CORRESPONDENCE COVER SHEET
WASTE PERMITS DIVISION
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Date: November 16, 2015
Facility Name: Sealy Composting Facility

Permit No.: To be determined
Registration No: To be determined

This cover sheet should accompany all correspondences submitted to the Waste Permits Division and should be affixed to the front of your submittal as a cover page. Please check the appropriate box for the type of correspondence being submitted. For questions regarding this form, please contact the Waste Permits Division at (512) 239-2335.

Table 1 - Municipal Solid Waste

APPLICATIONS	REPORTS and RESPONSES
☐ New Notification	☐ Closure Report
☒ New Permit (including Subchapter T)	☐ Groundwater Alternate SRC Demonstration
☐ New Registration (including Subchapter T)	☐ Groundwater Corrective Action
☐ Major Amendment	☐ Groundwater Monitoring Report
☐ Minor Amendment	☐ Groundwater Statistical Evaluation
☐ Limited Scope Major Amendment	☐ Landfill Gas Corrective Action
☐ Notice Modification	☐ Landfill Gas Monitoring
☐ Non-Notice Modification	☐ Liner Evaluation Report
☐ Transfer/Name Change Modification	☐ Soil Boring Plan
☐ Temporary Authorization	☐ Special Waste Request
☐ Voluntary Revocation	☐ Other:
☐ Subchapter T Workplan	
☐ Other:	

Table 2 - Industrial & Hazardous Waste

APPLICATIONS	REPORTS and RESPONSES
☐ New	☐ Annual/Biennial Site Activity Report
☐ Renewal	☐ CfPT Plan/Result
☐ Post-Closure Order	☐ Closure Certification/Report
☐ Major Amendment	☐ Construction Certification/Report
☐ Minor Amendment	☐ CPT Plan/Result
☐ Class 3 Modification	☐ Extension Request
☐ Class 2 Modification	☐ Groundwater Monitoring Report
☐ Class 1 ED Modification	☐ Interim Status Change
☐ Class 1 Modification	☐ Interim Status Closure Plan
☐ Endorsement	☐ Soil Core Monitoring Report
☐ Temporary Authorization	☐ Treatability Study
☐ Voluntary Revocation	☐ Trial Burn Plan/Result
☐ 335.6 Notification	☐ Unsaturated Zone Monitoring Report
☐ Other:	☐ Waste Minimization Report
	☐ Other:

TCEQ Core Data Form

TCEQ Use Only

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

SECTION I: General Information

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

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

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

2. Customer Reference Number (if issued)		3. Regulated Entity Reference Number (if issued)
CN 603436114	Follow this link to search for CN or RN numbers in Central Registry**	RN

SECTION II: Customer Information

4. General Customer Information	5. Effective Date for Customer Information Updates (mm/dd/yyyy)	11/16/2015

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

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

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

6. Customer Legal Name (If an individual, print last name first: e.g.: Doe, John)	If new Customer, enter previous Customer below:
SouthWaste Disposal, LLC.	

7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number (if applicable)
800553020		203596390	

11. Type of Customer:	☒ Corporation	☐ Individual	Partnership: ☐ General ☐ Limited
Government: ☐ City ☐ County ☐ Federal ☐ State ☐ Other		☐ Sole Proprietorship	☐ Other:

12. Number of Employees

☐ 0-20 ☒ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

13. Independently Owned and Operated?

☒ Yes ☐ No

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

☐ Owner ☐ Operator ☒ Owner & Operator

☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other:

15. Mailing Address:	9575 Katy Freeway, Suite 130						
	City	Houston	State	TX	ZIP	77024	ZIP + 4

16. Country Mailing Information (if outside USA)	17. E-Mail Address (if applicable)
	tcox@southwaste.com

18. Telephone Number	19. Extension or Code	20. Fax Number (if applicable)
(866) 412 - 9494		(713) 413 - 4179

SECTION III: Regulated Entity Information

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

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

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

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

SouthWaste Disposal, LLC. Sealy Composting Facility

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

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	Northwest corner of Bartlett Road and U.S. Interstate 10 in Austin County, Texas. The Facility is located in a rural area east of the corporate city limits of San Felipe, Texas, near the intersection of Bartlett Road and Brazos 10 Lane				
26. Nearest City				State	Nearest ZIP Code
San Felipe				TX	77474
27. Latitude (N) In Decimal:	29.775986		28. Longitude (W) In Decimal:	-96.078056	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	46	33.55	-96	04	41

29. Primary SIC Code (4 digits)	30. Secondary SIC Code (4 digits)	31. Primary NAICS Code (5 or 6 digits)	32. Secondary NAICS Code (5 or 6 digits)
2875		325314	

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

Organic Composting

34. Mailing Address:	9575 Katy Freeway, Suite 130						
	City	Houston	State	TX	ZIP	77024	ZIP + 4
35. E-Mail Address:	tcox@southwaste.com						

36. Telephone Number	37. Extension or Code	38. Fax Number (if applicable)
(866) 413 - 9494		(713) 413 - 4179

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

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

SECTION IV: Preparer Information

40. Name:	Ben Camacho of Daniel B. Stephens & Associates, Inc.		41. Title: Compliance Permitting Specialist
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(512) 651 - 6019		(512) 821 - 2724	bcamacho@dbstephens.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	SouthWaste Disposal, LLC.	Job Title:	Vice President of Operations
Name(*In Print*):	Tim Cox	Phone:	(866)413-9494
Signature:		Date:	11-10-2015

Facility Name: Sealy Composting Facility
Permittee/Registrant Name: SouthWaste Disposal, LLC.
MSW Authorization #:
Initial Submittal Date: 11/16/2015
Revision Date:

Texas Commission on Environmental Quality

Part I Form

New Permit/Registration and Amendment Applications for an MSW Facility

1. Reason for Submittal

☒ Initial Submittal ☐ Notice of Deficiency (NOD) Response

2. Authorization Type

☒ Permit ☐ Registration

3. Application Type

☒ New ☐ Major Amendment
☐ Major Amendment (Limited Scope)

4. Application Fees

☒ Pay by Check ☐ Online Payment

If paid online, e-Pay Confirmation Number:

5. Application URL

Is the application submitted for Type I Arid Exempt (AE) and/or Type IV AE facility?

☐ Yes ☒ No

If the answer is "No", provide the URL address of a publicly accessible internet web site where the application and all revisions to that application will be posted.
http:// dbsa-client-access.com/application/file_access.html

6. Application Publishing

Party Responsible for Publishing Notice:

☐ Applicant ☐ Agent in Service ☒ Consultant

7. Alternative Language Notice

Is an alternative language notice required for this application? (For determination refer to Alternative Language Checklist on the Public Notice Verification Form TCEQ-20244-Waste)

☒ Yes ☐ No

8. Public Place Location of Application

Name of the Public Place: Bellville Public Library

Physical Address: 12 W. Palm

City: Bellville County: Austin State: Texas Zip Code: 77418

(Area code) Telephone Number: 979-865-3731

9. Consolidated Permit Processing

Is this submittal part of a consolidated permit processing request, in accordance with 30 TAC Chapter 33?

☒ Yes ☐ No ☐ Not Applicable

If "Yes", state the other TCEQ program authorizations requested: Composting, Air Quaility

10. Confidential Documents

Does the application contain confidential documents?

☐ Yes ☒ No

If "Yes", cross-reference the confidential documents throughout the application and submit as a separate attachment in a binder clearly marked "CONFIDENTIAL."

11. Permits and/or Construction Approvals

Select all that apply	Received	Pending	Not Applicable
Hazardous Waste Management Program under the Texas Solid Waste Disposal Act	☐	☐	☒
Underground Injection Control Program under the Texas Injection Well Act	☐	☐	☒
National Pollutant Discharge Elimination System Program under the Clean Water Act and Waste Discharge Program under Texas Water Code, Chapter 26	☐	☒	☐
Prevention of Significant Deterioration Program under the Federal Clean Air Act (FCAA). Nonattainment Program under the FCAA	☐	☐	☒
National Emission Standards for Hazardous Air Pollutants Preconstruction Approval under the FCAA	☐	☐	☒

Select all that apply	Received	Pending	Not Applicable
Ocean Dumping Permits under the Marine Protection Research and Sanctuaries Act	☐	☐	■
Dredge or Fill Permits under the CWA	☐	☐	■
Licenses under the Texas Radiation Control Act	☐	☐	■
Other Environmental Permits			
Notice of Intent to Apply for a Compost Facility Permit or Regis	■	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

12. General Facility Information

Facility Name: **Sealy Composting Facility**

MSW Authorization No. (if available):

Regulated Entity Reference No. (if issued)*: RN

Physical or Street Address (if available):

City: County: Austin State: Texas Zip Code:

(Area Code) Telephone Number: 866-413-9494

Latitude (Degrees, Minutes Seconds): 29° 46' 33.55"

Longitude (Degrees, Minutes Seconds): -96° 04' 41.00"

Benchmark Elevation (above mean sea level): 148 ft.

Provide a description of the location of the facility with respect to known or easily identifiable landmarks: Northwest corner of Bartlett Road and U.S. Interstate 10 in Austin County, Texas. The Facility is located in a rural area east of the corporate city limits of San Felipe, Texas, near the intersection of Bartlett Road and Brazos 10 Lane.

Detail access routes from the nearest United States or state highway to the facility:
Traversing on U.S. Interstate 10, exit onto Bartlett Road and turn north on Bartlett Road. Then turn west on Brazos 10 Lane for approximately 0.25 mile. The Facility is located adjacent to Brazos 10 Lane on the south.

*If this number has not been issued for the facility, complete a TCEQ Core Data Form (TCEQ-10400) and submit it with this application. List the Facility as the Regulated Entity.

13. Facility Type(s)

☐ Type I ☐ Type IV ■ Type V
☐ Type I AE ☐ Type IV AE ☐ Type VI

14. Activities Conducted at the Facility

■ Storage ■ Processing ☐ Disposal

15. Facility Waste Management Unit(s)

☐ Landfill Unit(s)	☐ Incinerator(s)
☐ Class 1 Landfill Unit(s)	☐ Autoclave(s)
■ Process Tank(s)	☐ Refrigeration Unit(s)
■ Storage Tank(s)	☐ Mobile Processing Unit(s)
☐ Tipping Floor	☐ Type VI Demonstration Unit
☐ Storage Area	■ Compost Pile(s) and/or Vessel(s)
☐ Container(s)	■ Other (Specify) retention pond
☐ Roll-off Boxes	☐ Other (Specify)
☐ Surface Impoundment	☐ Other (Specify)

16. Description of the Revisions to the Facility

Skip this box, if "New" is selected under "Application Type".

Provide a brief description of all revisions to the permit conditions and supporting documents referenced by the permit. Also, provide an explanation of why the amendment is requested.

17. Facility Contact Information

Site Operator (Permittee/Registrant) Name: SouthWaste Disposal, LLC.

Customer Reference No. (if issued)*: CN 603436114

Mailing Address: 9575 Katy Freeway, Suite 130

City: Houston County: Harris State: Texas Zip Code: 77024

(Area Code) Telephone Number: 866-413-9494

E-mail Address: tcox@southwaste.com

TX Secretary of State (SOS) Filing Number: 800553020

*If the Site Operator (Permittee/Registrant) does not have this number, complete a TCEQ Core Data Form (TCEQ-10400) and submit it with this application. List the Site Operator (Permittee/Registrant) as the Customer.

Operator Name[1]: Same as "Site Operator (Permittee/Registrant)"

Customer Reference No. (if issued)*:

Mailing Address:

City: County: State: Zip Code:

(Area Code) Telephone Number:

E-mail Address:

TX SOS Filing Number:

[1]If the Operator is the same as Site Operator/Permittee type "Same as "Site Operator (Permittee/Registrant)".
*If the Operator does not have this number, complete a TCEQ Core Data Form (TCEQ-10400) and submit it with this application. List the Operator as the customer.

Consultant Name (if applicable): Daniel B. Stephens & Associates, Inc.

Texas Board of Professional Engineers Firm Registration Number: F-286

Mailing Address: 4030 West Braker Lane, Suite 325

City: Austin County: Travis State: Texas Zip Code: 78759

(Area Code) Telephone Number: 800-933-3105

E-Mail Address: tgolden@dbstephens.com

Agent in Service Name (required only for out-of-state):

Mailing Address:

City: County: State: Zip Code:

(Area Code) Telephone Number:

E-Mail Address:

18. Facility Supervisor's License

Select the Type of License that the Solid Waste Facility Supervisor, as defined in 30 TAC Chapter 30, Occupational Licenses and Registrations, will obtain prior to commencing facility operations.

