIBO DE LA SOLICITUD E
INTENCION DE OBTENER PERMISO PARA LA CALIDAD DEL AGUA**

PERMISO PROPUESTO NO. WQ0016571001

SOLICITUD. Firefly Partners, LLC, 200 North Harbor Place, Suite G, Davidson, North Carolina 28036 ha solicitado a la Comisión de Calidad Ambiental de Texas (TCEQ) para el propuesto Permiso No. WQ0016571001 de disposición de aguas residuales para autorizar la disposición de aguas residuales tratadas en un volumen que no sobrepasa un flujo promedio diario de 20,000 galones por día por medio de evaporación. La planta de tratamiento de aguas domésticos residuales y el área de disposición están ubicados en aproximadamente 0.52 millas al suroeste de la intersección de Farm-to-Market Road 1376 y OK Corral Drive en la ciudad de Fredericksburg en el Condado de Gillespie, Texas 78624. La TCEQ recibió esta solicitud el día 12 de julio de 2024. La solicitud para el permiso está disponible para leer y copiar en Harper Library, Recepción, 23247 West US Highway 290, Harper, Texas. La solicitud (cualquier actualización y aviso inclusive) está disponible electrónicamente en la siguiente página web: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications. Este enlace a un mapa electrónico de la ubicación general del sitio o de la instalación es proporcionado como una cortesía y no es parte de la solicitud o del aviso. Para la ubicación exacta, consulte la solicitud.
https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.751388,30.171111&level=18

AVISO ADICIONAL. El Director Ejecutivo de la TCEQ ha determinado que la solicitud es administrativamente completa y conducirá una revisión técnica de la solicitud. Después de completar la revisión técnica, el Director Ejecutivo puede preparar un borrador del permiso y emitirá una Decisión Preliminar sobre la solicitud. **El aviso de la solicitud y la decisión preliminar serán publicados y enviado a los que están en la lista de correo de las personas a lo largo del condado que desean recibir los avisos y los que están en la lista de correo que desean recibir avisos de esta solicitud. El aviso dará la fecha límite para someter comentarios públicos.**

COMENTARIO PUBLICO / REUNION PUBLICA. Usted puede presentar comentarios públicos o pedir una reunión pública sobre esta solicitud. El propósito de una reunión pública es dar la oportunidad de presentar comentarios o hacer preguntas acerca de la solicitud. La TCEQ realiza una reunión pública si el Director Ejecutivo determina que hay un grado de interés público suficiente en la solicitud o si un legislador local lo pide. Una reunión pública no es una audiencia administrativa de lo contencioso.

OPORTUNIDAD DE UNA AUDIENCIA ADMINISTRATIVA DE LO CONTENCIOSO. Después del plazo para presentar comentarios públicos, el Director Ejecutivo considerará todos los comentarios apropiados y preparará una respuesta a todo los comentarios públicos esenciales, pertinentes, o significativos. **A menos que la solicitud haya sido referida directamente a una audiencia administrativa de lo contencioso, la respuesta a los comentarios y la decisión del Director Ejecutivo sobre la solicitud serán enviados por correo a todos los que presentaron un comentario público y a las personas que están en la lista para recibir avisos sobre esta solicitud. Si se reciben comentarios, el aviso también proveerá instrucciones para pedir una reconsideración de la decisión del Director Ejecutivo y para pedir una audiencia administrativa de lo contencioso.** Una audiencia administrativa de lo contencioso es un procedimiento legal similar a un procedimiento legal civil en un tribunal de distrito del estado.

PARA SOLICITAR UNA AUDIENCIA DE CASO IMPUGNADO, USTED DEBE INCLUIR EN SU SOLICITUD LOS SIGUIENTES DATOS: su nombre, dirección, y número de teléfono; el nombre del solicitante y número del permiso; la ubicación y distancia de su propiedad/actividad con respecto a la instalación; una descripción específica de la forma cómo usted sería afectado adversamente por el sitio de una manera no común al público en general; una lista de todas las cuestiones de hecho en disputa que usted presente durante el período de comentarios; y la declaración "[Yo/nosotros] solicito/solicitamos una audiencia de caso impugnado". Si presenta la petición para una audiencia de caso impugnado de parte de un grupo o asociación, debe identificar una persona que representa al grupo para recibir correspondencia en el futuro; identificar el nombre y la dirección de un miembro del grupo que sería afectado adversamente por la planta o la actividad propuesta; proveer la información indicada anteriormente con respecto a la ubicación del miembro afectado y su distancia de la planta o actividad propuesta; explicar cómo y porqué el miembro sería afectado; y explicar cómo los intereses que el grupo desea proteger son pertinentes al propósito del grupo.

Después del cierre de todos los períodos de comentarios y de petición que aplican, el Director Ejecutivo enviará la solicitud y cualquier petición para reconsideración o para una audiencia de caso impugnado a los Comisionados de la TCEQ para su consideración durante una reunión programada de la Comisión. La Comisión sólo puede conceder una solicitud de una audiencia de caso impugnado sobre los temas que el solicitante haya presentado en sus comentarios oportunos que no fueron retirados posteriormente. Si se concede una audiencia, el tema de la audiencia estará limitado a cuestiones de hecho en disputa o cuestiones mixtas de hecho y de

derecho relacionadas a intereses pertinentes y materiales de calidad del agua que se hayan presentado durante el período de comentarios.

LISTA DE CORREO. Si somete comentarios públicos, un pedido para una audiencia administrativa de lo contencioso o una reconsideración de la decisión del Director Ejecutivo, la Oficina del Secretario Principal enviará por correo los avisos públicos en relación con la solicitud. Ademas, puede pedir que la TCEQ ponga su nombre en una or mas de las listas correos siguientes (1) la lista de correo permanente para recibir los avisos de el solicitante indicado por nombre y número del permiso específico y/o (2) la lista de correo de todas las solicitudes en un condado especifico. Si desea que se agrega su nombre en una de las listas designe cual lista(s) y envia por correo su pedido a la Oficina del Secretario Principal de la TCEQ.

CONTACTOS E INFORMACIÓN DE LA TCEQ. Todos los comentarios escritos del público y los para pedidos una reunión deben ser presentados a la Oficina del Secretario Principal, MC 105, TCEQ, P.O. Box 13087, Austin, TX 78711-3087 o por el internet at www.tceq.texas.gov/about/comments.html. Tenga en cuenta que cualquier información personal que usted proporcione, incluyendo su nombre, número de teléfono, dirección de correo electrónico y dirección física pasarán a formar parte del registro público de la Agencia. Si necesita más información en Español sobre esta solicitud para un permiso o el proceso del permiso, por favor llame a El Programa de Educación Pública de la TCEQ, sin cobro, al 1-800-687-4040. La información general sobre la TCEQ puede ser encontrada en nuestro sitio de la red: www.tceq.texas.gov.

También se puede obtener información adicional del Firefly Partners, LLC a la dirección indicada arriba o llamando a Sra. Kendall Longbotham, P.E., ingeniera de recursos hídricos, reUse Engineering, Inc. al 512-755-9943.

Fecha de emisión 16 de agosto de 2024

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

NOTICE OF APPLICATION AND PRELIMINARY DECISION FOR WATER QUALITY LAND APPLICATION PERMIT FOR MUNICIPAL WASTEWATER

NEW

PERMIT NO. WQ0016571001

APPLICATION AND PRELIMINARY DECISION. Firefly Partners, LLC, 200 North Harbor Place, Suite G, Davidson, North Carolina 28036, has applied to the Texas Commission on Environmental Quality (TCEQ) for a new permit, TCEQ Permit No. WQ0016571001 to authorize the disposal of treated domestic wastewater at a daily average flow not to exceed 20,000 gallons per day via evaporation. This permit will not authorize a discharge of pollutants into water in the state. TCEQ received this application on July 12, 2024.

The wastewater treatment facility and disposal site will be located approximately 0.52 miles southwest of the intersection of Farm-to-Market Road 1376 and OK Corral Drive, in Gillespie County, Texas 78624. The wastewater treatment facility and disposal site will be located in the drainage basin of Pedernales River in Segment No. 1414 of the Colorado River Basin. This link to an electronic map of the site or facility's general location is provided as a public courtesy and is not part of the application or notice. For the exact location, refer to the application.
https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.751388,30.171111&level=18

The TCEQ Executive Director has completed the technical review of the application and prepared a draft permit. The draft permit, if approved, would establish the conditions under which the facility must operate. The Executive Director has made a preliminary decision that this permit, if issued, meets all statutory and regulatory requirements. The permit application, Executive Director's preliminary decision, and draft permit are available for viewing and copying at Harper Library, front desk, 23247 West Highway 290, Harper, Texas. The application, including any updates, and associated notices are available electronically at the following webpage:
https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications.

ALTERNATIVE LANGUAGE NOTICE. Alternative language notice in Spanish is available at https://www.tceq.texas.gov/permitting/wastewater/plain-language-summaries-and-public-notices. El aviso de idioma alternativo en español está disponible en https://www.tceq.texas.gov/permitting/wastewater/plain-language-summaries-and-public-notices.

PUBLIC COMMENT / PUBLIC MEETING. **You may submit public comments or request a public meeting about this application.**] The purpose of a public meeting is to provide the opportunity to submit comments or to ask questions about the application. TCEQ holds a public meeting if the Executive Director determines that there is a significant degree of public interest in the application or if requested by a local legislator. A public meeting is not a contested case hearing.

OPPORTUNITY FOR A CONTESTED CASE HEARING. After the deadline for submitting public comments, the Executive Director will consider all timely comments and prepare a response to all relevant and material, or significant public comments. **Unless the application is directly referred for a contested case hearing, the response to comments will be mailed to everyone who submitted public comments and to those persons who are on the mailing list for this application. If comments are received, the mailing will also provide instructions for requesting a contested case hearing or reconsideration of the Executive Director's decision**. A contested case hearing is a legal proceeding similar to a civil trial in a state district court.

TO REQUEST A CONTESTED CASE HEARING, YOU MUST INCLUDE THE FOLLOWING ITEMS IN YOUR REQUEST: your name, address, phone number; applicant's name and proposed permit number; the location and distance of your property/activities relative to the proposed facility; a specific description of how you would be adversely affected by the facility in a way not common to the general public; a list of all disputed issues of fact that you submit during the comment period; and the statement "[I/we] request a contested case hearing." If the request for contested case hearing is filed on behalf of a group or association, the request must designate the group's representative for receiving future correspondence; identify by name and physical address an individual member of the group who would be adversely affected by the proposed facility or activity; provide the information discussed above regarding the affected member's location and distance from the facility or activity; explain how and why the member would be affected; and explain how the interests the group seeks to protect are relevant to the group's purpose.

Following the close of all applicable comment and request periods, the Executive Director will forward the application and any requests for reconsideration or for a contested case hearing to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

The Commission may only grant a request for a contested case hearing on issues the requestor submitted in their timely comments that were not subsequently withdrawn. **If a hearing is granted, the subject of a hearing will be limited to disputed issues of fact or mixed questions of fact and law relating to relevant and material water quality concerns submitted during the comment period.**

EXECUTIVE DIRECTOR ACTION. The Executive Director may issue final approval of the application unless a timely contested case hearing request or request for reconsideration is filed. If a timely hearing request or request for reconsideration is filed, the Executive Director will not issue final approval of the permit and will forward the application and request to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

MAILING LIST. If you submit public comments, a request for a contested case hearing or a reconsideration of the Executive Director's decision, you will be added to the mailing list for this specific application to receive future public notices mailed by the Office of the Chief Clerk. In addition, you may request to be placed on: (1) the permanent mailing list for a specific applicant name and permit number; and/or (2) the mailing list for a specific county. If you wish to be placed on the permanent and/or the county mailing list, clearly specify which list(s) and send your request to TCEQ Office of the Chief Clerk at the address below.

All written public comments and public meeting requests must be submitted to the Office of the Chief Clerk, MC 105, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, TX 78711-3087 or electronically at www.tceq.texas.gov/goto/comment **within 30 days from the date of newspaper publication of this notice.**

INFORMATION AVAILABLE ONLINE. For details about the status of the application, visit the Commissioners' Integrated Database at www.tceq.texas.gov/goto/cid. Search the database using the permit number for this application, which is provided at the top of this notice.

AGENCY CONTACTS AND INFORMATION. Public comments and requests must be submitted either electronically at www.tceq.texas.gov/goto/comment, or in writing to the Texas Commission on Environmental Quality, Office of the Chief Clerk, MC 105, P.O. Box 13087, Austin, Texas 78711-3087. Any personal information you submit to the TCEQ will become part of the agency's record; this includes email addresses. For more information about this permit application or the permitting process, please call the TCEQ Public Education Program, Toll Free, at 1-800-687-4040 or visit their website at www.tceq.texas.gov/goto/pep. Si desea información en Español, puede llamar al 1-800-687-4040.

Further information may also be obtained from Firefly Partners, LLC at the address stated above or by calling Mrs. Kendall Longbotham, P.E., Water Resource Engineer, reUse Engineering Inc, at 512-755-9943.

Issuance Date: April 3, 2025

Comisión De Calidad Ambiental Del Estado De Texas

**AVISO DE SOLICITUD Y DECISIÓN PRELIMINAR PARA
PERMISO PARA APLICACIÓN DE LA CALIDAD DEL AGUA EN TERRENOS
PARA AGUAS RESIDUALES MUNICIPALES**

NUEVO

PERMISO NO. WQ0016571001

SOLICITUD Y DECISIÓN PRELIMINAR. Firefly Partners, LLC, 200 North Harbor Place, Suite G, Davidson, North Carolina 28036, ha solicitado a la Comisión de Calidad Ambiental del Estado de Texas (TCEQ) por un nuevo para autorizar la eliminación de las aguas residuales domésticas tratadas con un caudal medio diario no superior a 20.000 galones por día por evaporación. Este permiso no autorizará una descarga de contaminantes a las aguas del estado. La TCEQ recibió esta solicitud el 12 de julio de 2024.

La planta y el sitio de disposición están ubicadas en aproximadamente 0,52 millas al suroeste de la intersección de Farm-to-Market Road 1376 y OK Corral Drive en el Condado de Gillespie, Texas. La planta y el sitio de disposición están ubicados en la cuenca de drenaje del río Pedernales en el Segmento No. 1414 de la Cuenca del Río Colorado. Este enlace a un mapa electrónico de la ubicación general del sitio o de la instalación es proporcionado como una cortesía y no es parte de la solicitud o del aviso. Para la ubicación exacta, consulte la solicitud. https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.751388,30.171111&level=18

El Director Ejecutivo de la TCEQ ha completado la revisión técnica de la solicitud y ha preparado un borrador del permiso. El borrador del permiso, si es aprobado, establecería las condiciones bajo las cuales la instalación debe operar. El Director Ejecutivo ha tomado una decisión preliminar que si este permiso es emitido, cumple con todos los requisitos normativos y legales. La solicitud del permiso, la decisión preliminar del Director Ejecutivo y el borrador del permiso están disponibles para leer y copiar en Harper Library, Recepción, 23247 West Highway 290, Harper, Texas 78631. La solicitud (cualquier actualización y aviso inclusive) está disponible electrónicamente en la siguiente página web: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications.

AVISO DE IDIOMA ALTERNATIVO. El aviso de idioma alternativo en español está disponible en https://www.tceq.texas.gov/permitting/wastewater/plain-language-summaries-and-public-notices.

COMENTARIO PUBLICO / REUNION PUBLICA. Usted puede presentar comentarios públicos o pedir una reunión pública sobre esta solicitud. El propósito de una reunión pública es dar la oportunidad de presentar comentarios o hacer preguntas acerca de la solicitud. La TCEQ realiza una reunión pública si el Director Ejecutivo determina que hay un grado de interés público suficiente en la solicitud o si un legislador local lo pide. Una reunión pública no es una audiencia administrativa de lo contencioso.

OPORTUNIDAD DE UNA AUDIENCIA ADMINISTRATIVA DE LO CONTENCIOSO. Después del plazo para presentar comentarios públicos, el Director Ejecutivo considerará todos los comentarios apropiados y preparará una respuesta a todo los comentarios públicos esenciales, pertinentes, o significativos. **A menos que la solicitud haya sido referida directamente a una audiencia administrativa de lo contencioso, la respuesta a los comentarios y la decisión del Director Ejecutivo sobre la solicitud serán enviados por correo a todos los que presentaron un comentario público y a las personas que están en la lista para recibir avisos sobre esta solicitud. Si se reciben comentarios, el aviso también proveerá instrucciones para pedir una reconsideración de la decisión del Director Ejecutivo y para pedir una audiencia administrativa de lo contencioso.** Una audiencia administrativa de lo contencioso es un procedimiento legal similar a un procedimiento legal civil en un tribunal de distrito del estado.

PARA SOLICITAR UNA AUDIENCIA DE CASO IMPUGNADO, USTED DEBE INCLUIR EN SU SOLICITUD LOS SIGUIENTES DATOS: su nombre, dirección, y número de teléfono; el nombre del solicitante y número del permiso; la ubicación y distancia de su propiedad/actividad con respecto a la instalación; una descripción específica de la forma cómo usted sería afectado adversamente por el sitio de una manera no común al público en general; una lista de todas las cuestiones de hecho en disputa que usted presente durante el período de comentarios; y la declaración "[Yo/nosotros] solicito/solicitamos una audiencia de caso impugnado". Si presenta la petición para una audiencia de caso impugnado de parte de un grupo o asociación, debe identificar una persona que representa al grupo para recibir correspondencia en el futuro; identificar el nombre y la dirección de un miembro del grupo que sería afectado adversamente por la planta o la actividad propuesta; proveer la información indicada anteriormente con respecto a la ubicación del miembro afectado y su distancia de la planta o actividad propuesta; explicar cómo y porqué el miembro sería afectado; y explicar cómo los intereses que el grupo desea proteger son pertinentes al propósito del grupo.

Después del cierre de todos los períodos de comentarios y de petición que aplican, el Director Ejecutivo enviará la solicitud y cualquier petición para reconsideración o para una audiencia de caso impugnado a los Comisionados de la TCEQ para su consideración durante una reunión programada de la Comisión. La Comisión sólo puede conceder una solicitud de una audiencia de caso impugnado sobre los temas que el solicitante haya presentado en sus comentarios oportunos que no fueron retirados posteriormente. Si se concede una audiencia, el tema de la audiencia estará limitado a cuestiones de hecho en disputa o cuestiones mixtas de hecho y de derecho relacionadas a intereses pertinentes y materiales de calidad del agua que se hayan presentado durante el período de comentarios.

ACCIÓN DEL DIRECTOR EJECUTIVO. El Director Ejecutivo puede emitir una aprobación final de la solicitud a menos que exista un pedido antes del plazo de vencimiento de una audiencia administrativa de lo contencioso o se ha presentado un pedido de reconsideración. Si un pedido ha llegado antes del plazo de vencimiento de la audiencia o el pedido de reconsideración ha sido presentado, el Director Ejecutivo no emitirá una aprobación final sobre el permiso y enviará la solicitud y el pedido a los Comisionados de la TECQ para consideración en una reunión programada de la Comisión.

LISTA DE CORREO. Si somete comentarios públicos, un pedido para una audiencia administrativa de lo contencioso o una reconsideración de la decisión del Director Ejecutivo, la Oficina del Secretario Principal enviará por correo los avisos públicos en relación con la solicitud. Ademas, puede pedir que la TCEQ ponga su nombre en una or mas de las listas correos siguientes (1) la lista de correo permanente para recibir los avisos de el solicitante indicado por nombre y número del permiso específico y/o (2) la lista de correo de todas las solicitudes en un condado especifico. Si desea que se agrega su nombre en una de las listas designe cual lista(s) y envia por correo su pedido a la Oficina del Secretario Principal de la TCEQ.

Todos los comentarios escritos del público y los pedidos una reunión deben ser presentados durante los 30 días después de la publicación del aviso a la Oficina del Secretario Principal, MC 105, TCEQ, P.O. Box 13087, Austin, TX 78711-3087 or por el internet a www.tceq.texas.gov/about/comments.html. Tenga en cuenta que cualquier información personal que usted proporcione, incluyendo su nombre, número de teléfono, dirección de correo electrónico y dirección física pasarán a formar parte del registro público de la Agencia.

CONTACTOS E INFORMACIÓN DE LA AGENCIA. Los comentarios y solicitudes públicas deben enviarse electrónicamente a www.tceq.texas.gov/goto/comment, o por escrito a Texas Commission on Environmental Quality, Office of the Chief Clerk, MC-105, P.O. Box 13087, Austin, Texas 78711-3087. Cualquier información personal que envíe a la TCEQ pasará a formar parte del registro de la agencia; esto incluye las direcciones de correo electrónico. Para obtener más información sobre esta solicitud de permiso o el proceso de permisos, llame al Programa de Educación Pública de TCEQ, línea gratuita, al 1-800-687-4040 o visite su sitio web en www.tceq.texas.gov/goto/pep. Si desea información en español, puede llamar al 1-800-687-4040.

También se puede obtener información adicional del Firefly Partners, LLC a la dirección indicada arriba o llamando a Sra. Kendall Longbotham, P.E., reUse Engineering Inc, al 512-755-9943.

Fecha de emission: 3 de abril de 2025

PERMIT NO. WQ0016571001

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. Box 13087
Austin, Texas 78711-3087

PERMIT TO DISCHARGE WASTES
under provisions of Chapter 26
of the Texas Water Code

Firefly Partners, LLC

whose mailing address is

200 North Harbor Place, Suite G
Davidson, North Carolina 28036

Nature of Business Producing Waste: Domestic wastewater treatment operation, SIC Code 4952.

General Description and Location of Waste Disposal System:

Description: The Firefly Wastewater Treatment Facility consists of a Membrane Bio-Reactor (MBR) system. Treatment units will include a fine screen, anoxic, aerobic, and membrane cells, a sludge press, and an Ultraviolet disinfection unit. Treated effluent will be pumped to two 30,000 gallon storage tanks and subsequently evaporated via the use of mechanical evaporator(s). Concentrated effluent water produced by the mechanical evaporator(s) will be mixed in with the sludge then hauled by a registered transporter and disposed of at a TCEQ-permitted landfill. The permittee is authorized to dispose of treated domestic wastewater effluent at a daily average flow not to exceed 0.020 million gallons per day (MGD) via evaporation. The facility includes two storage tanks with a total capacity of 60,000 gallons for storage prior to disposal.

Location: The wastewater treatment facility and disposal site are located approximately 0.52 miles southwest of the intersection of Farm-to-Market Road 1376 and OK Corral Drive, in Gillespie County, Texas 78624. (See Attachment B.)

Drainage Area: The wastewater treatment facility and disposal site are located in the drainage basin of Pedernales River in Segment No. 1414 of the Colorado River Basin. No discharge of pollutants into water in the state is authorized by this permit.

This permit and the authorization contained herein shall expire at midnight, **five years from the date of issuance**.

ISSUED DATE:

For the Commission

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Conditions of the Permit: No discharge of pollutants into water in the state is authorized.

A. Effluent Limitations

Character: Treated Domestic Sewage Effluent

Volume: Daily Average Flow – 0.020 MGD from the treatment system

Quality: The following effluent limitations are required:

Parameter	Effluent Concentrations (Not to Exceed) Daily Average mg/l	7-Day Average mg/l	Daily Maximum mg/	Single Grab mg/l
Carbonaceous Biochemical Oxygen Demand (5-day)	5	10	20	30
Total Suspended Solids	5	10	20	30
Ammonia Nitrogen	2	5	10	15
Total Phosphorus	1	2	4	6
Escherichia coli (*E. coli*), colony forming units or most probable number per 100 ml	N/A	N/A	N/A	20

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units.

The permittee shall utilize an Ultraviolet Light (UV) system for disinfection purposes.

B. Monitoring Requirements:

Parameter	Monitoring Frequency	Sample Type
Flow	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	One/month	Grab
pH	One/month	Grab
Total Suspended Solids	One/month	Grab
Ammonia Nitrogen	One/month	Grab
Total Phosphorus	One/month	Grab
E. coli	Five/week	Grab

The monitoring shall be done after the final treatment unit and prior to storage of the treated effluent or the mechanical evaporators. These records shall be maintained on a monthly basis and be available at the plant site for inspection by authorized representatives of the Commission for at least three years.

STANDARD PERMIT CONDITIONS

This permit is granted in accordance with the Texas Water Code and the rules and other Orders of the Commission and the laws of the State of Texas.

DEFINITIONS

All definitions in Section 26.001 of the Texas Water Code and 30 TAC Chapter 305 shall apply to this permit and are incorporated by reference. Some specific definitions of words or phrases used in this permit are as follows:

1. Flow Measurements

   a. Daily average flow - the arithmetic average of all determinations of the daily flow within a period of one calendar month. The daily average flow determination shall consist of determinations made on at least four separate days. If instantaneous measurements are used to determine the daily flow, the determination shall be the arithmetic average of all instantaneous measurements taken during that month. Daily average flow determination for intermittent discharges shall consist of a minimum of three flow determinations on days of discharge.

   b. Annual average flow - the arithmetic average of all daily flow determinations taken within the preceding 12 consecutive calendar months. The annual average flow determination shall consist of daily flow volume determinations made by a totalizing meter, charted on a chart recorder and limited to major domestic wastewater discharge facilities with a 1 million gallons per day or greater permitted flow.

   c. Instantaneous flow - the measured flow during the minimum time required to interpret the flow measuring device.

2. Concentration Measurements

   a. Daily average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar month, consisting of at least four separate representative measurements.

      i. For domestic wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values in the previous four consecutive month period consisting of at least four measurements shall be utilized as the daily average concentration.

      ii. For all other wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values taken during the month shall be utilized as the daily average concentration.

   b. 7-day average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar week, Sunday through Saturday.

   c. Daily maximum concentration - the maximum concentration measured on a single day, by the sample type specified in the permit, within a period of one calendar month.

3. Sample Type

   a. Composite sample - For domestic wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (a). For industrial wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (b).

   b. Grab sample - an individual sample collected in less than 15 minutes.

4. Treatment Facility (facility) - wastewater facilities used in the conveyance, storage, treatment, recycling, reclamation and/or disposal of domestic sewage, industrial wastes, agricultural wastes, recreational wastes, or other wastes including sludge handling or disposal facilities under the jurisdiction of the Commission.

5. The term "sewage sludge" is defined as solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in 30 TAC Chapter 312. This includes the solids which have not been classified as hazardous waste separated from wastewater by unit processes.

6. The term "biosolids" is defined as sewage sludge that has been tested or processed to meet Class A, Class AB, or Class B pathogen standards in 30 TAC Chapter 312 for beneficial use.

7. Bypass - the intentional diversion of a waste stream from any portion of a treatment facility.

MONITORING REQUIREMENTS

1. Monitoring Requirements

   Monitoring results shall be collected at the intervals specified in the permit. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall conduct effluent sampling in accordance with 30 TAC §§ 319.4 - 319.12.

   As provided by state law, the permittee is subject to administrative, civil and criminal penalties, as applicable, for negligently or knowingly violating the Texas Water Code, Chapters 26, 27, and 28, and Texas Health and Safety Code, Chapter 361, including but not limited to knowingly making any false statement, representation, or certification on any report, record or other document submitted or required to be maintained under this permit, including monitoring reports, records or reports of compliance or noncompliance, or falsifying, tampering with or knowingly rendering inaccurate any monitoring device or method required by this permit or violating any other requirement imposed by state or federal regulations.

2. Test Procedures

   a. Unless otherwise specified in this permit, test procedures for the analysis of pollutants shall comply with procedures specified in 30 TAC §§ 319.11 - 319.12. Measurements, tests and calculations shall be accurately accomplished in a representative manner.

b. All laboratory tests submitted to demonstrate compliance with this permit must meet the requirements of 30 TAC Chapter 25, Environmental Testing Laboratory Accreditation and Certification.

3. Records of Results

a. Monitoring samples and measurements shall be taken at times and in a manner so as to be representative of the monitored activity.

b. Except for records of monitoring information required by this permit related to the permittee's sewage sludge or biosolids use and disposal activities, which shall be retained for a period of at least five years, monitoring and reporting records, including strip charts and records of calibration and maintenance, copies of all records required by this permit, and records of all data used to complete the application for this permit shall be retained at the facility site, or shall be readily available for review by a TCEQ representative for a period of three years from the date of the record or sample, measurement, report, or application. This period shall be extended at the request of the Executive Director.

c. Records of monitoring activities shall include the following:

i. date, time and place of sample or measurement;
ii. identity of individual who collected the sample or made the measurement.
iii. date and time of analysis;
iv. identity of the individual and laboratory who performed the analysis;
v. the technique or method of analysis; and
vi. the results of the analysis or measurement and quality assurance/quality control records.

The period during which records are required to be kept shall be automatically extended to the date of the final disposition of any administrative or judicial enforcement action that may be instituted against the permittee.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit using approved analytical methods as specified above, all results of such monitoring shall be included in determining compliance with permit requirements.

5. Calibration of Instruments

All automatic flow measuring or recording devices and all totalizing meters for measuring flows shall be accurately calibrated by a trained person at plant start-up and as often thereafter as necessary to ensure accuracy, but not less often than annually unless authorized by the Executive Director for a longer period. Such person shall verify in writing that the device is operating properly and giving accurate results. Copies of the verification shall be retained at the facility site and/or shall be readily available for review by a TCEQ representative for a period of three years.

6. Compliance Schedule Reports

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later than 14 days following each schedule date to the Regional Office and the Enforcement Division (MC 224).

7. Noncompliance Notification

a. In accordance with 30 TAC § 305.125(9), any noncompliance which may endanger human health or safety, or the environment shall be reported by the permittee to the TCEQ. Except as allowed by 30 TAC § 305.132, report of such information shall be provided orally or by facsimile transmission (FAX) to the Regional Office within 24 hours of becoming aware of the noncompliance. A written submission of such information shall also be provided by the permittee to the Regional Office and the Enforcement Division (MC 224) within five working days of becoming aware of the noncompliance. The written submission shall contain a description of the noncompliance and its cause; the potential danger to human health or safety, or the environment; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance, and to mitigate its adverse effects.

b. The following violations shall be reported under Monitoring and Reporting Requirement 7.a.:

   i. Unauthorized discharges as defined in Permit Condition 2(g).

   ii. Any unanticipated bypass which exceeds any effluent limitation in the permit.

c. In addition to the above, any effluent violation which deviates from the permitted effluent limitation by more than 40% shall be reported by the permittee in writing to the Regional Office and the Enforcement Division (MC 224) within 5 working days of becoming aware of the noncompliance.

d. Any noncompliance other than that specified in this section, or any required information not submitted or submitted incorrectly, shall be reported to the Enforcement Division (MC 224) as promptly as possible.

8. In accordance with the procedures described in 30 TAC §§ 35.301 - 35.303 (relating to Water Quality Emergency and Temporary Orders) if the permittee knows in advance of the need for a bypass, it shall submit prior notice by applying for such authorization.

9. Changes in Discharges of Toxic Substances

All existing manufacturing, commercial, mining, and silvicultural permittees shall notify the Regional Office, orally or by facsimile transmission within 24 hours, and both the Regional Office and the Enforcement Division (MC 224) in writing within five (5) working days, after becoming aware of or having reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant listed at 40 CFR Part 122, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following “notification levels”:

i. One hundred micrograms per liter (100 μg/L);
ii. Two hundred micrograms per liter (200 μg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 μg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
iii. Five (5) times the maximum concentration value reported for that pollutant in the permit application; or
iv. The level established by the TCEQ.

b. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

i. Five hundred micrograms per liter (500 μg/L);
ii. One milligram per liter (1 mg/L) for antimony;
iii. Ten (10) times the maximum concentration value reported for that pollutant in the permit application; or
iv. The level established by the TCEQ.

10. Signatories to Reports

All reports and other information requested by the Executive Director shall be signed by the person and in the manner required by 30 TAC § 305.128 (relating to Signatories to Reports).

PERMIT CONDITIONS

1. General

a. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in an application or in any report to the Executive Director, it shall promptly submit such facts or information.

b. This permit is granted on the basis of the information supplied and representations made by the permittee during action on an application, and relying upon the accuracy and completeness of that information and those representations. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked, in whole or in part, in accordance with 30 TAC Chapter 305, Subchapter D, during its term for good cause including, but not limited to, the following:

i. Violation of any terms or conditions of this permit;
ii. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or
iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

c. The permittee shall furnish to the Executive Director, upon request and within a reasonable time, any information to determine whether cause exists for amending, revoking, suspending or terminating the permit. The permittee shall also furnish to the Executive Director, upon request, copies of records required to be kept by the permit.

2. Compliance

a. Acceptance of the permit by the person to whom it is issued constitutes acknowledgment and agreement that such person will comply with all the terms and conditions embodied in the permit, and the rules and other orders of the Commission.

b. The permittee has a duty to comply with all conditions of the permit. Failure to comply with any permit condition constitutes a violation of the permit and the Texas Water Code or the Texas Health and Safety Code, and is grounds for enforcement action, for permit amendment, revocation or suspension, or for denial of a permit renewal application or an application for a permit for another facility.

c. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

d. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal or other permit violation which has a reasonable likelihood of adversely affecting human health or the environment.

e. Authorization from the Commission is required before beginning any change in the permitted facility or activity that may result in noncompliance with any permit requirements.

f. A permit may be amended, suspended and reissued, or revoked for cause in accordance with 30 TAC §§ 305.62 and 305.66 and Texas Water Code Section 7.302. The filing of a request by the permittee for a permit amendment, suspension and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

g. There shall be no unauthorized discharge of wastewater or any other waste. For the purpose of this permit, an unauthorized discharge is considered to be any discharge of wastewater into or adjacent to water in the state at any location not permitted as an outfall or otherwise defined in the Special Provisions section of this permit.

h. The permittee is subject to administrative, civil, and criminal penalties, as applicable, under Texas Water Code §§ 7.051 - 7.075 (relating to Administrative Penalties), 7.101 - 7.111 (relating to Civil Penalties), and 7.141 - 7.202 (relating to Criminal Offenses and Penalties).

3. Inspections and Entry

a. Inspection and entry shall be allowed as prescribed in the Texas Water Code Chapters 26, 27, and 28, and Texas Health and Safety Code Chapter 361.

b. The members of the Commission and employees and agents of the Commission are entitled to enter any public or private property at any reasonable time for the purpose of inspecting and investigating conditions relating to the quality of water in the state or the compliance with any rule, regulation, permit or other order of the Commission. Members, employees, or agents of the Commission and Commission contractors are entitled to enter public or private property at any reasonable time to investigate or monitor or, if the responsible party is not responsive or there is an immediate danger to public health or the environment, to remove or remediate a condition related to the quality of water in the state. Members, employees, Commission contractors, or agents acting under this authority who enter private property shall observe the establishment's rules and regulations concerning safety, internal security, and fire protection, and if the property has management in residence, shall notify management or the person then in charge of his presence and shall exhibit proper credentials. If any member, employee, Commission contractor, or agent is refused the right to enter in or on public or private property under this authority, the Executive Director may invoke the remedies authorized in Texas Water Code Section 7.002. The statement above, that Commission entry shall occur in accordance with an establishment's rules and regulations concerning safety, internal security, and fire protection, is not grounds for denial or restriction of entry to any part of the facility, but merely describes the Commission's duty to observe appropriate rules and regulations during an inspection.

4. Permit Amendment and/or Renewal

   a. The permittee shall give notice to the Executive Director as soon as possible of any planned physical alterations or additions to the permitted facility if such alterations or additions would require a permit amendment or result in a violation of permit requirements. Notice shall also be required under this paragraph when:

      i. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements in Monitoring and Reporting Requirements No. 9;

      ii. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

   b. Prior to any facility modifications, additions, or expansions that will increase the plant capacity beyond the permitted flow, the permittee must apply for and obtain proper authorization from the Commission before commencing construction.

   c. The permittee must apply for an amendment or renewal at least 180 days prior to expiration of the existing permit in order to continue a permitted activity after the expiration date of the permit. If an application is submitted prior to the expiration date of the permit, the existing permit shall remain in effect until the application is approved, denied, or returned. If the application is returned or denied, authorization to continue such activity shall terminate upon the effective date of the action. If an application is not submitted prior to the expiration date of the permit, the permit shall expire and authorization to continue such activity shall terminate.

   d. Prior to accepting or generating wastes which are not described in the permit application or which would result in a significant change in the quantity or quality of the existing discharge, the permittee must report the proposed changes to the Commission. The permittee must apply for a permit amendment reflecting any necessary changes in permit conditions, including effluent limitations for pollutants not identified and limited by this permit.

e. In accordance with the Texas Water Code § 26.029(b), after a public hearing, notice of which shall be given to the permittee, the Commission may require the permittee, from time to time, for good cause, in accordance with applicable laws, to conform to new or additional conditions.

5. Permit Transfer

a. Prior to any transfer of this permit, Commission approval must be obtained. The Commission shall be notified in writing of any change in control or ownership of facilities authorized by this permit. Such notification should be sent to the Applications Review and Processing Team (MC 148) of the Water Quality Division.

b. A permit may be transferred only according to the provisions of 30 TAC § 305.64 (relating to Transfer of Permits) and 30 TAC § 50.133 (relating to Executive Director Action on Application or WQMP update).

6. Relationship to Hazardous Waste Activities

This permit does not authorize any activity of hazardous waste storage, processing, or disposal which requires a permit or other authorization pursuant to the Texas Health and Safety Code.

7. Property Rights

A permit does not convey any property rights of any sort, or any exclusive privilege.

8. Permit Enforceability

The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

9. Relationship to Permit Application

The application pursuant to which the permit has been issued is incorporated herein; provided, however, that in the event of a conflict between the provisions of this permit and the application, the provisions of the permit shall control.

10. Notice of Bankruptcy.

a. Each permittee shall notify the Executive Director, in writing, immediately following the filing of a voluntary or involuntary petition for bankruptcy under any chapter of Title 11 (Bankruptcy) of the United States Code (11 USC) by or against:

i. the permittee;
ii. an entity (as that term is defined in 11 USC, § 101(14)) controlling the permittee or listing the permit or permittee as property of the estate; or
iii. an affiliate (as that term is defined in 11 USC, § 101(2)) of the permittee.

b. This notification must indicate:

   i. the name of the permittee;
   ii. the permit number(s);
   iii. the bankruptcy court in which the petition for bankruptcy was filed; and
   iv. the date of filing of the petition.

OPERATIONAL REQUIREMENTS

1. The permittee shall at all times ensure that the facility and all of its systems of collection, treatment, and disposal are properly operated and maintained. This includes, but is not limited to, the regular, periodic examination of wastewater solids within the treatment plant by the operator in order to maintain an appropriate quantity and quality of solids inventory as described in the various operator training manuals and according to accepted industry standards for process control. Process control, maintenance, and operations records shall be retained at the facility site, or shall be readily available for review by a TCEQ representative, for a period of three years.

2. Upon request by the Executive Director, the permittee shall take appropriate samples and provide proper analysis in order to demonstrate compliance with Commission rules. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall comply with all applicable provisions of 30 TAC Chapter 312 concerning sewage sludge or biosolids use and disposal and 30 TAC §§ 319.21 - 319.29 concerning the discharge of certain hazardous metals.

3. Domestic wastewater treatment facilities shall comply with the following provisions:

   a. The permittee shall notify the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, in writing, of any facility expansion at least 90 days prior to conducting such activity.

   b. The permittee shall submit a closure plan for review and approval to the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, for any closure activity at least 90 days prior to conducting such activity. Closure is the act of permanently taking a waste management unit or treatment facility out of service and includes the permanent removal from service of any pit, tank, pond, lagoon, surface impoundment and/or other treatment unit regulated by this permit.

4. The permittee is responsible for installing prior to plant start-up, and subsequently maintaining, adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failures by means of alternate power sources, standby generators, and/or retention of inadequately treated wastewater.

5. Unless otherwise specified, the permittee shall provide a readily accessible sampling point and, where applicable, an effluent flow measuring device or other acceptable means by which effluent flow may be determined.

6. The permittee shall remit an annual water quality fee to the Commission as required by 30 TAC Chapter 21. Failure to pay the fee may result in revocation of this permit under Texas Water Code § 7.302(b)(6).

7. Documentation

For all written notifications to the Commission required of the permittee by this permit, the permittee shall keep and make available a copy of each such notification under the same conditions as self-monitoring data are required to be kept and made available. Except for information specified as not confidential in 30 TAC § 1.5(d), any information submitted pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted in the manner prescribed in the application form or by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, information may be made available to the public without further notice. If the Commission or Executive Director agrees with the designation of confidentiality, the TCEQ will not provide the information for public inspection unless required by the Texas Attorney General or a court pursuant to an open records request. If the Executive Director does not agree with the designation of confidentiality, the person submitting the information will be notified.

8. Facilities which generate domestic wastewater shall comply with the following provisions; domestic wastewater treatment facilities at permitted industrial sites are excluded.

   a. Whenever flow measurements for any domestic sewage treatment facility reach 75 percent of the permitted daily average or annual average flow for three consecutive months, the permittee must initiate engineering and financial planning for expansion and/or upgrading of the domestic wastewater treatment and/or collection facilities. Whenever the flow reaches 90 percent of the permitted daily average or annual average flow for three consecutive months, the permittee shall obtain necessary authorization from the Commission to commence construction of the necessary additional treatment and/or collection facilities. In the case of a domestic wastewater treatment facility which reaches 75 percent of the permitted daily average or annual average flow for three consecutive months, and the planned population to be served or the quantity of waste produced is not expected to exceed the design limitations of the treatment facility, the permittee shall submit an engineering report supporting this claim to the Executive Director of the Commission.

      If in the judgement of the Executive Director the population to be served will not cause permit noncompliance, then the requirement of this section may be waived. To be effective, any waiver must be in writing and signed by the Director of the Enforcement Division (MC 219) of the Commission, and such waiver of these requirements will be reviewed upon expiration of the existing permit; however, any such waiver shall not be interpreted as condoning or excusing any violation of any permit parameter.

   b. The plans and specifications for domestic sewage collection and treatment works associated with any domestic permit must be approved by the Commission and failure to secure approval before commencing construction of such works or making a discharge is a violation of this permit and each day is an additional violation until approval has been secured.

   c. Permits for domestic wastewater treatment plants are granted subject to the policy of the Commission to encourage the development of area-wide waste collection, treatment and disposal systems. The Commission reserves the right to amend any domestic wastewater permit in accordance with applicable procedural requirements to require the system covered by this permit to be integrated into an area-wide system, should such be developed; to require the delivery of the wastes authorized to be collected in, treated by or discharged from said system, to such area-wide system; or to amend this permit in any other particular to effectuate the Commission's policy. Such amendments may be made when the changes required are advisable for water quality control purposes and are feasible on the basis of waste treatment technology, engineering, financial, and related considerations existing at the time the changes are required, exclusive of the loss of investment in or revenues from any then existing or proposed waste collection, treatment or disposal system.

9. Domestic wastewater treatment plants shall be operated and maintained by sewage plant operators holding a valid certificate of competency at the required level as defined in 30 TAC Chapter 30.

10. Facilities which generate industrial solid waste as defined in 30 TAC § 335.1 shall comply with these provisions:

    a. Any solid waste, as defined in 30 TAC § 335.1 (including but not limited to such wastes as garbage, refuse, sludge from a waste treatment, water supply treatment plant or air pollution control facility, discarded materials, discarded materials to be recycled, whether the waste is solid, liquid, or semisolid), generated by the permittee during the management and treatment of wastewater, must be managed in accordance with all applicable provisions of 30 TAC Chapter 335, relating to Industrial Solid Waste Management.

    b. Industrial wastewater that is being collected, accumulated, stored, or processed before discharge through any final discharge outfall, specified by this permit, is considered to be industrial solid waste until the wastewater passes through the actual point source discharge and must be managed in accordance with all applicable provisions of 30 TAC Chapter 335.

    c. The permittee shall provide written notification, pursuant to the requirements of 30 TAC § 335.8(b)(1), to the Corrective Action Section (MC 127) of the Remediation Division informing the Commission of any closure activity involving an Industrial Solid Waste Management Unit, at least 90 days prior to conducting such an activity.

    d. Construction of any industrial solid waste management unit requires the prior written notification of the proposed activity to the Registration and Reporting Section (MC 129) of the Permitting and Remediation Support Division. No person shall dispose of industrial solid waste, including sludge or other solids from wastewater treatment processes, prior to fulfilling the deed recordation requirements of 30 TAC § 335.5.

    e. The term "industrial solid waste management unit" means a landfill, surface impoundment, waste-pile, industrial furnace, incinerator, cement kiln, injection well, container, drum, salt dome waste containment cavern, or any other structure vessel, appurtenance, or other improvement on land used to manage industrial solid waste.

    f. The permittee shall keep management records for all sludge (or other waste) removed from any wastewater treatment process. These records shall fulfill all applicable requirements of 30 TAC Chapter 335 and must include the following, as it pertains to wastewater treatment and discharge:

        i. Volume of waste and date(s) generated from treatment process;
        ii. Volume of waste disposed of on-site or shipped off-site;
        iii. Date(s) of disposal;

iv. Identity of hauler or transporter;
v. Location of disposal site; and
vi. Method of final disposal.

The above records shall be maintained on a monthly basis. The records shall be retained at the facility site, or shall be readily available for review by authorized representatives of the TCEQ for at least five years.

11. For industrial facilities to which the requirements of 30 TAC Chapter 335 do not apply, sludge and solid wastes, including tank cleaning and contaminated solids for disposal, shall be disposed of in accordance with Chapter 361 of the Texas Health and Safety Code.

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SLUDGE PROVISIONS

The permittee is authorized to dispose of sludge or biosolids only at a Texas Commission on Environmental Quality (TCEQ) authorized land application site, co-disposal landfill, wastewater treatment facility, or facility that further processes sludge. **The disposal of sludge or biosolids by land application on property owned, leased or under the direct control of the permittee is a violation of the permit unless the site is authorized with the TCEQ. This provision does not authorize Distribution and Marketing of Class A or Class AB Biosolids. This provision does not authorize the permittee to land apply biosolids on property owned, leased or under the direct control of the permittee.**

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE OR BIOSOLIDS LAND APPLICATION

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge or biosolids in accordance with 30 TAC § 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge or biosolids.

2. In all cases, if the person (permit holder) who prepares the sewage sludge or biosolids supplies the sewage sludge or biosolids to another person for land application use or to the owner or lease holder of the land, the permit holder shall provide necessary information to the parties who receive the sludge or biosolids to assure compliance with these regulations.

3. The land application of processed or unprocessed chemical toilet waste, grease trap waste, grit trap waste, milk solids, or similar non-hazardous municipal or industrial solid wastes, or any of the wastes listed in this provision combined with biosolids, WTP residuals or domestic septage is prohibited unless the grease trap waste is added at a fats, oil and grease (FOG) receiving facility as part of an anaerobic digestion process.

B. Testing Requirements

1. Sewage sludge or biosolids shall be tested once during the term of this permit in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I [Toxicity Characteristic Leaching Procedure (TCLP)] or other method that receives the prior approval of the TCEQ for the contaminants listed in 40 CFR Part 261.24, Table 1. Sewage sludge or biosolids failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal. Following failure of any TCLP test, the management or disposal of sewage sludge or biosolids at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge or biosolids no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Registration Support Division and the Regional Director (MC Region 11) within seven (7) days after failing the TCLP Test.

The report shall contain test results, certification that unauthorized waste management has stopped, and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Permitting and Registration Support Division (MC 129), Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. The permittee shall submit the following information in an annual report to the TCEQ by September 30th of each year. The permittee must submit this annual report using the online electronic reporting system available through TCEQ's website. If the permittee requests and obtains an electronic reporting waiver, the annual report can be submitted in hard copy to the TCEQ Regional Office (MC Region 11) and the Enforcement Division (MC 224).

2. Biosolids shall not be applied to the land if the concentration of the pollutants exceeds the pollutant concentration criteria in Table 1. The frequency of testing for pollutants in Table 1 is found in Section I.C. of this permit.

TABLE 1

Pollutant	Ceiling Concentration (Milligrams per kilogram)*
Arsenic	75
Cadmium	85
Chromium	3000
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
PCBs	49
Selenium	100
Zinc	7500

* Dry weight basis

3. Pathogen Control

All sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site must be treated by one of the following methods to ensure that the sludge meets either the Class A, Class AB or Class B biosolids pathogen requirements.

a. For sewage sludge to be classified as Class A biosolids with respect to pathogens, the density of fecal coliform in the sewage sludge must be less than 1,000 most probable number (MPN) per gram of total solids (dry weight basis), or the density of Salmonella sp. bacteria in the sewage sludge must be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. In addition, one of the alternatives listed below must be met:

<u>Alternative 1</u> - The temperature of the sewage sludge that is used or disposed shall be maintained at or above a specific value for a period of time. See 30 TAC § 312.82(a)(2)(A) for specific information;

Alternative 5 (PFRP) - Sewage sludge that is used or disposed of must be treated in one of the Processes to Further Reduce Pathogens (PFRP) described in 40 CFR Part 503, Appendix B. PFRP include composting, heat drying, heat treatment, and thermophilic aerobic digestion; or

Alternative 6 (PFRP Equivalent) - Sewage sludge that is used or disposed of must be treated in a process that has been approved by the U. S. Environmental Protection Agency as being equivalent to those in Alternative 5.

b. For sewage sludge to be classified as Class AB biosolids with respect to pathogens, the density of fecal coliform in the sewage sludge must be less than 1,000 MPN per gram of total solids (dry weight basis), or the density of *Salmonella* sp. bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. In addition, one of the alternatives listed below must be met:

<u>Alternative 2</u> - The pH of the sewage sludge that is used or disposed shall be raised to above 12 std. units and shall remain above 12 std. units for 72 hours.

The temperature of the sewage sludge shall be above 52° Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12 std. units.

At the end of the 72-hour period during which the pH of the sewage sludge is above 12 std. units, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50%; or

<u>Alternative 3</u> - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is less than one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(i-iii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(iv-vi) for specific information; or

<u>Alternative 4</u> - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed.

c. Sewage sludge that meets the requirements of Class AB biosolids may be classified a Class A biosolids if a variance request is submitted in writing that is supported by substantial documentation demonstrating equivalent methods for reducing odors and written approval is granted by the executive director. The executive director may deny the variance request or revoke that approved variance if it is determined that the variance may potentially endanger human health or the environment, or create nuisance odor conditions.

d. Three alternatives are available to demonstrate compliance with Class B biosolids criteria.

Alternative 1

i. A minimum of seven random samples of the sewage sludge shall be collected within 48 hours of the time the sewage sludge is used or disposed of during each monitoring episode for the sewage sludge.

ii. The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 MPN per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge that is used or disposed of shall be treated in one of the Processes to Significantly Reduce Pathogens (PSRP) described in 40 CFR Part 503, Appendix B, so long as all of the following requirements are met by the generator of the sewage sludge.

i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;

ii. An independent Texas Licensed Professional Engineer must make a certification to the generator of a sewage sludge that the wastewater treatment facility generating the sewage sludge is designed to achieve one of the PSRP at the permitted design loading of the facility. The certification need only be repeated if the design loading of the facility is increased. The certification shall include a statement indicating the design meets all the applicable standards specified in Appendix B of 40 CFR Part 503;

iii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;

iv. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review; and

v. If the sewage sludge is generated from a mixture of sources, resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the PSRP, and shall meet the certification, operation, and record keeping requirements of this paragraph.

Alternative 3 - Sewage sludge shall be treated in an equivalent process that has been approved by the U.S. Environmental Protection Agency, so long as all of the following requirements are met by the generator of the sewage sludge.

i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;

ii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;

iii. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review;

iv. The Executive Director will accept from the U.S. Environmental Protection Agency a finding of equivalency to the defined PSRP; and

v. If the sewage sludge is generated from a mixture of sources resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the Processes to Significantly Reduce Pathogens, and shall meet the certification, operation, and record keeping requirements of this paragraph.

In addition to the Alternatives 1 – 3, the following site restrictions must be met if Class B biosolids are land applied:

i. Food crops with harvested parts that touch the biosolids /soil mixture and are totally above the land surface shall not be harvested for 14 months after application of biosolids.

ii. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of biosolids when the biosolids remain the land surface for 4 months or longer prior to incorporation into the soil.

iii. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of biosolids when the biosolids remain on the land surface for less than 4 months prior to incorporation into the soil.

iv. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of biosolids.

v. Domestic livestock shall not be allowed to graze on the land for 30 days after application of biosolids.

vi. Turf grown on land where biosolids are applied shall not be harvested for 1 year after application of the biosolids when the harvested turf is placed on either land with a high potential for public exposure or a lawn.

vii. Public access to land with a high potential for public exposure shall be restricted for 1 year after application of biosolids.

viii. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of biosolids.

ix. Land application of biosolids shall be in accordance with the buffer zone requirements found in 30 TAC § 312.44.

4. Vector Attraction Reduction Requirements

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following Alternatives 1 through 10 for vector attraction reduction.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38%.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30° and 37° Celsius. Volatile solids must be reduced by less than 17% to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20° Celsius. Volatile solids must be reduced by less than 15% to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20° Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40° Celsius and the average temperature of the sewage sludge shall be higher than 45° Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali shall remain at 12 or higher for two hours and then remain at a pH of 11.5 or higher for an additional 22 hours at the time the sewage sludge is prepared for sale or given away in a bag or other container.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75% based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90% based on the moisture content and total solids prior to mixing with other materials at the time the sludge is used. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 9 -

i. Sewage sludge shall be injected below the surface of the land.

ii. No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

iii. When sewage sludge that is injected below the surface of the land is Class A or Class AB with respect to pathogens, the biosolids shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10-

i. Biosolids applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

ii. When biosolids that are incorporated into the soil is Class A or Class AB with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

C. Monitoring Requirements

Toxicity Characteristic Leaching Procedure (TCLP) Test	- once during the term of this permit
PCBs	- once during the term of this permit

All metal constituents and fecal coliform or *Salmonella* sp. bacteria shall be monitored at the appropriate frequency shown below, pursuant to 30 TAC § 312.46(a)(1):

Amount of biosolids (*) metric tons per 365-day period	Monitoring Frequency
0 to less than 290	Once/Year
290 to less than 1,500	Once/Quarter
1,500 to less than 15,000	Once/Two Months
15,000 or greater	Once/Month

(*) *The amount of bulk biosolids applied to the land (dry wt. basis).*

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 30 TAC § 312.7

Identify each of the analytic methods used by the facility to analyze enteric viruses, fecal coliforms, helminth ova, *Salmonella* sp., and other regulated parameters.

Identify in the following categories (as applicable) the sewage sludge or biosolids treatment process or processes at the facility: preliminary operations (e.g., sludge or biosolids grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

Identify the nature of material generated by the facility (such as a biosolid for beneficial use or land-farming, sewage sludge or biosolids for disposal at a monofill) and whether the material is ultimately conveyed off-site in bulk or in bags.

SECTION II. REQUIREMENTS SPECIFIC TO BULK SEWAGE SLUDGE FOR APPLICATION TO THE LAND MEETING CLASS A, CLASS AB or B BIOSOLIDS PATHOGEN REDUCTION AND THE CUMULATIVE LOADING RATES IN TABLE 2, OR CLASS B PATHOGEN REDUCTION AND THE POLLUTANT CONCENTRATIONS IN TABLE 3

For those permittees meeting Class A, Class AB or B pathogen reduction requirements and that meet the cumulative loading rates in Table 2 below, or the Class B pathogen reduction requirements and contain concentrations of pollutants below listed in Table 3, the following conditions apply:

A. Pollutant Limits

Table 2

Pollutant	Cumulative Pollutant Loading Rate (pounds per acre)*
Arsenic	36
Cadmium	35
Chromium	2677
Copper	1339
Lead	268
Mercury	15
Molybdenum	Report Only
Nickel	375
Selenium	89
Zinc	2500

Table 3

Pollutant	Monthly Average Concentration (milligrams per kilogram)*
Arsenic	41
Cadmium	39
Chromium	1200
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report Only
Nickel	420
Selenium	36
Zinc	2800

*Dry weight basis

B. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, shall be treated by either Class A, Class AB or Class B biosolids pathogen reduction requirements as defined above in Section I.B.3.

C. Management Practices

1. Bulk biosolids shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge or biosolids enters a wetland or other waters in the State.

2. Bulk sewage sludge not meeting Class A biosolids requirements shall be land applied in a manner which complies with Applicability in accordance with 30 TAC §312.41 and the Management Requirements in accordance with 30 TAC § 312.44.

3. Bulk biosolids shall be applied at or below the agronomic rate of the cover crop.

4. An information sheet shall be provided to the person who receives bulk Class A or AB biosolids sold or given away. The information sheet shall contain the following information:

   a. The name and address of the person who prepared the Class A or AB biosolids that are sold or given away in a bag or other container for application to the land.

   b. A statement that application of the Class A or AB biosolids to the land is prohibited except in accordance with the instruction on the label or information sheet.

   c. The annual whole sludge application rate for the sewage sludge application rate for the biosolids that does not cause any of the cumulative pollutant loading rates in Table 2 above to be exceeded, unless the pollutant concentrations in Table 3 found in Section II above are met.

D. Notification Requirements

1. If bulk biosolids are applied to land in a State other than Texas, written notice shall be provided prior to the initial land application to the permitting authority for the State in which the bulk biosolids are proposed to be applied. The notice shall include:

   a. The location, by street address, and specific latitude and longitude, of each land application site.

   b. The approximate time period bulk biosolids will be applied to the site.

   c. The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who will apply the bulk biosolids.

2. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the biosolids disposal practice.

E. Record Keeping Requirements

The documents will be retained at the facility site and/or shall be readily available for review by a TCEQ representative. The person who prepares bulk sewage sludge or a biosolids material shall develop the following information and shall retain the information at the facility site and/or shall be readily available for review by a TCEQ representative for a period of <u>five years</u>. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply.

1. The concentration (mg/kg) in the sludge of each pollutant listed in Table 3 above and the applicable pollutant concentration criteria (mg/kg), <u>or</u> the applicable cumulative pollutant loading rate and the applicable cumulative pollutant loading rate limit (lbs/ac) listed in Table 2 above.

2. A description of how the pathogen reduction requirements are met (including site restrictions for Class AB and Class B biosolids, if applicable).

3. A description of how the vector attraction reduction requirements are met.

4. A description of how the management practices listed above in Section II.C are being met.

5. The following certification statement:

   "I certify, under penalty of law, that the applicable pathogen requirements in 30 TAC § 312.82(a) or (b) and the vector attraction reduction requirements in 30 TAC § 312.83(b) have been met for each site on which bulk biosolids are applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

6. The recommended agronomic loading rate from the references listed in Section II.C.3. above, as well as the actual agronomic loading rate shall be retained. The person who applies bulk biosolids shall develop the following information and shall retain the information at the facility site and/or shall be readily available for review by a TCEQ representative <u>indefinitely</u>. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply:

   a. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii), as applicable, and to the permittee's specific sludge or biosolids treatment activities.

   b. The location, by street address, and specific latitude and longitude, of each site on which sludge or biosolids are applied.

   c. The number of acres in each site on which bulk sludge or biosolids are applied.

   d. The date and time sludge or biosolids are applied to each site.

   e. The cumulative amount of each pollutant in pounds/acre listed in Table 2 applied to each site.

   f. The total amount of sludge applied to each site in dry tons.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

F. Reporting Requirements

The permittee shall submit the following information in an annual report to the TCEQ by September 30th of each year. The permittee must submit this annual report using the online electronic reporting system available through TCEQ's website. If the permittee requests and obtains an electronic reporting waiver, the annual report can be submitted in hard copy to the TCEQ Regional Office (MC Region 11) and the Enforcement Division (MC 224).

1. Identify in the following categories (as applicable) the sewage sludge or biosolids treatment process or processes at the facility: preliminary operations (e.g., sludge or biosolids grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. Identify the nature of material generated by the facility (such as a biosolid for beneficial use or land-farming, or sewage sludge for disposal at a monofill) and whether the material is ultimately conveyed off-site in bulk or in bags.

3. Results of tests performed for pollutants found in either Table 2 or 3 as appropriate for the permittee's land application practices.

4. The frequency of monitoring listed in Section I.C. that applies to the permittee.

5. Toxicity Characteristic Leaching Procedure (TCLP) results.

6. PCB concentration in sludge or biosolids in mg/kg.

7. Identity of hauler(s) and TCEQ transporter number.

8. Date(s) of transport.

9. Texas Commission on Environmental Quality registration number, if applicable.

10. Amount of sludge or biosolids disposal dry weight (lbs/acre) at each disposal site.

11. The concentration (mg/kg) in the sludge or biosolids of each pollutant listed in Table 1 (defined as a monthly average) as well as the applicable pollutant concentration criteria (mg/kg) listed in Table 3 above, or the applicable pollutant loading rate limit (lbs/acre) listed in Table 2 above if it exceeds 90% of the limit.

12. Level of pathogen reduction achieved (Class A, Class AB or Class B).

13. Alternative used as listed in Section I.B.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met. If Class B biosolids, include information on how site restrictions were met.

14. Identify each of the analytic methods used by the facility to analyze enteric viruses, fecal coliforms, helminth ova, *Salmonella* sp., and other regulated parameters.

15. Vector attraction reduction alternative used as listed in Section I.B.4.

16. Amount of sludge or biosolids transported in dry tons/year.

17. The certification statement listed in either 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii) as applicable to the permittee's sludge or biosolids treatment activities, shall be attached to the annual reporting form.

18. When the amount of any pollutant applied to the land exceeds 90% of the cumulative pollutant loading rate for that pollutant, as described in Table 2, the permittee shall report the following information as an attachment to the annual reporting form.

    a. The location, by street address, and specific latitude and longitude.

    b. The number of acres in each site on which bulk biosolids are applied.

    c. The date and time bulk biosolids are applied to each site.

    d. The cumulative amount of each pollutant (i.e., pounds/acre) listed in Table 2 in the bulk biosolids applied to each site.

    e. The amount of biosolids (i.e., dry tons) applied to each site.

    The above records shall be maintained on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION III. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE OR BIOSOLIDS DISPOSED IN A MUNICIPAL SOLID WASTE LANDFILL

A. The permittee shall handle and dispose of sewage sludge or biosolids in accordance with 30 TAC § 330 and all other applicable state and federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present. The permittee shall ensure that the sewage sludge or biosolids meet the requirements in 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.

B. If the permittee generates sewage sludge or biosolids and supplies that sewage sludge or biosolids to the owner or operator of a municipal solid waste landfill (MSWLF) for disposal, the permittee shall provide to the owner or operator of the MSWLF appropriate information needed to be in compliance with the provisions of this permit.

C. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge or biosolids disposal practice.

D. Sewage sludge or biosolids shall be tested once during the term of this permit in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I (Toxicity Characteristic Leaching Procedure) or other method, which receives the prior approval of the TCEQ for contaminants listed in Table 1 of 40 CFR § 261.24. Sewage sludge or biosolids failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal.

   Following failure of any TCLP test, the management or disposal of sewage sludge or biosolids at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge or biosolids no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Registration Support Division and the Regional Director (MC Region 11) of the appropriate TCEQ field office within 7 days after failing the TCLP Test.

   The report shall contain test results, certification that unauthorized waste management has stopped, and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Permitting and Registration Support Division (MC 129), Texas Commission on Environmental Quality, P. O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. This annual report shall be submitted to the TCEQ Regional Office (MC Region 11) and the Enforcement Division (MC 224), by September 30th of each year.

E. Sewage sludge or biosolids shall be tested as needed, in accordance with the requirements of 30 TAC Chapter 330.

F. Record Keeping Requirements

   The permittee shall develop the following information and shall retain the information for five years.

1. The description (including procedures followed and the results) of all liquid Paint Filter Tests performed.

2. The description (including procedures followed and results) of all TCLP tests performed.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

G. Reporting Requirements

The permittee shall submit the following information in an annual report to the TCEQ by September 30th of each year. The permittee must submit this annual report using the online electronic reporting system available through TCEQ's website. If the permittee requests and obtains an electronic reporting waiver, the annual report can be submitted in hard copy to the TCEQ Regional Office (MC Region 11) and the Enforcement Division (MC224).

1. Identify in the following categories (as applicable) the sewage sludge or biosolids treatment process or processes at the facility: preliminary operations (e.g., sludge or biosolids grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. Toxicity Characteristic Leaching Procedure (TCLP) results.

3. Annual sludge or biosolids production in dry tons/year.

4. Amount of sludge or biosolids disposed in a municipal solid waste landfill in dry tons/year.

5. Amount of sludge or biosolids transported interstate in dry tons/year.

6. A certification that the sewage sludge or biosolids meets the requirements of 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.

7. Identity of hauler(s) and transporter registration number.

8. Owner of disposal site(s).

9. Location of disposal site(s).

10. Date(s) of disposal.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION IV. REQUIREMENTS APPLYING TO SLUDGE OR BIOSOLIDS TRANSPORTED TO ANOTHER FACILITY FOR FURTHER PROCESSING

These provisions apply to sludge or biosolids that is transported to another wastewater treatment facility or facility that further processes sludge or biosolids. These provisions are intended to allow transport of sludge or biosolids to facilities that have been authorized to accept sludge or biosolids. These provisions do not limit the ability of the receiving facility to determine whether to accept the sludge or biosolids, nor do they limit the ability of the receiving facility to request additional testing or documentation.

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge or biosolids in accordance with 30 TAC Chapter 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge.

2. Sludge or biosolids may only be transported using a registered transporter or using an approved pipeline.

B. Record Keeping Requirements

1. For sludge or biosolids transported by an approved pipeline, the permittee must maintain records of the following:

   a. the amount of sludge or biosolids transported;

   b. the date of transport;

   c. the name and TCEQ permit number of the receiving facility or facilities;

   d. the location of the receiving facility or facilities;

   e. the name and TCEQ permit number of the facility that generated the waste; and

   f. copy of the written agreement between the permittee and the receiving facility to accept sludge or biosolids.

2. For sludge or biosolids transported by a registered transporter, the permittee must maintain records of the completed trip tickets in accordance with 30 TAC § 312.145(a)(1)-(7) and amount of sludge or biosolids transported.

3. The above records shall be maintained on-site on a monthly basis and shall be made available to the TCEQ upon request. These records shall be retained for at least five years.

C. Reporting Requirements

The permittee shall submit the following information in an annual report to the TCEQ by September 30th of each year. The permittee must submit this annual report using the online electronic reporting system available through TCEQ's website. If the permittee requests and obtains an electronic reporting waiver, the annual report can be submitted in hard copy to the TCEQ Regional Office (MC Region 11) and the Enforcement Division (MC 224).

1. Identify in the following categories (as applicable) the sewage sludge or biosolids treatment process or processes at the facility: preliminary operations (e.g., sludge or biosolids grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. the annual sludge or biosolids production;

3. the amount of sludge or biosolids transported;

4. the owner of each receiving facility;

5. the location of each receiving facility; and

6. the date(s) of disposal at each receiving facility.

SPECIAL PROVISIONS:

1. This permit is granted subject to the policy of the Commission to encourage the development of area-wide waste collection, treatment, and disposal systems. The Commission reserves the right to amend this permit in accordance with applicable procedural requirements to require the system covered by this permit to be integrated into an area-wide system, if an area-wide system is developed; to require the delivery of the wastes authorized to be collected in, treated by, or discharged from the system, to an area-wide system; or to amend this permit in any other particular to effectuate the Commission's policy. Such amendments may be made when the changes required are advisable for water quality control purposes and are feasible on the basis of waste treatment technology, engineering, financial, and related considerations existing at the time the changes are required, exclusive of the loss of investment in or revenues from any then existing or proposed waste collection, treatment, or disposal system.

2. The permittee shall employ or contract with one or more licensed wastewater treatment facility operators or wastewater system operations companies holding a valid license or registration according to the requirements of 30 TAC Chapter 30, Occupational Licenses and Registrations, and in particular 30 TAC Chapter 30, Subchapter J, Wastewater Operators and Operations Companies.

   This Category C facility must be operated by a chief operator or an operator holding a Class C license or higher. The facility must be operated a minimum of five days per week by the licensed chief operator or an operator holding the required level of license or higher. The licensed chief operator or operator holding the required level of license or higher must be available by telephone or pager seven days per week. Where shift operation of the wastewater treatment facility is necessary, each shift which does not have the on-site supervision of the licensed chief operator must be supervised by an operator in charge who is licensed not less than one level below the category for the facility.

3. The permittee shall maintain and operate the treatment facility in order to achieve optimum efficiency of treatment capability. This shall include required monitoring of effluent flow and quality as well as appropriate grounds and building maintenance.

4. Prior to construction of the wastewater treatment facilities the permittee shall submit to the TCEQ Wastewater Permitting Section (MC 148) of the Water Quality Division, a summary transmittal letter according to the requirements in 30 TAC § 217.6(d). If requested by the Wastewater Permitting Section, the permittee shall submit plans, specifications and a final engineering design report which comply with the requirements of 30 TAC Chapter 217, Design Criteria for Domestic Wastewater Systems. The permittee shall clearly show how the treatment system will meet the permitted effluent limitations required on Page 2 of the permit. A copy of the summary transmittal letter shall be available at the plant site for inspection by authorized representatives of the TCEQ.

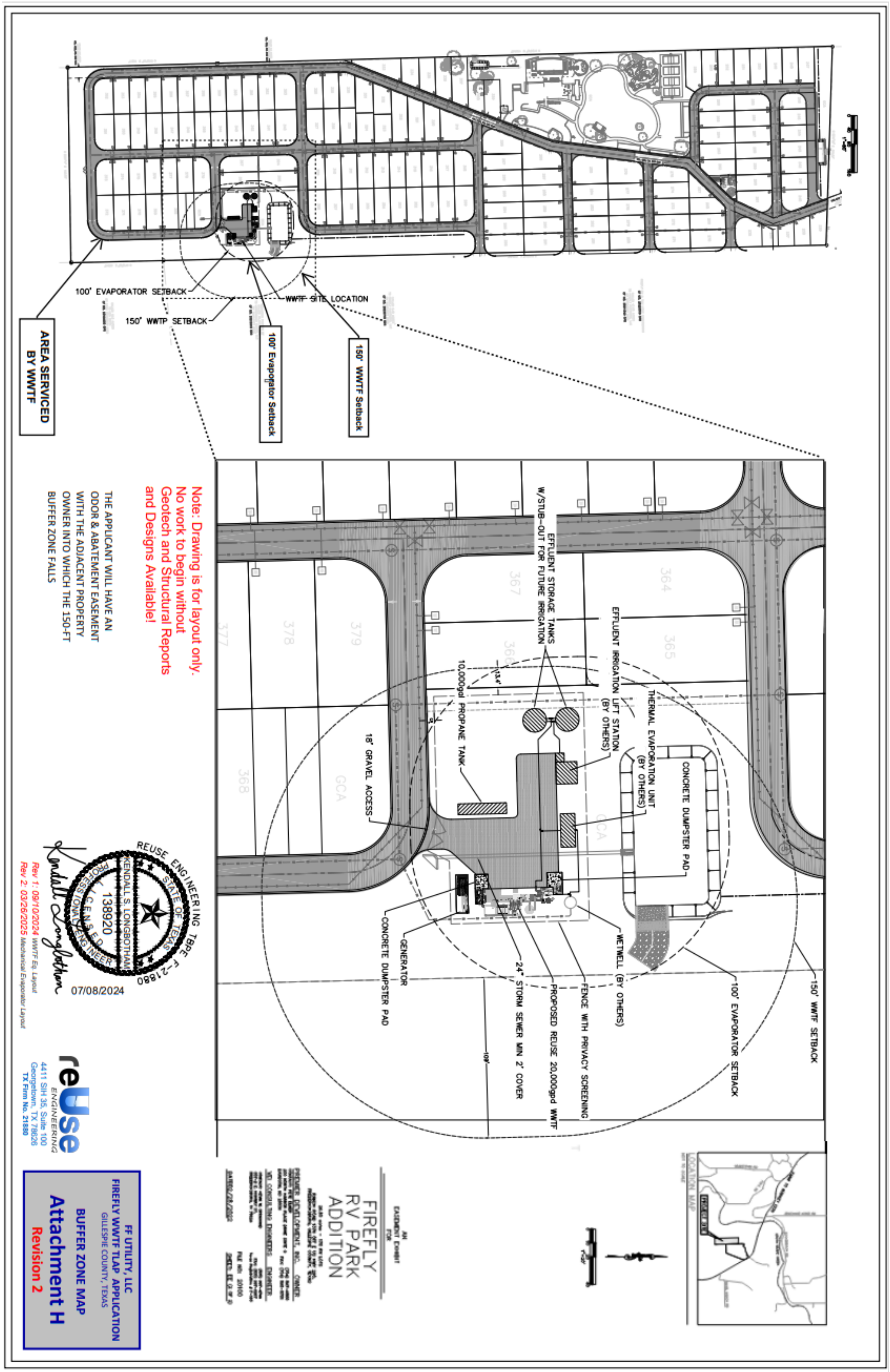
5. Reporting requirements according to 30 TAC § 319.1-319.11 and any additional effluent reporting requirements contained in this permit are suspended from the effective date of the permit until plant startup or discharge, whichever occurs first, from the facility described by this permit. The permittee shall provide written notice to the TCEQ Regional Office (MC Region 11) and the Applications Review and Processing Team (MC 148) of the Water Quality Division at least forty-five (45) days prior to plant startup or anticipated discharge, whichever occurs first, on Notification of Completion Form 20007.

6. Prior to construction of the treatment facility, the permittee shall submit sufficient evidence of legal restrictions prohibiting residential structures within the part of the buffer zone not owned by the permittee according to 30 TAC § 309.13(e)(3). The evidence of legal restrictions shall be submitted to the Executive Director in care of the TCEQ Wastewater Permitting Section (MC 148). The permittee shall comply with the requirements of 30 TAC § 309.13(a) through (d). (See Attachment A.)

7. The permittee shall comply with buffer zone requirements of 30 TAC Section §309.13(c). A wastewater treatment plant unit, defined by 30 TAC Section §309.11(9), must be located a minimum horizontal distance of 250 feet from a private well and a minimum horizontal distance of 500 feet from a public water well site, spring, or other similar sources of public drinking water, as provided by §290.41(c)(1) of this title.

8. The permittee shall provide facilities for the protection of its wastewater treatment facility from a 100-year flood.

Attachment 'A' – Buffer Zone Map



Attachment 'B' – Site Location Map

Figure 1. Site Location Map

TECHNICAL SUMMARY AND
EXECUTIVE DIRECTOR'S PRELIMINARY DECISION

DESCRIPTION OF APPLICATION

Applicant:	Firefly Partners, LLC TCEQ Permit No. WQ0016571001
Regulated Activity:	Domestic Wastewater Permit
Type of Application:	New Permit
Request:	New Permit
Authority:	Texas Water Code (TWC) § 26.027; 30 Texas Administrative Code (TAC) Chapters 305, 309, 312, 319, and 30; and Commission policies.

EXECUTIVE DIRECTOR RECOMMENDATION

The Executive Director has made a preliminary decision that this permit, if issued, meets all statutory and regulatory requirements. The draft permit includes an expiration date of **five years from the date of issuance,** according to 30 TAC Section 305.127(1)(C)(ii)(III), Conditions to be Determined for Individual Permits.

REASON FOR PROJECT PROPOSED

Firefly Partners, LLC has applied to the Texas Commission on Environmental Quality (TCEQ) for new Permit No. WQ0016571001 to authorize the disposal of treated domestic wastewater at a daily average flow not to exceed 0.020 million gallons per day (MGD) via evaporation. The facility includes two storage tanks with a total capacity of 60,000 gallons. The proposed wastewater treatment facility will serve the Firefly development a 26.8-acre Recreational Vehicle (RV) facility with approximately 145 RV locations.

PROJECT DESCRIPTION AND LOCATION

The Firefly Wastewater Treatment Facility will consists of a Membrane Bio-Reactor (MBR) system. Treatment units will include a fine screen, anoxic, aerobic, and membrane cells, a sludge press, and an Ultraviolet (UV) disinfection unit. Treated effluent will be pumped to two 30,000 gallon tanks and subsequesntly evaporated via the use mechanical evaporator(s). Concentrated effluent water produced by the mechanical evaporator(s) will be mixed in with the sludge then hauled by a registered transporter and disposed of at a TCEQ-permitted landfill. The facility has not been constructed.

Sludge generated from the treatment facility is hauled by a registered transporter and disposed of at a TCEQ-permitted landfill, City of Fredericksburg Landfill, Permit No. 1995, in Gillespie County. The draft permit also authorizes the disposal of sludge at a TCEQ-authorized land application site, co-disposal landfill, wastewater treatment facility, or facility that further processes sludge.

The wastewater treatment facility and disposal site are located approximately 0.52 miles southwest of the intersection of Farm-to-Market Road 1376 and OK Corral Drive in Gillespie County, Texas 78624.

The wastewater treatment facility and disposal site are located in the drainage basin of Pedernales River in Segment No. 1414 of the Colorado River Basin. No discharge of pollutants into water in the state is authorized by this permit.

SUMMARY OF EFFLUENT DATA

There is no effluent data since the facility has not been constructed.

DRAFT PERMIT CONDITIONS

The draft permit authorizes the disposal of treated domestic wastewater effluent at a daily average flow not to exceed 0.020 MGD via evaporation. The facility includes two storage tanks with a total capacity of 60,000 gallons for disposal of treated effluent via the use of mechanical evaporator(s).

The effluent limitation of the draft permit, based on a 30-day average, are 5 mg/l five -day carbonaceous biochemical oxygen demand, 5 mg/l total suspended solids, 2 mg/l ammonia nitrogen, 1 mg/l total phosphorus, and based on a single grab, is 20 colony forming units or most probably number per 100 ml of *Escherichia coli*. The permittee shall utilize an Ultraviolet Light (UV) system for disinfection purposes.

The permittee shall comply with the requirements of 30 TAC § 309.13(a) through (d). In addition, by ownership of the required buffer zone area, the permittee shall comply with the requirements of 30 TAC § 309.13(e).

The draft permit includes Sludge Provisions according to the requirements of 30 TAC Chapter 312, Sludge Use, Disposal, and Transportation. Sludge generated from the treatment facility is hauled by a registered transporter and disposed of at a TCEQ-permitted landfill, City of Fredericksburg Landfill, Permit No. 1995, in Gillespie County. The draft permit also authorizes the disposal of sludge at a TCEQ-authorized land application site, co-disposal landfill, wastewater treatment facility, or facility that further processes sludge.

SUMMARY OF CHANGES FROM APPLICATION

None.

BASIS FOR DRAFT PERMIT

The following items were considered in developing the draft permit:

1. Application received on July 12, 2024, and additional information received on September 11, 2024, and February 17, 2025.

2. Interoffice Memorandum from the Water Quality Assessment Team, Water Quality Assessment & Standards Section, Water Quality Division.

PROCEDURES FOR FINAL DECISION

When an application is declared administratively complete, the Chief Clerk sends a letter to the applicant advising the applicant to publish the Notice of Receipt of Application and Intent to Obtain Permit in the newspaper. In addition, the Chief Clerk instructs the applicant to place a copy of the application in a public place for review and copying in the county where the facility is or will be located. This application will be in a public place throughout the comment period. The Chief Clerk also mails this notice to any interested persons and, if required, to landowners identified in the permit application. This notice informs the public about the application and provides that an interested person may file comments on the application or request a contested case hearing or a public meeting.

Once a draft permit is completed, it is sent, along with the Executive Director's preliminary decision, as contained in the technical summary or fact sheet, to the Chief Clerk. At that time, the Notice of Application and Preliminary Decision will be mailed to the same people and published in the same newspaper as the prior notice. This notice sets a deadline for making public comments. The applicant must place a copy of the Executive Director's preliminary decision and draft permit in the public place with the application.

Any interested person may request a public meeting on the application until the deadline for filing public comments. A public meeting is intended for the taking of public comment and is not a contested case proceeding.

After the public comment deadline, the Executive Director prepares a response to all significant public comments on the application, or the draft permit raised during the public comment period. The Chief Clerk then mails the Executive Director's response to comments and final decision to people who have filed comments, requested a contested case hearing, or requested to be on the mailing list. This notice provides that if a person is not satisfied with the Executive Director's response and decision, they can request a contested case hearing or file a request to reconsider the Executive Director's decision within 30 days after the notice is mailed.

The Executive Director will issue the permit unless a written hearing request or request for reconsideration is filed within 30 days after the Executive Director's response to comments and final decision is mailed. If a hearing request or request for reconsideration is filed, the Executive Director will not issue the permit and will forward the application and request to the TCEQ Commissioners for their consideration at a scheduled Commission meeting. If a contested case hearing is held, it will be a legal proceeding similar to a civil trial in state district court.

If the Executive Director calls a public meeting or the Commission grants a contested case hearing as described above, the Commission will give notice of the date, time, and place of the meeting or hearing. If a hearing request or request for reconsideration is made, the Commission will consider all public comments in making its decision and shall either adopt the Executive Director's response to public comments or prepare its own response.

For additional information about this application, contact Shaun M. Speck at (512) 239-4549.

Shaun M. Speck	January 7, 2025
Shaun M. Speck Municipal Permits Team Wastewater Permitting Section (MC 148)	Date

Texas Commission on Environmental Quality

Protecting Texas by Reducing and Preventing Pollution

July 12, 2024

Dear Applicant:

Re: Confirmation of Submission of the New Private Domestic Wastewater Individual Permit Application

This is an acknowledgement that you have successfully completed Private Domestic Wastewater Individual Permit Application.

ER Account Number: ER105186
Application Reference Number: 664956
Authorization Number: WQ0016571001
Site Name: Firefly WWTF
Regulated Entity: RN112007265 - FIREFLY WWTF
Customer(s): CN605877836 - Firefly Partners, LLC

Please be aware that TCEQ staff may contact your designated contact for any additional information.

If you have any questions, you may contact the Applications Review and Processing Team by email at WQ-ARPTeam@tceq.texas.gov or by telephone at (512) 239-4671.

Sincerely,
Applications Review and Processing Team
Water Quality Division

Texas Commission on Environmental Quality

New Domestic or Industrial Individual Permit

Site Information (Regulated Entity)

What is the name of the site to be authorized?	Firefly WWTF
Does the site have a physical address?	No
Because there is no physical address, describe how to locate this site:	appx 0.52 mi southwest of the intersection of FM 1376 & OK Corral Drive
City	Fredericksburg
State	TX
ZIP	78624
County	GILLESPIE
Latitude (N) (##.######)	30.1712
Longitude (W) (-###.######)	-98.751387
Primary SIC Code	4952
Secondary SIC Code	
Primary NAICS Code	221320
Secondary NAICS Code	
Regulated Entity Site Information	
What is the Regulated Entity's Number (RN)?	
What is the name of the Regulated Entity (RE)?	Firefly WWTF
Does the RE site have a physical address?	No
Because there is no physical address, describe how to locate this site:	appx 0.52 mi southwest of the intersection of FM 1376 & OK Corral Drive
City	Fredericksburg
State	TX
ZIP	78624
County	GILLESPIE
Latitude (N) (##.######)	30.1712
Longitude (W) (-###.######)	-98.751387
Facility NAICS Code	221320
What is the primary business of this entity?	WW treatment for 3rd phase of tiny home/RV park

Firefly-Customer (Applicant) Information (Owner)

How is this applicant associated with this site?	Owner
What is the applicant's Customer Number (CN)?	CN605877836
Type of Customer	Corporation
Full legal name of the applicant:	
Legal Name	Firefly Partners, LLC
Texas SOS Filing Number	803952082
Federal Tax ID	862086530
State Franchise Tax ID	32078014233
State Sales Tax ID	
Local Tax ID	

DUNS Number	
Number of Employees	
Independently Owned and Operated?	Yes
I certify that the full legal name of the entity applying for this permit has been provided and is legally authorized to do business in Texas.	Yes
Responsible Authority Contact	
Organization Name	Firefly Partners, LLC
Prefix	MR
First	Pete
Middle	
Last	Elmer
Suffix	
Credentials	
Title	Director of Acquisitions & Development
Responsible Authority Mailing Address	
Enter new address or copy one from list:	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	200 N HARBOR PL STE G
Routing (such as Mail Code, Dept., or Attn:)	
City	DAVIDSON
State	NC
ZIP	28036
Phone (###-###-####)	7048976850
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	p.elmer@premierland.com

Billing Contact

Responsible contact for receiving billing statements:	
Select the permittee that is responsible for payment of the annual fee.	CN605877836, Firefly Partners, LLC
Organization Name	Firefly Partners LLC
Prefix	MR
First	Pete
Middle	
Last	Elmer
Suffix	
Credentials	
Title	Director of Acquisitions & Development
Enter new address or copy one from list:	CN605877836, Firefly Partners, LLC
Mailing Address	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	200 N HARBOR PL STE G
Routing (such as Mail Code, Dept., or Attn:)	
City	DAVIDSON
State	NC
ZIP	28036
Phone (###-###-####)	7048976850

Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	p.elmer@premierland.com

Application Contact

Person TCEQ should contact for questions about this application:	
Same as another contact?	
Organization Name	reUse Engineering Inc
Prefix	MRS
First	Hilary
Middle	
Last	Bond
Suffix	
Credentials	
Title	Director of Permitting and Entitlements
Enter new address or copy one from list:	
Mailing Address	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	4411 S INTERSTATE 35 STE 100
Routing (such as Mail Code, Dept., or Attn:)	
City	GEORGETOWN
State	TX
ZIP	78626
Phone (###-###-####)	5122850302
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	hilary@reuseeng.com

Technical Contact

Person TCEQ should contact for questions about this application:	
Same as another contact?	
Organization Name	reUse Engineering Inc
Prefix	MRS
First	Kendall
Middle	
Last	Longbotham
Suffix	
Credentials	PE
Title	Water Resource Engineer
Enter new address or copy one from list:	
Mailing Address	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	4411 S INTERSTATE 35 STE 100
Routing (such as Mail Code, Dept., or Attn:)	
City	GEORGETOWN

State	TX
ZIP	78626
Phone (###-###-####)	5127559943
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	kendall@reuseeng.com

DMR Contact

Person responsible for submitting Discharge Monitoring Report Forms:	
Same as another contact?	FF Utility LLC
Organization Name	Firefly Partners LLC
Prefix	MR
First	Pete
Middle	
Last	Elmer
Suffix	
Credentials	
Title	Director of Acquisitions & Development
Enter new address or copy one from list:	
Mailing Address:	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	200 N HARBOR PL STE G
Routing (such as Mail Code, Dept., or Attn:)	
City	DAVIDSON
State	NC
ZIP	28036
Phone (###-###-####)	7045199016
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	p.elmer@premierland.com

Section 1# Permit Contact

Permit Contact#: 1

Person TCEQ should contact throughout the permit term.	
1) Same as another contact?	FF Utility LLC
2) Organization Name	Firefly Partners LLC
3) Prefix	MR
4) First	Pete
5) Middle	
6) Last	Elmer
7) Suffix	
8) Credentials	
9) Title	Director of Acquisitions & Development
Mailing Address	

10) Enter new address or copy one from list	
11) Address Type	Domestic
11.1) Mailing Address (include Suite or Bldg. here, if applicable)	200 N HARBOR PL STE G
11.2) Routing (such as Mail Code, Dept., or Attn:)	
11.3) City	DAVIDSON
11.4) State	NC
11.5) ZIP	28036
12) Phone (###-###-####)	7045199016
13) Extension	
14) Alternate Phone (###-###-####)	
15) Fax (###-###-####)	
16) E-mail	p.elmer@premierland.com

Section 2# Permit Contact

Permit Contact#: 2

Person TCEQ should contact throughout the permit term.