☐ Class A ■ Class B

19. Ownership Status of the Facility

■ Corporation	☐ Limited Partnership	☐ Federal Government
☐ Individual	☐ City Government	☐ Other Government
☐ Sole Proprietorship	☐ County Government	☐ Military
☐ General Partnership	☐ State Government	☐ Other (Specify):

Does the Site Operator (Permittee/Registrant) own all the facility units and all the facility property?

☐ Yes ■ No

If "No", provide the information requested below for any additional ownership.

Owner Name: Mike Hicks

Street or P.O. Box: 1228 Brazos Ten Lane

City: Sealy County: Austin State: Texas Zip Code: 77474

(Area Code) Telephone Number: 832-643-0576

E-mail Address (optional): counthix@aol.com

20. Other Governmental Entities Information

Texas Department of Transportation District: Yoakum District

District Engineer's Name: Christopher D. Caron, P.E.

Street Address or P.O. Box: 403 Huck Street

City: Yoakum County: DeWitt State: Texas Zip Code: 77995

(Area Code) Telephone Number: (361) 293-4332

E-Mail Address (optional):

The Local Governmental Authority Responsible for Road Maintenance (if applicable): Austin County Commissioner, Precinct 4

Contact Person's Name: Douglas King

Street Address or P.O. Box: P.O. Box 754

City: Wallis County: Austin State: Texas Zip Code: 77485

(Area Code) Telephone Number: 979-478-7121

E-Mail Address (optional): dking@austincounty.com

City Mayor Information

City Mayor's Name: The Facility is located in area unincorporated area of Austin County, Texas

Office Address:

City: County: State: Zip Code:

(Area Code) Telephone Number:

E-Mail Address (optional):

City Health Authority: Facility is located in area unincorporated area of Austin County, Texas
Contact Person's Name:
Street Address or P.O. Box:
City: County: State: Zip Code:
(Area Code) Telephone Number:
E-Mail Address (optional):

County Judge Information
County Judge's Name: Judge Tim Lapham
Street Address or P.O. Box: One East Main
City: Bellville County: Austin State: Texas Zip Code: 77418
(Area Code) Telephone Number: 979-865-5911
E-Mail Address (optional): tlapham@austincounty.com

County Health Authority: HEALTH SERVICE REGION 6/5 SOUTH
Contact Person's Name: Paul K. McGaha, D.O., M.P.H
Street Address or P.O. Box: 5425 Polk, Suite J
City: Houston County: Harris State: Texas Zip Code: 77023
(Area Code) Telephone Number: 979-865-5211
E-Mail Address (optional):

State Representative Information
District Number: Texas State House District 13
State Representative's Name: Representative Leighton Schubert
District Office Address: P.O. Box 2910
City: Austin County: Travis State: Texas Zip Code: 78768
(Area Code) Telephone Number: (512) 463-0600
E-Mail Address (optional):

State Senator Information
District Number: Texas State Senate District 18
State Senator's Name: Senator Lois W. Kolkhorst
District Office Address: 2000 S. Market St. #101
City: Brenham County: Austin State: Texas Zip Code: 77833
(Area Code) Telephone Number: (979) 251-7888
E-Mail Address (optional):

Council of Government (COG) Name: Houston-Galveston Area Council

COG Representative's Name: Mr. Jack Steele

COG Representative's Title: Executive Director

Street Address or P.O. Box: P.O. Box 22777

City: Houston County: Harris State: Texas Zip Code: 77227

(Area Code) Telephone Number: (713) 627-3200

E-Mail Address (optional): jack.steele@h-gac.com

River Basin Authority Name: Brazos River Authority

Contact Person's Name: Richard Ball

Watershed Sub-Basin Name: Lower Brazos Watershed

Street Address or P.O. Box: 4600 Cobbs Drive

City: Waco County: McLennan State: Texas Zip Code: 76710

(Area Code) Telephone Number: (254) 761-3100

E-Mail Address (optional):

Coastal Management Program

Is the facility within the Coastal Management Program boundary?

☐ Yes ■ No

U.S. Army Corps of Engineers

The facility is located in the following District of the U.S. Army Corps of Engineers:

☐ Albuquerque, NM ■ Galveston, TX

☐ Ft. Worth, TX ☐ Tulsa, OK

Local Government Jurisdiction

Within City Limits of: N/A

Within Extraterritorial Jurisdiction of: N/A

Is the facility located in an area in which the governing body of the municipality or county has prohibited the storage, processing or disposal of municipal or industrial solid waste?

☐ Yes ■ No

(If "Yes", provide a copy of the ordinance or order as an attachment):

Signature Page

I, Tim Cox, VP OF OPERATIONS,
(Site Operator (Permittee/Registrant)'s Authorized Signatory) (Title)

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.

Signature: _____ Date: 11-10-2015

TO BE COMPLETED BY THE OPERATOR IF THE APPLICATION IS SIGNED BY AN AUTHORIZED REPRESENTATIVE FOR THE OPERATOR

I, _____, hereby designate _____
(Print or Type Operator Name) (Print or Type Representative Name)

as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

_____
Printed or Typed Name of Operator or Principal Executive Officer

_____
Signature

SUBSCRIBED AND SWORN to before me by the said Tim Cox
On this 10th day of November, 2015
My commission expires on the 4th day of December, 2017
Kayla M. Labra
Notary Public in and for
HARRIS County, Texas
(Note: Application Must Bear Signature & Seal of Notary Public)

Part I Attachments

(See Instructions for P.E. seal requirements.)

Required Attachments	**Attachment No.**
Supplementary Technical Report	Part III, App F
Property Legal Description	Part I, App A
Property Metes and Bounds Description	Part I, App A
Facility Legal Description	Part I, App A
Facility Metes and Bounds Description	Part I, App A
Metes and Bounds Drawings	Part I, App A
On-Site Easements Drawing	Part I, App A
Land Ownership Map	Figure 4
Land Ownership List	Part I, Table 1
Electronic List or Mailing Labels	Part I, Table 1
Texas Department of Transportation (TxDOT) County Map	Figure 1
General Location Map	Figure 1
General Topographic Map	Figure 2
Verification of Legal Status	Part I, App C
Property Owner Affidavit	App B
Evidence of Competency	Part I

Additional Attachments as Applicable- Select all those apply and add as necessary

- ☒ TCEQ Core Data Form(s)
- ☒ Signatory Authority Delegation
- ☐ Fee Payment Receipt
- ☐ Confidential Documents
- ☐ Waste Storage, Processing and Disposal Ordinances
- ☐ Final Plat Record of Property
- ☒ Certificate of Fact (Certificate of Incorporation)
- ☐ Assumed Name Certificate

Notice of Intent to Apply for a Compost Facility Permit or Registration (Compost Form No. 2 and 3, Consolidated)

Submit Original and Two Copies of All Application Documents, Including This Form

Permit/Registration Application No. MSW_____(for TCEQ use)

Applicant Information:

Applicant Name: SouthWaste Disposal, LLC.

Customer Reference Number – if known* (*9 digits): **CN** 603436114

** If you do not have this number, complete the customer information section of the Core Data Form (TCEQ-10400) and submit it with this application.*

Facility Information:

Facility Name: Sealy Composting Facility

Regulated Entity Reference Number – if known* (*9 digits): **RN**_____

** If you do not have this number, complete the regulated entity information section of the Core Data Form (TCEQ-10400) and submit it with this application.*

Applicant's Agent Information:

Authorized Agent's Name: Tim Cox

Authorized Agent's Title: Vice President of Operations

Street or P.O. Box: 9575 Katy Freeway, Suite 130

City: Houston County: Harris State: Texas Zip: 77024

Phone Number: (866) 413-9494

Fax Number: (713) 413-4179

Public Place Where Administratively Complete Permit Application Will Be Located:

Identify the public place in the county (e.g., public library, county court house, city hall, etc.) including the address, where the application will be made available for review and copying by the public. (Applicants for new permits and major amendments must make a copy of the administratively complete application available at a public place in the county where the facility is, or will be, located for review and copying by the public.)

Bellville Public Library, 12 W. Palm, Bellville, Texas 77418; Phone Number: (979) 865-3731

http://dbsa-client-access.com/application/file_access.html

Property Owners Information:

Name: Michael and Carolyn Hicks

Customer Reference Number – if known* (*9 digits): **CN**_____

** If you do not have this number, complete the customer information section of the Core Data Form (TCEQ-10400) and submit it with this application.*

Geographic Coordinates of Permanent Site Benchmark:

Latitude: **N** 29° 46' 33.55"

Longitude: **W** -96° 04' 41.00"

Elevation (above sea level): 148

Deed Information:

County: Austin - File#997087 of the Official Records of Austin County, Texas

Book: N/A

Volume: N/A

Easement Holders of On-Site Easements are:

Name	Address	Contact Person	Area Code/Telephone & FAX
Pennco Trucking, Inc.	831 Bartlett Rd, Sealy, TX	Ron Horne	(979) 885-0005

Local Government Jurisdiction:

Within City Limits of: Not Within city limits; The Facility is located in area unincorporated area of Austin County, Texas

Within Extraterritorial Jurisdiction (ETJ) of: Not Within a city ETJ

The Facility is Located:

~650 feet west (*direction*) of the nearest road

~14.84 miles southeast (*direction*) of the nearest airport/airfield; and

~480 feet/miles south (*direction*) of the nearest occupied structure.

Waste Acceptance Rate, and Site Life:

It is estimated that the site will receive an average of approximately 72 million tons / cubic yards / (gallons) per year of liquid feedstock, and have an estimated life of 30 or more years.

List the nature, type and estimated quantity of waste:

Feed Stock Type	**Quantity**
Mixed Municipal Solid Waste	
Municipal Sewage Sludge	up to 10% of liquid feedstock
Septage	up to 10% of liquid feedstock
Grease Trap	90% of liquid feed stock (65 million gallons / year)
Paper Sludge	
Positively Sorted Paper	
Positively Sorted Cardboard	
Positively Sorted Yard Trimmings	
Positively Sorted Wood	128,000 cubic yards / year (as bulking material)
Positively Sorted Vegetative Food Matter	up to 10% of liquid feedstock
Positively Sorted Cloth	
Other Feedstock (*describe*)	

Waste to be specifically excluded:

30 TAC §332.4(k), Hazardous waste. All hazardous wastes, any nonhazardous industrial solid wastes not listed in subsection 30 TAC §332.4(j) of this section, and any of the materials listed in

subsection 30 TAC §332.4(j) of this section which are not managed in accordance with the requirements of this chapter, shall be managed in accordance with Chapter 335 of this title (relating to Industrial Solid Waste and Municipal Solid Waste).

Traffic Impact:

The primary access routes to the site are (list roads within one mile of site to be used for site access) U.S. Interstate 10, Bartlett Road, and Brazos 10 Lane (private road).
Initial traffic impact is estimated to be 10 vehicles/day with an estimated ultimate traffic impact of 50 vehicles/day.

The site is located in Texas Department of Transportation District:

TxDOT District Name and Number: Yoakum District

District Engineer's Name: Christopher D. Caron, P.E.

Street or P.O. Box: 403 Huck Street

City: Yoakum County: DeWitt State: Texas Zip: 77995

Phone Number: (361) 293-4332

Fax Number: (361) 293-4372

The local governmental authority or agency responsible for road maintenance is:

Contact Person's Name: Austin County Commissioner, Precint 4

Street or P.O. Box: P.O. Box 754

City: Wallis County: Austin State: Texas Zip: 77485

Phone Number: (979) 478-7121

Fax Number: (979) 885-3829

Consulting Engineer:

Responsible Engineer's Name: Thomas Golden, P.E.

Name of Engineering Firm: Daniel B. Stephens & Associates, Inc.