1) Same as another contact?	Technical Contact
2) Organization Name	reUse Engineering Inc
3) Prefix	MRS
4) First	Kendall
5) Middle	
6) Last	Longbotham
7) Suffix	
8) Credentials	PE
9) Title	Water Resource Engineer

Mailing Address

10) Enter new address or copy one from list	Technical Contact
11) Address Type	Domestic
11.1) Mailing Address (include Suite or Bldg. here, if applicable)	4411 S INTERSTATE 35 STE 100
11.2) Routing (such as Mail Code, Dept., or Attn:)	
11.3) City	GEORGETOWN
11.4) State	TX
11.5) ZIP	78626
12) Phone (###-###-####)	5127559943
13) Extension	
14) Alternate Phone (###-###-####)	
15) Fax (###-###-####)	
16) E-mail	kendall@reuseeng.com

Public Notice Information

Individual Publishing the Notices

1) Prefix	MRS
2) First and Last Name	Hilary Bond
3) Credential	
4) Title	Director of Permitting and Entitlements
5) Organization Name	reUse Engineering Inc
6) Mailing Address	4411 S INTERSTATE 35 STE 100

7) Address Line 2	
8) City	GEORGETOWN
9) State	TX
10) Zip Code	78626
11) Phone (###-###-####)	5122850302
12) Extension	
13) Fax (###-###-####)	
14) Email	hilary@reuseeng.com
Contact person to be listed in the Notices	
15) Prefix	MRS
16) First and Last Name	Kendall Longbotham
17) Credential	PE
18) Title	Water Resource Engineer
19) Organization Name	reUse Engineering Inc
20) Phone (###-###-####)	5127559943
21) Fax (###-###-####)	
22) Email	kendall@reuseeng.com
Bilingual Notice Requirements	
23) 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
23.1) Are the students who attend either the elementary school or the middle school enrolled in a bilingual education program at that school?	Yes
23.2) Do the students at these schools attend a bilingual education program at another location?	No
23.3) 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)?	No
23.4) Which language is required by the bilingual program?	Spanish

Section 1# Public Viewing Information

County#: 1

1) County	GILLESPIE
2) Public building name	Harper Library & Resale Shop
3) Location within the building	Front Desk
4) Physical Address of Building	23247 US-290
5) City	Harper
6) Contact Name	Denise Monzingo
7) Phone (###-###-####)	8308644993
8) Extension	
9) Is the location open to the public?	Yes

Owner Information

Owner of Treatment Facility	
1) Prefix	
2) First and Last Name	
3) Organization Name	Firefly Partners LLC
4) Mailing Address	200 N Harbor Place Suite G

5) City	Davidson
6) State	NC
7) Zip Code	28036
8) Phone (###-###-####)	7045199016
9) Extension	
10) Email	p.elmer@premierland.com
11) What is ownership of the treatment facility?	Private
Owner of Land (where treatment facility is or will be)	
12) Prefix	
13) First and Last Name	
14) Organization Name	Firefly Partners LLC
15) Mailing Address	200 N Harbor Place Suite G
16) City	Davidson
17) State	NC
18) Zip Code	28036
19) Phone (###-###-####)	7045199016
20) Extension	
21) Email	p.elmer@premierland.com
22) Is the landowner the same person as the facility owner or co-applicant?	Yes

Admin General Information

1) Is the facility located on or does the treated effluent cross American Indian Land?	No
2) What is the authorization type that you are seeking?	Private Domestic Wastewater
2.1) Is the facility previously authorized under a Water Quality individual permit?	No
2.2) What is the proposed total flow in MGD discharged at the facility?	0.02
2.3) Select the applicable fee	<0.050 MGD - $350
3) What is your facility operational status?	Inactive
4) What is the classification for your authorization?	TLAP
4.1) Provide an accurate description of the effluent disposal site location:	Type 1 reclaimed water will be evaporated via the use of two 2 10,000 gallon per day mechanical evaporation units. Use of these mechanical evaporators has been approved by the TCEQ Attachment D.
4.2) City nearest the disposal site:	Fredericksburg
4.3) County in which the disposal site is located:	GILLESPIE
4.4) Describe the routing of effluent from the treatment facility to the disposal site:	Type 1 reclaimed water produced by the WWTF will be evaporated via the use of two 2 10,000-gallon per day mechanical evaporation units. Use of these mechanical evaporators has been approved by the TCEQ Attachment D.
4.5) Identify the nearest watercourse to the disposal site to which rainfall runoff might flow if not contained:	Although not applicable as the Type 1 reclaimed wastewater will be evaporated, the nearest water course to the evaporation units is South Grape Creek.
4.6) Is onsite sludge disposal requested?	No
Owner of Effluent TLAP Disposal Site	
4.7) Prefix	

4.8) First and Last Name	
4.9) Organization Name	Firefly Partners LLC
4.10) Mailing Address	200 N Harbor Place Suite G
4.11) City	Davidson
4.12) State	NC
4.13) Zip Code	28036
4.14) Phone (###-###-####)	7045199016
4.15) Extension	
4.16) Email	p.elmer@premierland.com
4.17) Is the landowner the same person as the facility owner or co-applicant?	Yes
5) Did any person formerly employed by the TCEQ represent your company and get paid for service regarding this application?	No

Plain Language

1) Plain Language

[File Properties]

File Name	LANG_10053 XB PLS Form.docx
Hash	3EB501C09EBDE95BCC3F2F4C499C2C30B15E4D7359423841D639F280D49B0767
MIME-Type	application/vnd.openxmlformats-officedocument.wordprocessingml.document

Domestic Attachments

1) Have you clearly outlined and labeled the required information on the original full size USGS Topographic Map?	Yes

1.1) I certify that I have clearly outlined and labeled the required information on the Topographic map and attached here.

[File Properties]

File Name	MAP_10053 XE2 Stonewall Topo Map.pdf
Hash	94065544C20F8FF11BEA67068FC22079B31BE2E1D9D33F74E6D9313419AB55E8
MIME-Type	application/pdf

[File Properties]

File Name	MAP_10053 XE1 Cain City Topo Map (reduced).pdf
Hash	C82CCF607AFBDF811D6E95AEA3C3BC2FDE23E91898302DC52C024E59C7201676
MIME-Type	application/pdf

2) Public Involvement Plan attachment (TCEQ Form 20960)

[File Properties]

File Name	PIP_10053 XC FF PIP.pdf
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MIME-Type	application/pdf

3) Administrative Report 1.1

[File Properties]

File Name	ARPT_10053 Admin RPT 1.1.pdf
Hash	55342E70C3AAA38675128E501038C27CDA3608875463B7231A85AF2FE5B5F1C7
MIME-Type	application/pdf

4) I confirm that all required sections of Technical Report 1.0 are complete and will be included in the Technical Attachment.	Yes
4.1) I confirm that Technical Report 1.1 is complete and included in the Technical Attachment.	Yes
4.2) Are you planning to include Worksheet 2.1 (Stream Physical Characteristics) in the Technical Attachment?	No
4.3) I confirm that Worksheet 3.0 (Land Disposal of Effluent) is complete and included in the Technical Attachment.	Yes
4.4) I confirm that Worksheet 3.1 (Surface Land Disposal of Effluent) is complete and included in the Technical Attachment.	Yes
4.5) I confirm that Worksheet 3.2 (Subsurface Land Disposal of Effluent) is complete and included in the Technical Attachment.	Yes
4.6) Are you planning to include Worksheet 4.0 (Pollutant Analyses Requirements) in the Technical Attachment?	No
4.7) Are you planning to include Worksheet 5.0 (Toxicity Testing Requirements) in the Technical Attachment?	No
4.8) Are you planning to include Worksheet 7.0 (Class V Injection Well Inventory/Authorization Form) in the Technical Attachment?	No

4.9) Technical Attachment

[File Properties]

File Name	TECH_10054 Technical RPT (New Form) Firefly.docx
Hash	94F8C7CCD9DB7C441B856AE37E372DF9254E174AC525E196BB79DE6164CF016F
MIME-Type	application/vnd.openxmlformats-officedocument.wordprocessingml.document

5) Affected Landowners Map

[File Properties]

File Name	LANDMP_10053 XF1 TLAP Landowner Map.pdf
Hash	2B7CAAE49D32A279C677F45158E768CCC297255FF1F17DEBB425EEEAB5A5000E
MIME-Type	application/pdf

6) Landowners Cross Reference List

[File Properties]

File Name	LANDCRL_10053 XF2 Landowner List.docx
Hash	DE1465838F66208746EFD7CA464E330A32CFCC685C90022076C85666B3858FE7
MIME-Type	application/vnd.openxmlformats-officedocument.wordprocessingml.document

7) Landowner Avery Template

[File Properties]

File Name	LANDAT_10053 XF2 Landowner Labels.docx
Hash	E8AFC8C07B73D24C2B9A4EDCD6A00E71E1D7FC3617B93BFA9FBC296E8259EBC6
MIME-Type	application/vnd.openxmlformats-officedocument.wordprocessingml.document

8) Buffer Zone Map

[File Properties]

File Name	BUFF_ZM_10053 XH Buffer Zone Map (Revised).pdf
Hash	2ABD86FA88B2F0591303C0AFFCD218AD33C9C6FDCB6F09C45F1FB325A1BEBE71
MIME-Type	application/pdf

9) Flow Diagram

[File Properties]

File Name	FLDIA_10054 X2 Process Flow Diagram.pdf
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MIME-Type	application/pdf

10) Site Drawing

[File Properties]

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MIME-Type	application/pdf

11) Original Photographs

[File Properties]

File Name	ORIGPH_10053 XG Photos - Firefly.pdf
Hash	A7CDB73574D486A952EBB7B855A3DE1CF6556803FE3BD4444B7EB212685EE3D0
MIME-Type	application/pdf

12) Design Calculations

[File Properties]

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MIME-Type	application/pdf

13) Solids Management Plan

[File Properties]

File Name	SMP_10054 X7 Solids Mgmt Plan.pdf
Hash	92819BA24B2DB1DFBA283E35A141E083134360A34A1FD24F29C26652C2DCDE68
MIME-Type	application/pdf

14) Water Balance

[File Properties]

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MIME-Type	application/vnd.openxmlformats-officedocument.wordprocessingml.document

15) Other Attachments

[File Properties]

File Name	OTHER_10053 XD 23.010.TX Firefly Innovative Tech Eng Report.pdf
Hash	76B153AF52F48349A0711C914DA8711025556EE8DB4649BD3FBEA553DEF92C3B
MIME-Type	application/pdf

[File Properties]

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MIME-Type	application/pdf

[File Properties]

File Name	OTHER_10054 X6 Wind Rose.pdf

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[File Properties]

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Hash	B22FFC44E6F4533C5F8859D9B9F44651A2C1AEB07C185EDEDFE77305B0FAAA64
MIME-Type	application/pdf

Certification

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

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.

1. I am Randall Nelson, the owner of the STEERS account ER105186.
2. I have the authority to sign this data on behalf of the applicant named above.
3. I have personally examined the foregoing and am familiar with its content and the content of any attachments, and based upon my personal knowledge and/or inquiry of any individual responsible for information contained herein, that this information is true, accurate, and complete.
4. I further certify that I have not violated any term in my TCEQ STEERS participation agreement and that I have no reason to believe that the confidentiality or use of my password has been compromised at any time.
5. I understand that use of my password constitutes an electronic signature legally equivalent to my written signature.
6. I also understand that the attestations of fact contained herein pertain to the implementation, oversight and enforcement of a state and/or federal environmental program and must be true and complete to the best of my knowledge.
7. I am aware that criminal penalties may be imposed for statements or omissions that I know or have reason to believe are untrue or misleading.
8. I am knowingly and intentionally signing New Domestic or Industrial Individual Permit.
9. My signature indicates that I am in agreement with the information on this form, and authorize its submittal to the TCEQ.

OWNER Signature: Randall Nelson OWNER

Customer Number:	CN605877836
Legal Name:	Firefly Partners, LLC
Account Number:	ER105186
Signature IP Address:	75.245.146.112
Signature Date:	2024-07-12
Signature Hash:	38BF6283B2907AF14FA76904D80382CE012C396242A6CD109F25084C755FD49B
Form Hash Code at time of Signature:	6DE163B708603DF4B15BC7CC235006542895E013C3CB315768BE00CCF1A0D7B9

Fee Payment

Transaction by:	The application fee payment transaction was made by ER105186/Randall Nelson
Paid by:	The application fee was paid by HILARY BOND
Fee Amount:	$300.00
Paid Date:	The application fee was paid on 2024-07-12
Transaction/Voucher number:	The transaction number is 582EA000617289 and the voucher number is 712787

Submission

Reference Number:	The application reference number is 664956

Submitted by:	The application was submitted by ER105186/Randall Nelson
Submitted Timestamp:	The application was submitted on 2024-07-12 at 10:47:49 CDT
Submitted From:	The application was submitted from IP address 75.245.146.112
Confirmation Number:	The confirmation number is 550641
Steers Version:	The STEERS version is 6.79

Additional Information

Application Creator: This account was created by Randall Nelson

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

Click to enter text.

Section 2. Original Photographs (Instructions Page 38)

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 38)

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

DOMESTIC WASTEWATER PERMIT APPLICATION

SUPPLEMENTAL PERMIT INFORMATION FORM (SPIF)

This form applies to TPDES permit applications only. Complete and attach the Supplemental Permit information Form (SPIF) (TCEQ Form 20971).

Attachment: <u>TLAP Application; thus, not applicable.</u>

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 5, 2024

Kendall S. Longbotham, P.E.
reUse Engineering, LLC
4411 S Interstate 35, Ste 100
Georgetown, TX 78626

Re: FF Utility, LLC
Firefly WWTF
WWPR Log No. 0424/123
Gillespie County

Dear Ms. Longbotham:

Texas Commission on Environmental Quality (TCEQ) received the project summary transmittal letter dated February 28, 2024.

The rules which regulate the design, installation and testing of domestic wastewater projects are found in 30 TAC, Chapter 217, of the Texas Commission on Environmental Quality (TCEQ) rules titled, Design Criteria for Wastewater Systems.

The engineer submitted an engineering report to be reviewed as Innovative Technology for the Firefly Wastewater Treatment Facility (WWTF) project located in Gillespie County, Texas. The Firefly WWTF project consists of a 20,000 gpd Membrane Bioreactor (MBR) WWTF, Mechanical Evaporators as a means of wastewater disposal, and a 1,000 gpd On-site Sewage Facility System (OSSF) for the disposal of the concentrated effluent water produced by the proposed Mechanical Evaporators. The WWTF will also include an ultraviolet (UV) light disinfection system. The engineer indicates that the Firefly Community would also like to request an authorization under 30 TAC Chapter 210 for the use of Type I reclaimed water to be used for on-site irrigation. The Firefly WWTF project is proposed to support the development of a Recreational Vehicle Park located in Gillespie County.

TCEQ has completed the review of the submitted engineering report. Based on the results of our review:

- The MBR WWTF, as proposed, appears to meet the minimum requirements of 30 TAC Chapter 217: Design Criteria for Wastewater Systems.
- The use of mechanical evaporators as an alternative means of treated wastewater disposal may be approved (on a case-by-case basis) as an innovative technology under Chapter 217.7(b)(2).

- We will review the proposed 1,000 gpd OSSF system when we receive the submittal with the plans and specifications.

Thank you for submitting the above-mentioned engineering report. We look forward to receiving the plans and specifications for our review when the design project is finalized.

You must keep certain materials on file for the life of the project and provide them to TCEQ upon request. These materials include an engineering report, test results, a summary transmittal letter, and the final version of the project plans and specifications. These materials shall be prepared and sealed by a Professional Engineer licensed in the State of Texas and must show substantial compliance with Chapter 217. All plans and specifications must conform to any waste discharge requirements authorized in a permit by the TCEQ. Certain specific items which shall be addressed in the engineering report are discussed in §217.6(d). Additionally, the engineering report must include all constants, graphs, equations, and calculations needed to show substantial compliance with Chapter 217. The items which shall be included in the summary transmittal letter are addressed in §217.6(d)(1)-(9).

Please be reminded of 30 TAC §217.7(a) of the rules which states, "Approval given by the executive director or other authorized review authority does not relieve an owner of any liability or responsibility with respect to designing, constructing, or operating a collection system or treatment facility in accordance with applicable commission rules and the associated wastewater permit".

If you have any questions, or if we can be of any further assistance, please call me at (512) 239-4924.

Sincerely,

Baltazar Lucero-Ramirez, P.E.
Wastewater Permits Section (MC 148)
Water Quality Division
Texas Commission on Environmental Quality

BLR/

cc: TCEQ, Region 13 Office

INNOVATIVE TECHNOLOGY ENGINEERING REPORT: MECHANICAL EVAPORATORS

FIREFLY PARTNERS, LLC

FIREFLY INNOVATIVE TECHNOLOGY ENGINEERING REPORT

TO SUPPORT DISPOSAL FROM MBR WASTEWATER TREATMENT FACILITY

Project Entity: FireFly Partners, LLC

Location: 5386 FM 1376, Fredericksburg, Texas

County: Gillespie County, TX

PREPARED BY:
Kendall S. Longbotham, PE
reUse Engineering, Inc.

February 28, 2024

4411 S Interstate 35, Ste 100
Georgetown, Texas 78626

REUSE ENGINEERING TBPE F-21880
STATE OF TEXAS
KENDALL S. LONGBOTHAM
138920
LICENSED
PROFESSIONAL ENGINEER
02/28/2024

Kendall Longbotham

ENGINEERING
TX Firm No. 21880

reUse
4411 S Interstate 35, Ste 100
Georgetown, Texas 78626
www.reuseinn.com
TX PE Firm 21880

February 28, 2024

Mr. Louis C. Herrin III, P.E.
TCEQ - MC 148
P.O. Box 13087
Austin, Texas 78711-3087

Re: Innovative Technology Engineering Report – Mechanical Evaporators

Permittee:	FF Utility, LLC
Project Name:	Firefly WWTF
County:	Gillespie County
Engineer(s):	reUse Engineering, LLC / TBPE# F-21880 Ms. Kendall S. Longbotham, PE 4411 S Interstate 35, Ste 100 Georgetown, TX 78626 (512) 755-9943 / kendall@reuseeng.com

Dear Mr. Herrin:

We respectfully submit the attached Engineering Report to be reviewed as Innovative Technology for a project located in Gillespie County, Texas. The Engineering Report includes the proposed Mechanical Evaporators as a means of wastewater effluent disposal for the proposed project site.

The attached Engineering Report includes specifications for the proposed Mechanical Evaporators, as well as the proposed wastewater treatment plant and appropriate wastewater influent and effluent characteristics.

Should you have any questions, please do not hesitate to reach out to me via phone or email.

Sincerely,

Kendall Longbotham

Kendall S. Longbotham, PE
reUse Engineering, LLC

REUSE ENGINEERING TBPE F-21880
STATE OF TEXAS
KENDALL S. LONGBOTHAM
138920
LICENSED
PROFESSIONAL ENGINEER
02/28/2024
Kendall Longbotham

TABLE OF CONTENTS

4411 S Interstate 35, Ste 100
Georgetown, Texas 78626
www.reuseinn.com
TX PE Firm 21880

Executive Summary

The Firefly Community is a new development that will require a Wastewater Treatment Facility (WWTF), as well as a means of disposal for the wastewater effluent produced at the WWTF. The Firefly WWTF consists of a Recreational Vehicle Park located in Gillespie County, Texas and will include a 20,000 gallon per day (gpd) WWTF. A Membrane Bioreactor (MBR) WWTF is proposed to treat the 20,000 gpd produced at the Firefly project site.

Due to site constraints, neither a Texas Pollutant Discharge Elimination System (TPDES) Permit nor a Texas Land Application Permit (TLAP) is feasible for this community. Mechanical Evaporators are proposed as the primary means of wastewater effluent disposal for the Firefly project site. The Firefly Community would also request authorization under 30 TAC Chapter 210 for the use of Type I Reclaimed Water in order for some of the wastewater effluent to be used for on-site irrigation.

General Site Information

The Firefly development is located in Gillespie County, Texas, approximately 0.45 miles southeast of the community of Luckenbach, Texas. The site is currently undeveloped farmland, with construction projected to start in Calendar Year 2024. The proposed development will be an addition to the neighboring development (also owned by Firefly), which includes Tiny Home units as well as RV spaces. This report pertains solely to the new addition, which is comprised of 26.8 acres that will be developed and utilized for RV spaces.

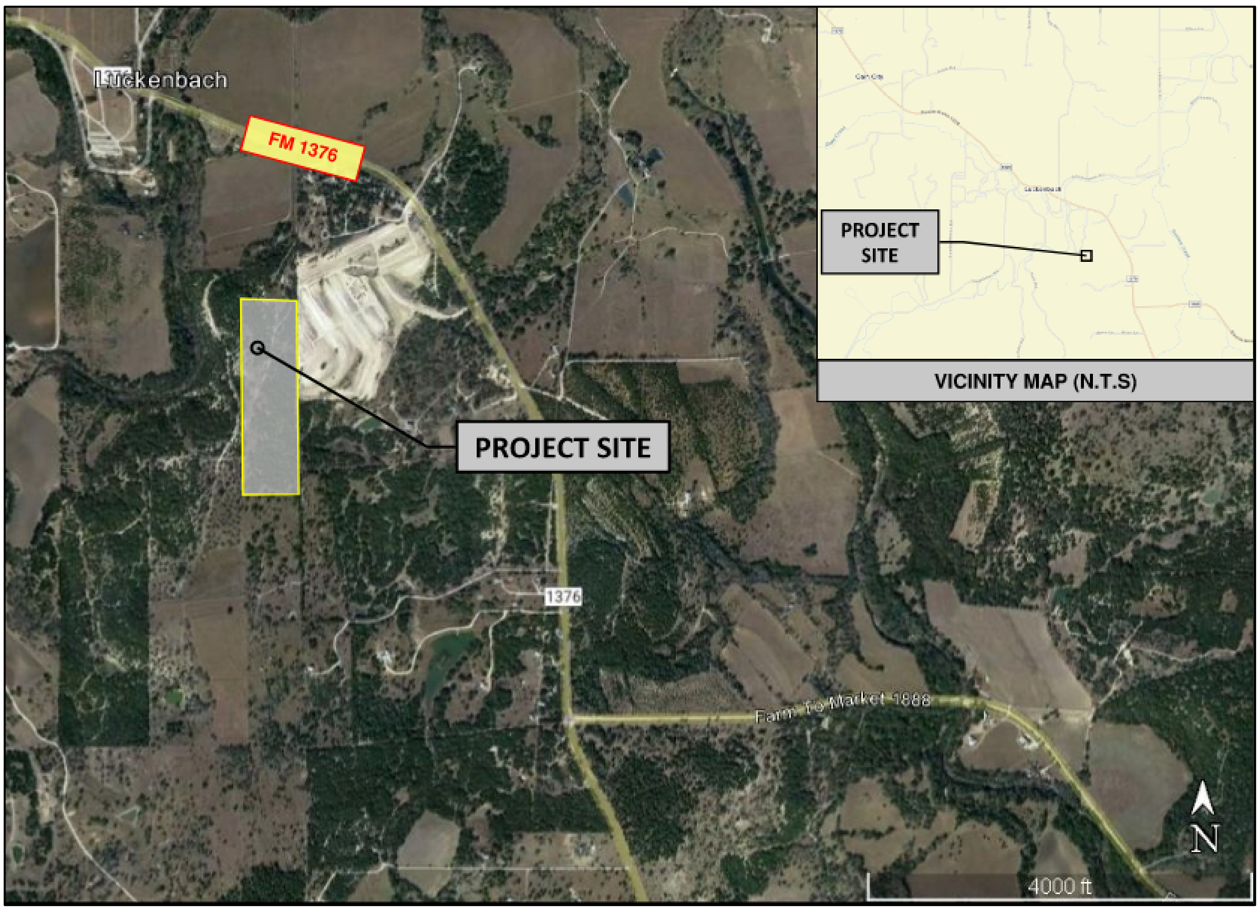

Figure 1. Site Location Map

4411 S Interstate 35, Ste 100
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Proposed MBR WWTF

General MBR Process Overview

The Firefly WWTF will be comprised of four main components: the Influent Lift Station, the Membrane Bioreactor, a screw type Sludge Press, and a backup generator. The WWTF will be designed to treat a daily average flow of 20,000 gpd of high-strength domestic waste from a recreational vehicle park and shall meet or exceed effluent standards typical for Type I Reclaimed Water, which is acceptable for public contact purposes. The 20,000 gpd MBR WWTF will also include an ultraviolet (UV) light disinfection system.

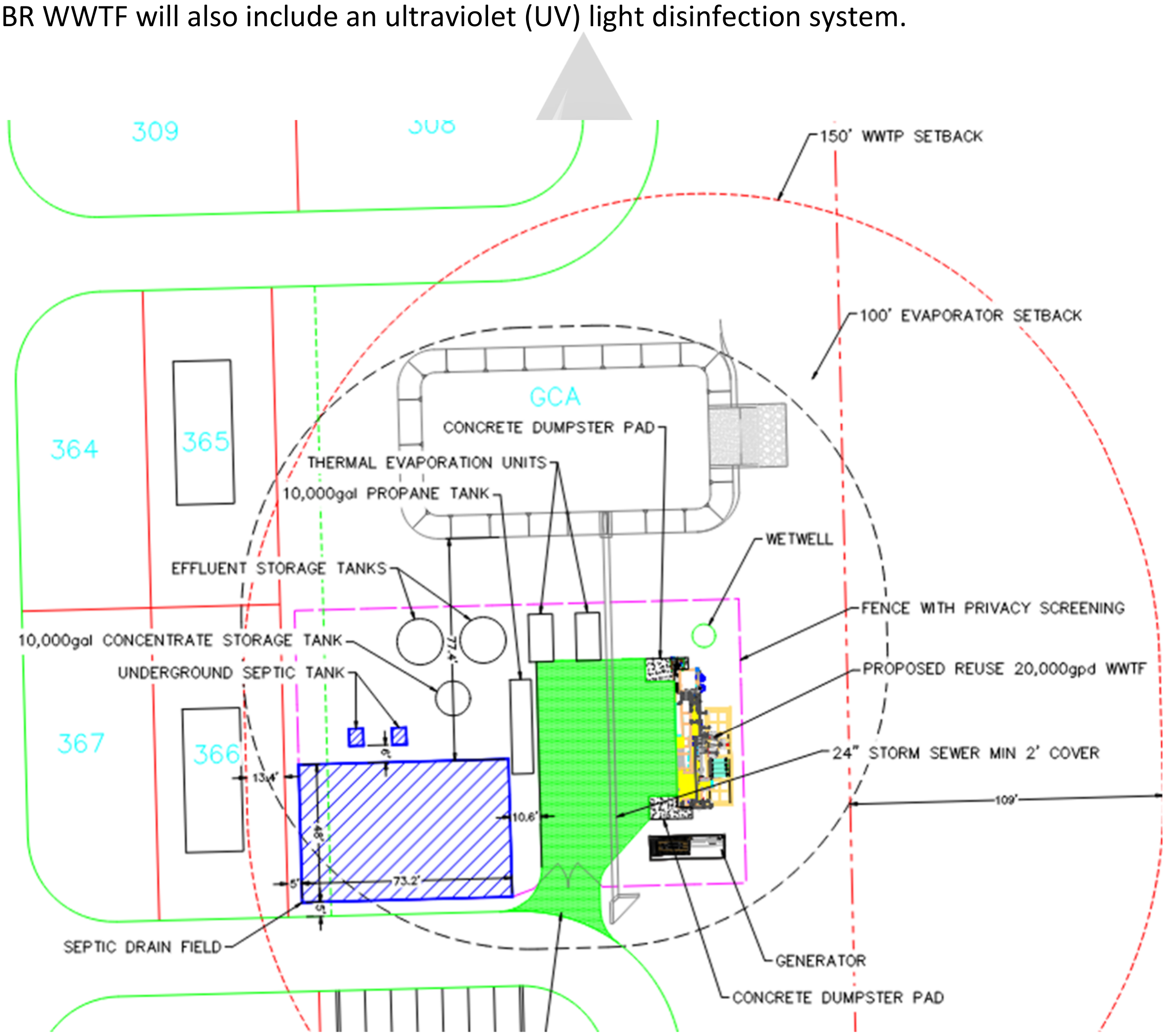

Figure 2. Firefly WWTF Layout

The MBR wastewater process starts with the raw wastewater flowing into the influent lift station via gravity. The wastewater is then pumped through a Contec Rotary Drum fine screen prior to entering the treatment process.

A Biological Nutrient Removal (BNR) treatment system with MBRs will be provided utilizing concrete tank configuration, as well as skid-mounted equipment housing. The biological treatment system will consist of plug-flow anoxic, aerobic bioreactors, and MBRs. Anoxic bioreactors will remove nitrates and nitrites while recovering alkalinity through de-nitrification. Aerobic bioreactors will remove soluble organics and ammonia originally present in wastewater. The MBRs will serve as the physical separators and secondary clarifiers while providing the anoxic bioreactors with highly concentrated nitrified mixed liquor (ML). A portion of this concentrated mixed liquor will be wasted as waste activated sludge (WAS).

The membranes provide a high-quality effluent (permeate) that is low in suspended solids. The proposed membrane system is the MaxFlow Rigid-Plate Ultrafiltration Membrane Modules, manufactured by A-3 USA, Inc. in the United States. The permeate will be disinfected by an ultraviolet light system and then pumped directly to the two 30,000-gallon storage tanks. The WAS will be pumped from the MBRs to a Screw Press for processing, and the resulting dry cake will be hauled to a local landfill for final disposal of solids.

Chemical feed pumps and storage totes will be provided for sodium hydroxide (caustic soda for alkalinity), alum feed system (precipitation), and Micro-C (denitrification). Citric acid and/or sodium hypochlorite will be used for cleaning the membranes.

The process calculations for the WWTF are included in Appendix A.

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Georgetown, Texas 78626
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TX PE Firm 21880

Expected Influent and Effluent Characteristics

The basis for the Firefly WWTF influent and effluent limits by design are shown in Figure 3. The influent and effluent limits are based on a 20,000 gpd treatment calculation.

Influent Charateristics	Symbol	Value	Units
NO_3	$N_{NO3,i}$	0.0	mg/l
NH_4	$N_{a,i}$	35.0	mg/l
TKN	$N_{TKN,i}$	50.0	mg/l
TP	P_i	8.0	mg/l
Dissolved Oxygen	$S_{O2,i}$	0.0	mg/l
FSA fraction	$f_{a/TKN,i}$	0.7	-
Fixed (inorganic) suspended solids	$X_{FSS,i}$	47.5	mgISS/l
TSS concentration	$S_{TSS,i}$	300.0	mgTSS/l
Total BOD mass	$FS_{BOD,i}$	26.5	kgBOD/d
Total COD mass	$FS_{COD,i}$	45.4	kgCOD/d
Total NH_4 mass	$FS_{a,i}$	2.6	kgNH_4/d
Total TKN mass	$FS_{TKN,i}$	3.8	kgTKN/d
Total P mass	$FS_{P,i}$	0.6	kgP/d

Effluent Characteristics	Symbol	Value	Units
Waste Sludge	FX_t	29	lb/d
Waste Sludge	Q_w	453	gpd
Effluent BOD	$S_{BOD,e}$	< 3	mgBOD/l
Effluent COD	$S_{COD,e}$	36	mgCOD/l
Effluent TSS	$S_{TSS,e}$	1.0	mgTSS/l
Effluent P	P_e	0.4	mgP/l
Effluent NH_4	$N_{a,e}$	0.3	mgN/l
Effluent NO_3	$N_{NO3,e}$	0.0	mgN/l
Effluent TN (N_{ne} + N_{te})	$N_{t,e}$	1.8	mgN/l

Figure 3. Influent and Effluent Limits for Firefly WWTF.

Per 30 TAC §217.32 Table B.1. Design Organic Loadings and Flows for a New WWTF, Firefly WWTF was designed based on Transient Trailer Park flow of 50 gpd/person with a maximum of 2.5 individuals per trailer. RV Spaces will not be occupied 24/7/365, as the development is primarily intended for temporary tourist stays. Additionally, the local Water Control District has restricted water supply permits to 41 gpd/person, and all lots and common areas are required to use xeriscaping. Assuming that each Living Unit Equivalent (LUE) may be occupied by 2.5 persons, max (per 30 TAC §217.32 Table B.1) yields a design flow of approximately 125 gpd/LUE. Firefly will have a maximum of 145 LUEs (RV Spaces). When the development is fully occupied, the projected flow is 18,125 gpd; thus, a 20,000 gpd WWTF is more than sufficient to handle the flows at this site.

MBR Process Description and Details

The Biological treatment system design will be based on an average daily flow of 0.02 MGD. The process summary shows the proposed configuration of the biological treatment system, see the design calculations located in Appendix A. As illustrated, the anoxic and aerobic basins are divided into separate zones to maximize treatment efficiency. The effluent from the inlet screens will flow into a degassing zone within the anoxic basin, where the conversion of nitrates and nitrites to nitrogen gas will occur. The aerobic basin will provide oxidation of carbonaceous 5-day biochemical oxygen demand (CBODs) and NH4. The MBR basin will provide liquid-solid total suspended solids (TSS) separation through the MaxFlow rigid-plate membrane – the Permeate – which is then disinfected through a UV light system and then pumped to the two 30,000-gallon storage tanks. Finally, a portion of the mixed liquor will discharge as WAS to the screw press, while the remainder will be recycled back to the degassing zone within the anoxic basin.

The MBR has been designed based on the BNR treatment concept to meet the effluent requirements for Type I Reclaimed water quality. Process simulator software was used to model this concept and to size the bioreactor's basins accordingly. The modeling software simulates the entire activated sludge process, including biological and chemical phosphorus removal, and complete bio-solids handling processes, plant recycle streams and a mass balance for the entire WWTF.

The design wastewater flow and treatment process design criteria presented in this section are the inputs of the flows and liquid/solids mass balance. The flow and liquids/solids mass balance have been prepared for the entire facility and includes the headworks, basins, membranes, and disinfection. Flows recycled to the plant headworks or any other treatment units have been considered in the flow and liquid/solids mass balance.

Anoxic Zone

The influent will flow into the degassing zone of the Anoxic basin from the rotary drum fine screen, where it will blend with the Mixed Liquor Recycle (ML) coming from the downstream Membrane basin (600 percent of influent flow each) which will provide an environment in which nitrates and nitrites are reduced to nitrogen gas. In the absence of oxygen in the Anoxic basin, bacteria utilize nitrate and nitrite as the electron receptor, reducing the nitrate and nitrite to form nitrogen gas which is then released from the system into the atmosphere.

Anoxic bioreactors offer several process advantages in addition to nitrogen removal. Approximately 40 percent of the alkalinity consumed in the nitrification process that produces the nitrates and nitrites in aerobic bioreactors is recovered by the de-nitrification process occurring in the anoxic bioreactors. This recovery will reduce chemical costs for additional alkalinity.

The contents of the Anoxic basin will be homogenized using submersible mixers. The action of the mixer may also blend Micro-C, which can be fed directly to Anoxic basin during winter months, if needed, as an additional carbon source.

The Anoxic basin has a volume of 3,959 gallons and shall maintain a MLSS of approximately 7,641 milligram per Liter (mg/L), per treatment train. Contents of the Anoxic basin will flow by gravity to the Aerobic basin at a rate of 83 gpm per treatment train.

Aerobic Zone

The Aerobic basin will provide for nitrification and carbon oxidation. The bottom of the aerobic bioreactor will be equipped with fine-bubble membrane diffuser grids. The process air will be supplied by tri-lobe blowers installed on the WWTF skid. There will be one aerobic blower and one swing spare blower serving both the Aerobic and Membrane concrete basins.

Air supply to the Aerobic basin can be automatically controlled and adjusted over a range of operating conditions at different flow rates to maintain an average dissolved oxygen (DO) concentration of 2 mg/L throughout the aerobic bioreactors. The DO concentration will be monitored with DO probes installed strategically throughout the bioreactors. The DO levels indicated by the probes will be used for automatic control of the blowers via variable frequency drives (VFDs) driving the blower motors.

The Aerobic basin has a volume of 4,751 gallons and shall maintain an MLSS of approximately 7,641 mg/L per treatment train. Contents of the Aerobic basin will flow by gravity to the MBR basin at a rate of 83 gpm per treatment train.

Membrane Zone

In general, MBRs combine conventional activated sludge treatment processes with membrane filtration and provide an advanced level of treatment. The benefits of MBR treatment systems include exceptional effluent quality for reclaimed water, automated operation, and a compact plant footprint. The mixed liquor concentration in an MBR can be increased to much higher levels than the conventional activated sludge system for fast and efficient operation, as these systems are not limited by gravity settling. Therefore, MBR treatment systems eliminate the need of secondary clarifications and filtration processes and reduce the process tankage required, as well as allowing for easy future upgrades and expansions.

An MBR system consists of immersed membrane sheets assembled in modules and racks in tanks with piping, permeate pumps, air scour blowers, a membrane cleaning mechanism, and a programmable logic controller. The mixed liquor from the upstream process will gravity flow to the Membrane basin and then filter by drawing it through the membrane surface under a vacuum produced by the permeate pumps.

The concentrated mixed liquor (MLSS) from the Membrane basin will be pumped to the degassing zone of the Anoxic basin at the rate of 6 times the average daily flow (6Q). Effluent will be extracted from the Membrane basin through the MaxFlow membranes via permeate pumps, passed through the proposed ultraviolet disinfection system, and discharged into the receiving stream.

The Membrane basin has a volume of 3,959 gallons and shall maintain a MLSS of approximately 9,258 mg/L, per treatment train. The system will utilize six U70 membrane modules in a double-stack configuration, per treatment train. The average flux rate, excluding rest cycles, will be 3.5 gallons per day per square foot (gfd) with a peak flux rate of 14.1 gfd.

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Proposed Mechanical Evaporators

Due to multiple site constraints, normal discharge routes that are regulated under a TPDES permit or a TLAP permit are not feasible for the Firefly WWTF. Mechanical Evaporators are proposed as an alternative solution to remove the wastewater effluent from the site. Mechanical evaporators have been deemed most feasible for the Firefly site due to the amount of space needed, as well as the low overall flow volume the site will produce.

The Firefly development proposes to use two Encon Thermal Evaporators (Encon), model number P33V4-438. Two units will ensure that the wastewater effluent is able to be efficiently evaporated on days when the wastewater effluent cannot be used to irrigate, or there is excess effluent due to peak flows. Treated effluent will flow into two 30,000-gallon storage tanks before either being used for on-site irrigation (Type I Reclaimed water use), or being evaporated through the mechanical evaporators. The two 30,000-gallon storage tanks allow for a 3-day storage volume in the event there are multiple days in which effluent cannot be evaporated or used for on-site irrigation.

Information provided by Encon indicates that their equipment operating in Texas is used for applications that include:

- Reverse Osmosis (RO) reject: RO may be used to generate clean water for a manufacturing process, or it may be used to filter dirty process water prior to disposal. Regardless of the use for the permeate, facilities evaporate the effluent because of regulatory issues – Pubically Operated Treatment Work (POTW) cannot accept due to what is in the waste stream, or hauling/disposal costs are too high. The contents of the effluent depend on the source of the water.

- Metal finishing operations: Some typical sources of wastewater include spent CNC coolant, parts washing, vibratory and floor scrubber wastewater. Off-site hauling is often the easiest choice, but disposal costs tend to be high, especially when you consider 70-99% of what you are paying to dispose of is just water.

- Compressor condensate, boiler blow down and cooling towers are a few more applications that are fairly "clean" to start with (over 99% water). Usually, these waste streams are sent to POTW for disposal but in cases where the site is not connected to a POTW and the only option is hauling, that's where evaporation is justified.

The mechanical evaporator works by bringing the wastewater effluent to a boil inside the evaporator, and then activating burners to fire into the combustion area of the unit's heat exchanger. The resultant gases travel around the vertical tubes inside the heat exchanger until they reach the insulated chimney outside of the unit's evaporator tank. The gases are then pulled back into the evaporator above the liquid level and drawn across the water's surface by the exhaust blower. The exhaust blower pulls the water vapor and flue gases through the mist eliminator and pushes them through the stack out to the atmosphere. A further process description can be found in the specifications for the evaporator, located in Appendix B. A general process flow diagram of the mechanical evaporators are shown in Figure 3 below.

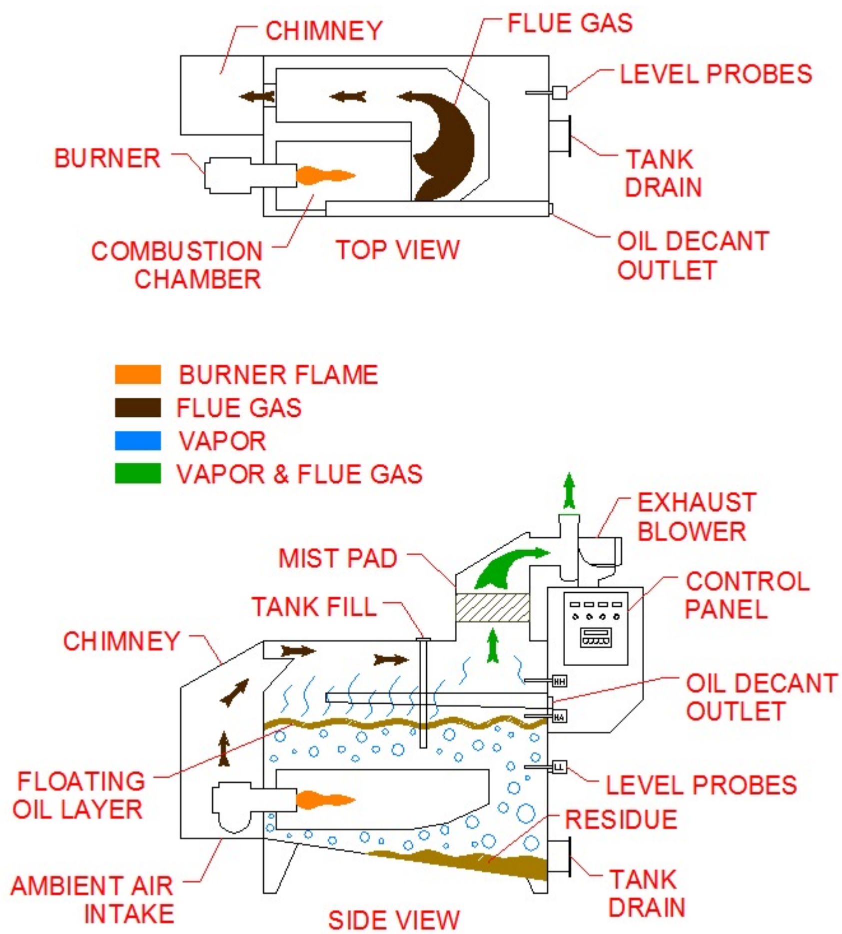

Figure 3. Mechanical Evaporator Process Flow Diagram

The mechanical evaporators will be powered by propane, as natural gas is not available on site. A 10,000-gal propane tank will also be located at the Firefly WWTF site to ensure there is a 5-day storage volume of propane to operate the mechanical evaporators.

The reUse team has been in contact with the Air Permitting department of the TCEQ. Pursuant to these discussions/communications, reUse is working with TCEQ to determine if an air discharge permit, via TCEQ's Permit By Rule (PBR), is needed. Per TCEQ's request a sample of treated wastewater from an operating MBR facility in Texas was collected and analyzed to assess potential air emission concentrations and rates. The treated wastewater sample was analyzed for constituents of concern including a suite (65) of volatile organic compounds (VOCs) and seven additional TCEQ specified constituents of concern (acetaldehyde, acetonitrile, ethylene glycol, formaldehyde, methanol, hydrogen sulfide, and ammonia-nitrogen).

The sample of treated domestic wastewater was obtained from an operating MBR facility located southwest of San Antonio, Texas on January 18, 2024, and delivered to Eurofins San Antonio office for subsequent laboratory analysis. The operating WWTF from which the sample was obtained uses chlorination for disinfection versus UV that will be used at the Firefly site. The laboratory report of analysis is included as Appendix C. Laboratory analysis of the treated domestic wastewater did not detect constituents of concern above their respective method detection limits excluding chloroform, which was reported at a concentration of 0.00143 mg/L.

The laboratory report of analysis was forwarded to TCEQ air permitting staff on February 7, 2024. TCEQ staff are evaluating the evaporators to determine if an air quality permit is needed.

A sample of the above referenced WWTF treated effluent was also forwarded to Encon for laboratory analysis. Encon analyzed the sample to "simulate the effects of boiling" treated domestic wastewater "to anticipate the effectiveness and expected reduction percentage" of evaporation. Encon prepared a report on the effectiveness of their units in evaporating the wastewater, which is included in Appendix B. As previously referenced, the WWTF from which the sample was obtained uses chlorination; thus, pre-chlorine and post-chlorine samples were collected/analyzed. As noted in the report, evaporation of the water:

- did not significantly change the pH of the wastewater;
- volume of the wastewater decreased by 98 to 99%;
- concentration of chloride increased significantly (450 to 45,000 mg/L);
- noticeable foaming was observed resulting in the recommendation of adding an anti-foaming agent; and
- proposed evaporation should be terminated at 95% to reduce the potential of chloride concentrations impacting the integrity of the evaporators.

Subsequent discussions with Encon indicate that if evaporation were terminated at 95% then approximately 90,000 gallons of chloride concentrated (~20,000 mg/L) residue (water) would be generated per year if the evaporators were operated 90 days per year.

Due to the need to dispose of the concentrated residue from the evaporators, an On-Site Sewage Facility System (OSSF) is proposed. A 1,000 gallon per day OSSF system, comprised of septic tanks and an adsorptive drainfield, is proposed to handle the residue water from the mechanical evaporators on the days that the proposed mechanical evaporators are in operation. At a 95% volume reduction, approximately 1,000 gallons per day would need to be disposed of. An OSSF system is the most feasible option to dispose of the residue water created at the Firefly site. The proposed OSSF system is shown in Figure 2 of this report. The OSSF system would consist of 2 – 1,500 gallon septic tanks, and an adsorptive drainfield that is approximately 48-feet long, and 73.2 feet wide with 167 leach chambers. reUse requests that the proposed OSSF system be reviewed and approved with the proposed Mechanical Evaporators and the MBR WWTP.

Upon approval of this engineering report, plans and specifications for the proposed MBR WWTP, Mechanical Evaporators, and OSSF system will be submitted to TCEQ for review and approval.

Climate Data

The climate for this region is humid and subtropical, with average annual maximum temperatures reaching 95.2°F (Texas A&M AgriLife Extension, 2024). Average evaporation rates range from 2.42 to 7.31 inches, with average relative humidity of 79.8%. Large evaporation basins are not ideal for this site, as the climate is not arid enough to facilitate efficient evaporation. There are also space constraints for such a small development. Thus, mechanical evaporation is proposed as the primary disposal method for treated effluent.

This site also proposes to dispose of treated effluent through irrigation via 210 Beneficial Reuse. Rainfall data can be used to estimate the number of days mechanical evaporation would be required, in the case that the site could not be irrigated. This area receives highest rainfall in the month of May (Texas A&M AgriLife Extension), with an average rainfall of 3.99 inches (see Tables in Appendix C). Further review of data obtained from the National Centers For Environmental Information (www.ncdc.noaa.gov) and Texas Water Development Board's (www.waterdatafortexas.org) websites indicates, via Rainfall Station US1TXGS0032 which is located 16 miles north of the site, that from January 9, 2011 through the end of 2022 the area received measured precipitation 45 days per year measuring 29.58 inches (see Tables in Appendix C). Conservatively, the number of days that the mechanical evaporation might be required to operate during the year would be 90 days.

When the treated effluent is evaporated in the mechanical evaporators, it becomes vapor. Wind Roses published for this area show strong preference for north and south direction of headwinds, with the majority of winds blowing from the South the majority of the year (Natural Resources Conservation Service). This provides an idea of where the vapor may travel once it is released into the atmosphere. A Wind Rose for this region is included in Appendix D.

Conclusions

Mechanical evaporators are proposed to be used in place of technology currently approved under TPDES and TLAP permits to properly dispose of the treated wastewater effluent that will be produced at the Firefly site. Development constraints do not allow for typical evaporation methods due to the lack of space the site can provide as well as unsuitable climate conditions for typical methods under a TLAP permit. Mechanical evaporators offer an economical solution to dispose of the treated effluent from the Firefly WWTF.

The Firefly site will be equipped with an MBR WWTF to treat the wastewater effluent to a Type I Reclaimed water standard, two 30,000-gallon storage tanks, one 10,000-gallon propane tank, two mechanical evaporators, a 10,000-gallon residue water storage tank, and a 1,000 gallon per day OSSF system. The mechanical evaporators are an innovative technology that is recommended to be the wastewater effluent disposal solution for the Firefly site. In addition to the mechanical evaporators, a Type I Reclaimed Water permit under TCEQ Chapter 210 is also recommended for the Firefly site. The combination of the mechanical evaporators being the primary means of effluent disposal, along with a Type I Reclaimed water authorization for irrigation on site, is the most feasible and economical solution for the effluent disposal based on the characteristics of the Firefly site.

Upon approval of this Engineering Report, any additional permits will be applied for, and plans and specifications for the MBR WWTP, Mechanical Evaporators, and OSSF system will be submitted to TCEQ for review and approval.

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APPENDIX A

MBR WWTF Design Calculations

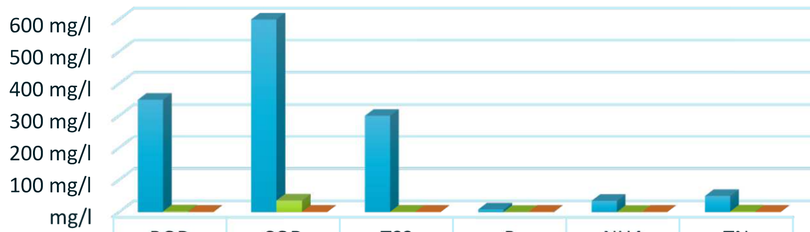
Budget Proposal # 948

Membrane Bioreactor Technology applying A3's patented MaxFlow Plate Ultrafiltration Membrane Modules

A3-USA, Inc 1674 Fountaintown Road Chinquapin, NC 28521

Process Summary

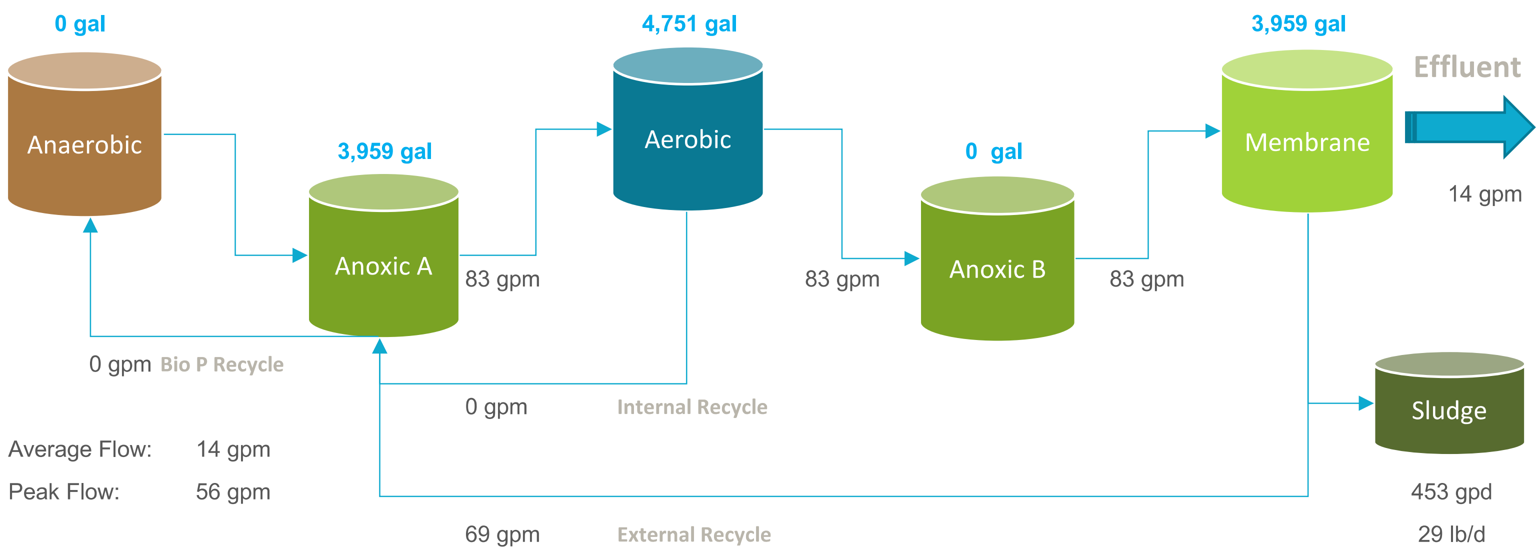
Influent & Effluent Parameters



	BOD	COD	TSS	P	NH4	TN
Influent	350 mg/l	600 mg/l	300 mg/l	8 mg/l	35 mg/l	50 mg/l
Effluent	2.0 mg/l	36.0 mg/l	1.0 mg/l	0.4 mg/l	0.3 mg/l	1.8 mg/l
Removal	99.4%	94.0%	99.7%	95.0%	99.1%	96.4%

PROCESS PARAMETERS

Sludge Age	25 d
Total Reactor Volume	12,668 gal
Total SOR	85 kgO2/d
MLSS in Anoxic / Aerobic Tank	7,641 mg/l
MLSS in Membrane Tank	9,258 mg/l
HRT	15 h
F/M RATIO (BOD)	0.080
F/M RATIO (COD)	0.137
Total Membrane Surface	5,667 sf



Average Flow: 14 gpm

Peak Flow: 56 gpm

Aeration	Flow	Pressure
EQ	0 scfm	0.0 psi
Sludge	0 scfm	0.0 psi
Aerobic	59 scfm	4.5 psi
Membrane	190 scfm	4.5 psi

Applied Options:

NO	DAF
NO	RO

5/23/2023

Biological Process Calculation

Influent Charateristics

Influent Charateristics	Symbol	Value	Units
Type of wastewater		municipal	
Temperature	T	15	°C
pH	-	7.0	-
H_2CO_3 alkalinity	Alk_i	300	mg/l as $CaCO_3$
Site pressure / elevation	$p_{a,i}$	14.5	psi
Average daily flow	Q_i	20,000	gpd
Peak daily flow	$Q_{i, max,d}$	50,000	gpd
Hourly peak flow	$Q_{i, max,p}$	56	gpm
Peak factor	-	4.0	-
Average daily flow	Q_i	76	m^3/d
Max. monthly average daily flow	$Q_{i, max,d}$	189	m^3/d
Hourly peak flow	$Q_{i, max,h}$	12.6	m^3/h
Total BOD	$S_{BOD,i}$	350	mgBOD/l
Total COD	$S_{COD,i}$	600	mgCOD/l
COD/BOD ratio	-	1.71	-
Rapidly biodegradable COD	$S_{s,i}$	150	mgCOD/l
Volitale fatty acids (VFA)	$S_{VFA,i}$	23	mgCOD/l
Fermentable COD	$S_{F,i}$	127	mgCOD/l
Slowly biodegradable COD	$S_{ss,i}$	324	mgCOD/l
Biodegradable COD	$S_{bio,i}$	474	mgCOD/l
Soluble inert COD	$S_{SIN,i}$	36	mgCOD/l
Particulate inert COD	$S_{PIN,i}$	90	mgCOD/l

Influent Charateristics

Influent Charateristics	Symbol	Value	Units
NO_3	$N_{NO3,i}$	0.0	mg/l
NH_4	$N_{a,i}$	35.0	mg/l
TKN	$N_{TKN,i}$	50.0	mg/l
TP	P_i	8.0	mg/l
Dissolved Oxygen	$S_{O2,i}$	0.0	mg/l
FSA fraction	$f_{a/TKN,i}$	0.7	-
Fixed (inorganic) suspended solids	$X_{FSS,i}$	47.5	mgISS/l
TSS concentration	$S_{TSS,i}$	300.0	mgTSS/l
Total BOD mass	$FS_{BOD,i}$	26.5	kgBOD/d
Total COD mass	$FS_{COD,i}$	45.4	kgCOD/d
Total NH_4 mass	$FS_{a,i}$	2.6	$kgNH_4/d$
Total TKN mass	$FS_{TKN,i}$	3.8	kgTKN/d
Total P mass	$FS_{P,i}$	0.6	kgP/d

Effluent Characteristics

Effluent Characteristics	Symbol	Value	Units
Waste Sludge	FX_t	29	lb/d
Waste Sludge	Q_w	453	gpd
Effluent BOD	$S_{BOD,e}$	< 3	mgBOD/l
Effluent COD	$S_{COD,e}$	36	mgCOD/l
Effluent TSS	$S_{TSS,e}$	1.0	mgTSS/l
Effluent P	P_e	0.4	mgP/l
Effluent NH_4	$N_{a,e}$	0.3	mgN/l
Effluent NO_3	$N_{NO3,e}$	0.0	mgN/l
Effluent TN (N_{ne} + N_{te})	$N_{t,e}$	1.8	mgN/l

Bioreactor Characteristics	Symbol	Value	Units
Temperature	T_{bio}	15	°C
Sludge retention time / Sludge age	SRT	25	d
Reactor volume	$V_{P,chosen}$	12,668	gallons
Reactor volume	$V_{P,chosen}$	48	m^3
Reactor volume	$V_{P,calc}$	11,334	gallons
Average MLSS concentration	X_{TSS}	7,750	mgTSS/l
Food to microorganism ratio	$F/M_{BOD,used}$	0.080	kgBOD/kgMLSS
Food to microorganism ratio	$F/M_{COD,used}$	0.137	kgCOD/kgMLSS
Membrane tank MLSS concentration	X_M	9,258	mgTSS/l
Aerobic/Anoxic tank MLSS concentration	X_{Bio}	7,641	mgTSS/l
Number of anaerobic zones	$\#_{AN}$	0	-
Number of anoxic zones	$\#_{AO}$	1	-
Number of aerobic zones	$\#_{AE}$	1	-
External recycle ratio	m	5	-
Internal recycle ratio	a	0	-
DO in m recycle	O_m	2	mgO_2/l
DO in a recycle	O_a	0	mgO_2/l
Recycle ratio to anaerobic tank (PAO)	s	0	-
DO in s recycle	$S_{O2,s}$	0	mgO_2/l
Nitrate on s recycle	$S_{NO3,s}$	0	mg/l
TKN/COD ratio	$f_{TKN/COD}$	0.083	mgTKN/mgCOD
Carbon source addition (Micro C)	B_{MicroC}	0.0	lb/d
Carbon source addition (Micro C)	S_{MicroC}	0.00	gpd
Nominal hydraulic retention time	HRT_n	15.2	h
Actual hydraulic retention time	HRT_a	2.5	h

Biological Oxygen Demand	Symbol	Value	Units
OD for synth & endo respiration (PAO)	FO_{PAO}	0	kgO_2/d
OD for synth & endo respiration (OHO)	FO_{OHO}	29	kgO_2/d
Mass carbonaceous oxygen demand	FO_C	29	kgO_2/d
Carbonaceous oxygen utilization rate	O_c	60%	-
Nitrification oxygen demand	FO_n	12	kgO_2/d
Total oxygen demand	FO_t	40	kgO_2/d
Oxygen recovered by denitrification	FO_d	7	kgO_2/d
Net total oxygen demand (AOR)	FO_{td}	33	kgO_2/d
Oxygen saturation @ operating temp.	c_s	10.2	mg/l
Desired oxygen level	c_x	2.0	mg/l
Transfer coefficient	α	0.50	-
Diffuser water depth	DWD	6.5	feet
Oxygen transfer efficiency	OTE	2	%
Standard total oxygen demand (SOR)	SOR	85	kgO_2/d
Required air flow	Q_{air}	**57**	scfm
Oxygen requir. per volume & depth	OS	18.3	$gO_2/(Nm_3*m_D)$

Membrane Module Design	Symbol	Value	Units
Permeate on cycle	T_o	8	minute
Permeate off cycle (relaxation)	T_s	2	minute
Effective membrane module surface	$A_{m,eff}$	87.8	m^2
Effective membrane module surface	$A_{m,eff}$	945	ft^2
Total number of membrane modules	N_M	6	-
Total membrane module surface	A_{total}	527	m^2
Total membrane module surface	A_{total}	5,667	ft^2
Nominal average daily flux	$Q_{ave,n}$	7.5	lmh
Nominal max. daily flux	$Q_{ave,n,max,mo}$	18.7	lmh
Nominal peak hourly flux	$Q_{peak,n}$	30.0	lmh
Average daily flux (excluding rest cycle)	$Q_{ave,n}$	**3.5**	gfd
Max. Daily flux (ex. rest cycle)	$Q_{ave,n,max,mo}$	**8.8**	gfd
Peak hourly flux (ex. rest cycle)	$Q_{peak,n}$	**14.1**	gfd
Total membrane module displacement vol	$V_{modules}$	66	ft^3
Total membrane module displacement vol	$V_{modules}$	494	gallons
Aeration modules	A#	6	-
Membrane module aeration requirement	Q_{am}	28.5	acfm
Total membrane modules aeration	$Q_{am,total}$	171	acfm
Membrane diffuser water depth	DWD_m	6.0	feet
Oxygen requirement per volume & depth	OS	14	$gO_2/(Nm_3*m_D)$
Standard oxygen rate, membrane aeration	SOR_m	381	lbO_2/d
Standard oxygen rate, membrane aeration	SOR_m	175	kgO_2/d

- ✓ Patented, innovative A3's MaxFlow™ membrane filtration modules manufactured in USA.
- ✓ The MaxFlow™ module "open channel design" provides optimal biofilm control, minimizes the quantity of chemical cleaning procedures and avoids module clogging.
- ✓ The compact module design enables dual-stack and triple-stack installations. It allows for a high membrane packing density resulting in a small footprint and high energy efficiency.
- ✓ Most existing conventional treatment plants can be retrofitted with MaxFlow™ membranes due to the flexible and compact nature of our membrane

Kinetic Constants	Symbol	Value	Units
Yield coefficient OHO	Y_{OHO}	0.40	mgVSS/mgCOD
Yield coefficient OHO,OBS	$Y_{OHO,obs}$	0.06	mgVSS/mgCOD
Fermentation rate at 20°C	$k_{F,20}$	0.06	m3/gVSSd
Temperature coefficient for $k_{F,T}$	Θ_{kF}	1.029	-
Fermentation rate at T	$k_{F,T}$	0.05	m3/gVSSd
Endogenous respiration rate (decay)	$b_{OHO,20}$	0.24	gVSS/gVSSd
Endogenous respiration rate T	$b_{OHO,T}$	0.21	gVSS/gVSSd
Yield coefficient FSA	Y_A	0.10	mgVSS/mgFSA
Nitri. pH sensitivity coefficient	K_I	1.13	-
Nitri. pH sensitivity coefficient	K_{max}	9.50	-
Nitri. pH sensitivity coefficient	K_{II}	0.30	-
Max. specific growth rate at 20°C	μ_{Am}	0.45	1/d
Max. spec. growth rate - Temp/pH	μ_{AmTpH}	0.21	1/d
Half saturation coefficient	K_n	0.75	mgFSA/l
Half saturation coefficient - Temp	K_{nT}	0.42	mgFSA/l
Endogenous respiration rate (decay)	b_A	0.04	1/d
Temperature coefficient for $k_{F,T}$	θ_n	1.123	-
Endogenous respiration rate T	b_{AT}	0.022	1/d
Temperature sensitivity coefficient	Θ_{nk1}	1.20	-
Temperature sensitivity coefficient	Θ_{nk2}	1.05	-
Temperature sensitivity coefficient	Θ_{nk3}	1.03	-
Denitrification rates at 20°C	k_1	0.70	-
Denitrification rates at 20°C	k_2	0.10	-
Denitrification rates at 20°C	k_3	0.08	-
Denitrification rates	k_{1T}	0.281	-
Denitrification rates	k_{2T}	0.079	-
Denitrification rates	k_{3T}	0.069	-
Yield coefficient PAO	Y_{PAO}	0.45	gAVSS/gCOD
Yield coefficient PAO	$Y_{PAO,obs}$	0.22	gAVSS/gCOD
Endogenous respiration rate (decay)	b_{PAO_20}	0.04	gEVSS/gCOD
Temperature coefficient for $k_{F,T}$	$\Theta_{b,PAO}$	1.029	-
Endogenous respiration rate T	$b_{PAO,T}$	0.03	gEVSS/gVSSd

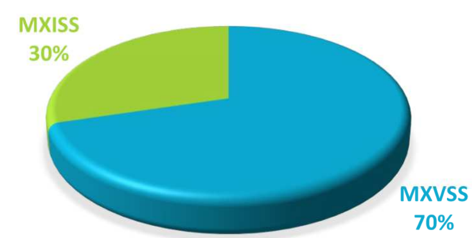
Stoichiometric Constants	Symbol	Value	Units
COD/BOD ratio	-	1.71	-
Readily biodeg. org. fraction (RBCOD)	$f_{s,COD}$	0.25	g/gTCOD
Non-biodegradable particulate COD	$f_{PNb,COD}$	0.15	g/gTCOD
Non-biodegradable soluble COD	$f_{SNb,COD}$	0.06	g/gTCOD
SVFA fraction of RBCOD	$f_{SVFA,SSi}$	0.15	g/gCOD$_{SS}$
VSS/TSS of activated sludge	f_{VT}	0.70	mgVSS/mgTSS
COD/VSS of activated sludge	f_{cv}	1.48	kgCOD/kgVSS
True synthesis fraction	f_s^0	0.57	-
Endogenous residue fraction	$f_{H/E,OHO}$	0.2	-
ISS content of OHOs	$f_{ISS,OHO}$	0.15	-
Active fraction - VSS	f_{avOHO}	25%	-
Active fraction - TSS	f_{at}	18%	-
Influent FSA fraction	$f_{FSA,i}$	0.70	-
Non-bio. soluble orgN fraction (inerts)	$f_{SNb,N}$	0.03	-
Non-bio. particulate orgN fraction	f_n	0.12	-
Permissible unaer. sludge mass fraction	f_{xm}	0.65	-
Design unaerated sludge mass fraction	f_{xt}	0.31	-
Minimum primary anoxic mass fraction	f_{x1min}	0.08	-
Primary anoxic mass fraction	f_{x1}	0.31	-
Secondary anoxic mass fraction	f_{x2}	0.00	-
Anaerobic mass fraction	f_{AN}	0.00	-
Non-bio. particulate orgP fraction	$f_{P,XE,OHO}$	0.05	mgP/mgVSS
Endogenous residue fraction	$f_{XE,PAO}$	0.25	gEVSS/gAVSS
P fraction in active PAO mass	$f_{P,PAO}$	0.38	gP/gAVSS
VSS/TSS ratio for PAO active mass	$f_{VT,PAO}$	0.46	gVSS/gTSS
Ratio of P release /VFA uptake	$f_{PO4,REL}$	0.5	gP/gCOD
Frac. of fixed inorganic s. solids of PAO	$f_{FSS,PAO}$	1.3	gFSS/gAVSS
P content of TSS	$f_{P,TSS}$	0.041	gP/gTSS
P content of VSS	$f_{P,FSS,i}$	0.02	gP/gVSS
TKN/COD ratio	f_{ns}	0.08	mgTKN/mgCOD
Nitrogen content of active biomass	$f_{N,VSS}$	0.10	gN/gAVSS

Biological Mass Balance

Biological Mass Balance	Symbol	Value	Units
Sludge age	SRT	25	d
Mixed liquor suspended solids	X_{TSS}	7,750	mgTSS/l
Readiable biodegradabe COD flux	$FS_{S,i}$	11	kgCOD/d
Daily flux of VFAs	$FS_{VFA,i}$	2	kgCOD/d
Daily flux of fermentable COD	$FS_{F,i}$	10	kgCOD/d
Daily flux of biodegradable COD	$FS_{bio,i}$	36	kgCOD/d
Daily flux of particulate inert COD	$FS_{PIN,i}$	7	kgCOD/d
Daily flux of fixed inorganic sus. solids	$FS_{ISS,i}$	4	kgISS/d
Influent particulate non-bio. COD	$FX_{VSS,i}$	5	kgVSS/d
Mass nitrogen into sludge prod.	FN_{Sludge}	1	kgN/d
Mass of nitrate generated per day	FN_{NO3}	3	kgN/d
VFAs stored by PAOs	$FS_{S,PAO}$	0	kgCOD/d
Remaining biodegradable COD	$FCOD_{b,OHO}$	36	kgCOD/d
Mass nitrifiers	MX_{A}	4	kgVSS
Active biomass PAO	MX_{PAO}	0	KgAVSS
Endogenous active biomass PAO	$MX_{E,PAO}$	0	kgEVSS
Bio mass	MX_{bio}	58	kgVSS
Active organism mass	MX_{OHO}	58	kgVSS
Endogenous residue mass	$MX_{E,OHO}$	61	kgVSS
Non-biodegradable particulate mass	MX_{Iv}	115	kgVSS
Volatile suspended solids mass	MX_{VSS}	234	kgVSS
Inorganic suspended solid mass	MX_{ISS}	99	kgISS
Total suspended solids mass	MX_{TSS}	332	kgTSS
Mass/Sludge TSS wasted	FX_{t}	13	KgTSS/d
Mass/Sludge VSS wasted	FX_{V}	9	kgVSS/d
Effluent COD	$S_{COD,e}$	36	mgCOD/l
COD mass out (effluent and waste)	$FS_{COD,e}$	3	kgCOD/d
Mass/Sludge COD wasted	$FX_{COD,s}$	14	kgCOD/d

Alkalinity

Alkalinity	Symbol	Value	Units
Alkalinity $_{\text{Nitrification as CaCO3 (consumed)}}$	Alk_{Nitri}	238	mg/l as $CaCO_3$
Alkalinity $_{\text{Denitrification as CaCO3 (recovered)}}$	$Alk_{Denitri}$	120	mg/l as $CaCO_3$
Alkalinity $_{ef}$	Alk_{e}	100	mg/l as $CaCO_3$
Alkalinity $_{inf}$	Alk_{i}	300	mg/l as $CaCO_3$
Alkalinity $_{\text{Alum (consumed)}}$	Alk_{Alum}	0.0	mg/l as $CaCO_3$
Alkalinity $_{Total}$	Alk_{total}	182	mg/l as $CaCO_3$
Alkalinity $_{Added}$	Alk_{added}	-82	mg/l as $CaCO_3$
Alkalinity $_{Added}$	$XAlk_{added}$	0	lb/d
Density caustic solution $_{(50\%)}$	-	12.76	lb/gal
Alkalinity $_{recovered}$	$Alk_{recovered}$	0.4	$lbCaCO_3$/lb
Caustic $_{needed}$	-	0.0	lb/d
Caustic $_{needed}$	-	0.0	gpd



$$V_p = \frac{MX_{TSS}}{X_{TSS}}$$

$$FX_t = \frac{MX_{TSS}}{SRT}$$

$$MX_{TSS} = MX_{ISS} + MX_{VSS}$$

N Removal	Symbol	Value	Units
Factor of safety	S_f	1.2	-
Nitrogen requirements	FN_{synth}	1	kgN/d
Nitrogen requirements	$TKN_{i,synth}$	12.36	gN/m3
Influent non-bio. soluble organic N	$N_{nbios,i}$	1.5	mgN/l
Influent non-bio. particulate org. N	$N_{nbiop,i}$	7.3	mgN/l
Influent biodegradable organic N	$N_{bio,i}$	13.5	mgN/l
Effluent non-bio. soluble organic N	$N_{nbios,e}$	1.5	mgN/l
NH4 concentration avail. for nitri.	N_{an}	33.7	mgN/l
Effluent ammonia	$N_{a,e}$	0.3	mgN/l
Effluent TKN	$N_{TKN,e}$	1.8	mgN/l
N concentration into sludge prod.	N_s	14.8	mgN/l
Nitrification capacity	N_c	33.4	mgN/l
Denitrification potential RBCOD	$D_{p1RBCOD}$	21.2	$mgNO_3$-N/l
Denitrification potential SBCOD	$D_{p1SBCOD}$	19.0	$mgNO_3$-N/l
Denitrification potential RBCOD	$D_{p3RBCOD}$	0.0	$mgNO_3$-N/l
Denitrification potential SBCOD	$D_{p3SBCOD}$	0.0	$mgNO_3$-N/l
Minimum sludge age for nitri.	SRT_m	8.1	d
Denitrification potential primary tank	D_{p1}	40.2	mgN/l
Denitrification potential secondary tank	D_{p3}	0.0	mgN/l
Denitri. potential recycle rate (f_{xm} = f_{xdm})	D_{p*}	31.3	mgN/l
Effluent nitrate	$N_{NO3,e}$	0.0	mgN/l
Effluent nitrate @ f_{xdm} & recycle rate	$N_{NO3,e*}$	5.6	mgN/l

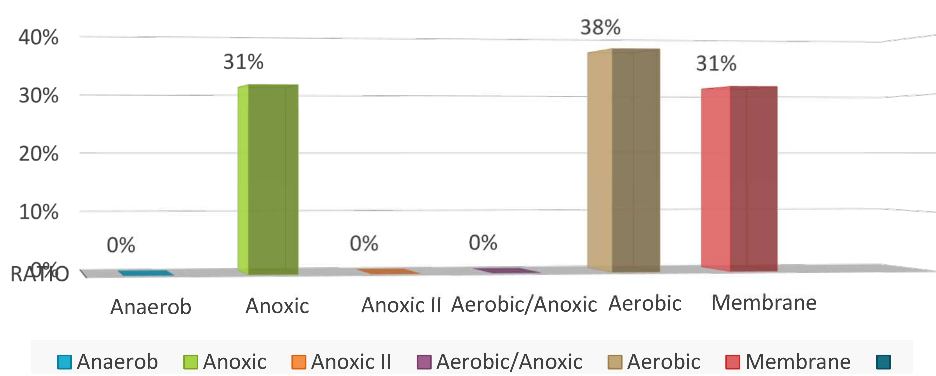
P Removal	Symbol	Value	Units
COD lost in anaerobic reatcor	$S_{F,ANn}$	0.0	$gCOD/m^3$
COD lost in anaerobic reatcor	$S_{F,ANn*}$	0.0	$gCOD/m^3$
Fermentable COD for AN reactor	$S_{F,I,conv}$	0.0	$gCOD/m^3$
DO in influent	$S_{O2,i}$	0.0	mgO_2/l
PO_4 release AN reactor	$S_{PO4,rel}$	0.0	gP/m^3
P removal by PAOs	ΔP_{PAO}	0.0	gP/m^3
P removal by OHOs	ΔP_{OHO}	0.9	gP/m^3
P removal by endgeneous biomass	ΔP_{XE}	1.6	gP/m^3
P removal by influent inert mass	ΔP_{XI}	3.0	gP/m^3
P into sludge production	P_s	5.1	gP/m^3
Potential P removal by system	$\Delta P_{SYS,POT}$	10.6	gP/m^3
Actual P removal by system	$\Delta P_{SYS,ACT}$	8.0	gP/m^3
Effluent particulate P from TSS	$X_{P,e}$	0.0	gP/m^3
Influent total P	P_i	8.0	gP/m^3
Effluent total P	P_{e*}	0.0	gP/m^3
P precipitated	P_{prec}	0.0	mgP/l
Precipitation chemical	B_{Alum}	0.0	lb/d
Precipitation chemical	Solution	0.0	gal/d
Density Alum	z_{AL}^{3+}	0.100	lb_{AL}/lb_{prec}
Density Iron	z_{FE}^{3+}	0.077	lb_{FE}/lb_{prec}
Alum efficiency	-	40.0	g/kg
Chemical precipitation sludge	-	0.0	lb/d

Mechanical Process Calculation

Tank Dimensions	Trains	Length	Width	Dia.	Degree	Height	Liquid level	Volume per train	Volume Total	Volume Total
Anaerobic	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
Anoxic I	1	10.00 ft	7.30 ft	.00 ft	0.0	9.00 ft	7.25 ft	3,959 gal	3,959 gal	15.0 m3
Aerobic	1	12.00 ft	7.30 ft	.00 ft	0.0	9.00 ft	7.25 ft	4,751 gal	4,751 gal	18.0 m3
Anoxic II	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
Anoxic Buffer	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
Membrane	1	10.00 ft	7.30 ft	.00 ft	0.0	9.00 ft	7.25 ft	3,959 gal	3,959 gal	15.0 m3
Sludge	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
EQ	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3

32.0

Tank Design	Symbol	Value	Units		
Total process tank volume		12,668	gallons	Weir level	0.6 inches
Total process tank volume$_{calc}$		**11,334**	gallons	Weir length	4.0 ft
Unaerated tank percentage		31	%	Velocity	0.75 fps
Total tank volume		**12,668**	gallons	Vertical tank	0
Membrane modules volume		494	gallons	Horz. Tank	0
F/M$_{used,BOD}$		0.080	kgBOD/kgMLSS	Diameter	0 ft
F/M$_{used,COD}$		0.137	kgCOD/kgMLSS		



Process Volume Distribution

Air Flow Design	Symbol	Membrane per train	Aerobic per train	Sludge	EQ	Unit
Minimum air flow	$Q_{A,re}$	171	57	0	0	acfm / scfm
Chosen air flow - actual	$Q_{A,\ chosen}$	171	54	0	0	acfm
Chosen air flow - inlet	$Q_{A,chosen}$	323	100	0	0	m^3/h
Chosen air flow - inlet	$Q_{A,chosen}$	**190**	**59**	**0**	**0**	scfm
Chosen air flow - piping	$Q_{A,chosen}$	145	45	0	0	acfm
Pipe pressure	p_b	4.5	4.5	0.0	0.0	psi
Pipe losses	H	0.40	0.36	0.00	0.00	psi
Equivalent length in pipe looses	L_p	400	400	400	400	feet
Pipe diameter	d	3.0	2.0	2.0	2.0	inches
Internal pipe diameter	d_i	3.26	2.16	2.16	2.16	inches
Standard temperature	T_1	293	293	293	293	K
Pipe temperature	T_2	316	316	293	293	K
Constant	f	0.02	0.03	0.06	0.06	-
Air velocity	v	**41.7**	**29.6**	**0.1**	**0.1**	fps
Atmospheric pressure	$p_{a,l}$	14.5	14.5	14.5	14.5	psi
Absolute pressure	p_2	19.0	19.0	14.5	14.5	psi
Pressure due to tank liquid level	$p_{DWD,m}$	2.6	2.9	0.0	0.0	psi
Pressure due to aeration device	p_{DWD}	0.7	0.5	0.5	0.5	psi
Pressure due to pipe losses & elev.	$p_{DWD,S}$	0.8	0.8	0.4	0.4	psi
Total pipe losses	p_t	4.1	4.2	0.9	0.9	psi
Total pipe losses	p_t	283.9	289.6	62.1	62.1	mbar

$$H = 9.82 \cdot 10^{-8} \cdot \frac{\left(f \cdot L_p T_2 Q_{A,chosen}\right)}{\left(p_2 d_i\right)^5}$$

$$f = \frac{\left(0.029 \cdot d_i^{0.027}\right)}{Q_{A,chosen}^{0.148}} \qquad T_2 = T_1\left(\frac{p_2}{p_{a,1}}\right)^{0.283}$$

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TX PE Firm 21880

APPENDIX B

Mechanical Evaporator Specifications & Boil Test Report

ENCON EVAPORATORS

ENERGY CONSCIOUS INNOVATION

Innovating Since 1993

Heat Source:	Liquid Propane Gas	Evaporation Rate:	438 GPH

PxxV4-438

THERMAL EVAPORATOR

PxxV4-438
ENCON THERMAL EVAPORATOR

- Handles Different Wastewater Streams Simultaneously
- Easy to install and operate
- Dramatically Reduces Disposal Volume and Cost

ENCON Thermal Evaporators and Distillation Systems are engineered to provide you with an effective and economical method of wastewater minimization. All ENCON systems are assembled with the highest quality components, ensuring years of trouble free operation.

Available in a wide range of standard capacities, 8 to 400 gallons per hour, these systems have a compact footprint and can exhaust clean vapor to atmosphere or capture clean condensate with an optional condenser.

The V4 integrated control and monitoring system offers control of every aspect of the evaporation process and features a 7” widescreen touch panel. The mist eliminator captures unwanted contaminants before exhausting, thus enabling you to comply with today’s stringent emissions regulations.

Model Number Nomenclature

P Heat source, in this case Liquid Propane Gas

x Tank material of construction. Standard is 316ss. Higher alloys available.

x Heat exchanger material of construction. Standard is 316ss. Higher alloys available.

V4 System controls, in this case Koyo Click PLC & Automation Direct C-more HMI

-

438 System evaporation rate based on tap water, in this case 438 GPH

MADE IN THE USA

ENCON Evaporators
www.evaporator.com

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Hooksett, NH 03106 USA
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Email: sales@evaporator.com

ENCON EVAPORATORS
ENERGY CONSCIOUS INNOVATION

Innovating Since 1993

NxxV4-438 SPECIFICATIONS

PHYSICAL	EVAPORATION UNIT	CONDENSER UNIT
System Dimensions (L x W xH):	199" x 101" x 142"	199" x 131" x 130"
System weight (empty):	11000 lb	12400 lb
Crated dimensions (L x W x H):	199" x 101" x 142	199" x 131" x 130"
Crated system weight:	11000 lb	12400 lb
Condenser size:	N/A	12" Dia x 48"L
Cooling water inlet/outlet diameter:	N/A	4" FNPT
Draft inducer outlet diameter:	N/A	8"
Draft inducer:	N/A	5 HP, 1725 RPM
Exhaust blower outlet diameter:	16"	
Exhaust stack diameter:	16"	
Exhaust blower:	6000 CFM, 10 HP, 1725 RPM, Variable Frequency Drive	
Evaporator feed connection:	1" FNPT	
Evaporator residue connection:	6" Flanged Cap with 1-1/2" FNPT coupling	
Heat exchanger:	Elevated with Cylindrical Firing Chamber	
Tank capacity:	1235 gallons @ Low Level, 1565 gallons @ Auto Level, 2319 gallons @ High Level	
Evaporation capacity:	438 Gallons/Hour, 10512 Gallons/Day, 73584 Gallons/Week, 3836880 Gallons/Year	

UTILITIES	EVAPORATION UNIT	CONDENSER UNIT
Cooling water:	N/A	254 GPM @ 90F
Burner type:	Direct spark ignition. Units 96gph and larger include FM gas train.	
Total system throughput:	4,976,000 Btu/hr	
Gas supply pressure required:	0.5-2.0 PSI of Liquid Propane Gas	
Gas connection:	2" FNPT (Manifold)	
Electrical requirements:	480 VAC, 3 PH, 60 Hz, 26.2 FLA	

FABRICATION	316SS VERSION	6% MOLY VERSION	HASTELLOY VERSION
Tank:	316L Stainless Steel, 14 ga	6% Molybdenum, 14 ga	Hastelloy, 14 ga
Heat exchanger:	316L Stainless Steel, 11 ga	6% Molybdenum, 11 ga	Hastelloy, 11 ga
Mist eliminator pad:	316L Stainless Steel		
Skins and lids:	Polished 304 Stainless Steel, 18 ga		
Insulation:	All 6 sides rated to 450F, R = 4.3		

CONTROLS	ALL UNITS
Burner controller:	Honeywell with Spark Ignition, loss of airflow shutdown
Temperature controls:	Type J Thermocouples with 4-20 mA analog input Monitoring of liquid and heater temperature
Control inputs:	Frequency Shift Level Probes and Exhaust Fan Proving Switch Redundant Low Level Shut-off
Remote connection:	Ethernet port for direct connection by ENCON Engineers
Control panel:	UL Listed, NEMA 4, PLC Control Panel 7" widescreen touch panel Human Machine Interface (HMI) Main power selector switch and indicator lights for main power, heater(s) and alarms Full data logging, alarm management, and trend screens

QUALITY	ALL UNITS
Pressure test:	Pressure leak test performed on every heat exchanger
Leak test:	Dye penetrant test performed on tank welds
I/O simulation:	All I/O and controls are fully tested to insure accuracy/functionality
Combustion Analysis:	Test for excess oxygen and gas exit temperature
Warranty:	Two years for parts and workmanship issues

Subject to change without notice

REV: 1/9/2023

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Process Description of Liquid Propane Gas ENCON Evaporator

1.Wastewater is collected in a holding tank, sump or pit upstream of the evaporator.

2.Water is either pumped or gravity fed into the evaporator through a 1” NPT fitting on lid.

3.The evaporator is equipped, as standard, with three level probes:
   a)The Low Level Probe acts as a safety.
   b)The Auto Level Probe controls water level in tank and the burner(s) operation (on/off) when in Auto Run Mode.
   c)The High Level Probe acts a redundancy to the auto level.

4.Upon initiation of Auto Run Mode, wastewater water will flow into the evaporator tank. The wastewater feed will stop and the burner(s) will light when the Auto Level Probe is covered.

5.Once the fluid comes to a boil and the evaporation process begins, the liquid level in the evaporator will begin to fall. The feed/refill sequence will activate a set amount of time after the Auto Level Probe is uncovered.   When the feed cycle is initiated, fresh wastewater will be fed into the evaporator until the fluid reaches the Auto Level Probe.

6.When activated, the burner(s) will fire into the combustion area of the heat exchanger. The hot gases travel around the vertical tubes inside the heat exchanger until they reach the insulated chimney outside the evaporator tank. There are two ways the flue gases and water vapor may be vented:

a) If the customer has chosen an Evaporation Unit (vent to atmosphere), the hot gases are pulled back into the Evaporator above the liquid level and drawn across the water’s surface by the exhaust blower. The exhaust blower pulls the combined water vapor and flue gases through the mist eliminator and pushes them through the stack to the outside of your building.

b) If the customer has chosen the “closed loop” Distillation Unit (condenser package), the hot gases are not pulled back into the Evaporator. Instead, the flue gases are vented separately up their own exhaust stack. The blower pulls only the water vapor through the mist eliminator and pushes it through the connection from the blower exhaust to the inlet side of the condenser, which is horizontally mounted, on the backside of the evaporator tank. The water leaving the condenser is separated from the air stream and directed to an automated condensate sump while the air stream is returned to the evaporator.

7.As long as there is wastewater available to the evaporator, this process will continue until either the fluid temperature reaches the target endpoint temperature or the cycle timer counts down to zero. If the feed tank level probe detects a low level condition, the evaporator will de-energize the heaters and wait for the feed tank level to recover.

8.The concentrated fluid is purged from the evaporator, after which a new evaporation cycle may commence.

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THE ENCON ADVANTAGE

High Quality Components and Superior Design

V4 Integrated Control and Monitoring System

The most advanced control and monitoring system for thermal evaporators in the industry. The NEMA 4 PLC control panel with touch panel provides continuous monitoring of flue gas, chimney and liquid temperatures as well as continuous probe diagnostics. Offers datalogging, alarm management, remote access through browser or app and control system integration through Modbus TCP/IP.

7” Widescreen Touch Panel

The large 7” touchscreen combined with a completely redesigned HMI offers control of every aspect of the evaporation process while at the same time being completely intuitive for daily operation.

Evaporator Safety

Critical components are operated by the control circuit through the PLC with appropriate control interlocks. The safety circuit monitors all emergency STOP conditions. The control circuit is interrupted by the safety circuit which includes a safety relay (with force guided contacts) and a redundant contactor setup.

Level Sensing

Tuning fork level probes provide reliable auto-filling and shutdown operations even in conditions of severe foam. The durable level probes are made of stainless steel for excellent corrosion resistance. Hastelloy level probes are available for highly corrosive applications.

Blower System

Thermal units, 72 gallons per hour and smaller, use a 1725 RPM, TEFC motor with class B insulation rated for high temperatures. The unit's design provides extremely quiet operation with as much as three times the longlivity of 3450 RPM motors. Larger units use variable frequency drive motors which maximize motor longevity.

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THE ENCON ADVANTAGE

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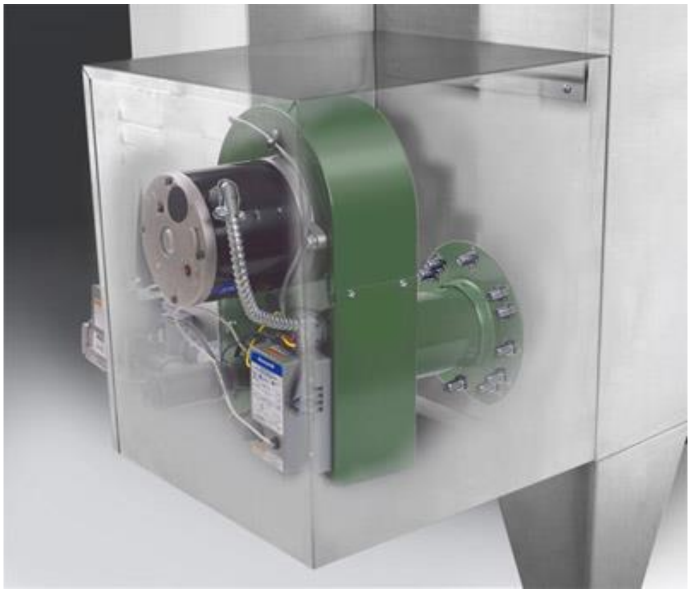

Forced Draft Blower

Each gas or propane fired system consists of a burner with an integrated blower, that along with the induction from the exhaust blower, supplies make-up air for combustion. It also includes: Honeywell controls, gas pressure gauge, airflow detection and lockout, spark ignition, and a redundant main valve and burner contactors for maximum safety.

FM gas trains and gas flow transmitters are standard on systems 96gph and larger. The stainless steel burner protection shroud is mounted on a track hanger for ease of removal and reattachment. Other combustion heat sources such as oil, diesel and waste oil are available. Non-combustion heat sources such as electricity, steam and waste heat are also offered.

Mist Eliminator System

The stainless mesh filter is designed for easy removal from its compression fit housing. The system is monitored for contaminant loading and airflow, which is interfaced to the control panel for maximum operator feedback.

Cleanout Flange

Large six inch cleanout* with flange cover and a 1 ½” NPT fitting for pump connection and ease of residue removal.

* Four inch cleanout on 8 and 10gph models

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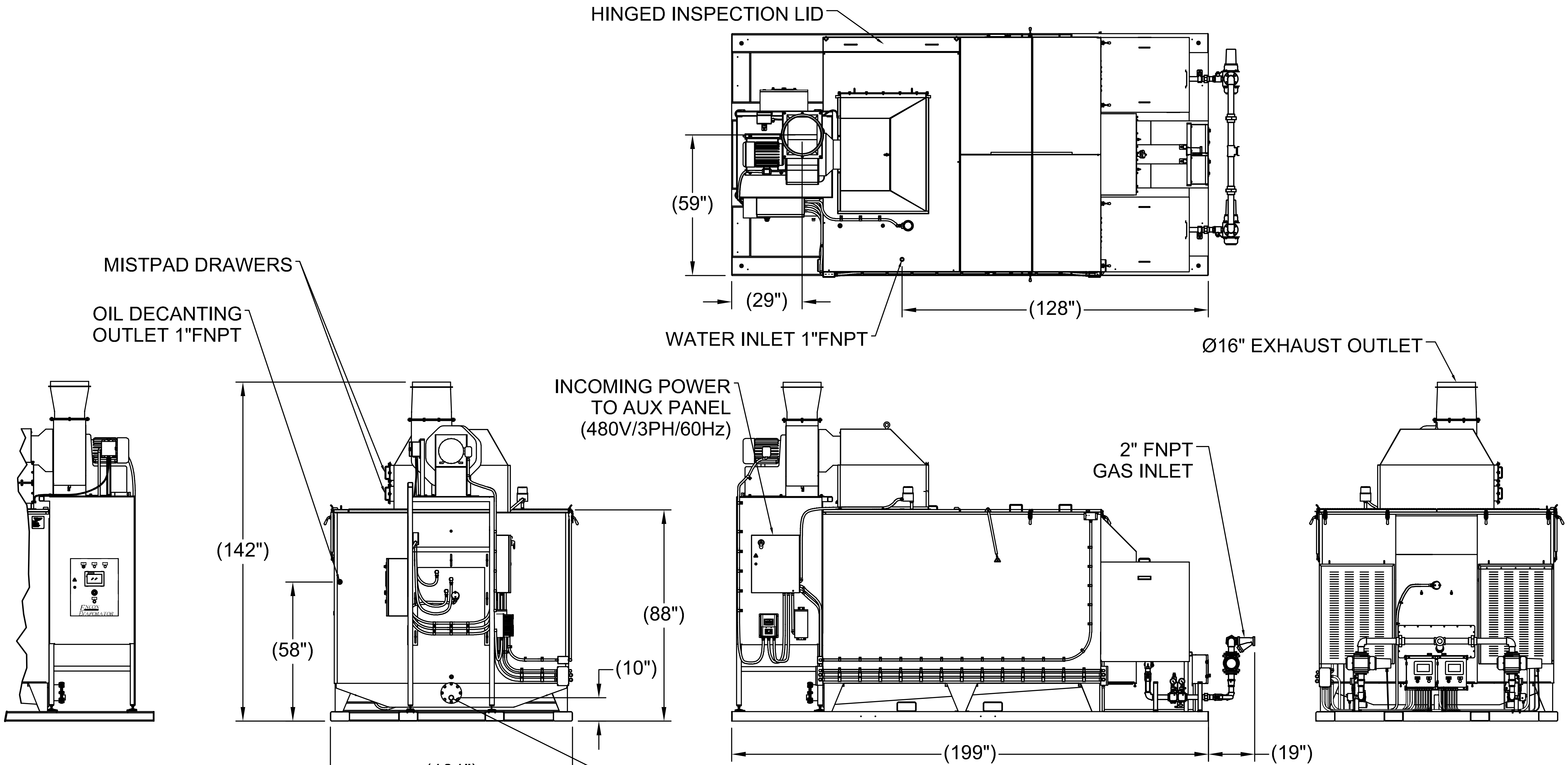

NOTE:
1. ALL DIMENSIONS ARE IN INCHES.

REVISION HISTORY

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
A	INITIAL RELEASE	7/16/19	RET	MDC	MDC

THIRD ANGLE PROJECTION

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ENCON Evaporators
1368 HOOKSETT ROAD, UNIT 9
HOOKSETT, NH 03106

TITLE:
N/Pxxx-438 EVAPORATION UNIT
DIMENSIONAL LAYOUT

SIZE: B | DWG NO: 3008274 | REV: A

SCALE: 1/64 | | SHEET: 1 OF 1

8 – 650
Gallons Per Hour

THERMAL EVAPORATORS

Industrial Wastewater Minimization
Reduce Hauling & Disposal Costs
Process Stream Concentration

ENCON
EVAPORATORS
www.evaporator.com

Why Choose Evaporation?

Evaporation is a time-tested & cost-effective method for reducing the volume of water-based waste

Hauling is Costly

Industrial and commercial facilities that generate wastewater spend too much money paying for hauling & disposal of waste streams that are mostly comprised of water.

Evaporation is Cost Effective

ENCON Thermal Evaporators are utilized by 1600+ facilities worldwide to evaporate the water portion of water-based wastes, reducing hauling/disposal volumes and cost by up to or even exceeding 99%.

Advantages of Evaporation

- ✓ Can handle different waste streams simultaneously
- ✓ Can handle very challenging and complex waste streams
- ✓ Dramatically reduces disposal volume & cost
- ✓ Eliminates sewer discharge accountability
- ✓ Achieve ZLD
- ✓ Safe to operate 24/7
- ✓ Low operating costs
- ✓ Requires less operator intervention than most wastewater treatment technologies
- ✓ Very effective for process stream concentration

Reduce a holding tank of wastewater

to a barrel of residue!*

*example is based on a 98% reduction; reducing a 2,600 gallon tank of wastewater to 52 gallons of residue. Actual reduction percentage will vary based on chemistry and characteristics of the wastewater

Superior Design

Mist Eliminator System

ENCON Thermal Evaporators utilize a 316 stainless steel mesh mist eliminator pad compression fit into a stainless housing. The mist pad is interfaced with the the control panel to allow HMI monitoring. Designed for easy removal and cleaning. Standard mist pad is rated to 10-microns or less to capture even the smallest droplets. 5-micron mist pads also available.

Blower System

Low RPM (1725 RPM), TEFC motor with class F insulation rated for high temperatures. Heavy gauge cast aluminum blower for durability and longevity. Extremely quiet with 3x the average life expectancy of 3450 RPM motors.

V4 Control & Monitoring System

NEMA 4 rated control panel with large 7" touchscreen provides continuous level probe diagnostics and monitoring of flue gas, chimney and liquid temperatures.

Forced Draft Industrial Burner

ENCON fuel heated Thermal Evaporators use a forced draft combustion burner system for heating. Forced draft offers a more consistent & efficient burn, less flame impingement, longer blower motor life, quieter operation and is less affected by atmospheric conditions than draft induced burners.

Level Sensing

Durable tuning fork level probes provide reliable level detection to facilitate evaporator auto-fill and fail safe shut down for low and high liquid level conditions.

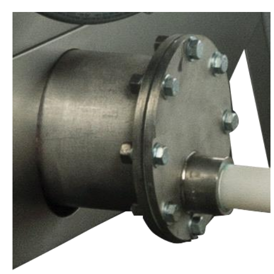
Robust Heat Exchanger

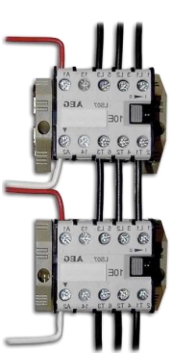
Each ENCON fuel heated Thermal Evaporator utilizes our unique heat exchanger design which provides extremely efficient heat transfer, resulting in reduced fuel costs. All ENCON heat exchangers are elevated in the evaporator tank which creates a void space for any solids to settle below the heat exchanger for easy cleanout.

Cleanout Flange

Large six-inch flanged cleanout cover with a 1 ½" NPT fitting for discharge pump connection and ease of residue removal.

8 & 10 gal/hr units have a four-inch flanged cleanout cover with 1" NPT fitting.





Redundant Burner Contactors

All ENCON Thermal Evaporators contain this critically important safety feature.

If the duty contactor becomes stuck or fails, the redundant contactor will open in an alarm condition. This prevents a permanent "burner on" condition in the event of a failed duty contactor..

Fabrication

All ENCON Thermal Evaporators are clad with a polished 304 stainless steel exterior which provides greater corrosion resistance versus painted surfaces. Insulation on all six sides of the evaporator is rated to 450F with an R-value of 4.3. The evaporator tank and heat exchanger come standard in 316L stainless steel. When applicable, ENCON utilizes higher alloys for corrosive applications.

V4 CONTROL

STANDARD FEATURES

7” touch screen HMI panel

Continuous monitoring of flue gas, chimney and liquid temperatures

Continuous level probe diagnostics

Alarm Management and multi-year datalogging

Scheduled preventative maintenance alarms

Control system integration through Modbus TCP/IP

Remote access through browser or mobile app

Reliable safety monitoring and shutdown via certified safety relay

NEMA 4 Rated

www.evaporator.com

ENCON link REMOTE MONITORING

The optional ENCON-link service allows you to monitor the evaporator remotely, minimizing operator walk-by’s. Proactive alarm notification allows you to quickly address alarms and minimize downtime. Take advantage of maintenance alerts to help prevent component failures. Monthly performance reports and data driven diagnostics highlight opportunities for process improvement.

INTUITIVE OPERATION

ENCON Thermal Evaporators come standard with the V4 integrated control and monitoring system, the most advanced system of its type in the industry. Provides continuous level probe diagnostics as well as continuous monitoring of flue gas, chimney and liquid temperatures. Large 7” color touchscreen offers control of every aspect of the evaporation process.

Process Description

1

WASTEWATER COLLECTION

Wastewater is collected in a holding tank upstream of the evaporator.

2

AUTO-FILL

Wastewater is automatically pumped or gravity fed into the evaporator through a 1" NPT fitting on the lid.

Once the evaporator is filled to the operating level, the heat source energizes, and water begins to boil.

3

EVAPORATION

As water is boiled off, the liquid level in the evaporator tank drops and is automatically replenished with water from the feed tank.

The evaporator continues in this cycle of boiling down a few inches and replenishing with feed water until the end-point concentration is reached.

4

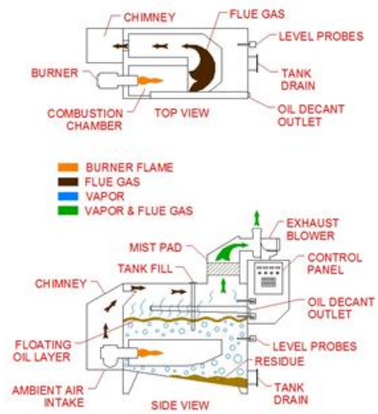
END SEQUENCE

The end-point concentration is automatically detected via a high fluid temperature or cycle timer setpoint, whichever is reached first.

Upon reaching the end-point concentration, the super concentrated residue is pumped out of the evaporator to a disposal drum or tank.

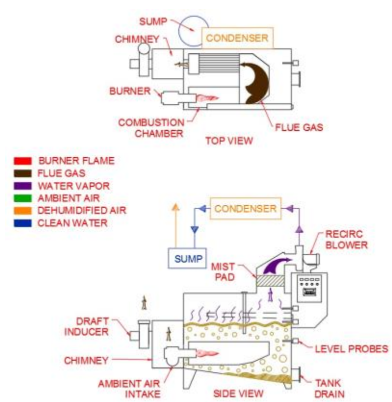
Exhaust Scenarios

Evaporation

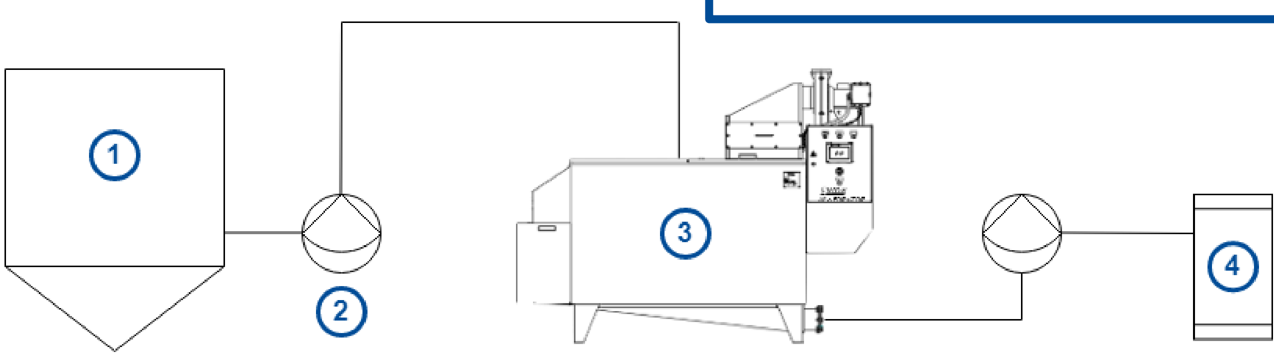


The flue gases are pulled back into the evaporator, mixed with the ambient air and drawn across the surface of the boiling water. The exhaust blower pulls the combined steam and gases through the mist eliminator and pushes them up through the stack and outside the building.

Distillation



The flue gases are not pulled back into the evaporator. Instead, they are vented separately up their own stack. The recirculation blower pulled the steam through the mist eliminator and pushed it through the condenser. The clean water is directed to a sump and pumped to a distilled water holding tank.



Why Choose ENCON?

ENCON Evaporators has been in business for over 27 years designing, fabricating, selling and servicing our line of evaporators and related technologies.

FULL RANGE OF UPGRADES, ACCESSORIES AND SERVICES TO UNLOCK YOUR EVAPORATOR'S FULL POTENTIAL

ENCON offers a full range of upgrades, accessories and services to minimize labor and maximize return on investment.

- Recover your wastewater as clean condensate with our condenser package!
- Work with our consultative Sales Engineers to spec a turn-key system.
- Automate with auto-dump or auto-oil-decant.
- Utilize our air permitting / permit-exemption services.

OVER 1,600 INSTALLATIONS WORLDWIDE

ENCON Evaporators was founded on the principle of design innovation. In 1993 ENCON introduced the world's first thermal evaporator with mist eliminator technology incorporated as part of the standard design. Today that tradition of innovation continues. We are constantly seeking client feedback which drives continuous product improvement. Our mission is to ensure that the ENCON Thermal Evaporator is not only the premier evaporator on the market today, but that it will be even better tomorrow.

We encourage you to speak to our valued clients about ENCON systems and our industry leading service & support. Contact a Sales Engineer at 603-624-5110 for references or view case studies at www.evaporator.com/case-studies.

TRUSTED BY THE WORLD'S MOST RESPECTED COMPANIES

3M ABB ALFA LAVAL GE CERN United Technologies CATERPILLAR KOHLER Ford pepsi TE connectivity WM WASTE MANAGEMENT Parker

MOST HEAT SOURCE OPTIONS IN THE INDUSTRY

Choose the most cost-effective option for your needs

- NATURAL GAS
- PROPANE
- STEAM
- ELECTRIC
- LANDFILL GAS
- #2 FUEL OIL
- THERMAL OIL
- WASTE OIL
- WASTE HEAT
- DIESEL

Industry Leading Service & Support

PROACTIVE STARTUP ASSISTANCE

After your order, a Service Engineer will be assigned to your account. They'll work with you to make sure everything is ready for installation. They will walk you through start up (on-site startup and training is also available).

FREE TECHNICAL SUPPORT FOR THE LIFE OF YOUR EVAPORATOR

Getting help and/or advice shouldn't require a contract!. ENCON has offered free and unlimited remote support for over a quarter century. On-site service is also available ENCON also maintains a complete record of service work and interactions regarding the evaporator.

Free Application Feasibility Report

The centerpiece of our consultative approach is our complimentary bench scale analysis of your waste or process stream. This free analysis determines:

- How appropriate the stream is for evaporation
- Estimated reduction percentage
- Recommended materials of construction
- Recommended operating procedures.

To find out more, ask your ENCON Sales Engineer, give us a call at 603-624-5110 or email sales@evaporator.com.

PREMIUM SERVICE OFFERINGS

In addition to our industry leading standard support, ENCON offers a variety of premium offerings such as scheduled visits by ENCON Service Engineers. They will review and tune your evaporator, assess the unit's condition, assess the wastewater process, make suggestions for improving results, and conduct training.

FREE STANDARD LAB ANALYSIS OF YOUR WASTE STREAM FOR THE LIFE OF YOUR EVAPORATOR

Want to consider a new waste or process stream for evaporation? Not sure if your waste stream has changed? ENCON will analyze a sample of your stream, compare it to previous tests and make recommendations on any necessary process changes.

SPECIFICATIONS

The following is a summary of natural gas and propane fueled ENCON Thermal Evaporator specifications. Specifications for other heat sources are available.

Size by Evaporation Rate (gal/hr)	24 Hour Evaporation Capacity (Gallons)	Yearly Evaporation Capacity (24hrs x 250 Days)	Evaporator Tank Volume (Gallons)	System Dimensions (Inches) L x W x H	System Weight (Empty)
10	240	60,000	55	68 x 28 x 72	650lbs
18	432	108,000	113	80 x 28 x 83	800lbs
28	672	168,000	153	100 x 28 x 83	1,100lbs
35	840	210,000	310	100 x 52 x 84	1,500lbs
48	1,152	288,000	310	100 x 52 x 84	1,500lbs
60	1,440	360,000	425	112 x 57 x 86	2,200lbs
72	1,728	432,000	425	112 x 57 x 86	2,200lbs
96	2,304	576,000	578	156 x 52 x 108	4,000lbs
126	3,024	756,000	752	142 x 77 x 110	4,750lbs
165	3,960	990,000	752	142 x 77 x 110	4,750lbs
192	4,608	1,152,000	875	156 x 82 x 110	5,400lbs
260	6,240	1,560,000	875	156 x 82 x 110	5,400lbs
400	9,600	2,400,000	1428	199 x 101 x 130	10,200lbs
438	10,440	2,610,000	1600	199 x 101 x 142	10,600lbs
650*	15,600	3,900,000	2350	234 x 120 x 154	16,000lbs

Materials of Construction	Exterior Skins: 304 Stainless Steel. Wetted Parts: 316L Stainless Steel - Standard. High Nickel Alloys & Chloride Resistant Alloys – Optional. Mist Eliminator Pad: 316L Stainless Steel. Insulation: All 6 Sides, Rated to 450F, R = 4.3.
Heat Source Options	Natural Gas, Propane, Steam, Waste Heat, #2 Fuel Oil, Diesel, Kerosene, Off-Spec Landfill gas, Thermal Oil, Electric (Available in 8, 15, 24, 40 & 80 gal/hr capacities), Waste Oil (Available in 12, 16, 26, 44, 63 & 88 gal/hr capacities). * available in natural gas, propane & steam.
Controls	Burner Controller: Honeywell with Spark Ignition, Loss of Airflow Shutdown. Temperature Controls: Type J Thermocouples with 4-20 mA Analog input. Monitoring of Liquid & Heater Temperatures. Controls Inputs: Frequency Shift Level probes & Exhaust Fan Proving Switch. Redundant Low Level Shut-Off. Control Panel: UL listed, NEMA 4, PLC Control Panel. 7” Touchscreen HMI. Main Power Selector Switch and Indicator Lights for Main Power, Heater(s) and Alarms.

ENCON EVAPORATORS

ENCON Evaporators
1368 Hooksett Road, Unit #9, Hooksett, NH 03106
P: 603-624-5110
E: sales@evaporator.com

Preliminary Pilot Bench Scale Test and Evaluation for the ENCON Thermal Evaporator System

Prepared For:
Mr. Rane Wilson
reUse
San Antonio, TX 78245

Test Performed By:
Olivia Church
Lab Chemist
ENCON Applications Lab

Test Conducted at:

ENCON Evaporators
Hooksett, NH
2/13/2024

Title of Study
Preliminary Pilot Bench Scale Test and Evaluation for the ENCON Thermal Evaporator System

Primary Objectives
The primary objective of this study is to simulate the effects of boiling your wastewater in the **ENCON** Thermal Evaporator System to anticipate the effectiveness and expected reduction percentage.

If issues with your application are identified in the bench scale test, we can establish simple procedures ahead of time to minimize operational problems once the system is installed.

Introduction
The centerpiece of the **ENCON** consultative approach is our wastewater qualification process. Not all waste streams are good candidates for evaporation. We believe it's better to find that out in our laboratory than on your factory floor.

This pilot bench scale analysis determines how appropriate the waste stream is for evaporation and how it will function in the **ENCON** evaporator. This analysis also helps determine materials of construction and allows us to determine operating procedure recommendations. If more detailed analysis of specific parameters is needed, **ENCON** can prepare appropriate samples and send them for outside lab analysis for a nominal cost.

Primary Results of the Study
Table 1 summarizes the results at time of testing based on an initial sample volume of 600 milliliters:

Sample #	Sample Name/ Description	Suspended Solids % by Volume Initial/Final	Free Oil % by Volume Initial/Final	Temp.(°F) Initial/Final	pH Initial/Final	Volume Reduction
1	**Pre-Chlorine** Light yellow, Clear	NA/~5%	NA/NA	211.6°F / 213.5°F	7.5/8.0	98%
2	**Post-Chlorine** Clear, Clear	NA/~50%*	NA/NA	211.7 °F / 213.6°F	7.6/8.0	99%

*Observed ~50% solids at 99.5% reduction.

Reduction Percent

Based on the samples provided and the results of the boil analysis, you will be able to achieve a reduction of approximately **98%** on the volume of your Sample 1 waste stream and approximately **99%** on the volume of your Sample 2 waste stream.

Corrosion

The initial and final concentrations of inorganic chlorides in your wastewater samples are listed below:

Sample #	Sample Name	Initial Chlorides	Final Chlorides	pH Initial/Final
1	**Pre-Chlorine**	556 ppm	27,800 ppm	7.5/8.0
2	**Post-Chlorine**	450 ppm	45,000 ppm	7.6/8.0

Due to the chloride levels listed above, pH, and the anticipated reduction percentage, we recommend that the wetted parts for your system be fabricated with the 6% Molybdenum chloride resistant alloy. If budget constraints dictate we utilize 316L SS for materials of construction, we recommend stopping the evaporation cycle after 95% volume reduction due to chlorides concentration. We strongly recommend that you maintain a neutral to alkaline condition (pH 7-10) in your wastewater to further protect your investment.

Solids Removal

At the time of testing the Pre-Chlorine sample in the lab, there were no discernable solids. Upon conclusion of the test, there were light yellow opaque suspended solids in the residue consisting of approximately 5% by volume.

At the time of testing the Post-Chlorine sample in the lab, there were no discernable solids. Upon conclusion of the test (at 99.5% reduction), there were light yellow opaque suspended solids in the residue consisting of approximately 50% by volume.

If there is a presence of settled solids in your full-scale operation, wastewater should be fed to the evaporator from above the settled solids. We also strongly recommend that any solids in your evaporator be pumped out before they encroach on the heat exchanger. Typically suspended solids will fall out of suspension if given enough time during the cooling process. Dumping immediately after concentration is reached minimizes the likelihood of solids falling out of suspension. We recommend the optional Auto-Dump/Auto-Restart System to help with this process.

Foaming

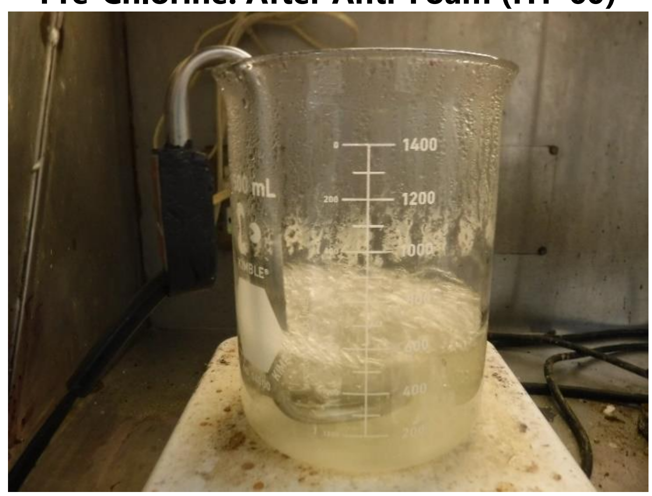
There was noticeable foaming during the boil of your wastewater samples. To mitigate the impact of foaming in your full scale operation, we recommend adding a small dose of high temperature anti-foam chemistry using the automated anti-foam dosing system.

Sample #	Sample Name	Foaming (Yes/No)	Volume of HT-60 Used	Concentration of HT-60 Used
1	**Pre-Chlorine**	Yes	0.05mL	83ppm
2	**Post-Chlorine**	Yes	0.05mL	83ppm

Initial Boil Images

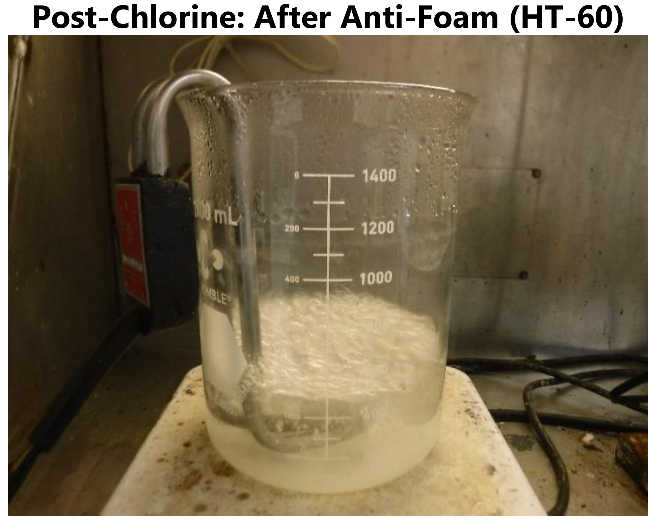
Pre-Chlorine: Before

Pre-Chlorine: After Anti-Foam (HT-60)



Post-Chlorine: Before

Post-Chlorine: After Anti-Foam (HT-60)



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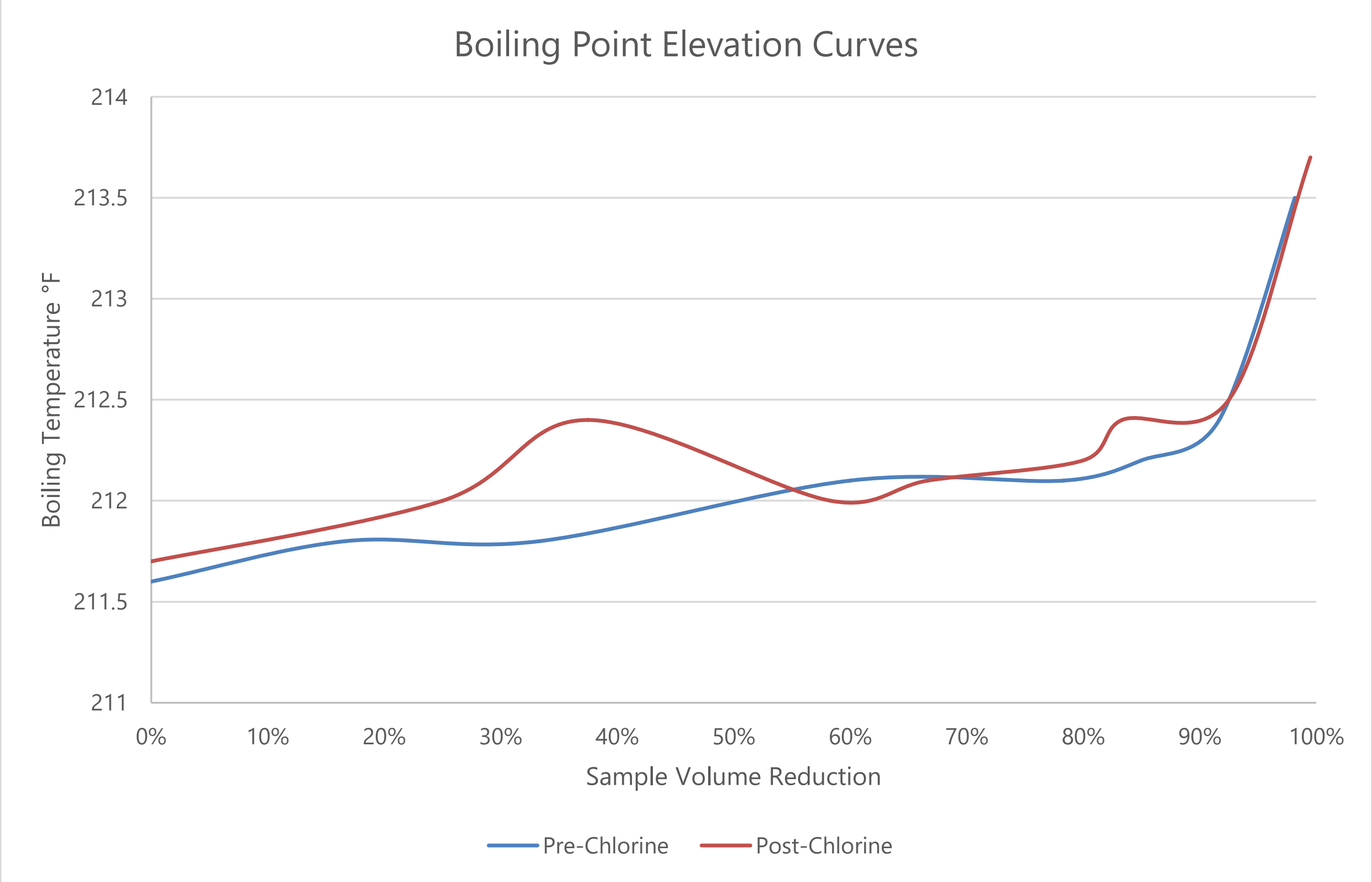
ENCON EVAPORATORS ENERGY CONSCIOUS INNOVATION

End Point

The end point for your evaporation cycle will be based on reaching the primary cycle timer count down or the redundant high fluid temperature set-point. We strongly recommend pumping out the concentrated residue at the end of this cycle to help keep suspended solids from encroaching on the heat exchanger. The factory setting for the cycle timer and redundant high fluid temperature will be based on the size/evaporation rate of the evaporator model you select. Please reference the table below for recommended end point concentration.

Sample #	Sample Name	Evaporator Model #	Proposed % Reduction	High Temp °F	Hours of Run Time	Volume Processed
1	**Pre-Chlorine**	**P66V4-438**	98%	213.5°	175	78,250 gallons
2	**Post-Chlorine**	**P66V4-438**	99%	213.6°	354	156,000 gallons
1	**Pre-Chlorine**	**P33V4-438**	95%	213.0°	68	31,300 gallons
2	**Post-Chlorine**	**P33V4-438**	95%	213.0°	68	31,300 gallons



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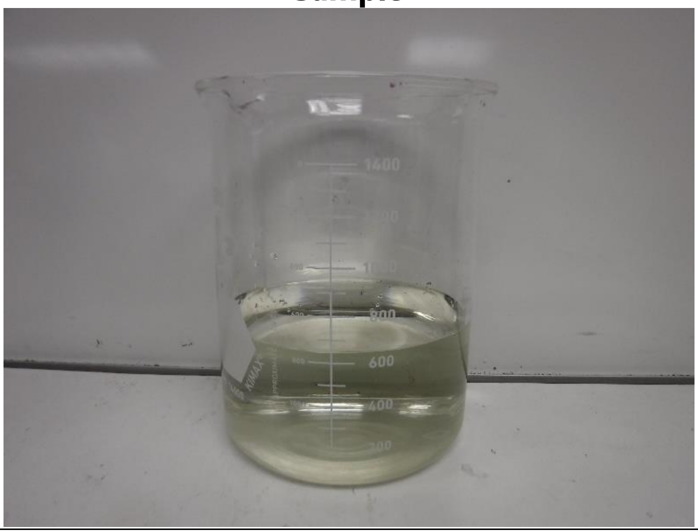
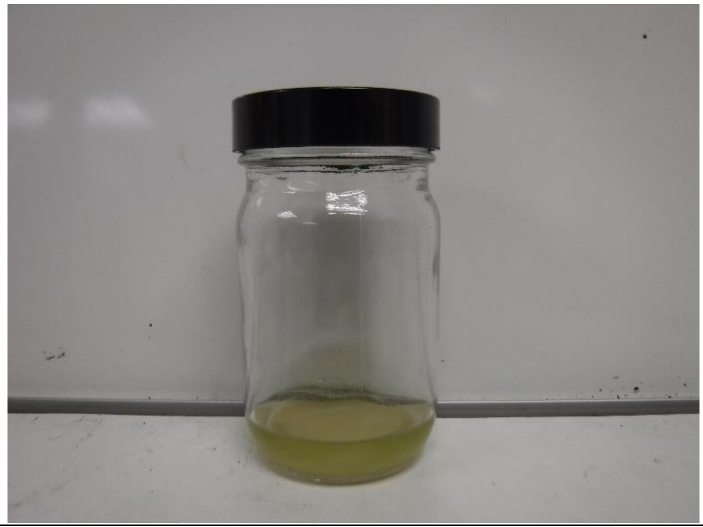
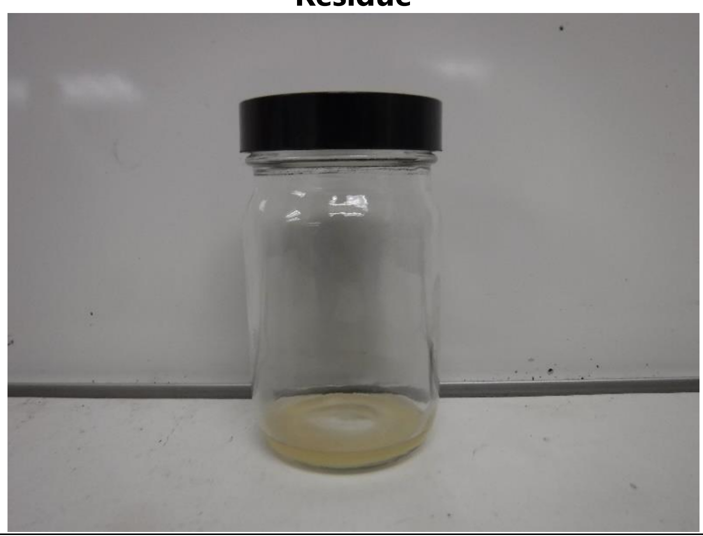
Images: Pre-Chlorine	
Sample	**Residue**
	

Images: Post-Chlorine	
Sample	**Residue**
	

Regulatory

Please note that in most cases the wastewater processed through our **ENCON** evaporators is non-hazardous. If the subject wastewater is hazardous or requires an air permit it is the responsibility of the customer to secure appropriate exemptions or permits. However, **ENCON** will assist in this endeavor wherever possible.

Conclusion

Based on the results of our pilot bench scale testing, your waste stream represented by the samples you submitted qualifies as a feasible application for the **ENCON** Thermal Evaporator System. We also recommend the optional Anti-Foam Dosing System and Auto-Dump/Auto-Restart System to maximize your reduction percentage and decrease maintenance requirements. Please inform us if chemistry changes are made to the tested application, or if additional waste streams are being considered for the evaporator.

We look forward to continuing to work with you and other key personnel at **ReUse** on the successful implementation of an **ENCON** Thermal Evaporator system.

Sincerely,

Chris Wise
ENCON Evaporators

4411 S Interstate 35, Ste 100
Georgetown, Texas 78626
www.reuseinn.com
TX PE Firm 21880

APPENDIX C

WWTF Effluent Laboratory Report of Analysis

Environment Testing

1
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ANALYTICAL REPORT

PREPARED FOR

Attn: Mr. Rane A. Wilson
reUse Engineering
4411 S. Interstate 35,
Suite 100
Georgetown, Texas 78626

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JOB DESCRIPTION

Wastewater Testing
Forest Glenn

JOB NUMBER

840-3317-1

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio TX 78238

See page two for job notes and contact information.

myEOL

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Authorization

Authorized for release by
Irene Vann, Project Manager
Irene.Vann@et.eurofinsus.com
(210)509-3334

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2/5/2024 12:18:45 PM

Table of Contents

Client: reUse Engineering — Job ID: 840-3317-1
Project/Site: Wastewater Testing — SDG: Forest Glenn

Qualifiers

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 840-3317-1 Eurofins San Antonio

**Job Narrative
840-3317-1**

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 1/18/2024 3:28 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 8.0°C

Receipt Exceptions
The container count for the following sample did not match what was listed on the Chain-of-Custody (COC): Post Chlorine (840-3317-1).
The laboratory received 4 total containers, while the COC lists 17 total containers.

GC/MS VOA
Method 8260D: The continuing calibration verification (CCV) associated with batch 860-141596 recovered above the upper control limit for Dichloro difluoromethane The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated sample is impacted: (CCVIS 860-141596/2).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC Semi VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Client Sample ID: Post Chlorine **Lab Sample ID: 840-3317-1**
Date Collected: 01/18/24 13:30 **Matrix: Water**
Date Received: 01/18/24 15:28

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	<0.00124		0.0100	0.00124	mg/L			01/23/24 01:44	1
cis-1,2-Dichloroethene	<0.000457		0.00100	0.000457	mg/L			01/23/24 01:44	1
cis-1,3-Dichloropropene	<0.00107		0.00500	0.00107	mg/L			01/23/24 01:44	1
Isopropylbenzene	<0.000592		0.00100	0.000592	mg/L			01/23/24 01:44	1
m,p-Xylenes	<0.00124		0.0100	0.00124	mg/L			01/23/24 01:44	1
n-Butylbenzene	<0.000510		0.00100	0.000510	mg/L			01/23/24 01:44	1
N-Propylbenzene	<0.000429		0.00100	0.000429	mg/L			01/23/24 01:44	1
o-Xylene	<0.000502		0.00100	0.000502	mg/L			01/23/24 01:44	1
p-Cymene (p-Isopropyltoluene)	<0.000676		0.00100	0.000676	mg/L			01/23/24 01:44	1
tert-Butylbenzene	<0.000442		0.00100	0.000442	mg/L			01/23/24 01:44	1
trans-1,2-Dichloroethene	<0.000368		0.00100	0.000368	mg/L			01/23/24 01:44	1
trans-1,3-Dichloropropene	<0.00127		0.00500	0.00127	mg/L			01/23/24 01:44	1
Vinyl chloride	<0.000428		0.00200	0.000428	mg/L			01/23/24 01:44	1
1,1,1,2-Tetrachloroethane	<0.000644		0.00100	0.000644	mg/L			01/23/24 01:44	1
1,1,1-Trichloroethane	<0.000585		0.00500	0.000585	mg/L			01/23/24 01:44	1
1,1,2,2-Tetrachloroethane	<0.000470		0.00100	0.000470	mg/L			01/23/24 01:44	1
1,1,2-Trichloroethane	<0.000411		0.00100	0.000411	mg/L			01/23/24 01:44	1
1,1-Dichloroethane	<0.000635		0.00100	0.000635	mg/L			01/23/24 01:44	1
Acetonitrile	<0.0146		0.100	0.0146	mg/L			01/23/24 01:44	1
1,1-Dichloroethene	<0.000738		0.00100	0.000738	mg/L			01/23/24 01:44	1
1,1-Dichloropropene	<0.000624		0.00500	0.000624	mg/L			01/23/24 01:44	1
1,2,3-Trichlorobenzene	<0.00177		0.00500	0.00177	mg/L			01/23/24 01:44	1
1,2,3-Trichloropropane	<0.000470		0.00100	0.000470	mg/L			01/23/24 01:44	1
1,2,4-Trichlorobenzene	<0.00175		0.00500	0.00175	mg/L			01/23/24 01:44	1
1,2,4-Trimethylbenzene	<0.000417		0.00100	0.000417	mg/L			01/23/24 01:44	1
1,2-Dibromo-3-Chloropropane	<0.000671		0.00500	0.000671	mg/L			01/23/24 01:44	1
1,2-Dibromoethane	<0.000999		0.00500	0.000999	mg/L			01/23/24 01:44	1
1,2-Dichlorobenzene	<0.000429		0.00100	0.000429	mg/L			01/23/24 01:44	1
1,2-Dichloroethane	<0.000372		0.00100	0.000372	mg/L			01/23/24 01:44	1
1,2-Dichloropropane	<0.000556		0.00500	0.000556	mg/L			01/23/24 01:44	1
1,3,5-Trimethylbenzene	<0.000411		0.00100	0.000411	mg/L			01/23/24 01:44	1
1,3-Dichlorobenzene	<0.000413		0.00100	0.000413	mg/L			01/23/24 01:44	1
1,3-Dichloropropane	<0.000514		0.00500	0.000514	mg/L			01/23/24 01:44	1
1,4-Dichlorobenzene	<0.000449		0.00100	0.000449	mg/L			01/23/24 01:44	1
2,2-Dichloropropane	<0.000679		0.00500	0.000679	mg/L			01/23/24 01:44	1
2-Butanone	<0.00828		0.0500	0.00828	mg/L			01/23/24 01:44	1
4-Chlorotoluene	<0.000386		0.00100	0.000386	mg/L			01/23/24 01:44	1
Benzene	<0.000460		0.00100	0.000460	mg/L			01/23/24 01:44	1
Bromobenzene	<0.000486		0.00100	0.000486	mg/L			01/23/24 01:44	1
Bromochloromethane	<0.000577		0.00100	0.000577	mg/L			01/23/24 01:44	1
Bromodichloromethane	<0.000552		0.00100	0.000552	mg/L			01/23/24 01:44	1
Bromoform	<0.000633		0.00500	0.000633	mg/L			01/23/24 01:44	1
Bromomethane	<0.00142		0.00500	0.00142	mg/L			01/23/24 01:44	1
Carbon tetrachloride	<0.000896		0.00500	0.000896	mg/L			01/23/24 01:44	1
Chlorobenzene	<0.000455		0.00100	0.000455	mg/L			01/23/24 01:44	1
Chloroethane	<0.00198		0.0100	0.00198	mg/L			01/23/24 01:44	1
Chloroform	**0.00143**		0.00100	0.000464	mg/L			01/23/24 01:44	1
Chloromethane	<0.00204		0.0100	0.00204	mg/L			01/23/24 01:44	1
Dibromochloromethane	<0.000547		0.00500	0.000547	mg/L			01/23/24 01:44	1

Client Sample ID: Post Chlorine

Lab Sample ID: 840-3317-1

Date Collected: 01/18/24 13:30

Matrix: Water

Date Received: 01/18/24 15:28

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	<0.000785		0.00100	0.000785	mg/L			01/23/24 01:44	1
Ethylbenzene	<0.000385		0.00100	0.000385	mg/L			01/23/24 01:44	1
Hexachlorobutadiene	<0.000627		0.00500	0.000627	mg/L			01/23/24 01:44	1
MTBE	<0.00139		0.00500	0.00139	mg/L			01/23/24 01:44	1
Methylene Chloride	<0.00173		0.00500	0.00173	mg/L			01/23/24 01:44	1
Naphthalene	<0.00135		0.0100	0.00135	mg/L			01/23/24 01:44	1
sec-Butylbenzene	<0.000468		0.00100	0.000468	mg/L			01/23/24 01:44	1
Styrene	<0.000619		0.00100	0.000619	mg/L			01/23/24 01:44	1
Tetrachloroethene	<0.000655		0.00100	0.000655	mg/L			01/23/24 01:44	1
Toluene	<0.000475		0.00100	0.000475	mg/L			01/23/24 01:44	1
Trichloroethene	<0.00150		0.00500	0.00150	mg/L			01/23/24 01:44	1
Trichlorofluoromethane	<0.000560		0.00100	0.000560	mg/L			01/23/24 01:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*63 - 144*		*01/23/24 01:44*	*1*
4-Bromofluorobenzene (Surr)	*94*		*74 - 124*		*01/23/24 01:44*	*1*
Dibromofluoromethane (Surr)	*100*		*75 - 131*		*01/23/24 01:44*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*01/23/24 01:44*	*1*

Method: SW846 8015C - Alcohols with GC/FID Direct Aqueous Injection

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	<460		1000	460	ug/L		01/23/24 08:45	01/24/24 13:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetone	*95*		*54 - 130*	*01/23/24 08:45*	*01/24/24 13:30*	*1*
Acetone	*95*		*54 - 130*	*01/23/24 08:45*	*01/24/24 13:30*	*1*

Method: SW846 8015D - Glycols- Direct Injection (GC/FID)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylene glycol	<1.22		5.00	1.22	mg/L			01/23/24 11:41	1

Method: SW846 8315A - Carbonyl Compounds by HPLC

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	<27.0		60.0	27.0	ug/L		01/20/24 15:06	01/22/24 16:55	1
Acetaldehyde	<30.0		60.0	30.0	ug/L		01/20/24 15:06	01/22/24 16:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Butyraldehyde	*110*		*60 - 130*	*01/20/24 15:06*	*01/22/24 16:55*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	<0.0510		0.100	0.0510	mg/L			01/24/24 21:02	1
pH (SW846 9040C)	**7.8**	**HF**			SU			01/26/24 17:25	1
Specific Conductance (SM 2510B)	**2190**		10.0	10.0	umho/cm @ 25C			01/26/24 10:40	1
Sulfide (SM 4500 S2 D)	<0.0400		0.100	0.0400	mg/L			01/23/24 13:50	1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA (63-144)	BFB (74-124)	DBFM (75-131)	TOL (80-120)
840-3317-1	Post Chlorine	103	94	100	99
LCS 860-141596/3	Lab Control Sample	97	98	97	100
LCSD 860-141596/4	Lab Control Sample Dup	97	97	98	100
MB 860-141596/10	Method Blank	101	94	101	97

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8015C - Alcohols with GC/FID Direct Aqueous Injection

Matrix: Water **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Acetone1 (54-130)	Acetone2 (54-130)
840-3317-1	Post Chlorine	95	95
840-3317-1 MS	Post Chlorine	98	99
840-3317-1 MSD	Post Chlorine	100	98
LCS 410-465713/2-A	Lab Control Sample	102	104
LCSD 410-465713/3-A	Lab Control Sample Dup	102	104
MB 410-465713/1-A	Method Blank	102	104

Surrogate Legend

Acetone = Acetone

Method: 8315A - Carbonyl Compounds by HPLC

Matrix: Water **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	BTRA (60-130)
840-3317-1	Post Chlorine	110
LCS 410-465138/2-A	Lab Control Sample	109
LCSD 410-465138/3-A	Lab Control Sample Dup	109
MB 410-465138/1-A	Method Blank	104

Surrogate Legend

BTRA = Butyraldehyde

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 860-141596/10
Matrix: Water
Analysis Batch: 141596

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	<0.00124		0.0100	0.00124	mg/L			01/23/24 00:01	1
cis-1,2-Dichloroethene	<0.000457		0.00100	0.000457	mg/L			01/23/24 00:01	1
cis-1,3-Dichloropropene	<0.00107		0.00500	0.00107	mg/L			01/23/24 00:01	1
Isopropylbenzene	<0.000592		0.00100	0.000592	mg/L			01/23/24 00:01	1
m,p-Xylenes	<0.00124		0.0100	0.00124	mg/L			01/23/24 00:01	1
n-Butylbenzene	<0.000510		0.00100	0.000510	mg/L			01/23/24 00:01	1
N-Propylbenzene	<0.000429		0.00100	0.000429	mg/L			01/23/24 00:01	1
o-Xylene	<0.000502		0.00100	0.000502	mg/L			01/23/24 00:01	1
p-Cymene (p-Isopropyltoluene)	<0.000676		0.00100	0.000676	mg/L			01/23/24 00:01	1
tert-Butylbenzene	<0.000442		0.00100	0.000442	mg/L			01/23/24 00:01	1
trans-1,2-Dichloroethene	<0.000368		0.00100	0.000368	mg/L			01/23/24 00:01	1
trans-1,3-Dichloropropene	<0.00127		0.00500	0.00127	mg/L			01/23/24 00:01	1
Vinyl chloride	<0.000428		0.00200	0.000428	mg/L			01/23/24 00:01	1
1,1,1,2-Tetrachloroethane	<0.000644		0.00100	0.000644	mg/L			01/23/24 00:01	1
1,1,1-Trichloroethane	<0.000585		0.00500	0.000585	mg/L			01/23/24 00:01	1
1,1,2,2-Tetrachloroethane	<0.000470		0.00100	0.000470	mg/L			01/23/24 00:01	1
1,1,2-Trichloroethane	<0.000411		0.00100	0.000411	mg/L			01/23/24 00:01	1
1,1-Dichloroethane	<0.000635		0.00100	0.000635	mg/L			01/23/24 00:01	1
Acetonitrile	<0.0146		0.100	0.0146	mg/L			01/23/24 00:01	1
1,1-Dichloroethene	<0.000738		0.00100	0.000738	mg/L			01/23/24 00:01	1
1,1-Dichloropropene	<0.000624		0.00500	0.000624	mg/L			01/23/24 00:01	1
1,2,3-Trichlorobenzene	<0.00177		0.00500	0.00177	mg/L			01/23/24 00:01	1
1,2,3-Trichloropropane	<0.000470		0.00100	0.000470	mg/L			01/23/24 00:01	1
1,2,4-Trichlorobenzene	<0.00175		0.00500	0.00175	mg/L			01/23/24 00:01	1
1,2,4-Trimethylbenzene	<0.000417		0.00100	0.000417	mg/L			01/23/24 00:01	1
1,2-Dibromo-3-Chloropropane	<0.000671		0.00500	0.000671	mg/L			01/23/24 00:01	1
1,2-Dibromoethane	<0.000999		0.00500	0.000999	mg/L			01/23/24 00:01	1
1,2-Dichlorobenzene	<0.000429		0.00100	0.000429	mg/L			01/23/24 00:01	1
1,2-Dichloroethane	<0.000372		0.00100	0.000372	mg/L			01/23/24 00:01	1
1,2-Dichloropropane	<0.000556		0.00500	0.000556	mg/L			01/23/24 00:01	1
1,3,5-Trimethylbenzene	<0.000411		0.00100	0.000411	mg/L			01/23/24 00:01	1
1,3-Dichlorobenzene	<0.000413		0.00100	0.000413	mg/L			01/23/24 00:01	1
1,3-Dichloropropane	<0.000514		0.00500	0.000514	mg/L			01/23/24 00:01	1
1,4-Dichlorobenzene	<0.000449		0.00100	0.000449	mg/L			01/23/24 00:01	1
2,2-Dichloropropane	<0.000679		0.00500	0.000679	mg/L			01/23/24 00:01	1
2-Butanone	<0.00828		0.0500	0.00828	mg/L			01/23/24 00:01	1
4-Chlorotoluene	<0.000386		0.00100	0.000386	mg/L			01/23/24 00:01	1
Benzene	<0.000460		0.00100	0.000460	mg/L			01/23/24 00:01	1
Bromobenzene	<0.000486		0.00100	0.000486	mg/L			01/23/24 00:01	1
Bromochloromethane	<0.000577		0.00100	0.000577	mg/L			01/23/24 00:01	1
Bromodichloromethane	<0.000552		0.00100	0.000552	mg/L			01/23/24 00:01	1
Bromoform	<0.000633		0.00500	0.000633	mg/L			01/23/24 00:01	1
Bromomethane	<0.00142		0.00500	0.00142	mg/L			01/23/24 00:01	1
Carbon tetrachloride	<0.000896		0.00500	0.000896	mg/L			01/23/24 00:01	1
Chlorobenzene	<0.000455		0.00100	0.000455	mg/L			01/23/24 00:01	1
Chloroethane	<0.00198		0.0100	0.00198	mg/L			01/23/24 00:01	1
Chloroform	<0.000464		0.00100	0.000464	mg/L			01/23/24 00:01	1
Chloromethane	<0.00204		0.0100	0.00204	mg/L			01/23/24 00:01	1

Client: reUse Engineering
Project/Site: Wastewater Testing

Job ID: 840-3317-1
SDG: Forest Glenn

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 860-141596/10
Matrix: Water
Analysis Batch: 141596

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromochloromethane	<0.000547		0.00500	0.000547	mg/L			01/23/24 00:01	1
Dichlorodifluoromethane	<0.000785		0.00100	0.000785	mg/L			01/23/24 00:01	1
Ethylbenzene	<0.000385		0.00100	0.000385	mg/L			01/23/24 00:01	1
Hexachlorobutadiene	<0.000627		0.00500	0.000627	mg/L			01/23/24 00:01	1
MTBE	<0.00139		0.00500	0.00139	mg/L			01/23/24 00:01	1
Methylene Chloride	<0.00173		0.00500	0.00173	mg/L			01/23/24 00:01	1
Naphthalene	<0.00135		0.0100	0.00135	mg/L			01/23/24 00:01	1
sec-Butylbenzene	<0.000468		0.00100	0.000468	mg/L			01/23/24 00:01	1
Styrene	<0.000619		0.00100	0.000619	mg/L			01/23/24 00:01	1
Tetrachloroethene	<0.000655		0.00100	0.000655	mg/L			01/23/24 00:01	1
Toluene	<0.000475		0.00100	0.000475	mg/L			01/23/24 00:01	1
Trichloroethene	<0.00150		0.00500	0.00150	mg/L			01/23/24 00:01	1
Trichlorofluoromethane	<0.000560		0.00100	0.000560	mg/L			01/23/24 00:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*63 - 144*		*01/23/24 00:01*	*1*
4-Bromofluorobenzene (Surr)	*94*		*74 - 124*		*01/23/24 00:01*	*1*
Dibromofluoromethane (Surr)	*101*		*75 - 131*		*01/23/24 00:01*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*01/23/24 00:01*	*1*

Lab Sample ID: LCS 860-141596/3
Matrix: Water
Analysis Batch: 141596

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	0.0500	0.05492		mg/L		110	75 - 125
cis-1,3-Dichloropropene	0.0500	0.05474		mg/L		109	74 - 125
Isopropylbenzene	0.0500	0.05637		mg/L		113	75 - 125
m,p-Xylenes	0.0500	0.05606		mg/L		112	75 - 125
n-Butylbenzene	0.0500	0.05311		mg/L		106	75 - 125
N-Propylbenzene	0.0500	0.05494		mg/L		110	75 - 125
o-Xylene	0.0500	0.05646		mg/L		113	75 - 125
p-Cymene (p-Isopropyltoluene)	0.0500	0.05593		mg/L		112	75 - 125
tert-Butylbenzene	0.0500	0.05659		mg/L		113	75 - 125
trans-1,2-Dichloroethene	0.0500	0.05679		mg/L		114	75 - 125
trans-1,3-Dichloropropene	0.0500	0.05532		mg/L		111	66 - 125
Vinyl chloride	0.0500	0.05299		mg/L		106	60 - 140
1,1,1,2-Tetrachloroethane	0.0500	0.05632		mg/L		113	72 - 125
1,1,1-Trichloroethane	0.0500	0.05334		mg/L		107	70 - 130
1,1,2,2-Tetrachloroethane	0.0500	0.05243		mg/L		105	74 - 125
1,1,2-Trichloroethane	0.0500	0.05568		mg/L		111	75 - 130
1,1-Dichloroethane	0.0500	0.05893		mg/L		118	71 - 130
Acetonitrile	0.500	0.4852		mg/L		97	60 - 140
1,1-Dichloroethene	0.0500	0.05195		mg/L		104	50 - 150
1,1-Dichloropropene	0.0500	0.05217		mg/L		104	75 - 125
1,2,3-Trichlorobenzene	0.0500	0.05484		mg/L		110	75 - 137
1,2,3-Trichloropropane	0.0500	0.05476		mg/L		110	75 - 125
1,2,4-Trichlorobenzene	0.0500	0.05444		mg/L		109	75 - 135

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 860-141596/3
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 141596

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,2,4-Trimethylbenzene	0.0500	0.05705		mg/L		114	75 - 125
1,2-Dibromo-3-Chloropropane	0.0500	0.05672		mg/L		113	59 - 125
1,2-Dibromoethane	0.0500	0.05621		mg/L		112	73 - 125
1,2-Dichlorobenzene	0.0500	0.05613		mg/L		112	75 - 125
1,2-Dichloroethane	0.0500	0.05393		mg/L		108	72 - 130
1,2-Dichloropropane	0.0500	0.05548		mg/L		111	74 - 125
1,3,5-Trimethylbenzene	0.0500	0.05620		mg/L		112	60 - 140
1,3-Dichlorobenzene	0.0500	0.05521		mg/L		110	75 - 125
1,3-Dichloropropane	0.0500	0.05483		mg/L		110	75 - 125
1,4-Dichlorobenzene	0.0500	0.05463		mg/L		109	75 - 125
2,2-Dichloropropane	0.0500	0.05165		mg/L		103	75 - 125
2-Butanone	0.250	0.2443		mg/L		98	60 - 140
4-Chlorotoluene	0.0500	0.05475		mg/L		110	74 - 125
Benzene	0.0500	0.05488		mg/L		110	75 - 125
Bromobenzene	0.0500	0.05611		mg/L		112	75 - 125
Bromochloromethane	0.0500	0.05749		mg/L		115	60 - 140
Bromodichloromethane	0.0500	0.05603		mg/L		112	75 - 125
Bromoform	0.0500	0.05840		mg/L		117	70 - 130
Bromomethane	0.0500	0.05355		mg/L		107	60 - 140
Carbon tetrachloride	0.0500	0.05295		mg/L		106	70 - 125
Chlorobenzene	0.0500	0.05559		mg/L		111	82 - 135
Chloroethane	0.0500	0.05343		mg/L		107	60 - 140
Chloroform	0.0500	0.05494		mg/L		110	70 - 121
Chloromethane	0.0500	0.05742		mg/L		115	60 - 140
Dibromochloromethane	0.0500	0.05807		mg/L		116	73 - 125
Dichlorodifluoromethane	0.0500	0.06586		mg/L		132	50 - 150
Ethylbenzene	0.0500	0.05516		mg/L		110	75 - 125
Hexachlorobutadiene	0.0500	0.05468		mg/L		109	75 - 125
MTBE	0.0500	0.05805		mg/L		116	65 - 135
Methylene Chloride	0.0500	0.05265		mg/L		105	71 - 125
Naphthalene	0.0500	0.05728		mg/L		115	70 - 130
sec-Butylbenzene	0.0500	0.05466		mg/L		109	75 - 125
Styrene	0.0500	0.05735		mg/L		115	75 - 125
Tetrachloroethene	0.0500	0.05468		mg/L		109	71 - 125
Toluene	0.0500	0.05556		mg/L		111	75 - 130
Trichloroethene	0.0500	0.05863		mg/L		117	75 - 135
Trichlorofluoromethane	0.0500	0.05260		mg/L		105	60 - 140

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*63 - 144*
4-Bromofluorobenzene (Surr)	*98*		*74 - 124*
Dibromofluoromethane (Surr)	*97*		*75 - 131*
Toluene-d8 (Surr)	*100*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 860-141596/4
Matrix: Water
Analysis Batch: 141596

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	0.0500	0.05056		mg/L		101	75 - 125	8	25
cis-1,3-Dichloropropene	0.0500	0.05153		mg/L		103	74 - 125	6	25
Isopropylbenzene	0.0500	0.05187		mg/L		104	75 - 125	8	25
m,p-Xylenes	0.0500	0.05202		mg/L		104	75 - 125	7	25
n-Butylbenzene	0.0500	0.04883		mg/L		98	75 - 125	8	25
N-Propylbenzene	0.0500	0.05006		mg/L		100	75 - 125	9	25
o-Xylene	0.0500	0.05260		mg/L		105	75 - 125	7	25
p-Cymene (p-Isopropyltoluene)	0.0500	0.05143		mg/L		103	75 - 125	8	25
tert-Butylbenzene	0.0500	0.05179		mg/L		104	75 - 125	9	25
trans-1,2-Dichloroethene	0.0500	0.05225		mg/L		105	75 - 125	8	25
trans-1,3-Dichloropropene	0.0500	0.05246		mg/L		105	66 - 125	5	25
Vinyl chloride	0.0500	0.04710		mg/L		94	60 - 140	12	25
1,1,1,2-Tetrachloroethane	0.0500	0.05309		mg/L		106	72 - 125	6	25
1,1,1-Trichloroethane	0.0500	0.04929		mg/L		99	70 - 130	8	25
1,1,2,2-Tetrachloroethane	0.0500	0.04933		mg/L		99	74 - 125	6	25
1,1,2-Trichloroethane	0.0500	0.05369		mg/L		107	75 - 130	4	25
1,1-Dichloroethane	0.0500	0.05468		mg/L		109	71 - 130	7	25
Acetonitrile	0.500	0.4637		mg/L		93	60 - 140	5	25
1,1-Dichloroethene	0.0500	0.04901		mg/L		98	50 - 150	6	25
1,1-Dichloropropene	0.0500	0.04776		mg/L		96	75 - 125	9	25
1,2,3-Trichlorobenzene	0.0500	0.05122		mg/L		102	75 - 137	7	25
1,2,3-Trichloropropane	0.0500	0.05008		mg/L		100	75 - 125	9	25
1,2,4-Trichlorobenzene	0.0500	0.05037		mg/L		101	75 - 135	8	25
1,2,4-Trimethylbenzene	0.0500	0.05211		mg/L		104	75 - 125	9	25
1,2-Dibromo-3-Chloropropane	0.0500	0.05315		mg/L		106	59 - 125	6	25
1,2-Dibromoethane	0.0500	0.05360		mg/L		107	73 - 125	5	25
1,2-Dichlorobenzene	0.0500	0.05190		mg/L		104	75 - 125	8	25
1,2-Dichloroethane	0.0500	0.05126		mg/L		103	72 - 130	5	25
1,2-Dichloropropane	0.0500	0.05209		mg/L		104	74 - 125	6	25
1,3,5-Trimethylbenzene	0.0500	0.05209		mg/L		104	60 - 140	8	25
1,3-Dichlorobenzene	0.0500	0.05134		mg/L		103	75 - 125	7	25
1,3-Dichloropropane	0.0500	0.05225		mg/L		104	75 - 125	5	25
1,4-Dichlorobenzene	0.0500	0.05010		mg/L		100	75 - 125	9	25
2,2-Dichloropropane	0.0500	0.04626		mg/L		93	75 - 125	11	25
2-Butanone	0.250	0.2290		mg/L		92	60 - 140	6	25
4-Chlorotoluene	0.0500	0.05014		mg/L		100	74 - 125	9	25
Benzene	0.0500	0.05105		mg/L		102	75 - 125	7	25
Bromobenzene	0.0500	0.05188		mg/L		104	75 - 125	8	25
Bromochloromethane	0.0500	0.05378		mg/L		108	60 - 140	7	25
Bromodichloromethane	0.0500	0.05296		mg/L		106	75 - 125	6	25
Bromoform	0.0500	0.05555		mg/L		111	70 - 130	5	25
Bromomethane	0.0500	0.04952		mg/L		99	60 - 140	8	25
Carbon tetrachloride	0.0500	0.04920		mg/L		98	70 - 125	7	25
Chlorobenzene	0.0500	0.05120		mg/L		102	82 - 135	8	25
Chloroethane	0.0500	0.04771		mg/L		95	60 - 140	11	25
Chloroform	0.0500	0.05076		mg/L		102	70 - 121	8	25
Chloromethane	0.0500	0.05315		mg/L		106	60 - 140	8	25
Dibromochloromethane	0.0500	0.05507		mg/L		110	73 - 125	5	25

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 860-141596/4 **Client Sample ID: Lab Control Sample Dup**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 141596

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Dichlorodifluoromethane	0.0500	0.05879		mg/L		118	50 - 150	11	25
Ethylbenzene	0.0500	0.05120		mg/L		102	75 - 125	7	25
Hexachlorobutadiene	0.0500	0.05065		mg/L		101	75 - 125	8	25
MTBE	0.0500	0.05662		mg/L		113	65 - 135	3	25
Methylene Chloride	0.0500	0.04934		mg/L		99	71 - 125	6	25
Naphthalene	0.0500	0.05413		mg/L		108	70 - 130	6	25
sec-Butylbenzene	0.0500	0.05032		mg/L		101	75 - 125	8	25
Styrene	0.0500	0.05308		mg/L		106	75 - 125	8	25
Tetrachloroethene	0.0500	0.05056		mg/L		101	71 - 125	8	25
Toluene	0.0500	0.05096		mg/L		102	75 - 130	9	25
Trichloroethene	0.0500	0.05437		mg/L		109	75 - 135	8	25
Trichlorofluoromethane	0.0500	0.04577		mg/L		92	60 - 140	14	25

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*63 - 144*
4-Bromofluorobenzene (Surr)	*97*		*74 - 124*
Dibromofluoromethane (Surr)	*98*		*75 - 131*
Toluene-d8 (Surr)	*100*		*80 - 120*

Method: 8015C - Alcohols with GC/FID Direct Aqueous Injection

Lab Sample ID: MB 410-465713/1-A **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 468619 **Prep Batch: 465713**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	<460		1000	460	ug/L		01/23/24 08:45	01/24/24 12:05	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetone	*102*		*54 - 130*	*01/23/24 08:45*	*01/24/24 12:05*	*1*
Acetone	*104*		*54 - 130*	*01/23/24 08:45*	*01/24/24 12:05*	*1*

Lab Sample ID: LCS 410-465713/2-A **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 468619 **Prep Batch: 465713**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methanol	2510	2725		ug/L		109	74 - 134

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Acetone	*102*		*54 - 130*
Acetone	*104*		*54 - 130*

Method: 8015C - Alcohols with GC/FID Direct Aqueous Injection (Continued)

Lab Sample ID: LCSD 410-465713/3-A
Matrix: Water
Analysis Batch: 468619

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 465713

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methanol			2510	2689		ug/L		107	74 - 134	1	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Acetone	*102*		*54 - 130*
Acetone	*104*		*54 - 130*

Lab Sample ID: 840-3317-1 MS
Matrix: Water
Analysis Batch: 468619

Client Sample ID: Post Chlorine
Prep Type: Total/NA
Prep Batch: 465713

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Methanol	<460		2510	2536		ug/L		101	74 - 134

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Acetone	*98*		*54 - 130*
Acetone	*99*		*54 - 130*

Lab Sample ID: 840-3317-1 MSD
Matrix: Water
Analysis Batch: 468619

Client Sample ID: Post Chlorine
Prep Type: Total/NA
Prep Batch: 465713

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methanol	<460		2510	2560		ug/L		102	74 - 134	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Acetone	*100*		*54 - 130*
Acetone	*98*		*54 - 130*

Method: 8015D - Glycols- Direct Injection (GC/FID)

Lab Sample ID: MB 860-141715/7
Matrix: Water
Analysis Batch: 141715

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylene glycol	<1.22		5.00	1.22	mg/L			01/23/24 10:06	1

Lab Sample ID: LCS 860-141715/3
Matrix: Water
Analysis Batch: 141715

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ethylene glycol			50.2	45.19		mg/L		90	71 - 132

Method: 8015D - Glycols- Direct Injection (GC/FID) (Continued)

Lab Sample ID: LCSD 860-141715/4 | **Client Sample ID: Lab Control Sample Dup**
Matrix: Water | **Prep Type: Total/NA**
Analysis Batch: 141715

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ethylene glycol			50.2	44.29		mg/L		88	71 - 132	2	30

Method: 8315A - Carbonyl Compounds by HPLC

Lab Sample ID: MB 410-465138/1-A | **Client Sample ID: Method Blank**
Matrix: Water | **Prep Type: Total/NA**
Analysis Batch: 465466 | **Prep Batch: 465138**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	<27.0		60.0	27.0	ug/L		01/20/24 15:06	01/22/24 15:40	1
Acetaldehyde	<30.0		60.0	30.0	ug/L		01/20/24 15:06	01/22/24 15:40	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Butyraldehyde	*104*		*60 - 130*	*01/20/24 15:06*	*01/22/24 15:40*	*1*

Lab Sample ID: LCS 410-465138/2-A | **Client Sample ID: Lab Control Sample**
Matrix: Water | **Prep Type: Total/NA**
Analysis Batch: 465466 | **Prep Batch: 465138**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Formaldehyde			500	515.9		ug/L		103	77 - 122
Acetaldehyde			503	576.5		ug/L		115	48 - 138

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Butyraldehyde	*109*		*60 - 130*

Lab Sample ID: LCSD 410-465138/3-A | **Client Sample ID: Lab Control Sample Dup**
Matrix: Water | **Prep Type: Total/NA**
Analysis Batch: 465466 | **Prep Batch: 465138**

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Formaldehyde			500	509.5		ug/L		102	77 - 122	1	30
Acetaldehyde			503	572.5		ug/L		114	48 - 138	1	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Butyraldehyde	*109*		*60 - 130*

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 860-142151/64 | **Client Sample ID: Method Blank**
Matrix: Water | **Prep Type: Total/NA**
Analysis Batch: 142151

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	<0.0510		0.100	0.0510	mg/L			01/24/24 20:14	1

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Method: 350.1 - Nitrogen, Ammonia (Continued)

Lab Sample ID: LCS 860-142151/65
Matrix: Water
Analysis Batch: 142151

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	1.00	1.090		mg/L		109	90 - 110

Lab Sample ID: LCSD 860-142151/66
Matrix: Water
Analysis Batch: 142151

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ammonia as N	1.00	1.097		mg/L		110	90 - 110	1	20

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 860-142367/2
Matrix: Water
Analysis Batch: 142367

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	<10.0		10.0	10.0	umho/cm @ 25C			01/26/24 10:40	1

Lab Sample ID: 840-3317-1 DU
Matrix: Water
Analysis Batch: 142367

Client Sample ID: Post Chlorine
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	2190		2182		umho/cm @ 25C		0.5	20

Method: SM 4500 S2 D - Sulfide, Total

Lab Sample ID: MB 860-141794/3
Matrix: Water
Analysis Batch: 141794

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	<0.0400		0.100	0.0400	mg/L			01/23/24 13:50	1

Lab Sample ID: LCS 860-141794/4
Matrix: Water
Analysis Batch: 141794

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Sulfide	1.00	1.017		mg/L		102	90 - 110

Lab Sample ID: LCSD 860-141794/5
Matrix: Water
Analysis Batch: 141794

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Sulfide	1.00	1.014		mg/L		101	90 - 110	0	20

Method: SM 4500 S2 D - Sulfide, Total (Continued)

Lab Sample ID: 840-3317-1 MS
Matrix: Water
Analysis Batch: 141794

Client Sample ID: Post Chlorine
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Sulfide	<0.0400		1.00	0.9326		mg/L		93	90 - 110		

Lab Sample ID: 840-3317-1 MSD
Matrix: Water
Analysis Batch: 141794

Client Sample ID: Post Chlorine
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Sulfide	<0.0400		1.00	0.9359		mg/L		94	90 - 110	0	20

QC Association Summary

Client: reUse Engineering
Project/Site: Wastewater Testing

Job ID: 840-3317-1
SDG: Forest Glenn

GC/MS VOA

Analysis Batch: 141596

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8260D	
MB 860-141596/10	Method Blank	Total/NA	Water	8260D	
LCS 860-141596/3	Lab Control Sample	Total/NA	Water	8260D	
LCSD 860-141596/4	Lab Control Sample Dup	Total/NA	Water	8260D	

GC Semi VOA

Analysis Batch: 141715

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8015D	
MB 860-141715/7	Method Blank	Total/NA	Water	8015D	
LCS 860-141715/3	Lab Control Sample	Total/NA	Water	8015D	
LCSD 860-141715/4	Lab Control Sample Dup	Total/NA	Water	8015D	

Prep Batch: 465713

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8015 DAI Prep	
MB 410-465713/1-A	Method Blank	Total/NA	Water	8015 DAI Prep	
LCS 410-465713/2-A	Lab Control Sample	Total/NA	Water	8015 DAI Prep	
LCSD 410-465713/3-A	Lab Control Sample Dup	Total/NA	Water	8015 DAI Prep	
840-3317-1 MS	Post Chlorine	Total/NA	Water	8015 DAI Prep	
840-3317-1 MSD	Post Chlorine	Total/NA	Water	8015 DAI Prep	

Analysis Batch: 468619

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8015C	465713
MB 410-465713/1-A	Method Blank	Total/NA	Water	8015C	465713
LCS 410-465713/2-A	Lab Control Sample	Total/NA	Water	8015C	465713
LCSD 410-465713/3-A	Lab Control Sample Dup	Total/NA	Water	8015C	465713
840-3317-1 MS	Post Chlorine	Total/NA	Water	8015C	465713
840-3317-1 MSD	Post Chlorine	Total/NA	Water	8015C	465713

HPLC/IC

Prep Batch: 465138

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8315A Prep	
MB 410-465138/1-A	Method Blank	Total/NA	Water	8315A Prep	
LCS 410-465138/2-A	Lab Control Sample	Total/NA	Water	8315A Prep	
LCSD 410-465138/3-A	Lab Control Sample Dup	Total/NA	Water	8315A Prep	

Analysis Batch: 465466

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8315A	465138
MB 410-465138/1-A	Method Blank	Total/NA	Water	8315A	465138
LCS 410-465138/2-A	Lab Control Sample	Total/NA	Water	8315A	465138
LCSD 410-465138/3-A	Lab Control Sample Dup	Total/NA	Water	8315A	465138

General Chemistry

Analysis Batch: 141794

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	SM 4500 S2 D	
MB 860-141794/3	Method Blank	Total/NA	Water	SM 4500 S2 D	
LCS 860-141794/4	Lab Control Sample	Total/NA	Water	SM 4500 S2 D	
LCSD 860-141794/5	Lab Control Sample Dup	Total/NA	Water	SM 4500 S2 D	
840-3317-1 MS	Post Chlorine	Total/NA	Water	SM 4500 S2 D	
840-3317-1 MSD	Post Chlorine	Total/NA	Water	SM 4500 S2 D	

Analysis Batch: 142151

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	350.1	
MB 860-142151/64	Method Blank	Total/NA	Water	350.1	
LCS 860-142151/65	Lab Control Sample	Total/NA	Water	350.1	
LCSD 860-142151/66	Lab Control Sample Dup	Total/NA	Water	350.1	

Analysis Batch: 142367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	SM 2510B	
MB 860-142367/2	Method Blank	Total/NA	Water	SM 2510B	
LCS 860-142367/3	Lab Control Sample	Total/NA	Water	SM 2510B	
LCSD 860-142367/4	Lab Control Sample Dup	Total/NA	Water	SM 2510B	
840-3317-1 DU	Post Chlorine	Total/NA	Water	SM 2510B	

Analysis Batch: 142458

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	9040C	

Client Sample ID: Post Chlorine
Lab Sample ID: 840-3317-1

Date Collected: 01/18/24 13:30
Matrix: Water
Date Received: 01/18/24 15:28

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	5 mL	5 mL	141596	01/23/24 01:44	NA	EET HOU
Total/NA	Prep	8015 DAI Prep			1 mL	1 mL	465713	01/23/24 08:45	WN7O	ELLE
Total/NA	Analysis	8015C		1			468619	01/24/24 13:30	WN7O	ELLE
Total/NA	Analysis	8015D		1	1 mL	1 mL	141715	01/23/24 11:41	JBS	EET HOU
Total/NA	Prep	8315A Prep			100 mL	10 mL	465138	01/20/24 15:06	U7CG	ELLE
Total/NA	Analysis	8315A		1	1 mL	1 mL	465466	01/22/24 16:55	GM5C	ELLE
Total/NA	Analysis	350.1		1	10 mL	10 mL	142151	01/24/24 21:02	ADL	EET HOU
Total/NA	Analysis	9040C		1			142458	01/26/24 17:25	KEG	EET HOU
Total/NA	Analysis	SM 2510B		1			142367	01/26/24 10:40	KEG	EET HOU
Total/NA	Analysis	SM 4500 S2 D		1	7.5 mL	7.5 mL	141794	01/23/24 13:50	SCI	EET HOU

Laboratory References:

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: reUse Engineering
Project/Site: Wastewater Testing

Job ID: 840-3317-1
SDG: Forest Glenn

Laboratory: Eurofins Houston

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Texas	NELAP	T104704215-23-53	01-31-24

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	0001.01	11-30-24
A2LA	ISO/IEC 17025	0001.01	11-30-24
Alabama	State	43200	01-31-24
Alaska	State	PA00009	06-30-24
Alaska (UST)	State	17-027	02-28-24
Arizona	State	AZ0780	03-12-24
Arkansas DEQ	State	88-00660	08-09-24
California	State	2792	01-31-24
Colorado	State	PA00009	06-30-24
Connecticut	State	PH-0746	06-30-25
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-24
Delaware (DW)	State	N/A	01-31-24
Florida	NELAP	E87997	06-30-24
Georgia (DW)	State	C048	01-31-24
Hawaii	State	N/A	01-31-24
Illinois	NELAP	200027	01-31-25
Iowa	State	361	03-01-24
Kansas	NELAP	E-10151	10-31-24
Kentucky (DW)	State	KY90088	12-31-24
Kentucky (UST)	State	0001.01	11-30-24
Kentucky (WW)	State	KY90088	12-31-23 *
Louisiana (All)	NELAP	02055	06-30-24
Maine	State	2019012	03-12-25
Maryland	State	100	06-30-24
Massachusetts	State	M-PA009	06-30-24
Michigan	State	9930	01-31-25
Minnesota	NELAP	042-999-487	12-31-24
Mississippi	State	023	01-31-25
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-25
Nebraska	State	NE-OS-32-17	01-31-24
New Hampshire	NELAP	2730	01-10-25
New Jersey	NELAP	PA011	06-30-24
New York	NELAP	10670	04-01-24
North Carolina (DW)	State	42705	07-31-24
North Carolina (WW/SW)	State	521	12-31-24
North Dakota	State	R-205	01-31-24
Oklahoma	NELAP	9804	08-31-24
Oregon	NELAP	PA200001	09-11-24
Pennsylvania	NELAP	36-00037	01-31-25
Quebec Ministry of Environment and Fight against Climate Change	PALA	507	09-16-24
Rhode Island	State	LAO00338	12-30-24
South Carolina	State	89002	01-31-24
Tennessee	State	02838	01-31-24

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Texas	NELAP	T104704194-23-46	08-31-24
USDA	US Federal Programs	525-22-298-19481	10-25-25
Vermont	State	VT - 36037	10-28-24
Virginia	NELAP	460182	06-14-25
Washington	State	C457	04-11-24
West Virginia (DW)	State	9906 C	01-31-25
West Virginia DEP	State	055	07-31-24
Wyoming	State	8TMS-L	01-31-24
Wyoming (UST)	A2LA	0001.01	11-30-24

Method Summary

Client: reUse Engineering
Project/Site: Wastewater Testing

Job ID: 840-3317-1
SDG: Forest Glenn

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET HOU
8015C	Alcohols with GC/FID Direct Aqueous Injection	SW846	ELLE
8015D	Glycols- Direct Injection (GC/FID)	SW846	EET HOU
8315A	Carbonyl Compounds by HPLC	SW846	ELLE
350.1	Nitrogen, Ammonia	EPA	EET HOU
9040C	pH	SW846	EET HOU
SM 2510B	Conductivity, Specific Conductance	SM	EET HOU
SM 4500 S2 D	Sulfide, Total	SM	EET HOU
5030C	Purge and Trap	SW846	EET HOU
8015 DAI Prep	Preparation, Direct Aqueous Injection	SW846	ELLE
8315A Prep	Solid Phase Extraction (SPE)	SW846	ELLE

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: reUse Engineering
Project/Site: Wastewater Testing

Job ID: 840-3317-1
SDG: Forest Glenn

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
840-3317-1	Post Chlorine	Water	01/18/24 13:30	01/18/24 15:28

840-3317

Eurofins San Antonio

5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

eurofins | Environment Testing

Client Information			
Sampler: Damon Harrington	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-3467-457.1
Client Contact: Mr. Rane Wilson	Phone: 570-567-4297	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin:
Company: reUse Engineering	PWSID:		Page: Page 1 of 1
Address: 4411 S. Interstate 35, Suite 100	Due Date Requested: Normal		Job #: 23.010.TX
City: Georgetown	TAT Requested (days):		
State, Zip: TX, 78626	Compliance Project: Δ Yes Δ No		
Phone: 512-937-7790(Tel)	PO #: Purchase Order not required		
Email: rane@reuseeng.com	WO #: 23.010.TX		
Project Name: Wastewater Testing	Project #: 84000417		
Site: Forrest Glenn	SSOW#: N/A		

840-3317 Chain of Custody

Loc: 840
3317

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Y - Trizma
Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform [redacted]	8315A - (MOD) Formaldehyde	8015C_DAI_7Day - (MOD) Ethlene Glycol 8015C	SM4500_S2_D - Sulfide, Total	350.1 - Nitrogen, Ammonia	2510B, 9040C	8260D - (MOD) Full List VOC 8260D	8015D_DAI_G - (MOD) Glycols	Total N	Special Instructions/Note:
			Preservation Code:				N	N	CB	S	N	A	N		
Pre-chlorine	1/18/24	1:00pm	G	Water											not taken
Post-chlorine	1/18/24	1:30pm	G	Water	X	X	X	X	X	X	X	X	X		Cooling process
															just begun

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Damon Harrington	1/18/24 15:28	reUse	Irene Vann	1/18/24 15:28	EETA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 7.5/8.0 SaA001

Ver: 06/08/2021

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

840-3317 eurofins Environment Testing

Client Information	Sampler: Damon Harrington	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-3467-457.1
Client Contact: Mr. Rane Wilson	Phone: 570-567-4297	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: reUse Engineering	PWSID:			Job #: 23.010.TX
Address: 4411 S. Interstate 35, Suite 100	Due Date Requested: Normal			
City: Georgetown	TAT Requested (days):			
State, Zip: TX, 78626	Compliance Project: ∆ Yes ∆ No			
Phone: 512-937-7790(Tel)	PO #: Purchase Order not required			
Email: rane@reuseeng.com	WO #: 23.010.TX			
Project Name: Wastewater Testing	Project #: 84000417			
Site: Forrest Glenn	SSOW#: N/A			

840-3317 Chain of Custody

Loc: 840
3317

Preservation Codes:
- HCL
- NaOH
- Zn Acetate
- Nitric Acid
- NaHSO4
- MeOH
- Amchlor
- H - Ascorbic Acid
- I - Ice
- J - DI Water
- K - EDTA
- L - EDA
- M - Hexane
- N - None
- O - AsNaO2
- P - Na2O4S
- Q - Na2SO3
- R - Na2S2O3
- S - H2SO4
- T - TSP Dodecahydrate
- U - Acetone
- V - MCAA
- W - pH 4-5
- Y - Trizma
- Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform [redacted]	8315A - (MOD) Formaldehyde	8015C_DAI_7Day - (MOD) Ethlene Glycol 8015C	SM4500_S2_D - Sulfide, Total	350.1 - Nitrogen, Ammonia	2510B, 9040C	8260D - (MOD) Full List VOC 8260D	8015D_DAI_G - (MOD) Glycols	Total N	Special Instructions/Note:
				Preservation Code:			N	N	CB	S	N	A	N		
Pre-chlorine	1/18/24	1:00pm	G	Water											not taken
Post-Chlorine	1/18/24	1:30pm	G	Water	X	X	X	X	X	X	X	X	X		
															Cooling process
															just begun

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Deliverable Requested: I, II, III, IV, Other (specify)

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: Damon Harrington	Date/Time: 1/18/24 15:26	Company: reUse	Received by: [signature]	Date/Time: 1/18/24 15:28	Company: EETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 7.5/8.0 SA001

Ver: 06/08/2021

2/5/2024

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

840-3317 eurofins | Environment Testing

Client Information	Sampler: Damon Harrington	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-3467-457.1
Client Contact: Mr. Rane Wilson	Phone: 570-567-4297	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: reUse Engineering	PWSID:			Job #: 23.010.TX
Address: 4411 S. Interstate 35, Suite 100	Due Date Requested: Normal			
City: Georgetown	TAT Requested (days):			
State, Zip: TX, 78626	Compliance Project: Δ Yes Δ No			
Phone: 512-937-7790(Tel)	PO #: Purchase Order not required			
Email: rane@reuseeng.com	WO #: 23.010.TX			
Project Name: Wastewater Testing	Project #: 84000417			
Site: Forrest Glenn	SSOW#: N/A			

840-3317 Chain of Custody

Loc: 840
3317

Preservation Codes:
HCL; NaOH; Zn Acetate; Nitric Acid; NaHSO4; MeOH; - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA
M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2O3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - pH 4-5; Y - Trizma; Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	MS/MSD (Yes or No)	8315A - (MOD) Formaldehyde	8015C_DAI_7Day - (MOD) Ethlene Glycol 8015C	SM4500_S2_D - Sulfide, Total	350.1 - Nitrogen, Ammonia	2510B, 9040C	8260D - (MOD) Full List VOC 8260D	8015D_DAI_G - (MOD) Glycols	Total N	Special Instructions/Note:
			Preservation Code:		X	X	N	N	CB	S	N	A	N	X	
Pre-chlorine	1/18/24	1:00pm	G	Water											not taken
Post-Chlorine	1/18/24	1:30pm	G	Water	X	X	X	X	X	X	X	X	X		Cooling process just begun

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Damon Harrington	1/18/24 15:28	reUse	[signature]	1/18/24 15:28	EETA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 7.5/8.0 SAn001

Ver: 06/08/2021

2/5/2024

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

840-3317 eurofins Environment Testing

Client Information	Sampler: Damon Harrington	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-3467-457.1
Client Contact: Mr. Rane Wilson	Phone: 570-567-4297	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: reUse Engineering	PWSID:			Job #: 23.010.TX
Address: 4411 S. Interstate 35, Suite 100	Due Date Requested: Normal			
City: Georgetown	TAT Requested (days):			
State, Zip: TX, 78626	Compliance Project: Δ Yes Δ No			
Phone: 512-937-7790(Tel)	PO #: Purchase Order not required			
Email: rane@reuseeng.com	WO #: 23.010.TX			
Project Name: Wastewater Testing	Project #: 84000417			
Site: Forrest Glenn	SSOW#: N/A			

840-3317 Chain of Custody

Loc: 840
3317

Preservation Codes:

HCL	M - Hexane
NaOH	N - None
Zn Acetate	O - AsNaO2
Nitric Acid	P - Na2O4S
NaHSO4	Q - Na2SO3
MeOH	R - Na2S2O3
- Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Y - Trizma
	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	MS/MSD (Yes or No)	8315A - (MOD) Formaldehyde	8015C_DAI_7Day - (MOD) Ethlene Glycol 8015C	SM4500_S2_D - Sulfide, Total	350.1 - Nitrogen, Ammonia	2510B, 9040C	8260D - (MOD) Full List VOC 8260D	8015D_DAI_G - (MOD) Glycols	Total N	Special Instructions/Note:
				Preservation Code:			N	N	CB	S	N	A	N		
Pre-chlorine	1/18/24	1:00pm	G	Water											not taken
Post-Chlorine	1/18/24	1:30pm	G	Water	X	X	X	X	X	X	X	X	X		Cooling process just begun

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: Damon Harrington	Date/Time: 1/18/24 15:28	Company: reUse	Received by: [signature]	Date/Time: 1/18/24 15:28	Company: EETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 7.5/8.0 SAA001

Ver: 06/08/2021

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-2995.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin: Texas	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - Texas		Job #: 840-3317-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 1/29/2024			
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: Wastewater Testing	Project #: 84000417			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015C_DAI_7Day/8015_DAI_Prep (MOD) Ethlene Glycol 8015C	8315A/8315A_W_Prep (MOD) Formaldehyde	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
Post Chlorine (840-3317-1)	1/18/24	13:30 Central		Water			X	X	17	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing South Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing South Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing South Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing South Central, LLC.

Possible Hazard Identification *Unconfirmed*	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)* ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For ____ Months*
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Irene Vann	1/19/24 17:00	EX SA			
			[illegible]	1/20/24 1145	ELLE

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: R: 1.2 C: 0.5

Ver: 06/08/2021

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

eurofins Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-2995.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin: Texas	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - Texas		Job #: 840-3317-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 1/29/2024	Analysis Requested		Preservation Codes:
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: Wastewater Testing	Project #: 84000417			
Site:	SSOW#:			Other:

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015C_DAI_7Day/8015_DAI_Prep (MOD) Ethlene Glycol 8015C	8315A/8315A_W_Prep (MOD) Formaldehyde	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
Post Chlorine (840-3317-1)	1/18/24	13:30 Central		Water			X	X	17	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing South Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing South Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing South Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing South Central, LLC.

Possible Hazard Identification *Unconfirmed*	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)* ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Irene Vann	1/19/24 17:00	ETSA			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	1/20/24 1145	ELLE

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: R: 1.2 C: 0.5

Ver: 06/08/2021

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-2994.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin: Texas	Page: Page 1 of 1
Company: Eurofins Environment Testing South Centr		Accreditations Required (See note): NELAP Texas		Job #: 840-3317-1
Address: 4145 Greenbriar Dr	Due Date Requested: 1/29/2024	Analysis Requested		Preservation Codes:
City: Stafford	TAT Requested (days):			
State, Zip: TX, 77477				
Phone: 281-240-4200(Tel)	PO #:			
Email:	WO #:			
Project Name: Wastewater Testing	Project #: 84000417			
Site:	SSOW#:			Other:

Preservation Codes: A HCL, B NaOH, C Zn Acetate, D Nitric Acid, E NaHSO4, F MeOH, G Amchlor, H Ascorbic Acid, I Ice, J DI Water, K EDTA, L EDA, M Hexane, N None, O AsNaO2, P Na2O4S, Q Na2SO3, R Na2S2O3, S H2SO4, T TSP Dodecahydrate, U Acetone, V MCAA, W pH 4-5, Y Trizma, Z other (specify)

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D/5030C (MOD) Full List VOC 8260D	8015D_DAI_G/ (MOD) Glycols	350.1/ Nitrogen, Ammonia	SM4500_S2_D/ Sulfide, Total	9040C/ (MOD) Local Method	2510B/ Specific Conductance	Total Number of containers	Special Instructions/Note:
			Preservation Code:											
Post Chlorine (840-3317-1)	1/18/24	13:30 Central		Water			X	X	X	X	X	X		

Temp. 2.5 IR ID·HOU-369
C/F.-0.0
Corrected Temp: 2.5

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing South Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing South Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing South Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing South Central, LLC.