Street or P.O. Box: 4030 West Braker Lane, Suite 325

City: Austin County: Travis State: Texas Zip: 78759

Phone Number: (800) 933-3105

Fax Number: (512) 821-2724

Provide the following information for the State Senators and Representatives who represent the area in which the municipal solid waste facility is located:

State Representative:

District Number: Texas State House District 13

State Representative's Name: Representative Leighton Schubert

District Office Address: P.O. Box 2910

City: Austin County: Travis State: Texas Zip: 78768

Phone Number: (512) 463-0600

Fax Number: (512) 463-5240

State Senator:

District Number: Texas State Senate District 18

State Senator's Name: Senator Lois W. Kolkhorst

District Office Address: 2000 S. Market St. #101

City: Brenham County: Austin State: Texas Zip: 77833

Phone Number: (979) 251-7888

Fax Number: (979) 251-7968

Provide the following information for the appropriate regional Council of Governments(COG), River Basin Information, and U.S. Army Corps of Engineers District which represents the area that the municipal solid waste facility is to be located:

COG Name:

COG Representative's Name: Houston-Galveston Area Council - Mr. Jack Steele

COG Representative's Title: Executive Director

Street or P.O. Box: P.O. Box 22777

City: Houston County: Harris State: Texas Zip: 77227

Phone Number: (713) 627-3200

Fax Number: (713) 993-2414

Name of Applicant: SouthWaste Disposal, LLC.

River Basin Information:

River Authority: Brazos River Authority

Contact Person's Name: Richard Ball

Watershed Sub-Basin Name: Lower Brazos Watershed

Street or P.O. Box: 4600 Cobbs Drive

City: Waco County: McLennan State: Texas Zip: 76710

Phone Number: (254) 761-3100

Fax Number: (254) 761-3207

U.S. Army Corps of Engineers District:

☐ Albuquerque, NM ☐ Ft. Worth, TX ☒ Galveston, TX ☐ Tulsa, OK

List all other permits or construction approvals:

List all other permits or construction approvals, required, received or applied for to this or any government agency, whether local, state, or federal which pertain to this facility. Be specific, include permit numbers and other relevant identifiers. Also indicate RQD (required), APP (applied for), REC (received), or N/A (not applicable).

N/A Hazardous Waste Management program under the Texas Solid Waste Disposal Act;

N/A Underground Injection Control (UIC) program under the Texas Injection Well Act;

RQD National Pollutant Discharge Elimination System (NPDES) program under the Federal Clean Water Act (CWA) and Waste Discharge program under the Texas Water Code, Chapter 26;

N/A Prevention of Significant Deterioration (PSD) Program under the Federal Clean Air Act;

N/A Nonattainment Program under the Federal Clean Air Act;

N/A National Emission Standards for Hazardous Pollutants (NESHAPS) preconstruction approval under the Clean Air Act;

N/A Ocean dumping permits under the Marine Protection Research and Sanctuaries Act;

N/A Dredge or fill permits under of the Federal Clean Water Act;

N/A NPDES Stormwater Pollution Control §402 Permit;

N/A U. S. Army Corps of Engineers Dredge and Fill Permit §404;

RQD TCEQ Air Quality Permit or Registration;

RQD Other environmental permits (list below).

TCEQ Municipal Solid Waste Processing Facility Registration

Name of Applicant: SouthWaste Disposal, LLC.

Applicant's Certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." [30 TAC §305.44(b)]

Signature of Applicant: _____

Type or Print Name and Title: Tim Cox / VP of Operations

Street or P.O. Box: 9575 Katy Freeway, Suite 130

City: Houston County: Harris State: Texas Zip: 77024

Phone Number: (866) 413-9494

Fax Number: (713) 413-4179

Notary Public's Certificate"

Subscribed and sworn to before me, by the said

_____,

this 10th day of November, 20 15, to certify which witness my hand and seal of office.

Kayla M. Labra

Notary Public in and for HARRIS County, Texas

My Commission Expires December 4, 2017

Submit completed Application and a TCEQ Core Data Form (TCEQ-10400) to:

Municipal Solid Waste Permits Section, MC 124
Waste Permits Division
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

SouthWaste Disposal, LLC.

Sealy Composting Facility

Municipal Solid Waste

Permit Application

Submitted to **Texas Department of Environmental Quality**
Austin, Texas

November 16, 2015

Daniel B. Stephens & Associates, Inc.

4030 W. Braker Lane, Suite 325 • Austin, Texas 78759

SouthWaste Disposal, LLC.
Sealy Composting Facility
Municipal Solid Waste Permit Application

Application Submittal Date: **November 16, 2015**

Project Information

RN _____ ***MSW Permit #*** _____

Project Name: Sealy Composting Facility

Project Location: Intersection of Bartlett Road and Brazos 10 Lane, Austin County, Texas.

Project Description: Project is a composting facility that processes compostable municipal solid waste such as grease trap waste/septic/sewage sludge (GSS) and distributes final product for sale.

Project Location Description: The facility is located in a rural area east of the corporate city limits of Sealy, Texas, near the intersection of Bartlett Road and Brazos 10 Lane.

Applicant Information

CN: 603436114

Owner/Operator: Southwaste Disposal, LLC.

Address: 9575 Katy Freeway, Suite 130 Houston, Harris County, Texas 77024

Telephone: 866-413-9494 **Email:** tcox@southwaste.com

Fed Tax ID: 203596390

Preparer Information

Firm: Daniel B. Stephens & Associates, Inc.

Preparer: Benjamin Camacho

Engineer: Thomas Golden, P.E.

Address: 4030 West Braker Lane, Suite 325, Austin, Texas 78759

Telephone: 800-933-3105

Email(s): bcamacho@dbstephens.com and tgolden@dbstephens.com

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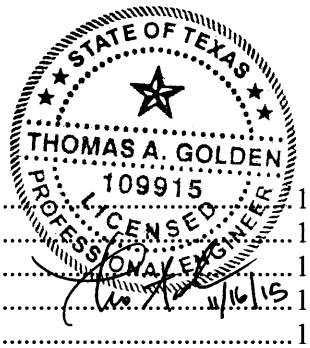
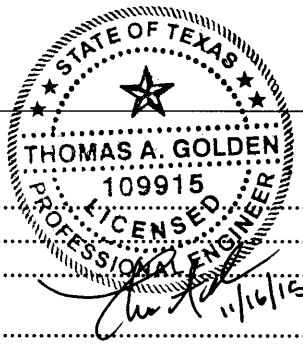
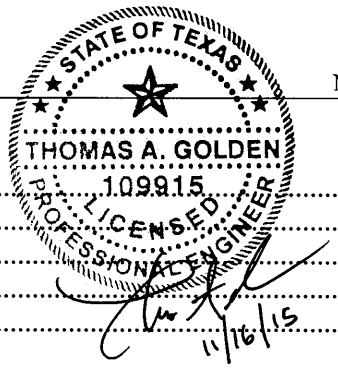
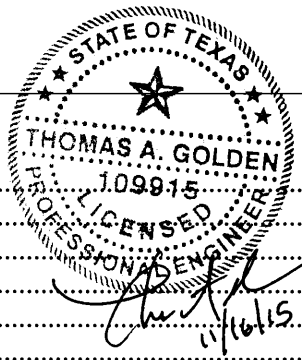
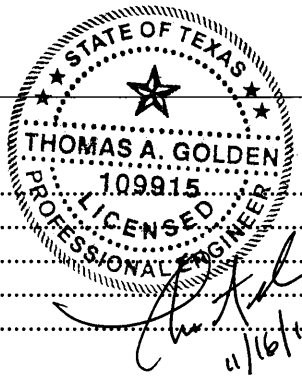
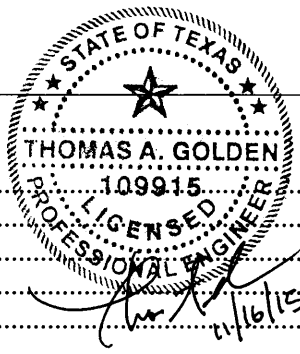












Requested Variances and Waivers

Part I

None

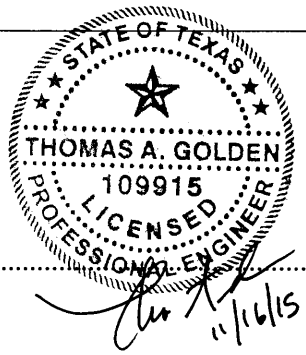
Part II

None

Part III

Part IV

None



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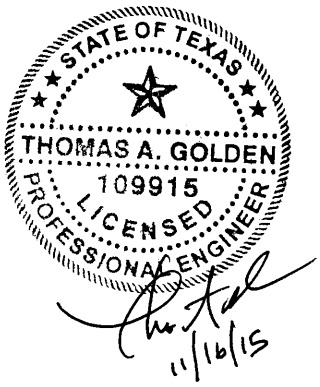


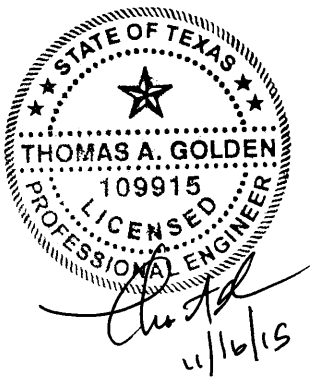
Part II

Part III

List of Drawings

Part III

List of Appendices



Part I

Part II

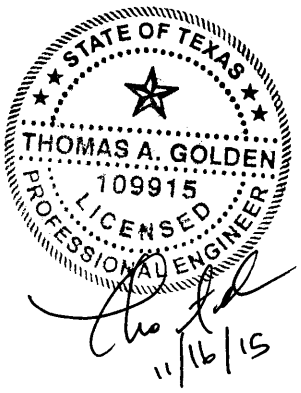
Part III

Part IV

None

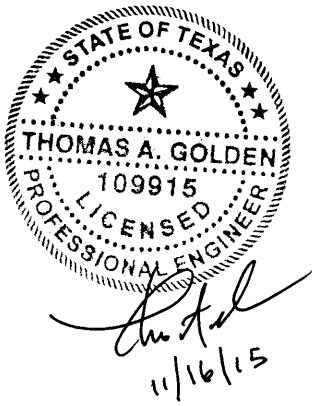
List of Acronyms

ADT	average daily traffic
ALU	aquatic life use
Avg	average
BACT	best achievable control technology
BOD	biological oxygen demand
CCN	Certificate of Convenience and Necessity
cfh	cubic feet per hour
cfm	cubic feet per minute
CR	County Road
CSAP	Closure Sampling Plan
EPA	United States Environmental Protection Agency
EQ	exceptional quality
°F	Fahrenheit degrees
FM	Farm to Market Road
ft bgs	feet below ground surface
gpm	gallons per minute
GSS	grease trap waste/septic/sewage sludge
hp	horse power
in	inch(es)
kips	kilo pounds per inch
MSDS	Material Safety Data Sheet
MSS	maintenance, start up, and shut down
MSW	municipal solid waste
SIC	Standard Industrial Classification
NAICS	North American Industry Classification System
NIST	National Institute of Standards and Technology
OSSF	on-site sewage facility



List of Acronyms (continued)

pci	pounds per cubic inch
plf	pounds per linear feet
psi	pounds per square inch
PWS	public water system
RCRA	Resource Conservation and Recovery Act
SC-SM	silty, clayey sand
SIC	Standard Classification
SO_2	sulfur dioxide
SOP	Standard Operating Procedures
SSO	sanitary sewer overflows
SUD	Sewer Use District
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
THSC	Texas Health and Safety Code
TLAP	Texas Land Application Permit
TPDES	Texas Pollution Discharge Elimination System
TWC	Texas Water Code
TXDOT	Texas Department of Transportation
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VCP	Vector Control Program
yd	yard(s)



Part I

Requirements of 30 TAC §330.59 for a Composting Facility

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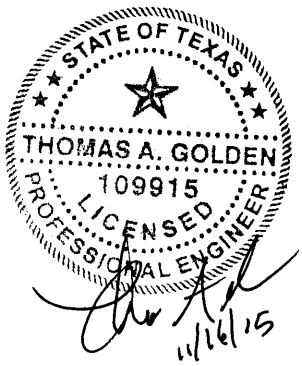
Part I *This document constitutes the requirements of 30 TAC §330.59 for a composting facility.*

Requested Variances and Waivers

Part I

None



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None

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Part I

List of Acronyms

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Avg	average
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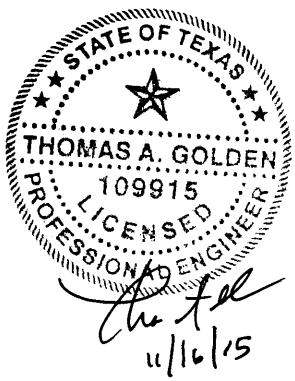

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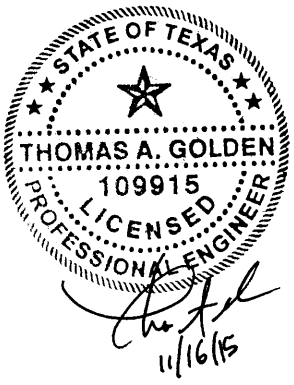

THSC	Texas Health and Safety Code
TLAP	Texas Land Application Permit
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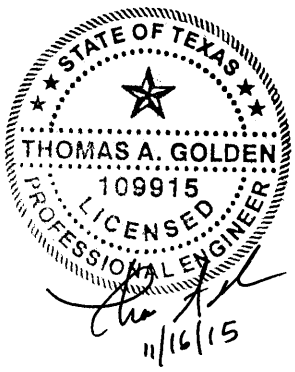

Section 1. Facility Permit Requirements

The SouthWaste Disposal, LLC Sealy Composting Facility (the Facility) will generate approximately 5,200 cubic yards of finished compost per month and is required to obtain a permit for the composting operations. The Facility requires a permit and is subject to 30 TAC §330, 30 TAC §332, and other sundry rules.