Possible Hazard Identification Unconfirmed		*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)* ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months	
Deliverable Requested: I, II, III, IV Other (specify)		Special Instructions/QC Requirements:	
Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Irene Vann	1/18/24 17:00	EX SA	[signature]	1/19/24 9:53	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.	Cooler Temperature(s) °C and Other Remarks:

Ver 06/08/2021

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-2994.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin: Texas	Page: Page 1 of 1
Company: Eurofins Environment Testing South Centr		Accreditations Required (See note): NELAP Texas		Job #: 840-3317-1
Address: 4145 Greenbriar Dr	Due Date Requested: 1/29/2024	Analysis Requested		Preservation Codes:
City: Stafford	TAT Requested (days):			
State, Zip: TX, 77477				
Phone: 281-240-4200(Tel)	PO #:			
Email:	WO #:			
Project Name: Wastewater Testing	Project #: 84000417			
Site:	SSOW#:			Other:

Preservation Codes:
A HCL, B NaOH, C Zn Acetate, D Nitric Acid, E NaHSO4, F MeOH, G Amchlor, H Ascorbic Acid, I Ice, J DI Water, K EDTA, L EDA
M Hexane, N None, O AsNaO2, P Na2O4S, Q Na2SO3, R Na2S2O3, S H2SO4, T TSP Dodecahydrate, U Acetone, V MCAA, W pH 4-5, Y Trizma, Z other (specify)

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D/5030C (MOD) Full List VOC 8260D	8015D_DAI_G/ (MOD) Glycols	350.1/ Nitrogen, Ammonia	SM4500_S2_D/ Sulfide, Total	9040C/ (MOD) Local Method	2510B/ Specific Conductance	Total Number of containers	Special Instructions/Note:
			Preservation Code:											
Post Chlorine (840-3317-1)	1/18/24	13:30 Central		Water			X	X	X	X	X	X		

Temp. 2.5 IR ID·HOU-369
C/F.-0.0
Corrected Temp: 2.5

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing South Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing South Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing South Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing South Central, LLC.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ________ *Months*

Deliverable Requested: I, II, III, IV Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:	Time:		Method of Shipment:
Relinquished by: [signature]	Date/Time: 1/18/24 17:00	Company: EX SA	Received by: [signature]	Date/Time: 1/19/24 9:53	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.	Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: reUse Engineering

Job Number: 840-3317-1
SDG Number: Forest Glenn

Login Number: 3317
List Number: 1
Creator: Vann, Irene

List Source: Eurofins San Antonio

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Received same day of collection; chilling process has begun.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Trip Blank included but not on COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	

Login Sample Receipt Checklist

Client: reUse Engineering

Job Number: 840-3317-1
SDG Number: Forest Glenn

Login Number: 3317
List Number: 2
Creator: Torrez, Lisandra

List Source: Eurofins Houston
List Creation: 01/19/24 01:28 PM

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	

Login Sample Receipt Checklist

Client: reUse Engineering

Job Number: 840-3317-1
SDG Number: Forest Glenn

Login Number: 3317
List Number: 3
Creator: Santiago, Nathaniel

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 01/20/24 01:28 PM

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature acceptable,where thermal pres is required(</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV:Container Temp acceptable,where thermal pres is required (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	False	Headspace greater than 6mm in diameter in some but not all containers

4411 S Interstate 35, Ste 100
Georgetown, Texas 78626
www.reuseinn.com
TX PE Firm 21880

APPENDIX D

Climate Data Tables/Figures

Average Maximum Temperature (TMax)

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Abilene	55.4	60.2	68.4	77.5	84.2	91.3	94.9	94.3	87	77.8	65.6	57.8	**76.2**
Amarillo	49.2	53.3	61.2	70.9	79	88	91.2	89.2	82.2	72.5	59.3	51	**70.6**
Austin	60.1	64.4	71.7	79.1	85.2	91.6	95.2	95.7	89.8	81.6	70.2	62.7	**78.9**
Brownsville	70.3	73.1	78	83.2	87.4	91.3	93	93.6	90.4	85.1	77.9	71.6	**82.9**
College Station	59.3	63.6	71	78.4	84.8	91.2	94.7	95.3	89.4	80.9	69.9	62.2	**78.4**
Corpus Christi	66.2	69.7	75.3	81.2	86	90.8	93.5	93.6	89.8	83.8	75.2	69	**81.2**
Dallas/Ft. Worth	54.2	59.9	67.8	75.9	83.2	91.6	96.2	95.7	88.3	78.6	66	57.3	**76.2**
Del Rio	63.4	68.2	76.1	83.6	88.8	94.4	97	96.7	91	82.1	71.6	64.3	**81.4**
El Paso	57.5	63.3	69.9	78.6	87.2	95.8	95.2	93	87.8	78.7	66.3	58.1	**77.6**
Galveston	59.4	61.5	67	73.5	80.2	85.5	87.7	88.1	85	78	69.1	62.9	**74.8**
Houston	61.8	66	72.7	79	85.3	90.8	93.7	93.5	89	81.4	71.7	64.9	**79.2**
Lubbock	53.5	58.7	66.3	75.3	82.7	90.6	92.6	91.1	84.2	75.1	63.2	54.7	**74**
Midland	57.1	62.2	69.8	78.6	86.4	92.9	94.3	93.2	86.4	77.9	66.2	59	**77**
Port Arthur	61.6	65.1	71.2	77.8	84.4	89.7	91.8	91.8	88	80.7	70.9	64.2	**78.1**
San Angelo	58.4	63.2	70.8	79.7	86.3	92.2	95.5	94.6	87.6	79.1	67.6	60.5	**78**
San Antonio	61.8	66.2	73.4	80.3	86.1	91.9	95.1	95.2	89.9	82.1	71.3	64.5	**79.8**
Victoria	63.3	67.1	73.8	80.4	85.7	90.8	93.7	94	89.6	83	73.7	66.3	**80.1**
Waco	57.1	61.9	69.4	78	84.6	92.1	96.4	96.8	89.9	80.6	68.1	59.9	**77.9**
Wichita Falls	53	58.4	67	76.6	83.9	92.6	97.6	97.2	88.6	78.4	64.7	55.6	**76.1**

Average Relative Humidity

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Abilene	55.4	60.2	68.4	77.5	84.2	91.3	94.9	94.3	87	77.8	65.6	57.8	**76.2**
Amarillo	49.2	53.3	61.2	70.9	79	88	91.2	89.2	82.2	72.5	59.3	51	**70.6**
Austin	60.1	64.4	71.7	79.1	85.2	91.6	95.2	95.7	89.8	81.6	70.2	62.7	**78.9**
Brownsville	70.3	73.1	78	83.2	87.4	91.3	93	93.6	90.4	85.1	77.9	71.6	**82.9**
College Station	59.3	63.6	71	78.4	84.8	91.2	94.7	95.3	89.4	80.9	69.9	62.2	**78.4**
Corpus Christi	66.2	69.7	75.3	81.2	86	90.8	93.5	93.6	89.8	83.8	75.2	69	**81.2**
Dallas/Ft. Worth	54.2	59.9	67.8	75.9	83.2	91.6	96.2	95.7	88.3	78.6	66	57.3	**76.2**
Del Rio	63.4	68.2	76.1	83.6	88.8	94.4	97	96.7	91	82.1	71.6	64.3	**81.4**
El Paso	57.5	63.3	69.9	78.6	87.2	95.8	95.2	93	87.8	78.7	66.3	58.1	**77.6**
Galveston	59.4	61.5	67	73.5	80.2	85.5	87.7	88.1	85	78	69.1	62.9	**74.8**
Houston	61.8	66	72.7	79	85.3	90.8	93.7	93.5	89	81.4	71.7	64.9	**79.2**
Lubbock	53.5	58.7	66.3	75.3	82.7	90.6	92.6	91.1	84.2	75.1	63.2	54.7	**74**
Midland	57.1	62.2	69.8	78.6	86.4	92.9	94.3	93.2	86.4	77.9	66.2	59	**77**
Port Arthur	61.6	65.1	71.2	77.8	84.4	89.7	91.8	91.8	88	80.7	70.9	64.2	**78.1**
San Angelo	58.4	63.2	70.8	79.7	86.3	92.2	95.5	94.6	87.6	79.1	67.6	60.5	**78**
San Antonio	61.8	66.2	73.4	80.3	86.1	91.9	95.1	95.2	89.9	82.1	71.3	64.5	**79.8**
Victoria	63.3	67.1	73.8	80.4	85.7	90.8	93.7	94	89.6	83	73.7	66.3	**80.1**
Waco	57.1	61.9	69.4	78	84.6	92.1	96.4	96.8	89.9	80.6	68.1	59.9	**77.9**
Wichita Falls	53	58.4	67	76.6	83.9	92.6	97.6	97.2	88.6	78.4	64.7	55.6	**76.1**

Historic Rainfall Reference

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Amarillo	0.59	0.58	0.93	1.24	2.74	3.4	2.88	2.99	1.89	1.41	0.62	0.57
Austin	2.11	2.41	2.05	3.01	4.38	3.46	2.05	2.23	3.38	3.35	2.28	2.46
Brownsville	1.33	1.31	0.9	1.63	2.31	2.85	1.69	2.46	4.95	3.36	1.61	1.18
College Station	2.87	2.88	2.5	3.77	4.73	3.79	2.24	2.43	4.3	3.64	3.07	3.15
Corpus Christi	1.57	1.88	1.33	2.06	3.09	3.19	1.84	3.33	5.3	3.54	1.56	1.6
Dallas / Ft Worth	1.94	2.44	3.12	3.15	5.43	3.18	2.09	2.1	2.42	4.01	2.43	2.5
Del Rio	0.53	0.91	0.86	1.89	2.39	1.9	1.54	1.72	2.59	1.94	0.85	0.65
El Paso	0.42	0.41	0.3	0.21	0.33	0.72	1.56	1.48	1.42	0.72	0.35	0.62
Galveston	3.33	2.58	2.43	2.55	3.46	4.14	3.77	4.23	5.36	3.17	3.33	3.59
Houston	3.7	2.99	3.48	3.49	5.22	5.13	3.25	3.79	4.45	4.65	3.89	3.64
Lubbock	0.52	0.61	0.82	1.26	2.62	2.67	2.12	2.07	2.53	1.99	0.62	0.64
Midland	0.54	0.61	0.47	0.77	2.02	1.59	1.83	1.65	2.04	1.56	0.58	0.53
Port Arthur	4.86	3.96	3.3	3.86	5.02	5.68	5.31	5.04	5.77	4.2	4.22	5.13
San Angelo	0.83	1.05	0.93	1.68	2.86	2.2	1.16	1.77	2.78	2.21	0.96	0.78
San Antonio	1.61	1.9	1.68	2.53	3.99	3.57	1.83	2.58	3.29	3.29	2.11	1.72
Victoria	2.28	2.12	2.08	2.93	4.95	4.77	3.03	3.08	5.37	3.72	2.51	2.33
Waco	2.07	2.39	2.51	3.43	4.59	2.8	1.88	1.66	3.07	2.91	2.48	2.49
Wichita Falls	1.08	1.31	1.91	2.72	4.59	3.36	2.05	2.16	2.94	2.69	1.55	1.56
Abilene	1.01	1.1	1.19	2.09	3.31	2.9	2.09	2.45	2.75	2.48	1.28	1.04

Historic ETo Reference

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Abilene	2.08	2.57	4.14	5.48	6.47	7.65	8.36	7.46	5.48	4.21	2.67	2.08
Amarillo	1.84	2.27	3.73	5.06	5.89	7.51	8.08	7.29	5.61	4.05	2.4	1.78
Austin	2.27	2.72	4.34	5.27	6.39	7.15	7.22	7.25	5.57	4.38	2.74	2.21
Brownsville	2.65	3.03	4.48	5.17	6.03	6.32	6.68	6.65	5.21	4.34	3.01	2.59
College Station	2.2	2.71	4.22	5.2	6.25	6.89	7.1	6.85	5.6	4.3	2.8	2.2
Corpus Christi	2.42	2.95	4.28	5.17	5.95	6.43	6.68	6.65	5.21	4.34	3.01	2.59
Dallas / Ft Worth	2	2.46	3.96	5.14	6.21	7.06	7.4	7.25	5.49	4.19	2.59	2.1
Del Rio	2.47	3.01	4.76	6.01	6.98	7.41	7.57	7.41	5.77	4.35	2.91	2.36
El Paso	2.74	3.53	6.07	8.19	9.83	11.12	9.19	8.94	7.69	5.89	3.58	2.49
Galveston	2.2	2.6	4.1	5	6.11	6.6	6.2	6	5.5	4.2	2.8	2.3
Houston	2.36	2.83	4.32	5.01	6.11	6.57	6.52	6.08	5.57	4.28	2.9	2.35
Lubbock	2.35	2.63	4.41	5.53	6.93	7.73	7.63	7.2	5.54	4.19	2.61	2.33
Midland	2.2	2.78	4.46	5.91	7.21	8.2	9.23	8.62	6.96	4.31	2.78	2.16
Port Arthur	2.25	2.63	3.95	5.09	6.12	6.6	5.81	5.61	5.46	4.18	2.76	2.23
San Angelo	2.88	3.13	5.31	7.01	8.48	9.16	9.29	8.49	6.6	5.08	3.37	2.54
San Antonio	2.42	2.9	4.42	5.47	6.47	6.97	7.31	6.99	5.64	4.44	2.85	2.36
Victoria	2.35	2.87	4.29	5.77	6.39	6.7	6.92	6.7	5.36	4.41	2.93	2.33
Waco	2.13	2.62	4.03	5.31	6.45	7.15	7.4	7.5	5.7	4.41	2.7	2.17
Wichita Falls	1.94	2.46	4.07	5.5	6.7	7.54	7.97	7.72	5.79	4.3	2.62	1.95

US1TXGS0032 FREDERICKSBURG 12.2 NE, TX US Station is located 16 miles north of Firefly and 13 miles north of Tiny Homes

[Daily Summaries Station Details: FREDERICKSBURG 12.2 NE, TX US, GHCND:US1TXGS0032 | Climate Data Online (CDO) | National Climatic Data Center (NCDC) (noaa.gov)]

	Jan.	Precip	Feb.	Precip	March	Precip	April	Precip	May	Precip	June	Precip	July	Precip	August	Precip	Sept	Precip	Oct	Precip	Nov	Precip	Dec	Precip		
	1/9/2011	1.09	2/1/2011	0.36	3/27/2011	0.06	4/11/2011	0.42	5/2/2011	0.26	6/22/2011	1.11					9/18/2011	0.11	10/9/2011	2.52	11/8/2011	0.11	12/3/2011	0.23		
	1/17/2011	0.35	2/9/2011	0.13			4/22/2011	0.14	5/11/2011	0.61							9/28/2011	0.1			11/15/2011	0.73	12/4/2011	0.39		
									5/12/2011	0.6							9/30/2011	0.2			11/22/2011	0.61	12/5/2011	0.73		
																					11/26/2011	0.58	12/11/2011	0.92		
2011																							12/14/2011	0.15		
																							12/19/2011	0.34		
																							12/22/2011	0.43		
																							12/25/2011	0.06		
																									# of Days	**Total Inches**
# of Days	2		2		1		2		3		1		0		0		3		1		4		8		**27**	
Inches of Precip		1.44		0.49		0.06		0.56		1.47		1.11		0		0		0.41		2.52		2.03		3.25		**13.34**
Gross EV		2.05		2.2		4.47		6.39		5.87		8.48		8.5		9.23		7.48		5.05		3.19		1.48		**64.39**
Net EV		0.61		1.71		4.41		5.83		4.4		7.37		8.5		9.23		7.07		2.53		1.16		-1.77		**51.05**
	1/10/2012	0.29	2/7/2012	0.07	3/9/2012	0.29	4/15/2012	0.06	5/6/2012	0.27	6/7/2012	0	7/2/2012	0.42	8/19/2012	0.46	9/14/2012	1.54	10/14/2012	0.53						
	1/25/2012	1.22	2/10/2012	0.13	3/10/2012	0.65			5/8/2012	0.83	6/8/2012	1.01	7/8/2012	0.26			9/15/2012	0.08	10/27/2012	0.11						
	1/26/2012	0.03	2/13/2012	0.41	3/11/2012	0.25			5/9/2012	0.7	6/18/2012	1.5	7/9/2012	0.48			9/16/2012	1.02								
			2/17/2012	0.31	3/19/2012	0.1			5/11/2012	2.15			7/10/2012	0.33			9/17/2012	0.6								
2012			2/18/2012	1.33	3/20/2012	2.84			5/12/2012	0.43			7/11/2012	0.1			9/29/2012	0.62								
			2/19/2012	0.31					5/15/2012	0.95			7/12/2012	0.59			9/30/2012	0.44								
			2/28/2012	0.07					5/16/2012	1.41			7/16/2012	0.07												
																									# of Days	**Total Inches**
# of Days	3		7		5		1		7		3		7		1		6		2		0		0		**42**	
Inches of Precip		1.54		2.63		4.13		0.06		6.74		2.51		2.25		0.46		4.3		0.64		0		0		**25.26**
Gross EV		2.37		2.35		4.1		5		5.23		6.46		6.74		7.57		5.78		3.78		3.58		2.54		**55.5**
Net EV		0.83		-0.28		-0.03		4.94		-1.51		3.95		4.49		7.11		1.48		3.14		3.58		2.54		**30.24**
	1/1/2013	0.15	2/10/2013	1.02	3/10/2013	1.01	4/1/2013	0.09	5/2/2013	0.72	6/2/2013	0.13	7/9/2013	0.1	8/16/2013	0.07	9/5/2013	0.11	10/13/2013	0.71	11/5/2013	0.07	12/21/2013	1.03		
	1/4/2013	0.19	2/12/2013	0.06	3/20/2013	0.65	4/3/2013	0.81	5/10/2013	1	6/18/2013	0.54	7/15/2013	1.6	8/27/2013	0.44	9/10/2013	0.23	10/14/2013	0.54	11/7/2013	0.19	12/22/2013	0.27		
	1/9/2013	2.78	2/21/2013	0.03			4/4/2013	0.29	5/15/2013	0.31	6/19/2013	0.22	7/17/2013	0.29			9/11/2013	0.1	10/16/2013	1.62	11/22/2013	0.3	12/27/2013	0.05		
	1/10/2013	0.15	2/25/2013	0.02			4/18/2013	0.12	5/25/2013	1.33			7/18/2013	0.21			9/17/2013	0.09	10/27/2013	1.42	11/24/2013	0.13				
2013							4/30/2013	0.81	5/26/2013	0.15			7/22/2013	0.16			9/21/2013	1.43	10/30/2013	0.08	11/25/2013	0.42				
									5/27/2013	0.01							9/29/2013	0.05								
																									# of Days	**Total Inches**
# of Days	4		4		2		5		6		3		5		2		6		5		5		3		**50**	
Inches of Precip		3.27		1.13		1.66		2.12		3.52		0.89		2.36		0.51		2.01		4.37		1.11		1.35		**24.3**
Gross EV		1.8		3.07		4.1		4.06		4.75		6.43		6.8		3.86		4.91		4.03		2.39		1.56		**47.76**
Net EV		-1.47		1.94		2.44		1.94		1.23		5.54		4.44		3.35		2.9		-0.34		1.28		0.21		**23.46**

US1TXGS0032 FREDERICKSBURG 12.2 NE, TX US **Station is located 16 miles north of Firefly and 13 miles north of Tiny Homes**

[Daily Summaries Station Details: FREDERICKSBURG 12.2 NE, TX US, GHCND:US1TXGS0032 | Climate Data Online (CDO) | National Climatic Data Center (NCDC) (noaa.gov)]

	Jan.	Precip	Feb.	Precip	March	Precip	April	Precip	May	Precip	June	Precip	July	Precip	August	Precip	Sept	Precip	Oct	Precip	Nov	Precip	Dec	Precip		
			2/27/2014	0.1			4/4/2014	0.04	5/9/2014	0.42	6/10/2014	0.58	7/16/2014	0.36	8/13/2014	0.48	9/4/2014	0.14	10/3/2014	0.24	11/5/2014	1.9	12/5/2014	0.03		
							4/22/2014	0.81	5/13/2014	2.4	6/13/2014	1.19	7/18/2014	0.27	8/19/2014	0.27	9/7/2014	0.66	10/11/2014	2.24	11/6/2014	0.96	12/23/2014	0.1		
									5/14/2014	0.52	6/15/2014	0.07	7/19/2014	0.07			9/8/2014	0.21	10/31/2014	0.12	11/23/2014	1.32	12/24/2014	0.08		
									5/25/2014	1.85	6/19/2014	0.13					9/13/2014	0.11								
2014									5/26/2014	1	6/21/2014	0.21					9/14/2014	0.13								
									5/27/2014	2.46							9/19/2014	0.08								
																	9/20/2014	2.52								
																									# of Days	**Total Inches**
# of Days	0		1		0		2		6		5		3		2		7		3		3		3		**35**	
Inches of Precip		0		0.1		0		0.85		8.65		2.18		0.7		0.75		3.85		2.6		4.18		0.21		**24.07**
Gross EV		2.06		2		3.66		4.97		6.34		5.61		8.84		7.61		5.24		4.56		2.54		1.49		**54.92**
Net EV		2.06		1.9		3.66		4.12		-2.31		3.43		8.14		6.86		1.39		1.96		-1.64		1.28		**30.85**
	1/2/2015	0.14	2/1/2015	0.25	3/1/2015	0.12	4/12/2015	0.09	5/6/2015	0.05	6/16/2015	0.63			8/1/2015	0.11	9/12/2015	0.11	10/23/2015	0.1	11/2/2015	0.02	12/13/2015	1.13		
	1/3/2015	0.38	2/25/2015	0.15	3/4/2015	0.06	4/18/2015	1.84	5/9/2015	0.53	6/17/2015	0.22			8/31/2015	0.95			10/24/2015	5.63	11/5/2015	0.12	12/27/2015	0.22		
	1/11/2015	0.43			3/5/2015	0.48	4/19/2015	1.54	5/12/2015	0.05	6/19/2015	0.59							10/25/2015	1.13	11/7/2015	1.13	12/28/2015	0.39		
	1/15/2015	0.14			3/9/2015	0.28	4/24/2015	0.45	5/13/2015	0.1	6/21/2015	0.09							10/26/2015	0.1	11/15/2015	0.26				
	1/22/2015	0.48			3/10/2015	0.29	4/27/2015	0.4	5/14/2015	1.2	6/22/2015	0.12							10/30/2015	0.42	11/17/2015	0.23				
	1/23/2015	1.13			3/21/2015	0.66	4/29/2015	0.02	5/15/2015	0.32	6/28/2015	0.08							10/31/2015	2.23	11/27/2015	0.22				
2015	1/24/2015	0.06			3/22/2015	0.14			5/17/2015	1.03	6/29/2015	0.07									11/28/2015	1.17				
					3/26/2015	0.02			5/21/2015	1.04											11/29/2015	0.13				
									5/23/2015	0.06																
									5/24/2015	1.13																
									5/26/2015	1.9																
									5/29/2015	1.61																
									5/30/2015	0.06															**# of Days**	**Total Inches**
# of Days	7		2		8		6		13		7		0		2		1		6		8		3		**63**	
Inches of Precip		2.76		0.4		2.05		4.34		9.08		1.8		0		1.06		0.11		9.61		3.28		1.74		**36.23**
Gross EV		1.34		1.5		2.35		3.62		3.42		5.04		6.98		5.49		5.92		4.53		2.07		2.15		**44.41**
Net EV		-1.42		1.1		0.3		-0.72		-5.66		3.24		6.98		4.43		5.81		-5.08		-1.21		0.41		**8.18**
	1/3/2016	0.45	2/23/2016	1.06	3/8/2016	0.13	4/1/2016	0.33	5/9/2016	0.05	6/1/2016	3.78	7/26/2016	1.54	8/13/2016	0.68	9/2/2016	0.13	10/8/2016	0.26	11/4/2016	1.2	12/3/2016	0.91		
	1/7/2016	0.11			3/9/2016	0.41	4/2/2016	0.15	5/16/2016	0.18	6/2/2016	1.15	7/28/2016	0.76	8/14/2016	0.21	9/3/2016	0.38			11/7/2016	1.8	12/4/2016	0.73		
					3/10/2016	0.35	4/13/2016	0.81	5/18/2016	1.49	6/3/2016	0.06			8/15/2016	1.07	9/11/2016	0.17			11/8/2016	0.78	12/5/2016	0.77		
					3/11/2016	2.09	4/14/2016	0.03	5/19/2016	1.57	6/29/2016	0.32			8/16/2016	0.45	9/25/2016	0.27			11/9/2016	0.93	12/23/2016	0.23		
					3/12/2016	0.46	4/17/2016	0.32	5/20/2016	0.31					8/17/2016	0.42	9/26/2016	1.31			11/10/2016	0.44				
2016					3/19/2016	0.05	4/18/2016	0.26	5/27/2016	0.35					8/18/2016	0.08	9/27/2016	1.33			11/23/2016	0.18				
							4/19/2016	0.47	5/29/2016	0.54					8/19/2016	0.81										
							4/20/2016	0.47	5/30/2016	0.58					8/20/2016	0.08										
							4/21/2016	1.25							8/21/2016	0.82										
							4/27/2016	0.47							8/22/2016	0.1										
															8/30/2016	0.38									**# of Days**	**Total Inches**
# of Days	2		1		6		10		8		4		2		11		6		1		6		4		**61**	
Inches of Precip		0.56		1.06		3.49		4.56		5.07		5.31		2.3		5.1		3.59		0.26		5.33		2.64		**39.27**
Gross EV		1.86		2.91		3.43		3.83		3.4		5.3		7.67		5.47		4.21		4.13		2.45		1.64		**46.3**
Net EV		1.3		1.85		-0.06		-0.73		-1.67		-0.01		5.37		0.37		0.62		3.87		-2.88		-1		**7.03**

US1TXGS0032 FREDERICKSBURG 12.2 NE, TX US **Station is located 16 miles north of Firefly and 13 miles north of Tiny Homes**

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	Jan.	Precip	Feb.	Precip	March	Precip	April	Precip	May	Precip	June	Precip	July	Precip	August	Precip	Sept	Precip	Oct	Precip	Nov	Precip	Dec	Precip		
	1/2/2017	0.21	2/14/2017	1.74	3/5/2017	0.47	4/2/2017	0.78	5/17/2017	0.18	6/1/2017	0.08	7/2/2017	0.26	8/3/2017	0.15	9/26/2017	0.6	10/4/2017	0.31	11/9/2017	0.33	12/6/2017	0.96		
	1/16/2017	0.75	2/20/2017	1.11	3/12/2017	0.12	4/11/2017	0.25	5/20/2017	1.4	6/3/2017	0.13	7/18/2017	0.73	8/7/2017	3.43	9/27/2017	0.29	10/22/2017	0.12	11/13/2017	0.11	12/7/2017	0.92		
	1/20/2017	0.23			3/29/2017	0.53	4/12/2017	0.19	5/22/2017	0.13	6/4/2017	0.57	7/24/2017	0.42	8/8/2017	0.34	9/28/2017	0.91					12/17/2017	0.13		
							4/18/2017	0.09	5/24/2017	0.1	6/5/2017	0.23			8/24/2017	0.1	9/29/2017	0.65					12/20/2017	0.13		
2017							4/30/2017	0.13	5/29/2017	0.59	6/6/2017	0.26			8/26/2017	0.03	9/30/2017	0.5					12/27/2017	0.12		
											6/25/2017	2.23			8/27/2017	1.13										
											6/26/2017	0.27			8/28/2017	0.18										
											6/27/2017	0.44														
											6/28/2017	0.26													**# of Days**	**Total Inches**
# of Days	3		2		3		5		5		9		3		7		5		2		2		5		**51**	
Inches of Precip		1.19		2.85		1.12		1.44		2.4		4.47		1.41		5.36		2.95		0.43		0.44		2.26		**26.32**
Gross EV		2.1		2.61		3.42		4.11		4.27		5.56		7.02		5.62		5.02		4.38		3.31		1.73		**49.15**
Net EV		0.91		-0.24		2.3		2.67		1.87		1.09		5.61		0.26		2.07		3.95		2.87		-0.53		**22.83**
			2/7/2018	0.18	3/1/2018	0.12	4/14/2018	0.46	5/4/2018	2.77	6/4/2018	0.47	7/5/2018	0.57	8/12/2018	1.43	9/4/2018	0.58	10/7/2018	0.09	11/1/2018	0.39	12/8/2018	2.24		
			2/21/2018	0.86	3/28/2018	0.87	4/21/2018	0.18	5/5/2018	0.69	6/5/2018	0.08	7/8/2018	0.43	8/13/2018	1.6	9/6/2018	1.27	10/9/2018	0.42	11/9/2018	0.24	12/14/2018	0.22		
			2/22/2018	0.57			4/26/2018	0.35	5/16/2018	0.54	6/19/2018	0.1	7/10/2018	0.19			9/8/2018	1.28	10/10/2018	0.52	11/12/2018	0.25	12/20/2018	0.13		
			2/23/2018	0.07					5/21/2018	0.34	6/20/2018	0.25	7/31/2018	0.06			9/9/2018	0.71	10/14/2018	0.24			12/26/2018	0.16		
											6/21/2018	0.12					9/10/2018	1.8	10/16/2018	6.31			12/27/2018	0.99		
2018																	9/12/2018	0.73	10/17/2018	0.82						
																	9/13/2018	0.23	10/19/2018	0.43						
																	9/15/2018	1.08	10/20/2018	0.3						
																	9/16/2018	0.86	10/25/2018	0.52						
																	9/17/2018	0.56								
																	9/22/2018	0.47								
																	9/24/2018	0.07							**# of Days**	**Total Inches**
# of Days	0		4		2		3		4		5		4		2		12		9		3		5		**53**	
Inches of Precip		0		1.68		0.99		0.99		4.34		1.02		1.25		3.03		9.64		9.65		0.88		3.74		**37.21**
Gross EV		1.87		1.63		3.44		4.47		5.18		6.7		7.55		7		3.34		2.4		2.19		1.86		**47.63**
Net EV		1.87		-0.05		2.45		3.48		0.84		5.68		6.3		3.97		-6.3		-7.25		1.31		-1.88		**10.42**
	1/3/2019	1.22	2/10/2019	0.48	3/1/2019	0.23	4/8/2019	0.41	5/1/2019	0.08	6/6/2019	0.46	7/11/2019	0.68	8/24/2019	0.19	9/1/2019	0.71	10/7/2019	0.14	11/8/2019	1.24	12/11/2019	0.22		
	1/12/2019	0.2			3/13/2019	0.93	4/14/2019	0.38	5/3/2019	0.38	6/10/2019	1.85	7/15/2019	0.44			9/2/2019	0.26	10/11/2019	0.39	11/12/2019	0.37	12/29/2019	0.1		
	1/27/2019	0.6					4/18/2019	0.81	5/4/2019	1.05	6/12/2019	0.1	7/23/2019	0.16			9/12/2019	0.63	10/13/2019	0.37	11/15/2019	0.05				
							4/24/2019	0.12	5/9/2019	2.05	6/17/2019	0.56					9/20/2019	0.88	10/21/2019	0.75						
2019							4/25/2019	1.16	5/10/2019	0.19	6/19/2019	0.11					9/29/2019	0.22	10/25/2019	0.35						
									5/11/2019	0.06	6/27/2019	0.44							10/30/2019	0.26						
									5/21/2019	0.22	6/30/2019	0.45							10/31/2019	0.15						
									5/30/2019	0.06															**# of Days**	**Total Inches**
# of Days	3		1		2		5		8		7		3		1		5		7		3		2		**47**	
Inches of Precip		2.02		0.48		1.16		2.88		4.09		3.97		1.28		0.19		2.7		2.41		1.66		0.32		**23.16**
Gross EV		1.8		1.77		2.91		4.01		3.5		5.24		6.52		7.06		6.18		4.24		1.95		1.8		**46.98**
Net EV		-0.22		1.29		1.75		1.13		-0.59		1.27		5.24		6.87		3.48		1.83		0.29		1.48		**23.82**
	1/11/2020	0.8	2/12/2020	1.53	3/4/2020	0.64	4/4/2020	1.14	5/13/2020	1.24	6/23/2020	0.32	7/27/2020	0.14	8/23/2020	0.1	9/5/2020	0.86	10/24/2020	0.04	11/29/2020	0.48	12/19/2020	0.38		
	1/17/2020	0.67	2/19/2020	0.42	3/5/2020	0.51	4/5/2020	0.52	5/16/2020	3.49			7/28/2020	0.24			9/6/2020	0.8	10/28/2020	0.28			12/31/2020	0.9		
	1/18/2020	0.22	2/20/2020	0.29	3/16/2020	0.31	4/12/2020	1.37	5/21/2020	0.52			7/29/2020	0.37			9/9/2020	2.18								
2020	1/22/2020	0.26			3/20/2020	0.59			5/25/2020	2.05							9/10/2020	1.8								
	1/28/2020	0.56			3/21/2020	0.24			5/26/2020	0.63							9/22/2020	0.23								
					3/22/2020	0.75			5/29/2020	0.14																
					3/31/2020	0.08																			**# of Days**	**Total Inches**
# of Days	5		3		7		3		6		1		3		1		5		2		1		2		**39**	
Inches of Precip		2.51		2.24		3.12		3.03		8.07		0.32		0.75		0.1		5.87		0.32		0.48		1.28		**28.09**
Gross EV		1.93		1.73		2.45		3.84		4.72		5.24		7.14		7.54		3.95		4.14		2.63		1.86		**47.17**
Net EV		-0.58		-0.51		-0.67		0.81		-3.35		4.92		6.39		7.44		-1.92		3.82		2.15		0.58		**19.08**

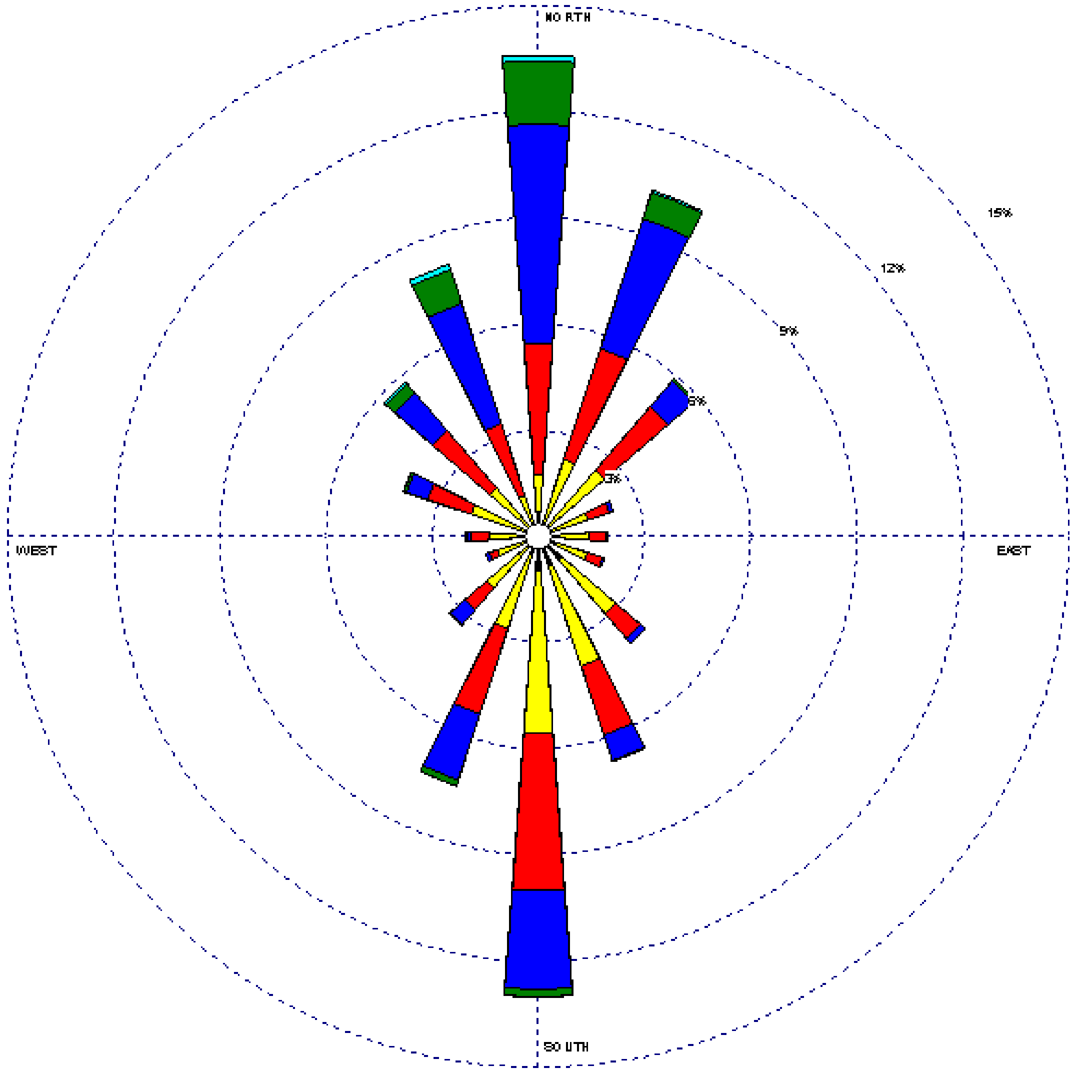
US1TXGS0032 FREDERICKSBURG 12.2 NE, TX US Station is located 16 miles north of Firefly and 13 miles north of Tiny Homes

Daily Summaries Station Details: FREDERICKSBURG 12.2 NE, TX US, GHCND:US1TXGS0032 | Climate Data Online (CDO) | National Climatic Data Center (NCDC) (noaa.gov)

	Jan.	Precip	Feb.	Precip	March	Precip	April	Precip	May	Precip	June	Precip	July	Precip	August	Precip	Sept	Precip	Oct	Precip	Nov	Precip	Dec	Precip		
	1/1/2021	0.42	2/5/2021	0.1	3/1/2021	0.15	4/3/2021	0.41	5/1/2021	1.25	6/1/2021	0.88	7/4/2021	0.28	8/2/2021	0.08	9/6/2021	0.01	10/1/2021	1.23	11/3/2021	0.92				
	1/11/2021	0.66			3/14/2021	0.12	4/4/2021	0.08	5/2/2021	2.26	6/3/2021	2.04	7/7/2021	1.9	8/3/2021	0.18	9/29/2021	0.89	10/11/2021	0.39	11/4/2021	0.79				
	1/21/2021	0.54			3/17/2021	0.24	4/16/2021	0.13	5/10/2021	1	6/4/2021	0.3	7/10/2021	0.75	8/6/2021	0.08			10/13/2021	0.8	11/27/2021	0.26				
2021					3/23/2021	0.89	4/29/2021	2.96	5/18/2021	0.86	6/7/2021	0.1	7/15/2021	0.43	8/16/2021	0.09			10/14/2021	0.86						
					3/25/2021	0.88			5/23/2021	1.39	6/8/2021	0.05	7/20/2021	0.75	8/18/2021	0.11			10/27/2021	0.42						
									5/24/2021	0.32	6/22/2021	1.37			8/27/2021	0.08										
									5/29/2021	0.5															**# of Days**	**Total Inches**
# of Days	3		1		5		4		7		6		5		6		2		5		3		0		**47**	
Inches of Precip		1.62		0.1		2.28		3.58		7.58		4.74		4.11		0.62		0.9		3.7		1.97		0		**31.2**
Gross EV		2.01		1.88		3.76		3.81		3.99		4.82		4.89		5.54		5.59		7.07		2.3		1.82		**47.48**
Net EV		0.39		1.78		1.48		0.23		-3.59		0.08		0.78		4.92		4.69		3.37		0.33		0		**14.46**
	1/12/2022	0.25	2/4/2022	0.2	3/30/2022	0.1	4/18/2022	0.2	5/6/2022	0.8	6/4/2022	0.34	7/15/2022	1.43	8/19/2022	0.89	9/1/2022	1.03	10/25/2022	0.2	11/8/2022	0.74	12/13/2022	0.12		
	1/31/2022	0.66					4/26/2022	0.58	5/22/2022	0.24					8/20/2022	0.86	9/3/2022	1.35	10/28/2022	0.54	11/12/2022	0.69	12/20/2022	0.31		
2022															8/23/2022	1.06	9/14/2022	0.18			11/20/2022	0.44				
																					11/25/2022	1.3				
																					11/26/2022	1.2			**# of Days**	**Total Inches**
# of Days	2		1		1		2		2		1		1		3		3		2		5		2		**25**	
Inches of Precip		0.91		0.2		0.1		0.78		1.04		0.34		1.43		2.81		2.56		0.74		4.37		0.43		**15.71**
Gross EV		1.96		1.89		4.96		4.66		5.83		7.12		8.48		6.26		5.3		4.35		2.46		1.45		**54.72**
Net EV		1.05		1.69		4.86		3.88		4.79		6.78		7.05		3.45		2.74		3.61		-1.91		1.02		**39.01**
	2.83		**2.42**		**3.50**		**4.00**		**6.25**		**4.33**		**3.00**		**3.17**		**5.08**		**3.75**		**3.58**		**3.08**		**45.00**	
Average	**Precip**	**1.66**		**1.27**		**1.99**		**2.44**		**4.98**		**2.67**		**2.17**		**2.24**		**3.36**		**3.27**		**2.01**		**1.54**		**29.58**
	Gross EV	**1.93**		**2.12**		**3.59**		**4.33**		**3.99**		**5.82**		**7.20**		**6.46**		**4.92**		**4.17**		**2.24**		**1.76**		**48.53**
	Net EV	**0.28**		**0.88**		**1.61**		**1.96**		**-0.27**		**3.38**		**5.56**		**4.29**		**1.90**		**1.13**		**0.58**		**0.18**		**21.49**

WIND ROSE PLOT

Station #13958 - AUSTIN/MUNICIPAL ARPT, TX



Wind Speed (m/s)	MODELER Sara West	DATE 8/29/2002	COMPANY NAME USDA-ARS
> 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80	DISPLAY Wind Speed	UNIT m/s	COMMENTS
	AVG. WIND SPEED 4.47 m/s	CALM WINDS 8.07%	
	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 1961 Dec 1 - Dec 31 Midnight - 11 PM	

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

reUse ENGINEERING

4411 SIH 35, Suite 100
Georgetown, TX 78626
TX Firm No. 21880

NRCS Natural Resources Conservation Service

https://www.wcc.nrcs.usda.gov/ftpref/downloads/climate/windrose/texas/

FIREFLY DEVELOPMENT
MECHANICAL EVAPORATION APPLICATION
GILLESPIE COUNTY, TEXAS

WIND ROSE

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 5, 2024

Kendall S. Longbotham, P.E.
reUse Engineering, LLC
4411 S Interstate 35, Ste 100
Georgetown, TX 78626

Re: FF Utility, LLC
Firefly WWTF
WWPR Log No. 0424/123
Gillespie County

Dear Ms. Longbotham:

Texas Commission on Environmental Quality (TCEQ) received the project summary transmittal letter dated February 28, 2024.

The rules which regulate the design, installation and testing of domestic wastewater projects are found in 30 TAC, Chapter 217, of the Texas Commission on Environmental Quality (TCEQ) rules titled, Design Criteria for Wastewater Systems.

The engineer submitted an engineering report to be reviewed as Innovative Technology for the Firefly Wastewater Treatment Facility (WWTF) project located in Gillespie County, Texas. The Firefly WWTF project consists of a 20,000 gpd Membrane Bioreactor (MBR) WWTF, Mechanical Evaporators as a means of wastewater disposal, and a 1,000 gpd On-site Sewage Facility System (OSSF) for the disposal of the concentrated effluent water produced by the proposed Mechanical Evaporators. The WWTF will also include an ultraviolet (UV) light disinfection system. The engineer indicates that the Firefly Community would also like to request an authorization under 30 TAC Chapter 210 for the use of Type I reclaimed water to be used for on-site irrigation. The Firefly WWTF project is proposed to support the development of a Recreational Vehicle Park located in Gillespie County.

TCEQ has completed the review of the submitted engineering report. Based on the results of our review:

- The MBR WWTF, as proposed, appears to meet the minimum requirements of 30 TAC Chapter 217: Design Criteria for Wastewater Systems.
- The use of mechanical evaporators as an alternative means of treated wastewater disposal may be approved (on a case-by-case basis) as an innovative technology under Chapter 217.7(b)(2).

- We will review the proposed 1,000 gpd OSSF system when we receive the submittal with the plans and specifications.

Thank you for submitting the above-mentioned engineering report. We look forward to receiving the plans and specifications for our review when the design project is finalized.

You must keep certain materials on file for the life of the project and provide them to TCEQ upon request. These materials include an engineering report, test results, a summary transmittal letter, and the final version of the project plans and specifications. These materials shall be prepared and sealed by a Professional Engineer licensed in the State of Texas and must show substantial compliance with Chapter 217. All plans and specifications must conform to any waste discharge requirements authorized in a permit by the TCEQ. Certain specific items which shall be addressed in the engineering report are discussed in §217.6(d). Additionally, the engineering report must include all constants, graphs, equations, and calculations needed to show substantial compliance with Chapter 217. The items which shall be included in the summary transmittal letter are addressed in §217.6(d)(1)-(9).

Please be reminded of 30 TAC §217.7(a) of the rules which states, "Approval given by the executive director or other authorized review authority does not relieve an owner of any liability or responsibility with respect to designing, constructing, or operating a collection system or treatment facility in accordance with applicable commission rules and the associated wastewater permit".

If you have any questions, or if we can be of any further assistance, please call me at (512) 239-4924.

Sincerely,

Baltazar Lucero-Ramirez, P.E.
Wastewater Permits Section (MC 148)
Water Quality Division
Texas Commission on Environmental Quality

BLR/

cc: TCEQ, Region 13 Office

INNOVATIVE TECHNOLOGY ENGINEERING REPORT: MECHANICAL EVAPORATORS

FIREFLY PARTNERS, LLC

FIREFLY INNOVATIVE TECHNOLOGY ENGINEERING REPORT

TO SUPPORT DISPOSAL FROM MBR WASTEWATER TREATMENT FACILITY

Project Entity: FireFly Partners, LLC

Location: 5386 FM 1376, Fredericksburg, Texas

County: Gillespie County, TX

PREPARED BY:
Kendall S. Longbotham, PE
reUse Engineering, Inc.

February 28, 2024

4411 S Interstate 35, Ste 100
Georgetown, Texas 78626

REUSE ENGINEERING TBPE F-21880
STATE OF TEXAS
KENDALL S. LONGBOTHAM
138920
LICENSED
PROFESSIONAL ENGINEER
02/28/2024

Kendall Longbotham

reUse ENGINEERING
TX Firm No. 21880

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February 28, 2024

Mr. Louis C. Herrin III, P.E.
TCEQ - MC 148
P.O. Box 13087
Austin, Texas 78711-3087

Re: Innovative Technology Engineering Report – Mechanical Evaporators

Permittee:	FF Utility, LLC
Project Name:	Firefly WWTF
County:	Gillespie County
Engineer(s):	reUse Engineering, LLC / TBPE# F-21880 Ms. Kendall S. Longbotham, PE 4411 S Interstate 35, Ste 100 Georgetown, TX 78626 (512) 755-9943 / kendall@reuseeng.com

Dear Mr. Herrin:

We respectfully submit the attached Engineering Report to be reviewed as Innovative Technology for a project located in Gillespie County, Texas. The Engineering Report includes the proposed Mechanical Evaporators as a means of wastewater effluent disposal for the proposed project site.

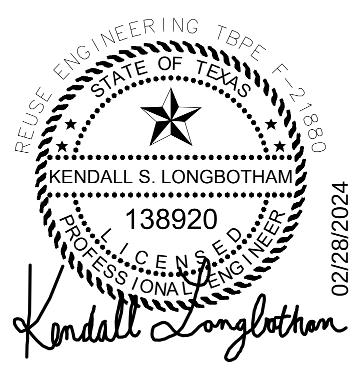
The attached Engineering Report includes specifications for the proposed Mechanical Evaporators, as well as the proposed wastewater treatment plant and appropriate wastewater influent and effluent characteristics.

Should you have any questions, please do not hesitate to reach out to me via phone or email.

Sincerely,

Kendall Longbotham

Kendall S. Longbotham, PE
reUse Engineering, LLC



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Executive Summary

The Firefly Community is a new development that will require a Wastewater Treatment Facility (WWTF), as well as a means of disposal for the wastewater effluent produced at the WWTF. The Firefly WWTF consists of a Recreational Vehicle Park located in Gillespie County, Texas and will include a 20,000 gallon per day (gpd) WWTF. A Membrane Bioreactor (MBR) WWTF is proposed to treat the 20,000 gpd produced at the Firefly project site.

Due to site constraints, neither a Texas Pollutant Discharge Elimination System (TPDES) Permit nor a Texas Land Application Permit (TLAP) is feasible for this community. Mechanical Evaporators are proposed as the primary means of wastewater effluent disposal for the Firefly project site. The Firefly Community would also request authorization under 30 TAC Chapter 210 for the use of Type I Reclaimed Water in order for some of the wastewater effluent to be used for on-site irrigation.

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General Site Information

The Firefly development is located in Gillespie County, Texas, approximately 0.45 miles southeast of the community of Luckenbach, Texas. The site is currently undeveloped farmland, with construction projected to start in Calendar Year 2024. The proposed development will be an addition to the neighboring development (also owned by Firefly), which includes Tiny Home units as well as RV spaces. This report pertains solely to the new addition, which is comprised of 26.8 acres that will be developed and utilized for RV spaces.

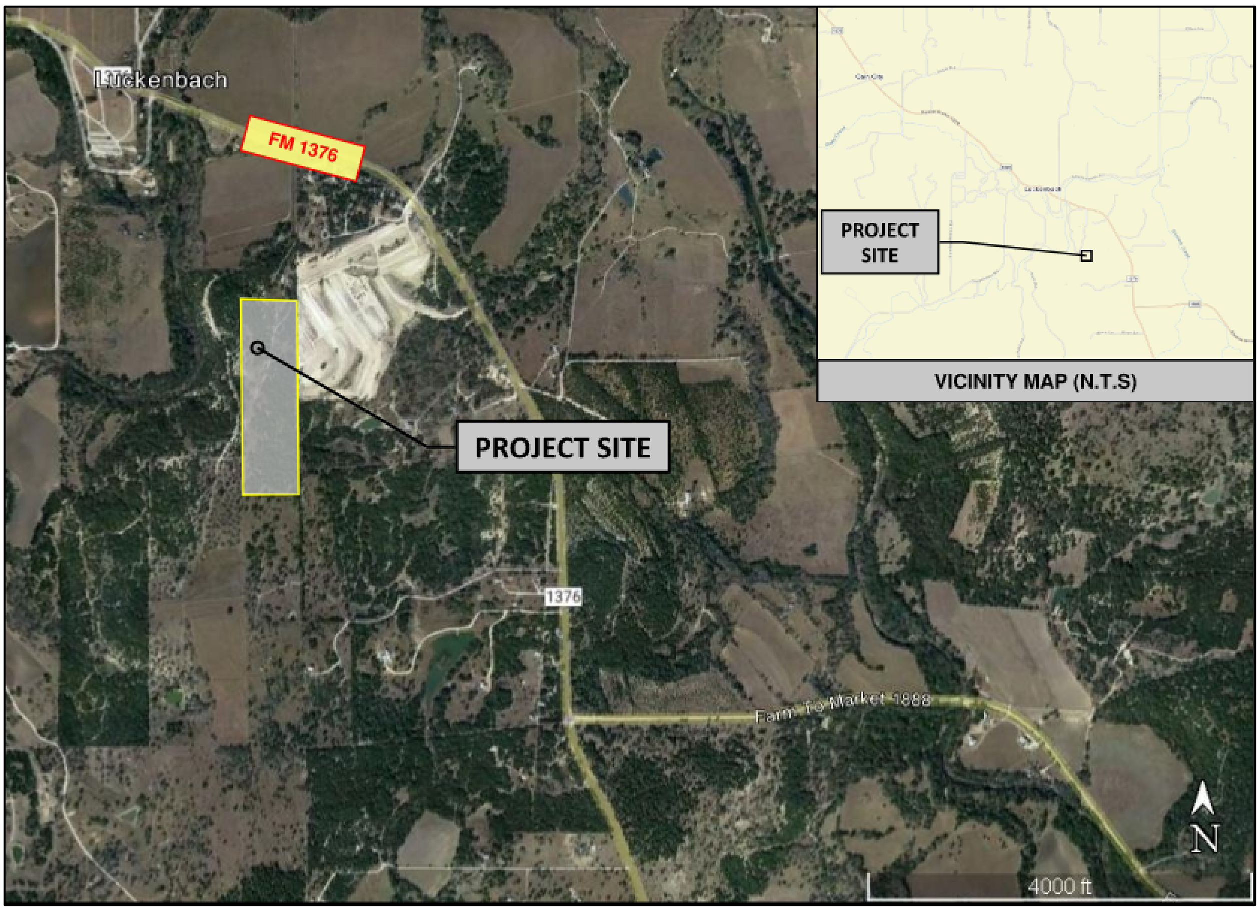

Figure 1. Site Location Map

Proposed MBR WWTF

General MBR Process Overview

The Firefly WWTF will be comprised of four main components: the Influent Lift Station, the Membrane Bioreactor, a screw type Sludge Press, and a backup generator. The WWTF will be designed to treat a daily average flow of 20,000 gpd of high-strength domestic waste from a recreational vehicle park and shall meet or exceed effluent standards typical for Type I Reclaimed Water, which is acceptable for public contact purposes. The 20,000 gpd MBR WWTF will also include an ultraviolet (UV) light disinfection system.

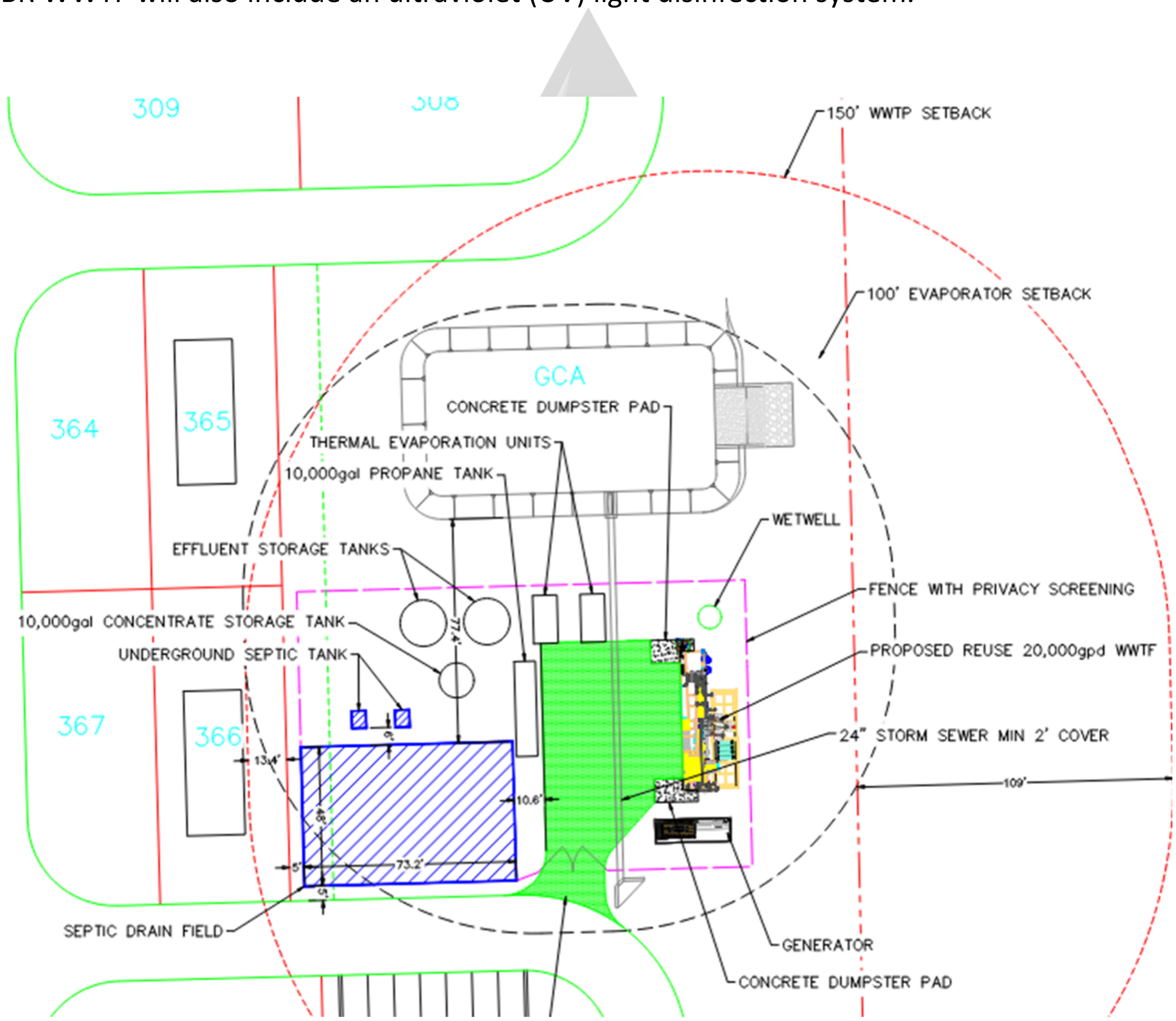

Figure 2. Firefly WWTF Layout

The MBR wastewater process starts with the raw wastewater flowing into the influent lift station via gravity. The wastewater is then pumped through a Contec Rotary Drum fine screen prior to entering the treatment process.

A Biological Nutrient Removal (BNR) treatment system with MBRs will be provided utilizing concrete tank configuration, as well as skid-mounted equipment housing. The biological treatment system will consist of plug-flow anoxic, aerobic bioreactors, and MBRs. Anoxic bioreactors will remove nitrates and nitrites while recovering alkalinity through de-nitrification. Aerobic bioreactors will remove soluble organics and ammonia originally present in wastewater. The MBRs will serve as the physical separators and secondary clarifiers while providing the anoxic bioreactors with highly concentrated nitrified mixed liquor (ML). A portion of this concentrated mixed liquor will be wasted as waste activated sludge (WAS).

The membranes provide a high-quality effluent (permeate) that is low in suspended solids. The proposed membrane system is the MaxFlow Rigid-Plate Ultrafiltration Membrane Modules, manufactured by A-3 USA, Inc. in the United States. The permeate will be disinfected by an ultraviolet light system and then pumped directly to the two 30,000-gallon storage tanks. The WAS will be pumped from the MBRs to a Screw Press for processing, and the resulting dry cake will be hauled to a local landfill for final disposal of solids.

Chemical feed pumps and storage totes will be provided for sodium hydroxide (caustic soda for alkalinity), alum feed system (precipitation), and Micro-C (denitrification). Citric acid and/or sodium hypochlorite will be used for cleaning the membranes.

The process calculations for the WWTF are included in Appendix A.

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Expected Influent and Effluent Characteristics

The basis for the Firefly WWTF influent and effluent limits by design are shown in Figure 3. The influent and effluent limits are based on a 20,000 gpd treatment calculation.

Influent Charateristics	Symbol	Value	Units
NO_3	$N_{NO3,i}$	0.0	mg/l
NH_4	$N_{a,i}$	35.0	mg/l
TKN	$N_{TKN,i}$	50.0	mg/l
TP	P_i	8.0	mg/l
Dissolved Oxygen	$S_{O2,i}$	0.0	mg/l
FSA fraction	$f_{a/TKN,i}$	0.7	-
Fixed (inorganic) suspended solids	$X_{FSS,i}$	47.5	mgISS/l
TSS concentration	$S_{TSS,i}$	300.0	mgTSS/l
Total BOD mass	$FS_{BOD,i}$	26.5	kgBOD/d
Total COD mass	$FS_{COD,i}$	45.4	kgCOD/d
Total NH_4 mass	$FS_{a,i}$	2.6	kgNH_4/d
Total TKN mass	$FS_{TKN,i}$	3.8	kgTKN/d
Total P mass	$FS_{P,i}$	0.6	kgP/d

Effluent Characteristics	Symbol	Value	Units
Waste Sludge	FX_t	29	lb/d
Waste Sludge	Q_w	453	gpd
Effluent BOD	$S_{BOD,e}$	< 3	mgBOD/l
Effluent COD	$S_{COD,e}$	36	mgCOD/l
Effluent TSS	$S_{TSS,e}$	1.0	mgTSS/l
Effluent P	P_e	0.4	mgP/l
Effluent NH_4	$N_{a,e}$	0.3	mgN/l
Effluent NO_3	$N_{NO3,e}$	0.0	mgN/l
Effluent TN (N_{ne} + N_{te})	$N_{t,e}$	1.8	mgN/l

Figure 3. Influent and Effluent Limits for Firefly WWTF.

Per 30 TAC §217.32 Table B.1. Design Organic Loadings and Flows for a New WWTF,
Firefly WWTF was designed based on Transient Trailer Park flow of 50 gpd/person with a maximum of 2.5 individuals per trailer. RV Spaces will not be occupied 24/7/365, as the development is primarily intended for temporary tourist stays. Additionally, the local Water Control District has restricted water supply permits to 41 gpd/person, and all lots and common areas are required to use xeriscaping. Assuming that each Living Unit Equivalent (LUE) may be

occupied by 2.5 persons, max (per 30 TAC §217.32 Table B.1) yields a design flow of approximately 125 gpd/LUE. Firefly will have a maximum of 145 LUEs (RV Spaces). When the development is fully occupied, the projected flow is 18,125 gpd; thus, a 20,000 gpd WWTF is more than sufficient to handle the flows at this site.

MBR Process Description and Details

The Biological treatment system design will be based on an average daily flow of 0.02 MGD. The process summary shows the proposed configuration of the biological treatment system, see the design calculations located in Appendix A. As illustrated, the anoxic and aerobic basins are divided into separate zones to maximize treatment efficiency. The effluent from the inlet screens will flow into a degassing zone within the anoxic basin, where the conversion of nitrates and nitrites to nitrogen gas will occur. The aerobic basin will provide oxidation of carbonaceous 5-day biochemical oxygen demand (CBODs) and NH4. The MBR basin will provide liquid-solid total suspended solids (TSS) separation through the MaxFlow rigid-plate membrane – the Permeate – which is then disinfected through a UV light system and then pumped to the two 30,000-gallon storage tanks. Finally, a portion of the mixed liquor will discharge as WAS to the screw press, while the remainder will be recycled back to the degassing zone within the anoxic basin.

The MBR has been designed based on the BNR treatment concept to meet the effluent requirements for Type I Reclaimed water quality. Process simulator software was used to model this concept and to size the bioreactor’s basins accordingly. The modeling software simulates the entire activated sludge process, including biological and chemical phosphorus removal, and complete bio-solids handling processes, plant recycle streams and a mass balance for the entire WWTF.

The design wastewater flow and treatment process design criteria presented in this section are the inputs of the flows and liquid/solids mass balance. The flow and liquids/solids mass balance have been prepared for the entire facility and includes the headworks, basins, membranes, and disinfection. Flows recycled to the plant headworks or any other treatment units have been considered in the flow and liquid/solids mass balance.

Anoxic Zone

The influent will flow into the degassing zone of the Anoxic basin from the rotary drum fine screen, where it will blend with the Mixed Liquor Recycle (ML) coming from the downstream Membrane basin (600 percent of influent flow each) which will provide an environment in which nitrates and nitrites are reduced to nitrogen gas. In the absence of oxygen in the Anoxic basin, bacteria utilize nitrate and nitrite as the electron receptor, reducing the nitrate and nitrite to form nitrogen gas which is then released from the system into the atmosphere.

Anoxic bioreactors offer several process advantages in addition to nitrogen removal. Approximately 40 percent of the alkalinity consumed in the nitrification process that produces the nitrates and nitrites in aerobic bioreactors is recovered by the de-nitrification process occurring in the anoxic bioreactors. This recovery will reduce chemical costs for additional alkalinity.

The contents of the Anoxic basin will be homogenized using submersible mixers. The action of the mixer may also blend Micro-C, which can be fed directly to Anoxic basin during winter months, if needed, as an additional carbon source.

The Anoxic basin has a volume of 3,959 gallons and shall maintain a MLSS of approximately 7,641 milligram per Liter (mg/L), per treatment train. Contents of the Anoxic basin will flow by gravity to the Aerobic basin at a rate of 83 gpm per treatment train.

Aerobic Zone

The Aerobic basin will provide for nitrification and carbon oxidation. The bottom of the aerobic bioreactor will be equipped with fine-bubble membrane diffuser grids. The process air will be supplied by tri-lobe blowers installed on the WWTF skid. There will be one aerobic blower and one swing spare blower serving both the Aerobic and Membrane concrete basins.

Air supply to the Aerobic basin can be automatically controlled and adjusted over a range of operating conditions at different flow rates to maintain an average dissolved oxygen (DO) concentration of 2 mg/L throughout the aerobic bioreactors. The DO concentration will be monitored with DO probes installed strategically throughout the bioreactors. The DO levels indicated by the probes will be used for automatic control of the blowers via variable frequency drives (VFDs) driving the blower motors.

The Aerobic basin has a volume of 4,751 gallons and shall maintain an MLSS of approximately 7,641 mg/L per treatment train. Contents of the Aerobic basin will flow by gravity to the MBR basin at a rate of 83 gpm per treatment train.

Membrane Zone

In general, MBRs combine conventional activated sludge treatment processes with membrane filtration and provide an advanced level of treatment. The benefits of MBR treatment systems include exceptional effluent quality for reclaimed water, automated operation, and a compact plant footprint. The mixed liquor concentration in an MBR can be increased to much higher levels than the conventional activated sludge system for fast and efficient operation, as these systems are not limited by gravity settling. Therefore, MBR treatment systems eliminate the need of secondary clarifications and filtration processes and reduce the process tankage required, as well as allowing for easy future upgrades and expansions.

An MBR system consists of immersed membrane sheets assembled in modules and racks in tanks with piping, permeate pumps, air scour blowers, a membrane cleaning mechanism, and a programmable logic controller. The mixed liquor from the upstream process will gravity flow to the Membrane basin and then filter by drawing it through the membrane surface under a vacuum produced by the permeate pumps.

The concentrated mixed liquor (MLSS) from the Membrane basin will be pumped to the degassing zone of the Anoxic basin at the rate of 6 times the average daily flow (6Q). Effluent will be extracted from the Membrane basin through the MaxFlow membranes via permeate pumps, passed through the proposed ultraviolet disinfection system, and discharged into the receiving stream.

The Membrane basin has a volume of 3,959 gallons and shall maintain a MLSS of approximately 9,258 mg/L, per treatment train. The system will utilize six U70 membrane modules in a double-stack configuration, per treatment train. The average flux rate, excluding rest cycles, will be 3.5 gallons per day per square foot (gfd) with a peak flux rate of 14.1 gfd.

Proposed Mechanical Evaporators

Due to multiple site constraints, normal discharge routes that are regulated under a TPDES permit or a TLAP permit are not feasible for the Firefly WWTF. Mechanical Evaporators are proposed as an alternative solution to remove the wastewater effluent from the site. Mechanical evaporators have been deemed most feasible for the Firefly site due to the amount of space needed, as well as the low overall flow volume the site will produce.

The Firefly development proposes to use two Encon Thermal Evaporators (Encon), model number P33V4-438. Two units will ensure that the wastewater effluent is able to be efficiently evaporated on days when the wastewater effluent cannot be used to irrigate, or there is excess effluent due to peak flows. Treated effluent will flow into two 30,000-gallon storage tanks before either being used for on-site irrigation (Type I Reclaimed water use), or being evaporated through the mechanical evaporators. The two 30,000-gallon storage tanks allow for a 3-day storage volume in the event there are multiple days in which effluent cannot be evaporated or used for on-site irrigation.

Information provided by Encon indicates that their equipment operating in Texas is used for applications that include:

- Reverse Osmosis (RO) reject: RO may be used to generate clean water for a manufacturing process, or it may be used to filter dirty process water prior to disposal. Regardless of the use for the permeate, facilities evaporate the effluent because of regulatory issues – Pubically Operated Treatment Work (POTW) cannot accept due to what is in the waste stream, or hauling/disposal costs are too high. The contents of the effluent depend on the source of the water.

- Metal finishing operations: Some typical sources of wastewater include spent CNC coolant, parts washing, vibratory and floor scrubber wastewater. Off-site hauling is often the easiest choice, but disposal costs tend to be high, especially when you consider 70-99% of what you are paying to dispose of is just water.

- Compressor condensate, boiler blow down and cooling towers are a few more applications that are fairly “clean” to start with (over 99% water). Usually, these waste streams are sent to POTW for disposal but in cases where the site is not connected to a POTW and the only option is hauling, that’s where evaporation is justified.

The mechanical evaporator works by bringing the wastewater effluent to a boil inside the evaporator, and then activating burners to fire into the combustion area of the unit’s heat exchanger. The resultant gases travel around the vertical tubes inside the heat exchanger until they reach the insulated chimney outside of the unit's evaporator tank. The gases are then pulled back into the evaporator above the liquid level and drawn across the water's surface by the exhaust blower. The exhaust blower pulls the water vapor and flue gases through the mist eliminator and pushes them through the stack out to the atmosphere. A further process description can be found in the specifications for the evaporator, located in Appendix B. A general process flow diagram of the mechanical evaporators are shown in Figure 3 below.

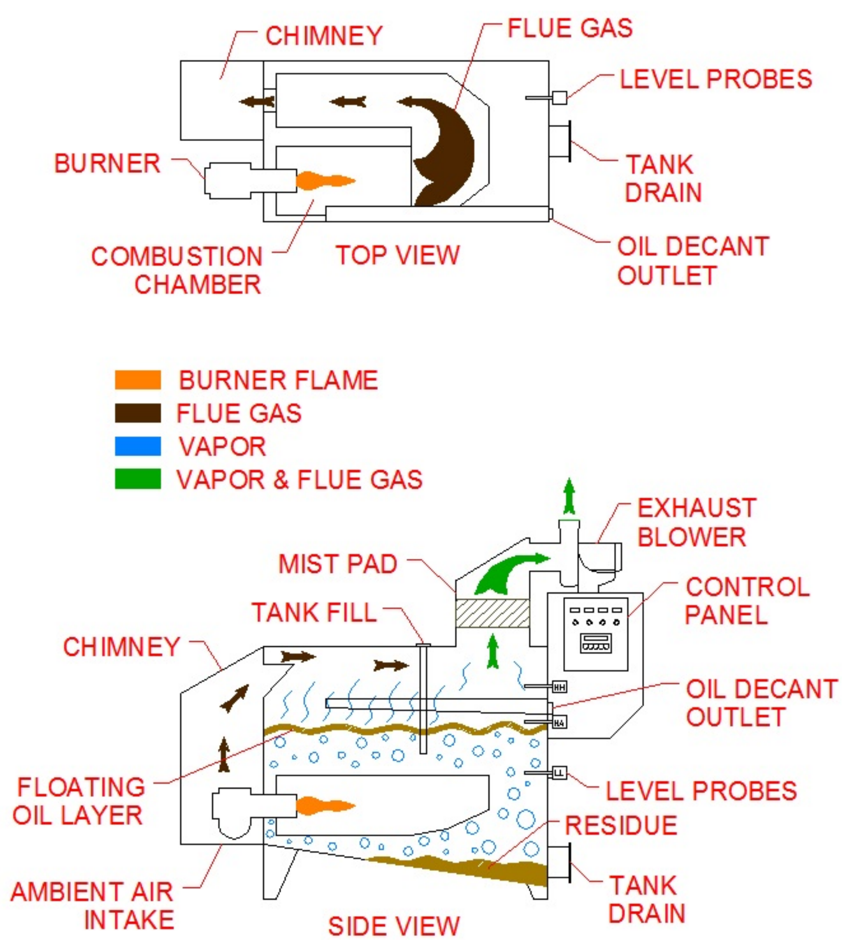

Figure 3. Mechanical Evaporator Process Flow Diagram

The mechanical evaporators will be powered by propane, as natural gas is not available on site. A 10,000-gal propane tank will also be located at the Firefly WWTF site to ensure there is a 5-day storage volume of propane to operate the mechanical evaporators.

The reUse team has been in contact with the Air Permitting department of the TCEQ. Pursuant to these discussions/communications, reUse is working with TCEQ to determine if an air discharge permit, via TCEQ's Permit By Rule (PBR), is needed. Per TCEQ's request a sample of treated wastewater from an operating MBR facility in Texas was collected and analyzed to assess potential air emission concentrations and rates. The treated wastewater sample was analyzed for constituents of concern including a suite (65) of volatile organic compounds (VOCs) and seven additional TCEQ specified constituents of concern (acetaldehyde, acetonitrile, ethylene glycol, formaldehyde, methanol, hydrogen sulfide, and ammonia-nitrogen).

The sample of treated domestic wastewater was obtained from an operating MBR facility located southwest of San Antonio, Texas on January 18, 2024, and delivered to Eurofins San Antonio office for subsequent laboratory analysis. The operating WWTF from which the sample was obtained uses chlorination for disinfection versus UV that will be used at the Firefly site. The laboratory report of analysis is included as Appendix C. Laboratory analysis of the treated domestic wastewater did not detect constituents of concern above their respective method detection limits excluding chloroform, which was reported at a concentration of 0.00143 mg/L.

The laboratory report of analysis was forwarded to TCEQ air permitting staff on February 7, 2024. TCEQ staff are evaluating the evaporators to determine if an air quality permit is needed.

A sample of the above referenced WWTF treated effluent was also forwarded to Encon for laboratory analysis. Encon analyzed the sample to "simulate the effects of boiling" treated domestic wastewater "to anticipate the effectiveness and expected reduction percentage" of evaporation. Encon prepared a report on the effectiveness of their units in evaporating the wastewater, which is included in Appendix B. As previously referenced, the WWTF from which the sample was obtained uses chlorination; thus, pre-chlorine and post-chlorine samples were collected/analyzed. As noted in the report, evaporation of the water:

- did not significantly change the pH of the wastewater;
- volume of the wastewater decreased by 98 to 99%;
- concentration of chloride increased significantly (450 to 45,000 mg/L);
- noticeable foaming was observed resulting in the recommendation of adding an anti-foaming agent; and
- proposed evaporation should be terminated at 95% to reduce the potential of chloride concentrations impacting the integrity of the evaporators.

Subsequent discussions with Encon indicate that if evaporation were terminated at 95% then approximately 90,000 gallons of chloride concentrated (~20,000 mg/L) residue (water) would be generated per year if the evaporators were operated 90 days per year.

Due to the need to dispose of the concentrated residue from the evaporators, an On-Site Sewage Facility System (OSSF) is proposed. A 1,000 gallon per day OSSF system, comprised of septic tanks and an adsorptive drainfield, is proposed to handle the residue water from the mechanical evaporators on the days that the proposed mechanical evaporators are in operation. At a 95% volume reduction, approximately 1,000 gallons per day would need to be disposed of. An OSSF system is the most feasible option to dispose of the residue water created at the Firefly site. The proposed OSSF system is shown in Figure 2 of this report. The OSSF system would consist of 2 – 1,500 gallon septic tanks, and an adsorptive drainfield that is approximately 48-feet long, and 73.2 feet wide with 167 leach chambers. reUse requests that the proposed OSSF system be reviewed and approved with the proposed Mechanical Evaporators and the MBR WWTP.

Upon approval of this engineering report, plans and specifications for the proposed MBR WWTP, Mechanical Evaporators, and OSSF system will be submitted to TCEQ for review and approval.

Climate Data

The climate for this region is humid and subtropical, with average annual maximum temperatures reaching 95.2°F (Texas A&M AgriLife Extension, 2024). Average evaporation rates range from 2.42 to 7.31 inches, with average relative humidity of 79.8%. Large evaporation basins are not ideal for this site, as the climate is not arid enough to facilitate efficient evaporation. There are also space constraints for such a small development. Thus, mechanical evaporation is proposed as the primary disposal method for treated effluent.

This site also proposes to dispose of treated effluent through irrigation via 210 Beneficial Reuse. Rainfall data can be used to estimate the number of days mechanical evaporation would be required, in the case that the site could not be irrigated. This area receives highest rainfall in the month of May (Texas A&M AgriLife Extension), with an average rainfall of 3.99 inches (see Tables in Appendix C). Further review of data obtained from the National Centers For Environmental Information (www.ncdc.noaa.gov) and Texas Water Development Board's (www.waterdatafortexas.org) websites indicates, via Rainfall Station US1TXGS0032 which is located 16 miles north of the site, that from January 9, 2011 through the end of 2022 the area received measured precipitation 45 days per year measuring 29.58 inches (see Tables in Appendix C). Conservatively, the number of days that the mechanical evaporation might be required to operate during the year would be 90 days.

When the treated effluent is evaporated in the mechanical evaporators, it becomes vapor. Wind Roses published for this area show strong preference for north and south direction of headwinds, with the majority of winds blowing from the South the majority of the year (Natural Resources Conservation Service). This provides an idea of where the vapor may travel once it is released into the atmosphere. A Wind Rose for this region is included in Appendix D.

Conclusions

Mechanical evaporators are proposed to be used in place of technology currently approved under TPDES and TLAP permits to properly dispose of the treated wastewater effluent that will be produced at the Firefly site. Development constraints do not allow for typical evaporation methods due to the lack of space the site can provide as well as unsuitable climate conditions for typical methods under a TLAP permit. Mechanical evaporators offer an economical solution to dispose of the treated effluent from the Firefly WWTF.

The Firefly site will be equipped with an MBR WWTF to treat the wastewater effluent to a Type I Reclaimed water standard, two 30,000-gallon storage tanks, one 10,000-gallon propane tank, two mechanical evaporators, a 10,000-gallon residue water storage tank, and a 1,000 gallon per day OSSF system. The mechanical evaporators are an innovative technology that is recommended to be the wastewater effluent disposal solution for the Firefly site. In addition to the mechanical evaporators, a Type I Reclaimed Water permit under TCEQ Chapter 210 is also recommended for the Firefly site. The combination of the mechanical evaporators being the primary means of effluent disposal, along with a Type I Reclaimed water authorization for irrigation on site, is the most feasible and economical solution for the effluent disposal based on the characteristics of the Firefly site.

Upon approval of this Engineering Report, any additional permits will be applied for, and plans and specifications for the MBR WWTP, Mechanical Evaporators, and OSSF system will be submitted to TCEQ for review and approval.

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TX PE Firm 21880

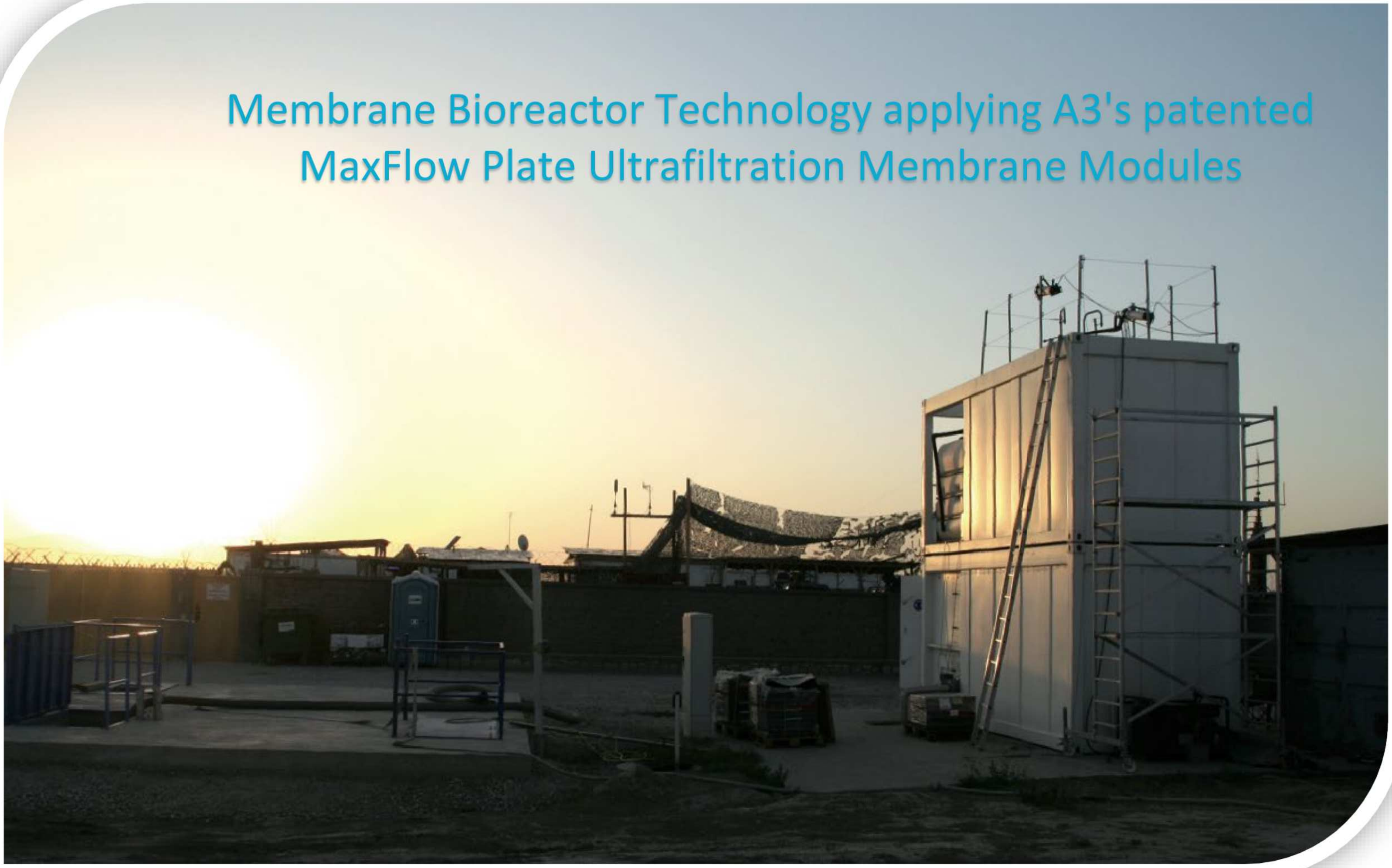
APPENDIX A

MBR WWTF Design Calculations

MODERN WASTEWATER SOLUTIONS

Budget Proposal # 948

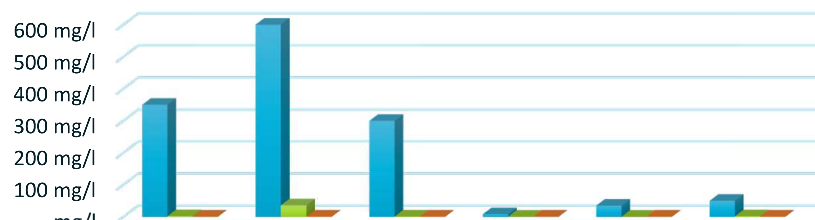
Membrane Bioreactor Technology applying A3's patented MaxFlow Plate Ultrafiltration Membrane Modules



A3-USA, Inc 1674 Fountaintown Road Chinquapin, NC 28521

Process Summary

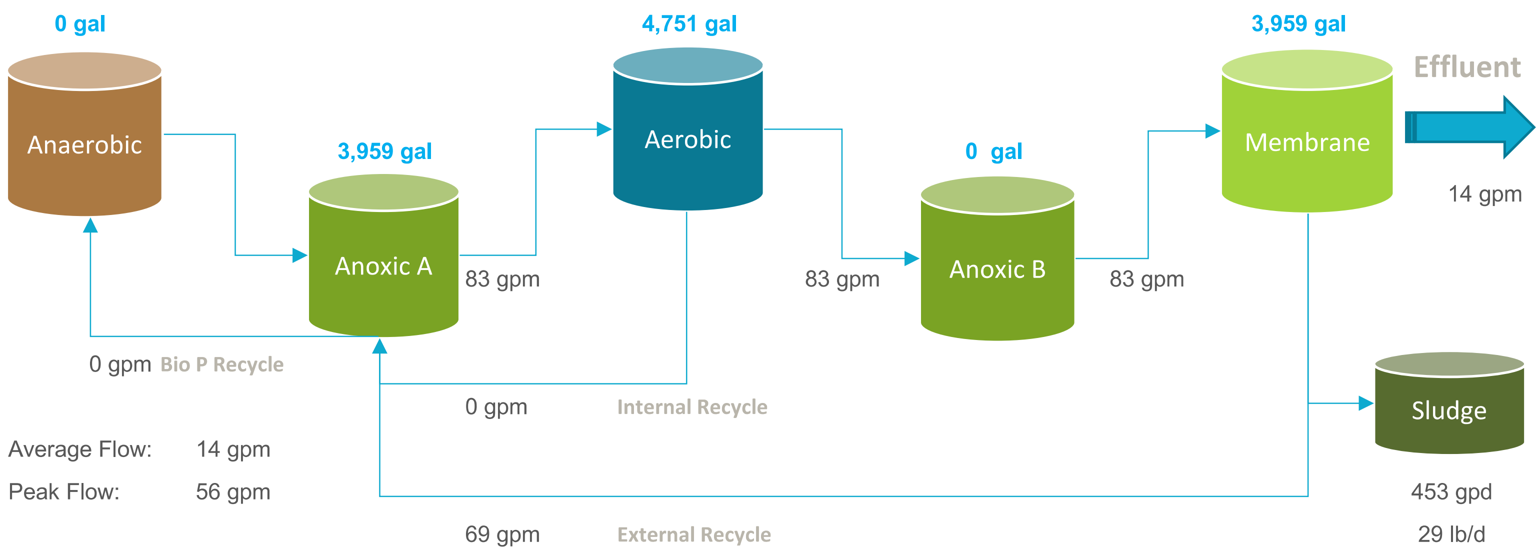
Influent & Effluent Parameters



	BOD	COD	TSS	P	NH4	TN
Influent	350 mg/l	600 mg/l	300 mg/l	8 mg/l	35 mg/l	50 mg/l
Effluent	2.0 mg/l	36.0 mg/l	1.0 mg/l	0.4 mg/l	0.3 mg/l	1.8 mg/l
Removal	99.4%	94.0%	99.7%	95.0%	99.1%	96.4%

PROCESS PARAMETERS

Sludge Age	25 d
Total Reactor Volume	12,668 gal
Total SOR	85 kgO2/d
MLSS in Anoxic / Aerobic Tank	7,641 mg/l
MLSS in Membrane Tank	9,258 mg/l
HRT	15 h
F/M RATIO (BOD)	0.080
F/M RATIO (COD)	0.137
Total Membrane Surface	5,667 sf



Average Flow: 14 gpm

Peak Flow: 56 gpm

Aeration	Flow	Pressure
EQ	0 scfm	0.0 psi
Sludge	0 scfm	0.0 psi
Aerobic	59 scfm	4.5 psi
Membrane	190 scfm	4.5 psi

Applied Options:

NO DAF

NO RO

5/23/2023

Biological Process Calculation

Influent Charateristics

Influent Charateristics	Symbol	Value	Units
Type of wastewater		municipal	
Temperature	T	15	^oC
pH	-	7.0	-
H_2CO_3 alkalinity	Alk_i	300	mg/l as $CaCO_3$
Site pressure / elevation	$p_{a,i}$	14.5	psi
Average daily flow	Q_i	20,000	gpd
Peak daily flow	$Q_{i, max,d}$	50,000	gpd
Hourly peak flow	$Q_{i, max,p}$	56	gpm
Peak factor	-	4.0	-
Average daily flow	Q_i	76	m^3/d
Max. monthly average daily flow	$Q_{i, max,d}$	189	m^3/d
Hourly peak flow	$Q_{i, max,h}$	12.6	m^3/h
Total BOD	$S_{BOD,i}$	350	mgBOD/l
Total COD	$S_{COD,i}$	600	mgCOD/l
COD/BOD ratio	-	1.71	-
Rapidly biodegradable COD	$S_{s,i}$	150	mgCOD/l
Volitale fatty acids (VFA)	$S_{VFA,i}$	23	mgCOD/l
Fermentable COD	$S_{F,i}$	127	mgCOD/l
Slowly biodegradable COD	$S_{ss,i}$	324	mgCOD/l
Biodegradable COD	$S_{bio,i}$	474	mgCOD/l
Soluble inert COD	$S_{SIN,i}$	36	mgCOD/l
Particulate inert COD	$S_{PIN,i}$	90	mgCOD/l

Influent Charateristics

Influent Charateristics	Symbol	Value	Units
NO_3	$N_{NO3,i}$	0.0	mg/l
NH_4	$N_{a,i}$	35.0	mg/l
TKN	$N_{TKN,i}$	50.0	mg/l
TP	P_i	8.0	mg/l
Dissolved Oxygen	$S_{O2,i}$	0.0	mg/l
FSA fraction	$f_{a/TKN,i}$	0.7	-
Fixed (inorganic) suspended solids	$X_{FSS,i}$	47.5	mgISS/l
TSS concentration	$S_{TSS,i}$	300.0	mgTSS/l
Total BOD mass	$FS_{BOD,i}$	26.5	kgBOD/d
Total COD mass	$FS_{COD,i}$	45.4	kgCOD/d
Total NH_4 mass	$FS_{a,i}$	2.6	$kgNH_4/d$
Total TKN mass	$FS_{TKN,i}$	3.8	kgTKN/d
Total P mass	$FS_{P,i}$	0.6	kgP/d

Effluent Characteristics

Effluent Characteristics	Symbol	Value	Units
Waste Sludge	FX_t	29	lb/d
Waste Sludge	Q_w	453	gpd
Effluent BOD	$S_{BOD,e}$	< 3	mgBOD/l
Effluent COD	$S_{COD,e}$	36	mgCOD/l
Effluent TSS	$S_{TSS,e}$	1.0	mgTSS/l
Effluent P	P_e	0.4	mgP/l
Effluent NH_4	$N_{a,e}$	0.3	mgN/l
Effluent NO_3	$N_{NO3,e}$	0.0	mgN/l
Effluent TN (N_{ne} + N_{te})	$N_{t,e}$	1.8	mgN/l

Bioreactor Characteristics	Symbol	Value	Units
Temperature	T_{bio}	15	°C
Sludge retention time / Sludge age	SRT	25	d
Reactor volume	$V_{P,chosen}$	12,668	gallons
Reactor volume	$V_{P,chosen}$	48	m^3
Reactor volume	$V_{P,calc}$	11,334	gallons
Average MLSS concentration	X_{TSS}	7,750	mgTSS/l
Food to microorganism ratio	$F/M_{BOD,used}$	0.080	kgBOD/kgMLSS
Food to microorganism ratio	$F/M_{COD,used}$	0.137	kgCOD/kgMLS S
Membrane tank MLSS concentration	X_M	9,258	mgTSS/l
Aerobic/Anoxic tank MLSS concentration	X_{Bio}	7,641	mgTSS/l
Number of anaerobic zones	$\#_{AN}$	0	-
Number of anoxic zones	$\#_{AO}$	1	-
Number of aerobic zones	$\#_{AE}$	1	-
External recycle ratio	m	5	-
Internal recycle ratio	a	0	-
DO in m recycle	O_m	2	mgO_2/l
DO in a recycle	O_a	0	mgO_2/l
Recycle ratio to anaerobic tank (PAO)	s	0	-
DO in s recycle	$S_{O2,s}$	0	mgO_2/l
Nitrate on s recycle	$S_{NO3,s}$	0	mg/l
TKN/COD ratio	$f_{TKN/COD}$	0.083	mgTKN/mgCOD
Carbon source addition (Micro C)	B_{MicroC}	0.0	lb/d
Carbon source addition (Micro C)	S_{MicroC}	0.00	gpd
Nominal hydraulic retention time	HRT_n	15.2	h
Actual hydraulic retention time	HRT_a	2.5	h

Biological Oxygen Demand	Symbol	Value	Units
OD for synth & endo respiration (PAO)	FO_{PAO}	0	kgO_2/d
OD for synth & endo respiration (OHO)	FO_{OHO}	29	kgO_2/d
Mass carbonaceous oxygen demand	FO_C	29	kgO_2/d
Carbonaceous oxygen utilization rate	O_c	60%	-
Nitrification oxygen demand	FO_n	12	kgO_2/d
Total oxygen demand	FO_t	40	kgO_2/d
Oxygen recovered by denitrification	FO_d	7	kgO_2/d
Net total oxygen demand (AOR)	FO_{td}	33	kgO_2/d
Oxygen saturation @ operating temp.	c_s	10.2	mg/l
Desired oxygen level	c_x	2.0	mg/l
Transfer coefficient	α	0.50	-
Diffuser water depth	DWD	6.5	feet
Oxygen transfer efficiency	OTE	2	%
Standard total oxygen demand (SOR)	SOR	85	kgO_2/d
Required air flow	Q_{air}	**57**	scfm
Oxygen requir. per volume & depth	OS	18.3	$gO_2/(Nm_3*m_D)$

Membrane Module Design

Membrane Module Design	Symbol	Value	Units
Permeate on cycle	T_o	8	minute
Permeate off cycle (relaxation)	T_s	2	minute
Effective membrane module surface	$A_{m,eff}$	87.8	m^2
Effective membrane module surface	$A_{m,eff}$	945	ft^2
Total number of membrane modules	N_M	6	-
Total membrane module surface	A_{total}	527	m^2
Total membrane module surface	A_{total}	5,667	ft^2
Nominal average daily flux	$Q_{ave,n}$	7.5	lmh
Nominal max. daily flux	$Q_{ave,n,max,mo}$	18.7	lmh
Nominal peak hourly flux	$Q_{peak,n}$	30.0	lmh
Average daily flux (excluding rest cycle)	$Q_{ave,n}$	**3.5**	gfd
Max. Daily flux (ex. rest cycle)	$Q_{ave,n,max,mo}$	**8.8**	gfd
Peak hourly flux (ex. rest cycle)	$Q_{peak,n}$	**14.1**	gfd
Total membrane module displacement vol	$V_{modules}$	66	ft^3
Total membrane module displacement vol	$V_{modules}$	494	gallons
Aeration modules	A#	6	-
Membrane module aeration requirement	Q_{am}	28.5	acfm
Total membrane modules aeration	$Q_{am,total}$	171	acfm
Membrane diffuser water depth	DWD_m	6.0	feet
Oxygen requirement per volume & depth	OS	14	$gO_2/(Nm_3{*}m_D)$
Standard oxygen rate, membrane aeration	SOR_m	381	lbO_2/d
Standard oxygen rate, membrane aeration	SOR_m	175	kgO_2/d

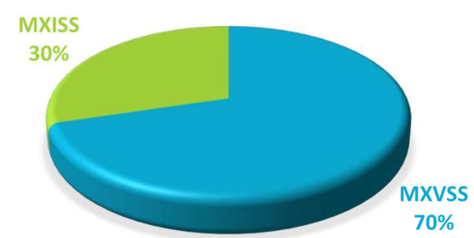
- ✓ Patented, innovative A3's MaxFlow™ membrane filtration modules manufactured in USA.
- ✓ The MaxFlow™ module "open channel design" provides optimal biofilm control, minimizes the quantity of chemical cleaning procedures and avoids module clogging.
- ✓ The compact module design enables dual-stack and triple-stack installations. It allows for a high membrane packing density resulting in a small footprint and high energy efficiency.
- ✓ Most existing conventional treatment plants can be retrofitted with MaxFlow™ membranes due to the flexible and compact nature of our membrane

Kinetic Constants	Symbol	Value	Units
Yield coefficient OHO	Y_{OHO}	0.40	mgVSS/mgCOD
Yield coefficient OHO,OBS	$Y_{OHO,obs}$	0.06	mgVSS/mgCOD
Fermentation rate at 20°C	$k_{F,20}$	0.06	m3/gVSSd
Temperature coefficient for $k_{F,T}$	Θ_{kF}	1.029	-
Fermentation rate at T	$k_{F,T}$	0.05	m3/gVSSd
Endogenous respiration rate (decay)	$b_{OHO,20}$	0.24	gVSS/gVSSd
Endogenous respiration rate T	$b_{OHO,T}$	0.21	gVSS/gVSSd
Yield coefficient FSA	Y_A	0.10	mgVSS/mgFSA
Nitri. pH sensitivity coefficient	K_I	1.13	-
Nitri. pH sensitivity coefficient	K_{max}	9.50	-
Nitri. pH sensitivity coefficient	K_{II}	0.30	-
Max. specific growth rate at 20°C	μ_{Am}	0.45	1/d
Max. spec. growth rate - Temp/pH	μ_{AmTpH}	0.21	1/d
Half saturation coefficient	K_n	0.75	mgFSA/l
Half saturation coefficient - Temp	K_{nT}	0.42	mgFSA/l
Endogenous respiration rate (decay)	b_A	0.04	1/d
Temperature coefficient for $k_{F,T}$	θ_n	1.123	-
Endogenous respiration rate T	b_{AT}	0.022	1/d
Temperature sensitivity coefficient	Θ_{nk1}	1.20	-
Temperature sensitivity coefficient	Θ_{nk2}	1.05	-
Temperature sensitivity coefficient	Θ_{nk3}	1.03	-
Denitrification rates at 20°C	k_1	0.70	-
Denitrification rates at 20°C	k_2	0.10	-
Denitrification rates at 20°C	k_3	0.08	-
Denitrification rates	k_{1T}	0.281	-
Denitrification rates	k_{2T}	0.079	-
Denitrification rates	k_{3T}	0.069	-
Yield coefficient PAO	Y_{PAO}	0.45	gAVSS/gCOD
Yield coefficient PAO	$Y_{PAO,obs}$	0.22	gAVSS/gCOD
Endogenous respiration rate (decay)	b_{PAO_20}	0.04	gEVSS/gCOD
Temperature coefficient for $k_{F,T}$	$\Theta_{b,PAO}$	1.029	-
Endogenous respiration rate T	$b_{PAO,T}$	0.03	gEVSS/gVSSd

Stoichiometric Constants	Symbol	Value	Units
COD/BOD ratio	-	1.71	-
Readily biodeg. org. fraction (RBCOD)	$f_{s,COD}$	0.25	g/gTCOD
Non-biodegradable particulate COD	$f_{PNb,COD}$	0.15	g/gTCOD
Non-biodegradable soluble COD	$f_{SNb,COD}$	0.06	g/gTCOD
SVFA fraction of RBCOD	$f_{SVFA,SSi}$	0.15	g/gCOD$_{SS}$
VSS/TSS of activated sludge	f_{VT}	0.70	mgVSS/mgTSS
COD/VSS of activated sludge	f_{cv}	1.48	kgCOD/kgVSS
True synthesis fraction	f_s^0	0.57	-
Endogenous residue fraction	$f_{H/E,OHO}$	0.2	-
ISS content of OHOs	$f_{ISS,OHO}$	0.15	-
Active fraction - VSS	f_{avOHO}	25%	-
Active fraction - TSS	f_{at}	18%	-
Influent FSA fraction	$f_{FSA,i}$	0.70	-
Non-bio. soluble orgN fraction (inerts)	$f_{SNb,N}$	0.03	-
Non-bio. particulate orgN fraction	f_n	0.12	-
Permissible unaer. sludge mass fraction	f_{xm}	0.65	-
Design unaerated sludge mass fraction	f_{xt}	0.31	-
Minimum primary anoxic mass fraction	f_{x1min}	0.08	-
Primary anoxic mass fraction	f_{x1}	0.31	-
Secondary anoxic mass fraction	f_{x2}	0.00	-
Anaerobic mass fraction	f_{AN}	0.00	-
Non-bio. particulate orgP fraction	$f_{P,XE,OHO}$	0.05	mgP/mgVSS
Endogenous residue fraction	$f_{XE,PAO}$	0.25	gEVSS/gAVSS
P fraction in active PAO mass	$f_{P,PAO}$	0.38	gP/gAVSS
VSS/TSS ratio for PAO active mass	$f_{VT,PAO}$	0.46	gVSS/gTSS
Ratio of P release /VFA uptake	$f_{PO4,REL}$	0.5	gP/gCOD
Frac. of fixed inorganic s. solids of PAO	$f_{FSS,PAO}$	1.3	gFSS/gAVSS
P content of TSS	$f_{P,TSS}$	0.041	gP/gTSS
P content of VSS	$f_{P,FSS,i}$	0.02	gP/gVSS
TKN/COD ratio	f_{ns}	0.08	mgTKN/mgCOD
Nitrogen content of active biomass	$f_{N,VSS}$	0.10	gN/gAVSS

Biological Mass Balance	Symbol	Value	Units
Sludge age	SRT	25	d
Mixed liquor suspended solids	X_{TSS}	7,750	mgTSS/l
Readiable biodegradabe COD flux	$FS_{S,i}$	11	kgCOD/d
Daily flux of VFAs	$FS_{VFA,i}$	2	kgCOD/d
Daily flux of fermentable COD	$FS_{F,i}$	10	kgCOD/d
Daily flux of biodegradable COD	$FS_{bio,i}$	36	kgCOD/d
Daily flux of particulate inert COD	$FS_{PIN,i}$	7	kgCOD/d
Daily flux of fixed inorganic sus. solids	$FS_{ISS,i}$	4	kgISS/d
Influent particulate non-bio. COD	$FX_{VSS,i}$	5	kgVSS/d
Mass nitrogen into sludge prod.	FN_{Sludge}	1	kgN/d
Mass of nitrate generated per day	FN_{NO3}	3	kgN/d
VFAs stored by PAOs	$FS_{S,PAO}$	0	kgCOD/d
Remaining biodegradable COD	$FCOD_{b,OHO}$	36	kgCOD/d
Mass nitrifiers	MX_A	4	kgVSS
Active biomass PAO	MX_{PAO}	0	KgAVSS
Endogenous active biomass PAO	$MX_{E,PAO}$	0	kgEVSS
Bio mass	MX_{bio}	58	kgVSS
Active organism mass	MX_{OHO}	58	kgVSS
Endogenous residue mass	$MX_{E,OHO}$	61	kgVSS
Non-biodegradable particulate mass	MX_{Iv}	115	kgVSS
Volatile suspended solids mass	MX_{VSS}	234	kgVSS
Inorganic suspended solid mass	MX_{ISS}	99	kgISS
Total suspended solids mass	MX_{TSS}	332	kgTSS
Mass/Sludge TSS wasted	FX_t	13	KgTSS/d
Mass/Sludge VSS wasted	FX_V	9	kgVSS/d
Effluent COD	$S_{COD,e}$	36	mgCOD/l
COD mass out (effluent and waste)	$FS_{COD,e}$	3	kgCOD/d
Mass/Sludge COD wasted	$FX_{COD,s}$	14	kgCOD/d

Alkalinity	Symbol	Value	Units
Alkalinity $_{\text{Nitrification as CaCO3 (consumed)}}$	Alk_{Nitri}	238	mg/l as $CaCO_3$
Alkalinity $_{\text{Denitrification as CaCO3 (recovered)}}$	$Alk_{Denitri}$	120	mg/l as $CaCO_3$
Alkalinity $_{ef}$	Alk_e	100	mg/l as $CaCO_3$
Alkalinity $_{inf}$	Alk_i	300	mg/l as $CaCO_3$
Alkalinity $_{\text{Alum (consumed)}}$	Alk_{Alum}	0.0	mg/l as $CaCO_3$
Alkalinity $_{Total}$	Alk_{total}	182	mg/l as $CaCO_3$
Alkalinity $_{Added}$	Alk_{added}	-82	mg/l as $CaCO_3$
Alkalinity $_{Added}$	$XAlk_{added}$	0	lb/d
Density caustic solution $_{(50\%)}$	-	12.76	lb/gal
Alkalinity $_{recovered}$	$Alk_{recovered}$	0.4	$lbCaCO_3/lb$
Caustic $_{needed}$	-	0.0	lb/d
Caustic $_{needed}$	-	0.0	gpd



$$V_P = \frac{MX_{TSS}}{X_{TSS}}$$

$$FX_t = \frac{MX_{TSS}}{SRT}$$

$$MX_{TSS} = MX_{ISS} + MX_{VSS}$$

N Removal	Symbol	Value	Units
Factor of safety	S_f	1.2	-
Nitrogen requirements	FN_{synth}	1	kgN/d
Nitrogen requirements	$TKN_{i,synth}$	12.36	gN/m3
Influent non-bio. soluble organic N	$N_{nbios,i}$	1.5	mgN/l
Influent non-bio. particulate org. N	$N_{nbiop,i}$	7.3	mgN/l
Influent biodegradable organic N	$N_{bio,i}$	13.5	mgN/l
Effluent non-bio. soluble organic N	$N_{nbios,e}$	1.5	mgN/l
NH4 concentration avail. for nitri.	N_{an}	33.7	mgN/l
Effluent ammonia	$N_{a,e}$	0.3	mgN/l
Effluent TKN	$N_{TKN,e}$	1.8	mgN/l
N concentration into sludge prod.	N_s	14.8	mgN/l
Nitrification capacity	N_c	33.4	mgN/l
Denitrification potential RBCOD	$D_{p1RBCOD}$	21.2	$mgNO_3$-N/l
Denitrification potential SBCOD	$D_{p1SBCOD}$	19.0	$mgNO_3$-N/l
Denitrification potential RBCOD	$D_{p3RBCOD}$	0.0	$mgNO_3$-N/l
Denitrification potential SBCOD	$D_{p3SBCOD}$	0.0	$mgNO_3$-N/l
Minimum sludge age for nitri.	SRT_m	8.1	d
Denitrification potential primary tank	D_{p1}	40.2	mgN/l
Denitrification potential secondary tank	D_{p3}	0.0	mgN/l
Denitri. potential recycle rate (f_{xm} = f_{xdm})	D_{p*}	31.3	mgN/l
Effluent nitrate	$N_{NO3,e}$	0.0	mgN/l
Effluent nitrate @ f_{xdm} & recycle rate	$N_{NO3,e*}$	5.6	mgN/l

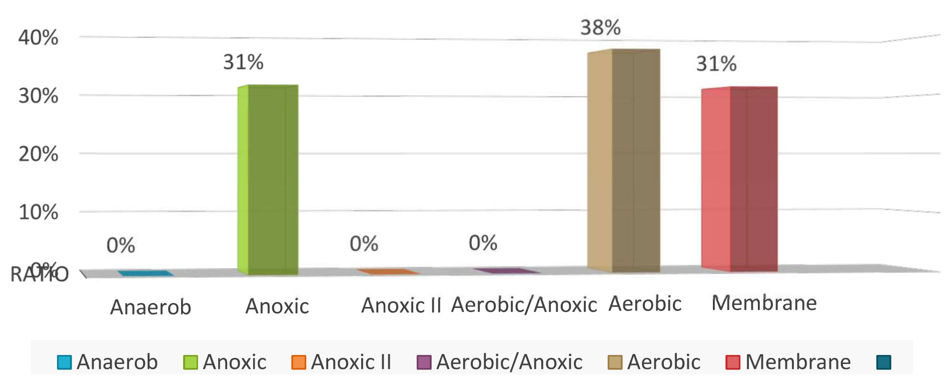
P Removal	Symbol	Value	Units
COD lost in anaerobic reatcor	$S_{F,ANn}$	0.0	$gCOD/m^3$
COD lost in anaerobic reatcor	$S_{F,ANn*}$	0.0	$gCOD/m^3$
Fermentable COD for AN reactor	$S_{F,I,conv}$	0.0	$gCOD/m^3$
DO in influent	$S_{O2,i}$	0.0	mgO_2/l
PO_4 release AN reactor	$S_{PO4,rel}$	0.0	gP/m^3
P removal by PAOs	ΔP_{PAO}	0.0	gP/m^3
P removal by OHOs	ΔP_{OHO}	0.9	gP/m^3
P removal by endgeneous biomass	ΔP_{XE}	1.6	gP/m^3
P removal by influent inert mass	ΔP_{XI}	3.0	gP/m^3
P into sludge production	P_s	5.1	gP/m^3
Potential P removal by system	$\Delta P_{SYS,POT}$	10.6	gP/m^3
Actual P removal by system	$\Delta P_{SYS,ACT}$	8.0	gP/m^3
Effluent particulate P from TSS	$X_{P,e}$	0.0	gP/m^3
Influent total P	P_i	8.0	gP/m^3
Effluent total P	P_{e*}	0.0	gP/m^3
P precipitated	P_{prec}	0.0	mgP/l
Precipitation chemical	B_{Alum}	0.0	lb/d
Precipitation chemical	Solution	0.0	gal/d
Density Alum	z_{AL}^{3+}	0.100	lb_{AL}/lb_{prec}
Density Iron	z_{FE}^{3+}	0.077	lb_{FE}/lb_{prec}
Alum efficiency	-	40.0	g/kg
Chemical precipitation sludge	-	0.0	lb/d

Mechanical Process Calculation

Tank Dimensions	Trains	Length	Width	Dia.	Degree	Height	Liquid level	Volume per train	Volume Total	Volume Total
Anaerobic	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
Anoxic I	1	10.00 ft	7.30 ft	.00 ft	0.0	9.00 ft	7.25 ft	3,959 gal	3,959 gal	15.0 m3
Aerobic	1	12.00 ft	7.30 ft	.00 ft	0.0	9.00 ft	7.25 ft	4,751 gal	4,751 gal	18.0 m3
Anoxic II	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
Anoxic Buffer	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
Membrane	1	10.00 ft	7.30 ft	.00 ft	0.0	9.00 ft	7.25 ft	3,959 gal	3,959 gal	15.0 m3
Sludge	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
EQ	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
		32.0								

Tank Design	Symbol	Value	Units
Total process tank volume	12,668	gallons	
Total process tank volume$_{calc}$	**11,334**	gallons	
Unaerated tank percentage	31	%	
Total tank volume	**12,668**	gallons	
Membrane modules volume	494	gallons	
F/M$_{used,BOD}$	0.080	kgBOD/kgMLSS	
F/M$_{used,COD}$	0.137	kgCOD/kgMLSS	

Weir level	0.6	inches
Weir length	4.0	ft
Velocity	0.75	fps
Vertical tank	0	
Horz. Tank	0	
Diameter	0	ft



Process Volume Distribution

Air Flow Design	Symbol	Membrane per train	Aerobic per train	Sludge	EQ	Unit
Minimum air flow	$Q_{A,re}$	171	57	0	0	acfm / scfm
Chosen air flow - actual	$Q_{A,\ chosen}$	171	54	0	0	acfm
Chosen air flow - inlet	$Q_{A,chosen}$	323	100	0	0	m^3/h
Chosen air flow - inlet	$Q_{A,chosen}$	**190**	**59**	**0**	**0**	scfm
Chosen air flow - piping	$Q_{A,chosen}$	145	45	0	0	acfm
Pipe pressure	p_b	4.5	4.5	0.0	0.0	psi
Pipe losses	H	0.40	0.36	0.00	0.00	psi
Equivalent length in pipe looses	L_p	400	400	400	400	feet
Pipe diameter	d	3.0	2.0	2.0	2.0	inches
Internal pipe diameter	d_i	3.26	2.16	2.16	2.16	inches
Standard temperature	T_1	293	293	293	293	K
Pipe temperature	T_2	316	316	293	293	K
Constant	f	0.02	0.03	0.06	0.06	-
Air velocity	v	**41.7**	**29.6**	**0.1**	**0.1**	fps
Atmospheric pressure	$p_{a,l}$	14.5	14.5	14.5	14.5	psi
Absolute pressure	p_2	19.0	19.0	14.5	14.5	psi
Pressure due to tank liquid level	$p_{DWD,m}$	2.6	2.9	0.0	0.0	psi
Pressure due to aeration device	p_{DWD}	0.7	0.5	0.5	0.5	psi
Pressure due to pipe losses & elev.	$p_{DWD,S}$	0.8	0.8	0.4	0.4	psi
Total pipe losses	p_t	4.1	4.2	0.9	0.9	psi
Total pipe losses	p_t	283.9	289.6	62.1	62.1	mbar

$$H = 9.82 \cdot 10^{-8} \cdot \frac{\left(f \cdot L_p T_2 Q_{A,chosen}\right)}{\left(p_2 d_i\right)^5}$$

$$f = \frac{\left(0.029 \cdot d_i^{0.027}\right)}{Q_{A,chosen}^{0.148}} \qquad T_2 = T_1 \left(\frac{p_2}{p_{a,1}}\right)^{0.283}$$

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APPENDIX B

Mechanical Evaporator Specifications & Boil Test Report

ENCON
EVAPORATORS
ENERGY CONSCIOUS INNOVATION

Innovating Since 1993

Heat Source:	Liquid Propane Gas	Evaporation Rate:	438 GPH

PxxV4-438

THERMAL EVAPORATOR

PxxV4-438

ENCON THERMAL EVAPORATOR

- Handles Different Wastewater Streams Simultaneously
- Easy to install and operate
- Dramatically Reduces Disposal Volume and Cost

ENCON Thermal Evaporators and Distillation Systems are engineered to provide you with an effective and economical method of wastewater minimization. All ENCON systems are assembled with the highest quality components, ensuring years of trouble free operation.

Available in a wide range of standard capacities, 8 to 400 gallons per hour, these systems have a compact footprint and can exhaust clean vapor to atmosphere or capture clean condensate with an optional condenser.

The V4 integrated control and monitoring system offers control of every aspect of the evaporation process and features a 7” widescreen touch panel. The mist eliminator captures unwanted contaminants before exhausting, thus enabling you to comply with today’s stringent emissions regulations.

Model Number Nomenclature

P Heat source, in this case Liquid Propane Gas

x Tank material of construction. Standard is 316ss. Higher alloys available.

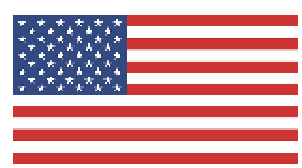
x Heat exchanger material of construction. Standard is 316ss. Higher alloys available.

V4 System controls, in this case Koyo Click PLC & Automation Direct C-more HMI

-

438 System evaporation rate based on tap water, in this case 438 GPH

MADE IN THE USA



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ENCON EVAPORATORS
ENERGY CONSCIOUS INNOVATION

Innovating Since 1993

NxxV4-438 SPECIFICATIONS

PHYSICAL	EVAPORATION UNIT	CONDENSER UNIT
System Dimensions (L x W xH):	199" x 101" x 142"	199" x 131" x 130"
System weight (empty):	11000 lb	12400 lb
Crated dimensions (L x W x H):	199" x 101" x 142	199" x 131" x 130"
Crated system weight:	11000 lb	12400 lb
Condenser size:	N/A	12" Dia x 48"L
Cooling water inlet/outlet diameter:	N/A	4" FNPT
Draft inducer outlet diameter:	N/A	8"
Draft inducer:	N/A	5 HP, 1725 RPM
Exhaust blower outlet diameter:	16"	
Exhaust stack diameter:	16"	
Exhaust blower:	6000 CFM, 10 HP, 1725 RPM, Variable Frequency Drive	
Evaporator feed connection:	1" FNPT	
Evaporator residue connection:	6" Flanged Cap with 1-1/2" FNPT coupling	
Heat exchanger:	Elevated with Cylindrical Firing Chamber	
Tank capacity:	1235 gallons @ Low Level, 1565 gallons @ Auto Level, 2319 gallons @ High Level	
Evaporation capacity:	438 Gallons/Hour, 10512 Gallons/Day, 73584 Gallons/Week, 3836880 Gallons/Year	

UTILITIES	EVAPORATION UNIT	CONDENSER UNIT
Cooling water:	N/A	254 GPM @ 90F
Burner type:	Direct spark ignition. Units 96gph and larger include FM gas train.	
Total system throughput:	4,976,000 Btu/hr	
Gas supply pressure required:	0.5-2.0 PSI of Liquid Propane Gas	
Gas connection:	2" FNPT (Manifold)	
Electrical requirements:	480 VAC, 3 PH, 60 Hz, 26.2 FLA	

FABRICATION	316SS VERSION	6% MOLY VERSION	HASTELLOY VERSION
Tank:	316L Stainless Steel, 14 ga	6% Molybdenum, 14 ga	Hastelloy, 14 ga
Heat exchanger:	316L Stainless Steel, 11 ga	6% Molybdenum, 11 ga	Hastelloy, 11 ga
Mist eliminator pad:	316L Stainless Steel		
Skins and lids:	Polished 304 Stainless Steel, 18 ga		
Insulation:	All 6 sides rated to 450F, R = 4.3		

CONTROLS	ALL UNITS
Burner controller:	Honeywell with Spark Ignition, loss of airflow shutdown
Temperature controls:	Type J Thermocouples with 4-20 mA analog input Monitoring of liquid and heater temperature
Control inputs:	Frequency Shift Level Probes and Exhaust Fan Proving Switch Redundant Low Level Shut-off
Remote connection:	Ethernet port for direct connection by ENCON Engineers
Control panel:	UL Listed, NEMA 4, PLC Control Panel 7" widescreen touch panel Human Machine Interface (HMI) Main power selector switch and indicator lights for main power, heater(s) and alarms Full data logging, alarm management, and trend screens

QUALITY	ALL UNITS
Pressure test:	Pressure leak test performed on every heat exchanger
Leak test:	Dye penetrant test performed on tank welds
I/O simulation:	All I/O and controls are fully tested to insure accuracy/functionality
Combustion Analysis:	Test for excess oxygen and gas exit temperature
Warranty:	Two years for parts and workmanship issues

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Process Description of Liquid Propane Gas ENCON Evaporator

1.Wastewater is collected in a holding tank, sump or pit upstream of the evaporator.

2.Water is either pumped or gravity fed into the evaporator through a 1” NPT fitting on lid.

3.The evaporator is equipped, as standard, with three level probes:
 a)The Low Level Probe acts as a safety.
 b)The Auto Level Probe controls water level in tank and the burner(s) operation (on/off) when in Auto Run Mode.
 c)The High Level Probe acts a redundancy to the auto level.

4.Upon initiation of Auto Run Mode, wastewater water will flow into the evaporator tank. The wastewater feed will stop and the burner(s) will light when the Auto Level Probe is covered.

5.Once the fluid comes to a boil and the evaporation process begins, the liquid level in the evaporator will begin to fall. The feed/refill sequence will activate a set amount of time after the Auto Level Probe is uncovered. When the feed cycle is initiated, fresh wastewater will be fed into the evaporator until the fluid reaches the Auto Level Probe.

6.When activated, the burner(s) will fire into the combustion area of the heat exchanger. The hot gases travel around the vertical tubes inside the heat exchanger until they reach the insulated chimney outside the evaporator tank. There are two ways the flue gases and water vapor may be vented:

a) If the customer has chosen an Evaporation Unit (vent to atmosphere), the hot gases are pulled back into the Evaporator above the liquid level and drawn across the water’s surface by the exhaust blower. The exhaust blower pulls the combined water vapor and flue gases through the mist eliminator and pushes them through the stack to the outside of your building.

b) If the customer has chosen the “closed loop” Distillation Unit (condenser package), the hot gases are not pulled back into the Evaporator. Instead, the flue gases are vented separately up their own exhaust stack. The blower pulls only the water vapor through the mist eliminator and pushes it through the connection from the blower exhaust to the inlet side of the condenser, which is horizontally mounted, on the backside of the evaporator tank. The water leaving the condenser is separated from the air stream and directed to an automated condensate sump while the air stream is returned to the evaporator.

7.As long as there is wastewater available to the evaporator, this process will continue until either the fluid temperature reaches the target endpoint temperature or the cycle timer counts down to zero. If the feed tank level probe detects a low level condition, the evaporator will de-energize the heaters and wait for the feed tank level to recover.

8.The concentrated fluid is purged from the evaporator, after which a new evaporation cycle may commence.

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THE ENCON ADVANTAGE

High Quality Components and Superior Design

V4 Integrated Control and Monitoring System

The most advanced control and monitoring system for thermal evaporators in the industry. The NEMA 4 PLC control panel with touch panel provides continuous monitoring of flue gas, chimney and liquid temperatures as well as continuous probe diagnostics. Offers datalogging, alarm management, remote access through browser or app and control system integration through Modbus TCP/IP.

7" Widescreen Touch Panel

The large 7" touchscreen combined with a completely redesigned HMI offers control of every aspect of the evaporation process while at the same time being completely intuitive for daily operation.

Evaporator Safety

Critical components are operated by the control circuit through the PLC with appropriate control interlocks. The safety circuit monitors all emergency STOP conditions. The control circuit is interrupted by the safety circuit which includes a safety relay (with force guided contacts) and a redundant contactor setup.

Level Sensing

Tuning fork level probes provide reliable auto-filling and shutdown operations even in conditions of severe foam. The durable level probes are made of stainless steel for excellent corrosion resistance. Hastelloy level probes are available for highly corrosive applications.

Blower System

Thermal units, 72 gallons per hour and smaller, use a 1725 RPM, TEFC motor with class B insulation rated for high temperatures. The unit's design provides extremely quiet operation with as much as three times the longlivity of 3450 RPM motors. Larger units use variable frequency drive motors which maximize motor longevity.

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THE ENCON ADVANTAGE

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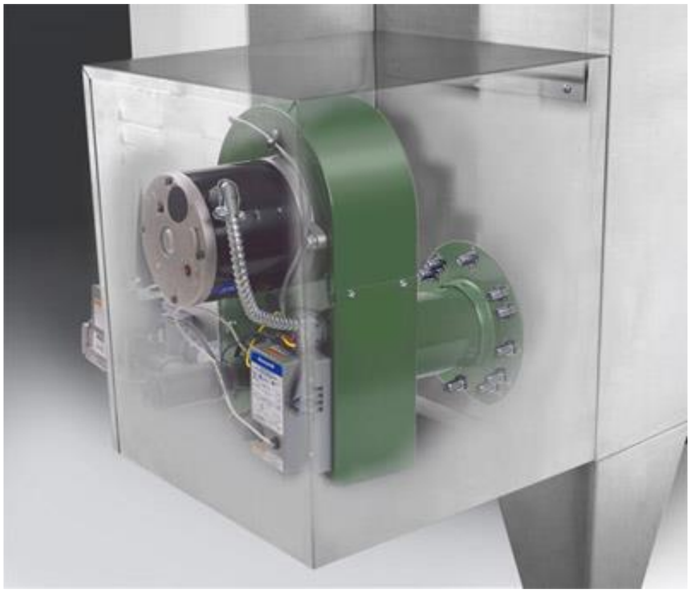

Forced Draft Blower

Each gas or propane fired system consists of a burner with an integrated blower, that along with the induction from the exhaust blower, supplies make-up air for combustion. It also includes: Honeywell controls, gas pressure gauge, airflow detection and lockout, spark ignition, and a redundant main valve and burner contactors for maximum safety.

FM gas trains and gas flow transmitters are standard on systems 96gph and larger. The stainless steel burner protection shroud is mounted on a track hanger for ease of removal and reattachment. Other combustion heat sources such as oil, diesel and waste oil are available. Non-combustion heat sources such as electricity, steam and waste heat are also offered.

Mist Eliminator System

The stainless mesh filter is designed for easy removal from its compression fit housing. The system is monitored for contaminant loading and airflow, which is interfaced to the control panel for maximum operator feedback.

Cleanout Flange

Large six inch cleanout* with flange cover and a 1 ½” NPT fitting for pump connection and ease of residue removal.

* Four inch cleanout on 8 and 10gph models

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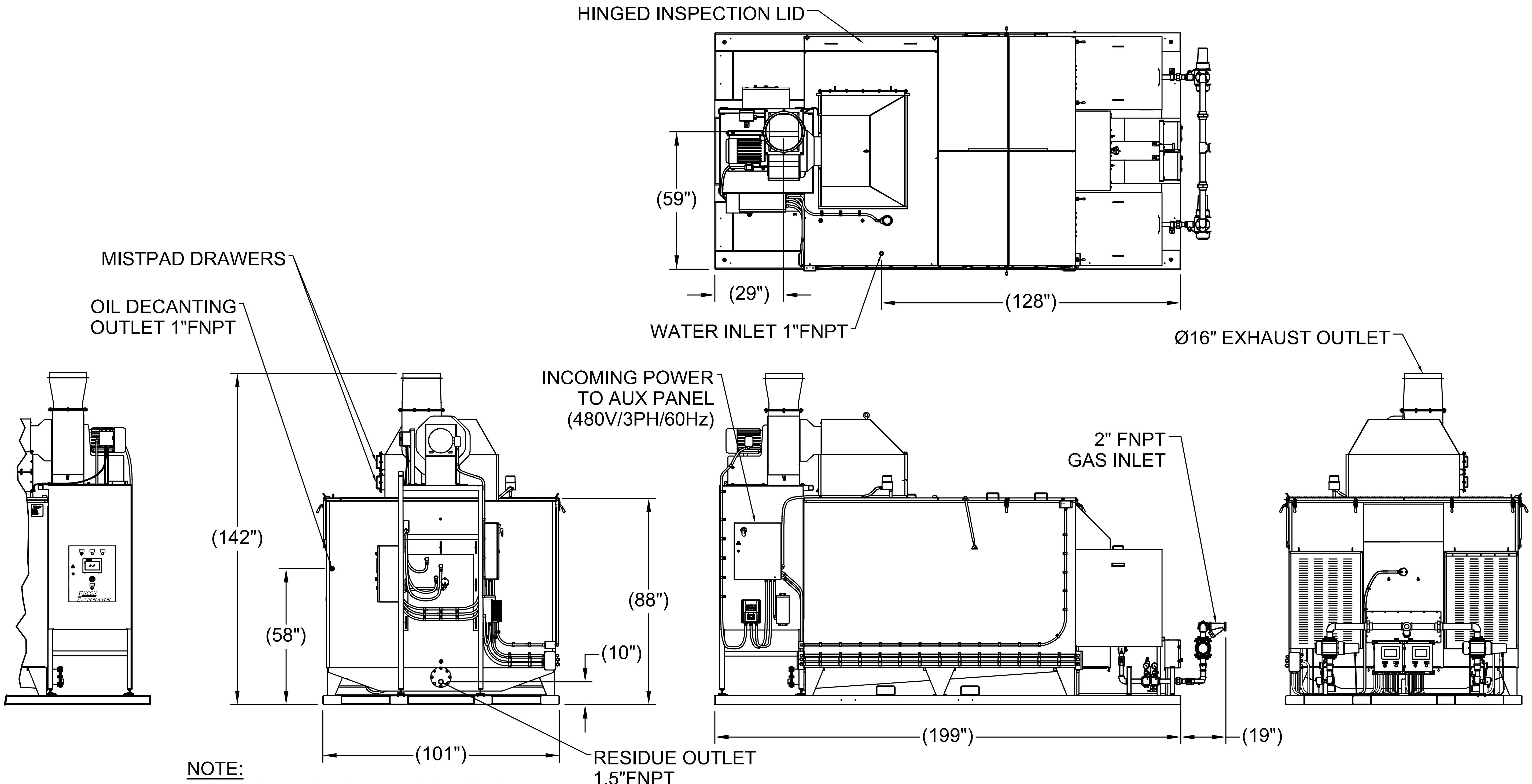

NOTE:
1. ALL DIMENSIONS ARE IN INCHES.

REVISION HISTORY

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
A	INITIAL RELEASE	7/16/19	RET	MDC	MDC

THIRD ANGLE PROJECTION

CONFIDENTIAL

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ENCON Evaporators
1368 HOOKSETT ROAD, UNIT 9
HOOKSETT, NH 03106

TITLE:
N/Pxxx-438 EVAPORATION UNIT
DIMENSIONAL LAYOUT

SIZE: B | DWG NO: 3008274 | REV: A

SCALE: 1/64 | | SHEET: 1 OF 1

8 – 650
Gallons Per Hour

THERMAL EVAPORATORS

Industrial Wastewater Minimization
Reduce Hauling & Disposal Costs
Process Stream Concentration

ENCON EVAPORATORS
www.evaporator.com

Why Choose Evaporation?

Evaporation is a time-tested & cost-effective method for reducing the volume of water-based waste

Hauling is Costly

Industrial and commercial facilities that generate wastewater spend too much money paying for hauling & disposal of waste streams that are mostly comprised of water.

Evaporation is Cost Effective

ENCON Thermal Evaporators are utilized by 1600+ facilities worldwide to evaporate the water portion of water-based wastes, reducing hauling/disposal volumes and cost by up to or even exceeding 99%.

Advantages of Evaporation

- ✓ Can handle different waste streams simultaneously
- ✓ Can handle very challenging and complex waste streams
- ✓ Dramatically reduces disposal volume & cost
- ✓ Eliminates sewer discharge accountability
- ✓ Achieve ZLD
- ✓ Safe to operate 24/7
- ✓ Low operating costs
- ✓ Requires less operator intervention than most wastewater treatment technologies
- ✓ Very effective for process stream concentration

Reduce a holding tank of wastewater

to a barrel of residue!*

*example is based on a 98% reduction; reducing a 2,600 gallon tank of wastewater to 52 gallons of residue. Actual reduction percentage will vary based on chemistry and characteristics of the wastewater

Superior Design

Mist Eliminator System

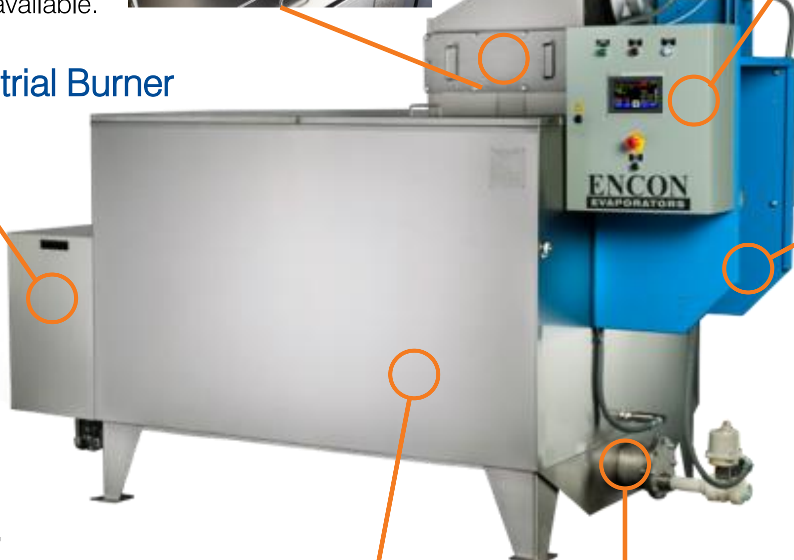
ENCON Thermal Evaporators utilize a 316 stainless steel mesh mist eliminator pad compression fit into a stainless housing. The mist pad is interfaced with the the control panel to allow HMI monitoring. Designed for easy removal and cleaning. Standard mist pad is rated to 10-microns or less to capture even the smallest droplets. 5-micron mist pads also available.

Blower System

Low RPM (1725 RPM), TEFC motor with class F insulation rated for high temperatures. Heavy gauge cast aluminum blower for durability and longevity. Extremely quiet with 3x the average life expectancy of 3450 RPM motors.

V4 Control & Monitoring System

NEMA 4 rated control panel with large 7” touchscreen provides continuous level probe diagnostics and monitoring of flue gas, chimney and liquid temperatures.



Forced Draft Industrial Burner

ENCON fuel heated Thermal Evaporators use a forced draft combustion burner system for heating. Forced draft offers a more consistent & efficient burn, less flame impingement, longer blower motor life, quieter operation and is less affected by atmospheric conditions than draft induced burners.

Level Sensing

Durable tuning fork level probes provide reliable level detection to facilitate evaporator auto-fill and fail safe shut down for low and high liquid level conditions.

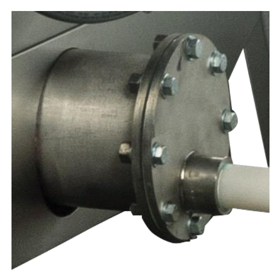
Robust Heat Exchanger

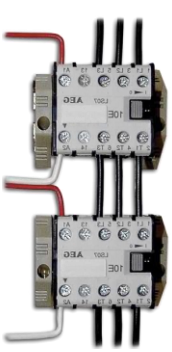
Each ENCON fuel heated Thermal Evaporator utilizes our unique heat exchanger design which provides extremely efficient heat transfer, resulting in reduced fuel costs. All ENCON heat exchangers are elevated in the evaporator tank which creates a void space for any solids to settle below the heat exchanger for easy cleanout.

Cleanout Flange

Large six-inch flanged cleanout cover with a 1 ½” NPT fitting for discharge pump connection and ease of residue removal.

8 & 10 gal/hr units have a four-inch flanged cleanout cover with 1” NPT fitting.





Redundant Burner Contactors

All ENCON Thermal Evaporators contain this critically important safety feature.

If the duty contactor becomes stuck or fails, the redundant contactor will open in an alarm condition. This prevents a permanent “burner on” condition in the event of a failed duty contactor..

Fabrication

All ENCON Thermal Evaporators are clad with a polished 304 stainless steel exterior which provides greater corrosion resistance versus painted surfaces. Insulation on all six sides of the evaporator is rated to 450F with an R-value of 4.3. The evaporator tank and heat exchanger come standard in 316L stainless steel. When applicable, ENCON utilizes higher alloys for corrosive applications.

ENCON link
REMOTE MONITORING

The optional ENCON-link service allows you to monitor the evaporator remotely, minimizing operator walk-by's. Proactive alarm notification allows you to quickly address alarms and minimize downtime. Take advantage of maintenance alerts to help prevent component failures. Monthly performance reports and data driven diagnostics highlight opportunities for process improvement.

INTUITIVE OPERATION

ENCON Thermal Evaporators come standard with the V4 integrated control and monitoring system, the most advanced system of its type in the industry. Provides continuous level probe diagnostics as well as continuous monitoring of flue gas, chimney and liquid temperatures. Large 7" color touchscreen offers control of every aspect of the evaporation process.

V4 CONTROL

STANDARD FEATURES

7" touch screen HMI panel

Continuous monitoring of flue gas, chimney and liquid temperatures

Continuous level probe diagnostics

Alarm Management and multi-year datalogging

Scheduled preventative maintenance alarms

Control system integration through Modbus TCP/IP

Remote access through browser or mobile app

Reliable safety monitoring and shutdown via certified safety relay

NEMA 4 Rated

www.evaporator.com

Process Description

1

WASTEWATER COLLECTION

Wastewater is collected in a holding tank upstream of the evaporator.

2

AUTO-FILL

Wastewater is automatically pumped or gravity fed into the evaporator through a 1" NPT fitting on the lid.

Once the evaporator is filled to the operating level, the heat source energizes, and water begins to boil.

3

EVAPORATION

As water is boiled off, the liquid level in the evaporator tank drops and is automatically replenished with water from the feed tank.

The evaporator continues in this cycle of boiling down a few inches and replenishing with feed water until the end-point concentration is reached.

4

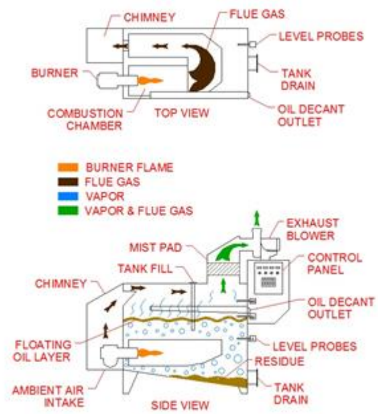
END SEQUENCE

The end-point concentration is automatically detected via a high fluid temperature or cycle timer setpoint, whichever is reached first.

Upon reaching the end-point concentration, the super concentrated residue is pumped out of the evaporator to a disposal drum or tank.

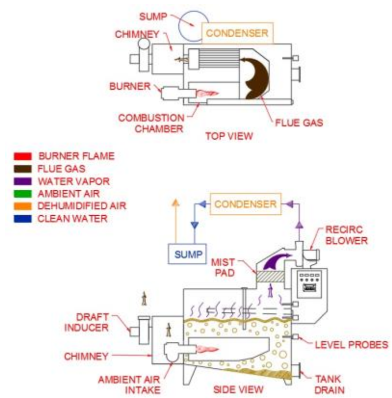
Exhaust Scenarios

Evaporation

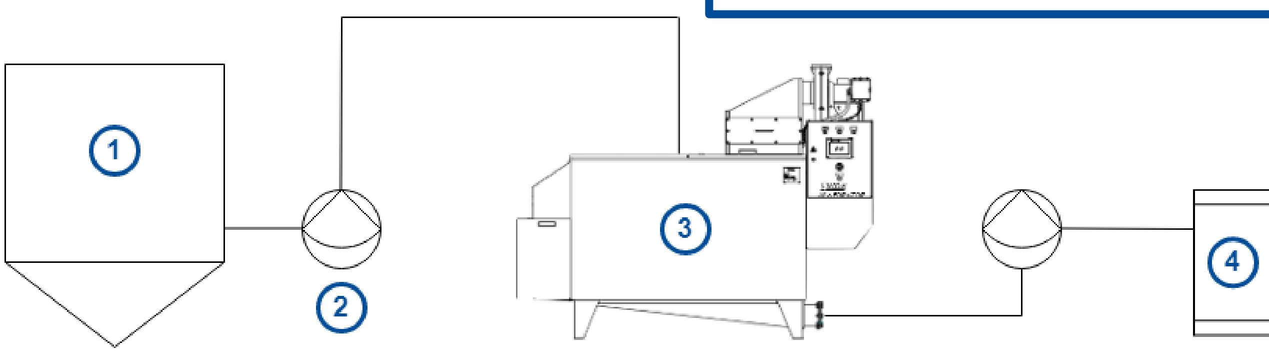


The flue gases are pulled back into the evaporator, mixed with the ambient air and drawn across the surface of the boiling water. The exhaust blower pulls the combined steam and gases through the mist eliminator and pushes them up through the stack and outside the building.

Distillation



The flue gases are not pulled back into the evaporator. Instead, they are vented separately up their own stack. The recirculation blower pulled the steam through the mist eliminator and pushed it through the condenser. The clean water is directed to a sump and pumped to a distilled water holding tank.



Why Choose ENCON?

ENCON Evaporators has been in business for over 27 years designing, fabricating, selling and servicing our line of evaporators and related technologies.

FULL RANGE OF UPGRADES, ACCESSORIES AND SERVICES TO UNLOCK YOUR EVAPORATOR'S FULL POTENTIAL

ENCON offers a full range of upgrades, accessories and services to minimize labor and maximize return on investment.

- Recover your wastewater as clean condensate with our condenser package!
- Work with our consultative Sales Engineers to spec a turn-key system.
- Automate with auto-dump or auto-oil-decant.
- Utilize our air permitting / permit-exemption services.

OVER 1,600 INSTALLATIONS WORLDWIDE

ENCON Evaporators was founded on the principle of design innovation. In 1993 ENCON introduced the world's first thermal evaporator with mist eliminator technology incorporated as part of the standard design. Today that tradition of innovation continues. We are constantly seeking client feedback which drives continuous product improvement. Our mission is to ensure that the ENCON Thermal Evaporator is not only the premier evaporator on the market today, but that it will be even better tomorrow.

We encourage you to speak to our valued clients about ENCON systems and our industry leading service & support. Contact a Sales Engineer at 603-624-5110 for references or view case studies at www.evaporator.com/case-studies.

TRUSTED BY THE WORLD'S MOST RESPECTED COMPANIES

3M, ABB, Alfa Laval, GE, CERN, United Technologies, Caterpillar, Kohler, Ford, pepsi, TE connectivity, WM Waste Management, Parker

MOST HEAT SOURCE OPTIONS IN THE INDUSTRY

Choose the most cost-effective option for your needs

- NATURAL GAS
- PROPANE
- STEAM
- ELECTRIC
- LANDFILL GAS
- #2 FUEL OIL
- THERMAL OIL
- WASTE OIL
- WASTE HEAT
- DIESEL

Industry Leading Service & Support

PROACTIVE STARTUP ASSISTANCE

After your order, a Service Engineer will be assigned to your account. They'll work with you to make sure everything is ready for installation. They will walk you through start up (on-site startup and training is also available).

FREE TECHNICAL SUPPORT FOR THE LIFE OF YOUR EVAPORATOR

Getting help and/or advice shouldn't require a contract!. ENCON has offered free and unlimited remote support for over a quarter century. On-site service is also available ENCON also maintains a complete record of service work and interactions regarding the evaporator.

Free Application Feasibility Report

The centerpiece of our consultative approach is our complimentary bench scale analysis of your waste or process stream. This free analysis determines:

- How appropriate the stream is for evaporation
- Estimated reduction percentage
- Recommended materials of construction
- Recommended operating procedures.

To find out more, ask your ENCON Sales Engineer, give us a call at 603-624-5110 or email sales@evaporator.com.

PREMIUM SERVICE OFFERINGS

In addition to our industry leading standard support, ENCON offers a variety of premium offerings such as scheduled visits by ENCON Service Engineers. They will review and tune your evaporator, assess the unit's condition, assess the wastewater process, make suggestions for improving results, and conduct training.

FREE STANDARD LAB ANALYSIS OF YOUR WASTE STREAM FOR THE LIFE OF YOUR EVAPORATOR

Want to consider a new waste or process stream for evaporation? Not sure if your waste stream has changed? ENCON will analyze a sample of your stream, compare it to previous tests and make recommendations on any necessary process changes.

SPECIFICATIONS

The following is a summary of natural gas and propane fueled ENCON Thermal Evaporator specifications. Specifications for other heat sources are available.

Size by Evaporation Rate (gal/hr)	24 Hour Evaporation Capacity (Gallons)	Yearly Evaporation Capacity (24hrs x 250 Days)	Evaporator Tank Volume (Gallons)	System Dimensions (Inches) L x W x H	System Weight (Empty)
10	240	60,000	55	68 x 28 x 72	650lbs
18	432	108,000	113	80 x 28 x 83	800lbs
28	672	168,000	153	100 x 28 x 83	1,100lbs
35	840	210,000	310	100 x 52 x 84	1,500lbs
48	1,152	288,000	310	100 x 52 x 84	1,500lbs
60	1,440	360,000	425	112 x 57 x 86	2,200lbs
72	1,728	432,000	425	112 x 57 x 86	2,200lbs
96	2,304	576,000	578	156 x 52 x 108	4,000lbs
126	3,024	756,000	752	142 x 77 x 110	4,750lbs
165	3,960	990,000	752	142 x 77 x 110	4,750lbs
192	4,608	1,152,000	875	156 x 82 x 110	5,400lbs
260	6,240	1,560,000	875	156 x 82 x 110	5,400lbs
400	9,600	2,400,000	1428	199 x 101 x 130	10,200lbs
438	10,440	2,610,000	1600	199 x 101 x 142	10,600lbs
650*	15,600	3,900,000	2350	234 x 120 x 154	16,000lbs

Materials of Construction	Exterior Skins: 304 Stainless Steel. Wetted Parts: 316L Stainless Steel - Standard. High Nickel Alloys & Chloride Resistant Alloys – Optional. Mist Eliminator Pad: 316L Stainless Steel. Insulation: All 6 Sides, Rated to 450F, R = 4.3.
Heat Source Options	Natural Gas, Propane, Steam, Waste Heat, #2 Fuel Oil, Diesel, Kerosene, Off-Spec Landfill gas, Thermal Oil, Electric (Available in 8, 15, 24, 40 & 80 gal/hr capacities), Waste Oil (Available in 12, 16, 26, 44, 63 & 88 gal/hr capacities). * available in natural gas, propane & steam.
Controls	Burner Controller: Honeywell with Spark Ignition, Loss of Airflow Shutdown. Temperature Controls: Type J Thermocouples with 4-20 mA Analog input. Monitoring of Liquid & Heater Temperatures. Controls Inputs: Frequency Shift Level probes & Exhaust Fan Proving Switch. Redundant Low Level Shut-Off. Control Panel: UL listed, NEMA 4, PLC Control Panel. 7" Touchscreen HMI. Main Power Selector Switch and Indicator Lights for Main Power, Heater(s) and Alarms.

ENCON EVAPORATORS

ENCON Evaporators
1368 Hooksett Road, Unit #9, Hooksett, NH 03106
P: 603-624-5110
E: sales@evaporator.com

Preliminary Pilot Bench Scale Test and Evaluation for the ENCON Thermal Evaporator System

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Prepared For:
Mr. Rane Wilson
reUse
San Antonio, TX 78245

Test Performed By:
Olivia Church
Lab Chemist
ENCON Applications Lab

Test Conducted at:

ENCON Evaporators
Hooksett, NH
2/13/2024

ENCON Evaporators
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Title of Study
Preliminary Pilot Bench Scale Test and Evaluation for the ENCON Thermal Evaporator System

Primary Objectives
The primary objective of this study is to simulate the effects of boiling your wastewater in the **ENCON** Thermal Evaporator System to anticipate the effectiveness and expected reduction percentage.

If issues with your application are identified in the bench scale test, we can establish simple procedures ahead of time to minimize operational problems once the system is installed.

Introduction
The centerpiece of the **ENCON** consultative approach is our wastewater qualification process. Not all waste streams are good candidates for evaporation. We believe it's better to find that out in our laboratory than on your factory floor.

This pilot bench scale analysis determines how appropriate the waste stream is for evaporation and how it will function in the **ENCON** evaporator. This analysis also helps determine materials of construction and allows us to determine operating procedure recommendations. If more detailed analysis of specific parameters is needed, **ENCON** can prepare appropriate samples and send them for outside lab analysis for a nominal cost.

Primary Results of the Study
Table 1 summarizes the results at time of testing based on an initial sample volume of 600 milliliters:

Sample #	Sample Name/ Description	Suspended Solids % by Volume Initial/Final	Free Oil % by Volume Initial/Final	Temp.(°F) Initial/Final	pH Initial/Final	Volume Reduction
1	**Pre-Chlorine** Light yellow, Clear	NA/~5%	NA/NA	211.6°F / 213.5°F	7.5/8.0	98%
2	**Post-Chlorine** Clear, Clear	NA/~50%*	NA/NA	211.7 °F / 213.6°F	7.6/8.0	99%

*Observed ~50% solids at 99.5% reduction.

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Reduction Percent

Based on the samples provided and the results of the boil analysis, you will be able to achieve a reduction of approximately **98%** on the volume of your Sample 1 waste stream and approximately **99%** on the volume of your Sample 2 waste stream.

Corrosion

The initial and final concentrations of inorganic chlorides in your wastewater samples are listed below:

Sample #	Sample Name	Initial Chlorides	Final Chlorides	pH Initial/Final
1	**Pre-Chlorine**	556 ppm	27,800 ppm	7.5/8.0
2	**Post-Chlorine**	450 ppm	45,000 ppm	7.6/8.0

Due to the chloride levels listed above, pH, and the anticipated reduction percentage, we recommend that the wetted parts for your system be fabricated with the 6% Molybdenum chloride resistant alloy. If budget constraints dictate we utilize 316L SS for materials of construction, we recommend stopping the evaporation cycle after 95% volume reduction due to chlorides concentration. We strongly recommend that you maintain a neutral to alkaline condition (pH 7-10) in your wastewater to further protect your investment.

Solids Removal

At the time of testing the Pre-Chlorine sample in the lab, there were no discernable solids. Upon conclusion of the test, there were light yellow opaque suspended solids in the residue consisting of approximately 5% by volume.

At the time of testing the Post-Chlorine sample in the lab, there were no discernable solids. Upon conclusion of the test (at 99.5% reduction), there were light yellow opaque suspended solids in the residue consisting of approximately 50% by volume.

If there is a presence of settled solids in your full-scale operation, wastewater should be fed to the evaporator from above the settled solids. We also strongly recommend that any solids in your evaporator be pumped out before they encroach on the heat exchanger. Typically suspended solids will fall out of suspension if given enough time during the cooling process. Dumping immediately after concentration is reached minimizes the likelihood of solids falling out of suspension. We recommend the optional Auto-Dump/Auto-Restart System to help with this process.

Foaming

There was noticeable foaming during the boil of your wastewater samples. To mitigate the impact of foaming in your full scale operation, we recommend adding a small dose of high temperature anti-foam chemistry using the automated anti-foam dosing system.

Sample #	Sample Name	Foaming (Yes/No)	Volume of HT-60 Used	Concentration of HT-60 Used
1	**Pre-Chlorine**	Yes	0.05mL	83ppm
2	**Post-Chlorine**	Yes	0.05mL	83ppm

Initial Boil Images

Pre-Chlorine: Before

Pre-Chlorine: After Anti-Foam (HT-60)

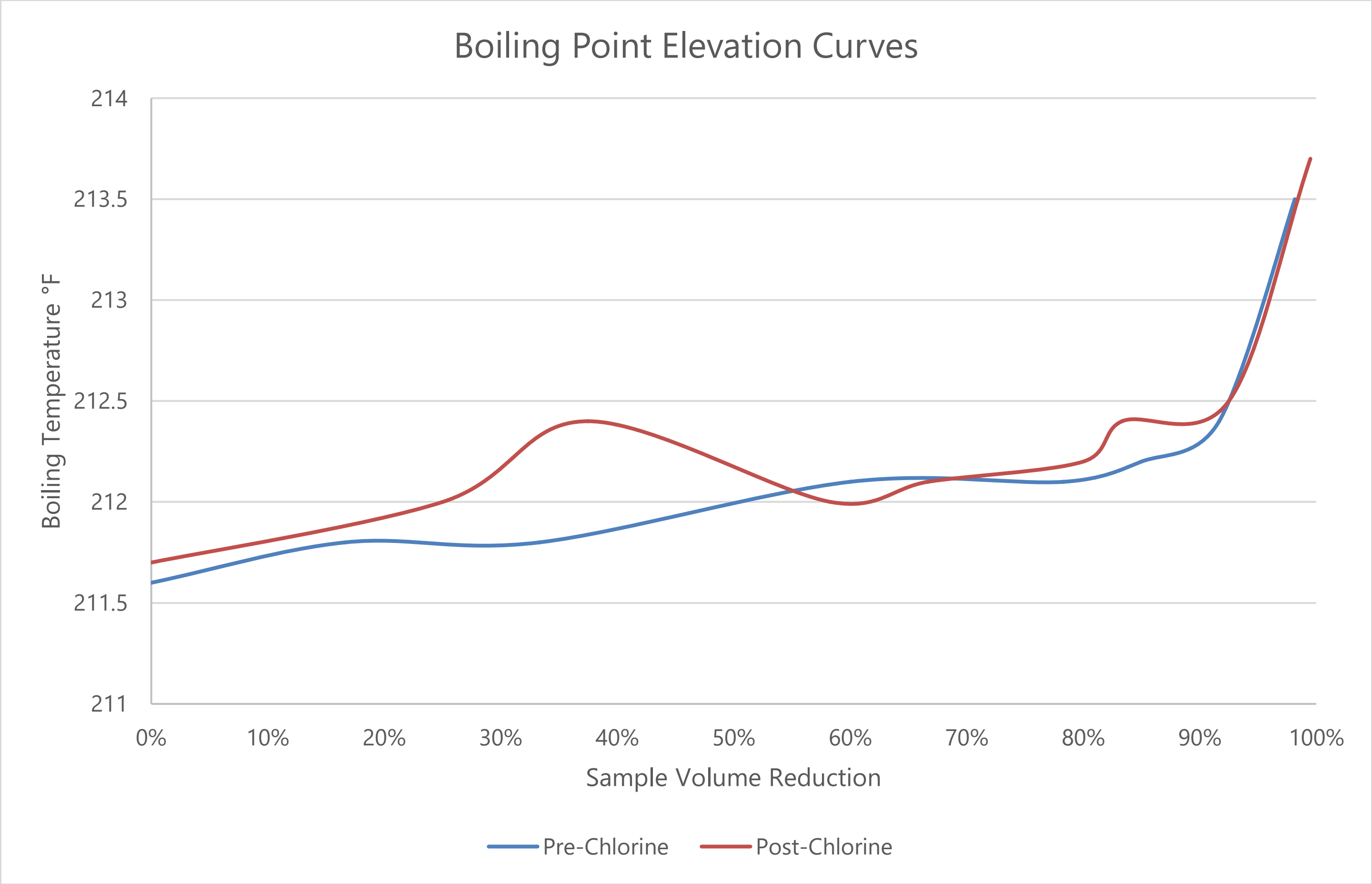
Post-Chlorine: Before

Post-Chlorine: After Anti-Foam (HT-60)

End Point

The end point for your evaporation cycle will be based on reaching the primary cycle timer count down or the redundant high fluid temperature set-point. We strongly recommend pumping out the concentrated residue at the end of this cycle to help keep suspended solids from encroaching on the heat exchanger. The factory setting for the cycle timer and redundant high fluid temperature will be based on the size/evaporation rate of the evaporator model you select. Please reference the table below for recommended end point concentration.

Sample #	Sample Name	Evaporator Model #	Proposed % Reduction	High Temp °F	Hours of Run Time	Volume Processed
1	**Pre-Chlorine**	**P66V4-438**	98%	213.5°	175	78,250 gallons
2	**Post-Chlorine**	**P66V4-438**	99%	213.6°	354	156,000 gallons
1	**Pre-Chlorine**	**P33V4-438**	95%	213.0°	68	31,300 gallons
2	**Post-Chlorine**	**P33V4-438**	95%	213.0°	68	31,300 gallons



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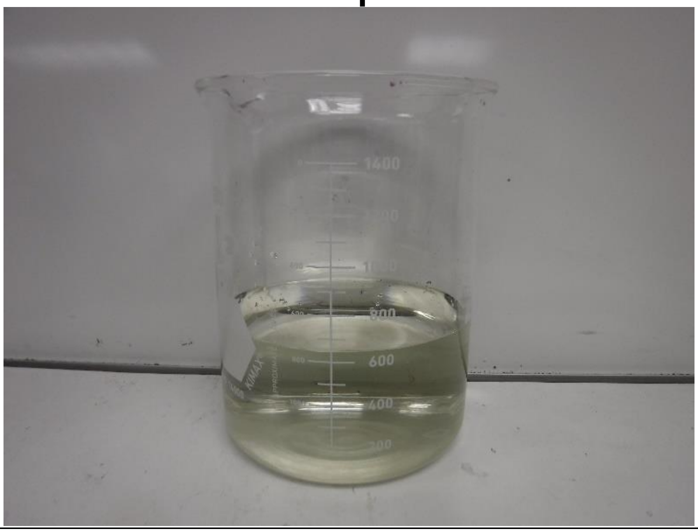
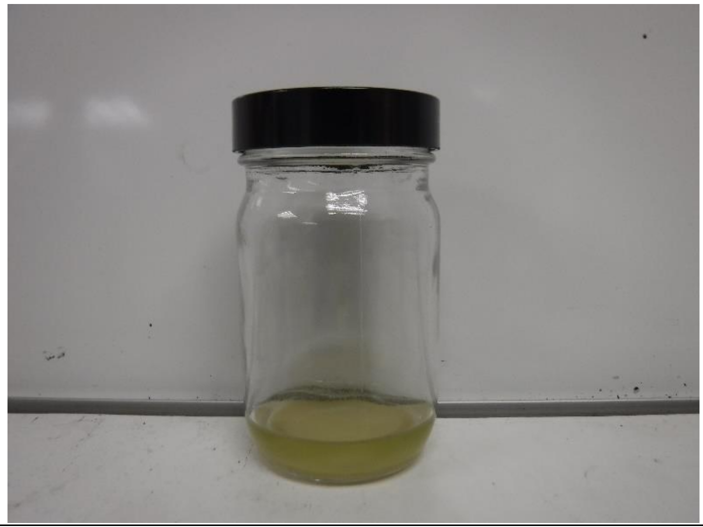
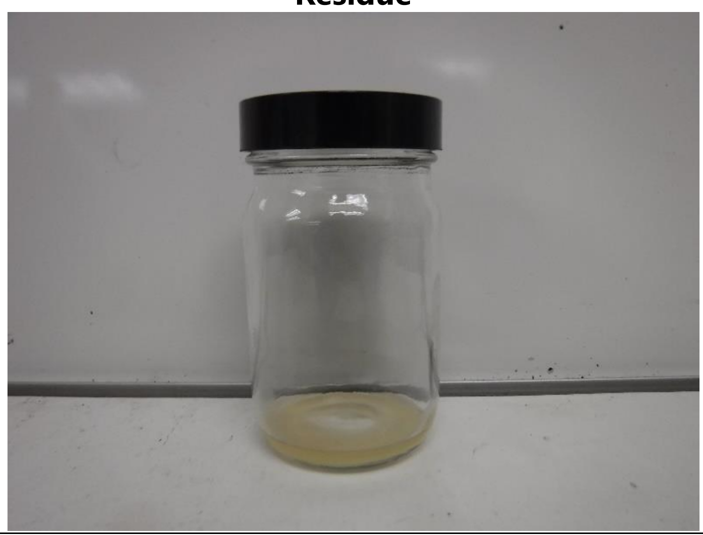
ENCON EVAPORATORS ENERGY CONSCIOUS INNOVATION

Images: Pre-Chlorine	
Sample	**Residue**
	

Images: Post-Chlorine	
Sample	**Residue**
	

Regulatory

Please note that in most cases the wastewater processed through our **ENCON** evaporators is non-hazardous. If the subject wastewater is hazardous or requires an air permit it is the responsibility of the customer to secure appropriate exemptions or permits. However, **ENCON** will assist in this endeavor wherever possible.

Conclusion

Based on the results of our pilot bench scale testing, your waste stream represented by the samples you submitted qualifies as a feasible application for the **ENCON** Thermal Evaporator System. We also recommend the optional Anti-Foam Dosing System and Auto-Dump/Auto-Restart System to maximize your reduction percentage and decrease maintenance requirements. Please inform us if chemistry changes are made to the tested application, or if additional waste streams are being considered for the evaporator.

We look forward to continuing to work with you and other key personnel at **ReUse** on the successful implementation of an **ENCON** Thermal Evaporator system.

Sincerely,

Chris Wise
ENCON Evaporators

4411 S Interstate 35, Ste 100
Georgetown, Texas 78626
www.reuseinn.com
TX PE Firm 21880

APPENDIX C

WWTF Effluent Laboratory Report of Analysis

Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

Attn: Mr. Rane A. Wilson
reUse Engineering
4411 S. Interstate 35,
Suite 100
Georgetown, Texas 78626

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JOB DESCRIPTION

Wastewater Testing
Forest Glenn

JOB NUMBER

840-3317-1

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio TX 78238

See page two for job notes and contact information.

Eurofins San Antonio

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Authorization

Authorized for release by
Irene Vann, Project Manager
Irene.Vann@et.eurofinsus.com
(210)509-3334

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

Table of Contents

Client: reUse Engineering
Project/Site: Wastewater Testing

Job ID: 840-3317-1
SDG: Forest Glenn

Qualifiers

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 840-3317-1 — Eurofins San Antonio

Job Narrative
840-3317-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 1/18/2024 3:28 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 8.0°C

Receipt Exceptions
The container count for the following sample did not match what was listed on the Chain-of-Custody (COC): Post Chlorine (840-3317-1).
The laboratory received 4 total containers, while the COC lists 17 total containers.

GC/MS VOA
Method 8260D: The continuing calibration verification (CCV) associated with batch 860-141596 recovered above the upper control limit for Dichloro difluoromethane The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated sample is impacted: (CCVIS 860-141596/2).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC Semi VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Client Sample ID: Post Chlorine

Lab Sample ID: 840-3317-1

Date Collected: 01/18/24 13:30
Date Received: 01/18/24 15:28

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	<0.00124		0.0100	0.00124	mg/L			01/23/24 01:44	1
cis-1,2-Dichloroethene	<0.000457		0.00100	0.000457	mg/L			01/23/24 01:44	1
cis-1,3-Dichloropropene	<0.00107		0.00500	0.00107	mg/L			01/23/24 01:44	1
Isopropylbenzene	<0.000592		0.00100	0.000592	mg/L			01/23/24 01:44	1
m,p-Xylenes	<0.00124		0.0100	0.00124	mg/L			01/23/24 01:44	1
n-Butylbenzene	<0.000510		0.00100	0.000510	mg/L			01/23/24 01:44	1
N-Propylbenzene	<0.000429		0.00100	0.000429	mg/L			01/23/24 01:44	1
o-Xylene	<0.000502		0.00100	0.000502	mg/L			01/23/24 01:44	1
p-Cymene (p-Isopropyltoluene)	<0.000676		0.00100	0.000676	mg/L			01/23/24 01:44	1
tert-Butylbenzene	<0.000442		0.00100	0.000442	mg/L			01/23/24 01:44	1
trans-1,2-Dichloroethene	<0.000368		0.00100	0.000368	mg/L			01/23/24 01:44	1
trans-1,3-Dichloropropene	<0.00127		0.00500	0.00127	mg/L			01/23/24 01:44	1
Vinyl chloride	<0.000428		0.00200	0.000428	mg/L			01/23/24 01:44	1
1,1,1,2-Tetrachloroethane	<0.000644		0.00100	0.000644	mg/L			01/23/24 01:44	1
1,1,1-Trichloroethane	<0.000585		0.00500	0.000585	mg/L			01/23/24 01:44	1
1,1,2,2-Tetrachloroethane	<0.000470		0.00100	0.000470	mg/L			01/23/24 01:44	1
1,1,2-Trichloroethane	<0.000411		0.00100	0.000411	mg/L			01/23/24 01:44	1
1,1-Dichloroethane	<0.000635		0.00100	0.000635	mg/L			01/23/24 01:44	1
Acetonitrile	<0.0146		0.100	0.0146	mg/L			01/23/24 01:44	1
1,1-Dichloroethene	<0.000738		0.00100	0.000738	mg/L			01/23/24 01:44	1
1,1-Dichloropropene	<0.000624		0.00500	0.000624	mg/L			01/23/24 01:44	1
1,2,3-Trichlorobenzene	<0.00177		0.00500	0.00177	mg/L			01/23/24 01:44	1
1,2,3-Trichloropropane	<0.000470		0.00100	0.000470	mg/L			01/23/24 01:44	1
1,2,4-Trichlorobenzene	<0.00175		0.00500	0.00175	mg/L			01/23/24 01:44	1
1,2,4-Trimethylbenzene	<0.000417		0.00100	0.000417	mg/L			01/23/24 01:44	1
1,2-Dibromo-3-Chloropropane	<0.000671		0.00500	0.000671	mg/L			01/23/24 01:44	1
1,2-Dibromoethane	<0.000999		0.00500	0.000999	mg/L			01/23/24 01:44	1
1,2-Dichlorobenzene	<0.000429		0.00100	0.000429	mg/L			01/23/24 01:44	1
1,2-Dichloroethane	<0.000372		0.00100	0.000372	mg/L			01/23/24 01:44	1
1,2-Dichloropropane	<0.000556		0.00500	0.000556	mg/L			01/23/24 01:44	1
1,3,5-Trimethylbenzene	<0.000411		0.00100	0.000411	mg/L			01/23/24 01:44	1
1,3-Dichlorobenzene	<0.000413		0.00100	0.000413	mg/L			01/23/24 01:44	1
1,3-Dichloropropane	<0.000514		0.00500	0.000514	mg/L			01/23/24 01:44	1
1,4-Dichlorobenzene	<0.000449		0.00100	0.000449	mg/L			01/23/24 01:44	1
2,2-Dichloropropane	<0.000679		0.00500	0.000679	mg/L			01/23/24 01:44	1
2-Butanone	<0.00828		0.0500	0.00828	mg/L			01/23/24 01:44	1
4-Chlorotoluene	<0.000386		0.00100	0.000386	mg/L			01/23/24 01:44	1
Benzene	<0.000460		0.00100	0.000460	mg/L			01/23/24 01:44	1
Bromobenzene	<0.000486		0.00100	0.000486	mg/L			01/23/24 01:44	1
Bromochloromethane	<0.000577		0.00100	0.000577	mg/L			01/23/24 01:44	1
Bromodichloromethane	<0.000552		0.00100	0.000552	mg/L			01/23/24 01:44	1
Bromoform	<0.000633		0.00500	0.000633	mg/L			01/23/24 01:44	1
Bromomethane	<0.00142		0.00500	0.00142	mg/L			01/23/24 01:44	1
Carbon tetrachloride	<0.000896		0.00500	0.000896	mg/L			01/23/24 01:44	1
Chlorobenzene	<0.000455		0.00100	0.000455	mg/L			01/23/24 01:44	1
Chloroethane	<0.00198		0.0100	0.00198	mg/L			01/23/24 01:44	1
Chloroform	**0.00143**		0.00100	0.000464	mg/L			01/23/24 01:44	1
Chloromethane	<0.00204		0.0100	0.00204	mg/L			01/23/24 01:44	1
Dibromochloromethane	<0.000547		0.00500	0.000547	mg/L			01/23/24 01:44	1

Client Sample ID: Post Chlorine

Lab Sample ID: 840-3317-1

Date Collected: 01/18/24 13:30

Matrix: Water

Date Received: 01/18/24 15:28

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	<0.000785		0.00100	0.000785	mg/L			01/23/24 01:44	1
Ethylbenzene	<0.000385		0.00100	0.000385	mg/L			01/23/24 01:44	1
Hexachlorobutadiene	<0.000627		0.00500	0.000627	mg/L			01/23/24 01:44	1
MTBE	<0.00139		0.00500	0.00139	mg/L			01/23/24 01:44	1
Methylene Chloride	<0.00173		0.00500	0.00173	mg/L			01/23/24 01:44	1
Naphthalene	<0.00135		0.0100	0.00135	mg/L			01/23/24 01:44	1
sec-Butylbenzene	<0.000468		0.00100	0.000468	mg/L			01/23/24 01:44	1
Styrene	<0.000619		0.00100	0.000619	mg/L			01/23/24 01:44	1
Tetrachloroethene	<0.000655		0.00100	0.000655	mg/L			01/23/24 01:44	1
Toluene	<0.000475		0.00100	0.000475	mg/L			01/23/24 01:44	1
Trichloroethene	<0.00150		0.00500	0.00150	mg/L			01/23/24 01:44	1
Trichlorofluoromethane	<0.000560		0.00100	0.000560	mg/L			01/23/24 01:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*63 - 144*		*01/23/24 01:44*	*1*
4-Bromofluorobenzene (Surr)	*94*		*74 - 124*		*01/23/24 01:44*	*1*
Dibromofluoromethane (Surr)	*100*		*75 - 131*		*01/23/24 01:44*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*01/23/24 01:44*	*1*

Method: SW846 8015C - Alcohols with GC/FID Direct Aqueous Injection

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	<460		1000	460	ug/L		01/23/24 08:45	01/24/24 13:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetone	*95*		*54 - 130*	*01/23/24 08:45*	*01/24/24 13:30*	*1*
Acetone	*95*		*54 - 130*	*01/23/24 08:45*	*01/24/24 13:30*	*1*

Method: SW846 8015D - Glycols- Direct Injection (GC/FID)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylene glycol	<1.22		5.00	1.22	mg/L			01/23/24 11:41	1

Method: SW846 8315A - Carbonyl Compounds by HPLC

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	<27.0		60.0	27.0	ug/L		01/20/24 15:06	01/22/24 16:55	1
Acetaldehyde	<30.0		60.0	30.0	ug/L		01/20/24 15:06	01/22/24 16:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Butyraldehyde	*110*		*60 - 130*	*01/20/24 15:06*	*01/22/24 16:55*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	<0.0510		0.100	0.0510	mg/L			01/24/24 21:02	1
pH (SW846 9040C)	**7.8**	**HF**			SU			01/26/24 17:25	1
Specific Conductance (SM 2510B)	**2190**		10.0	10.0	umho/cm @ 25C			01/26/24 10:40	1
Sulfide (SM 4500 S2 D)	<0.0400		0.100	0.0400	mg/L			01/23/24 13:50	1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(63-144)	(74-124)	(75-131)	(80-120)
840-3317-1	Post Chlorine	103	94	100	99
LCS 860-141596/3	Lab Control Sample	97	98	97	100
LCSD 860-141596/4	Lab Control Sample Dup	97	97	98	100
MB 860-141596/10	Method Blank	101	94	101	97

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8015C - Alcohols with GC/FID Direct Aqueous Injection

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		Acetone1	Acetone2
Lab Sample ID	Client Sample ID	(54-130)	(54-130)
840-3317-1	Post Chlorine	95	95
840-3317-1 MS	Post Chlorine	98	99
840-3317-1 MSD	Post Chlorine	100	98
LCS 410-465713/2-A	Lab Control Sample	102	104
LCSD 410-465713/3-A	Lab Control Sample Dup	102	104
MB 410-465713/1-A	Method Blank	102	104

Surrogate Legend

Acetone = Acetone

Method: 8315A - Carbonyl Compounds by HPLC

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		BTRA
Lab Sample ID	Client Sample ID	(60-130)
840-3317-1	Post Chlorine	110
LCS 410-465138/2-A	Lab Control Sample	109
LCSD 410-465138/3-A	Lab Control Sample Dup	109
MB 410-465138/1-A	Method Blank	104

Surrogate Legend

BTRA = Butyraldehyde

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 860-141596/10
Matrix: Water
Analysis Batch: 141596

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	<0.00124		0.0100	0.00124	mg/L			01/23/24 00:01	1
cis-1,2-Dichloroethene	<0.000457		0.00100	0.000457	mg/L			01/23/24 00:01	1
cis-1,3-Dichloropropene	<0.00107		0.00500	0.00107	mg/L			01/23/24 00:01	1
Isopropylbenzene	<0.000592		0.00100	0.000592	mg/L			01/23/24 00:01	1
m,p-Xylenes	<0.00124		0.0100	0.00124	mg/L			01/23/24 00:01	1
n-Butylbenzene	<0.000510		0.00100	0.000510	mg/L			01/23/24 00:01	1
N-Propylbenzene	<0.000429		0.00100	0.000429	mg/L			01/23/24 00:01	1
o-Xylene	<0.000502		0.00100	0.000502	mg/L			01/23/24 00:01	1
p-Cymene (p-Isopropyltoluene)	<0.000676		0.00100	0.000676	mg/L			01/23/24 00:01	1
tert-Butylbenzene	<0.000442		0.00100	0.000442	mg/L			01/23/24 00:01	1
trans-1,2-Dichloroethene	<0.000368		0.00100	0.000368	mg/L			01/23/24 00:01	1
trans-1,3-Dichloropropene	<0.00127		0.00500	0.00127	mg/L			01/23/24 00:01	1
Vinyl chloride	<0.000428		0.00200	0.000428	mg/L			01/23/24 00:01	1
1,1,1,2-Tetrachloroethane	<0.000644		0.00100	0.000644	mg/L			01/23/24 00:01	1
1,1,1-Trichloroethane	<0.000585		0.00500	0.000585	mg/L			01/23/24 00:01	1
1,1,2,2-Tetrachloroethane	<0.000470		0.00100	0.000470	mg/L			01/23/24 00:01	1
1,1,2-Trichloroethane	<0.000411		0.00100	0.000411	mg/L			01/23/24 00:01	1
1,1-Dichloroethane	<0.000635		0.00100	0.000635	mg/L			01/23/24 00:01	1
Acetonitrile	<0.0146		0.100	0.0146	mg/L			01/23/24 00:01	1
1,1-Dichloroethene	<0.000738		0.00100	0.000738	mg/L			01/23/24 00:01	1
1,1-Dichloropropene	<0.000624		0.00500	0.000624	mg/L			01/23/24 00:01	1
1,2,3-Trichlorobenzene	<0.00177		0.00500	0.00177	mg/L			01/23/24 00:01	1
1,2,3-Trichloropropane	<0.000470		0.00100	0.000470	mg/L			01/23/24 00:01	1
1,2,4-Trichlorobenzene	<0.00175		0.00500	0.00175	mg/L			01/23/24 00:01	1
1,2,4-Trimethylbenzene	<0.000417		0.00100	0.000417	mg/L			01/23/24 00:01	1
1,2-Dibromo-3-Chloropropane	<0.000671		0.00500	0.000671	mg/L			01/23/24 00:01	1
1,2-Dibromoethane	<0.000999		0.00500	0.000999	mg/L			01/23/24 00:01	1
1,2-Dichlorobenzene	<0.000429		0.00100	0.000429	mg/L			01/23/24 00:01	1
1,2-Dichloroethane	<0.000372		0.00100	0.000372	mg/L			01/23/24 00:01	1
1,2-Dichloropropane	<0.000556		0.00500	0.000556	mg/L			01/23/24 00:01	1
1,3,5-Trimethylbenzene	<0.000411		0.00100	0.000411	mg/L			01/23/24 00:01	1
1,3-Dichlorobenzene	<0.000413		0.00100	0.000413	mg/L			01/23/24 00:01	1
1,3-Dichloropropane	<0.000514		0.00500	0.000514	mg/L			01/23/24 00:01	1
1,4-Dichlorobenzene	<0.000449		0.00100	0.000449	mg/L			01/23/24 00:01	1
2,2-Dichloropropane	<0.000679		0.00500	0.000679	mg/L			01/23/24 00:01	1
2-Butanone	<0.00828		0.0500	0.00828	mg/L			01/23/24 00:01	1
4-Chlorotoluene	<0.000386		0.00100	0.000386	mg/L			01/23/24 00:01	1
Benzene	<0.000460		0.00100	0.000460	mg/L			01/23/24 00:01	1
Bromobenzene	<0.000486		0.00100	0.000486	mg/L			01/23/24 00:01	1
Bromochloromethane	<0.000577		0.00100	0.000577	mg/L			01/23/24 00:01	1
Bromodichloromethane	<0.000552		0.00100	0.000552	mg/L			01/23/24 00:01	1
Bromoform	<0.000633		0.00500	0.000633	mg/L			01/23/24 00:01	1
Bromomethane	<0.00142		0.00500	0.00142	mg/L			01/23/24 00:01	1
Carbon tetrachloride	<0.000896		0.00500	0.000896	mg/L			01/23/24 00:01	1
Chlorobenzene	<0.000455		0.00100	0.000455	mg/L			01/23/24 00:01	1
Chloroethane	<0.00198		0.0100	0.00198	mg/L			01/23/24 00:01	1
Chloroform	<0.000464		0.00100	0.000464	mg/L			01/23/24 00:01	1
Chloromethane	<0.00204		0.0100	0.00204	mg/L			01/23/24 00:01	1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 860-141596/10
Matrix: Water
Analysis Batch: 141596

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromochloromethane	<0.000547		0.00500	0.000547	mg/L			01/23/24 00:01	1
Dichlorodifluoromethane	<0.000785		0.00100	0.000785	mg/L			01/23/24 00:01	1
Ethylbenzene	<0.000385		0.00100	0.000385	mg/L			01/23/24 00:01	1
Hexachlorobutadiene	<0.000627		0.00500	0.000627	mg/L			01/23/24 00:01	1
MTBE	<0.00139		0.00500	0.00139	mg/L			01/23/24 00:01	1
Methylene Chloride	<0.00173		0.00500	0.00173	mg/L			01/23/24 00:01	1
Naphthalene	<0.00135		0.0100	0.00135	mg/L			01/23/24 00:01	1
sec-Butylbenzene	<0.000468		0.00100	0.000468	mg/L			01/23/24 00:01	1
Styrene	<0.000619		0.00100	0.000619	mg/L			01/23/24 00:01	1
Tetrachloroethene	<0.000655		0.00100	0.000655	mg/L			01/23/24 00:01	1
Toluene	<0.000475		0.00100	0.000475	mg/L			01/23/24 00:01	1
Trichloroethene	<0.00150		0.00500	0.00150	mg/L			01/23/24 00:01	1
Trichlorofluoromethane	<0.000560		0.00100	0.000560	mg/L			01/23/24 00:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*63 - 144*		*01/23/24 00:01*	*1*
4-Bromofluorobenzene (Surr)	*94*		*74 - 124*		*01/23/24 00:01*	*1*
Dibromofluoromethane (Surr)	*101*		*75 - 131*		*01/23/24 00:01*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*01/23/24 00:01*	*1*

Lab Sample ID: LCS 860-141596/3
Matrix: Water
Analysis Batch: 141596

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	0.0500	0.05492		mg/L		110	75 - 125
cis-1,3-Dichloropropene	0.0500	0.05474		mg/L		109	74 - 125
Isopropylbenzene	0.0500	0.05637		mg/L		113	75 - 125
m,p-Xylenes	0.0500	0.05606		mg/L		112	75 - 125
n-Butylbenzene	0.0500	0.05311		mg/L		106	75 - 125
N-Propylbenzene	0.0500	0.05494		mg/L		110	75 - 125
o-Xylene	0.0500	0.05646		mg/L		113	75 - 125
p-Cymene (p-Isopropyltoluene)	0.0500	0.05593		mg/L		112	75 - 125
tert-Butylbenzene	0.0500	0.05659		mg/L		113	75 - 125
trans-1,2-Dichloroethene	0.0500	0.05679		mg/L		114	75 - 125
trans-1,3-Dichloropropene	0.0500	0.05532		mg/L		111	66 - 125
Vinyl chloride	0.0500	0.05299		mg/L		106	60 - 140
1,1,1,2-Tetrachloroethane	0.0500	0.05632		mg/L		113	72 - 125
1,1,1-Trichloroethane	0.0500	0.05334		mg/L		107	70 - 130
1,1,2,2-Tetrachloroethane	0.0500	0.05243		mg/L		105	74 - 125
1,1,2-Trichloroethane	0.0500	0.05568		mg/L		111	75 - 130
1,1-Dichloroethane	0.0500	0.05893		mg/L		118	71 - 130
Acetonitrile	0.500	0.4852		mg/L		97	60 - 140
1,1-Dichloroethene	0.0500	0.05195		mg/L		104	50 - 150
1,1-Dichloropropene	0.0500	0.05217		mg/L		104	75 - 125
1,2,3-Trichlorobenzene	0.0500	0.05484		mg/L		110	75 - 137
1,2,3-Trichloropropane	0.0500	0.05476		mg/L		110	75 - 125
1,2,4-Trichlorobenzene	0.0500	0.05444		mg/L		109	75 - 135

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 860-141596/3
Matrix: Water
Analysis Batch: 141596