The Facility will consist of bulk material chipping and storage areas, a lined grease trap waste/septic/sewage sludge (GSS) processing area (composting pad), a composting area for other approved non-GSS waste, a stormwater retention pond, a post-processing area, aboveground feedstock storage tanks, and office areas (which include toilet and potable water facilities). GSS composting and curing processes will be restricted to the lined GSS processing area. Yellow grease processing may be added to future operations, which would be discussed in a future permit modification.

1.1 Municipal Solid Waste

1.1.1 Permit Applicability

The Facility will store, handle, process, and dispose of municipal solid waste (MSW). This application is for a new composting permit to process GSS and non-GSS waste and to compost the solids from these waste sources. Other activities performed within the Facility boundaries that do not require a permit under 30 TAC §332 include the use of tankage/equipment related to a liquid waste transfer station, storage and composting of food wastes, and chipping and grinding operations. These activities will be incorporated as part of this Facility permit. The Facility is not a medical waste mobile treatment or a mobile treatment unit.

Compliance information is discussed in the Site Development Plan presented in Part III of this application. This Facility does not store combustible material and is not required to comply with TAC §37, Subchapter J. Groundwater monitoring may be required by the Executive Director and will be maintained in accordance with the requirements of §330 Subchapter J, if required.

1.1.2 MSW Permits

1. Municipal Solid Waste Facilities TAC §30§330
    a. 30TAC §330.1 (d): The Facility will compost MSW in accordance with the requirements of 30TAC §332, but is required to apply for a permit in accordance with 30TAC §332.3(a). The application will follow the applicable requirements of 30TAC §330 Subchapter B.
2. 30TAC §332: Composting

1.1.3 Water and Storm Water

1. Spill Prevention and Control 30TAC §327
2. TPDES Multisector General Permit TXR050000 – Storm Water
    a. Sector C: Chemical and Allied Products

1.1.4 Air Quality

1. RULE §106.4 Requirements for Permitting by Rule
2. RULE §106.472 Organic and Inorganic Liquid Loading and Unloading
3. Composting Standard Permit Rule §332.8 Air Quality Requirements

1.1.5 Miscellaneous

4. Financial Assurance 30TAC §37
5. Public Notice 30TAC §39

1.2 Texas State Laws

6. Texas Solid Waste Disposal Act, Texas Health and Safety Code (THSC) Chapter 361
7. Texas Litter Abatement Act, THSC Chapter 365
8. Texas Toxic Chemical Release Reporting Act, THSC Chapter 370
9. Texas Clean Air Act, THSC Chapter 382
10. Texas Water Code (TWC) Chapter 26 (relating to Water Quality Control)

Section 2. Operation and Process Summary

The Facility will divert organic materials from typical MSW streams for beneficial reuse while maintaining standards for human health and safety and environmental protection. The Facility will produce compost from non-hazardous MSW. The Facility is required to obtain a compost permit.

The estimated quantity of incoming feedstock to be received is approximately 930 tons per day (22,300 tons per month, assuming 24 operating days per month) or approximately 250,000 gallons per operating day (assuming 7.44 pounds per gallon typical for grease trap waste). Grease trap waste is expected to account for approximately 90 percent of the incoming feedstock at this Facility. The other feedstock accepted at the Facility will include municipal sewage sludge, food processing waste, and septage wastewater. The bulking material used in the process will be chipped and shredded wood and vegetation. Bulking material will be received either chipped or screened or in raw form, in which case it will be chipped on the property. All materials entering the Facility, both feedstock and bulking material, will be screened on entry for unauthorized materials.

Both pre-chipped and shredded bulking material and raw bulking material will be delivered by truck to the Facility. Raw bulking materials will be stored and then chipped and screened at a designated area. The Facility will be equipped with a chipper/grinder to chip and grind raw bulk material. The chipper/grinder will be equipped with low-velocity spray nozzles to minimize the

generation of dust during operation. The chipped and shredded bulking material will be placed on the processing areas in windrows using a front-end loader.

The liquid feedstock will be pumped either into aboveground storage tanks for temporary storage or to the Facility vacuum truck or equivalent to be sprayed directly onto prepared windrows of bulking material located within the processing areas. The storage capacity of the aboveground tanks will allow the liquid feedstocks to be applied in a consistent manner and will provide additional feedstock storage capacity that can be used during periods of rainfall that limit feedstock application. No feedstock will be accepted in excess of the available capacity of the storage tanks.

Feedstock material will be applied to the windrows using a vacuum truck or equivalent. Once the feedstock is applied to a windrow, the windrow will be immediately turned, mixed, and homogenized using a self-propelled tiller to thoroughly mix feedstock and bulking material. This process allows the feedstock material to be evenly distributed throughout the windrows and prevents moisture or liquids from collecting at the base of the compost material. Once a windrow is considered to have the appropriate moisture content and mixture of bulking material and feedstock, then the temperature within the mixture throughout the windrow will be monitored.

After the monitoring period, the final composted product will be placed in a stockpile on the lined processing area for curing. Each batch of final product will be placed in a separate stockpile and assigned a batch number. Each batch will be physically separated to prevent co-mingling of different batches and will be tested for maturity and final product parameters. Batches that do not meet the maturity parameters will remain on the processing area and continue to be monitored until the maturity parameters are reached. Batches that meet the maturity parameters but do not meet the final product parameters for either Grade 1 or Grade 2 compost (waste grade compost) will be disposed off-site at an authorized MSW facility. Compost will initially be sold in bulk form. However, the facility may sell containerized compost at some time in the future.

Section 3. Facility Location

3.1 Location

Project Name: SouthWaste Disposal, LLC Sealy Composting Facility

Project Location: Northwest corner of Bartlett Road and U.S. Interstate 10 in Austin County, Texas

Project Location Description: The Facility is located in a rural area east of the corporate city limits of San Felipe, Texas, near the intersection of Bartlett Road and Brazos 10 Lane.

3.2 Access Routes

Route 1: Traversing on U.S. Interstate 10, exit onto Bartlett Road and turn north on Bartlett Road. Then turn west on Brazos 10 Lane for approximately 0.25 mile. The Facility is located adjacent to Brazos 10 Lane on the south.

3.3 Geographic Coordinates

The latitude and longitude of the approximate centroid of the property are 29° 46' 33.55" North and –96° 04' 41.00" West, respectively (North American Datum of 1983).

Section 4. Maps

4.1 General Location

The Site is located near the city of San Felipe, just east of the city of Sealy, in Austin County, Texas. See Figure 1 for a Facility Location Map. The Facility Location Map is scaled at ½ inch equals 1 mile. The property boundaries and longitudinal and latitudinal coordinates have been overlaid on the enlarged map. The Facility location map accurately shows proximity to surrounding features.

The property is 32.209 acres in size and irregular in shape.

4.2 General Topographic Map

The Topographic Map (Figure 2) is an excerpt of United States Geological Survey 7½-minute quadrangle sheets as an equivalency for the facility. The topographic map is at a scale of 1 inch equals 2,000 feet (1:24,000).

4.3 Land Use

The Land Use Map (Figure 3), on a scale of 1 inch equals ½ mile, depicts boundaries of the tract of land to be used by the applicant and extends at least 1 mile beyond the tract boundaries sufficient to show the following:

- Each well, spring, and surface water body or other water of the state within the map area;
- The general character of the areas adjacent to the Facility, including public roads, towns, and the nature of development of adjacent lands such as residential, commercial, agricultural, recreational, undeveloped, and so forth;
- The location of any waste disposal activities conducted on the tract not included in the application; and,
- The ownership of tracts of land adjacent to the Facility and within a reasonable distance from the proposed point or points of discharge, deposit, injection, or other place of disposal or activity.

4.4 Land Ownership

The landowners within ½ mile of the Facility boundaries listed in the following table are shown on Figure 4. The source of the names and addresses of property owners is the Austin County Appraisal District Database.

The Land Ownership Map (Figure 4), along with the list of landowners (Table 1), identifies properties owned by adjacent and potentially affected landowners within ½ mile of the Facility boundaries. The mineral interest ownership, designated as executive rights, under the facility is owned by the property owner, Michael and Carolyn Hicks (INST #997087 DRACTX).

Section 5. Property Owner Information

5.1 Legal Description of the Facility

The Facility is located near the cities of Sealy and San Felipe in Austin County, Texas. The following is a legal description with deed record information.

> Legal Description: 32.209 ACRES: ALL THAT TRACT OR PARCEL OF LAND consisting of 32.209 Acres located in the Stephen F. Austin Survey, A7, Austin County, Texas. Subject tract being a portion of the 62.53606 Acre tract described in Deed to Michael P. & Carolyn S. Hicks recorded in File# 997087 of the Official Records of Austin County, Texas.

As of submission of this application, the County had not completed its final plat in its records for this property. The survey (Appendix A) drawing is considered the final plat submitted to Austin County.

The Boundary Metes and Bounds with Drawing, included as Appendix A, is an official metes and bounds description and drawing of the proposed facility prepared and sealed by a registered surveyor.

5.2 Property Owner Affidavit and Lease Agreement

A property owner affidavit signed by the property owner includes the statements and affirmations of §330.59 (d) (2) (A), (B), (C). An executed Commercial Contract for Unimproved Property between SouthWaste, the "Buyer," and Mr. Mike Hicks dated May 4, 2015, the property owner and "Seller," is included in Appendix B.

According to the Commercial Contract for Unimproved Property, SouthWaste has agreed to lease the property for a term of 24 months, beginning 60 days following the effective date of the contract. At the end of the 24-month lease term, the 32.209-acre property will be sold to SouthWaste.