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,2,4-Trimethylbenzene	0.0500	0.05705		mg/L		114	75 - 125
1,2-Dibromo-3-Chloropropane	0.0500	0.05672		mg/L		113	59 - 125
1,2-Dibromoethane	0.0500	0.05621		mg/L		112	73 - 125
1,2-Dichlorobenzene	0.0500	0.05613		mg/L		112	75 - 125
1,2-Dichloroethane	0.0500	0.05393		mg/L		108	72 - 130
1,2-Dichloropropane	0.0500	0.05548		mg/L		111	74 - 125
1,3,5-Trimethylbenzene	0.0500	0.05620		mg/L		112	60 - 140
1,3-Dichlorobenzene	0.0500	0.05521		mg/L		110	75 - 125
1,3-Dichloropropane	0.0500	0.05483		mg/L		110	75 - 125
1,4-Dichlorobenzene	0.0500	0.05463		mg/L		109	75 - 125
2,2-Dichloropropane	0.0500	0.05165		mg/L		103	75 - 125
2-Butanone	0.250	0.2443		mg/L		98	60 - 140
4-Chlorotoluene	0.0500	0.05475		mg/L		110	74 - 125
Benzene	0.0500	0.05488		mg/L		110	75 - 125
Bromobenzene	0.0500	0.05611		mg/L		112	75 - 125
Bromochloromethane	0.0500	0.05749		mg/L		115	60 - 140
Bromodichloromethane	0.0500	0.05603		mg/L		112	75 - 125
Bromoform	0.0500	0.05840		mg/L		117	70 - 130
Bromomethane	0.0500	0.05355		mg/L		107	60 - 140
Carbon tetrachloride	0.0500	0.05295		mg/L		106	70 - 125
Chlorobenzene	0.0500	0.05559		mg/L		111	82 - 135
Chloroethane	0.0500	0.05343		mg/L		107	60 - 140
Chloroform	0.0500	0.05494		mg/L		110	70 - 121
Chloromethane	0.0500	0.05742		mg/L		115	60 - 140
Dibromochloromethane	0.0500	0.05807		mg/L		116	73 - 125
Dichlorodifluoromethane	0.0500	0.06586		mg/L		132	50 - 150
Ethylbenzene	0.0500	0.05516		mg/L		110	75 - 125
Hexachlorobutadiene	0.0500	0.05468		mg/L		109	75 - 125
MTBE	0.0500	0.05805		mg/L		116	65 - 135
Methylene Chloride	0.0500	0.05265		mg/L		105	71 - 125
Naphthalene	0.0500	0.05728		mg/L		115	70 - 130
sec-Butylbenzene	0.0500	0.05466		mg/L		109	75 - 125
Styrene	0.0500	0.05735		mg/L		115	75 - 125
Tetrachloroethene	0.0500	0.05468		mg/L		109	71 - 125
Toluene	0.0500	0.05556		mg/L		111	75 - 130
Trichloroethene	0.0500	0.05863		mg/L		117	75 - 135
Trichlorofluoromethane	0.0500	0.05260		mg/L		105	60 - 140

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*63 - 144*
4-Bromofluorobenzene (Surr)	*98*		*74 - 124*
Dibromofluoromethane (Surr)	*97*		*75 - 131*
Toluene-d8 (Surr)	*100*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 860-141596/4
Matrix: Water
Analysis Batch: 141596

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	0.0500	0.05056		mg/L		101	75 - 125	8	25
cis-1,3-Dichloropropene	0.0500	0.05153		mg/L		103	74 - 125	6	25
Isopropylbenzene	0.0500	0.05187		mg/L		104	75 - 125	8	25
m,p-Xylenes	0.0500	0.05202		mg/L		104	75 - 125	7	25
n-Butylbenzene	0.0500	0.04883		mg/L		98	75 - 125	8	25
N-Propylbenzene	0.0500	0.05006		mg/L		100	75 - 125	9	25
o-Xylene	0.0500	0.05260		mg/L		105	75 - 125	7	25
p-Cymene (p-Isopropyltoluene)	0.0500	0.05143		mg/L		103	75 - 125	8	25
tert-Butylbenzene	0.0500	0.05179		mg/L		104	75 - 125	9	25
trans-1,2-Dichloroethene	0.0500	0.05225		mg/L		105	75 - 125	8	25
trans-1,3-Dichloropropene	0.0500	0.05246		mg/L		105	66 - 125	5	25
Vinyl chloride	0.0500	0.04710		mg/L		94	60 - 140	12	25
1,1,1,2-Tetrachloroethane	0.0500	0.05309		mg/L		106	72 - 125	6	25
1,1,1-Trichloroethane	0.0500	0.04929		mg/L		99	70 - 130	8	25
1,1,2,2-Tetrachloroethane	0.0500	0.04933		mg/L		99	74 - 125	6	25
1,1,2-Trichloroethane	0.0500	0.05369		mg/L		107	75 - 130	4	25
1,1-Dichloroethane	0.0500	0.05468		mg/L		109	71 - 130	7	25
Acetonitrile	0.500	0.4637		mg/L		93	60 - 140	5	25
1,1-Dichloroethene	0.0500	0.04901		mg/L		98	50 - 150	6	25
1,1-Dichloropropene	0.0500	0.04776		mg/L		96	75 - 125	9	25
1,2,3-Trichlorobenzene	0.0500	0.05122		mg/L		102	75 - 137	7	25
1,2,3-Trichloropropane	0.0500	0.05008		mg/L		100	75 - 125	9	25
1,2,4-Trichlorobenzene	0.0500	0.05037		mg/L		101	75 - 135	8	25
1,2,4-Trimethylbenzene	0.0500	0.05211		mg/L		104	75 - 125	9	25
1,2-Dibromo-3-Chloropropane	0.0500	0.05315		mg/L		106	59 - 125	6	25
1,2-Dibromoethane	0.0500	0.05360		mg/L		107	73 - 125	5	25
1,2-Dichlorobenzene	0.0500	0.05190		mg/L		104	75 - 125	8	25
1,2-Dichloroethane	0.0500	0.05126		mg/L		103	72 - 130	5	25
1,2-Dichloropropane	0.0500	0.05209		mg/L		104	74 - 125	6	25
1,3,5-Trimethylbenzene	0.0500	0.05209		mg/L		104	60 - 140	8	25
1,3-Dichlorobenzene	0.0500	0.05134		mg/L		103	75 - 125	7	25
1,3-Dichloropropane	0.0500	0.05225		mg/L		104	75 - 125	5	25
1,4-Dichlorobenzene	0.0500	0.05010		mg/L		100	75 - 125	9	25
2,2-Dichloropropane	0.0500	0.04626		mg/L		93	75 - 125	11	25
2-Butanone	0.250	0.2290		mg/L		92	60 - 140	6	25
4-Chlorotoluene	0.0500	0.05014		mg/L		100	74 - 125	9	25
Benzene	0.0500	0.05105		mg/L		102	75 - 125	7	25
Bromobenzene	0.0500	0.05188		mg/L		104	75 - 125	8	25
Bromochloromethane	0.0500	0.05378		mg/L		108	60 - 140	7	25
Bromodichloromethane	0.0500	0.05296		mg/L		106	75 - 125	6	25
Bromoform	0.0500	0.05555		mg/L		111	70 - 130	5	25
Bromomethane	0.0500	0.04952		mg/L		99	60 - 140	8	25
Carbon tetrachloride	0.0500	0.04920		mg/L		98	70 - 125	7	25
Chlorobenzene	0.0500	0.05120		mg/L		102	82 - 135	8	25
Chloroethane	0.0500	0.04771		mg/L		95	60 - 140	11	25
Chloroform	0.0500	0.05076		mg/L		102	70 - 121	8	25
Chloromethane	0.0500	0.05315		mg/L		106	60 - 140	8	25
Dibromochloromethane	0.0500	0.05507		mg/L		110	73 - 125	5	25

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 860-141596/4
Matrix: Water
Analysis Batch: 141596

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Dichlorodifluoromethane	0.0500	0.05879		mg/L		118	50 - 150	11	25
Ethylbenzene	0.0500	0.05120		mg/L		102	75 - 125	7	25
Hexachlorobutadiene	0.0500	0.05065		mg/L		101	75 - 125	8	25
MTBE	0.0500	0.05662		mg/L		113	65 - 135	3	25
Methylene Chloride	0.0500	0.04934		mg/L		99	71 - 125	6	25
Naphthalene	0.0500	0.05413		mg/L		108	70 - 130	6	25
sec-Butylbenzene	0.0500	0.05032		mg/L		101	75 - 125	8	25
Styrene	0.0500	0.05308		mg/L		106	75 - 125	8	25
Tetrachloroethene	0.0500	0.05056		mg/L		101	71 - 125	8	25
Toluene	0.0500	0.05096		mg/L		102	75 - 130	9	25
Trichloroethene	0.0500	0.05437		mg/L		109	75 - 135	8	25
Trichlorofluoromethane	0.0500	0.04577		mg/L		92	60 - 140	14	25

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*63 - 144*
4-Bromofluorobenzene (Surr)	*97*		*74 - 124*
Dibromofluoromethane (Surr)	*98*		*75 - 131*
Toluene-d8 (Surr)	*100*		*80 - 120*

Method: 8015C - Alcohols with GC/FID Direct Aqueous Injection

Lab Sample ID: MB 410-465713/1-A
Matrix: Water
Analysis Batch: 468619

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 465713

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	<460		1000	460	ug/L		01/23/24 08:45	01/24/24 12:05	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetone	*102*		*54 - 130*	*01/23/24 08:45*	*01/24/24 12:05*	*1*
Acetone	*104*		*54 - 130*	*01/23/24 08:45*	*01/24/24 12:05*	*1*

Lab Sample ID: LCS 410-465713/2-A
Matrix: Water
Analysis Batch: 468619

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 465713

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methanol	2510	2725		ug/L		109	74 - 134

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Acetone	*102*		*54 - 130*
Acetone	*104*		*54 - 130*

Method: 8015C - Alcohols with GC/FID Direct Aqueous Injection (Continued)

Lab Sample ID: LCSD 410-465713/3-A
Matrix: Water
Analysis Batch: 468619

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 465713

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methanol			2510	2689		ug/L		107	74 - 134	1	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Acetone	*102*		*54 - 130*
Acetone	*104*		*54 - 130*

Lab Sample ID: 840-3317-1 MS
Matrix: Water
Analysis Batch: 468619

Client Sample ID: Post Chlorine
Prep Type: Total/NA
Prep Batch: 465713

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Methanol	<460		2510	2536		ug/L		101	74 - 134

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Acetone	*98*		*54 - 130*
Acetone	*99*		*54 - 130*

Lab Sample ID: 840-3317-1 MSD
Matrix: Water
Analysis Batch: 468619

Client Sample ID: Post Chlorine
Prep Type: Total/NA
Prep Batch: 465713

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methanol	<460		2510	2560		ug/L		102	74 - 134	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Acetone	*100*		*54 - 130*
Acetone	*98*		*54 - 130*

Method: 8015D - Glycols- Direct Injection (GC/FID)

Lab Sample ID: MB 860-141715/7
Matrix: Water
Analysis Batch: 141715

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylene glycol	<1.22		5.00	1.22	mg/L			01/23/24 10:06	1

Lab Sample ID: LCS 860-141715/3
Matrix: Water
Analysis Batch: 141715

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ethylene glycol			50.2	45.19		mg/L		90	71 - 132

Method: 8015D - Glycols- Direct Injection (GC/FID) (Continued)

Lab Sample ID: LCSD 860-141715/4
Matrix: Water
Analysis Batch: 141715

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ethylene glycol			50.2	44.29		mg/L		88	71 - 132	2	30

Method: 8315A - Carbonyl Compounds by HPLC

Lab Sample ID: MB 410-465138/1-A
Matrix: Water
Analysis Batch: 465466

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 465138

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	<27.0		60.0	27.0	ug/L		01/20/24 15:06	01/22/24 15:40	1
Acetaldehyde	<30.0		60.0	30.0	ug/L		01/20/24 15:06	01/22/24 15:40	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Butyraldehyde	*104*		*60 - 130*	*01/20/24 15:06*	*01/22/24 15:40*	*1*

Lab Sample ID: LCS 410-465138/2-A
Matrix: Water
Analysis Batch: 465466

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 465138

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Formaldehyde			500	515.9		ug/L		103	77 - 122
Acetaldehyde			503	576.5		ug/L		115	48 - 138

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Butyraldehyde	*109*		*60 - 130*

Lab Sample ID: LCSD 410-465138/3-A
Matrix: Water
Analysis Batch: 465466

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 465138

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Formaldehyde			500	509.5		ug/L		102	77 - 122	1	30
Acetaldehyde			503	572.5		ug/L		114	48 - 138	1	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Butyraldehyde	*109*		*60 - 130*

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 860-142151/64
Matrix: Water
Analysis Batch: 142151

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	<0.0510		0.100	0.0510	mg/L			01/24/24 20:14	1

Method: 350.1 - Nitrogen, Ammonia (Continued)

Lab Sample ID: LCS 860-142151/65
Matrix: Water
Analysis Batch: 142151

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	1.00	1.090		mg/L		109	90 - 110

Lab Sample ID: LCSD 860-142151/66
Matrix: Water
Analysis Batch: 142151

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Ammonia as N	1.00	1.097		mg/L		110	90 - 110	1	20

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 860-142367/2
Matrix: Water
Analysis Batch: 142367

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	<10.0		10.0	10.0	umho/cm @ 25C			01/26/24 10:40	1

Lab Sample ID: 840-3317-1 DU
Matrix: Water
Analysis Batch: 142367

Client Sample ID: Post Chlorine
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	2190		2182		umho/cm @ 25C		0.5	20

Method: SM 4500 S2 D - Sulfide, Total

Lab Sample ID: MB 860-141794/3
Matrix: Water
Analysis Batch: 141794

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	<0.0400		0.100	0.0400	mg/L			01/23/24 13:50	1

Lab Sample ID: LCS 860-141794/4
Matrix: Water
Analysis Batch: 141794

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Sulfide	1.00	1.017		mg/L		102	90 - 110

Lab Sample ID: LCSD 860-141794/5
Matrix: Water
Analysis Batch: 141794

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Sulfide	1.00	1.014		mg/L		101	90 - 110	0	20

Method: SM 4500 S2 D - Sulfide, Total (Continued)

Lab Sample ID: 840-3317-1 MS
Matrix: Water
Analysis Batch: 141794

Client Sample ID: Post Chlorine
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Sulfide	<0.0400		1.00	0.9326		mg/L		93	90 - 110		

Lab Sample ID: 840-3317-1 MSD
Matrix: Water
Analysis Batch: 141794

Client Sample ID: Post Chlorine
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Sulfide	<0.0400		1.00	0.9359		mg/L		94	90 - 110	0	20

GC/MS VOA

Analysis Batch: 141596

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8260D	
MB 860-141596/10	Method Blank	Total/NA	Water	8260D	
LCS 860-141596/3	Lab Control Sample	Total/NA	Water	8260D	
LCSD 860-141596/4	Lab Control Sample Dup	Total/NA	Water	8260D	

GC Semi VOA

Analysis Batch: 141715

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8015D	
MB 860-141715/7	Method Blank	Total/NA	Water	8015D	
LCS 860-141715/3	Lab Control Sample	Total/NA	Water	8015D	
LCSD 860-141715/4	Lab Control Sample Dup	Total/NA	Water	8015D	

Prep Batch: 465713

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8015 DAI Prep	
MB 410-465713/1-A	Method Blank	Total/NA	Water	8015 DAI Prep	
LCS 410-465713/2-A	Lab Control Sample	Total/NA	Water	8015 DAI Prep	
LCSD 410-465713/3-A	Lab Control Sample Dup	Total/NA	Water	8015 DAI Prep	
840-3317-1 MS	Post Chlorine	Total/NA	Water	8015 DAI Prep	
840-3317-1 MSD	Post Chlorine	Total/NA	Water	8015 DAI Prep	

Analysis Batch: 468619

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8015C	465713
MB 410-465713/1-A	Method Blank	Total/NA	Water	8015C	465713
LCS 410-465713/2-A	Lab Control Sample	Total/NA	Water	8015C	465713
LCSD 410-465713/3-A	Lab Control Sample Dup	Total/NA	Water	8015C	465713
840-3317-1 MS	Post Chlorine	Total/NA	Water	8015C	465713
840-3317-1 MSD	Post Chlorine	Total/NA	Water	8015C	465713

HPLC/IC

Prep Batch: 465138

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8315A Prep	
MB 410-465138/1-A	Method Blank	Total/NA	Water	8315A Prep	
LCS 410-465138/2-A	Lab Control Sample	Total/NA	Water	8315A Prep	
LCSD 410-465138/3-A	Lab Control Sample Dup	Total/NA	Water	8315A Prep	

Analysis Batch: 465466

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	8315A	465138
MB 410-465138/1-A	Method Blank	Total/NA	Water	8315A	465138
LCS 410-465138/2-A	Lab Control Sample	Total/NA	Water	8315A	465138
LCSD 410-465138/3-A	Lab Control Sample Dup	Total/NA	Water	8315A	465138

General Chemistry

Analysis Batch: 141794

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	SM 4500 S2 D	
MB 860-141794/3	Method Blank	Total/NA	Water	SM 4500 S2 D	
LCS 860-141794/4	Lab Control Sample	Total/NA	Water	SM 4500 S2 D	
LCSD 860-141794/5	Lab Control Sample Dup	Total/NA	Water	SM 4500 S2 D	
840-3317-1 MS	Post Chlorine	Total/NA	Water	SM 4500 S2 D	
840-3317-1 MSD	Post Chlorine	Total/NA	Water	SM 4500 S2 D	

Analysis Batch: 142151

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	350.1	
MB 860-142151/64	Method Blank	Total/NA	Water	350.1	
LCS 860-142151/65	Lab Control Sample	Total/NA	Water	350.1	
LCSD 860-142151/66	Lab Control Sample Dup	Total/NA	Water	350.1	

Analysis Batch: 142367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	SM 2510B	
MB 860-142367/2	Method Blank	Total/NA	Water	SM 2510B	
LCS 860-142367/3	Lab Control Sample	Total/NA	Water	SM 2510B	
LCSD 860-142367/4	Lab Control Sample Dup	Total/NA	Water	SM 2510B	
840-3317-1 DU	Post Chlorine	Total/NA	Water	SM 2510B	

Analysis Batch: 142458

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
840-3317-1	Post Chlorine	Total/NA	Water	9040C	

Client Sample ID: Post Chlorine
Date Collected: 01/18/24 13:30
Date Received: 01/18/24 15:28

Lab Sample ID: 840-3317-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	5 mL	5 mL	141596	01/23/24 01:44	NA	EET HOU
Total/NA	Prep	8015 DAI Prep			1 mL	1 mL	465713	01/23/24 08:45	WN7O	ELLE
Total/NA	Analysis	8015C		1			468619	01/24/24 13:30	WN7O	ELLE
Total/NA	Analysis	8015D		1	1 mL	1 mL	141715	01/23/24 11:41	JBS	EET HOU
Total/NA	Prep	8315A Prep			100 mL	10 mL	465138	01/20/24 15:06	U7CG	ELLE
Total/NA	Analysis	8315A		1	1 mL	1 mL	465466	01/22/24 16:55	GM5C	ELLE
Total/NA	Analysis	350.1		1	10 mL	10 mL	142151	01/24/24 21:02	ADL	EET HOU
Total/NA	Analysis	9040C		1			142458	01/26/24 17:25	KEG	EET HOU
Total/NA	Analysis	SM 2510B		1			142367	01/26/24 10:40	KEG	EET HOU
Total/NA	Analysis	SM 4500 S2 D		1	7.5 mL	7.5 mL	141794	01/23/24 13:50	SCI	EET HOU

Laboratory References:

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Laboratory: Eurofins Houston

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Texas	NELAP	T104704215-23-53	01-31-24

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	0001.01	11-30-24
A2LA	ISO/IEC 17025	0001.01	11-30-24
Alabama	State	43200	01-31-24
Alaska	State	PA00009	06-30-24
Alaska (UST)	State	17-027	02-28-24
Arizona	State	AZ0780	03-12-24
Arkansas DEQ	State	88-00660	08-09-24
California	State	2792	01-31-24
Colorado	State	PA00009	06-30-24
Connecticut	State	PH-0746	06-30-25
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-24
Delaware (DW)	State	N/A	01-31-24
Florida	NELAP	E87997	06-30-24
Georgia (DW)	State	C048	01-31-24
Hawaii	State	N/A	01-31-24
Illinois	NELAP	200027	01-31-25
Iowa	State	361	03-01-24
Kansas	NELAP	E-10151	10-31-24
Kentucky (DW)	State	KY90088	12-31-24
Kentucky (UST)	State	0001.01	11-30-24
Kentucky (WW)	State	KY90088	12-31-23 *
Louisiana (All)	NELAP	02055	06-30-24
Maine	State	2019012	03-12-25
Maryland	State	100	06-30-24
Massachusetts	State	M-PA009	06-30-24
Michigan	State	9930	01-31-25
Minnesota	NELAP	042-999-487	12-31-24
Mississippi	State	023	01-31-25
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-25
Nebraska	State	NE-OS-32-17	01-31-24
New Hampshire	NELAP	2730	01-10-25
New Jersey	NELAP	PA011	06-30-24
New York	NELAP	10670	04-01-24
North Carolina (DW)	State	42705	07-31-24
North Carolina (WW/SW)	State	521	12-31-24
North Dakota	State	R-205	01-31-24
Oklahoma	NELAP	9804	08-31-24
Oregon	NELAP	PA200001	09-11-24
Pennsylvania	NELAP	36-00037	01-31-25
Quebec Ministry of Environment and Fight against Climate Change	PALA	507	09-16-24
Rhode Island	State	LAO00338	12-30-24
South Carolina	State	89002	01-31-24
Tennessee	State	02838	01-31-24

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Client: reUse Engineering | Job ID: 840-3317-1
Project/Site: Wastewater Testing | SDG: Forest Glenn

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Texas	NELAP	T104704194-23-46	08-31-24
USDA	US Federal Programs	525-22-298-19481	10-25-25
Vermont	State	VT - 36037	10-28-24
Virginia	NELAP	460182	06-14-25
Washington	State	C457	04-11-24
West Virginia (DW)	State	9906 C	01-31-25
West Virginia DEP	State	055	07-31-24
Wyoming	State	8TMS-L	01-31-24
Wyoming (UST)	A2LA	0001.01	11-30-24

Method Summary

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET HOU
8015C	Alcohols with GC/FID Direct Aqueous Injection	SW846	ELLE
8015D	Glycols- Direct Injection (GC/FID)	SW846	EET HOU
8315A	Carbonyl Compounds by HPLC	SW846	ELLE
350.1	Nitrogen, Ammonia	EPA	EET HOU
9040C	pH	SW846	EET HOU
SM 2510B	Conductivity, Specific Conductance	SM	EET HOU
SM 4500 S2 D	Sulfide, Total	SM	EET HOU
5030C	Purge and Trap	SW846	EET HOU
8015 DAI Prep	Preparation, Direct Aqueous Injection	SW846	ELLE
8315A Prep	Solid Phase Extraction (SPE)	SW846	ELLE

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Sample Summary

Client: reUse Engineering
Project/Site: Wastewater Testing

Job ID: 840-3317-1
SDG: Forest Glenn

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
840-3317-1	Post Chlorine	Water	01/18/24 13:30	01/18/24 15:28

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

840-3317 eurofins | Environment Testing

Client Information	Sampler: Damon Harrington	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-3467-457.1
Client Contact: Mr. Rane Wilson	Phone: 570-567-4297	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: reUse Engineering	PWSID:			Job #: 23.010.TX
Address: 4411 S. Interstate 35, Suite 100	Due Date Requested: Normal			
City: Georgetown	TAT Requested (days):			
State, Zip: TX, 78626	Compliance Project: ∆ Yes ∆ No			
Phone: 512-937-7790(Tel)	PO #: Purchase Order not required			
Email: rane@reuseeng.com	WO #: 23.010.TX			
Project Name: Wastewater Testing	Project #: 84000417			
Site: Forrest Glenn	SSOW#: N/A			

840-3317 Chain of Custody

Loc: 840
3317

Preservation Codes:
HCL; NaOH; Zn Acetate; Nitric Acid; NaHSO4; MeOH; Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA
M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2O3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - pH 4-5; Y - Trizma; Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform [redacted]	8315A - (MOD) Formaldehyde	8015C_DAI_7Day - (MOD) Ethlene Glycol 8015C	SM4500_S2_D - Sulfide, Total	350.1 - Nitrogen, Ammonia	2510B, 9040C	8260D - (MOD) Full List VOC 8260D	8015D_DAI_G - (MOD) Glycols	Total N	Special Instructions/Note:
				Preservation Code:			N	N	CB	S	N	A	N		
Pre-chlorine	1/18/24	1:00pm	G	Water											not taken
Post-chlorine	1/18/24	1:30pm	G	Water	X	X	X	X	X	X	X	X	X		Cooling process just begun

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Damon Harrington	1/18/24 15:26	reUse	[illegible signature]	1/18/24 15:28	EETA

Custody Seals Intact: ∆ Yes ∆ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 7.5/8.0 SAA001

Ver: 06/08/2021

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

840-3317 eurofins Environment Testing

Client Information	Sampler: Damon Harrington	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-3467-457.1
Client Contact: Mr. Rane Wilson	Phone: 570-567-4297	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: reUse Engineering	PWSID:			Job #: 23.010.TX
Address: 4411 S. Interstate 35, Suite 100	Due Date Requested: Normal			
City: Georgetown	TAT Requested (days):			
State, Zip: TX, 78626	Compliance Project: Δ Yes Δ No			
Phone: 512-937-7790(Tel)	PO #: Purchase Order not required			
Email: rane@reuseeng.com	WO #: 23.010.TX			
Project Name: Wastewater Testing	Project #: 84000417			
Site: Forrest Glenn	SSOW#: N/A			

840-3317 Chain of Custody

Loc: 840
3317

Preservation Codes:
HCL; NaOH; Zn Acetate; Nitric Acid; NaHSO4; MeOH; Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA
M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2O3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - pH 4-5; Y - Trizma; Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform [illegible]	8315A - (MOD) Formaldehyde	8015C_DAI_7Day - (MOD) Ethlene Glycol 8015C	SM4500_S2_D - Sulfide, Total	350.1 - Nitrogen, Ammonia	2510B, 9040C	8260D - (MOD) Full List VOC 8260D	8015D_DAI_G - (MOD) Glycols	Total Number of containers	Special Instructions/Note:
				Preservation Code:			N	N	CB	S	N	A	N		
Pre-chlorine	1/18/24	1:00pm	G	Water											not taken
Post-chlorine	1/18/24	1:30pm	G	Water	X	X	X	X	X	X	X	X	X		Cooling process just begun

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: Damon Harrington	Date/Time: 1/18/24 15:26	Company: reUse	Received by: [signature]	Date/Time: 1/18/24 15:28	Company: EETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 7.5/8.0 SAA001		

Ver: 06/08/2021

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

840-3317 eurofins Environment Testing

Client Information	Sampler: Damon Harrington	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-3467-457.1
Client Contact: Mr. Rane Wilson	Phone: 570-567-4297	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: reUse Engineering	PWSID:			Job #: 23.010.TX
Address: 4411 S. Interstate 35, Suite 100	Due Date Requested: Normal			
City: Georgetown	TAT Requested (days):			
State, Zip: TX, 78626	Compliance Project: Δ Yes Δ No			
Phone: 512-937-7790(Tel)	PO #: Purchase Order not required			
Email: rane@reuseeng.com	WO #: 23.010.TX			
Project Name: Wastewater Testing	Project #: 84000417			
Site: Forrest Glenn	SSOW#: N/A			

840-3317 Chain of Custody

Loc: 840
3317

Preservation Codes:

HCL	M - Hexane
NaOH	N - None
Zn Acetate	O - AsNaO2
Nitric Acid	P - Na2O4S
NaHSO4	Q - Na2SO3
MeOH	R - Na2S2O3
- Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Y - Trizma
	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	MS/MSD	8315A - (MOD) Formaldehyde	8015C_DAI_7Day - (MOD) Ethlene Glycol 8015C	SM4500_S2_D - Sulfide, Total	350.1 - Nitrogen, Ammonia	2510B, 9040C	8260D - (MOD) Full List VOC 8260D	8015D_DAI_G - (MOD) Glycols	Total N	Special Instructions/Note:
			Preservation Code:		X	X	N	N	CB	S	N	A	N	X	
Pre-chlorine	1/18/24	1:00pm	G	Water											not taken
Post-Chlorine	1/18/24	1:30pm	G	Water	X	X	X	X	X	X	X	X	X		
															Cooling process just begun

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Damon Harrington	Date/Time: 1/18/24 15:28	Company: reUse	Received by: [signature]	Date/Time: 1/18/24 15:28	Company: EETA
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 7.5/8.0 SAA001		

Ver: 06/08/2021

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

840-3317 eurofins Environment Testing

Client Information	Sampler: Damon Harrington	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-3467-457.1
Client Contact: Mr. Rane Wilson	Phone: 570-567-4297	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: reUse Engineering	PWSID:			Job #: 23.010.TX
Address: 4411 S. Interstate 35, Suite 100	Due Date Requested: Normal			
City: Georgetown	TAT Requested (days):			
State, Zip: TX, 78626	Compliance Project: Δ Yes Δ No			
Phone: 512-937-7790(Tel)	PO #: Purchase Order not required			
Email: rane@reuseeng.com	WO #: 23.010.TX			
Project Name: Wastewater Testing	Project #: 84000417			
Site: Forrest Glenn	SSOW#: N/A			

840-3317 Chain of Custody

Loc: 840
3317

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Y - Trizma
	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8315A - (MOD) Formaldehyde	8015C_DAI_7Day - (MOD) Ethlene Glycol 8015C	SM4500_S2_D - Sulfide, Total	350.1 - Nitrogen, Ammonia	2510B, 9040C	8260D - (MOD) Full List VOC 8260D	8015D_DAI_G - (MOD) Glycols	Total Number of containers	Special Instructions/Note:
				Preservation Code:	X	X	N	N	CB	S	N	A	N	X	
Pre-chlorine	1/18/24	1:00pm	G	Water											not taken
Post-chlorine	1/18/24	1:30pm	G	Water	X	X	X	X	X	X	X	X	X		Cooling process just begun

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Damon Harrington	1/18/24 15:28	reUse	Irene Vann	1/18/24 15:28	ETA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 7.5/8.0 SAA001

Ver: 06/08/2021

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-2995.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin: Texas	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - Texas		Job #: 840-3317-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 1/29/2024	Analysis Requested		Preservation Codes:
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: Wastewater Testing	Project #: 84000417			
Site:	SSOW#:			

Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015C_DAI_7Day/8015_DAI_Prep (MOD) Ethlene Glycol 8015C	8315A/8315A_W_Prep (MOD) Formaldehyde	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
Post Chlorine (840-3317-1)	1/18/24	13:30 Central		Water			X	X	17	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing South Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing South Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing South Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing South Central, LLC.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* ______ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Irene Vann	1/19/24 17:00	ETSA			
			[illegible]	1/20/24 1145	ELLE

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: R: 1.2 C: 0.5

Ver: 06/08/2021

2/5/2024

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-2995.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin: Texas	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - Texas		Job #: 840-3317-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 1/29/2024	Analysis Requested		Preservation Codes:
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: Wastewater Testing	Project #: 84000417			
Site:	SSOW#:			Other:

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015C_DAI_7Day/8015_DAI_Prep (MOD) Ethlene Glycol 8015C	8315A/8315A_W_Prep (MOD) Formaldehyde	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
Post Chlorine (840-3317-1)	1/18/24	13:30 Central		Water			X	X	17	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing South Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing South Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing South Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing South Central, LLC.

Possible Hazard Identification *Unconfirmed*	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)* ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For ____ Months*
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Irene Vann	1/19/24 17:00	EESA			
			[illegible]	1/20/24 1145	ELLE

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: R: 1.2 C: 0.5

Ver: 06/08/2021

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-2994.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin: Texas	Page: Page 1 of 1
Company: Eurofins Environment Testing South Centr		Accreditations Required (See note): NELAP Texas		Job #: 840-3317-1
Address: 4145 Greenbriar Dr	Due Date Requested: 1/29/2024			
City: Stafford	TAT Requested (days):			
State, Zip: TX, 77477				
Phone: 281-240-4200(Tel)	PO #:			
Email:	WO #:			
Project Name: Wastewater Testing	Project #: 84000417			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A HCL, B NaOH, C Zn Acetate, D Nitric Acid, E NaHSO4, F MeOH, G Amchlor, H Ascorbic Acid, I Ice, J DI Water, K EDTA, L EDA
M Hexane, N None, O AsNaO2, P Na2O4S, Q Na2SO3, R Na2S2O3, S H2SO4, T TSP Dodecahydrate, U Acetone, V MCAA, W pH 4-5, Y Trizma, Z other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D/5030C (MOD) Full List VOC 8260D	8015D_DAI_G/ (MOD) Glycols	350.1/ Nitrogen, Ammonia	SM4500_S2_D/ Sulfide, Total	9040C/ (MOD) Local Method	2510B/ Specific Conductance	Total Number of containers	Special Instructions/Note:
			Preservation Code:											
Post Chlorine (840-3317-1)	1/18/24	13:30 Central		Water			X	X	X	X	X	X		

Temp. 2.5 IR ID-HOU-369
C/F.-0.0
Corrected Temp: 2.5

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing South Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing South Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing South Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing South Central, LLC.

Possible Hazard Identification *Unconfirmed*	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)* ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For ______ Months*
Deliverable Requested: I, II, III, IV Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: [signature]	Date/Time: 1/18/24 17:00	Company: EX SA	Received by: [signature]	Date/Time: 1/19/24 9:53	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.	Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Eurofins San Antonio
5309 Wurzbach Rd. #119
San Antonio, TX 78238
Phone: 210-509-3334

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Vann, Irene	Carrier Tracking No(s):	COC No: 840-2994.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Irene.Vann@et.eurofinsus.com	State of Origin: Texas	Page: Page 1 of 1
Company: Eurofins Environment Testing South Centr		Accreditations Required (See note): NELAP Texas		Job #: 840-3317-1
Address: 4145 Greenbriar Dr	Due Date Requested: 1/29/2024			
City: Stafford	TAT Requested (days):			
State, Zip: TX, 77477				
Phone: 281-240-4200(Tel)	PO #:			
Email:	WO #:			
Project Name: Wastewater Testing	Project #: 84000417			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A HCL, B NaOH, C Zn Acetate, D Nitric Acid, E NaHSO4, F MeOH, G Amchlor, H Ascorbic Acid, I Ice, J DI Water, K EDTA, L EDA
M Hexane, N None, O AsNaO2, P Na2O4S, Q Na2SO3, R Na2S2O3, S H2SO4, T TSP Dodecahydrate, U Acetone, V MCAA, W pH 4-5, Y Trizma, Z other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D/5030C (MOD) Full List VOC 8260D	8015D_DAI_G/ (MOD) Glycols	350.1/ Nitrogen, Ammonia	SM4500_S2_D/ Sulfide, Total	9040C/ (MOD) Local Method	2510B/ Specific Conductance	Total Number of containers	Special Instructions/Note:
			Preservation Code:											
Post Chlorine (840-3317-1)	1/18/24	13:30 Central		Water			X	X	X	X	X	X		

Temp. 2.5 IR ID-HOU-369
C/F.-0.0
Corrected Temp: 2.5

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing South Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing South Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing South Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing South Central, LLC.

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For ______ Months*
Deliverable Requested: I, II, III, IV Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 1/18/24 17:00	Company: EX SA	Received by: [signature]	Date/Time: 1/19/24 9:53	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.		Cooler Temperature(s) °C and Other Remarks:		

Ver 06/08/2021

Login Sample Receipt Checklist

Client: reUse Engineering

Job Number: 840-3317-1
SDG Number: Forest Glenn

Login Number: 3317
List Number: 1
Creator: Vann, Irene

List Source: Eurofins San Antonio

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Received same day of collection; chilling process has begun.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Trip Blank included but not on COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	

Login Sample Receipt Checklist

Client: reUse Engineering

Job Number: 840-3317-1
SDG Number: Forest Glenn

Login Number: 3317
List Number: 2
Creator: Torrez, Lisandra

List Source: Eurofins Houston
List Creation: 01/19/24 01:28 PM

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	

Login Sample Receipt Checklist

Client: reUse Engineering

Job Number: 840-3317-1
SDG Number: Forest Glenn

Login Number: 3317
List Number: 3
Creator: Santiago, Nathaniel

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 01/20/24 01:28 PM

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature acceptable,where thermal pres is required(</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV:Container Temp acceptable,where thermal pres is required (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	False	Headspace greater than 6mm in diameter in some but not all containers

4411 S Interstate 35, Ste 100
Georgetown, Texas 78626
www.reuseinn.com
TX PE Firm 21880

APPENDIX D

Climate Data Tables/Figures

Average Maximum Temperature (TMax)

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Abilene	55.4	60.2	68.4	77.5	84.2	91.3	94.9	94.3	87	77.8	65.6	57.8	**76.2**
Amarillo	49.2	53.3	61.2	70.9	79	88	91.2	89.2	82.2	72.5	59.3	51	**70.6**
Austin	60.1	64.4	71.7	79.1	85.2	91.6	95.2	95.7	89.8	81.6	70.2	62.7	**78.9**
Brownsville	70.3	73.1	78	83.2	87.4	91.3	93	93.6	90.4	85.1	77.9	71.6	**82.9**
College Station	59.3	63.6	71	78.4	84.8	91.2	94.7	95.3	89.4	80.9	69.9	62.2	**78.4**
Corpus Christi	66.2	69.7	75.3	81.2	86	90.8	93.5	93.6	89.8	83.8	75.2	69	**81.2**
Dallas/Ft. Worth	54.2	59.9	67.8	75.9	83.2	91.6	96.2	95.7	88.3	78.6	66	57.3	**76.2**
Del Rio	63.4	68.2	76.1	83.6	88.8	94.4	97	96.7	91	82.1	71.6	64.3	**81.4**
El Paso	57.5	63.3	69.9	78.6	87.2	95.8	95.2	93	87.8	78.7	66.3	58.1	**77.6**
Galveston	59.4	61.5	67	73.5	80.2	85.5	87.7	88.1	85	78	69.1	62.9	**74.8**
Houston	61.8	66	72.7	79	85.3	90.8	93.7	93.5	89	81.4	71.7	64.9	**79.2**
Lubbock	53.5	58.7	66.3	75.3	82.7	90.6	92.6	91.1	84.2	75.1	63.2	54.7	**74**
Midland	57.1	62.2	69.8	78.6	86.4	92.9	94.3	93.2	86.4	77.9	66.2	59	**77**
Port Arthur	61.6	65.1	71.2	77.8	84.4	89.7	91.8	91.8	88	80.7	70.9	64.2	**78.1**
San Angelo	58.4	63.2	70.8	79.7	86.3	92.2	95.5	94.6	87.6	79.1	67.6	60.5	**78**
San Antonio	61.8	66.2	73.4	80.3	86.1	91.9	95.1	95.2	89.9	82.1	71.3	64.5	**79.8**
Victoria	63.3	67.1	73.8	80.4	85.7	90.8	93.7	94	89.6	83	73.7	66.3	**80.1**
Waco	57.1	61.9	69.4	78	84.6	92.1	96.4	96.8	89.9	80.6	68.1	59.9	**77.9**
Wichita Falls	53	58.4	67	76.6	83.9	92.6	97.6	97.2	88.6	78.4	64.7	55.6	**76.1**

Average Relative Humidity

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Abilene	55.4	60.2	68.4	77.5	84.2	91.3	94.9	94.3	87	77.8	65.6	57.8	**76.2**
Amarillo	49.2	53.3	61.2	70.9	79	88	91.2	89.2	82.2	72.5	59.3	51	**70.6**
Austin	60.1	64.4	71.7	79.1	85.2	91.6	95.2	95.7	89.8	81.6	70.2	62.7	**78.9**
Brownsville	70.3	73.1	78	83.2	87.4	91.3	93	93.6	90.4	85.1	77.9	71.6	**82.9**
College Station	59.3	63.6	71	78.4	84.8	91.2	94.7	95.3	89.4	80.9	69.9	62.2	**78.4**
Corpus Christi	66.2	69.7	75.3	81.2	86	90.8	93.5	93.6	89.8	83.8	75.2	69	**81.2**
Dallas/Ft. Worth	54.2	59.9	67.8	75.9	83.2	91.6	96.2	95.7	88.3	78.6	66	57.3	**76.2**
Del Rio	63.4	68.2	76.1	83.6	88.8	94.4	97	96.7	91	82.1	71.6	64.3	**81.4**
El Paso	57.5	63.3	69.9	78.6	87.2	95.8	95.2	93	87.8	78.7	66.3	58.1	**77.6**
Galveston	59.4	61.5	67	73.5	80.2	85.5	87.7	88.1	85	78	69.1	62.9	**74.8**
Houston	61.8	66	72.7	79	85.3	90.8	93.7	93.5	89	81.4	71.7	64.9	**79.2**
Lubbock	53.5	58.7	66.3	75.3	82.7	90.6	92.6	91.1	84.2	75.1	63.2	54.7	**74**
Midland	57.1	62.2	69.8	78.6	86.4	92.9	94.3	93.2	86.4	77.9	66.2	59	**77**
Port Arthur	61.6	65.1	71.2	77.8	84.4	89.7	91.8	91.8	88	80.7	70.9	64.2	**78.1**
San Angelo	58.4	63.2	70.8	79.7	86.3	92.2	95.5	94.6	87.6	79.1	67.6	60.5	**78**
San Antonio	61.8	66.2	73.4	80.3	86.1	91.9	95.1	95.2	89.9	82.1	71.3	64.5	**79.8**
Victoria	63.3	67.1	73.8	80.4	85.7	90.8	93.7	94	89.6	83	73.7	66.3	**80.1**
Waco	57.1	61.9	69.4	78	84.6	92.1	96.4	96.8	89.9	80.6	68.1	59.9	**77.9**
Wichita Falls	53	58.4	67	76.6	83.9	92.6	97.6	97.2	88.6	78.4	64.7	55.6	**76.1**

Historic Rainfall Reference

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Amarillo	0.59	0.58	0.93	1.24	2.74	3.4	2.88	2.99	1.89	1.41	0.62	0.57
Austin	2.11	2.41	2.05	3.01	4.38	3.46	2.05	2.23	3.38	3.35	2.28	2.46
Brownsville	1.33	1.31	0.9	1.63	2.31	2.85	1.69	2.46	4.95	3.36	1.61	1.18
College Station	2.87	2.88	2.5	3.77	4.73	3.79	2.24	2.43	4.3	3.64	3.07	3.15
Corpus Christi	1.57	1.88	1.33	2.06	3.09	3.19	1.84	3.33	5.3	3.54	1.56	1.6
Dallas / Ft Worth	1.94	2.44	3.12	3.15	5.43	3.18	2.09	2.1	2.42	4.01	2.43	2.5
Del Rio	0.53	0.91	0.86	1.89	2.39	1.9	1.54	1.72	2.59	1.94	0.85	0.65
El Paso	0.42	0.41	0.3	0.21	0.33	0.72	1.56	1.48	1.42	0.72	0.35	0.62
Galveston	3.33	2.58	2.43	2.55	3.46	4.14	3.77	4.23	5.36	3.17	3.33	3.59
Houston	3.7	2.99	3.48	3.49	5.22	5.13	3.25	3.79	4.45	4.65	3.89	3.64
Lubbock	0.52	0.61	0.82	1.26	2.62	2.67	2.12	2.07	2.53	1.99	0.62	0.64
Midland	0.54	0.61	0.47	0.77	2.02	1.59	1.83	1.65	2.04	1.56	0.58	0.53
Port Arthur	4.86	3.96	3.3	3.86	5.02	5.68	5.31	5.04	5.77	4.2	4.22	5.13
San Angelo	0.83	1.05	0.93	1.68	2.86	2.2	1.16	1.77	2.78	2.21	0.96	0.78
San Antonio	1.61	1.9	1.68	2.53	3.99	3.57	1.83	2.58	3.29	3.29	2.11	1.72
Victoria	2.28	2.12	2.08	2.93	4.95	4.77	3.03	3.08	5.37	3.72	2.51	2.33
Waco	2.07	2.39	2.51	3.43	4.59	2.8	1.88	1.66	3.07	2.91	2.48	2.49
Wichita Falls	1.08	1.31	1.91	2.72	4.59	3.36	2.05	2.16	2.94	2.69	1.55	1.56
Abilene	1.01	1.1	1.19	2.09	3.31	2.9	2.09	2.45	2.75	2.48	1.28	1.04

Historic ETo Reference

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Abilene	2.08	2.57	4.14	5.48	6.47	7.65	8.36	7.46	5.48	4.21	2.67	2.08
Amarillo	1.84	2.27	3.73	5.06	5.89	7.51	8.08	7.29	5.61	4.05	2.4	1.78
Austin	2.27	2.72	4.34	5.27	6.39	7.15	7.22	7.25	5.57	4.38	2.74	2.21
Brownsville	2.65	3.03	4.48	5.17	6.03	6.32	6.68	6.65	5.21	4.34	3.01	2.59
College Station	2.2	2.71	4.22	5.2	6.25	6.89	7.1	6.85	5.6	4.3	2.8	2.2
Corpus Christi	2.42	2.95	4.28	5.17	5.95	6.43	6.68	6.65	5.21	4.34	3.01	2.59
Dallas / Ft Worth	2	2.46	3.96	5.14	6.21	7.06	7.4	7.25	5.49	4.19	2.59	2.1
Del Rio	2.47	3.01	4.76	6.01	6.98	7.41	7.57	7.41	5.77	4.35	2.91	2.36
El Paso	2.74	3.53	6.07	8.19	9.83	11.12	9.19	8.94	7.69	5.89	3.58	2.49
Galveston	2.2	2.6	4.1	5	6.11	6.6	6.2	6	5.5	4.2	2.8	2.3
Houston	2.36	2.83	4.32	5.01	6.11	6.57	6.52	6.08	5.57	4.28	2.9	2.35
Lubbock	2.35	2.63	4.41	5.53	6.93	7.73	7.63	7.2	5.54	4.19	2.61	2.33
Midland	2.2	2.78	4.46	5.91	7.21	8.2	9.23	8.62	6.96	4.31	2.78	2.16
Port Arthur	2.25	2.63	3.95	5.09	6.12	6.6	5.81	5.61	5.46	4.18	2.76	2.23
San Angelo	2.88	3.13	5.31	7.01	8.48	9.16	9.29	8.49	6.6	5.08	3.37	2.54
San Antonio	2.42	2.9	4.42	5.47	6.47	6.97	7.31	6.99	5.64	4.44	2.85	2.36
Victoria	2.35	2.87	4.29	5.77	6.39	6.7	6.92	6.7	5.36	4.41	2.93	2.33
Waco	2.13	2.62	4.03	5.31	6.45	7.15	7.4	7.5	5.7	4.41	2.7	2.17
Wichita Falls	1.94	2.46	4.07	5.5	6.7	7.54	7.97	7.72	5.79	4.3	2.62	1.95

US1TXGS0032 FREDERICKSBURG 12.2 NE, TX US Station is located 16 miles north of Firefly and 13 miles north of Tiny Homes

[Daily Summaries Station Details: FREDERICKSBURG 12.2 NE, TX US, GHCND:US1TXGS0032 | Climate Data Online (CDO) | National Climatic Data Center (NCDC) (noaa.gov)]

	Jan.	Precip	Feb.	Precip	March	Precip	April	Precip	May	Precip	June	Precip	July	Precip	August	Precip	Sept	Precip	Oct	Precip	Nov	Precip	Dec	Precip		
	1/9/2011	1.09	2/1/2011	0.36	3/27/2011	0.06	4/11/2011	0.42	5/2/2011	0.26	6/22/2011	1.11					9/18/2011	0.11	10/9/2011	2.52	11/8/2011	0.11	12/3/2011	0.23		
	1/17/2011	0.35	2/9/2011	0.13			4/22/2011	0.14	5/11/2011	0.61							9/28/2011	0.1			11/15/2011	0.73	12/4/2011	0.39		
									5/12/2011	0.6							9/30/2011	0.2			11/22/2011	0.61	12/5/2011	0.73		
																					11/26/2011	0.58	12/11/2011	0.92		
2011																							12/14/2011	0.15		
																							12/19/2011	0.34		
																							12/22/2011	0.43		
																							12/25/2011	0.06		
																									# of Days	**Total Inches**
# of Days	2		2		1		2		3		1		0		0		3		1		4		8		**27**	
Inches of Precip		1.44		0.49		0.06		0.56		1.47		1.11		0		0		0.41		2.52		2.03		3.25		**13.34**
Gross EV		2.05		2.2		4.47		6.39		5.87		8.48		8.5		9.23		7.48		5.05		3.19		1.48		**64.39**
Net EV		0.61		1.71		4.41		5.83		4.4		7.37		8.5		9.23		7.07		2.53		1.16		-1.77		**51.05**
	1/10/2012	0.29	2/7/2012	0.07	3/9/2012	0.29	4/15/2012	0.06	5/6/2012	0.27	6/7/2012	0	7/2/2012	0.42	8/19/2012	0.46	9/14/2012	1.54	10/14/2012	0.53						
	1/25/2012	1.22	2/10/2012	0.13	3/10/2012	0.65			5/8/2012	0.83	6/8/2012	1.01	7/8/2012	0.26			9/15/2012	0.08	10/27/2012	0.11						
	1/26/2012	0.03	2/13/2012	0.41	3/11/2012	0.25			5/9/2012	0.7	6/18/2012	1.5	7/9/2012	0.48			9/16/2012	1.02								
			2/17/2012	0.31	3/19/2012	0.1			5/11/2012	2.15			7/10/2012	0.33			9/17/2012	0.6								
			2/18/2012	1.33	3/20/2012	2.84			5/12/2012	0.43			7/11/2012	0.1			9/29/2012	0.62								
2012			2/19/2012	0.31					5/15/2012	0.95			7/12/2012	0.59			9/30/2012	0.44								
			2/28/2012	0.07					5/16/2012	1.41			7/16/2012	0.07												
																									# of Days	**Total Inches**
# of Days	3		7		5		1		7		3		7		1		6		2		0		0		**42**	
Inches of Precip		1.54		2.63		4.13		0.06		6.74		2.51		2.25		0.46		4.3		0.64		0		0		**25.26**
Gross EV		2.37		2.35		4.1		5		5.23		6.46		6.74		7.57		5.78		3.78		3.58		2.54		**55.5**
Net EV		0.83		-0.28		-0.03		4.94		-1.51		3.95		4.49		7.11		1.48		3.14		3.58		2.54		**30.24**
	1/1/2013	0.15	2/10/2013	1.02	3/10/2013	1.01	4/1/2013	0.09	5/2/2013	0.72	6/2/2013	0.13	7/9/2013	0.1	8/16/2013	0.07	9/5/2013	0.11	10/13/2013	0.71	11/5/2013	0.07	12/21/2013	1.03		
	1/4/2013	0.19	2/12/2013	0.06	3/20/2013	0.65	4/3/2013	0.81	5/10/2013	1	6/18/2013	0.54	7/15/2013	1.6	8/27/2013	0.44	9/10/2013	0.23	10/14/2013	0.54	11/7/2013	0.19	12/22/2013	0.27		
	1/9/2013	2.78	2/21/2013	0.03			4/4/2013	0.29	5/15/2013	0.31	6/19/2013	0.22	7/17/2013	0.29			9/11/2013	0.1	10/16/2013	1.62	11/22/2013	0.3	12/27/2013	0.05		
	1/10/2013	0.15	2/25/2013	0.02			4/18/2013	0.12	5/25/2013	1.33			7/18/2013	0.21			9/17/2013	0.09	10/27/2013	1.42	11/24/2013	0.13				
2013							4/30/2013	0.81	5/26/2013	0.15			7/22/2013	0.16			9/21/2013	1.43	10/30/2013	0.08	11/25/2013	0.42				
									5/27/2013	0.01							9/29/2013	0.05								
																									# of Days	**Total Inches**
# of Days	4		4		2		5		6		3		5		2		6		5		5		3		**50**	
Inches of Precip		3.27		1.13		1.66		2.12		3.52		0.89		2.36		0.51		2.01		4.37		1.11		1.35		**24.3**
Gross EV		1.8		3.07		4.1		4.06		4.75		6.43		6.8		3.86		4.91		4.03		2.39		1.56		**47.76**
Net EV		-1.47		1.94		2.44		1.94		1.23		5.54		4.44		3.35		2.9		-0.34		1.28		0.21		**23.46**

US1TXGS0032 FREDERICKSBURG 12.2 NE, TX US Station is located 16 miles north of Firefly and 13 miles north of Tiny Homes

Daily Summaries Station Details: FREDERICKSBURG 12.2 NE, TX US, GHCND:US1TXGS0032 | Climate Data Online (CDO) | National Climatic Data Center (NCDC) (noaa.gov)

	Jan.	Precip	Feb.	Precip	March	Precip	April	Precip	May	Precip	June	Precip	July	Precip	August	Precip	Sept	Precip	Oct	Precip	Nov	Precip	Dec	Precip		
			2/27/2014	0.1			4/4/2014	0.04	5/9/2014	0.42	6/10/2014	0.58	7/16/2014	0.36	8/13/2014	0.48	9/4/2014	0.14	10/3/2014	0.24	11/5/2014	1.9	12/5/2014	0.03		
							4/22/2014	0.81	5/13/2014	2.4	6/13/2014	1.19	7/18/2014	0.27	8/19/2014	0.27	9/7/2014	0.66	10/11/2014	2.24	11/6/2014	0.96	12/23/2014	0.1		
									5/14/2014	0.52	6/15/2014	0.07	7/19/2014	0.07			9/8/2014	0.21	10/31/2014	0.12	11/23/2014	1.32	12/24/2014	0.08		
									5/25/2014	1.85	6/19/2014	0.13					9/13/2014	0.11								
2014									5/26/2014	1	6/21/2014	0.21					9/14/2014	0.13								
									5/27/2014	2.46							9/19/2014	0.08								
																	9/20/2014	2.52								
																									# of Days	**Total Inches**
# of Days	0		1		0		2		6		5		3		2		7		3		3		3		**35**	
Inches of Precip		0		0.1		0		0.85		8.65		2.18		0.7		0.75		3.85		2.6		4.18		0.21		**24.07**
Gross EV		2.06		2		3.66		4.97		6.34		5.61		8.84		7.61		5.24		4.56		2.54		1.49		**54.92**
Net EV		2.06		1.9		3.66		4.12		-2.31		3.43		8.14		6.86		1.39		1.96		-1.64		1.28		**30.85**
	1/2/2015	0.14	2/1/2015	0.25	3/1/2015	0.12	4/12/2015	0.09	5/6/2015	0.05	6/16/2015	0.63			8/1/2015	0.11	9/12/2015	0.11	10/23/2015	0.1	11/2/2015	0.02	12/13/2015	1.13		
	1/3/2015	0.38	2/25/2015	0.15	3/4/2015	0.06	4/18/2015	1.84	5/9/2015	0.53	6/17/2015	0.22			8/31/2015	0.95			10/24/2015	5.63	11/5/2015	0.12	12/27/2015	0.22		
	1/11/2015	0.43			3/5/2015	0.48	4/19/2015	1.54	5/12/2015	0.05	6/19/2015	0.59							10/25/2015	1.13	11/7/2015	1.13	12/28/2015	0.39		
	1/15/2015	0.14			3/9/2015	0.28	4/24/2015	0.45	5/13/2015	0.1	6/21/2015	0.09							10/26/2015	0.1	11/15/2015	0.26				
	1/22/2015	0.48			3/10/2015	0.29	4/27/2015	0.4	5/14/2015	1.2	6/22/2015	0.12							10/30/2015	0.42	11/17/2015	0.23				
	1/23/2015	1.13			3/21/2015	0.66	4/29/2015	0.02	5/15/2015	0.32	6/28/2015	0.08							10/31/2015	2.23	11/27/2015	0.22				
2015	1/24/2015	0.06			3/22/2015	0.14			5/17/2015	1.03	6/29/2015	0.07									11/28/2015	1.17				
					3/26/2015	0.02			5/21/2015	1.04											11/29/2015	0.13				
									5/23/2015	0.06																
									5/24/2015	1.13																
									5/26/2015	1.9																
									5/29/2015	1.61																
									5/30/2015	0.06															**# of Days**	**Total Inches**
# of Days	7		2		8		6		13		7		0		2		1		6		8		3		**63**	
Inches of Precip		2.76		0.4		2.05		4.34		9.08		1.8		0		1.06		0.11		9.61		3.28		1.74		**36.23**
Gross EV		1.34		1.5		2.35		3.62		3.42		5.04		6.98		5.49		5.92		4.53		2.07		2.15		**44.41**
Net EV		-1.42		1.1		0.3		-0.72		-5.66		3.24		6.98		4.43		5.81		-5.08		-1.21		0.41		**8.18**
	1/3/2016	0.45	2/23/2016	1.06	3/8/2016	0.13	4/1/2016	0.33	5/9/2016	0.05	6/1/2016	3.78	7/26/2016	1.54	8/13/2016	0.68	9/2/2016	0.13	10/8/2016	0.26	11/4/2016	1.2	12/3/2016	0.91		
	1/7/2016	0.11			3/9/2016	0.41	4/2/2016	0.15	5/16/2016	0.18	6/2/2016	1.15	7/28/2016	0.76	8/14/2016	0.21	9/3/2016	0.38			11/7/2016	1.8	12/4/2016	0.73		
					3/10/2016	0.35	4/13/2016	0.81	5/18/2016	1.49	6/3/2016	0.06			8/15/2016	1.07	9/11/2016	0.17			11/8/2016	0.78	12/5/2016	0.77		
					3/11/2016	2.09	4/14/2016	0.03	5/19/2016	1.57	6/29/2016	0.32			8/16/2016	0.45	9/25/2016	0.27			11/9/2016	0.93	12/23/2016	0.23		
					3/12/2016	0.46	4/17/2016	0.32	5/20/2016	0.31					8/17/2016	0.42	9/26/2016	1.31			11/10/2016	0.44				
2016					3/19/2016	0.05	4/18/2016	0.26	5/27/2016	0.35					8/18/2016	0.08	9/27/2016	1.33			11/23/2016	0.18				
							4/19/2016	0.47	5/29/2016	0.54					8/19/2016	0.81										
							4/20/2016	0.47	5/30/2016	0.58					8/20/2016	0.08										
							4/21/2016	1.25							8/21/2016	0.82										
							4/27/2016	0.47							8/22/2016	0.1										
															8/30/2016	0.38									**# of Days**	**Total Inches**
# of Days	2		1		6		10		8		4		2		11		6		1		6		4		**61**	
Inches of Precip		0.56		1.06		3.49		4.56		5.07		5.31		2.3		5.1		3.59		0.26		5.33		2.64		**39.27**
Gross EV		1.86		2.91		3.43		3.83		3.4		5.3		7.67		5.47		4.21		4.13		2.45		1.64		**46.3**
Net EV		1.3		1.85		-0.06		-0.73		-1.67		-0.01		5.37		0.37		0.62		3.87		-2.88		-1		**7.03**

US1TXGS0032 FREDERICKSBURG 12.2 NE, TX US **Station is located 16 miles north of Firefly and 13 miles north of Tiny Homes**

Daily Summaries Station Details: FREDERICKSBURG 12.2 NE, TX US, GHCND:US1TXGS0032 | Climate Data Online (CDO) | National Climatic Data Center (NCDC) (noaa.gov)

	Jan.	Precip	Feb.	Precip	March	Precip	April	Precip	May	Precip	June	Precip	July	Precip	August	Precip	Sept	Precip	Oct	Precip	Nov	Precip	Dec	Precip		
	1/2/2017	0.21	2/14/2017	1.74	3/5/2017	0.47	4/2/2017	0.78	5/17/2017	0.18	6/1/2017	0.08	7/2/2017	0.26	8/3/2017	0.15	9/26/2017	0.6	10/4/2017	0.31	11/9/2017	0.33	12/6/2017	0.96		
	1/16/2017	0.75	2/20/2017	1.11	3/12/2017	0.12	4/11/2017	0.25	5/20/2017	1.4	6/3/2017	0.13	7/18/2017	0.73	8/7/2017	3.43	9/27/2017	0.29	10/22/2017	0.12	11/13/2017	0.11	12/7/2017	0.92		
	1/20/2017	0.23			3/29/2017	0.53	4/12/2017	0.19	5/22/2017	0.13	6/4/2017	0.57	7/24/2017	0.42	8/8/2017	0.34	9/28/2017	0.91					12/17/2017	0.13		
							4/18/2017	0.09	5/24/2017	0.1	6/5/2017	0.23			8/24/2017	0.1	9/29/2017	0.65					12/20/2017	0.13		
2017							4/30/2017	0.13	5/29/2017	0.59	6/6/2017	0.26			8/26/2017	0.03	9/30/2017	0.5					12/27/2017	0.12		
											6/25/2017	2.23			8/27/2017	1.13										
											6/26/2017	0.27			8/28/2017	0.18										
											6/27/2017	0.44														
											6/28/2017	0.26													**# of Days**	**Total Inches**
# of Days	3		2		3		5		5		9		3		7		5		2		2		5		**51**	
Inches of Precip		1.19		2.85		1.12		1.44		2.4		4.47		1.41		5.36		2.95		0.43		0.44		2.26		**26.32**
Gross EV		2.1		2.61		3.42		4.11		4.27		5.56		7.02		5.62		5.02		4.38		3.31		1.73		**49.15**
Net EV		0.91		-0.24		2.3		2.67		1.87		1.09		5.61		0.26		2.07		3.95		2.87		-0.53		**22.83**
			2/7/2018	0.18	3/1/2018	0.12	4/14/2018	0.46	5/4/2018	2.77	6/4/2018	0.47	7/5/2018	0.57	8/12/2018	1.43	9/4/2018	0.58	10/7/2018	0.09	11/1/2018	0.39	12/8/2018	2.24		
			2/21/2018	0.86	3/28/2018	0.87	4/21/2018	0.18	5/5/2018	0.69	6/5/2018	0.08	7/8/2018	0.43	8/13/2018	1.6	9/6/2018	1.27	10/9/2018	0.42	11/9/2018	0.24	12/14/2018	0.22		
			2/22/2018	0.57			4/26/2018	0.35	5/16/2018	0.54	6/19/2018	0.1	7/10/2018	0.19			9/8/2018	1.28	10/10/2018	0.52	11/12/2018	0.25	12/20/2018	0.13		
			2/23/2018	0.07					5/21/2018	0.34	6/20/2018	0.25	7/31/2018	0.06			9/9/2018	0.71	10/14/2018	0.24			12/26/2018	0.16		
											6/21/2018	0.12					9/10/2018	1.8	10/16/2018	6.31			12/27/2018	0.99		
2018																	9/12/2018	0.73	10/17/2018	0.82						
																	9/13/2018	0.23	10/19/2018	0.43						
																	9/15/2018	1.08	10/20/2018	0.3						
																	9/16/2018	0.86	10/25/2018	0.52						
																	9/17/2018	0.56								
																	9/22/2018	0.47								
																	9/24/2018	0.07							**# of Days**	**Total Inches**
# of Days	0		4		2		3		4		5		4		2		12		9		3		5		**53**	
Inches of Precip		0		1.68		0.99		0.99		4.34		1.02		1.25		3.03		9.64		9.65		0.88		3.74		**37.21**
Gross EV		1.87		1.63		3.44		4.47		5.18		6.7		7.55		7		3.34		2.4		2.19		1.86		**47.63**
Net EV		1.87		-0.05		2.45		3.48		0.84		5.68		6.3		3.97		-6.3		-7.25		1.31		-1.88		**10.42**
	1/3/2019	1.22	2/10/2019	0.48	3/1/2019	0.23	4/8/2019	0.41	5/1/2019	0.08	6/6/2019	0.46	7/11/2019	0.68	8/24/2019	0.19	9/1/2019	0.71	10/7/2019	0.14	11/8/2019	1.24	12/11/2019	0.22		
	1/12/2019	0.2			3/13/2019	0.93	4/14/2019	0.38	5/3/2019	0.38	6/10/2019	1.85	7/15/2019	0.44			9/2/2019	0.26	10/11/2019	0.39	11/12/2019	0.37	12/29/2019	0.1		
	1/27/2019	0.6					4/18/2019	0.81	5/4/2019	1.05	6/12/2019	0.1	7/23/2019	0.16			9/12/2019	0.63	10/13/2019	0.37	11/15/2019	0.05				
2019							4/24/2019	0.12	5/9/2019	2.05	6/17/2019	0.56					9/20/2019	0.88	10/21/2019	0.75						
							4/25/2019	1.16	5/10/2019	0.19	6/19/2019	0.11					9/29/2019	0.22	10/25/2019	0.35						
									5/11/2019	0.06	6/27/2019	0.44							10/30/2019	0.26						
									5/21/2019	0.22	6/30/2019	0.45							10/31/2019	0.15						
									5/30/2019	0.06															**# of Days**	**Total Inches**
# of Days	3		1		2		5		8		7		3		1		5		7		3		2		**47**	
Inches of Precip		2.02		0.48		1.16		2.88		4.09		3.97		1.28		0.19		2.7		2.41		1.66		0.32		**23.16**
Gross EV		1.8		1.77		2.91		4.01		3.5		5.24		6.52		7.06		6.18		4.24		1.95		1.8		**46.98**
Net EV		-0.22		1.29		1.75		1.13		-0.59		1.27		5.24		6.87		3.48		1.83		0.29		1.48		**23.82**
	1/11/2020	0.8	2/12/2020	1.53	3/4/2020	0.64	4/4/2020	1.14	5/13/2020	1.24	6/23/2020	0.32	7/27/2020	0.14	8/23/2020	0.1	9/5/2020	0.86	10/24/2020	0.04	11/29/2020	0.48	12/19/2020	0.38		
	1/17/2020	0.67	2/19/2020	0.42	3/5/2020	0.51	4/5/2020	0.52	5/16/2020	3.49			7/28/2020	0.24			9/6/2020	0.8	10/28/2020	0.28			12/31/2020	0.9		
	1/18/2020	0.22	2/20/2020	0.29	3/16/2020	0.31	4/12/2020	1.37	5/21/2020	0.52			7/29/2020	0.37			9/9/2020	2.18								
2020	1/22/2020	0.26			3/20/2020	0.59			5/25/2020	2.05							9/10/2020	1.8								
	1/28/2020	0.56			3/21/2020	0.24			5/26/2020	0.63							9/22/2020	0.23								
					3/22/2020	0.75			5/29/2020	0.14																
					3/31/2020	0.08																			**# of Days**	**Total Inches**
# of Days	5		3		7		3		6		1		3		1		5		2		1		2		**39**	
Inches of Precip		2.51		2.24		3.12		3.03		8.07		0.32		0.75		0.1		5.87		0.32		0.48		1.28		**28.09**
Gross EV		1.93		1.73		2.45		3.84		4.72		5.24		7.14		7.54		3.95		4.14		2.63		1.86		**47.17**
Net EV		-0.58		-0.51		-0.67		0.81		-3.35		4.92		6.39		7.44		-1.92		3.82		2.15		0.58		**19.08**

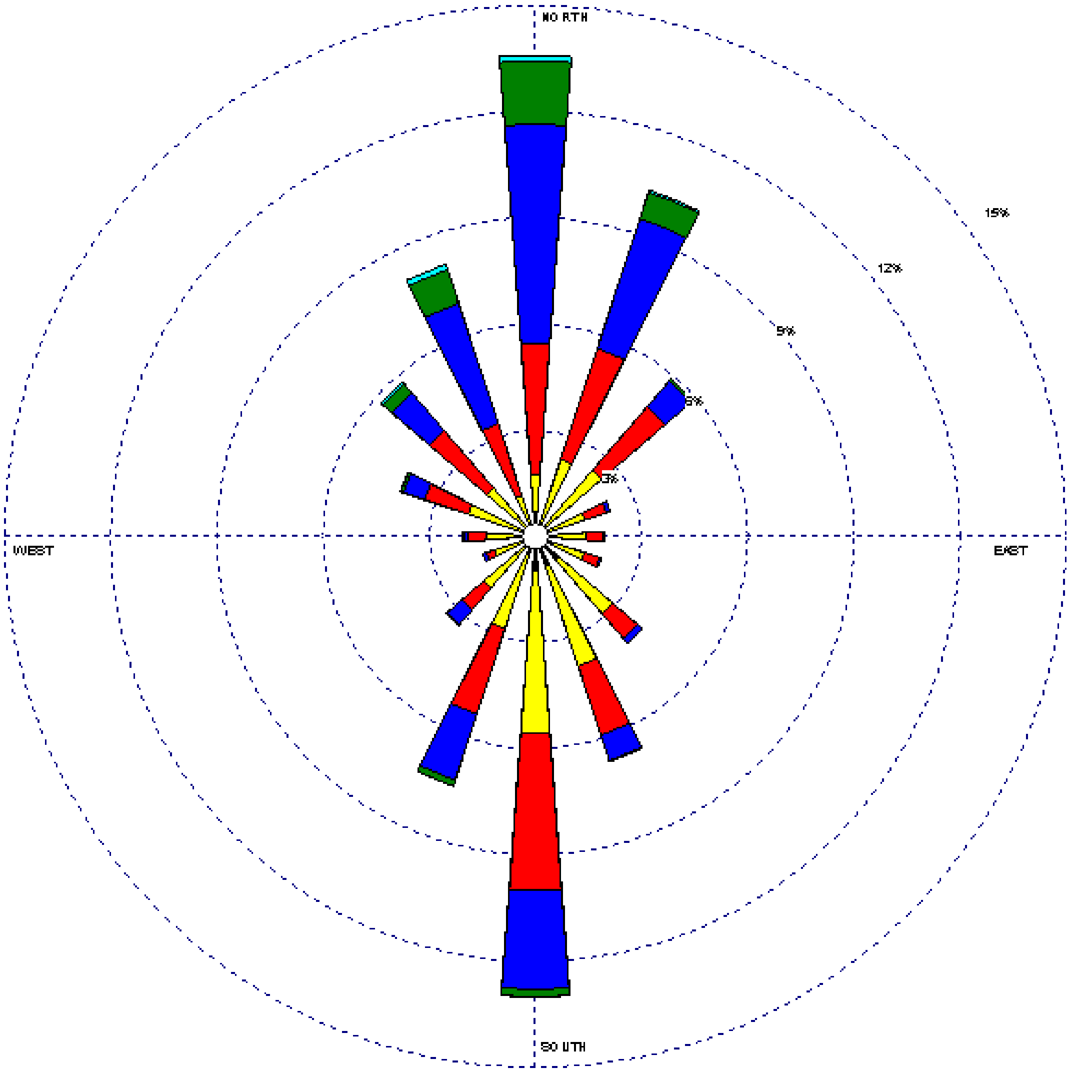
US1TXGS0032 FREDERICKSBURG 12.2 NE, TX US **Station is located 16 miles north of Firefly and 13 miles north of Tiny Homes**

Daily Summaries Station Details: FREDERICKSBURG 12.2 NE, TX US, GHCND:US1TXGS0032 | Climate Data Online (CDO) | National Climatic Data Center (NCDC) (noaa.gov)

	Jan.	**Precip**	**Feb.**	**Precip**	**March**	**Precip**	**April**	**Precip**	**May**	**Precip**	**June**	**Precip**	**July**	**Precip**	**August**	**Precip**	**Sept**	**Precip**	**Oct**	**Precip**	**Nov**	**Precip**	**Dec**	**Precip**		
	1/1/2021	0.42	2/5/2021	0.1	3/1/2021	0.15	4/3/2021	0.41	5/1/2021	1.25	6/1/2021	0.88	7/4/2021	0.28	8/2/2021	0.08	9/6/2021	0.01	10/1/2021	1.23	11/3/2021	0.92				
	1/11/2021	0.66			3/14/2021	0.12	4/4/2021	0.08	5/2/2021	2.26	6/3/2021	2.04	7/7/2021	1.9	8/3/2021	0.18	9/29/2021	0.89	10/11/2021	0.39	11/4/2021	0.79				
	1/21/2021	0.54			3/17/2021	0.24	4/16/2021	0.13	5/10/2021	1	6/4/2021	0.3	7/10/2021	0.75	8/6/2021	0.08			10/13/2021	0.8	11/27/2021	0.26				
2021					3/23/2021	0.89	4/29/2021	2.96	5/18/2021	0.86	6/7/2021	0.1	7/15/2021	0.43	8/16/2021	0.09			10/14/2021	0.86						
					3/25/2021	0.88			5/23/2021	1.39	6/8/2021	0.05	7/20/2021	0.75	8/18/2021	0.11			10/27/2021	0.42						
									5/24/2021	0.32	6/22/2021	1.37			8/27/2021	0.08										
									5/29/2021	0.5															**# of Days**	**Total Inches**
# of Days	3		1		5		4		7		6		5		6		2		5		3		0		**47**	
Inches of Precip		1.62		0.1		2.28		3.58		7.58		4.74		4.11		0.62		0.9		3.7		1.97		0		**31.2**
Gross EV		2.01		1.88		3.76		3.81		3.99		4.82		4.89		5.54		5.59		7.07		2.3		1.82		**47.48**
Net EV		0.39		1.78		1.48		0.23		-3.59		0.08		0.78		4.92		4.69		3.37		0.33		0		**14.46**
	1/12/2022	0.25	2/4/2022	0.2	3/30/2022	0.1	4/18/2022	0.2	5/6/2022	0.8	6/4/2022	0.34	7/15/2022	1.43	8/19/2022	0.89	9/1/2022	1.03	10/25/2022	0.2	11/8/2022	0.74	12/13/2022	0.12		
	1/31/2022	0.66					4/26/2022	0.58	5/22/2022	0.24					8/20/2022	0.86	9/3/2022	1.35	10/28/2022	0.54	11/12/2022	0.69	12/20/2022	0.31		
2022															8/23/2022	1.06	9/14/2022	0.18			11/20/2022	0.44				
																					11/25/2022	1.3				
																					11/26/2022	1.2			**# of Days**	**Total Inches**
# of Days	2		1		1		2		2		1		1		3		3		2		5		2		**25**	
Inches of Precip		0.91		0.2		0.1		0.78		1.04		0.34		1.43		2.81		2.56		0.74		4.37		0.43		**15.71**
Gross EV		1.96		1.89		4.96		4.66		5.83		7.12		8.48		6.26		5.3		4.35		2.46		1.45		**54.72**
Net EV		1.05		1.69		4.86		3.88		4.79		6.78		7.05		3.45		2.74		3.61		-1.91		1.02		**39.01**
	2.83		**2.42**		**3.50**		**4.00**		**6.25**		**4.33**		**3.00**		**3.17**		**5.08**		**3.75**		**3.58**		**3.08**		**45.00**	
Average	**Precip**	**1.66**		**1.27**		**1.99**		**2.44**		**4.98**		**2.67**		**2.17**		**2.24**		**3.36**		**3.27**		**2.01**		**1.54**		**29.58**
	Gross EV	**1.93**		**2.12**		**3.59**		**4.33**		**3.99**		**5.82**		**7.20**		**6.46**		**4.92**		**4.17**		**2.24**		**1.76**		**48.53**
	Net EV	**0.28**		**0.88**		**1.61**		**1.96**		**-0.27**		**3.38**		**5.56**		**4.29**		**1.90**		**1.13**		**0.58**		**0.18**		**21.49**

WIND ROSE PLOT

Station #13958 - AUSTIN/MUNICIPAL ARPT, TX



Wind Speed (m/s)			
> 11.06	MODELER Sara West	DATE 8/29/2002	COMPANY NAME USDA-ARS
8.49 - 11.06	DISPLAY Wind Speed	UNIT m/s	COMMENTS
5.40 - 8.49	AVG. WIND SPEED 4.47 m/s	CALM WINDS 8.07%	
3.34 - 5.40 1.80 - 3.34 0.51 - 1.80	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 1961 Dec 1 - Dec 31 Midnight - 11 PM	

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

NRCS Natural Resources Conservation Service

https://www.wcc.nrcs.usda.gov/ftpref/downloads/climate/windrose/texas/

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Georgetown, TX 78626
TX Firm No. 21880

FIREFLY DEVELOPMENT
MECHANICAL EVAPORATION APPLICATION
GILLESPIE COUNTY, TEXAS

WIND ROSE

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

PLAIN LANGUAGE SUMMARY FOR TPDES OR TLAP PERMIT APPLICATIONS

Plain Language Summary Template and Instructions for Texas Pollutant Discharge Elimination System (TPDES) and Texas Land Application (TLAP) Permit Applications

Applicants should use this template to develop a plain language summary as required by Title 30, Texas Administrative Code (30 TAC), Chapter 39, Subchapter H. Applicants may modify the template as necessary to accurately describe their facility as long as the summary includes the following information: (1) the function of the proposed plant or facility; (2) the expected output of the proposed plant or facility; (3) the expected pollutants that may be emitted or discharged by the proposed plant or facility; and (4) how the applicant will control those pollutants, so that the proposed plant will not have an adverse impact on human health or the environment.

Fill in the highlighted areas below to describe your facility and application in plain language. Instructions and examples are provided below. Make any other edits necessary to improve readability or grammar and to comply with the rule requirements.

If you are subject to the alternative language notice requirements in 30 TAC Section 39.426, **you must provide a translated copy of the completed plain language summary in the appropriate alternative language as part of your application package**. For your convenience, a Spanish template has been provided below.

ENGLISH TEMPLATE FOR TPDES or TLAP NEW/RENEWAL/AMENDMENT APPLICATIONS DOMESTIC WASTEWATER/STORMWATER

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 TAC Chapter 39. The information provided in this summary may change during the technical review of the application and is not a federal enforceable representation of the permit application.

Firefly Partners LLC (CN605877835) proposes to operate Firefly WWTF (5. Enter Regulated Entity Number here (i.e., RN1########)), a domestic wastewater treatment facility. The facility will be located at approximately 0.52 miles southwest of the intersection of FM 1376 and OK Corral Drive, in Fredericksburg, Gillespie County, Texas 78624. The applicant is currently applying to the Texas Commission on Environmental Quality for a Texas Land Application Permit (TLAP) to utilize a maximum of 20,000 gallons per day of treated domestic wastewater from the proposed onsite Wastewater Treatment Facility for landscape irrigation.

Discharges from the facility are expected to contain no pollutants. Domestic wastewater will be treated by MBR (membrane bioreactor) treatment technology. The facility will include an influent pumping station, fine screening, anoxic, oxic and membrane cells with ultraviolet disinfection and a sludge press. The resulting Type 1 reclaimed water will be evaporated via the use of two (2) 10,000 GPD mechanical evaporation units. Use of these mechanical evaporators has been approved by the TCEQ.

PLANTILLA EN ESPAÑOL PARA SOLICITUDES NUEVAS/RENOVACIONES/ENMIENDAS DE TPDES o TLAP

AGUAS RESIDUALES DOMÉSTICAS /AGUAS PLUVIALES

El siguiente resumen se proporciona para esta solicitud de permiso de calidad del agua pendiente que está siendo revisada por la Comisión de Calidad Ambiental de Texas según lo requerido por el Capítulo 39 del Código Administrativo de Texas 30. La información proporcionada en este resumen puede cambiar durante la revisión técnica de la solicitud y no es una representación ejecutiva fedérale de la solicitud de permiso.

Firefly Partners LLC (605877835) propone operar Firefly WWTF 5. Introduzca el número de entidad regulada aquí (es decir, RN1########), una instalación de tratamiento de aguas residuales domésticas. La instalación estará ubicada en aproximadamente 0,52 millas al suroeste de la intersección de FM 1376 y OK Corral Drive, en Fredericksburg, Condado de Gillespie, Texas 78624. El solicitante actualmente está solicitando a la Comisión de Calidad Ambiental de Texas un Permiso de Solicitud de Tierras de Texas (TLAP) para utilizar un máximo de 20.000 galones por día de aguas residuales domésticas tratadas de la Instalación de Tratamiento de Aguas Residuales propuesta en el sitio para riego paisajístico.

Se espera que las descargas de la instalación contengan no contaminantes. Las aguas residuales domésticas. estará tratado por la tecnología de tratamiento MBR (biorreactor de membrana). La instalación incluye una estación de bombeo de afluente, cribado fino, células anóxicas, óxicas y de membrana con desinfección ultravioleta y una prensa de lodos. El agua recuperada Tipo 1 resultante se evaporará mediante el uso de dos (2) unidades de evaporación mecánica de 10.000 GPD. El uso de estos evaporadores mecánicos ha sido aprobado por la TCEQ..

INSTRUCTIONS

1. Enter the name of applicant in this section. The applicant name should match the name associated with the customer number.
2. Enter the Customer Number in this section. Each Individual or Organization is issued a unique 11-digit identification number called a CN (e.g. CN123456789).
3. Choose “operates” in this section for existing facility applications or choose “proposes to operate” for new facility applications.
4. Enter the name of the facility in this section. The facility name should match the name associated with the regulated entity number.
5. Enter the Regulated Entity number in this section. Each site location is issued a unique 11-digit identification number called an RN (e.g. RN123456789).
6. Choose the appropriate article (a or an) to complete the sentence.
7. Enter a description of the facility in this section. For example: steam electric generating facility, nitrogenous fertilizer manufacturing facility, etc.
8. Choose “is” for an existing facility or “will be” for a new facility.
9. Enter the location of the facility in this section.
10. Enter the City nearest the facility in this section.
11. Enter the County nearest the facility in this section.
12. Enter the zip code for the facility address in this section.
13. Enter a summary of the application request in this section. For example: renewal to discharge 25,000 gallons per day of treated domestic wastewater, new application to discharge process wastewater and stormwater on an intermittent and flow-variable basis, or major amendment to reduce monitoring frequency for pH, etc. If more than one outfall is included in the application, provide applicable information for each individual outfall.
14. List all pollutants expected in the discharge from this facility in this section. If applicable, refer to the pollutants from any federal numeric effluent limitations that apply to your facility.
15. Enter the discharge types from your facility in this section (e.g., stormwater, process wastewater, once through cooling water, etc.)
16. Choose the appropriate verb tense to complete the sentence.
17. Enter a description of the wastewater treatment used at your facility. Include a description of each process, starting with initial treatment and finishing with the outfall/point of disposal. Use additional lines for individual discharge types if necessary.

Questions or comments concerning this form may be directed to the Water Quality Division’s Application Review and Processing Team by email at WQ-ARPTeam@tceq.texas.gov or by phone at (512) 239-4671.

Example

Individual Industrial Wastewater Application

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by 30 TAC Chapter 39. The information provided in this summary may change during the technical review of the application and are not federal enforceable representations of the permit application.

ABC Corporation (CN600000000) operates the Starr Power Station (RN10000000000), a two-unit gas-fired electric generating facility. Unit 1 has a generating capacity of 393 megawatts (MWs) and Unit 2 has a generating capacity of 528 MWs. The facility is located at 1356 Starr Street, near the City of Austin, Travis County, Texas 78753.

This application is for a renewal to discharge 870,000,000 gallons per day of once through cooling water, auxiliary cooling water, and also authorizes the following waste streams monitored inside the facility (internal outfalls) before it is mixed with the other wastewaters authorized for discharge via main Outfall 001, referred to as “previously monitored effluents” (low-volume wastewater, metal-cleaning waste, and stormwater (from diked oil storage area yards and storm drains)) via Outfall 001. Low-volume waste sources, metal-cleaning waste, and stormwater drains on a continuous and flow-variable basis via internal Outfall 101.

The discharge of once through cooling water via Outfall 001 and low-volume waste and metal-cleaning waste via Outfall 101 from this facility is subject to federal effluent limitation guidelines at 40 CFR Part 423. The pollutants expected from these discharges based on 40 CFR Part 423 are: free available chlorine, total residual chlorine, total suspended solids, oil and grease, total iron, total copper, and pH. Temperature is also expected from these discharges. Additional potential pollutants are included in the Industrial Wastewater Application Technical Report, Worksheet 2.0.

Cooling water and boiler make-up water are supplied by Lake Starr Reservoir. The City of Austin municipal water plant (CN600000000, PWS 00000) supplies the facility’s potable water and serves as an alternate source of boiler make-up water. Water from the Lake Starr Reservoir is withdrawn at the intake structure and treated with sodium hypochlorite to prevent biofouling and sodium bromide as a chlorine enhancer to improve efficacy and then passed through condensers and auxiliary equipment on a once-through basis to cool equipment and condense exhaust steam.

Low-volume wastewater from blowdown of boiler Units 1 and 2 and metal-cleaning wastes receive no treatment prior to discharge via Outfall 101. Plant floor and equipment drains and stormwater runoff from diked oil storage areas, yards, and storm drains are routed through an oil and water separator prior to discharge via Outfall 101. Domestic wastewater, blowdown, and backwash water from the service water filter, clarifier, and sand filter are routed to the Starr Creek Domestic Sewage Treatment Plant, TPDES Permit No. WQ0010000001, for treatment and disposal. Metal-cleaning waste from equipment cleaning is generally disposed of off-site.

Texas Commission on Environmental Quality

Public Involvement Plan Form for Permit and Registration Applications

The Public Involvement Plan is intended to provide applicants and the agency with information about how public outreach will be accomplished for certain types of applications in certain geographical areas of the state. It is intended to apply to new activities; major changes at existing plants, facilities, and processes; and to activities which are likely to have significant interest from the public. This preliminary screening is designed to identify applications that will benefit from an initial assessment of the need for enhanced public outreach.

All applicable sections of this form should be completed and submitted with the permit or registration application. For instructions on how to complete this form, see TCEQ-20960-inst.

Section 1. Preliminary Screening

☒ New Permit or Registration Application

☐ New Activity – modification, registration, amendment, facility, etc. (see instructions)

If neither of the above boxes are checked, completion of the form is not required and does not need to be submitted.

Section 2. Secondary Screening

☒ Requires public notice,

☐ Considered to have significant public interest, **and**

☒ Located within any of the following geographical locations:

- Austin
- Dallas
- Fort Worth
- Houston
- San Antonio
- West Texas
- Texas Panhandle
- Along the Texas/Mexico Border
- Other geographical locations should be decided on a case-by-case basis

If all the above boxes are not checked, a Public Involvement Plan is not necessary. Stop after Section 2 and submit the form.

☐ Public Involvement Plan not applicable to this application. Provide **brief** explanation.