Table 1. Landowner List (½-mile radius)

Map #	Owner	Address
34, 35	Alvin Konvicka	516 Acres Lane, Sealy, Texas 77474
34, 35	Alvin Konvicka	516 Acres Lane, Sealy, Texas 77474
32	Barry Wayne Jackson	1723 Prince George Court, Katy, Texas 77492
40, 41	Beatrice Mae Haczynski	12040 Mlcak Road, Sealy, Texas 77474
46	Bhaidani Ali	5003 Skipping Stone Loane, Sugarland, Texas 77479
11	Brian and Ramona Valenti	3911 Wood Park, Sugarland, Texas 77479
47	Cardenas Rebecca	5408 Holly St, Bellaire, TX 774014704
37	Charles Mlcak	4106 Sea Meadow Court, Katy, Texas 77494
39	Christopher Haczynski	12040 Mlcak Road, Sealy, Texas 77474
22	Clem Buchala	263 Manak Road, Sealy, Texas 77474
17	David Wickens Family Partnership, LTD.	3027 Willow Oak Lane, Sealy, Texas 77418
13	DNAR, LLC	PO Box 396, Barker, Texas 77413
45	Donna Cash	7625 SE IH 10 Frontage Road, Sealy, Texas 77474
12	Douglas and Linda Simmons	11326 Inwood Drive, Houston, Texas 77077
8	Farshad Nazemi	11305 Green Vale, Houston, Texas 77024
15	Frank and Victoria Chou	2585 Meyer Road, Sealy, Texas 77474
36	Fred and JoAnn Buri	7918 Hilshire Green Drive, Houston, Texas 77005
9, 10	GeoSouthern Energy Corporation	1425 Lake Front Circle, Suite 200, The Woodlands, Texas 77380
44	Geraldine Hamil	7595 SE IH 10 Frontage Road, Sealy, Texas 77474
42	James Lezak	9455 Lake Drive, Chappell Hill, Texas 77426
30	Jeanette Kucera	131 Lezak Road, Sealy, Texas 77474
38	Jeanne Netardus	8518 Ivy Falls Court, Houston, Texas 77040
27	John Gannon, Inc.	525 Park Grove, Katy, Texas 77450
20	Joseph Walker Dudgeon, Jr. Trustee	23042 260th Avenue, Centerville, Iowa 52544
25, 29	JWJ Stone Properties	PO Box 277, San Felipe, Texas 77473
26	Kenneth and Cheri Bumbera	413 Brazos Hill Lane, Sealy, Texas 77474
43	Maxine Rudloff	7439 SE IH 10 Frontage Road, Sealy, Texas 77474
1	Michael and Carolyn Hicks	1228 Brazos Ten Lane, Sealy, Texas 77474
28	Patricia Bagwell	PO Box 473, San Felipe, Texas 77473
2, 4	Pencco	PO Box 600, San Felipe, Texas 77473
3	Reactive Metals & Alloy Metals	PO Box 786, Sealy, Texas 77474
16, 21	Richard and Carol Papso	10 Preston Court, Sugarland, Texas 77479
24	Rubie Mae Buchala	477 Manak Road, Sealy, Texas 77474
19	Rudolfo and Celia Pena	3226 Mulberry Lane, Houston, Texas 77084
14	Terrell Burtschell	106 6th Street, Sealy, Texas 77474
23	Victoria Buchala	6060 NE IH 10 Frontage Road, Sealy, Texas 77474
5, 6, 7	Vital Link, Inc.	PO BOX 303, San Felipe, Texas 77473
33	Whitehorse Development, LLC	2352 FM 1094, Sealy, Texas 77474
18	William Skrivanek	2226 Skrivanek Road, Sealy, Texas 77474
31	Woodridge Development LP	PO Box 22606, Houston, Texas 77227

Section 6. Legal Authority and Appointments

6.1 Legal Authority

SouthWaste has provided verification of legal status in the form of a one-page certificate of incorporation issued by the Secretary of State (Appendix C). The Secretary of State filing number for SouthWaste (owner and operator) is SOS#800553020.

6.2 Appointments

SouthWaste Disposal, LLC is a corporation, and the application will be signed by Mr. Tim Cox, Vice President of Operations for SouthWaste. Mr. Cox meets the requirements of TAC §305.44 related to the delegation of signatory authority. Mr. Cox has been granted legal authority to sign and encumber SouthWaste Disposal, LLC.

Section 7. Evidence of Competency

7.1 Other Operation Ownership

SouthWaste owns and operates several active MSW facilities throughout Texas, as indicated below:

RN Number:	RN101478071		
Name:	SouthWaste Disposal, LLC San Antonio Facility		
Primary Business:	Organic composting		
Street Address:	20805 Old Limn Road		
County: Bexar	*Nearest City:* Elmendorf	*State:* TX	*Zip Code:* 78112
Physical Location:			
7 miles west of Elmendorf near roadway 1 mile southwest of Interstate Highway 37			
Customer's Role:	Owner / Operator	*Begin Date*:	06/04/2010
		End Date:	NA
Program ID:	*Type:*	*ID Number:*	*ID Status:*
MSW processing	Permit	2317	Active
Petroleum storage tank	Registration	87042	Active
Storm water	Permit	TXR05BC61	Active

RN Number:	RN105876601		
Name:	Austin Liquid Waste Processing Facility		
Primary Business:	No primary business description on file		
Street Address:	828 Linger Lane		
County: Travis	*Nearest City:* Austin	*State:* TX	*Zip Code:* 78725
Physical Location:			
Located on Linger Lane approximately 800 feet southwest of the intersection of Highway 183 and Linger Lane			
Customer's Role:	Owner	*Begin Date*:	NA
		End Date:	NA
Program ID:	*Type:*	*ID Number:*	*ID Status:*
MSW processing	Permit	2367	Active

RN Number:	RN101289171		
Name:	SouthWaste Disposal, LLC South Plains Facility		
Primary Business:	Grease and grit trap processing		
Street Address:	801 North Avenue P		
County: Lubbock	*Nearest City:* Lubbock	*State:* TX	*Zip Code:* 79403
Physical Location:			
No physical location description on file			
Customer's Role:	Owner / Operator	*Begin Date*:	05/05/2010
		End Date:	NA
Program ID:	*Type:*	*ID Number:*	*ID Status:*
MSW processing	Permit	2231	Active

RN Number:	RN103155800 RN101288603		
Name:	SouthWaste Disposal Hurst Facility		
Primary Business:	Industrial chemical manufacturing plant		
Street Address:	6407 Hurst Street		
County: Harris	*Nearest City:* Houston	*State:* TX	*Zip Code:* 77024
Physical Location:			
1.933 acres located on 6407 Hurst Street in Houston, Harris County			
Customer's Role:	Owner / Operator	*Begin Date*:	01/01/2009
		End Date:	NA
Program ID:	*Type:*	*ID Number:*	*ID Status:*
Sludge	Registration	23737	Cancelled
Sludge	Registration	24075	Active
Air new source permits	Registration	120677	Active
Air new source permits	Registration	120683	Active
MSW processing	Permit	2241A	Active
MSW processing	Permit	2241B	Pending
Storm water	Permit	TXR05BV26	Active

RN Number:	RN102327715		
Name:	SouthWaste Disposal Dallas Facility		
Primary Business:	No primary business description on file.		
Street Address:	525 South 6th Avenue		
County: Tarrant	*Nearest City:* Mansfield	*State:* TX	*Zip Code:* 76063
Physical Location:			
Located at 525 South 6th Avenue in the city of Mansfield approximately ½ mile south of the intersection of 6th Avenue and Broad Street			
Customer's Role:	Owner / Operator	*Begin Date*:	10/23/2009
		End Date:	NA
Program ID:	*Type:*	*ID Number:*	*ID Status:*
Air New Source Permits	Registration	115976	Active
MSW Processing	Permit	2256	Active
Storm water	Permit	TXRNEW710	Active

RN Number:	RN102803590		
Name:	SouthWaste Disposal Lockwood Facility		
Primary Business:	No primary business description on file		
Street Address:	753 Lockwood Drive		
County: Harris	*Nearest City:* Houston	*State:* TX	*Zip Code:* 78112
Physical Location:			
753 Lockwood Drive 0.4 mile south of Clinton Drive, Houston, Texas			
Customer's Role:	Owner / Operator	*Begin Date*:	02/16/2010
		End Date:	NA
Program ID:	*Type:*	*ID Number:*	*ID Status:*
Air new source permits	Registration	11741	Active
MSW processing	Permit	1117	Canceled

SouthWaste is experienced with MSW facility type operations and understands the MSW rules and regulations set forth by the State of Texas. SouthWaste is currently staffed with several licensed solid waste facility supervisors that manage SouthWaste operations throughout Texas. Prior to operating the Sealy Composting Facility, SouthWaste will designate a licensed solid waste facility supervisor. In addition, the Facility will employ at least one TCEQ-certified compost operator within six months from the initiation of operations at the Facility. The TCEQ-certified compost operator will routinely be on-site during the hours of operation. Mr. Tim Cox is the principal and supervisor of the Facility's organization.

7.2 Financial Interest or Enforcement Actions

Currently, SouthWaste has one financial interest in a solid waste site in another state, territory, or country outside the State of Texas, which includes their Central Florida Disposal Interests facility located in Groveland, Florida. SouthWaste does not have any final enforcement orders, court judgments, consent decrees, or criminal convictions by the State of Texas, the State of Florida, or the federal government within the last five years relating to compliance with applicable legal requirements relating to the handling of solid or liquid waste under the jurisdiction of the TCEQ, the Florida Department of Environmental Protection, or the United States Environmental Protection Agency (U.S. EPA).

Part II

Requirements of 30 TAC §330.60

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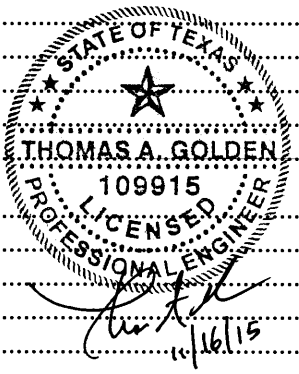
Part II *This document constitutes the requirements of 30 TAC §330.60, Part II of the Application.*



Requested Variances and Waivers

Part II

None

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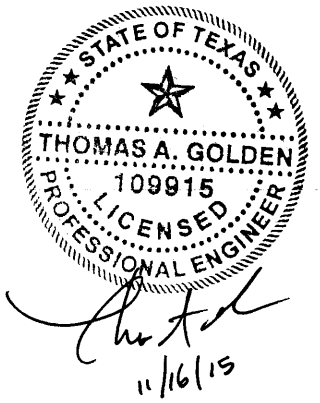
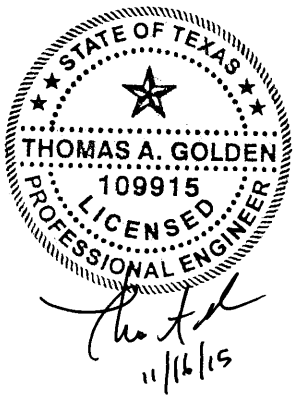


Acronyms

ADT	average daily traffic
BMPs	best management practices
CGP	Construction General Permit
EDR	Environmental Data Resources
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
GSS	grease trap waste/septic/sewage sludge
MSW	municipal solid waste
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OIC	Operator in Charge
OSSF	on-site sewage facility
PBR	Permit by Rule
PCB	polychlorinated biphenyls
PBR	Permit by Rule
SSO	sanitary sewer overflows
SWPPP	Storm Water Pollution Prevention Plan
TDWR	Texas Department of Water Resources
THC	Texas Historical Commission
TWBD	Texas Water Development Board
TXDOT	Texas Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tanks
WOTUS	Waters of the U.S.
yd	yard(s)



Section 8. Existing Conditions Summary

8.1 Historical Land Use

Daniel B. Stephens & Associates, Inc. (DBS&A) performed a Phase I Environmental Site Assessment (ESA) for the property in June 2015. According to the previous property owner, the property was never developed or used to store materials. The property was owned by Sea Corps prior to 1995 and was undeveloped during Sea Corps ownership. Based on a review of aerial photography ranging in dates from 1953 through 2012, the property appears to still be undeveloped.

8.2 Site Specific Conditions

The following property information was observed by DBS&A personnel during the June 2015 Phase I ESA site visit. The property, an approximately 32.209 acre tract of undeveloped land, is covered primarily with vegetation and native soil and does not contain any paved areas. A gravel road is located at the northern portion of the property. A man-made pond was observed in the eastern portion of the property on the day of the site visit. According to the property owner, the pond area was excavated and utilized as a stock pond. No structures, other than an unused wooden shed at the northwestern portion of the property, were observed during the Phase I ESA site visit. No evidence of underground storage tanks (USTs) or hydraulic/stationary lifts was observed. There were no signs of distressed vegetation or standing water observed during the site visit. DBS&A personnel did not observe any areas of staining on soil throughout the undeveloped property, and no unusual odors or stressed vegetation were noted. No storage tanks, drums, or other containers were observed at the property. No fill dirt or evidence of fill activities was observed at the property on the day of inspection. No hazardous materials, petroleum products, or waste storage areas were observed at the property.

Section 9. Climate

The average climate of Austin County is humid subtropical with hot summers. Evaporation and precipitation rates are provided on the Texas Water Development Board (TWDB) web site (http://www.twdb.texas.gov/surfacewater/conditions) for 1-degree quadrangular areas across the state. Austin County falls within quadrangle numbers 711 and 811. The data provided are based on sites operated by the National Weather Service and the Texas Department of Water Resources (TDWR). The average annual evaporation, based on data collected from 1954 through 2014, is 51.6 inches, and average annual precipitation, from 1940 through 2014, is 40.46 inches.

Prevailing winds are southerly March through November and northerly December through February. The Wind Rose, included as Figure 5, illustrates the predominant winds of Houston, Texas, which most accurately emulate the winds at the property.

Section 10. Waste Acceptance Plan

10.1 Sources and Characteristics

Sheet 3 of the Drawings section shows the facility plan and layout, including the permitted Facility, as well as the property boundary, fencing, internal roadways, the grease trap waste/septic/sewage sludge (GSS) processing area (as noted on that drawing, tipping also occurs in this area, and there is not a discrete tipping area at the Facility), post-processing areas, all structures, and other improvements to the property.

An estimated 270,000 tons of feedstock will be composted annually. The estimated quantity of incoming feedstock to be received is up to 930 tons per day (22,300 tons per month, assuming 24 operating days per month) or approximately 250,000 gallons per operating day (assuming 7.44 pounds per gallon typical for grease trap waste). Grease trap waste is expected to account for approximately 90 percent of the incoming feedstock at this facility. Expected to account for 10 percent or less of the incoming feedstock, the other feedstocks accepted at the Facility are:

- Municipal sewage sludge;
- Septage; and
- Dairy/food including meat and fish.

The bulking material used in the process will be chipped and shredded wood and vegetation. Bulking material will be either received already chipped and screened or will be received in raw form and chipped at the Facility. An estimated 111 tons of chipped bulking material may be placed on the processing area daily.

All materials entering the Facility, both feedstock and bulking material, will be screened on entry for unauthorized materials as described in Part III.

10.2 Limiting Parameters

The anticipated final product grade of compost will be Grade 1. The intended final use of the Grade 1 composted material will be used as a soil amendment in residential and commercial applications. In the event that final testing indicates that the composted material is Grade 2, it will either be disposed of at a permitted municipal solid waste (MSW) facility or sold only to commercial users and will be labeled as not for use at residences or child-care facilities. In the event that final testing indicates that the composted material is Waste Grade, it will be disposed at a permitted MSW facility.

In order to confirm compost grade classification, two types of sampling and analysis will be performed at the Facility: sampling and analysis for maturity and sampling and analysis for final product grading.

A Maturity Protocol (maturity testing presented in Part III) has been developed to measure the potential for biological activity in the composted materials at the completion of the composting process.

In addition to maturity testing, all batches of final product will be analyzed for the parameters using the methods listed in Table 2, and the analytical results will be used to assign a final product grade. Product grades include Grade 1 Compost, Grade 2 Compost, and Waste Grade Compost. Grade 1 Compost and Grade 2 Compost will not contain foreign matter of a size or shape that can cause human or animal injury and will meet the other applicable standards presented in Table 2. Waste Grade Compost is any material that does not meet the final product standards for either Grade 1 or Grade 2.

Table 2. Final Product Analytical requirements and Standards

Parameter	Analytical Method	Final Product Standards for Grade 1 Compost	Final Product Standards for Grade 2 Compost
Total metals			
As	SW-846, Method 6020	≤10 mg/kg	≤41 mg/kg [a]
Cd	SW-846, Method 6020	≤16 mg/kg	≤39 mg/kg [a]
Cr (total)	SW-846, Method 6020	≤180 mg/kg	≤1200 mg/kg [a]
Cu	SW-846, Method 6020	≤1020 mg/kg	≤1500 mg/kg [a]
Pb	SW-846, Method 6020	≤300 mg/kg	≤300 mg/kg [a]
Hg	SW-846, Method 7470	≤11 mg/kg	≤17 mg/kg [a]
Mo	SW-846, Method 6020	≤75 mg/kg	≤75 mg/kg [a]
Ni	SW-846, Method 6020	≤160 mg/kg	≤420 mg/kg [a]
Se	SW-846, Method 6020	≤36 mg/kg	≤36 mg/kg [a]
Zn	SW-846, Method 6020	≤2190 mg/kg	≤2800 mg/kg [a]
Maturity / Stability	Maturity Protocol	> 60% Reduction of Organic Matter	> 20 % Reduction of Organic Matter
Weight% Foreign Matter	Dry weight basis	≤1.5% on a 4mm screen	1.5% on a 4mm screen
pH	North Central Regional Method 14 for Saturated Media (SW 9045D)	5.0 to 8.5 [b]	5.0 to 8.5 [b]
Salinity	North Central Regional Method 14 for Saturated Media	10 mmhos/com	10 mmhos/com
Pathogens			
Salmonella	Standard Methods for the Examination of Water and Wastewater, Water Pollution Control Federation	< 3 MPN per 4 grams total solids or meets PFRP	No Value
Fecal Coliform		< 1,000 MPN per gram of solids or meets PFRP	Geometric mean density <2,000,000 MPN per gram of solids or meets PFRP
PCBs	SW-846, Method 8082	1 mg/kg	10 mg/kg

[a] Metals concentrations are for a cured compost. Compost that is semi-mature or mature will have the metal concentrations adjusted to reflect the metal concentration that would be present if the compost met the criteria of a cured compost.

[b] A conductivity or pH outside the indicated range may be appropriate if the compost is specified for a special use.

PFRP = Processes to further reduce pathogens
MPN = Most probable number
PCBs = Polychlorinated biphenyls

Both maturity testing and final product testing are further discussed in Part III and IV.

10.3 Prohibited Wastes and Materials

This facility does not accept:

- Regulated hazardous waste,
- Used or scrap tires,
- Lead acid storage batteries,
- Polychlorinated biphenyls (PCB) wastes,
- Used motor vehicle oil,
- Items containing chlorinated fluorocarbon,
- Used oil filters; and
- Radioactive materials.

No special authorization is requested to accept Conditionally Exempt Small Quantity Generator Waste not listed as feedstock or for the disposal of Special Wastes or Industrial Wastes.

10.4 Un-compostable Materials

Only the designated feedstocks will be accepted at the Facility. Delivery trucks entering the property are inspected by the Operator in Charge (OIC) for the presence of unauthorized materials during unloading. Loads determined to contain unprocessable, prohibited, or unauthorized materials are either refused, or the drivers are directed to remove the unacceptable material from the load and then remove it from the property. In the event that unprocessable, prohibited, or unauthorized materials are discovered after delivery, these materials will be removed from the Facility and disposed of at an authorized MSW facility.

Section 11. Feedstocks and Sources

The liquid feedstock will be pumped into either one of eight 31,500-gallon aboveground storage tanks for temporary storage or to the Facility vacuum truck, or equivalent, to be sprayed directly onto prepared windrows of bulking material located within the processing areas. The storage capacity of the aboveground tanks will allow the liquid feedstocks to be applied in a consistent manner and will provide additional feedstock storage capacity that can be used during periods of rainfall when feedstock application is limited. No feedstock will be accepted in excess of the available capacity of the storage tanks.

The Facility may generate approximately 5,200 cubic yards of finished compost per month. Some chipping and shredding of bulking material is performed in an area outside the lined portion of the Facility. Chipped and shredded bulking material may also be brought to the Facility from off-site locations. Energy and mass balance calculations for the GSS and non-GSS waste composting process are presented in Part III, Section 18.3.

11.1 Grease Trap Waste

Approximately 90 percent of the incoming feedstock accepted at the Facility will be grease trap waste. Grease traps are used by food service and processing establishments to separate out fats, oils, and greases in wastewater from dishwashers, sinks, floor drains, and dumpster pads. If grease and solids accumulations are not routinely pumped out of the trap, the grease overflows the trap, settles in the sewer collection system, and plugs up the sewer, thereby contributing to sanitary sewer overflows (SSO). Increasing public and regulatory concern over the potential public health and environmental impacts of SSO has increased maintenance of grease traps.

Grease trap wastes are siphoned out of traps as a liquid with about 5 to 6 percent total solids content. The waste contains grease, water, and sediment (food particles) that are washed down the drain. The grease is essentially comprised of fats and oils (triglycerides), which are comprised of one unit of a sugar alcohol (glycerol $C_3H_8O_3$) and three units of fatty acids. Fats and oils contain twice the energy of other organic materials.

The high energy content of the grease trap waste is advantageous to composting when high temperatures are needed to ensure pathogen reduction. The grease coats the bulking agent, which offers large surface areas for microbial decomposition in a compost pile. The high energy content encourages a more rapid rise in composting temperatures, which kills the pathogens that make humans ill (BioCycle, 2006). The large surface area accelerates the decomposition of the raw materials.

11.2 OSSF Wastes

On-site sewage facility (OSSF) septage is a slurry (solids content of only 3 to 10 percent) of organic and inorganic material. Septage includes pumpings from septic systems, aerobic treatment unit tanks, holding tanks, composting toilets, chemical or vault toilets, and other systems that receive domestic wastewaters. The exact composition of septage from a particular treatment system is highly dependent upon the activities and habits of its users**.** Table 3 lists the average metal concentration of septage (U.S. EPA, 1993).

Table 3. Comparison of Septage, Biosolids, and Regulatory Concentrations

Parameter	Concentration (mg/L)			
	Septage	Biosolids	Part 503 Limits	Grade 1 Compost
Arsenic	4	10	41	10
Cadmium	3	7	39	16
Chromium	14	120	1,200	180
Copper	140	740	1,500	1,020
Mercury	0.15	5	17	11
Nickel	1.5	43	420	160
Lead	35	130	300	300
Selenium	2	5	100	36
Zinc	290	1,200	2,800	2,190

mg/L = Milligrams per liter

Section 12. Generation Areas

12.1 Service Population

The Facility will serve at least the counties listed in Table 4. The total potential population serviced is 6,412,450 persons (U.S. Census, 2014).

Table 4. Service Area and Population

County	Population 2014	County	Population 2014
Austin	29,114	Grimes	27,172
Bastrop	78,069	Harris	4,441,370
Burleson	17,253	Lee	16,742
Chambers	38,145	Liberty	78,117
Colorado	20,719	Montgomery	518,947
Fayette	24,833	Waller	46,820
Fort Bend	685,345	Washington	34,438
Galveston	314,198	Wharton	41,168
		Total Serviced	6,412,450

12.2 Growth Trends

The U.S. Census Bureau estimates a rural population of 44 persons per square mile. The Austin County population in 2014 was 29,114 (34 percent urban and 66 percent rural); it was 23,590 in 2000 (City-Data 2015), indicating that the county's population has increased at an average rate of 23.4 percent per year from 2000 to 2014. Bellville is the county seat, and other municipalities in the county are Sealy, Wallis, Brazos Country, Industry, and San Felipe. The total area of Austin County is 663 square miles. Austin County is rural in nature, but is networked by two main thoroughfares: U.S. Interstate 10 (I-10) and State Highway 36. The manufacturing, trade, service, agriculture, and local government sectors fuel the county's employment. According to the Texas Labor Market Review for August 2015, Austin County has experienced a 2.0 percent to 3.2 percent job growth rate since 2014 compared to the 2.5 percent Texas average.

A series of aerial photographs (scale of 1 inch equals 2,000 feet) showing the property and areas within a 1-mile radius of the site boundaries are included in Appendix D. The quality of evaluation of aerial photographs is controlled by the photograph's scale and quality. The aerial photographs show the development of the area within 1 mile of the property during the years 1977 to 2014. These photographs indicate a slow growth of the agriculture, commercial, and manufacturing industries with minimal increase to residential development. The Facility is bordered to the north by Brazos 10 Lane and residential properties. A sewage chemical treatment production company (Pencco Sealy) is located northeast of the Facility. The Facility is bordered to the west by undeveloped land and wooded areas. The Facility is bordered to the south by Union Pacific Railroad, wooded areas, and I-10. The Facility is bordered to the east by a custom metal fabrication and manufacturing company (Ram Industries) and wooded areas.

Section 13. Land Use

13.1 Zoning

The Facility is located in an unincorporated area of Austin County, Texas; east of San Felipe, Texas. Neither the City of San Felipe nor Austin County has any zoning restrictions; therefore, there are no zoning restrictions within 1 mile of the Facility. However, the Austin County Planning and Development Department requires a permit application to be submitted for any development that occurs within the county. The permit application and guidelines for obtaining the development permit can be accessed at http://austincounty.com/default.aspx?Austin_County/Permits.

13.2 Land Use Characterization

Land use in the vicinity of the Facility was determined based on a review of U.S. Geological Survey (USGS) topographic maps, aerial photographs, Austin County tax records, and visual observations made from public roads. Land use within a 1-mile radius of the Facility is predominantly agricultural, with some commercial and light industrial sites located adjacent to the property and scattered residential sites (Figure 3).