Significant public interest is not anticipated as the effluent will be staying on site, thus not impacting any local waters. Comments on other nearby permit applications (i.e. WQ0005452000) are primarily concerned about the impact of discharging to the Pedernales River and other local waterways, which is not the case for this application. Other nearby applications received no significant public interest (WQ0005452000, WQ0010576002, WQ0014397001, WQ0014541001, WQ0014157001)

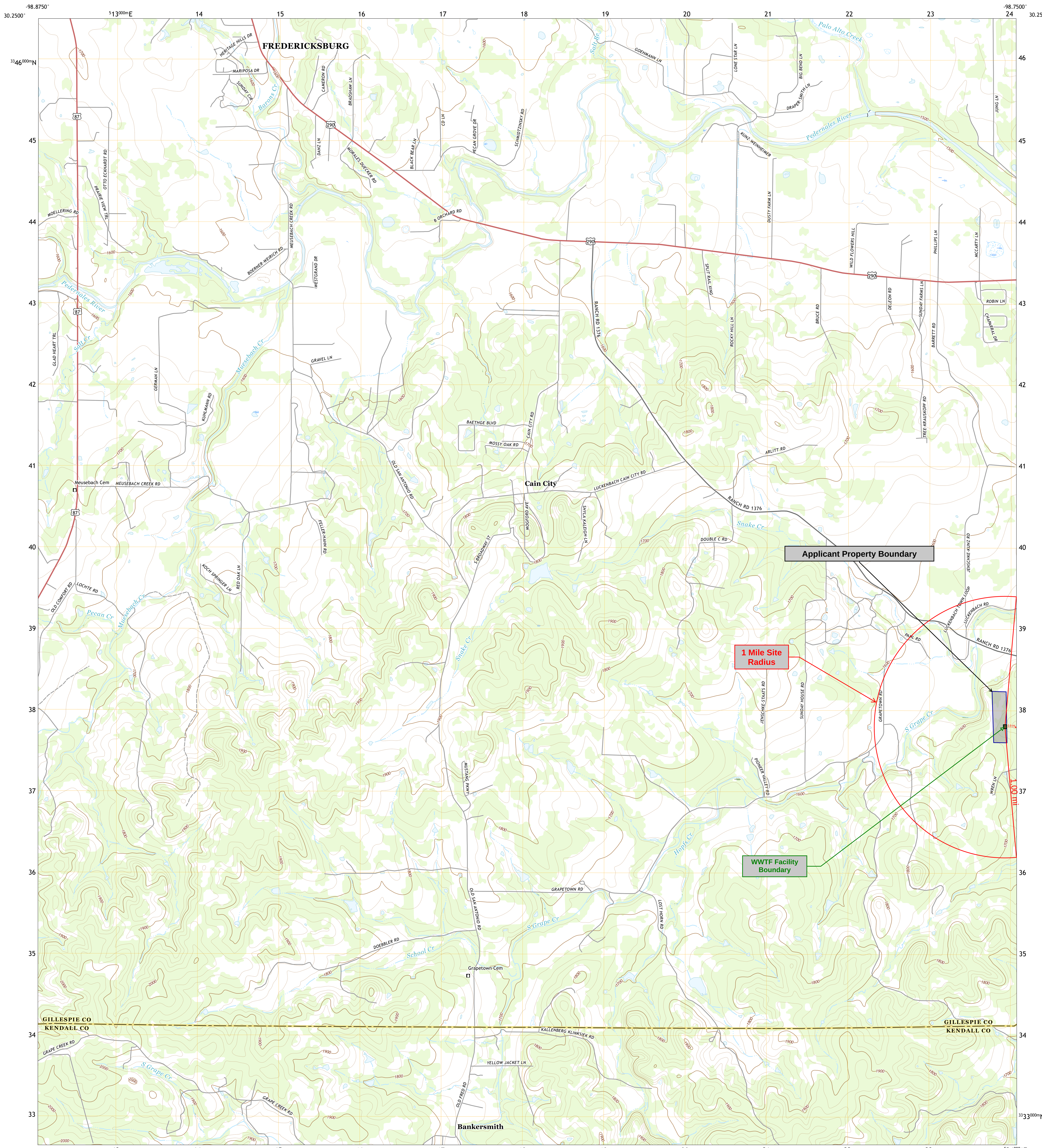
Remainder of TCEQ-20960 not applicable

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

USGS science for a changing world

The National Map US Topo

CAIN CITY QUADRANGLE
TEXAS
7.5-MINUTE SERIES



STATE OF TEXAS
RANE A. WILSON
GEOLOGY
15005
LICENSED
PROFESSIONAL GEOSCIENTIST
07/08/24

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 - 2018
Names.....GNIS, 1979 - 2012
Hydrography.....National Hydrography Dataset, 2002 - 2018
Contours.....National Elevation Dataset, 2003
Boundaries.....Multiple sources; see metadata file 2016 - 2017
Wetlands.....FWS National Wetlands Inventory 1983

MN
GN
0°6´ 2 MILS
4°16´ 76 MILS
UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

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

SCALE 1:24 000
KILOMETERS 1 0.5 0 1 2
METERS 1000 500 0 1000 2000
MILES 1 0.5 0 1
FEET 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
2,000.00 ft

CONTOUR INTERVAL 20 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

1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES

1 Fredericksburg West
2 Fredericksburg East
3 Cave Creek School
4 Lady Bird Johnson Park
5 Stonewall
6 Cypress Creek
7 Rafter Hollow
8 Whitworth Ranch

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

CAIN CITY, TX
2019

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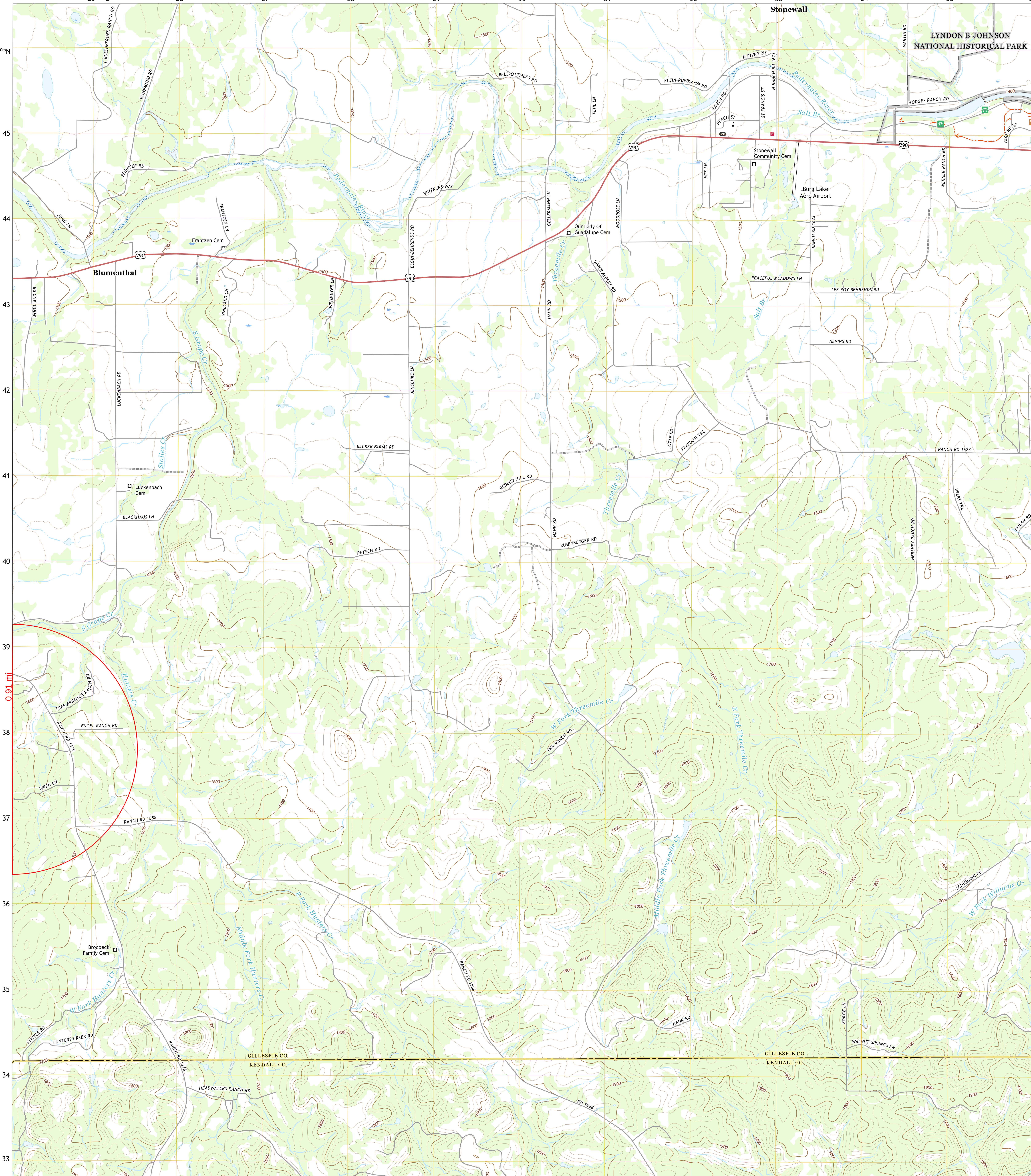
Georgetown, TX 78626
TX Firm No. 21880

FIREFLY PARTNERS LLC
FIREFLY WWTF TLAP APPLICATION
GILLESPIE COUNTY, TEXAS
U.S. TOPOGRAPHIC MAP
Attachment E.1

NSN. 7643016395335
NGA REF NO. USGSX24K66625
7643016395335



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

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Imagery ... NAIP, September 2016 - November 2016
Roads ... U.S. Census Bureau, 2015 - 2021
Names ... GNIS, 1979 - 2022
Hydrography ... National Hydrography Dataset, 2002 - 2018
Contours ... National Elevation Dataset, 2021
Boundaries ... Multiple sources; see metadata file 2019 - 2021
Wetlands ... FWS National Wetlands Inventory Not Available

UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

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

SCALE 1:24 000

1,000.00 ft

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

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

QUADRANGLE LOCATION

1 Fredericksburg East
2 Cave Creek School
3 Rocky Creek
4 Cain City
5 Hye
6 Rafter Hollow
7 Whitworth Ranch
8 Crabapple Creek

ADJOINING QUADRANGLES

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

07/08/24

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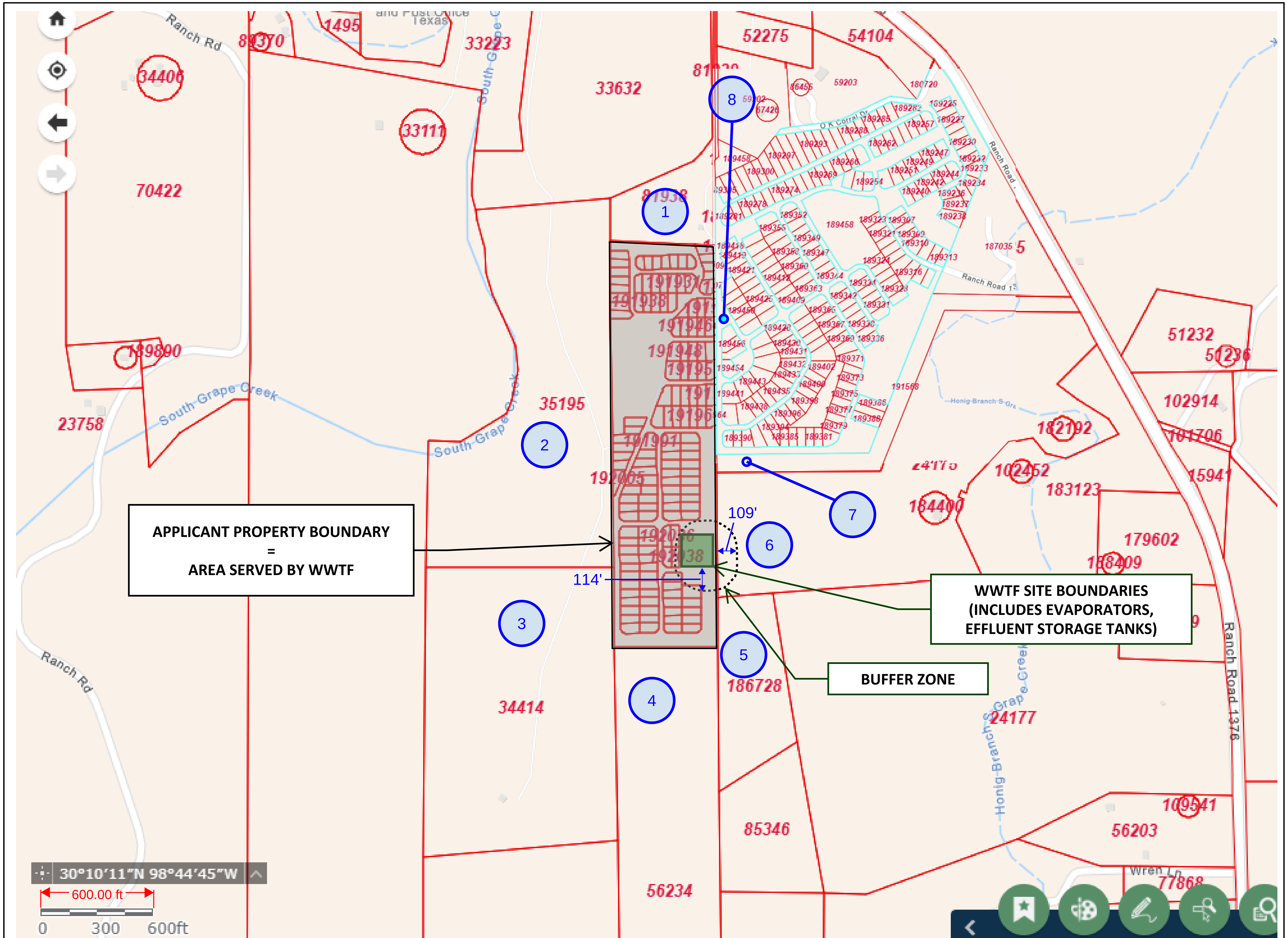
Georgetown, TX 78626
TX Firm No. 21880

FIREFLY PARTNERS LLC
FIREFLY WWTF TLAP APPLICATION
GILLESPIE COUNTY, TEXAS

U.S. TOPOGRAPHIC MAP
Attachment E.2

NSN. 7643016398479
NGA REF NO. USGSX24K43330



SOURCE:

Gillespie Central Appraisal District

https://gis.bisclient.com/gillespiecad/

Landowner's Cross Reference List provided on next page

Information compiled on 9 JUL 2024

THESE DOCUMENTS ARE FOR INTERIM REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSE.
ENGINEER: Lauren B. Wahl, P.E.
P.E. LICENSE NUMBER: Texas 141050
TEXAS ENGR FIRM: F-21880 ReUse Engineering, Inc.
DATE: 11 JUN 2024

reUse ENGINEERING
4411 SIH 35, Suite 100
Georgetown, TX 78626
TX Firm No. 21880

FIREFLY PARTNERS LLC
FIREFLY WWTF TLAP APPLICATION
GILLESPIE COUNTY, TEXAS

LANDOWNERS MAP

Attachment D

LANDOWNERS CROSS REFERENCE LIST

1. Property ID: 81938
   TATSCH, CARRIE PEHL
   315 W MORSE
   FREDERICKSBURG, TX 78624

2. Property ID: 35195
   ODOWD, JULIA O
   3546 MISTIC GROVE
   SAN ANTONIO, TX 78247

3. Property ID: 34414
   PANKRATZ, PATRICK LOYD ETAL
   8 TEMPLE WILKE LN
   BOERNE, TX 78006

4. Property ID: 56234
   PEHL, KENTON
   616 SHERWOOD FOREST DR
   DICKINSON, TX 77539

5. Property ID: 186728
   BLAYLOCK, DONOVAN II
   13728 MESA VERDE DR
   AUSTIN, TX 78737

6. Property ID: 24175
   LUCKENBACH RANCH LLC
   Attn: SCHEMEL, ROBERT
   5412 RANCH ROAD 1376
   FREDERICKSBURG, TX 78624-7843

7. Property ID: 191568
   FIREFLY PARTNERS LLC
   200 N HARBOR PL STE G
   DAVIDSON, NC 28036

8. Property ID: 189458
   FIREFLY PARTNERS LLC
   200 N HARBOR PL STE G
   DAVIDSON, NC 28036

CARRIE PEHL TATSCH
315 W MORSE
FREDERICKBURG TX 78624

JULIA O ODOWD
3546 MISTIC GROVE
SAN ANTONIO TX 78247

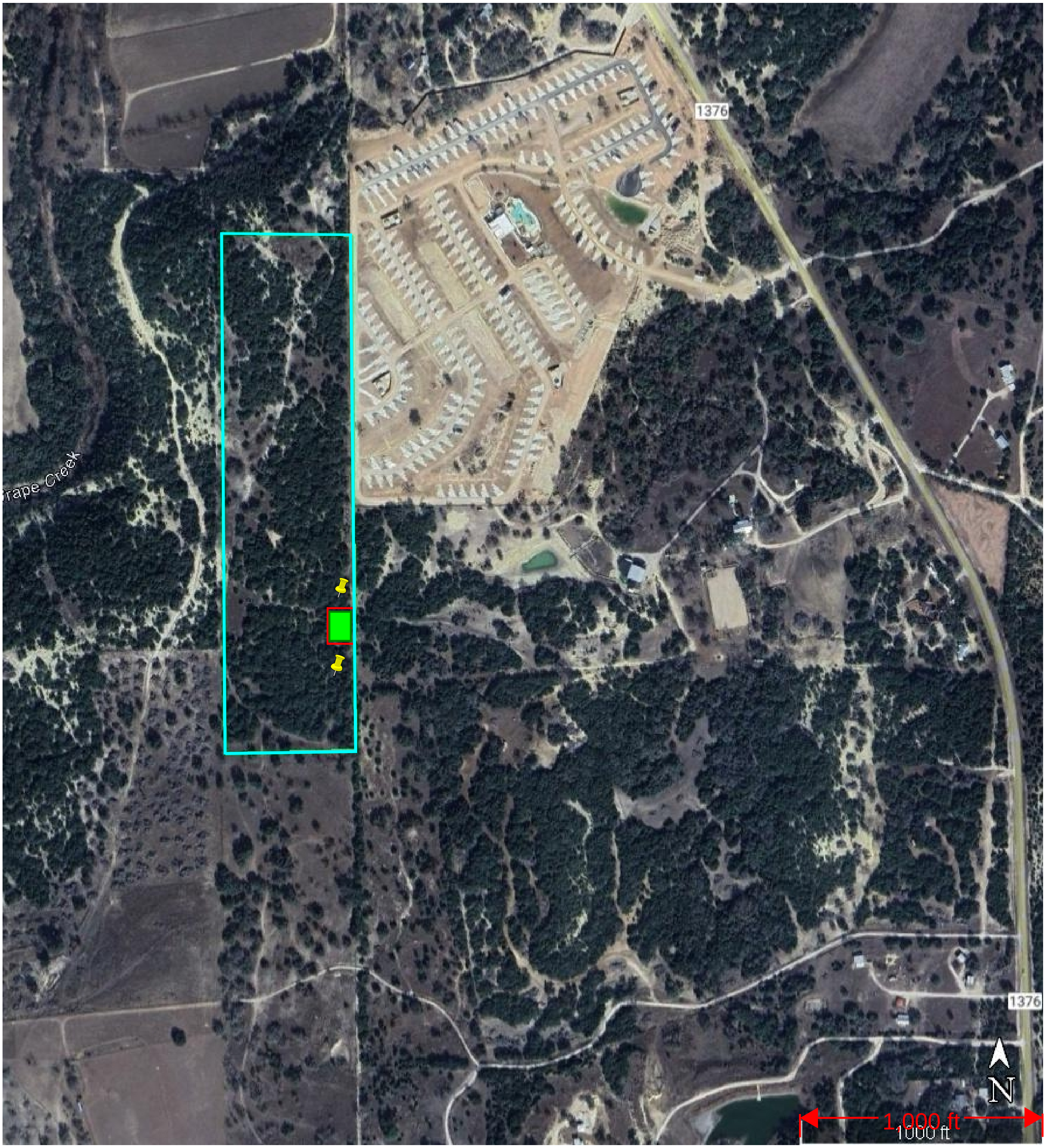
PATRICK LOYD PANKRATZ
8 TEMPLE WILKE LN
BOERNE TX 78006

KENTON PEHL
616 SHERWOOD FOREST DR
DICKINSON TX 77539

DONOVAN BLAYLOCK II
13728 MESA VERDE DR
AUSTIN TX 78737

LUCKENBACH RANCH LLC
ATTN ROBERT SCHEMEL
5412 RANCH ROAD 1376
FREDERICKSBURG TX 78624-7843

FIREFLY PARTNERS LLC
200 N HARBOR PL STE G
DAVIDSON NC 28036



Applicant's Property Boundary

Treatment Facility Boundary

Area Served By WWTF

Photo Location

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Georgetown, TX 78626
TX Firm No. 21880

FIREFLY PARTNERS, LLC
FIREFLY WWTF TLAP APPLICATION
GILLESPIE COUNTY, TEXAS

ORIGINAL PHOTOGRAPHS

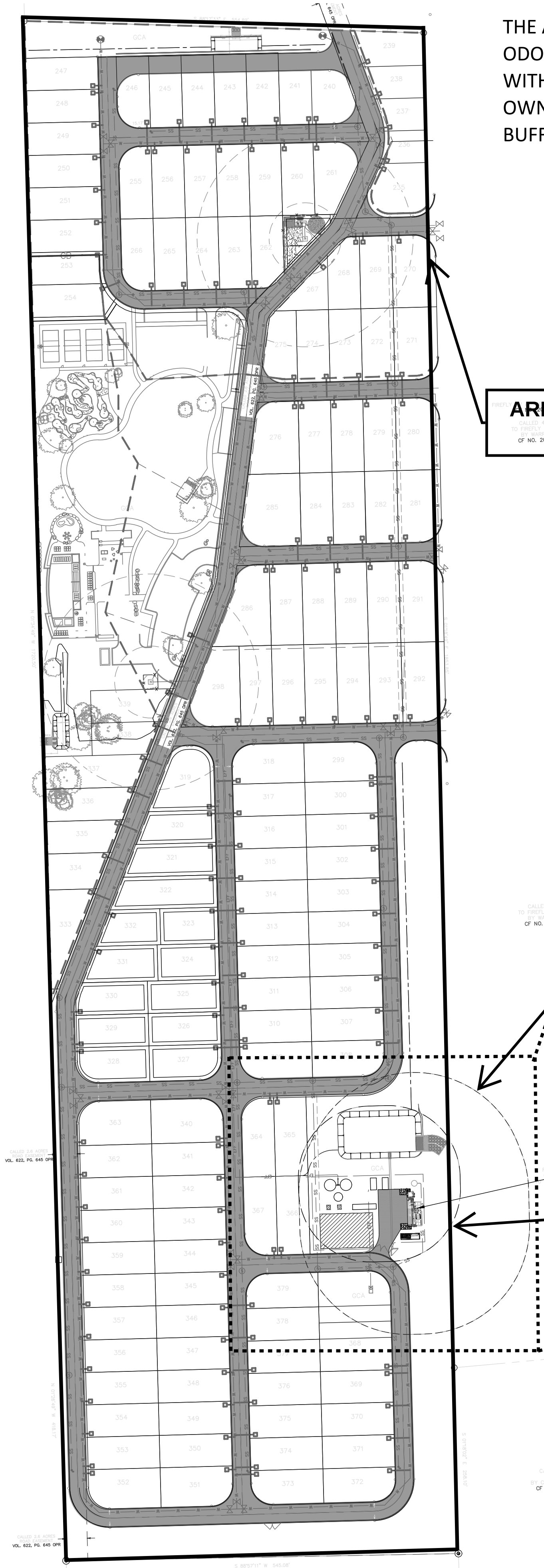
Attachment G

WWTF

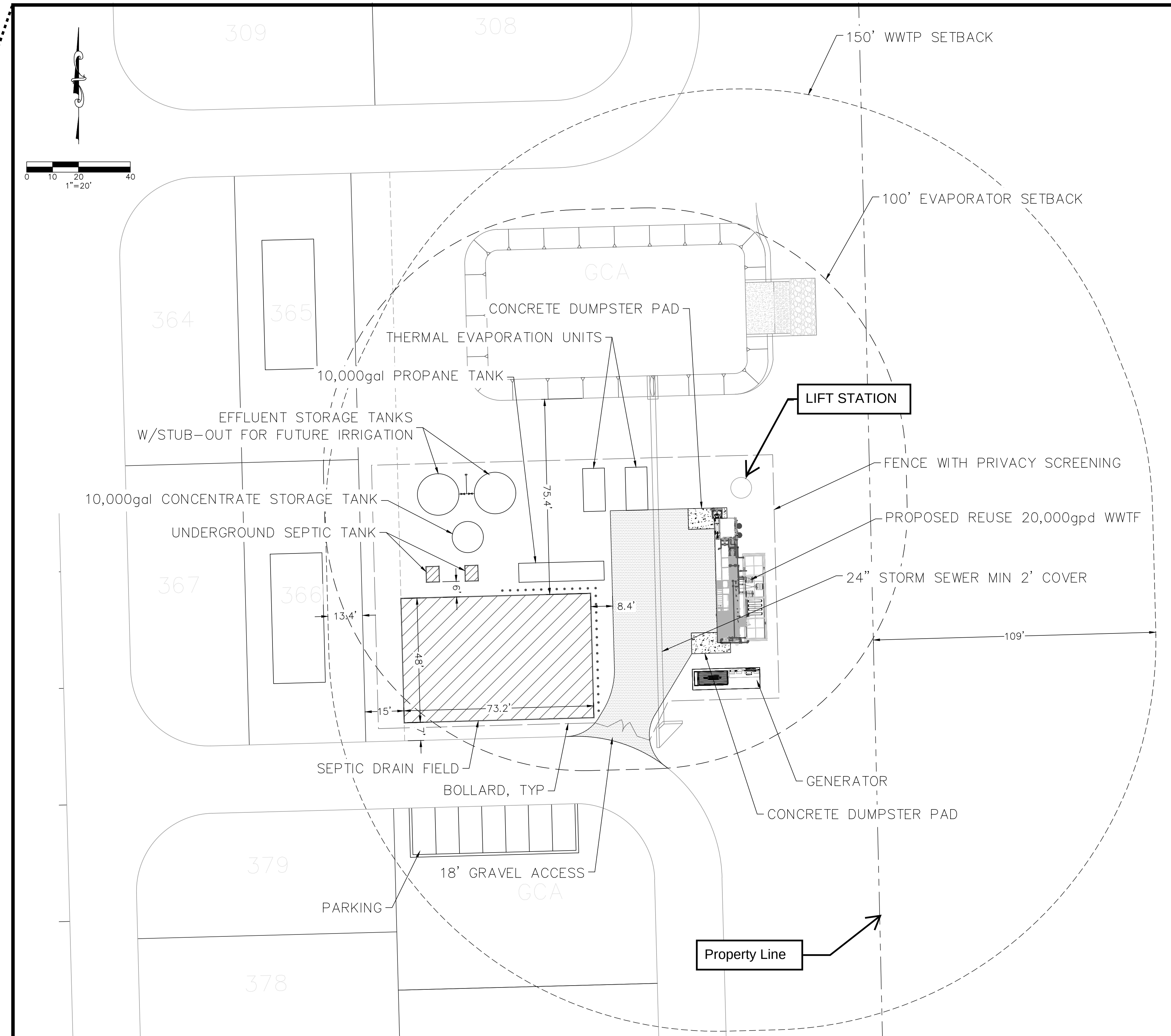
VIEW TO NORTH

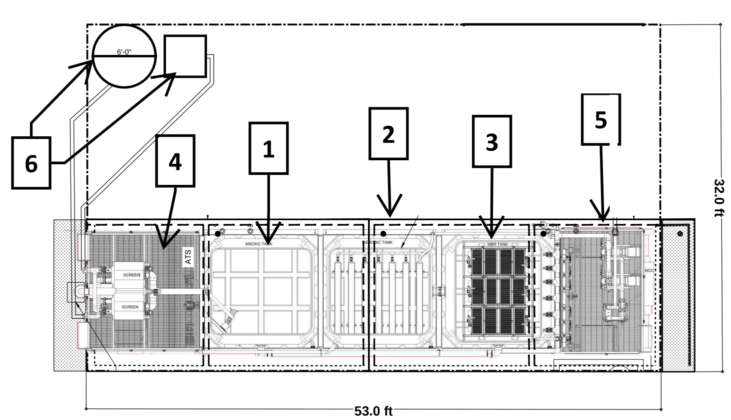
WWTF

VIEW TO SOUTH



THE APPLICANT WILL HAVE AN ODOR & ABATEMENT EASEMENT WITH THE ADJACENT PROPERTY OWNER INTO WHICH THE 150-FT BUFFER ZONE FALLS





1.Anoxic Tank
2.Aerobic Tank
3.Membranes Tank
4.Fine Screens/Sludge Press Skid
5.Permeate & Blower Skid
6.Influent Lift Station & Valve Pit

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Georgetown, TX 78626
TX Firm No. 21880

FIREFLY PARTNERS LLC
FIREFLY WWTF TLAP APPLICATION
GILLESPIE COUNTY, TEXAS

BUFFER ZONE MAP

Attachment H

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

DOMESTIC WASTEWATER PERMIT APPLICATION TECHNICAL REPORT 1.0

For any questions about this form, please contact the Domestic Wastewater Permitting Team at 512-239-4671.

The following information is required for all renewal, new, and amendment applications.

Section 1. Permitted or Proposed Flows (Instructions Page 43)

A. Existing/Interim I Phase

Design Flow (MGD): 0.02

2-Hr Peak Flow (MGD): 0.08

Estimated construction start date: Calendar Year 2025

Estimated waste disposal start date: Calendar Year 2025

B. Interim II Phase

Design Flow (MGD):

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

Estimated construction start date: Click to enter text.

Estimated waste disposal start date:

C. Final Phase

Design Flow (MGD): 0.02

2-Hr Peak Flow (MGD): 0.08

Estimated construction start date: Calendar Year 2025

Estimated waste disposal start date: Calendar Year 2025

D. Current Operating Phase

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

Section 2. Treatment Process (Instructions Page 43)

A. Current Operating Phase

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, a description of *each phase* must be provided.**

The plant is a Membrane Bio-Reactor (MBR) facility, including influent pump station, fine screen, anoxic, aerobic, and membrane cells with ultraviolent disinfection, and a sludge press. Type 1 reclaimed water will be pumped to two (2) 30,000-gallon tanks and subsequently evaporated via the use of two (2) 10,000 gallon per day mechanical evaporators. Concentrated effluent water produced by the mechanical evaporators will be disposed through a 1,000 gpd On-site Sewage Facility System (OSSF). Per TCEQ (Attachment 1), an air discharge permit is not needed for the proposed evaporators.

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)
Fine Screen	2	N/A
Anoxic Tank I	1	10'x7.30'x9.0'
Aerobic Tank	1	12'x7.30'x9.0'
Membrane Cell	1	10'x7.30'x9.0'
Ultraviolet Disinfection	2	N/A
Sludge Press	1	N/A

C. Process Flow Diagram

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

Attachment: 2. Process Flow Diagram

Section 3. Site Information and Drawing (Instructions Page 44)

Provide the TPDES discharge outfall latitude and longitude. Enter N/A if not applicable.

- Latitude: N/A
- Longitude: N/A

Provide the TLAP disposal site latitude and longitude. Enter N/A if not applicable.

- Latitude: 30.171200
- Longitude: -98.751387

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: 3. Site Drawing

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

The Firefly development will serve a Recreational Vehicle (RV) facility encompassing 26.8 acres with approximately 145 RV locations.

Collection System Information **for wastewater TPDES permits only**: Provide information for each **uniquely owned** collection system, existing and new, served by this facility, including satellite collection systems. **Please see the instructions for a detailed explanation and examples.**

Collection System Information

Collection System Name	Owner Name	Owner Type	Population Served
Firefly WWTF	FF Utility, LLC	Privately Owned	145 LUEs
		Choose an item.	
		Choose an item.	
		Choose an item.	

Section 4. Unbuilt Phases (Instructions Page 45)

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 to enter text.

Section 5. Closure Plans (Instructions Page 45)

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 to enter text.

Section 6. Permit Specific Requirements (Instructions Page 45)

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: <u>See 10053 Administrative Report, Attachment D.</u>

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.**

<u>TCEQ has approved the use of the mechanical evaporators (see 10053 Administrative Report, Attachment D) to evaporate Type 1 reclaimed water. Additionally, the TCEQ has indicated that an air quality permit is not needed for the mechanical evaporators (Attachment 1).</u>

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.

See Attachment H of the 10053 Administrative Report. The wastewater treatment facility is either located 150 feet from the nearest property line or an easement (Odor and Noise Abatement) has been/will be created between the Applicant and the neighboring property into which the buffer zone falls.

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 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 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 512-239-2335. 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 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 512-239-2335.

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

Click 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 to enter text. or TXRNE Click 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 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 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 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 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, attach a Sewage Sludge Solids Management Plan. See Example 5 in the instructions.
Click to enter text.

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

1. Acceptance of sludge from other WWTPs

Does or will the facility accept sludge from other treatment plants at the facility site?

☐ Yes ☒ No

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

In addition, provide the date the plant started 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 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 the date the plant started 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 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 or will the facility 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 to enter text.

Section 7. Pollutant Analysis of Treated Effluent (Instructions Page 50)

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). Provide copies of the laboratory results sheets. **These tables are not applicable for a minor amendment without renewal.** See the instructions for guidance.

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

Table1.0(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) 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

Table1.0(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 50)

Facility Operator Name: Not yet contracted.

Facility Operator's License Classification and Level: Click to enter text.

Facility Operator's License Number: Click to enter text.

Section 9. Sludge and Biosolids Management and Disposal (Instructions Page 51)

A. WWTP's Biosolids Management Facility Type

Check all that apply. See instructions for guidance

☐ Design flow>= 1 MGD

☐ Serves >= 10,000 people

☐ Class I Sludge Management Facility (per 40 CFR § 503.9)

☐ Biosolids generator

☐ Biosolids end user – land application (onsite)

☐ Biosolids end user – surface disposal (onsite)

☐ Biosolids end user – incinerator (onsite)

B. WWTP's Biosolids Treatment Process

Check all that apply. See instructions for guidance.

☐ Aerobic Digestion

☐ Air Drying (or sludge drying beds)

☐ Lower Temperature Composting

☐ Lime Stabilization

☐ Higher Temperature Composting

☐ Heat Drying

☐ Thermophilic Aerobic Digestion

☐ Beta Ray Irradiation

☐ Gamma Ray Irradiation

☐ Pasteurization

☐ Preliminary Operation (e.g. grinding, de-gritting, blending)

☒ Thickening (e.g. gravity thickening, centrifugation, filter press, vacuum filter)

☐ Sludge Lagoon

☐ Temporary Storage (< 2 years)

☐ Long Term Storage (>= 2 years)

☐ Methane or Biogas Recovery

☐ Other Treatment Process: Click to enter text.

C. Biosolids Management

Provide information on the *intended* biosolids management practice. Do not enter every management practice that you want authorized in the permit, as the permit will authorize all biosolids management practices listed in the instructions. Rather indicate the management practice the facility plans to use.

Biosolids Management

Management Practice	Handler or Preparer Type	Bulk or Bag Container	Amount (dry metric tons)	Pathogen Reduction Options	Vector Attraction Reduction Option
Disposal in Landfill	On-Site Owner or Operator	Bulk	4.9 metric tons per year	Class B: PSRP Air Drying	Option 11: Biosolids covered at end of each day
Choose an item.	Choose an item.	Choose an item.		Choose an item.	Choose an item.
Choose an item.	Choose an item.	Choose an item.		Choose an item.	Choose an item.

If "Other" is selected for Management Practice, please explain (e.g. monofill or transport to another WWTP): Click to enter text.

D. Disposal site

Disposal site name: City of Fredericksburg Landfill

TCEQ permit or registration number: 1995

County where disposal site is located: Gillespie

E. Transportation method

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

Name of the hauler: The Cleaning Guys

Hauler registration number: RN106037484, Sludge ID 25218

Sludge is transported as a:

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

Section 10. Permit Authorization for Sewage Sludge Disposal (Instructions Page 53)

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 53)

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

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

  Attachment: Click to enter text.
- Site map:

  Attachment: Click 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 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 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 to enter text.

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

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

Phosphorus, mg/kg: Click to enter text.

Potassium, mg/kg: Click to enter text.

pH, standard units: Click to enter text.

Ammonia Nitrogen mg/kg: Click to enter text.

Arsenic: Click to enter text.

Cadmium: Click to enter text.

Chromium: Click to enter text.

Copper: Click to enter text.

Lead: Click to enter text.

Mercury: Click to enter text.

Molybdenum: Click to enter text.

Nickel: Click to enter text.

Selenium: Click to enter text.

Zinc: Click to enter text.

Total PCBs: Click to enter text.

Provide the following information:

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

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

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

D. Site development plan

Provide a detailed description of the methods used to deposit sludge in the lagoon(s):

Click to enter text.

Attach the following documents to the application.

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

  Attachment: Click to enter text.

- Copy of the closure plan

  Attachment: Click to enter text.

- Copy of deed recordation for the site

  Attachment: Click to enter text.

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

  Attachment: Click to enter text.

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

  Attachment: Click to enter text.

- Procedures to prevent the occurrence of nuisance conditions

  Attachment: Click 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 to enter text.

Section 12. Authorizations/Compliance/Enforcement (Instructions Page 55)

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:

As noted in Attachment D of 10053 Domestic Administrative Report, the use of the two mechanical evaporators as a means to dispose of the Type 1 wastewater has been approved by the TCEQ. Additionally, as noted in Attachment 1 of this report, an air discharge permit for these mechanical evaporators is not required by the TCEQ.

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 to enter text.

Section 13. RCRA/CERCLA Wastes (Instructions Page 55)

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 to enter text.

Section 14. Laboratory Accreditation (Instructions Page 56)

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: N/A, no laboratory tests submitted with New Application.

Title: Click to enter text.

Signature: ________________________

Date: __________________

DOMESTIC WASTEWATER PERMIT APPLICATION TECHNICAL REPORT 1.1

The following information is required for new and amendment major applications.

Section 1. Justification for Permit (Instructions Page 57)

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.

There is not currently a central (public or private) wastewater service that is willing to provide service to the proposed development. Sewer treatment per individual lot is not practical and connection to nearby systems is not a viable option. See Attachment 4 for the Projection of LUEs & Wastewater Flow to WWTF Capacity Over Time of Development. The plot shows that the WWTF capacity will increase prior to development and occupation of LUEs (Living Unit Equivalents). Year 0 represents the start of operation, when LUEs are occupied, and wastewater flow begins.

B. Regionalization of facilities

For additional guidance, please review TCEQ's Regionalization Policy for Wastewater Treatment[1].

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 to enter text.

If yes, attach correspondence from the city.

Attachment: Click 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 to enter text.

2. Utility CCN areas

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

☐ Yes ☒ No

[1] https://www.tceq.texas.gov/permitting/wastewater/tceq-regionalization-for-wastewater

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 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 and collection systems that includes each permittee's name and permit number, and an area map showing the location of these facilities and collection systems.

Attachment: Click to enter text.

If yes, attach proof of mailing a request for service to each facility and collection system, the letters requesting service, and correspondence from each facility and collection system.

Attachment: .

If the facility or collection system agrees to provide service, attach a justification for the proposed facility and a cost analysis of expenditures that includes the cost of connecting to the facility or collection system versus the cost of the proposed facility or expansion.

Attachment: Click to enter text.

Section 2. Proposed Organic Loading (Instructions Page 59)

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 to enter text.

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

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

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

Click 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 BOD5 Concentration (mg/l)
Municipality		
Subdivision	0.02	350
Trailer park – transient		
Mobile home park		
School with cafeteria and showers		
School with cafeteria, no showers		
Recreational park, overnight use		
Recreational park, day use		
Office building or factory		
Motel		
Restaurant		
Hospital		
Nursing home		
Other		
TOTAL FLOW from all sources	0.02	
AVERAGE BOD_5 from all sources		350

Section 3. Proposed Effluent Quality and Disinfection (Instructions Page 59)

A. Existing/Interim I Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: Click to enter text.

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

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

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

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

Other: Click to enter text.

B. Interim II Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: Click to enter text.

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

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

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

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

Other: Click to enter text.

C. Final Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: 10

Total Suspended Solids, mg/l: 10

Ammonia Nitrogen, mg/l: 5

Total Phosphorus, mg/l: 2

Dissolved Oxygen, mg/l: 5.0

Other: Click to enter text.

D. Disinfection Method

Identify the proposed method of disinfection.

☐ Chlorine: Click to enter text. mg/l after Click to enter text. minutes detention time at peak flow

Dechlorination process: Click to enter text.

☒ Ultraviolet Light: 1.0 seconds contact time at peak flow

☐ Other: Click to enter text.

Section 4. Design Calculations (Instructions Page 59)

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

Attachment: 5. Design Calculations

Section 5. Facility Site (Instructions Page 60)

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 to enter text.

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

FEMA Flood Map Service Center (https://msc.fema.gov/portal/home

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 to enter text.

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

B. Wind rose

Attach a wind rose: Attachment 6. Wind Rose

Section 6. Permit Authorization for Sewage Sludge Disposal (Instructions Page 60)

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)**: Click 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 the completed **Domestic Wastewater Permit Application: Sewage Sludge Technical Report (TCEQ Form No. 10056)**: Click to enter text.

Section 7. Sewage Sludge Solids Management Plan (Instructions Page 61)

Attach a solids management plan to the application.

Attachment: 7. Solids Management Plan

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 WASTEWATER PERMIT APPLICATION WORKSHEET 2.0: RECEIVING WATERS

The following information is required for all TPDES permit applications.

Section 1. Domestic Drinking Water Supply (Instructions Page 64)

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 **no**, proceed it Section 2. **If yes**, provide the following:

Owner of the drinking water supply: Click to enter text.

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

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

Attachment: Click to enter text.

Section 2. Discharge into Tidally Affected Waters (Instructions Page 64)

Does the facility discharge into tidally affected waters?

☐ Yes ☐ No

If **no**, proceed to Section 3. **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 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 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 to enter text.

Section 3. Classified Segments (Instructions Page 64)

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 65)

Name of the immediate receiving waters: Click to enter text.

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 to enter text.

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

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

☐ Man-made Channel or Ditch

☐ Open Bay

☐ Tidal Stream, Bayou, or Marsh

☐ Other, specify: Click to enter text.

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 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.

Click to enter text.

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.

Click to enter text.

E. Normal dry weather characteristics

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

Click to enter text.

Date and time of observation: Click to enter text.

Was the water body influenced by stormwater runoff during observations?

☐ Yes ☐ No

Section 5. General Characteristics of the Waterbody (Instructions Page 66)

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 to enter text.

B. Waterbody uses

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

- ☐ Livestock watering
- ☐ Irrigation withdrawal
- ☐ Fishing
- ☐ Domestic water supply
- ☐ Park activities
- ☐ Contact recreation
- ☐ Non-contact recreation
- ☐ Navigation
- ☐ Industrial water supply
- ☐ Other(s), specify: Click to enter text.

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

DOMESTIC WASTEWATER PERMIT APPLICATION
WORKSHEET 2.1: STREAM PHYSICAL CHARACTERISTICS

Required for new applications, major facilities, and applications adding an outfall.

Worksheet 2.1 is not required for discharges to intermittent streams or discharges directly to (or within 300 feet of) a classified segment.

Section 1. General Information (Instructions Page 66)

Date of study: Click to enter text. Time of study: Click to enter text.

Stream name: Click to enter text.

Location: Click to enter text.

Type of stream upstream of existing discharge or downstream of proposed discharge (check one).

☐ Perennial ☐ Intermittent with perennial pools

Section 2. Data Collection (Instructions Page 66)

Number of stream bends that are well defined: Click to enter text.

Number of stream bends that are moderately defined: Click to enter text.

Number of stream bends that are poorly defined: Click to enter text.

Number of riffles: Click to enter text.

Evidence of flow fluctuations (check one):

☐ Minor ☐ moderate ☐ severe

Indicate the observed stream uses and if there is evidence of flow fluctuations or channel obstruction/modification.

Click to enter text.

Stream transects

In the table below, provide the following information for each transect downstream of the existing or proposed discharges. Use a separate row for each transect.

Table 2.1(1) - Stream Transect Records

Stream type at transect Select riffle, run, glide, or pool. See Instructions, Definitions section.	**Transect location**	**Water surface width (ft)**	**Stream depths (ft)** at 4 to 10 points along each transect from the channel bed to the water surface. Separate the measurements with commas.
Choose an item.			
Choose an item.			
Choose an item.			
Choose an item.			
Choose an item.			
Choose an item.			
Choose an item.			
Choose an item.			
Choose an item.			
Choose an item.			

Section 3. Summarize Measurements (Instructions Page 66)

Streambed slope of entire reach, from USGS map in feet/feet: Click to enter text.

Approximate drainage area above the most downstream transect (from USGS map or county highway map, in square miles): Click to enter text.

Length of stream evaluated, in feet: Click to enter text.

Number of lateral transects made: Click to enter text.

Average stream width, in feet: Click to enter text.

Average stream depth, in feet: Click to enter text.

Average stream velocity, in feet/second: Click to enter text.

Instantaneous stream flow, in cubic feet/second: Click to enter text.

Indicate flow measurement method (type of meter, floating chip timed over a fixed distance, etc.): Click to enter text.

Size of pools (large, small, moderate, none): Click to enter text.

Maximum pool depth, in feet: Click to enter text.

DOMESTIC WASTEWATER PERMIT APPLICATION WORKSHEET 3.0: LAND DISPOSAL OF EFFLUENT

The following is required for renewal, new, and amendment permit applications.

Section 1. Type of Disposal System (Instructions Page 68)

Identify the method of land disposal:

- ☐ Surface application
- ☐ Subsurface application
- ☐ Irrigation
- ☐ Subsurface soils absorption
- ☐ Drip irrigation system
- ☐ Subsurface area drip dispersal system
- ☐ Evaporation
- ☐ Evapotranspiration beds
- ☒ Other (describe in detail): Two mechanical evaporators, each capable of evaporating 10,000 gpd, will be used to evaporate the Type 1 reclaimed water. Please see 10053 Attachment B regarding the WWTF and mechanical evaporators.

NOTE: All applicants without authorization or proposing new/amended subsurface disposal MUST complete and submit Worksheet 7.0.

For existing authorizations, provide Registration Number: Click to enter text.

Section 2. Land Application Site(s) (Instructions Page 68)

In table 3.0(1), provide the requested information for the land application sites. Include the agricultural or cover crop type (wheat, cotton, alfalfa, bermuda grass, native grasses, etc.), land use (golf course, hayland, pastureland, park, row crop, etc.), irrigation area, amount of effluent applied, and whether or not the public has access to the area. Specify the amount of land area and the amount of effluent that will be allotted to each agricultural or cover crop, if more than one crop will be used.

Table 3.0(1) – Land Application Site Crops

Crop Type & Land Use	Irrigation Area (acres)	Effluent Application (GPD)	Public Access? Y/N
Not applicable			

Section 3. Storage and Evaporation Lagoons/Ponds (Instructions Page 68)

Table 3.0(2) – Storage and Evaporation Ponds

Pond Number	Surface Area (acres)	Storage Volume (acre-feet)	Dimensions	Liner Type

Attach a copy of a liner certification that was prepared, signed, and sealed by a Texas licensed professional engineer for each pond.

Attachment: Click to enter text.

Section 4. Flood and Runoff Protection (Instructions Page 68)

Is the land application site <u>within</u> the 100-year frequency flood level?

☐ Yes ☒ No

If yes, describe how the site will be protected from inundation.

Click to enter text.

Provide the source used to determine the 100-year frequency flood level:

Click to enter text.

Provide a description of tailwater controls and rainfall run-on controls used for the land application site.

Click to enter text.

Section 5. Annual Cropping Plan (Instructions Page 68)

Attach an Annual Cropping Plan which includes a discussion of each of the following items. If not applicable, provide a detailed explanation indicating why. **Attachment**: Not applicable as the Type 1 reclaim water will be evaporated.

- Soils map with crops
- Cool and warm season plant species
- Crop yield goals
- Crop growing season
- Crop nutrient requirements
- Additional fertilizer requirements
- Minimum/maximum harvest height (for grass crops)
- Supplemental watering requirements
- Crop salt tolerances
- Harvesting method/number of harvests
- Justification for not removing existing vegetation to be irrigated

Section 6. Well and Map Information (Instructions Page 69)

Attach a USGS map with the following information shown and labeled. If not applicable, provide a detailed explanation indicating why. **Attachment**: Not applicable as the Type 1 reclaim water will be evaporated and will not impact groundwater or waters of the State.

- The boundaries of the land application site(s)
- Waste disposal or treatment facility site(s)
- On-site buildings
- Buffer zones
- Effluent storage and tailwater control facilities
- All water wells within 1-mile radius of the disposal site or property boundaries
- All springs and seeps onsite and within 500 feet of the property boundaries
- All surface waters in the state onsite and within 500 feet of the property boundaries
- All faults and sinkholes onsite and within 500 feet of the property

List and cross reference all water wells located within a half-mile radius of the disposal site or property boundaries shown on the USGS map in the following table. Attach additional pages as necessary to include all of the wells.

Table 3.0(3) – Water Well Data

Well ID	Well Use	Producing? Y/N	Open, cased, capped, or plugged?	Proposed Best Management Practice
			Choose an item.	
			Choose an item.	
			Choose an item.	
			Choose an item.	

Well ID	Well Use	Producing? Y/N	Open, cased, capped, or plugged?	Proposed Best Management Practice
			Choose an item.	

If water quality data or well log information is available please include the information in an attachment listed by Well ID.

Attachment: Click to enter text.

Section 7. Groundwater Quality (Instructions Page 69)

Attach a Groundwater Quality Technical Report which assesses the impact of the wastewater disposal system on groundwater. This report shall include an evaluation of the water wells (including the information in the well table provided in Item 6. above), the wastewater application rate, and pond liners. Indicate by a check mark that this report is provided.

Attachment: Not applicable

Are groundwater monitoring wells available onsite? ☐ Yes ☐ No

Do you plan to install ground water monitoring wells or lysimeters around the land application site? ☐ Yes ☐ No

If yes, provide the proposed location of the monitoring wells or lysimeters on a site map.

Attachment: Click to enter text.

Section 8. Soil Map and Soil Analyses (Instructions Page 70)

A. Soil map

Attach a USDA Soil Survey map that shows the area to be used for effluent disposal.

Attachment: Not applicable

B. Soil analyses

Attach the laboratory results sheets from the soil analyses. **Note**: for renewal applications, the current annual soil analyses required by the permit are acceptable as long as the test date is less than one year prior to the submission of the application.

Attachment: Click to enter text.

List all USDA designated soil series on the proposed land application site. Attach additional pages as necessary.

Table 3.0(4) – Soil Data

Soil Series	Depth from Surface	Permeability	Available Water Capacity	Curve Number

Soil Series	Depth from Surface	Permeability	Available Water Capacity	Curve Number

Section 9. Effluent Monitoring Data (Instructions Page 71)

Is the facility in operation?

☐ Yes ☒ No

If no, this section is not applicable and the worksheet is complete.

If yes, provide the effluent monitoring data for the parameters regulated in the existing permit. If a parameter is not regulated in the existing permit, enter N/A.

Table 3.0(5) – Effluent Monitoring Data

Date	30 Day Avg Flow MGD	BOD5 mg/l	TSS mg/l	pH	Chlorine Residual mg/l	Acres irrigated

Date	30 Day Avg Flow MGD	BOD5 mg/l	TSS mg/l	pH	Chlorine Residual mg/l	Acres irrigated

Provide a discussion of all persistent excursions above the permitted limits and any corrective actions taken.

Click to enter text.

DOMESTIC WASTEWATER PERMIT APPLICATION WORKSHEET 3.1: SURFACE LAND DISPOSAL OF EFFLUENT

The following is required for new and major amendment permit applications. Renewal and minor amendment permit applications may be asked for this worksheet on a case by case basis.

Section 1. Surface Disposal (Instructions Page 72)

Complete the item that applies for the method of disposal being used.

A. Irrigation

Area under irrigation, in acres: Not Applicable

Design application frequency:

hours/day Click to enter text. **And** days/week Click to enter text.

Land grade (slope):

average percent (%): Click to enter text.

maximum percent (%): Click to enter text.

Design application rate in acre-feet/acre/year: Click to enter text.

Design total nitrogen loading rate, in lbs N/acre/year: Click to enter text.

Soil conductivity (mmhos/cm): Click to enter text.

Method of application: Click to enter text.

Attach a separate engineering report with the water balance and storage volume calculations, method of application, irrigation efficiency, and nitrogen balance.

Attachment: Click to enter text.

B. Evaporation ponds

Daily average effluent flow into ponds, in gallons per day: Not Applicable

Attach a separate engineering report with the water balance and storage volume calculations.

Attachment: Click to enter text.

C. Evapotranspiration beds

Number of beds: N/A

Area of bed(s), in acres: Click to enter text.

Depth of bed(s), in feet: Click to enter text.

Void ratio of soil in the beds: Click to enter text.

Storage volume within the beds, in acre-feet: Click to enter text.

Attach a separate engineering report with the water balance and storage volume calculations, and a description of the lining.

Attachment: Click to enter text.

D. Overland flow

Area used for application, in acres: Not Applicable

Slopes for application area, percent (%): Click to enter text.

Design application rate, in gpm/foot of slope width: Click to enter text.

Slope length, in feet: Click to enter text.

Design BOD_5 loading rate, in lbs BOD_5/acre/day: Click to enter text.

Design application frequency:

hours/day: Click to enter text. **And** days/week: Click to enter text.

Attach a separate engineering report with the method of application and design requirements according to *30 TAC Chapter 217*.

Attachment: Click to enter text.

Section 2. Edwards Aquifer (Instructions Page 73)

Is the facility subject to *30 TAC Chapter 213*, Edwards Aquifer Rules?

☐ Yes ☒ No

If **yes**, is the facility located on the Edwards Aquifer Recharge Zone?

☐ Yes ☐ No

If yes, attach a geological report addressing potential recharge features.

Attachment: Click to enter text.

DOMESTIC WASTEWATER PERMIT APPLICATION WORKSHEET 3.2: SURFACE LAND DISPOSAL OF EFFLUENT

The following **is required** for **new and major amendment** permit applications. Renewal and minor amendments applicants may be asked for the worksheet on a case by case basis.

NOTE: All applicants proposing new/amended subsurface disposal MUST complete and submit Worksheet 7.0. This worksheet applies to any subsurface disposal system that **does not meet** the definition of a subsurface area drip dispersal system as defined in *30 TAC Chapter 222, Subsurface Area Drip Dispersal System.*

Section 1. Subsurface Application (Instructions Page 74)

Identify the type of system:

☐ Conventional Gravity Drainfield, Beds, or Trenches (new systems must be less than 5,000 GPD)

☐ Low Pressure Dosing

☒ Other, specify: Mechanical evaporation

Application area, in acres: Not applicable

Area of drainfield, in square feet: Click to enter text.

Application rate, in gal/square foot/day: Click to enter text.

Depth to groundwater, in feet: Click to enter text.

Area of trench, in square feet: Click to enter text.

Dosing duration per area, in hours: Click to enter text.

Number of beds: Click to enter text.

Dosing amount per area, in inches/day: Click to enter text.

Infiltration rate, in inches/hour: Click to enter text.

Storage volume, in gallons: Click to enter text.

Area of bed(s), in square feet: Click to enter text.

Soil Classification: Click to enter text.

Attach a separate engineering report with the information required in *30 TAC § 309.20,* excluding the requirements of § 309.20 b(3)(A) and (B) design analysis which may be asked for on a case by case basis. Include a description of the schedule of dosing basin rotation.

Attachment: See Attachment D of the 10053 Administrative Report

Section 2. Edwards Aquifer (Instructions Page 74)

Is the subsurface system over the Edwards Aquifer Recharge Zone as mapped by TCEQ?

☐ Yes ☒ No

Is the subsurface system over the Edwards Aquifer Transition Zone as mapped by TCEQ?

☐ Yes ☒ No

If yes to either question, the subsurface system may be prohibited by *30 TAC §213.8.* Please call the Municipal Permits Team, at 512-239-4671, to schedule a pre-application meeting.

DOMESTIC WASTEWATER PERMIT APPLICATION WORKSHEET 3.3: SUBSURFACE AREA DRIP DISPERSAL (SADDS) LAND DISPOSAL OF EFFLUENT

The following **is required** for **new and major amendment** subsurface area drip dispersal system permit applications. Renewal and minor amendments applicants may be asked for the worksheet on a case by case basis.

NOTE: All applicants proposing new/amended subsurface disposal MUST complete and submit Worksheet 7.0. This worksheet applies to any subsurface disposal system that **meets** the definition of a subsurface area drip dispersal system as defined in *30 TAC Chapter 222, Subsurface Area Drip Dispersal System.*

Section 1. Administrative Information (Instructions Page 75)

A. Provide the legal name of all corporations or other business entities managed, owned, or otherwise closely related to the owner of the treatment facility:

B. Not Applicable Is the owner of the land where the treatment facility is located the same as the owner of the treatment facility?

☐ Yes ☐ No

If **no**, provide the legal name of all corporations or other business entities managed, owned, or otherwise closely related to the owner of the land where the treatment facility is located.

Click to enter text.

C. Owner of the subsurface area drip dispersal system: Click to enter text.

D. Is the owner of the subsurface area drip dispersal system the same as the owner of the wastewater treatment facility or the site where the wastewater treatment facility is located?

☐ Yes ☐ No

If **no**, identify the names of all corporations or other business entities managed, owned, or otherwise closely related to the entity identified in Item 1.C.

Click to enter text.

E. Owner of the land where the subsurface area drip dispersal system is located: N/A

F. Is the owner of the land where the subsurface area drip dispersal system is located the same as owner of the wastewater treatment facility, the site where the wastewater treatment facility is located, or the owner of the subsurface area drip dispersal system?

☐ Yes ☐ No

If **no**, identify the name of all corporations or other business entities managed, owned, or otherwise closely related to the entity identified in item 1.E.

Click to enter text.

Section 2. Subsurface Area Drip Dispersal System (Instructions Page

75)

A. Type of system

☐ Subsurface Drip Irrigation

☐ Surface Drip Irrigation

☒ Other, specify: Mechanical Evaporation

B. Irrigation operations

Application area, in acres: Not Applicable

Infiltration Rate, in inches/hour: Click to enter text.

Average slope of the application area, percent (%): Click to enter text.

Maximum slope of the application area, percent (%): Click to enter text.

Storage volume, in gallons: Click to enter text.

Major soil series: Click to enter text.

Depth to groundwater, in feet: Click to enter text.

C. Application rate

Is the facility located **west** of the boundary shown in *30 TAC § 222.83* **and** also using a vegetative cover of non-native grasses over seeded with cool season grasses during the winter months (October-March)?

☐ Yes ☐ No

If yes, then the facility may propose a hydraulic application rate not to exceed 0.1 gal/square foot/day.

Is the facility located **east** of the boundary shown in *30 TAC § 222.83* **or** in any part of the state when the vegetative cover is any crop other than non-native grasses?

☐ Yes ☐ No

If **yes**, the facility must use the formula in *30 TAC §222.83* to calculate the maximum hydraulic application rate.

Do you plan to submit an alternative method to calculate the hydraulic application rate for approval by the executive director?

☐ Yes ☐ No

Hydraulic application rate, in gal/square foot/day: Click to enter text.

Nitrogen application rate, in lbs/gal/day: Click to enter text.

D. Dosing information

Number of doses per day: Click to enter text.

Dosing duration per area, in hours: Click to enter text.

Rest period between doses, in hours: Click to enter text.

Dosing amount per area, in inches/day: Click to enter text.

Number of zones: Click to enter text.

Does the proposed subsurface drip irrigation system use tree vegetative cover as a crop?

☐ Yes ☐ No

If **yes**, provide a vegetation survey by a certified arborist. Please call the Water Quality Assessment Team at (512) 239-4671 to schedule a pre-application meeting.

Attachment: Click to enter text.

Section 3. Required Plans (Instructions Page 75)

A. Recharge feature plan

Attach a Recharge Feature Plan with all information required in *30 TAC §222.79*.

Attachment: Click to enter text.

B. Soil evaluation

Attach a Soil Evaluation with all information required in *30 TAC §222.73*.

Attachment: Click to enter text.

C. Site preparation plan

Attach a Site Preparation Plan with all information required in *30 TAC §222.75*.

Attachment: Click to enter text.

D. Soil sampling/testing

Attach soil sampling and testing that includes all information required in *30 TAC §222.157*.

Attachment: Click to enter text.

Section 4. Floodway Designation (Instructions Page 76)

A. Site location

Is the existing/proposed land application site within a designated floodway?

☐ Yes ☐ No

B. Flood map

Attach either the FEMA flood map or alternate information used to determine the floodway.

Attachment: Click to enter text.

Section 5. Surface Waters in the State (Instructions Page 76)

A. Buffer Map

Attach a map showing appropriate buffers on surface waters in the state, water wells, and springs/seeps.

Attachment: Click to enter text.

B. Buffer variance request

Do you plan to request a buffer variance from water wells or waters in the state?

☐ Yes ☐ No

If yes, then attach the additional information required in *30 TAC § 222.81(c).*

Attachment: Click to enter text.

Section 6. Edwards Aquifer (Instructions Page 76)

A. Is the SADDS located over the Edwards Aquifer Recharge Zone as mapped by TCEQ?

☐ Yes ☐ No

B. Is the SADDS located over the Edwards Aquifer Transition Zone as mapped by TCEQ?

☐ Yes ☐ No

If yes to either question, then the SADDS may be prohibited by *30 TAC §213.8*. Please call the Municipal Permits Team at 512-239-4671 to schedule a pre-application meeting.

DOMESTIC WASTEWATER PERMIT APPLICATION WORKSHEET 4.0: POLLUTANT ANALYSIS REQUIREMENTS

The following **is required** for facilities with a permitted or proposed flow of **1.0 MGD or greater**, facilities with an approved **pretreatment** program, or facilities classified as a **major** facility. See instructions for further details.

This worksheet is not required minor amendments without renewal.

Section 1. Toxic Pollutants (Instructions Page 78)

For pollutants identified in Table 4.0(1), indicate the type of sample.

Grab ☐ Composite ☐

Date and time sample(s) collected: Click to enter text.

Table 4.0(1) – Toxics Analysis

Pollutant	AVG Effluent Conc. (µg/l)	MAX Effluent Conc. (µg/l)	Number of Samples	MAL (µg/l)
Acrylonitrile				50
Aldrin				0.01
Aluminum				2.5
Anthracene				10
Antimony				5
Arsenic				0.5
Barium				3
Benzene				10
Benzidine				50
Benzo(a)anthracene				5
Benzo(a)pyrene				5
Bis(2-chloroethyl)ether				10
Bis(2-ethylhexyl)phthalate				10
Bromodichloromethane				10
Bromoform				10
Cadmium				1
Carbon Tetrachloride				2
Carbaryl				5
Chlordane*				0.2
Chlorobenzene				10
Chlorodibromomethane				10

Pollutant	**AVG Effluent Conc. (µg/l)**	**MAX Effluent Conc. (µg/l)**	**Number of Samples**	**MAL (µg/l)**
Chloroform				10
Chlorpyrifos				0.05
Chromium (Total)				3
Chromium (Tri) **(*1)**				N/A
Chromium (Hex)				3
Copper				2
Chrysene				5
p-Chloro-m-Cresol				10
4,6-Dinitro-o-Cresol				50
p-Cresol				10
Cyanide **(*2)**				10
4,4'- DDD				0.1
4,4'- DDE				0.1
4,4'- DDT				0.02
2,4-D				0.7
Demeton (O and S)				0.20
Diazinon				0.5/0.1
1,2-Dibromoethane				10
m-Dichlorobenzene				10
o-Dichlorobenzene				10
p-Dichlorobenzene				10
3,3'-Dichlorobenzidine				5
1,2-Dichloroethane				10
1,1-Dichloroethylene				10
Dichloromethane				20
1,2-Dichloropropane				10
1,3-Dichloropropene				10
Dicofol				1
Dieldrin				0.02
2,4-Dimethylphenol				10
Di-n-Butyl Phthalate				10
Diuron				0.09
Endosulfan I (alpha)				0.01

Pollutant	AVG Effluent Conc. (µg/l)	MAX Effluent Conc. (µg/l)	Number of Samples	MAL (µg/l)
Endosulfan II (beta)				0.02
Endosulfan Sulfate				0.1
Endrin				0.02
Ethylbenzene				10
Fluoride				500
Guthion				0.1
Heptachlor				0.01
Heptachlor Epoxide				0.01
Hexachlorobenzene				5
Hexachlorobutadiene				10
Hexachlorocyclohexane (alpha)				0.05
Hexachlorocyclohexane (beta)				0.05
gamma-Hexachlorocyclohexane (Lindane)				0.05
Hexachlorocyclopentadiene				10
Hexachloroethane				20
Hexachlorophene				10
Lead				0.5
Malathion				0.1
Mercury				0.005
Methoxychlor				2
Methyl Ethyl Ketone				50
Mirex				0.02
Nickel				2
Nitrate-Nitrogen				100
Nitrobenzene				10
N-Nitrosodiethylamine				20
N-Nitroso-di-n-Butylamine				20
Nonylphenol				333
Parathion (ethyl)				0.1
Pentachlorobenzene				20
Pentachlorophenol				5
Phenanthrene				10

Pollutant	AVG Effluent Conc. (μg/l)	MAX Effluent Conc. (μg/l)	Number of Samples	MAL (μg/l)
Polychlorinated Biphenyls (PCB's) **(*3)**				0.2
Pyridine				20
Selenium				5
Silver				0.5
1,2,4,5-Tetrachlorobenzene				20
1,1,2,2-Tetrachloroethane				10
Tetrachloroethylene				10
Thallium				0.5
Toluene				10
Toxaphene				0.3
2,4,5-TP (Silvex)				0.3
Tributyltin (see instructions for explanation)				0.01
1,1,1-Trichloroethane				10
1,1,2-Trichloroethane				10
Trichloroethylene				10
2,4,5-Trichlorophenol				50
TTHM (Total Trihalomethanes)				10
Vinyl Chloride				10
Zinc				5

(*1) Determined by subtracting hexavalent Cr from total Cr.

(*2) Cyanide, amenable to chlorination or weak-acid dissociable.

(*3) The sum of seven PCB congeners 1242, 1254, 1221, 1232, 1248, 1260, and 1016.

Section 2. Priority Pollutants

For pollutants identified in Tables 4.0(2)A-E, indicate type of sample.

Grab ☐ Composite ☐

Date and time sample(s) collected: Click to enter text.

Table 4.0(2)A – Metals, Cyanide, and Phenols

Pollutant	**AVG Effluent Conc. (µg/l)**	**MAX Effluent Conc. (µg/l)**	**Number of Samples**	**MAL (µg/l)**
Antimony				5
Arsenic				0.5
Beryllium				0.5
Cadmium				1
Chromium (Total)				3
Chromium (Hex)				3
Chromium (Tri) **(*1)**				N/A
Copper				2
Lead				0.5
Mercury				0.005
Nickel				2
Selenium				5
Silver				0.5
Thallium				0.5
Zinc				5
Cyanide **(*2)**				10
Phenols, Total				10

(*1) Determined by subtracting hexavalent Cr from total Cr.

(*2) Cyanide, amenable to chlorination or weak-acid dissociable

Table 4.0(2)B – Volatile Compounds

Pollutant	AVG Effluent Conc. (µg/l)	MAX Effluent Conc. (µg/l)	Number of Samples	MAL (µg/l)
Acrolein				50
Acrylonitrile				50
Benzene				10
Bromoform				10
Carbon Tetrachloride				2
Chlorobenzene				10
Chlorodibromomethane				10
Chloroethane				50
2-Chloroethylvinyl Ether				10
Chloroform				10
Dichlorobromomethane [Bromodichloromethane]				10
1,1-Dichloroethane				10
1,2-Dichloroethane				10
1,1-Dichloroethylene				10
1,2-Dichloropropane				10
1,3-Dichloropropylene [1,3-Dichloropropene]				10
1,2-Trans-Dichloroethylene				10
Ethylbenzene				10
Methyl Bromide				50
Methyl Chloride				50
Methylene Chloride				20
1,1,2,2-Tetrachloroethane				10
Tetrachloroethylene				10
Toluene				10
1,1,1-Trichloroethane				10
1,1,2-Trichloroethane				10
Trichloroethylene				10
Vinyl Chloride				10

Table 4.0(2)C – Acid Compounds

Pollutant	AVG Effluent Conc. (µg/l)	MAX Effluent Conc. (µg/l)	Number of Samples	MAL (µg/l)
2-Chlorophenol				10
2,4-Dichlorophenol				10
2,4-Dimethylphenol				10
4,6-Dinitro-o-Cresol				50
2,4-Dinitrophenol				50
2-Nitrophenol				20
4-Nitrophenol				50
P-Chloro-m-Cresol				10
Pentalchlorophenol				5
Phenol				10
2,4,6-Trichlorophenol				10

Table 4.0(2)D – Base/Neutral Compounds

Pollutant	AVG Effluent Conc. (µg/l)	MAX Effluent Conc. (µg/l)	Number of Samples	MAL (µg/l)
Acenaphthene				10
Acenaphthylene				10
Anthracene				10
Benzidine				50
Benzo(a)Anthracene				5
Benzo(a)Pyrene				5
3,4-Benzofluoranthene				10
Benzo(ghi)Perylene				20
Benzo(k)Fluoranthene				5
Bis(2-Chloroethoxy)Methane				10
Bis(2-Chloroethyl)Ether				10
Bis(2-Chloroisopropyl)Ether				10
Bis(2-Ethylhexyl)Phthalate				10
4-Bromophenyl Phenyl Ether				10
Butyl benzyl Phthalate				10
2-Chloronaphthalene				10
4-Chlorophenyl phenyl ether				10
Chrysene				5
Dibenzo(a,h)Anthracene				5
1,2-(o)Dichlorobenzene				10
1,3-(m)Dichlorobenzene				10
1,4-(p)Dichlorobenzene				10
3,3-Dichlorobenzidine				5
Diethyl Phthalate				10
Dimethyl Phthalate				10
Di-n-Butyl Phthalate				10
2,4-Dinitrotoluene				10
2,6-Dinitrotoluene				10
Di-n-Octyl Phthalate				10
1,2-Diphenylhydrazine (as Azo-benzene)				20
Fluoranthene				10

Pollutant	AVG Effluent Conc. (µg/l)	MAX Effluent Conc. (µg/l)	Number of Samples	MAL (µg/l)
Fluorene				10
Hexachlorobenzene				5
Hexachlorobutadiene				10
Hexachlorocyclo-pentadiene				10
Hexachloroethane				20
Indeno(1,2,3-cd)pyrene				5
Isophorone				10
Naphthalene				10
Nitrobenzene				10
N-Nitrosodimethylamine				50
N-Nitrosodi-n-Propylamine				20
N-Nitrosodiphenylamine				20
Phenanthrene				10
Pyrene				10
1,2,4-Trichlorobenzene				10

Table 4.0(2)E - Pesticides

Pollutant	AVG Effluent Conc. (µg/l)	MAX Effluent Conc. (µg/l)	Number of Samples	MAL (µg/l)
Aldrin				0.01
alpha-BHC (Hexachlorocyclohexane)				0.05
beta-BHC (Hexachlorocyclohexane)				0.05
gamma-BHC (Hexachlorocyclohexane)				0.05
delta-BHC (Hexachlorocyclohexane)				0.05
Chlordane				0.2
4,4-DDT				0.02
4,4-DDE				0.1
4,4,-DDD				0.1
Dieldrin				0.02
Endosulfan I (alpha)				0.01
Endosulfan II (beta)				0.02
Endosulfan Sulfate				0.1
Endrin				0.02
Endrin Aldehyde				0.1
Heptachlor				0.01
Heptachlor Epoxide				0.01
PCB-1242				0.2
PCB-1254				0.2
PCB-1221				0.2
PCB-1232				0.2
PCB-1248				0.2
PCB-1260				0.2
PCB-1016				0.2
Toxaphene				0.3

* For PCBS, if all are non-detects, enter the highest non-detect preceded by a “<”.

Section 3. Dioxin/Furan Compounds

A. Indicate which of the following compounds from may be present in the influent from a contributing industrial user or significant industrial user. Check all that apply.

- ☐ 2,4,5-trichlorophenoxy acetic acid

  Common Name 2,4,5-T, CASRN 93-76-5
- ☐ 2-(2,4,5-trichlorophenoxy) propanoic acid

  Common Name Silvex or 2,4,5-TP, CASRN 93-72-1
- ☐ 2-(2,4,5-trichlorophenoxy) ethyl 2,2-dichloropropionate

  Common Name Erbon, CASRN 136-25-4
- ☐ 0,0-dimethyl 0-(2,4,5-trichlorophenyl) phosphorothioate

  Common Name Ronnel, CASRN 299-84-3
- ☐ 2,4,5-trichlorophenol

  Common Name TCP, CASRN 95-95-4
- ☐ hexachlorophene

  Common Name HCP, CASRN 70-30-4

For each compound identified, provide a brief description of the conditions of its/their presence at the facility.

Click to enter text.

B. Do you know or have any reason to believe that 2,3,7,8 Tetrachlorodibenzo-P-Dioxin (TCDD) or any congeners of TCDD may be present in your effluent?

☐ Yes ☐ No

If **yes**, provide a brief description of the conditions for its presence.

Click to enter text.

C. If any of the compounds in Subsection A **or** B are present, complete Table 4.0(2)F.

For pollutants identified in Table 4.0(2)F, indicate the type of sample.

Grab ☐ Composite ☐

Date and time sample(s) collected: Click to enter text.

Table 4.0(2)F – Dioxin/Furan Compounds

Compound	Toxic Equivalency Factors	Wastewater Concentration (ppq)	Wastewater Equivalents (ppq)	Sludge Concentration (ppt)	Sludge Equivalents (ppt)	MAL (ppq)
2,3,7,8 TCDD	1					10
1,2,3,7,8 PeCDD	0.5					50
2,3,7,8 HxCDDs	0.1					50
1,2,3,4,6,7,8 HpCDD	0.01					50
2,3,7,8 TCDF	0.1					10
1,2,3,7,8 PeCDF	0.05					50
2,3,4,7,8 PeCDF	0.5					50
2,3,7,8 HxCDFs	0.1					50
2,3,4,7,8 HpCDFs	0.01					50
OCDD	0.0003					100
OCDF	0.0003					100
PCB 77	0.0001					0.5
PCB 81	0.0003					0.5
PCB 126	0.1					0.5
PCB 169	0.03					0.5
Total						

DOMESTIC WASTEWATER PERMIT APPLICATION WORKSHEET 5.0: TOXICITY TESTING REQUIREMENTS

The following **is required** for facilities with a current operating design flow of**1.0 MGD or greater**, with an EPA-approved **pretreatment** program (or those required to have one under 40 CFR Part 403), or are required to perform Whole Effluent Toxicity testing. See instructions for further details.

This worksheet is not required minor amendments without renewal.

Section 1. Required Tests (Instructions Page 88)

Indicate the number of 7-day chronic or 48-hour acute Whole Effluent Toxicity (WET) tests performed in the four and one-half years prior to submission of the application.

7-day Chronic: Click to enter text.

48-hour Acute: Click to enter text.

Section 2. Toxicity Reduction Evaluations (TREs)

Has this facility completed a TRE in the past four and a half years? Or is the facility currently performing a TRE?

☐ Yes ☐ No

If yes, describe the progress to date, if applicable, in identifying and confirming the toxicant.

Click to enter text.

Section 3. Summary of WET Tests

If the required biomonitoring test information has not been previously submitted via both the Discharge Monitoring Reports (DMRs) and the Table 1 (as found in the permit), provide a summary of the testing results for all valid and invalid tests performed over the past four and one-half years. Make additional copies of this table as needed.

Table 5.0(1) Summary of WET Tests

Test Date	Test Species	NOEC Survival	NOEC Sub-lethal

DOMESTIC WASTEWATER PERMIT APPLICATION WORKSHEET 6.0: INDUSTRIAL WASTE CONTRIBUTION

The following **is required** for **all publicly owned treatment works**.

Section 1. All POTWs (Instructions Page 89)

A. Industrial users (IUs)

Provide the number of each of the following types of industrial users (IUs) that discharge to your POTW and the daily flows from each user. See the Instructions for definitions of Categorical IUs, Significant IUs – non-categorical, and Other IUs.

If there are no users, enter 0 (zero).

Categorical IUs:

Number of IUs: Click to enter text.

Average Daily Flows, in MGD: Click to enter text.

Significant IUs – non-categorical:

Number of IUs: Click to enter text.

Average Daily Flows, in MGD: Click to enter text.

Other IUs:

Number of IUs: Click to enter text.

Average Daily Flows, in MGD: Click to enter text.

B. Treatment plant interference

In the past three years, has your POTW experienced treatment plant interference (see instructions)?

☐ Yes ☐ No

If yes, identify the dates, duration, description of interference, and probable cause(s) and possible source(s) of each interference event. Include the names of the IUs that may have caused the interference.

Click to enter text.

C. Treatment plant pass through

In the past three years, has your POTW experienced pass through (see instructions)?

☐ Yes ☐ No

If yes, identify the dates, duration, a description of the pollutants passing through the treatment plant, and probable cause(s) and possible source(s) of each pass through event. Include the names of the IUs that may have caused pass through.

Click to enter text.

D. Pretreatment program

Does your POTW have an approved pretreatment program?

☐ Yes ☐ No

If yes, complete Section 2 only of this Worksheet.

Is your POTW required to develop an approved pretreatment program?

☐ Yes ☐ No

If yes, complete Section 2.c. and 2.d. only, and skip Section 3.

If no to either question above, skip Section 2 and complete Section 3 for each significant industrial user and categorical industrial user.

Section 2. POTWs with Approved Programs or Those Required to Develop a Program (Instructions Page 90)

A. Substantial modifications

Have there been any **substantial modifications** to the approved pretreatment program that have not been submitted to the TCEQ for approval according to *40 CFR §403.18*?

☐ Yes ☐ No

If yes, identify the modifications that have not been submitted to TCEQ, including the purpose of the modification.

Click to enter text.

B. Non-substantial modifications

Have there been any **non-substantial modifications** to the approved pretreatment program that have not been submitted to TCEQ for review and acceptance?

☐ Yes ☐ No

If yes, identify all non-substantial modifications that have not been submitted to TCEQ, including the purpose of the modification.

Click to enter text.

C. Effluent parameters above the MAL

In Table 6.0(1), list all parameters measured above the MAL in the POTW's effluent monitoring during the last three years. Submit an attachment if necessary.

Table 6.0(1) – Parameters Above the MAL

Pollutant	Concentration	MAL	Units	Date

D. Industrial user interruptions

Has any SIU, CIU, or other IU caused or contributed to any problems (excluding interferences or pass throughs) at your POTW in the past three years?

☐ Yes ☐ No

If yes, identify the industry, describe each episode, including dates, duration, description of the problems, and probable pollutants.

Click to enter text.

Section 3. Significant Industrial User (SIU) Information and Categorical Industrial User (CIU) (Instructions Page 90)

A. General information

Company Name: Click to enter text.

SIC Code: Click to enter text.

Contact name: Click to enter text.

Address: Click to enter text.

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

Telephone number: Click to enter text.

Email address: Click to enter text.

B. Process information

Describe the industrial processes or other activities that affect or contribute to the SIU(s) or CIU(s) discharge (i.e., process and non-process wastewater).

Click to enter text.

C. Product and service information

Provide a description of the principal product(s) or services performed.

Click to enter text.

D. Flow rate information

See the Instructions for definitions of "process" and "non-process wastewater."

Process Wastewater:

Discharge, in gallons/day: Click to enter text.

Discharge Type: ☐ Continuous ☐ Batch ☐ Intermittent

Non-Process Wastewater:

Discharge, in gallons/day: Click to enter text.

Discharge Type: ☐ Continuous ☐ Batch ☐ Intermittent

E. Pretreatment standards

Is the SIU or CIU subject to technically based local limits as defined in the *i*nstructions?

☐ Yes ☐ No

Is the SIU or CIU subject to categorical pretreatment standards found in *40 CFR Parts 405-471*?

☐ Yes ☐ No

If subject to categorical pretreatment standards, indicate the applicable category and subcategory for each categorical process.

Category: Subcategories: Click to enter text.

Click or tap here to enter text. Click to enter text.

Category: Click to enter text.

Subcategories: Click to enter text.

Category: Click to enter text.

Subcategories: Click to enter text.

Category: Click to enter text.

Subcategories: Click to enter text.

Category: Click to enter text.

Subcategories: Click to enter text.

F. Industrial user interruptions

Has the SIU or CIU caused or contributed to any problems (e.g., interferences, pass through, odors, corrosion, blockages) at your POTW in the past three years?

☐ Yes ☐ No

If yes, identify the SIU, describe each episode, including dates, duration, description of problems, and probable pollutants.

Click to enter text.

WORKSHEET 7.0

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

CLASS V INJECTION WELL INVENTORY/AUTHORIZATION FORM

Submit the completed form to:

TCEQ
IUC Permits Team
Radioactive Materials Division
MC-233
PO Box 13087
Austin, Texas 78711-3087
512-239-6466

For TCEQ Use Only
Reg. No.______________
Date Received___________
Date Authorized__________

Section 1. General Information (Instructions Page 92)

1. **TCEQ Program Area**

Program Area (PST, VCP, IHW, etc.): Click to enter text.

Program ID: Click to enter text.

Contact Name: Click to enter text.

Phone Number: Click to enter text.

2. **Agent/Consultant Contact Information**

Contact Name: Click to enter text.

Address: Click to enter text.

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

Phone Number: Click to enter text.

3. **Owner/Operator Contact Information**

☐ Owner ☐ Operator

Owner/Operator Name: Click to enter text.

Contact Name: Click to enter text.

Address: Click to enter text.

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

Phone Number: Click to enter text.

4. **Facility Contact Information**

Facility Name: Click to enter text.

Address: Click to enter text.

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

Location description (if no address is available): Click to enter text.

Facility Contact Person: Click to enter text.

Phone Number: Click to enter text.

5. **Latitude and Longitude, in degrees-minutes-seconds**

Latitude: Click to enter text.

Longitude: Click to enter text.

Method of determination (GPS, TOPO, etc.): Click to enter text.

Attach topographic quadrangle map as attachment A.

6. **Well Information**

Type of Well Construction, select one:

- ☐ Vertical Injection
- ☐ Subsurface Fluid Distribution System
- ☐ Infiltration Gallery
- ☐ Temporary Injection Points
- ☐ Other, Specify: Click to enter text.

Number of Injection Wells: Click to enter text.

7. **Purpose**

Detailed Description regarding purpose of Injection System:

Click to enter text.

Attach a Site Map as Attachment B (Attach the Approved Remediation Plan, if appropriate.)

8. **Water Well Driller/Installer**

Water Well Driller/Installer Name: Click to enter text.

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

Phone Number: Click to enter text.

License Number: Click to enter text.

Section 2. Proposed Down Hole Design

Attach a diagram signed and sealed by a licensed engineer as Attachment C.

Table 7.0(1) – Down Hole Design Table

Name of String	Size	Setting Depth	Sacks Cement/Grout – Slurry Volume – Top of Cement	Hole Size	Weight (lbs/ft) PVC/Steel
Casing					
Tubing					
Screen					

Section 3. Proposed Trench System, Subsurface Fluid Distribution System, or Infiltration Gallery

Attach a diagram signed and sealed by a licensed engineer as Attachment D.

System(s) Dimensions: Click to enter text.

System(s) Construction: Click to enter text.

Section 4. Site Hydrogeological and Injection Zone Data

1. Name of Contaminated Aquifer: Click to enter text.

2. Receiving Formation Name of Injection Zone: Click to enter text.

3. Well/Trench Total Depth: Click to enter text.

4. Surface Elevation: Click to enter text.

5. Depth to Ground Water: Click to enter text.

6. Injection Zone Depth: Click to enter text.

7. Injection Zone vertically isolated geologically? ☐ Yes ☐ No

Impervious Strata between Injection Zone and nearest Underground Source of Drinking Water:

Name: Click to enter text.

Thickness: Click to enter text.

8. Provide a list of contaminants and the levels (ppm) in contaminated aquifer

Attach as Attachment E.

9. Horizontal and Vertical extent of contamination and injection plume

Attach as Attachment F.

10. Formation (Injection Zone) Water Chemistry (Background levels) TDS, etc.

Attach as Attachment G.

11. Injection Fluid Chemistry in PPM at point of injection

Attach as Attachment H.

12. Lowest Known Depth of Ground Water with < 10,000 PPM TDS: Click to enter text.

13. Maximum injection Rate/Volume/Pressure: Click to enter text.

14. Water wells within 1/4 mile radius (attach map as Attachment I): Click to enter text.

15. Injection wells within 1/4 mile radius (attach map as Attachment J): Click to enter text.

16. Monitor wells within 1/4 mile radius (attach drillers logs and map as Attachment K): Click to enter text.

17. Sampling frequency: Click to enter text.

18. Known hazardous components in injection fluid: Click to enter text.

Section 5. Site History

1. Type of Facility: Click to enter text.
2. Contamination Dates: Click to enter text.
3. Original Contamination (VOCs, TPH, BTEX, etc.) and Concentrations (attach as Attachment L): Click to enter text.
4. Previous Remediation (attach results of any previous remediation as attachment M): Click to enter text.

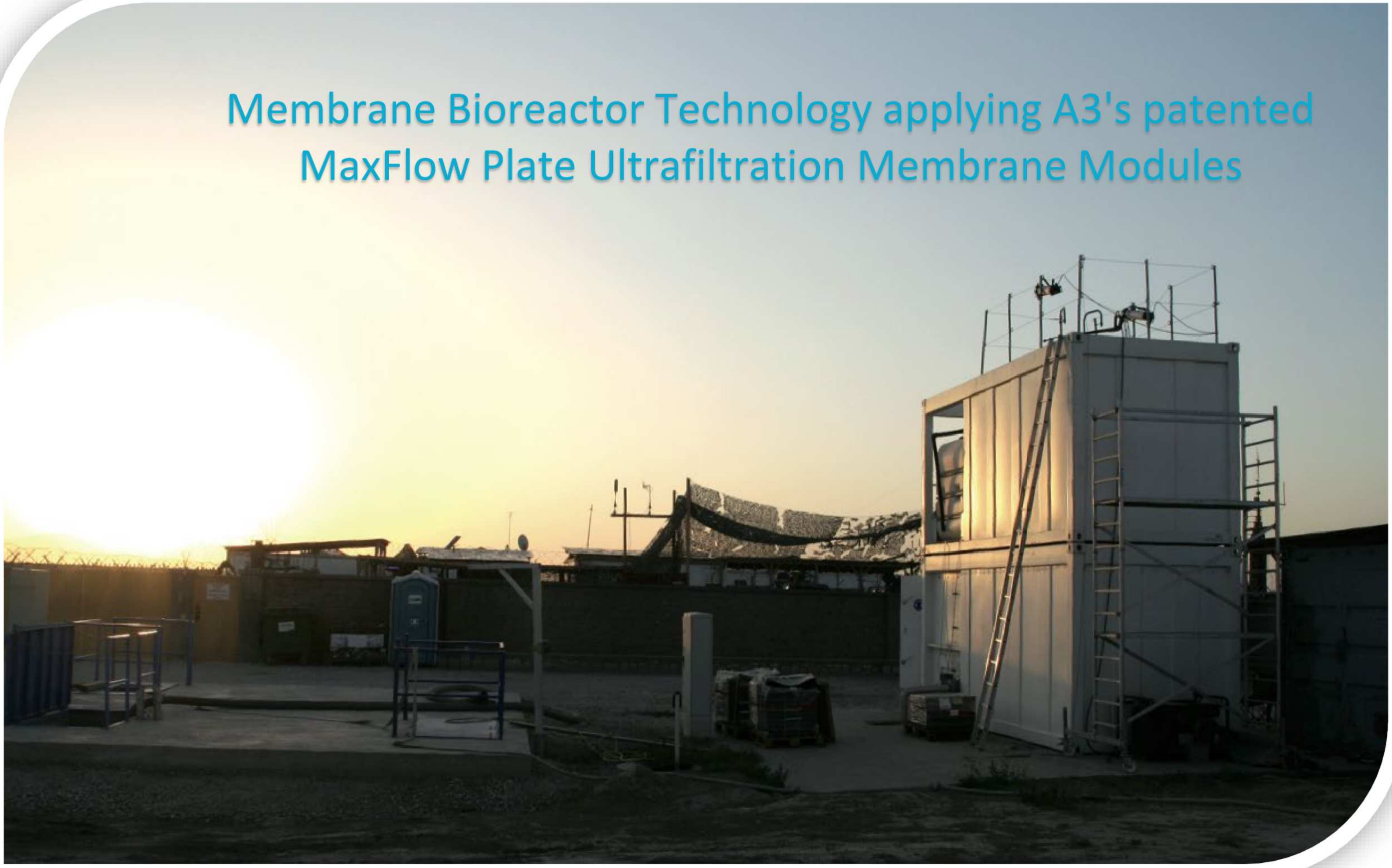
NOTE: Authorization Form should be completed in detail and authorization given by the TCEQ before construction, operation, and/or conversion can begin. Attach additional pages as necessary.