The following summarizes the quantities of various land use types within 1 mile of the Facility:

- 86 agricultural properties;
- 38 residential properties;
- 11 commercial businesses;
- 3 commercial / industrial businesses; and
- 2 commercial / agricultural businesses.

There are no licensed day cares, cemeteries, schools, recreational sites, recreational facilities, or sites having exceptional aesthetic quality within 1 mile of the Facility. In summary, the area surrounding the Facility and property has a relatively low population density and is used primarily for agricultural purposes. According to the Texas Department of Transportation (TXDOT) Texas Airport Directory Map, the Facility is located approximately 14.87 miles southeast of Grawunder field (code: 06R). The presence and operation of a composting facility is fully compatible with this setting and land use.

A 30-foot easement for Brazos 10 Lane, located at the northern property line, is shown on the survey included in Appendix A. No other easements have been found on the property.

13.3 Site Soils and Geology

The U.S. Natural Resources Conservation Service (NRCS) Web Soil Survey (http://websoilssurvey.nrcs.usda.gov) for Austin County, Texas, was used to identify surface soils in the area of the proposed Facility. The predominant soil map units at the site are Lake Charles Clay, with 3 to 8 percent slopes, and Verland clay loam, with 0 to 3 percent slopes. Styx

loamy fine sand is mapped outside the northeast boundary of the Site with a slight incursion across the north boundary following a topographic contour. An NRCS Custom Soil Resource Report for Austin County, Texas, which presents site soil information, is included in Appendix E.

The Lake Charles series consists of very deep, moderately well drained, very slowly permeable soils that formed in clayey sediments. These soils are on broad, coastal prairies and are mainly in cultivated and native pasture. Common crops on these soils are corn, cotton, rice, and grain sorghum. Native grasses include little bluestem, Indiangrass, eastern gamagrass, switchgrass, big bluestem, and brownseed Paspalum. Most areas have scattered live oak, water oak, elm, hackberry, and huisache trees.

The Verland series consists of very deep, somewhat poorly drained, very slowly permeable soils. These nearly level to very gently sloping soils formed in clayey and loamy sediments of the Beaumont Formation of Pleistocene age. Most of the soil is used for pasture or for growing rice and soybeans. Native vegetation is tall prairie grasses consisting primarily of Andropogons, Paspalums, switchgrass, and Indiangrass. Various species of trees have encroached on some areas.

The Styx series consists of very deep, well drained, moderately permeable soils that formed in sandy and loamy sediments. These nearly level to gently sloping soils are on high stream terraces. Most areas are used for pasture. A few areas are used for growing small grains for cool season grazing and truck crop production. Native vegetation is mainly post and blackjack oak and greenbrier, with an understory of mid and tall grasses.

The Site is located within a stratified sequence of the Cenozoic Era, Quaternary System, and Holocene Group. Based on review of the Bureau of Economic Geology Geologic Atlas of Texas (Fisher, 1974), Seguin 1974 Sheet, the property is located on the Beaumont Formation outcrop. The lithology is dominantly clay and mud of low permeability. The clay has a high water-holding capacity, high compressibility, high to very high shrink-swell potential, poor drainage, and high plasticity. The formation thickness ranges up to 100 feet. Geologic and hydrogeologic information is further discussed in Part III of this application.

13.4 Waterways, Wetland, and Floodplain Use and Characterization

DBS&A personnel reviewed available USGS 7.5-minute topographic quadrangle maps for the site and vicinity, which indicates that the site is located on terrain sloping down to the north-northeast. Based on site observations, the general flow direction of stormwater run-off across the site appears to be in an east and northeast direction. Surface water drains as sheet flow to a man-made stock pond located at the eastern portion of the property. The property is located at the edge of a plateau with elevation of approximately 140 feet National Geodetic Vertical Datum. The Site is relatively level with some relief developing near the west, north, and east boundaries. The area north of the property descends to the Brazos River valley, with the Brazos River located approximately 2 miles east of the Site at its closest point. The nearest watercourse represented on the topographic map is an intermittent stream within the Brazos River valley approximately 0.3 mile north of the property that drains to an unnamed freshwater pond and a tributary to the Brazos River.

A Waters of the U.S. (WOTUS) and wetland determination was conducted at the Facility by W&M Environmental Group, LLC (W&M) in support of a biological assessment. The biological assessment report prepared by W&M and dated October 30, 2015 is included in Appendix F**.** As part of the WOTUS and wetlands determination, W&M reviewed several of the standard record sources for indications of streams and wetlands in the study area. Wetlands features are shown in a U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map in Figure 6. W&M reviewed the NWI for indications of wetlands on or adjacent to the study areas. The NWI map does not indicate the presence of wetlands on or adjacent to the property. The nearest mapped wetlands are represented within the Brazos River valley north of the property. Based on field observations conducted by W&M, one wetland was identified on the property within a swale in the eastern portion of the property and appears to be created by an excavation and impoundment (man-made pond) at the property. According to W&M, hydrology to the wetland appears to be provided by surface drainage from the property aided by a drainage swale through the cropland. The extent of the wetland as estimated by field observation and records review is 0.4 acre. The swales draining to the impoundment and on the downslope side of the impoundment do not have indications of ordinary high water marks or wetlands beyond the impoundment. The swales and wetland do not have a surface hydrologic connection or significant nexus to a downstream navigable water; therefore, they do not constitute jurisdictional WOTUS.

According to the Federal Emergency Management Agency (FEMA) map Panel 48015C0350E, panel 350 of 475, dated September 3, 2010 (Figure 7), the site is not located in a FEMA flood zone. No mitigation for construction or operation in a flood plain is required.

13.5 Groundwater and Water Wells

A Water Well Report prepared by Environmental Data Resources (EDR) (EDR, 2015a), included as Appendix G**,** reported two public drinking water supply wells, associated with one non-transient, non-community public water system, that exist in the investigative area (Figure 3) but are greater than 500 feet from the site. Additionally, both public supply wells are screened below 350 feet and pressure cemented to surface in accordance with TCEQ requirements.

The Water Well Report further identified 34 domestic, irrigation, and industrial use wells within the investigative area, ranging in depth from 50 feet to 300 feet (EDR, 2015a). None of these wells are within 500 feet of the site. The composting pad will not be located within a 250-foot buffer of private wells or 500 feet of public wells. Wells are documented on Figure 3.

A review of plugged well reports on the TWDB Groundwater Data Viewer revealed no plugged wells within 0.5 mile of the site and only one within the investigative area (TWDB, 2015).

13.6 Other Wells

An Oil & Gas report by prepared by EDR (EDR, 2015b), included as Appendix G, identified four locations in the investigative area and greater than 0.5 mile from the site associated with oil and gas activity (EDR, 2015b). Three of these wells were dry holes and one is listed as a canceled location. There are no American Petroleum Institute numbers registered to the records searched. These wells are plotted on Figure 3.

13.7 Structures and Site Proximity

The nearest occupied structures are residential buildings, owned by the property owner, located approximately 480 feet north of the Facility. The nearest business is Ram Industries, located adjacent to the eastern end of the eastern property line of the Facility. Recreational, community, daycare centers, hospitals, or school sites do not exist within 1 mile of the Facility.

13.8 Texas Historical Commission Review

A Texas Historical Commission (THC) review has been completed. According to the Texas Historic Sites Atlas published by the Texas Historical Commission, there are no documented historic properties such as cemeteries, museums, historical markers within 1 mile of the Facility. Mitigation for discovered significant sites includes facility set back and road design to eliminate surface disturbance in the significant site. This mitigation has been approved by the THC State Historic Preservation Officer, and a stamped approval form is including in Appendix H.

13.9 Compatibility

The surrounding land uses are agricultural, which will benefit from the Facility's composting operations. Storage and land application of animal waste is common in the surrounding agriculture operations. The residential population is sparse, on farming and ranching operations. The Facility is compatible with the surrounding land uses. The Facility will not impact wetlands, flood plains, or waterways.

Section 14. Water Quality

14.1 Construction Storm Water Discharge Permit

The Facility is required to submit a Notice of Intent (NOI) for the Construction Activity Storm Water Discharge Permit and obtain coverage under the TCEQ Construction General Permit (CGP) TXR150000 since the construction of the Facility will disturb fewer more than 5 acres of ground surface. A Storm Water Pollution Prevention Plan (SWPPP) will be developed to comply with the conditions of the CGP prior to submitting the NOI. Notice of Construction will also be posted.

14.2 Multi Sector Storm Water Discharge Permit

The Facility is required to submit an NOI for the Multi Sector Storm Water Discharge Permit. The NOI will be submitted electronically 24 hours prior to beginning operations. A SWPPP will be developed to comply with the conditions of the General Permit prior to submitting the NOI.

Section 15. Air Quality

15.1 Control of Airborne Emissions

Air emissions from MSW facilities will not cause or contribute to a condition of air pollution as defined in the Texas Clean Air Act. No specifically regulated airborne emissions are anticipated to be generated.

15.2 Minimizing Odors

Odors will be minimized through the use of best management practices (BMPs), including:

- Liquid feedstocks will be stored in enclosed aboveground storage tanks;
- Application of feedstock will not occur during high winds;
- Adequate bulking material will be used; and
- Bulking material will be turned or tilled immediately after feedstocks are applied.

In addition, an olfactory inspection will be performed daily to ensure that odors are minimized, as described in the Sampling and Monitoring section of Part IV of this application. Nuisance odors will be prevented from leaving the boundary of the Facility. If nuisance odors are found to be passing the Facility boundary, the OIC will suspend odor-producing operations until the nuisance is abated.

15.3 Control of Windblown Material

The feedstocks accepted at the Facility are aqueous and therefore not susceptible to being windblown. The bulking material to be used at the Facility consists of chipped and shredded wood and vegetative matter that is not very susceptible to being windblown. The Facility will not accept paper, cardboard, cloth, or other materials that would be more susceptible to being windblown. The application of feedstock and tilling of windrows will not be performed during periods of high wind. In the event that high winds should result in bulking material being blown from windrows or piles, the material will be picked up daily and returned to the windrows or stockpiles from which the material originated. Equipment engines will be maintained in good condition and will be well-tuned and serviced at manufacturers' recommended service schedules.

15.4 Authorizations and Permits

Construction will not begin until Air Quality authorizations to operate, listed below, are complete. Air Quality authorizations do not require registration or notification to TCEQ. This Facility is not a major facility or subject to prevention of significant deterioration review.

Permit by Rule (PBR) will be claimed by the Facility, and documentation will be maintained in the Facility records. The composting operation of the Facility meets all of the applicable PBR requirements and is entitled to this air quality standard permit authorization in lieu of obtaining an air quality permit under Chapter 116. The Facility will operate under the Composting

Standard permit 332.8 and will not hold concurrent Air Quality Permits under Chapter 116 for the composting operation.

The composting operation will comply with the general requirements in §332.4 and 332.8(e). The following authorizations, which meet the requirements of the Air Quality Standard Permit for composting, will be implemented.

A. All permanent in-plant roads and vehicle work areas will be watered or treated with dust-suppressant chemicals for maximum control of dust emissions. Vehicular speeds on non-paved roads shall not exceed 10 miles per hour.

B. An adequate volume of bulking material to blend with or cover the material will be on hand prior to receiving material with a high odor potential and will be processed within 72 hours to prevent nuisances.

C. All activities, such as turning of compost, that could result in increased odor emissions will be conducted in a manner that does not create nuisance conditions. SouthWaste will employ the following:

   - *On-site buffer zones for odor control:* The processing area will be set back from the road with at least a 50-foot buffer from the property lines.
   - Additional waste handling procedures, storage procedures, and cleanup procedures for odor control when accepting putrescible waste: Liquid waste will be stored in storage tanks and transported through pipes. Any spilled feedstock will be cleaned up within 48 hours.

The Facility has been designed to minimize exposure of putrescible waste to the air. Liquid feedstock transfer operations will be controlled to prevent release of nuisance odors to the atmosphere. Putrescible waste holding time will be limited to three days. Putrescible waste will be covered with a layer of wood chips to contain odor.

Section 16. Access Roads

The Facility will use the roads listed in Table 5 for access. Access roadways within 1 mile of the Facility are shown on Figure 8.