Class V Injection Well Designations

5A07	Heat Pump/AC return (IW used for groundwater to heat and/or cool buildings)
5A19	Industrial Cooling Water Return Flow (IW used to cool industrial process equipment)
5B22	Salt Water Intrusion Barrier (IW used to inject fluids to prevent the intrusion of salt water into an aquifer)
5D02	Storm Water Drainage (IW designed for the disposal of rain water)
5D04	Industrial Stormwater Drainage Wells (IW designed for the disposal of rain water associated with industrial facilities)
5F01	Agricultural Drainage (IW that receive agricultural runoff)
5R21	Aquifer Recharge (IW used to inject fluids to recharge an aquifer)
5S23	Subsidence Control Wells (IW used to control land subsidence caused by ground water withdrawal)
5W09	Untreated Sewage
5W10	Large Capacity Cesspools (Cesspools that are designed for 5,000 gpd or greater)
5W11	Large Capacity Septic systems (Septic systems designed for 5,000 gpd or greater)
5W12	WTTP disposal
5W20	Industrial Process Waste Disposal Wells
5W31	Septic System (Well Disposal method)
5W32	Septic System Drainfield Disposal
5X13	Mine Backfill (IW used to control subsidence, dispose of mining byproducts, and/or fill sections of a mine)
5X25	Experimental Wells (Pilot Test) (IW used to test new technologies or tracer dye studies)
5X26	Aquifer Remediation (IW used to clean up, treat, or prevent contamination of a USDW)
5X27	Other Wells
5X28	Motor Vehicle Waste Disposal Wells (IW used to dispose of waste from a motor vehicle site - These are currently banned)
5X29	Abandoned Drinking Water Wells (waste disposal)

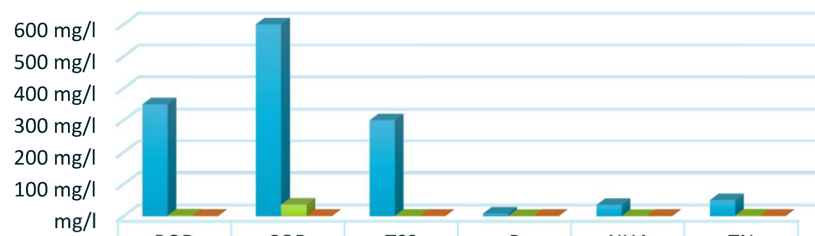
Budget Proposal # 948

Membrane Bioreactor Technology applying A3's patented MaxFlow Plate Ultrafiltration Membrane Modules



Process Summary

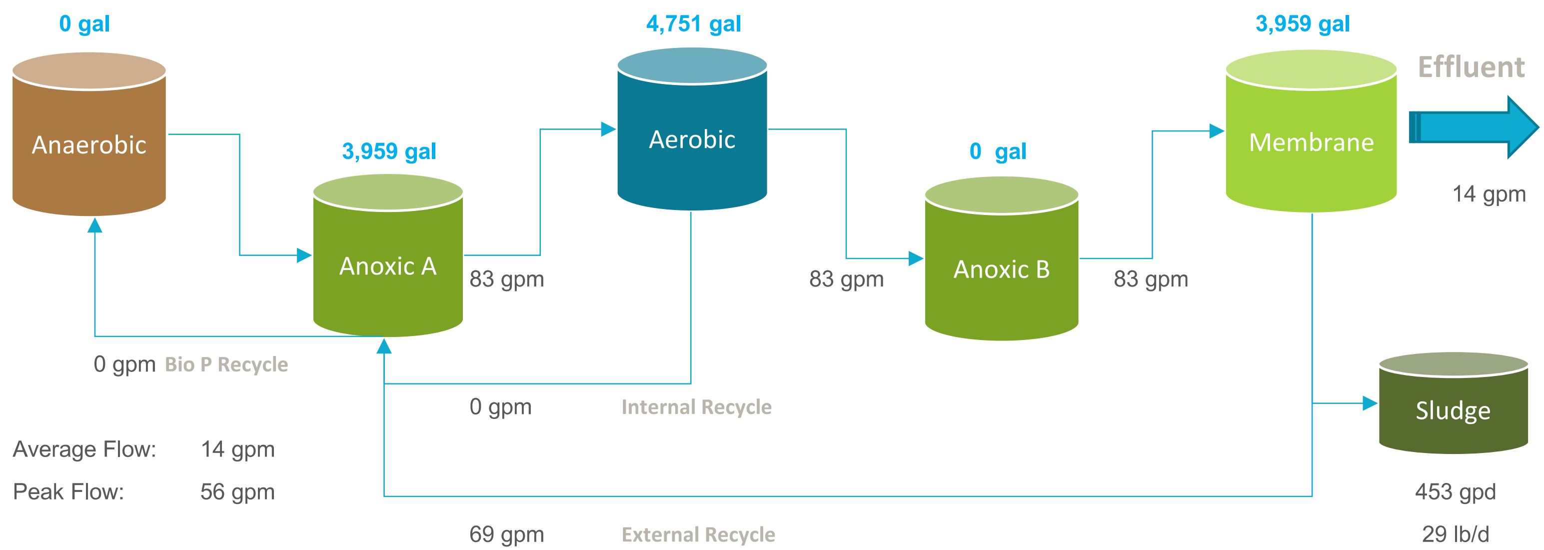
Influent & Effluent Parameters



	BOD	COD	TSS	P	NH4	TN
Influent	350 mg/l	600 mg/l	300 mg/l	8 mg/l	35 mg/l	50 mg/l
Effluent	2.0 mg/l	36.0 mg/l	1.0 mg/l	0.4 mg/l	0.3 mg/l	1.8 mg/l
Removal	99.4%	94.0%	99.7%	95.0%	99.1%	96.4%

PROCESS PARAMETERS

Sludge Age	25 d
Total Reactor Volume	12,668 gal
Total SOR	85 kgO2/d
MLSS in Anoxic / Aerobic Tank	7,641 mg/l
MLSS in Membrane Tank	9,258 mg/l
HRT	15 h
F/M RATIO (BOD)	0.080
F/M RATIO (COD)	0.137
Total Membrane Surface	5,667 sf



Average Flow: 14 gpm

Peak Flow: 56 gpm

Aeration	Flow	Pressure
EQ	0 scfm	0.0 psi
Sludge	0 scfm	0.0 psi
Aerobic	59 scfm	4.5 psi
Membrane	190 scfm	4.5 psi

Applied Options:

NO	DAF
NO	RO

5/23/2023

Biological Process Calculation

Influent Charateristics

Influent Charateristics	Symbol	Value	Units
Type of wastewater		municipal	
Temperature	T	15	°C
pH	-	7.0	-
H_2CO_3 alkalinity	Alk_i	300	mg/l as $CaCO_3$
Site pressure / elevation	$p_{a,i}$	14.5	psi
Average daily flow	Q_i	20,000	gpd
Peak daily flow	$Q_{i,\ max,d}$	50,000	gpd
Hourly peak flow	$Q_{i,\ max,p}$	56	gpm
Peak factor	-	4.0	-
Average daily flow	Q_i	76	m^3/d
Max. monthly average daily flow	$Q_{i,\ max,d}$	189	m^3/d
Hourly peak flow	$Q_{i,\ max,h}$	12.6	m^3/h
Total BOD	$S_{BOD,i}$	350	mgBOD/l
Total COD	$S_{COD,i}$	600	mgCOD/l
COD/BOD ratio	-	1.71	-
Rapidly biodegradable COD	$S_{s,i}$	150	mgCOD/l
Volitale fatty acids (VFA)	$S_{VFA,i}$	23	mgCOD/l
Fermentable COD	$S_{F,i}$	127	mgCOD/l
Slowly biodegradable COD	$S_{ss,i}$	324	mgCOD/l
Biodegradable COD	$S_{bio,i}$	474	mgCOD/l
Soluble inert COD	$S_{SIN,i}$	36	mgCOD/l
Particulate inert COD	$S_{PIN,i}$	90	mgCOD/l

Influent Charateristics

Influent Charateristics	Symbol	Value	Units
NO_3	$N_{NO3,i}$	0.0	mg/l
NH_4	$N_{a,i}$	35.0	mg/l
TKN	$N_{TKN,i}$	50.0	mg/l
TP	P_i	8.0	mg/l
Dissolved Oxygen	$S_{O2,i}$	0.0	mg/l
FSA fraction	$f_{a/TKN,i}$	0.7	-
Fixed (inorganic) suspended solids	$X_{FSS,i}$	47.5	mgISS/l
TSS concentration	$S_{TSS,i}$	300.0	mgTSS/l
Total BOD mass	$FS_{BOD,i}$	26.5	kgBOD/d
Total COD mass	$FS_{COD,i}$	45.4	kgCOD/d
Total NH_4 mass	$FS_{a,i}$	2.6	$kgNH_4/d$
Total TKN mass	$FS_{TKN,i}$	3.8	kgTKN/d
Total P mass	$FS_{P,i}$	0.6	kgP/d

Effluent Characteristics

Effluent Characteristics	Symbol	Value	Units
Waste Sludge	FX_t	29	lb/d
Waste Sludge	Q_w	453	gpd
Effluent BOD	$S_{BOD,e}$	< 3	mgBOD/l
Effluent COD	$S_{COD,e}$	36	mgCOD/l
Effluent TSS	$S_{TSS,e}$	1.0	mgTSS/l
Effluent P	P_e	0.4	mgP/l
Effluent NH_4	$N_{a,e}$	0.3	mgN/l
Effluent NO_3	$N_{NO3,e}$	0.0	mgN/l
Effluent TN (N_{ne} + N_{te})	$N_{t,e}$	1.8	mgN/l

Bioreactor Characteristics

Bioreactor Characteristics	Symbol	Value	Units
Temperature	T_{bio}	15	°C
Sludge retention time / Sludge age	SRT	25	d
Reactor volume	$V_{P,chosen}$	12,668	gallons
Reactor volume	$V_{P,chosen}$	48	m^3
Reactor volume	$V_{P,calc}$	11,334	gallons
Average MLSS concentration	X_{TSS}	7,750	mgTSS/l
Food to microorganism ratio	$F/M_{BOD,used}$	0.080	kgBOD/kgMLSS
Food to microorganism ratio	$F/M_{COD,used}$	0.137	kgCOD/kgMLSS
Membrane tank MLSS concentration	X_M	9,258	mgTSS/l
Aerobic/Anoxic tank MLSS concentration	X_{Bio}	7,641	mgTSS/l
Number of anaerobic zones	$\#_{AN}$	0	-
Number of anoxic zones	$\#_{AO}$	1	-
Number of aerobic zones	$\#_{AE}$	1	-
External recycle ratio	m	5	-
Internal recycle ratio	a	0	-
DO in m recycle	O_m	2	mgO_2/l
DO in a recycle	O_a	0	mgO_2/l
Recycle ratio to anaerobic tank (PAO)	s	0	-
DO in s recycle	$S_{O2,s}$	0	mgO_2/l
Nitrate on s recycle	$S_{NO3,s}$	0	mg/l
TKN/COD ratio	$f_{TKN/COD}$	0.083	mgTKN/mgCOD
Carbon source addition (Micro C)	B_{MicroC}	0.0	lb/d
Carbon source addition (Micro C)	S_{MicroC}	0.00	gpd
Nominal hydraulic retention time	HRT_n	15.2	h
Actual hydraulic retention time	HRT_a	2.5	h

Biological Oxygen Demand

Biological Oxygen Demand	Symbol	Value	Units
OD for synth & endo respiration (PAO)	FO_{PAO}	0	kgO_2/d
OD for synth & endo respiration (OHO)	FO_{OHO}	29	kgO_2/d
Mass carbonaceous oxygen demand	FO_C	29	kgO_2/d
Carbonaceous oxygen utilization rate	O_c	60%	-
Nitrification oxygen demand	FO_n	12	kgO_2/d
Total oxygen demand	FO_t	40	kgO_2/d
Oxygen recovered by denitrification	FO_d	7	kgO_2/d
Net total oxygen demand (AOR)	FO_{td}	33	kgO_2/d
Oxygen saturation @ operating temp.	c_s	10.2	mg/l
Desired oxygen level	c_x	2.0	mg/l
Transfer coefficient	α	0.50	-
Diffuser water depth	DWD	6.5	feet
Oxygen transfer efficiency	OTE	2	%
Standard total oxygen demand (SOR)	SOR	85	kgO_2/d
Required air flow	Q_{air}	**57**	scfm
Oxygen requir. per volume & depth	OS	18.3	$gO_2/(Nm_3*m_D)$

Membrane Module Design	Symbol	Value	Units
Permeate on cycle	T_o	8	minute
Permeate off cycle (relaxation)	T_s	2	minute
Effective membrane module surface	$A_{m,eff}$	87.8	m^2
Effective membrane module surface	$A_{m,eff}$	945	ft^2
Total number of membrane modules	N_M	6	-
Total membrane module surface	A_{total}	527	m^2
Total membrane module surface	A_{total}	5,667	ft^2
Nominal average daily flux	$Q_{ave,n}$	7.5	lmh
Nominal max. daily flux	$Q_{ave,n,max,mo}$	18.7	lmh
Nominal peak hourly flux	$Q_{peak,n}$	30.0	lmh
Average daily flux (excluding rest cycle)	$Q_{ave,n}$	**3.5**	gfd
Max. Daily flux (ex. rest cycle)	$Q_{ave,n,max,mo}$	**8.8**	gfd
Peak hourly flux (ex. rest cycle)	$Q_{peak,n}$	**14.1**	gfd
Total membrane module displacement vol	$V_{modules}$	66	ft^3
Total membrane module displacement vol	$V_{modules}$	494	gallons
Aeration modules	A#	6	-
Membrane module aeration requirement	Q_{am}	28.5	acfm
Total membrane modules aeration	$Q_{am,total}$	171	acfm
Membrane diffuser water depth	DWD_m	6.0	feet
Oxygen requirement per volume & depth	OS	14	$gO_2/(Nm_3*m_D)$
Standard oxygen rate, membrane aeration	SOR_m	381	lbO_2/d
Standard oxygen rate, membrane aeration	SOR_m	175	kgO_2/d

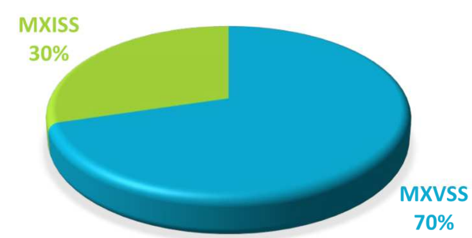
- ✓ Patented, innovative A3's MaxFlow™ membrane filtration modules manufactured in USA.
- ✓ The MaxFlow™ module "open channel design" provides optimal biofilm control, minimizes the quantity of chemical cleaning procedures and avoids module clogging.
- ✓ The compact module design enables dual-stack and triple-stack installations. It allows for a high membrane packing density resulting in a small footprint and high energy efficiency.
- ✓ Most existing conventional treatment plants can be retrofitted with MaxFlow™ membranes due to the flexible and compact nature of our membrane

Kinetic Constants	Symbol	Value	Units
Yield coefficient OHO	Y_{OHO}	0.40	mgVSS/mgCOD
Yield coefficient OHO,OBS	$Y_{OHO,obs}$	0.06	mgVSS/mgCOD
Fermentation rate at 20°C	$k_{F,20}$	0.06	m3/gVSSd
Temperature coefficient for $k_{F,T}$	Θ_{kF}	1.029	-
Fermentation rate at T	$k_{F,T}$	0.05	m3/gVSSd
Endogenous respiration rate (decay)	$b_{OHO,20}$	0.24	gVSS/gVSSd
Endogenous respiration rate T	$b_{OHO,T}$	0.21	gVSS/gVSSd
Yield coefficient FSA	Y_A	0.10	mgVSS/mgFSA
Nitri. pH sensitivity coefficient	K_I	1.13	-
Nitri. pH sensitivity coefficient	K_{max}	9.50	-
Nitri. pH sensitivity coefficient	K_{II}	0.30	-
Max. specific growth rate at 20°C	μ_{Am}	0.45	1/d
Max. spec. growth rate - Temp/pH	μ_{AmTpH}	0.21	1/d
Half saturation coefficient	K_n	0.75	mgFSA/l
Half saturation coefficient - Temp	K_{nT}	0.42	mgFSA/l
Endogenous respiration rate (decay)	b_A	0.04	1/d
Temperature coefficient for $k_{F,T}$	θ_n	1.123	-
Endogenous respiration rate T	b_{AT}	0.022	1/d
Temperature sensitivity coefficient	Θ_{nk1}	1.20	-
Temperature sensitivity coefficient	Θ_{nk2}	1.05	-
Temperature sensitivity coefficient	Θ_{nk3}	1.03	-
Denitrification rates at 20°C	k_1	0.70	-
Denitrification rates at 20°C	k_2	0.10	-
Denitrification rates at 20°C	k_3	0.08	-
Denitrification rates	k_{1T}	0.281	-
Denitrification rates	k_{2T}	0.079	-
Denitrification rates	k_{3T}	0.069	-
Yield coefficient PAO	Y_{PAO}	0.45	gAVSS/gCOD
Yield coefficient PAO	$Y_{PAO,obs}$	0.22	gAVSS/gCOD
Endogenous respiration rate (decay)	b_{PAO_20}	0.04	gEVSS/gCOD
Temperature coefficient for $k_{F,T}$	$\Theta_{b,PAO}$	1.029	-
Endogenous respiration rate T	$b_{PAO,T}$	0.03	gEVSS/gVSSd

Stoichiometric Constants	Symbol	Value	Units
COD/BOD ratio	-	1.71	-
Readily biodeg. org. fraction (RBCOD)	$f_{s,COD}$	0.25	g/gTCOD
Non-biodegradable particulate COD	$f_{PNb,COD}$	0.15	g/gTCOD
Non-biodegradable soluble COD	$f_{SNb,COD}$	0.06	g/gTCOD
SVFA fraction of RBCOD	$f_{SVFA,SSi}$	0.15	g/gCOD$_{SS}$
VSS/TSS of activated sludge	f_{VT}	0.70	mgVSS/mgTSS
COD/VSS of activated sludge	f_{cv}	1.48	kgCOD/kgVSS
True synthesis fraction	f_s^0	0.57	-
Endogenous residue fraction	$f_{H/E,OHO}$	0.2	-
ISS content of OHOs	$f_{ISS,OHO}$	0.15	-
Active fraction - VSS	f_{avOHO}	25%	-
Active fraction - TSS	f_{at}	18%	-
Influent FSA fraction	$f_{FSA,i}$	0.70	-
Non-bio. soluble orgN fraction (inerts)	$f_{SNb,N}$	0.03	-
Non-bio. particulate orgN fraction	f_n	0.12	-
Permissible unaer. sludge mass fraction	f_{xm}	0.65	-
Design unaerated sludge mass fraction	f_{xt}	0.31	-
Minimum primary anoxic mass fraction	f_{x1min}	0.08	-
Primary anoxic mass fraction	f_{x1}	0.31	-
Secondary anoxic mass fraction	f_{x2}	0.00	-
Anaerobic mass fraction	f_{AN}	0.00	-
Non-bio. particulate orgP fraction	$f_{P,XE,OHO}$	0.05	mgP/mgVSS
Endogenous residue fraction	$f_{XE,PAO}$	0.25	gEVSS/gAVSS
P fraction in active PAO mass	$f_{P,PAO}$	0.38	gP/gAVSS
VSS/TSS ratio for PAO active mass	$f_{VT,PAO}$	0.46	gVSS/gTSS
Ratio of P release /VFA uptake	$f_{PO4,REL}$	0.5	gP/gCOD
Frac. of fixed inorganic s. solids of PAO	$f_{FSS,PAO}$	1.3	gFSS/gAVSS
P content of TSS	$f_{P,TSS}$	0.041	gP/gTSS
P content of VSS	$f_{P,FSS,i}$	0.02	gP/gVSS
TKN/COD ratio	f_{ns}	0.08	mgTKN/mgCOD
Nitrogen content of active biomass	$f_{N,VSS}$	0.10	gN/gAVSS

Biological Mass Balance	Symbol	Value	Units
Sludge age	SRT	25	d
Mixed liquor suspended solids	X_{TSS}	7,750	mgTSS/l
Readiable biodegradabe COD flux	$FS_{S,i}$	11	kgCOD/d
Daily flux of VFAs	$FS_{VFA,i}$	2	kgCOD/d
Daily flux of fermentable COD	$FS_{F,i}$	10	kgCOD/d
Daily flux of biodegradable COD	$FS_{bio,i}$	36	kgCOD/d
Daily flux of particulate inert COD	$FS_{PIN,i}$	7	kgCOD/d
Daily flux of fixed inorganic sus. solids	$FS_{ISS,i}$	4	kgISS/d
Influent particulate non-bio. COD	$FX_{VSS,i}$	5	kgVSS/d
Mass nitrogen into sludge prod.	FN_{Sludge}	1	kgN/d
Mass of nitrate generated per day	FN_{NO3}	3	kgN/d
VFAs stored by PAOs	$FS_{S,PAO}$	0	kgCOD/d
Remaining biodegradable COD	$FCOD_{b,OHO}$	36	kgCOD/d
Mass nitrifiers	MX_A	4	kgVSS
Active biomass PAO	MX_{PAO}	0	KgAVSS
Endogenous active biomass PAO	$MX_{E,PAO}$	0	kgEVSS
Bio mass	MX_{bio}	58	kgVSS
Active organism mass	MX_{OHO}	58	kgVSS
Endogenous residue mass	$MX_{E,OHO}$	61	kgVSS
Non-biodegradable particulate mass	MX_{Iv}	115	kgVSS
Volatile suspended solids mass	MX_{VSS}	234	kgVSS
Inorganic suspended solid mass	MX_{ISS}	99	kgISS
Total suspended solids mass	MX_{TSS}	332	kgTSS
Mass/Sludge TSS wasted	FX_t	13	KgTSS/d
Mass/Sludge VSS wasted	FX_V	9	kgVSS/d
Effluent COD	$S_{COD,e}$	36	mgCOD/l
COD mass out (effluent and waste)	$FS_{COD,e}$	3	kgCOD/d
Mass/Sludge COD wasted	$FX_{COD,s}$	14	kgCOD/d

Alkalinity	Symbol	Value	Units
Alkalinity $_{\text{Nitrification as CaCO3 (consumed)}}$	Alk_{Nitri}	238	mg/l as $CaCO_3$
Alkalinity $_{\text{Denitrification as CaCO3 (recovered)}}$	$Alk_{Denitri}$	120	mg/l as $CaCO_3$
Alkalinity $_{ef}$	Alk_e	100	mg/l as $CaCO_3$
Alkalinity $_{inf}$	Alk_i	300	mg/l as $CaCO_3$
Alkalinity $_{\text{Alum (consumed)}}$	Alk_{Alum}	0.0	mg/l as $CaCO_3$
Alkalinity $_{Total}$	Alk_{total}	182	mg/l as $CaCO_3$
Alkalinity $_{Added}$	Alk_{added}	-82	mg/l as $CaCO_3$
Alkalinity $_{Added}$	$XAlk_{added}$	0	lb/d
Density caustic solution $_{(50\%)}$	-	12.76	lb/gal
Alkalinity $_{recovered}$	$Alk_{recovered}$	0.4	lb$CaCO_3$/lb
Caustic $_{needed}$	-	0.0	lb/d
Caustic $_{needed}$	-	0.0	gpd



$$V_p = \frac{MX_{TSS}}{X_{TSS}}$$

$$FX_t = \frac{MX_{TSS}}{SRT}$$

$$MX_{TSS} = MX_{ISS} + MX_{VSS}$$

N Removal

N Removal	Symbol	Value	Units
Factor of safety	S_f	1.2	-
Nitrogen requirements	FN_{synth}	1	kgN/d
Nitrogen requirements	$TKN_{i,synth}$	12.36	gN/m3
Influent non-bio. soluble organic N	$N_{nbios,i}$	1.5	mgN/l
Influent non-bio. particulate org. N	$N_{nbiop,i}$	7.3	mgN/l
Influent biodegradable organic N	$N_{bio,i}$	13.5	mgN/l
Effluent non-bio. soluble organic N	$N_{nbios,e}$	1.5	mgN/l
NH4 concentration avail. for nitri.	N_{an}	33.7	mgN/l
Effluent ammonia	$N_{a,e}$	0.3	mgN/l
Effluent TKN	$N_{TKN,e}$	1.8	mgN/l
N concentration into sludge prod.	N_s	14.8	mgN/l
Nitrification capacity	N_c	33.4	mgN/l
Denitrification potential RBCOD	$D_{p1RBCOD}$	21.2	$mgNO_3$-N/l
Denitrification potential SBCOD	$D_{p1SBCOD}$	19.0	$mgNO_3$-N/l
Denitrification potential RBCOD	$D_{p3RBCOD}$	0.0	$mgNO_3$-N/l
Denitrification potential SBCOD	$D_{p3SBCOD}$	0.0	$mgNO_3$-N/l
Minimum sludge age for nitri.	SRT_m	8.1	d
Denitrification potential primary tank	D_{p1}	40.2	mgN/l
Denitrification potential secondary tank	D_{p3}	0.0	mgN/l
Denitri. potential recycle rate ($f_{xm} = f_{xdm}$)	D_{p*}	31.3	mgN/l
Effluent nitrate	$N_{NO3,e}$	0.0	mgN/l
Effluent nitrate @ f_{xdm} & recycle rate	$N_{NO3,e*}$	5.6	mgN/l

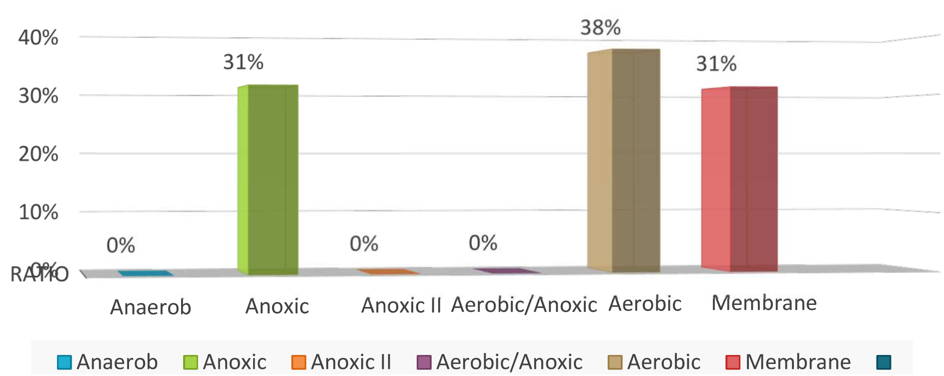
P Removal

P Removal	Symbol	Value	Units
COD lost in anaerobic reatcor	$S_{F,ANn}$	0.0	$gCOD/m^3$
COD lost in anaerobic reatcor	$S_{F,ANn*}$	0.0	$gCOD/m^3$
Fermentable COD for AN reactor	$S_{F,I,conv}$	0.0	$gCOD/m^3$
DO in influent	$S_{O2,i}$	0.0	mgO_2/l
PO_4 release AN reactor	$S_{PO4,rel}$	0.0	gP/m^3
P removal by PAOs	ΔP_{PAO}	0.0	gP/m^3
P removal by OHOs	ΔP_{OHO}	0.9	gP/m^3
P removal by endgeneous biomass	ΔP_{XE}	1.6	gP/m^3
P removal by influent inert mass	ΔP_{XI}	3.0	gP/m^3
P into sludge production	P_s	5.1	gP/m^3
Potential P removal by system	$\Delta P_{SYS,POT}$	10.6	gP/m^3
Actual P removal by system	$\Delta P_{SYS,ACT}$	8.0	gP/m^3
Effluent particulate P from TSS	$X_{P,e}$	0.0	gP/m^3
Influent total P	P_i	8.0	gP/m^3
Effluent total P	P_{e*}	0.0	gP/m^3
P precipitated	P_{prec}	0.0	mgP/l
Precipitation chemical	B_{Alum}	0.0	lb/d
Precipitation chemical	Solution	0.0	gal/d
Density Alum	z_{AL}^{3+}	0.100	lb_{AL}/lb_{prec}
Density Iron	z_{FE}^{3+}	0.077	lb_{FE}/lb_{prec}
Alum efficiency	-	40.0	g/kg
Chemical precipitation sludge	-	0.0	lb/d

Mechanical Process Calculation

Tank Dimensions	Trains	Length	Width	Dia.	Degree	Height	Liquid level	Volume per train	Volume Total	Volume Total
Anaerobic	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
Anoxic I	1	10.00 ft	7.30 ft	.00 ft	0.0	9.00 ft	7.25 ft	3,959 gal	3,959 gal	15.0 m3
Aerobic	1	12.00 ft	7.30 ft	.00 ft	0.0	9.00 ft	7.25 ft	4,751 gal	4,751 gal	18.0 m3
Anoxic II	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
Anoxic Buffer	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
Membrane	1	10.00 ft	7.30 ft	.00 ft	0.0	9.00 ft	7.25 ft	3,959 gal	3,959 gal	15.0 m3
Sludge	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
EQ	0	.00 ft	.00 ft	.00 ft	0.0	.00 ft	.00 ft	gal	gal	0.0 m3
		32.0								

Tank Design	Symbol	Value	Units			
Total process tank volume	12,668	gallons		Weir level	0.6	inches
Total process tank volume$_{calc}$	**11,334**	gallons		Weir length	4.0	ft
Unaerated tank percentage	31	%		Velocity	0.75	fps
Total tank volume	**12,668**	gallons		Vertical tank	0	
Membrane modules volume	494	gallons		Horz. Tank	0	
F/M$_{used,BOD}$	0.080	kgBOD/kgMLSS		Diameter	0	ft
F/M$_{used,COD}$	0.137	kgCOD/kgMLSS				



Process Volume Distribution

Air Flow Design	Symbol	Membrane per train	Aerobic per train	Sludge	EQ	Unit
Minimum air flow	$Q_{A,re}$	171	57	0	0	acfm / scfm
Chosen air flow - actual	$Q_{A, chosen}$	171	54	0	0	acfm
Chosen air flow - inlet	$Q_{A,chosen}$	323	100	0	0	m^3/h
Chosen air flow - inlet	$Q_{A,chosen}$	**190**	**59**	**0**	**0**	scfm
Chosen air flow - piping	$Q_{A,chosen}$	145	45	0	0	acfm
Pipe pressure	p_b	4.5	4.5	0.0	0.0	psi
Pipe losses	H	0.40	0.36	0.00	0.00	psi
Equivalent length in pipe looses	L_p	400	400	400	400	feet
Pipe diameter	d	3.0	2.0	2.0	2.0	inches
Internal pipe diameter	d_i	3.26	2.16	2.16	2.16	inches
Standard temperature	T_1	293	293	293	293	K
Pipe temperature	T_2	316	316	293	293	K
Constant	f	0.02	0.03	0.06	0.06	-
Air velocity	v	**41.7**	**29.6**	**0.1**	**0.1**	fps
Atmospheric pressure	$p_{a,I}$	14.5	14.5	14.5	14.5	psi
Absolute pressure	p_2	19.0	19.0	14.5	14.5	psi
Pressure due to tank liquid level	$p_{DWD,m}$	2.6	2.9	0.0	0.0	psi
Pressure due to aeration device	p_{DWD}	0.7	0.5	0.5	0.5	psi
Pressure due to pipe losses & elev.	$p_{DWD,S}$	0.8	0.8	0.4	0.4	psi
Total pipe losses	p_t	4.1	4.2	0.9	0.9	psi
Total pipe losses	p_t	283.9	289.6	62.1	62.1	mbar

$$H = 9.82 \cdot 10^{-8} \cdot \frac{\left(f \cdot L_p T_2 Q_{A,chosen}\right)}{\left(p_2 d_i\right)^5}$$

$$f = \frac{\left(0.029 \cdot d_i^{0.027}\right)}{Q_{A,chosen}^{0.148}} \qquad T_2 = T_1 \left(\frac{p_2}{p_{a,1}}\right)^{0.283}$$

Rane Wilson

From: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Sent: Monday, March 11, 2024 4:56 PM
To: Rane Wilson
Cc: Kendall Longbotham; Robert Burgin
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Wilson: The water evaporator will not require an Air Quality Permit.

Guillermo E. Reyes, P.E.
Air Permits Division
512-239-5716
TCEQ

Take Care of Texas

How are we doing? Fill out our online customer satisfaction survey
at https://link.edgepilot.com/s/48bd51ed/vliuElp51EC4uurps10zVQ?u=http://www.tceq.texas.gov/customersurvey

From: Rane Wilson <rane@reuseeng.com>
Sent: Thursday, February 29, 2024 9:32 AM
To: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Cc: Kendall Longbotham <kendall@reuseeng.com>; Robert Burgin <rob@reuseinn.com>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Reyes:

Good morning.

Don't mean to push but we are wondering if the Air Division has evaluated the data provided and if an air permit will be required.

Appreciate your attention to this matter in advance.

Best regards

Rane A. Wilson, P.G.
reUse Engineering
(570) 567-4297
rane@reuseeng.com

From: Rane Wilson
Sent: Friday, February 9, 2024 10:36 AM
To: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Cc: Kendall Longbotham <kendall@reuseeng.com>; Robert Burgin <rob@reuseinn.com>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Reyes:

Per your request, the Encon evaporator specifications are attached. The evaporator operates at 4.9 MBtu/hour and will be fired by propane. Two evaporators will be needed to evaporate the maximum daily treated wastewater flow proposed at the site. However, the evaporators will only be operated when the treated wastewater cannot be beneficially used.

We have been/are in communications with TCEQ's Wastewater Division. An innovative technical report has been prepared and will be forwarded to the TCEQ.

Should you have any questions or need additional information, please do not hesitate to call, or write.

Regards

Rane A. Wilson, P.G.
reUse Engineering
(570) 567-4297
rane@reuseeng.com

From: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Sent: Wednesday, February 7, 2024 4:44 PM
To: Rane Wilson <rane@reuseeng.com>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Rane: We will need information about the evaporator to determine if you will need an air quality permit. What is the heat source for the evaporator and what is maximum heat input (in Btu/hr).

Our communications only pertain to Air Quality permits; it is your responsibility to check with TCEQ's Waste Water Division and determine if you need a Waste Water Permit.

Have a good day

Guillermo E. Reyes, P.E.
Air Permits Division
512-239-5716
TCEQ

From: Rane Wilson <rane@reuseeng.com>
Sent: Wednesday, February 7, 2024 1:03 PM
To: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Reyes:

Attached is the laboratory report of analysis of a sample of treated wastewater from one of reUse's operating wastewater treatment facility. As noted in the laboratory report of analysis, only one constituent of concern (chloroform) was reported above its reporting limit at a concentration of 0.00143 milligram per Liter (mg/L).

Upon receipt and review, should you have any questions don't hesitate to call or write.

Regards

Rane A. Wilson, P.G.
reUse Engineering
(570) 567-4297
rane@reuseeng.com

From: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Sent: Thursday, January 11, 2024 3:33 PM
To: Rane Wilson <rane@reuseeng.com>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Rayne: That analysis will be acceptable to authorize the evaporator.

Guillermo E. Reyes, P.E.
Air Permits Division
512-239-5716
TCEQ

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---

From: Rane Wilson <rane@reuseeng.com>
Sent: Wednesday, January 10, 2024 12:17 PM
To: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Cc: Amber Ni <Amber.Ni@Tceq.Texas.Gov>; Crystal DelaCruz <Crystal.DelaCruz@tceq.texas.gov>; Robert Burgin <rob@reuseinn.com>; Randall Nelson <randall@reuseinn.com>; Lauren Wahl <lauren@reuseeng.com>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Reyes:

Attached is a list of VOCs we are proposing to analyze in the required wastewater sample. In addition to those VOCs listed on the attached Excel file, the HAPS you referenced on January 4 that are not included on the attached list (acetaldehyde, acetonitrile, ethylene glycol, formaldehyde, and methanol) as well as H2S and ammonia will be analyzed.

Please review this list and lets us know if there are additional analytes that are required by the TCEQ.

Regards

Rane A. Wilson, P.G.
reUse Engineering

(570) 567-4297
rane@reuseeng.com

From: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Sent: Thursday, January 4, 2024 12:50 PM
To: Rane Wilson <rane@reuseeng.com>
Cc: Amber Ni <Amber.Ni@Tceq.Texas.Gov>; Crystal DelaCruz <Crystal.DelaCruz@tceq.texas.gov>; Robert Burgin <rob@reuseinn.com>; Randall Nelson <randall@reuseinn.com>; Lauren Wahl <lauren@reuseeng.com>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Wilson: The purpose of the wastewater analysis is to determine what potential air contaminants could be there. So, we need a complete wastewater analysis; the test needs to include all VOCs.

Guillermo E. Reyes, P.E.
Air Permits Division
512-239-5716
TCEQ

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at https://link.edgepilot.com/s/6a4e8cee/DpdCbd5XT0eH6ltafR5wPA?u=http://www.tceq.texas.gov/customersurvey

From: Rane Wilson <rane@reuseeng.com>
Sent: Thursday, January 4, 2024 10:13 AM
To: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Reyes:

Could you provide a specific list of VOCs that TCEQ would like us to analyze? As discussed on December 18, we don't want to collect and analyze a sample for VOCs that does not include the specific VOCs TCEQ is looking for?

Thanks

Rane A. Wilson, P.G.
reUse Engineering
(570) 567-4297
rane@reuseeng.com

From: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Sent: Thursday, January 4, 2024 10:39 AM
To: Rane Wilson <rane@reuseeng.com>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Wilson: I did not say that I would contact the Water Quality Division. I said that you should contact them. For purposes of an Air Quality permit we would need an analysis that includes VOCs, HAPS (acetaldehyde, acetonitrile, chloroform, ethylene glycol, formaldehyde, methanol, methylene chloride, tetratchloroethylene, toluene, and xylenes) H2S and ammonia.

Guillermo E. Reyes, P.E.
Air Permits Division
512-239-5716
TCEQ

Take Care of Texas

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From: Rane Wilson <rane@reuseeng.com>
Sent: Thursday, January 4, 2024 8:47 AM
To: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Reyes:

Good morning. Trust you had a safe and enjoyable holiday season.

Pursuant to our conversation on December 18, 2023, you indicated that you would be speaking to personnel in the water quality division regarding the suite of constituents that we would need to analysis. When might this suite be provided so that we can plan/prepare accordingly?

Thank you

Rane A. Wilson, P.G.
reUse Engineering
(570) 567-4297
rane@reuseeng.com

From: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Sent: Monday, December 18, 2023 10:03 AM
To: Rane Wilson <rane@reuseeng.com>
Cc: Amber Ni <Amber.Ni@Tceq.Texas.Gov>; Crystal DelaCruz <Crystal.DelaCruz@tceq.texas.gov>; Michael Partee <michael.partee@tceq.texas.gov>; Robert Burgin <rob@reuseinn.com>; Randall Nelson <randall@reuseinn.com>; Lauren Wahl <lauren@reuseeng.com>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Wilson: The purpose of the chemical analysis is to determine all the potential air contaminants are in the waste water not just the chemicals included in 106.261(a)(2) (acetylene, argon, butane, crude oil, refinery petroleum fractions (except for pyrolysis naphthas and pyrolysis gasoline) containing less than ten volume percent benzene, carbon monoxide, cyclohexane, cyclohexene, cyclopentane, ethyl acetate, ethanol, ethyl ether, ethylene, fluorocarbons Numbers 11, 12, 13, 14, 21, 22, 23, 113, 114, 115, and 116, helium, isohexane, isopropyl alcohol, methyl acetylene, methyl chloroform, methyl cyclohexane, neon, nonane, oxides of nitrogen, propane, propyl alcohol, propylene, propyl ether, sulfur dioxide, alumina, calcium carbonate, calcium silicate, cellulose fiber, cement dust, emery dust, glycerin mist, gypsum, iron oxide dust, kaolin, limestone, magnesite, marble, pentaerythritol, plaster of paris, silicon, silicon carbide, starch, sucrose, zinc stearate, or zinc oxide) or the chemicals included in the 262 table included in 106.262(2).

I'm available to discuss the matter if you would give a call. I left you a couple of messages but you have not returned my calls.

Guillermo E. Reyes, P.E.
Air Permits Division
512-239-5716
TCEQ

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---

From: Rane Wilson <rane@reuseeng.com>
Sent: Monday, December 18, 2023 8:43 AM
To: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Cc: Amber Ni <Amber.Ni@Tceq.Texas.Gov>; Crystal DelaCruz <Crystal.DelaCruz@tceq.texas.gov>; Michael Partee <michael.partee@tceq.texas.gov>; Robert Burgin <rob@reuseinn.com>; Randall Nelson <randall@reuseinn.com>; Lauren Wahl <lauren@reuseeng.com>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Reyes:

Good morning.

reUse has recently started a MBR plant up and will obtain a sample of its effluent. However, please provide a specific list of analytes that are needed for the de minimis determination. The basis of this request is that we are not aware of specific water analysis for several of the analytes included in "List-261 Chemicals". These analytes include:

- refinery petroleum fractions containing less than ten volume percent benzene;
- cement dust;
- emery dust;
- glycerin mist;
- iron oxide dust; and
- plaster of Paris.

We look forward to receiving the list of analytes.

Best regards

Rane A. Wilson, P.G.
reUse Engineering
(570) 567-4297
rane@reuseeng.com

From: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Sent: Thursday, December 14, 2023 2:43 PM
To: Rane Wilson <rane@reuseeng.com>
Cc: Amber Ni <Amber.Ni@Tceq.Texas.Gov>; Crystal DelaCruz <Crystal.DelaCruz@tceq.texas.gov>; Michael Partee

<michael.partee@tceq.texas.gov>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Wilson: We discussed the matter with our Management and we will need a wastewater sample analysis to do a de minimis determination. We would accept a representative analysis from a similar facility since the proposed site has not been built yet.

I'm available for a phone call if you would like to discuss the matter.

Have a good day

Guillermo E. Reyes, P.E.
Air Permits Division
512-239-5716
TCEQ

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at https://link.edgepilot.com/s/18b0276e/kICV_BfVZkW2Ofgr9c4p6Q?u=http://www.tceq.texas.gov/customersurvey

From: Rane Wilson <rane@reuseeng.com>
Sent: Monday, December 11, 2023 10:41 AM
To: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Cc: Amber Ni <Amber.Ni@Tceq.Texas.Gov>
Subject: RE: Air Permitting Associated with Treated Wastewater

Guillermo:

Please take the matter to management as we would not be able to take a sample of the treated wastewater until the wastewater treatment facility is constructed/operating.

Yes, we will be working with TCEQ's Wastewater group to obtain the required permit/authorization.

Regards

Rane A. Wilson, P.G.
reUse Engineering
(570) 567-4297
rane@reuseeng.com

From: Guillermo Reyes <guillermo.reyes@tceq.texas.gov>
Sent: Friday, December 8, 2023 12:32 PM
To: Rane Wilson <rane@reuseeng.com>
Cc: Amber Ni <Amber.Ni@Tceq.Texas.Gov>
Subject: RE: Air Permitting Associated with Treated Wastewater

Mr. Rane: Amber asked to respond to your e-mail. The Agency could possibly do a case by case de minimis determination for the site but we would need some kind of wastewater analysis to determine that there are no pollutants. Let take the matter to our management to see what we can do since I realize that a sample of the wastewater is not available.

Have you contacted our Waste Water Division? You will probably need a wastewater permit. There may be something that you can do within a wastewater permit to authorize the evaporators.

Have a good day

Guillermo E. Reyes, P.E.
Air Permits Division
512-239-5716
TCEQ

How are we doing? Fill out our online customer satisfaction survey
at https://link.edgepilot.com/s/4eaa3aee/YxLo_5lT40m3QpSm1BYaDQ?u=http://www.tceq.texas.gov/customersurvey

---

From: Rane Wilson <rane@reuseeng.com>
Sent: Thursday, December 7, 2023 6:07 PM
To: Amber Ni <Amber.Ni@Tceq.Texas.Gov>; Michael Partee <michael.partee@tceq.texas.gov>
Cc: Robert Burgin <rob@reuseinn.com>; Randall Nelson <randall@reuseinn.com>
Subject: RE: Air Permitting Associated with Treated Wastewater

Amber:

Thank you for responding so quickly.

The proposed wastewater treatment facility (WWTF) will be in an attainment area (Gillispie County) and will treat domestic wastewater from approximately 140 "tiny homes." The estimated volume of domestic wastewater from each tiny home is approximately 125 gallons per day (gpd), totaling 18,000 gpd. The WWTF will produce Type 1 reclaimed water via membrane bio-reactor (MBR) technology that will be land applied. Two evaporators, each capable of evaporating approximately 10,000 gallons per day, are proposed to treat the WWTF's effluent when irrigation is not practicable (precipitation, frozen soil, etc.). The evaporators are rated for 4.97 MBTU/hour and will use propane as the fuel source.

reUse has designed, permitted, and constructed several MBR WWTFs in Texas. The Type 1 reclaimed water from these WWTFs is generally discharged to surface water via a TPDES permit. Although these permitted facilities meet the conditions referenced in PBR 106.472 and 532, I am not aware of reUse communicating with or working through TCEQ's Air Permits Division. <u>Should we have?</u>

If I'm understanding things correctly, we are dealing with two potential sources of air emissions: 1) emissions associated with the combustion of propane within the evaporator (PBR 106.183) and 2) emissions from the evaporation of the treated Type 1 wastewater (PBR 106.261 and 262):

1. PBR 106.183: the only emissions will be products from the combustion of liquid petroleum gas and the heat input is less than 40 MBTU/hr. Information from the evaporator manufacturer indicates that the volume of propane needed to operate the two evaporators 22.4 hours per day, 365 days per year (which is very conservative given the anticipated use of the evaporators only when irrigation cannot be performed) is approximately 900,000 gallons/year. Combustion of the referenced volume of propane will not result in exceeding the emission limits of pollutants listed in PBR 106.4(a)(1).

2. PBR 106.261: As referenced above, the WWTF will produce Type 1 reclaimed water, which can be used for "irrigation or other uses in areas where the public may be present during the time when irrigation takes place or other uses where the public may come in contact with the reclaimed water." TCEQ's November 3rd email (within this email string) indicates that we will need to use this PBR (106.261) for evaporation of the reclaimed water including completion of the 106.261/262 workbook and collection/analysis of the reclaimed water for speciation of the air contaminants. Potable water (i.e. – drinking water) for the proposed development is sourced from four groundwater wells located on the eastern adjacent property. The attached PDF presents recent inorganic quality data from the four wells. Analysis of this water indicates little to no nitrate/nitrite or salts.

   As referenced above, the site is in Gillispie County, southeast of Luckenbach, Texas. The site area has historically been used for agricultural purposes and there are no oil/gas wells/operations and no commercial/industrial operations within approximately 1 mile of the site. Therefore, it is extremely unlikely that the chemicals referenced in the 106.261 workbook (48 primarily organic chemicals/constituents) would be encountered in the groundwater being used for potable purposes. Furthermore, and unless an occupant of one of the proposed tiny homes were to purposefully discard a product that contains chemicals listed in the 106.261 workbook, said chemicals would not be expected in the site's domestic wastewater or the produced reclaimed water. Therefore, speciation of air contaminants that are not anticipated to be encountered and then calculating emissions of said contaminants from the evaporation of Type 1 reclaimed water is difficult at best.

   Given the above, could TCEQ please provide some guidance in how reUse may comply with TCEQ requirements for the anticipated de minimis emission from the evaporation of Type 1 reclaimed water at this site. Further development of the site including the procurement of the evaporator(s) without some assurance that the use of evaporation will meet emission requirements is fiscally irresponsible.

We appreciate your attention to this matter and look forward to further communications.

Best regards

Rane A. Wilson, P.G.
reUse Engineering
(570) 567-4297
rane@reuseeng.com

From: Amber Ni <Amber.Ni@Tceq.Texas.Gov>
Sent: Thursday, December 7, 2023 9:35 AM
To: Rane Wilson <rane@reuseeng.com>
Cc: Michael Partee <michael.partee@tceq.texas.gov>
Subject: RE: Air Permitting Associated with Treated Wastewater

Hi Rane,

The facilities authorized under PBR 106.261 would be subject to the 10 tpy limit for NOx and CO. Facilities authorized under other rules, for example PBR 106.183, have the 250 tpy limit since there is not a PBR specific limit.

Let me know if you have any questions.

Thank you,

Amber Ni, P.E.
Rule Registration

TCEQ Air Permits Division
(512) 239-0198
amber.ni@tceq.texas.gov

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From: Rane Wilson <rane@reuseeng.com>
Sent: Wednesday, December 6, 2023 3:30 PM
To: Amber Ni <Amber.Ni@Tceq.Texas.Gov>
Cc: Michael Partee <michael.partee@tceq.texas.gov>
Subject: RE: Air Permitting Associated with Treated Wastewater

Amber:

Good afternoon.

Could you provide some clarification regarding the referenced regulations?

- Title 30, Part 1, Chapter 106, Subchapter A, Rule 106.4
  (a) To quality for a permit by rule, the following general requirements must be met.
    (1) Total actual emissions authorized under permit by rule from the facility shall not exceed the following limits, as applicable:
      (A) 250 tpy of CO or NOx
- Rule 106.261
  (a)(2) Total new or increased emission.... shall not exceed 6.0 lb/hr and ten tpy for the following.... refinery petroleum fractions ...CO ... NOx

What is the actual limits for CO and NOx – 250 tpy or 10 tpy?

Thanks

Rane A. Wilson, P.G.
reUse Engineering
(570) 567-4297
rane@reuseeng.com

From: Amber Ni <Amber.Ni@Tceq.Texas.Gov>
Sent: Friday, November 3, 2023 3:02 PM
To: Rane Wilson <rane@reuseeng.com>
Cc: Michael Partee <michael.partee@tceq.texas.gov>
Subject: RE: Air Permitting Associated with Treated Wastewater

Hi Rane,

Per our conversation this morning, here are some of the applicable PBRs associated with wastewater treatment:

PBR 106.472 – Wastewater Storage Tanks and Loading/Unloading
This PBR authorizes the unloading and storage of wastewater.

PBR 106.532 – Water and Wastewater Treatment
This PBR authorizes water treatment facilities, but does not authorize stripping air contaminants directly into the atmosphere.

PBR 106.261/262 – Wastewater Evaporator (These rules require registration with TCEQ)

The wastewater evaporator can be authorized under PBRs 106.261 and/or 106.262. These rules require speciation of the air contaminants, which may require testing of the wastewater.

When submitting the PBR application for these rules, we also require that the company fill out the 106.261/262 workbook, which can be found on this webpage: https://link.edgepilot.com/s/5f607855/EMOmwXHZ_E2eD3AvAD81qw?u=https://www.tceq.texas.gov/permitting/air/permitbyrule/subchapter-k/emission_limitations.html

PBR 106.183 – Heating Unit on Evaporator

The POC emissions from the evaporator heat source can be authorized under PBR 106.183 if indirect heat is being used. The maximum heat input under this rule is 40 MMBtu/hr.

Once you determine which PBRs are applicable, you will submit your application and 261/262 workbook through the TCEQ STEERS ePermits system. Guidance documents on how to submit a PBR application can be found here: https://link.edgepilot.com/s/5ff330ae/v0XubWWFPE6VIMz7xLHR4A?u=https://www.tceq.texas.gov/permitting/air/apd-steers.html

Please let me know if you have any questions.

Thank you,

Amber Ni, P.E.
Rule Registration
TCEQ Air Permits Division
(512) 239-0198
amber.ni@tceq.texas.gov

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From: Amber Ni <Amber.Ni@Tceq.Texas.Gov>
Sent: Thursday, November 2, 2023 2:17 PM
To: Rane Wilson <rane@reuseeng.com>
Cc: Michael Partee <michael.partee@tceq.texas.gov>
Subject: RE: Air Permitting Associated with Treated Wastewater

Hi Rane,

I am available to discuss air permitting for an evaporator. To authorize the evaporator, the company will need to have an analysis of the wastewater to calculate what the emissions are.

I can schedule a call via Teams to discuss. I have availability anytime tomorrow except for 9am, or Monday afternoon after 2pm. Let me know a time that works for you.

Thank you,

Amber Ni, P.E.
Rule Registration
TCEQ Air Permits Division
(512) 239-0198
amber.ni@tceq.texas.gov

How is our customer service? https://link.edgepilot.com/s/a76e5970/K5-rrRzgFEyBp6KezKHBFQ?u=http://www.tceq.texas.gov/customersurvey

From: Rane Wilson <rane@reuseeng.com>
Sent: Thursday, November 2, 2023 8:07 AM
To: Michael Partee <michael.partee@tceq.texas.gov>
Subject: Air Permitting Associated with Treated Wastewater

Michael:

Paul Brochi indicated that you would be a good contact/resource regarding the necessary air permitting, if any, associated with an evaporator being used to reduce/eliminate the amount of treated wastewater discharged from a membrane bioreactor (MBR) domestic wastewater treatment facility. To facilitate a discussion, what type of information regarding the MBR plant and evaporator would you need?

Please let me know at your earliest convenience and we will pull it together. Also, when might be a good time to call and discuss?

Thanks

Rane A. Wilson, PG
Hydrogeologist Lead
ReUse Engineering
PG – TX, PA, & NC
Mobile: (570) 567-4297
Email: rane@reuseeng.com

reUse Engineering
4411 S Interstate 35, Ste 100
Georgetown, Texas 78626
https://link.edgepilot.com/s/de217812/N2xC4VO7TUqJy0o5QJEltw?u=http://www.reuseinn.com/

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		Design Flow gpd	Cumulative Flow gpd
WWTF	1	20,000	20,000

		Development per Year LUE	Cumulative Development LUE	Projected Flow gpd
Year	1	90	90	7,380
Year	2	55	145	11,890

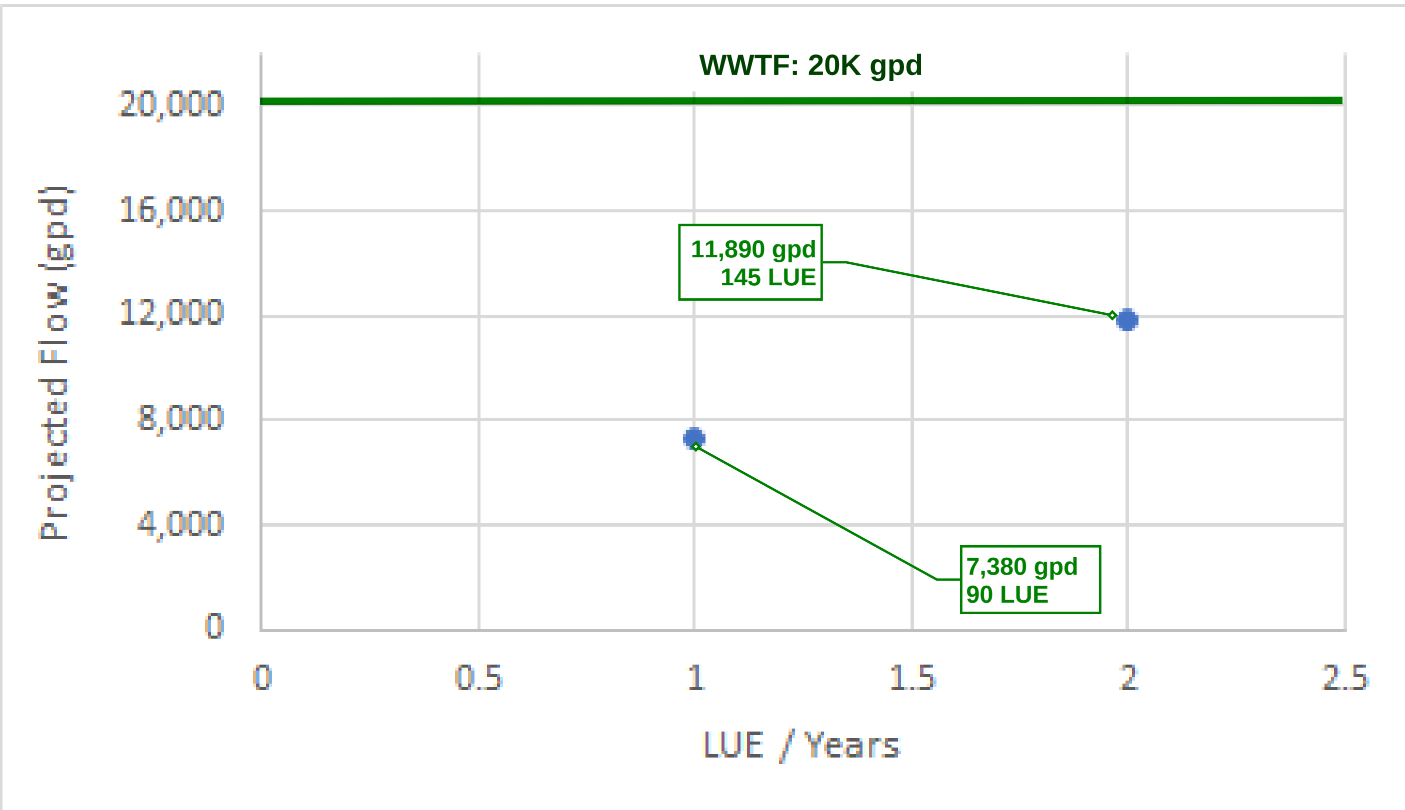
LUE (Living Unit Equivalents) **82** * **gpd/LUE**

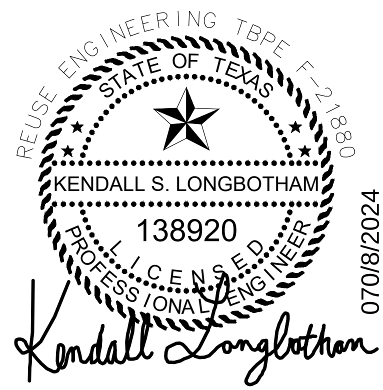
30 TAC §217.32 Table B.1. Design Organic Loadings and Flows for New WWTF

Mobile Home Park; Hotel/Motel: 50-75 gpd/person

Tiny Homes designed as single-bed hotel rooms, not occupied 24/7/365

*Local WCD has restricted water supply permits to 41 gal per day per person. Assuming each LUE may be occupied by 2 persons, max.





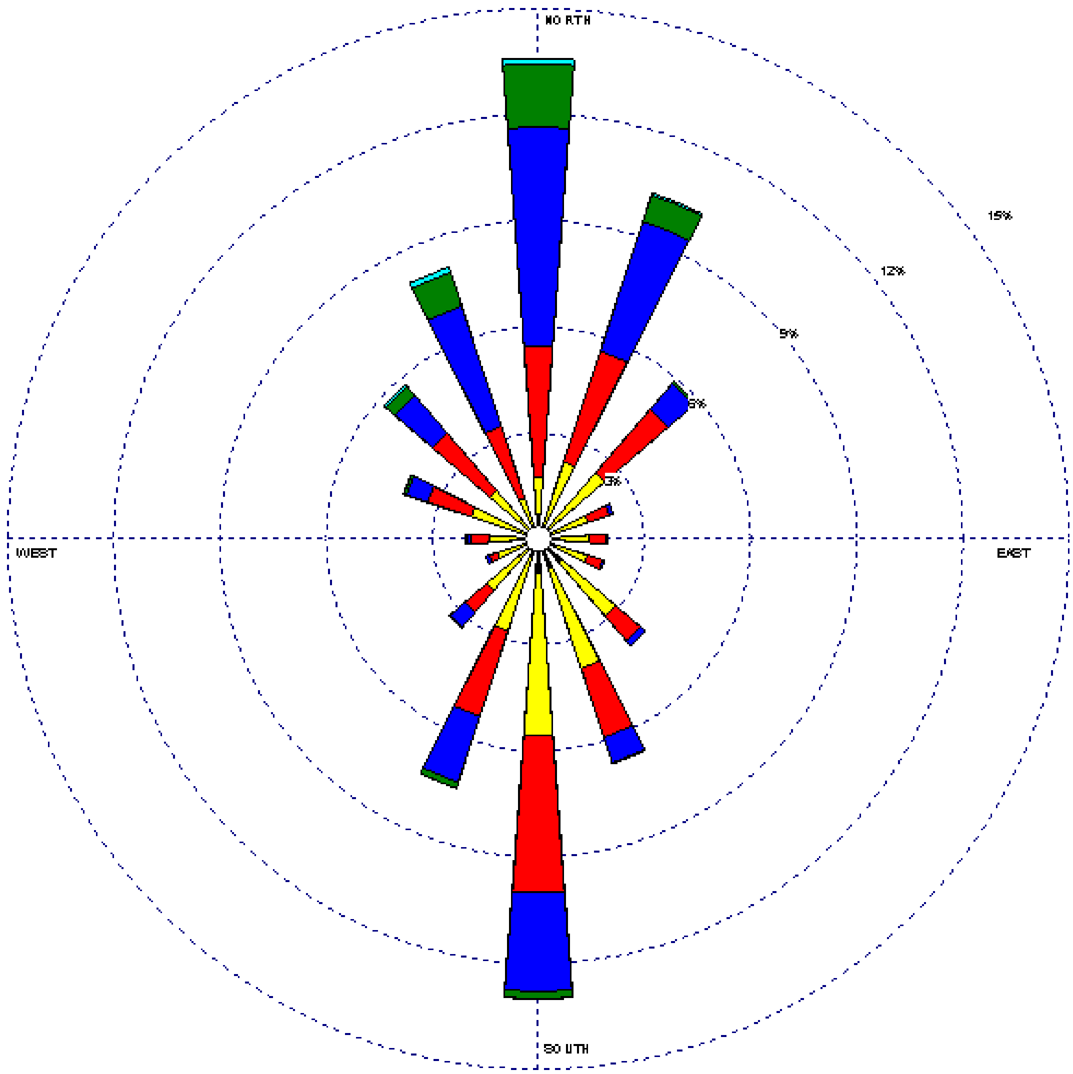
FIREFLY PARTNERS, LLC
FIREFLY WWTF TLAP APPLICATION
GILLESPIE COUNTY, TEXAS

PROJECTION OF LUES & WASTEWATER FLOW

Attachment 4

WIND ROSE PLOT

Station #13958 - AUSTIN/MUNICIPAL ARPT, TX



Wind Speed (m/s)	MODELER	DATE	COMPANY NAME
> 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80	Sara West	8/29/2002	USDA-ARS
	DISPLAY Wind Speed	UNIT m/s	COMMENTS
	AVG. WIND SPEED 4.47 m/s	CALM WINDS 8.07%	
	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 1961 Dec 1 - Dec 31 Midnight - 11 PM	

Natural Resources Conservation Service

https://www.wcc.nrcs.usda.gov/ftpref/downloads/climate/windrose/texas/

reUse ENGINEERING

4411 SIH 35, Suite 100
Georgetown, TX 78626
TX Firm No. 21880

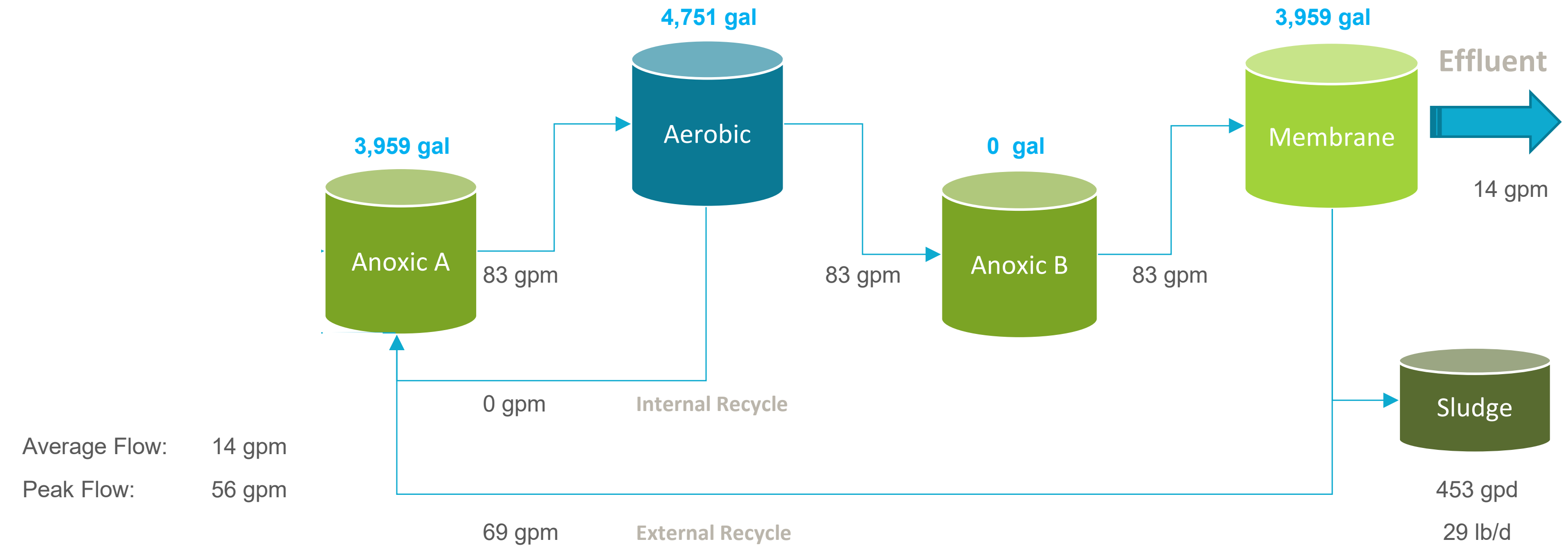
FIREFLY PARTNERS, LLC
FIREFLY WWTF TLAP APPLICATION
GILLESPIE COUNTY, TEXAS

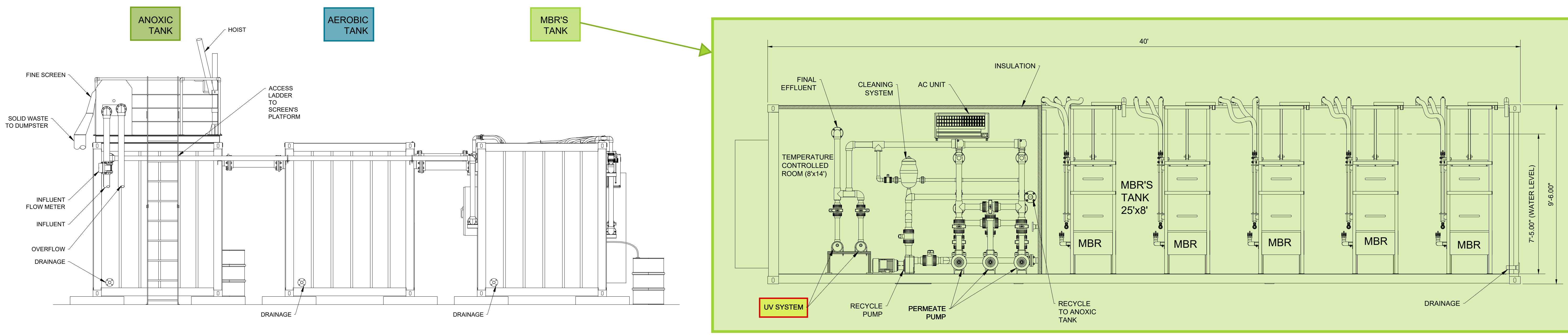
WIND ROSE - AUSTIN, TX

Attachment 6

The Wastewater Treatment Facility will be comprised of one (1) 20,000 GPD treatment train

See Technical Report Attachment 5 Design Calculations





Example of Process Flow/Treatment Process (provided from design for 80,000 gpd Treatment Plant)

Disclaimer
This drawing was created by A3-USA for a separate project. It is presented here for illustrative purposes only. Sizes and dimensions will vary.

REUSE ENGINEERING TBPE F-21880
STATE OF TEXAS
KENDALL S. LONGBOTHAM
138920
LICENSED PROFESSIONAL ENGINEER
07/8/2024

reUse ENGINEERING
4411 SIH 35, Suite 100
Georgetown, TX 78626
TX Firm No. 21880

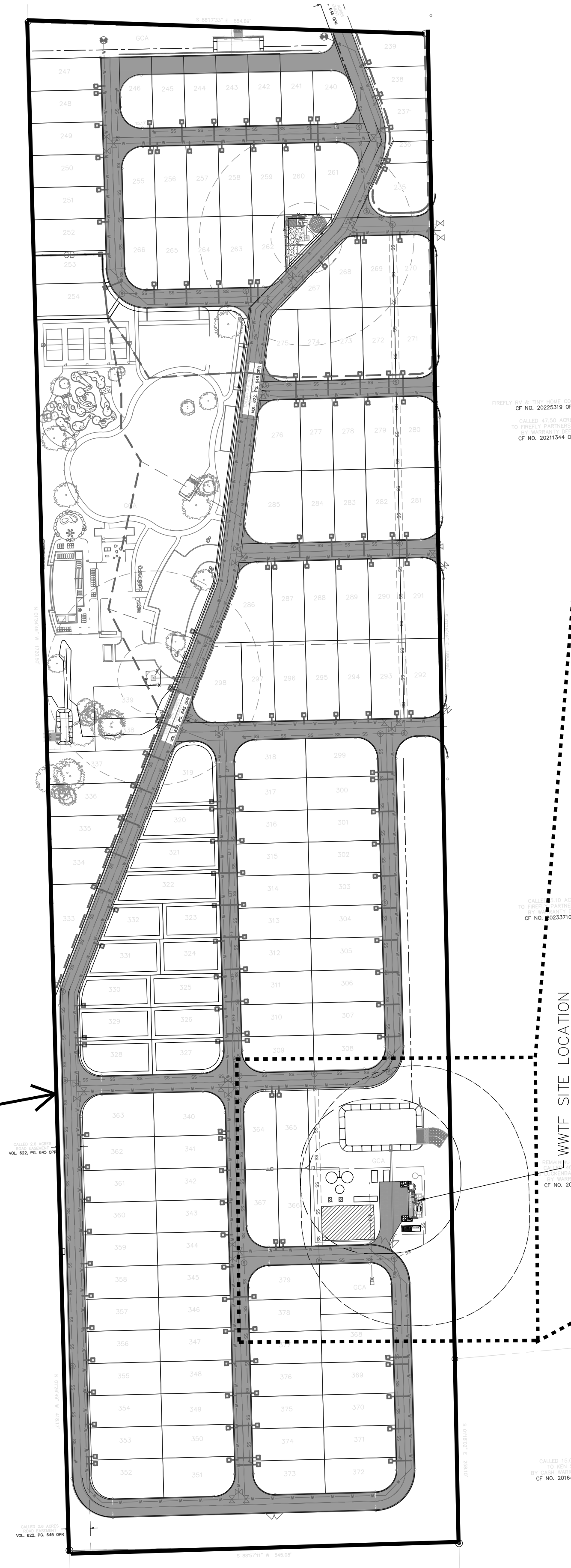
FIREFLY PARTNERS, LLC
FIREFLY WWTF TLAP APPLICATION
GILLESPIE COUNTY, TEXAS

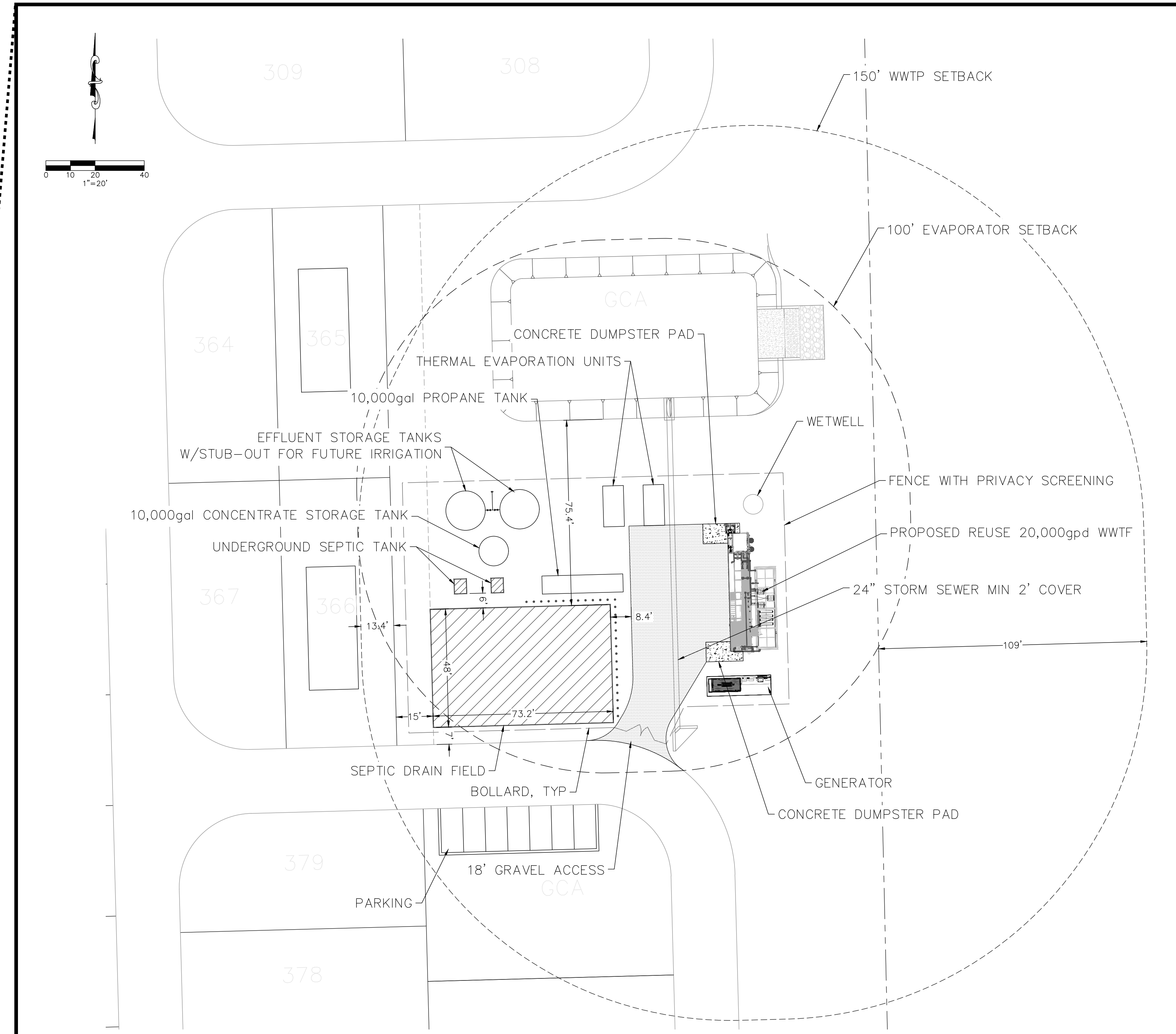
PROCESS FLOW DIAGRAM
Attachment 2

Gillispie County, TX

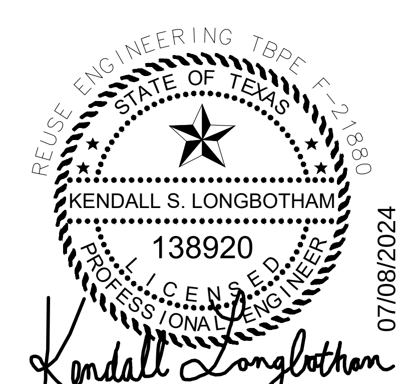
Note: Drawing is for layout only. No work to begin without Geotech and Structural Reports and Designs Available!

AREA SERVICED BY WWTF





THE APPLICANT WILL HAVE AN ODOR & ABATEMENT EASEMENT WITH THE ADJACENT PROPERTY OWNER INTO WHICH THE 150-FT BUFFER ZONE FALLS



reUse ENGINEERING
4411 SIH 35, Suite 100
Georgetown, TX 78626
TX Firm No. 21880

FIREFLY PARTNERS, LLC
FIREFLY WWTF TLAP APPLICATION
GILLESPIE COUNTY, TEXAS

SITE DRAWING

Attachment 3

4411 S Interstate 35, Ste 100
Georgetown, Texas 78626
www.reuseinn.com

SOLIDS MANAGEMENT PLAN

Influent Design Flow: 20,000 gpd = 0.02 MGD, Total
Influent BOD Concentration: 350 mg/L
MBR Basin MLVSS: 9,2580 mg/L

See **Attachment 1 - Process Flow Diagram** and **Attachment 5 - Design Calculations**. This site will include one 20,000 gpd (0.02 MGD) treatment train. Treatment unit dimensions and capacities are provided on page 2 (Process Summary) and page 9 (Process Calculation) of **Attachment 5 - Design Calculations**.

Table 1 – Sludge Production for 0.02 MGD Design Flow

Solids Generated	100%	75%	50%	25%
Lbs/d Influent BOD_5	58.4	43.8	29.2	14.6
Lbs/d Dry Sludge Produced	29.0	21.8	14.5	7.3

Sludge will be sent from the Recycled Activated Sludge flow stream to the Sludge Screw Press. Calculations are based on 453 gpd of waste sludge, which equates to 29 lbs/d (Table 1). The sludge will be pressed in the Sludge Screw Press to remove liquids and produce a dry sludge cake. All liquid will be decanted from the Screw Press and returned to the headworks for treatment. No wet solids will be produced through the treatment process. Dry sludge will be removed from the screw press and deposited into 2 cubic yard (CY) roll-off containers for disposal on a regular basis (Table 2).

Table 2 – Sludge Removal Schedule

Removal Schedule	100%	75%	50%	25%	Unit
Dry Waste Sludge	29.0	21.8	14.5	7.3	**lb/d**
Wet Waste Sludge	453	340	227	113	**gpd**
Wet Sludge	2.2	1.7	1.1	0.6	**CF/d**
Wet Sludge	11.1	8.3	5.6	2.8	**CY/d**
Reduction Factor	18.0	(provided by MBR WWTP manufacturer)			
Dry Sludge	0.1	0.1	0.1	0.0	**CY/d**
Dumpster Volume	2.0	2.0	2.0	2.0	**CY**
Req Days - Sludge Removal	16	21	32	64	days
Design Days - Sludge Removal	**7**	**10**	**14**	**18**	**days**

The Sludge Age (Solids Retention Time) for a Total Reactor Volume of approximately 12,668 gal is 25 days, with an annual average sludge production of 10,585 lbs dry sludge produced at 100% capacity. The dewatered sludge will be transported by a registered hauler, The Cleaning Guys (TCEQ Sludge Registration ID #25218) to City of Fredericksburg Landfill (TCEQ Registration ID #1995) in Gillespie County, Texas.

Item N/A to this application.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 12, 2024

Dear Applicant:

Re: Confirmation of Submission of the New Private Domestic Wastewater Individual Permit Application

This is an acknowledgement that you have successfully completed Private Domestic Wastewater Individual Permit Application.

ER Account Number: ER105186
Application Reference Number: 664956
Authorization Number: WQ0016571001
Site Name: Firefly WWTF
Regulated Entity: RN112007265 - FIREFLY WWTF
Customer(s): CN605877836 - Firefly Partners, LLC

Please be aware that TCEQ staff may contact your designated contact for any additional information.

If you have any questions, you may contact the Applications Review and Processing Team by email at WQ-ARPTeam@tceq.texas.gov or by telephone at (512) 239-4671.

Sincerely,
Applications Review and Processing Team
Water Quality Division

4411 S Interstate 35, Ste 100
Georgetown, Texas 78626
www.reuseinn.com

July 26, 2024

Ms. Rachel Ellis
Applications Review and Processing Team (MC148)
Water Quality Division
Texas Commission of Environmental Quality

RE: Notice of Deficiency Letter
Application for Proposed Permit No.: WQ0016571001
Applicant Name: Firefly Partners, LLC (CN605877836)
Site Name: Firefly WWTF (RN112007265)
Type of Application: New

Dear Ms. Ellis,

Thank you for your prompt review of the submitted application and the follow-up NOD letter. Please see below for our reply plus one additional requested update to the application.

1. The NORI excerpt is approved with the one spelling change shown in red below:

APPLICATION. Firefly Partners, LLC, 200 North Harbor Place, Suite G, Davidson, North Carolina 28036, has applied to the Texas Commission on Environmental Quality (TCEQ) for proposed Texas Land Application Permit (TLAP) No. WQ0016571001 to authorize the disposal of treated wastewater at a volume not to exceed a daily average flow of 20,000 gallons per day via evaporation. The domestic wastewater facility and disposal area will be located at approximately 0.52 miles southwest of the intersection of Farm-to-Market Road 1376 and OK Corral Drive, in the city of Fredericksburg, in Gillespie County, Texas 78624. TCEQ received this application on July 12, 2024. The permit application will be available for viewing and copying at Harper Library, front desk, 23247 US Highway 290, Harper, Texas prior to the date this notice is published in the newspaper. The application, including any updates, and associated notices are available electronically at the following webpage: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications. This link to an electronic map of the site or facility's general location is provided as a public courtesy and not part of the application or notice. For the exact location, refer to the application. https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.751388,30.171111&level=18 Mrs. Hilary Bond Page 2 July 23, 2024 Permit No. WQ0016571001 Further information may also be obtained from Firefly Partners, LLC at the address stated above or by calling Mrs. Kendall Longbotham, P.E., Water Resource Engineer, reUse Engineering Inc, at 512-755-9943.

2. The NORI Spanish translation has been created via the provided template and includes the change from Item 1. Please see Attachment 1 – WQ0016571001 Spanish NORI.

3. Additionally, we would like to request to change the Proposed Effluent Quality and Disinfection (Domestic Technical Report 1.1, Section 3) to the tightest limits available, 5 mg/L CBOD5, 5 mg/L TSS, 2 mg/L NH3-N, and 1 mg/L TP so that we meet Type 1 irrigation standards. Our MBR plants already meet or exceed these standards, so there is no other change to the application necessary. Attachment 2 contains the revised pages for the 10054 Technical Report (pgs. 21-22).

Thank you again for your prompt review and follow-up!

Respectfully,

Hilary Bond

Hilary Bond
Director of Permitting and Entitlements
reUse Engineering, Inc.

Enclosure(s)
Attachment 1- WQ0016571001 Spanish NORI
Attachment 2 – 10054 Technical RPT Firefly REV PGS 21-22

cc: Mrs. Kendall Longbotham, P.E., Water Resourse Engineer, reUse Engineering Inc, 4411 South Interstate 35, Suite 100, Georgetown, Texas 78626

ATTACHMENT 1 - SPANISH NORI

Comisión de Calidad Ambiental del Estado de Texas

AVISO DE RECIBO DE LA SOLICITUD E
INTENCION DE OBTENER PERMISO PARA LA CALIDAD DEL AGUA

PERMISO PROPUESTO NO. WQ0016571001

SOLICITUD. Firefly Partners, LLC, 200 North Harbor Place, Suite G, Davidson, North Carolina 28036 ha solicitado a la Comisión de Calidad Ambiental de Texas (TCEQ) para el propuesto Permiso No.WQ0016571001 de disposición de aguas residuales para autorizar la disposición de aguas residuales tratadas en un volumen que no sobrepasa un flujo promedio diario de 20.000 galones por día por medio de evaporación . La planta de tratamiento de aguas domésticos residuales y el área de disposición están ubicados en aproximadamente 0,52 millas al suroeste de la intersección de FM 1376 y OK Corral Drive en la ciudad de Fredericksburg en el Condado de Gillespie, Texas. La TCEQ recibió esta solicitud el día 12 de julio de 2024. La solicitud para el permiso está disponible para leer y copiar en Harper Library, Recepción, 23247 US Highway 290, Harper, Texas. La solicitud (cualquier actualización y aviso inclusive) está disponible electrónicamente en la siguiente página web: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications. Este enlace a un mapa electrónico de la ubicación general del sitio o de la instalación es proporcionado como una cortesía y no es parte de la solicitud o del aviso. Para la ubicación exacta, consulte la solicitud. https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.751388,30.171111&level=18

AVISO ADICIONAL. El Director Ejecutivo de la TCEQ ha determinado que la solicitud es administrativamente completa y conducirá una revisión técnica de la solicitud. Después de completar la revisión técnica, el Director Ejecutivo puede preparar un borrador del permiso y emitirá una Decisión Preliminar sobre la solicitud. **El aviso de la solicitud y la decisión preliminar serán publicados y enviado a los que están en la lista de correo de las personas a lo largo del condado que desean recibir los avisos y los que están en la lista de correo que desean recibir avisos de esta solicitud. El aviso dará la fecha límite para someter comentarios públicos.**

COMENTARIO PUBLICO / REUNION PUBLICA. Usted puede presentar comentarios públicos o pedir una reunión pública sobre esta solicitud. El propósito de una reunión pública es dar la oportunidad de presentar comentarios o hacer preguntas acerca de la solicitud. La TCEQ realiza una reunión pública si el Director Ejecutivo determina que hay un grado de interés público suficiente en la solicitud o si un legislador local lo pide. Una reunión pública no es una audiencia administrativa de lo contencioso.

OPORTUNIDAD DE UNA AUDIENCIA ADMINISTRATIVA DE LO CONTENCIOSO. Después del plazo para presentar comentarios públicos, el Director Ejecutivo considerará todos los comentarios apropiados y preparará una respuesta a todo los comentarios públicos esenciales, pertinentes, o significativos. **A menos que la solicitud haya sido referida directamente a una audiencia administrativa de lo contencioso, la respuesta a los comentarios y la decisión del Director Ejecutivo sobre la solicitud serán enviados por correo a todos los que presentaron un comentario público y a las personas que están en la lista para recibir avisos sobre esta solicitud. Si se reciben comentarios, el aviso también proveerá instrucciones para pedir una reconsideración de la decisión del Director Ejecutivo y para pedir una audiencia administrativa de lo contencioso.** Una audiencia administrativa de lo contencioso es un procedimiento legal similar a un procedimiento legal civil en un tribunal de distrito del estado.

PARA SOLICITAR UNA AUDIENCIA DE CASO IMPUGNADO, USTED DEBE INCLUIR EN SU SOLICITUD LOS SIGUIENTES DATOS: su nombre, dirección, y número de teléfono; el nombre del solicitante y número del permiso; la ubicación y distancia de su propiedad/actividad con respecto a la instalación; una descripción específica de la forma cómo usted sería afectado adversamente por el sitio de una manera no común al público en general; una lista de todas las cuestiones de hecho en disputa que usted presente durante el período de comentarios; y la declaración "[Yo/nosotros] solicito/solicitamos una audiencia de caso impugnado". Si presenta la petición para una audiencia de caso impugnado de parte de un grupo o asociación, debe identificar una persona que representa al grupo para recibir correspondencia en el futuro; identificar el nombre y la dirección de un miembro del grupo que sería afectado adversamente por la planta o la actividad propuesta; proveer la información indicada anteriormente con respecto a la ubicación del miembro afectado y su distancia de la planta o actividad propuesta; explicar cómo y porqué el miembro sería afectado; y explicar cómo los intereses que el grupo desea proteger son pertinentes al propósito del grupo.

Después del cierre de todos los períodos de comentarios y de petición que aplican, el Director Ejecutivo enviará la solicitud y cualquier petición para reconsideración o para una audiencia de caso impugnado a los Comisionados de la TCEQ para su consideración durante una reunión programada de la Comisión. La Comisión sólo puede conceder una solicitud de una audiencia de caso impugnado sobre los temas que el solicitante haya presentado en sus comentarios oportunos que no fueron retirados posteriormente. Si se concede una audiencia, el tema de la audiencia estará

limitado a cuestiones de hecho en disputa o cuestiones mixtas de hecho y de derecho relacionadas a intereses pertinentes y materiales de calidad del agua que se hayan presentado durante el período de comentarios.

LISTA DE CORREO. Si somete comentarios públicos, un pedido para una audiencia administrativa de lo contencioso o una reconsideración de la decisión del Director Ejecutivo, la Oficina del Secretario Principal enviará por correo los avisos públicos en relación con la solicitud. Ademas, puede pedir que la TCEQ ponga su nombre en una or mas de las listas correos siguientes (1) la lista de correo permanente para recibir los avisos de el solicitante indicado por nombre y número del permiso específico y/o (2) la lista de correo de todas las solicitudes en un condado especifico. Si desea que se agrega su nombre en una de las listas designe cual lista(s) y envia por correo su pedido a la Oficina del Secretario Principal de la TCEQ.

CONTACTOS E INFORMACIÓN DE LA TCEQ. Todos los comentarios escritos del público y los para pedidos una reunión deben ser presentados a la Oficina del Secretario Principal, MC 105, TCEQ, P.O. Box 13087, Austin, TX 78711-3087 o por el internet at www.tceq.texas.gov/about/comments.html. Tenga en cuenta que cualquier información personal que usted proporcione, incluyendo su nombre, número de teléfono, dirección de correo electrónico y dirección física pasarán a formar parte del registro público de la Agencia. Si necesita más información en Español sobre esta solicitud para un permiso o el proceso del permiso, por favor llame a El Programa de Educación Pública de la TCEQ, sin cobro, al 1-800-687-4040. La información general sobre la TCEQ puede ser encontrada en nuestro sitio de la red: www.tceq.texas.gov.

También se puede obtener información adicional del Firefly Partners, LLC a la dirección indicada arriba o llamando a Sra. Kendall Longbotham, P.E., ingeniera de recursos hídricos, reUse Engineering, Inc. al (512)239-4658.

Fecha de emisión ___________ *[Date notice issued]*

ATTACHMENT 2 - EFFLUENT REVISION

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 BOD5 Concentration (mg/l)
Municipality		
Subdivision	0.02	350
Trailer park – transient		
Mobile home park		
School with cafeteria and showers		
School with cafeteria, no showers		
Recreational park, overnight use		
Recreational park, day use		
Office building or factory		
Motel		
Restaurant		
Hospital		
Nursing home		
Other		
TOTAL FLOW from all sources	0.02	
AVERAGE BOD_5 from all sources		350

Section 3. Proposed Effluent Quality and Disinfection (Instructions Page 59)

A. Existing/Interim I Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: Click to enter text.

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

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

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

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

Other: Click to enter text.

B. Interim II Phase Design Effluent Quality

Biochemical Oxygen Demand (5-day), mg/l: Click to enter text.

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

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

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

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

Other: Click to enter text.

C. Final Phase Design Effluent Quality

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

Total Suspended Solids, mg/l: 5

Ammonia Nitrogen, mg/l: 2

Total Phosphorus, mg/l: 1

Dissolved Oxygen, mg/l: 5.0

Other: Click to enter text.

D. Disinfection Method

Identify the proposed method of disinfection.

☐ Chlorine: Click to enter text. mg/l after Click to enter text. minutes detention time at peak flow

Dechlorination process: Click to enter text.

☒ Ultraviolet Light: 1.0 seconds contact time at peak flow

☐ Other: Click to enter text.

Section 4. Design Calculations (Instructions Page 59)

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

Attachment: 5. Design Calculations

Section 5. Facility Site (Instructions Page 60)

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 to enter text.

ORIGINAL NOD LETTER

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 23, 2024

Mrs. Hilary Bond
Director of Permitting and Entitlements
reUse Engineering Inc
4411 South Interstate 35, Suite 100
Georgetown, Texas 78626

RE: Application for Proposed Permit No.: WQ0016571001
Applicant Name: Firefly Partners, LLC (CN605877836)
Site Name: Firefly WWTF (RN112007265)
Type of Application: New

VIA EMAIL

Dear Mrs. Bond:

We have received the application for the above referenced permit, and it is currently under review. Your attention to the following item(s) are requested before we can declare the application administratively complete. Please submit responses to the following items via email

1. The following is a portion of the NORI which contains information relevant to your application. Please read it carefully and indicate if it contains any errors or omissions. The complete notice will be sent to you once the application is declared administratively complete.

   APPLICATION. Firefly Partners, LLC, 200 North Harbor Place, Suite G, Davidson, North Carolina 28036, has applied to the Texas Commission on Environmental Quality (TCEQ) for proposed Texas Land Application Permit (TLAP) No. WQ0016571001 to authorize the disposal of treated wastewater at a volume not to exceed a daily average flow of 20,000 gallons per day via evaporation. The domestic wastewater facility and disposal area will be located at approximately 0.52 miles southwest of the intersection of Farm-to-Market Road 1376 and OK Corral Drive, in the city of Fredericksburg, in Gillespie County, Texas 78624. TCEQ received this application on July 12, 2024. The permit application will be available for viewing and copying at Harper Library, front desk, 23247 US Highway 290, Harper, Texas prior to the date this notice is published in the newspaper. The application, including any updates, and associated notices are available electronically at the following webpage: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/tlap-applications. This link to an electronic map of the site or facility's general location is provided as a public courtesy and not part of the application or notice. For the exact location, refer to the application. https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.751388,30.171111&level=18

Further information may also be obtained from Firefly Partners, LLC at the address stated above or by calling Mrs. Kendall Longbotham, P.E., Water Resourse Engineer, reUse Engineering Inc, at 512-755-9943.

2. The application indicates that public notices in Spanish are required. After confirming the portion of the NORI above does not contain any errors or omissions, please use the attached template to translate the NORI into Spanish. Only the first and last paragraphs are unique to this application and require translation. Please provide the translated Spanish NORI in a Microsoft Word document.

Please submit the complete response, addressed to my attention by August 6, 2024. If you should have any questions, please do not hesitate to contact me by phone at (512) 239-4658 or by email at rachel.ellis@tceq.texas.gov

Sincerely,

Rachel Ellis

Rachel Ellis
Applications Review and Processing Team (MC148)
Water Quality Division
Texas Commission of Environmental Quality

re

Enclosure(s)
Attachment 1- Municipal Disposal New Spanish NORI

cc: Mrs. Kendall Longbotham, P.E., Water Resourse Engineer, reUse Engineering Inc, 4411 South Interstate 35, Suite 100, Georgetown, Texas 78626