16.1 Roadway Data

The access roads to the Facility are I-10, Bartlett Road, and Brazos 10 Lane. Vehicles accessing the Facility are anticipated to arrive via Interstate Highway 10, exit onto and turn north on Bartlett Road, then turn west on Brazos 10 Lane for approximately 0.25 mile. The Facility is located on the south side of Brazos 10 Lane.

The conditions of the access roads are described in Table 5. DBS&A personnel an evaluated Bartlett Road and Brazos 10 Lane and reviewed the Austin County Road and Bridge Report for Precinct #4 (dated June 22, 2015) and information provided by the property owner. According to TXDOT (Yoakum District), no load limits are designated for I-10 and Bartlett Road.

Additionally, there are no proposed public roadway improvements or location restrictions for I-10 and Bartlett Road; therefore, coordination with TXDOT is not required. Brazos 10 Lane is a private road used by the property owner and tenants, including commercial/industrial facilities (Pencco Sealy and Ram Industries).

Table 5. Roadway Data

Roadway	Dimensions	Type of Road	Condition Score	Repairs	Source [a]
I-10	2 lanes (each direction) 14-foot lanes Center median Access roads	Asphalt pavement	Good	None	1
Bartlett Road	1 lane (each direction) 12-foot lanes No shoulders (2.83 miles)	Asphalt (blade mix overlay)	Fair / In need of repair	Filled potholes in 2015 with cold mix asphalt	2
Brazos 10 Lane	Private road 14 feet wide (0.35 miles)	Gravel	Good	None	3

[a] 1 = TXDOT Yoakum District
2 = Austin County Precinct 4
3 = DBS&A

16.2 Vehicular Traffic Volume

The initial volume of additional traffic generated by the Facility on the access roads to the Facility is estimated to be 10 vehicles per day. The maximum additional traffic projected at peak operation is estimated to be 50 vehicles per day.

The average daily traffic (ADT) on Bartlett road is based on the number of households and businesses that access the road. Bartlett Road traverses in a "horseshoe" like direction from two entry/exit routes on the I-10 frontage road; therefore, the ADT assumes that half the surrounding residences and businesses use the eastern entry/exit route, which is located near the Facility. Each household is expected to have an average trip of 3 trips per adult per day with an average adult population of 2 per household. Business traffic is approximately twice per day assuming 25 vehicles per business. Residential traffic access is approximated at 30 households, which is equivalent to 180 vehicles per day. Business traffic accounts for approximately 4 businesses, which is equivalent to 200 vehicles per day.

The population of Austin County is expected to grow at an average 7.24 percent annual rate to 2030 (Texas State Data Center, 2014). The projected traffic volumes presented in Table 6 were calculated assuming that traffic volumes would increase at this same rate over 20 years.

The projected traffic (10 vehicles per day) generated by the Facility represents approximately 2.76 percent of the current traffic on Bartlett Road and approximately 0.01 percent of the current traffic on I-10.

Given the limited traffic per day estimated to be generated by the Facility, no significant impact to the roadway system from traffic accessing the Facility is expected at either the existing or the future traffic loads. No measures, such as the construction of turn lanes or other road improvements, are predicted as part of this project.

Table 6. Vehicular Traffic Volume

Roadway	Existing Traffic	Projected Traffic in 20 years				Increased Traffic Due to Facility (%)	Source [a]
		Without Facility		With Facility			
	ADT	ADT	Annual Increase (%)	ADT	Annual increase (%)		
IH-10	52,805	56,628	7.24 [b]	56,638	7.25	0.01	1, 2
Bartlett Road	380	408	7.24 [b]	418	10	2.76	2
Brazos 10 Lane	Private road	—	—	—	—	—	—

[a] 1 = Texas Department of Transportation
2 = DBS&A
ADT= Average daily traffic
[b] Increase over 20 years

16.3 Facility Access Road Design Data

Brazos 10 Lane is a private gravel road that will provide access to the Facility access road. The Facility unloading areas will be constructed for wet-weather operational use.

The access road is provided with a sufficient turning radius of 300 feet to accommodate single deliveries. Vehicle parking is provided for equipment, employees, and visitors. Dust will be controlled by watering the Facility road when needed. Off-site mud tracking will be controlled by maintaining the entrance and loading areas. The access road has been designed to reduce ponding on the road. An inspection and maintenance program has been developed for the access road that will prevent rutting and potholes.

Clearly posted signage at the Facility entrance will specify a 10-mile per hour speed limit on the entrance road. The maximum speed allowed in the processing area will be 5 miles per hour.

16.4 Facility Impact on Roadway System

The current traffic consists of passenger vehicles, farm tractors, commercial transport trucks and trailers, agriculture transport tractor trailer rigs, and livestock/agriculture trailers. The Facility traffic will add passenger trucks and medium-size liquid and solid transport vehicles with 14.1-ton average and 21-ton maximum loads.

The impact on the roadway system is minimal. Due to the limited production, remoteness of the site, and low traffic volume, roads will not be significantly impacted by the additional traffic.

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Part III

Site Development Plan for a Composting Facility

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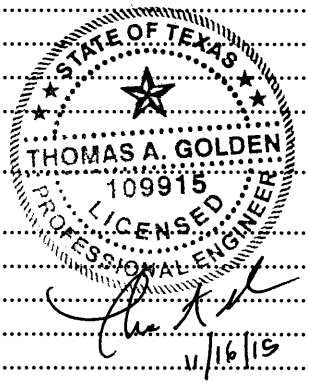
Part III Site Development Plan for a Composting Facility.



List of Requested Variances

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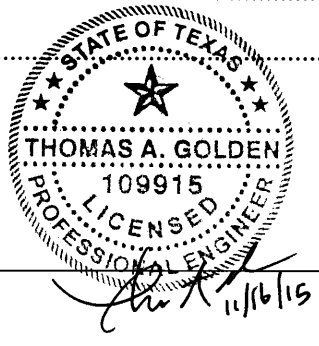

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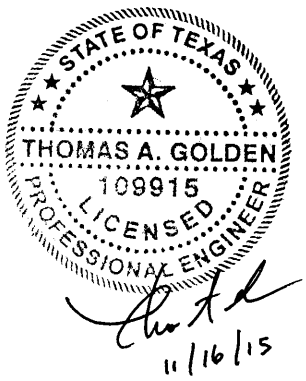
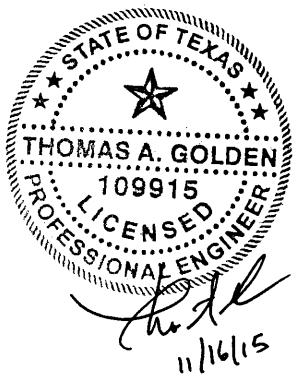
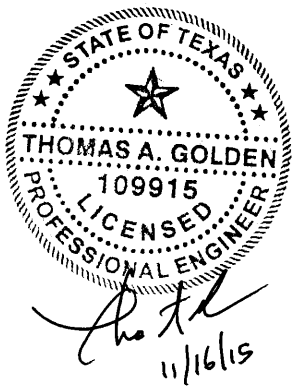


Acronyms

ADT	average daily traffic
ALU	aquatic life use
Avg	average
BACT	best achievable control technology
BOD	biological oxygen demand
CCN	Certificate of Convenience and Necessity
cfh	cubic feet per hour
cfm	cubic feet per minute
CR	County Road
CSAP	Closure Sampling Plan
EQ	exceptional quality
°F	Fahrenheit degrees
FM	Farm to Market Road
ft bgs	feet below ground surface
gpm	gallons per minute
hp	horse power
in	inch(es)
kips	kilo pounds per inch
MSS	maintenance, start up, and shut down
MSW	municipal solid waste
NAICS	North American Industry Classification System
NIST	National Institute of Standards and Technology
OSSF	on-site sewage facility
pci	pounds per cubic inch
plf	pounds per linear feet
psi	pounds per square inch
PWS	public water system



RCRA	Resource Conservation and Recovery Act
SC-SM	silty, clayey sand
SDS	safety data sheet
SIC	Standard Classification
SO_2	sulfur dioxide
SOP	Standard Operating Procedures
SSO	sanitary sewer overflows
SUD	Sewer Use District
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality (Executive Director)
THC	Texas Historical Commission
THSC	Texas Health and Safety Code
TMDL	total maximum daily load
TPDES	Texas Pollution Discharge Elimination System
TPH	total petroleum hydrocarbon
TSS	total suspended solids
TWC	Texas Water Code
TXDOT	Texas Department of Transportation
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VCP	Vector Control Program
VTCA	Vernon's Texas Codes Annotated
WoC	Wolfpen loamy fine sand
WSC	water supply company
WWTP	wastewater treatment plant
yd	yard(s)



Section 17. General Facility Design

17.1 Facility Plan and Facility Layout

Sheet 3 in the Drawings section shows the facility plan and layout including the permitted Facility, as well as the property boundary, fencing, internal roadways, the grease trap waste/septic/sewage sludge (GSS) processing area (as noted on that figure, tipping also occurs in this area, and there is not a discrete tipping area at the Facility), post-processing areas, structures, and other improvements to the property. In addition, DBS&A has prepared engineering design drawings showing the GSS composting pad layout and cross sections.

The following drawings are located in the Drawings section:

- Drawing 1 Title Sheet;
- Drawing 2 General Notes and Legend;
- Drawing 3 Site Plan;
- Drawing 4 Grading Plan and Profile - 1;
- Drawing 5 Grading Plan and Profile - 2;
- Drawing 6 Drainage Plan;
- Drawing 7 Civil Details; and
- Drawing 8 Drainage Details

17.2 Facility Access

17.2.1 Operator in Charge

The operator in charge (OIC) will be responsible for monitoring access to the Facility. The OIC will schedule deliveries to ensure staff supervises all unloading operations. Public Access will be prohibited and enforced by the OIC.

17.2.2 Operating Hours

The proposed operating hours are subject to approval by TCEQ for extended waste acceptance hours.

The waste acceptance hours will be between dawn and dusk Monday through Saturday. Operating hours for operating heavy equipment and transporting materials on-site or off-site will be Monday through Saturday from 7:00 a.m. to 7:00 p.m. When any alternative operating hours are employed, Facility personnel will record the dates, times, and duration in the site operating record.

17.2.3 Variance # 1

Variance #1: Extended Waste Acceptance Hours.

Since daylight hours (between dawn and dusk, Monday through Saturday) would ensure a safe operation, this Facility requires a waste acceptance variance for extended hours.

This variance would be appropriate due to the remoteness of the Facility. Consolidated feedstock from several sources is gathered in bulk and transported in liquid tankers. The extended hours would permit waste haulers to optimize their service routes and accommodate their customers by servicing their grease traps during non-peak hours between 3:00 and 5:00 p.m. Additionally, composting operations are sometimes performed outside standard operating hours, as required by weather or other factors.

Since the Facility is located in a sparsely populated area with 24-hour agribusiness operations, the additional hours will not impact area residents or businesses.

17.2.4 Facility Sign

A sign will be conspicuously display at the entrance to the Facility, measuring at least 4-feet by 4-feet with letters at least 3 inches in height, stating the Facility name, type of facility, standard hours of operation, the permit number, and Facility rules. The posting of erroneous or misleading information will be prohibited. The potential sign will contain at least the following:

- SouthWaste Sealy Composting Facility;
- Telephone number;
- Permit number;
- Check in at office; and
- No public access allowed.

17.2.5 Facility Access Control

Access to the Facility will be controlled to prevent disposal of unauthorized and prohibited materials and scavenging. The following measures will be implemented:

- At least one OIC will be present at the Facility during operations to monitor visitors or transporters.
- The Facility will be completely enclosed with a perimeter fence, consisting of a 4-foot barbed wire fence with lockable gates.
- The entrance and exit gates will be secured when the Facility is not operational.
- No Trespassing signs will be placed around the perimeter of the Facility.
- The fence, gates, and roads will be inspected on a weekly basis. Any access breach or unsafe condition will be repaired as soon as practical and noted in the Facility weekly log.

- A sign located at the entrance of the Facility will state that all visitors must check in at the office.
- Deliveries are scheduled by the OIC to facilitate orderly unloading.
- Unauthorized access will be prohibited. No public access is allowed.
- All truck traffic will be supervised by on-site personnel and must proceed directly to the loading and unloading areas.
- Only vehicles authorized by the OIC, personal vehicles of employees, and authorized haul vehicles will have access beyond the Facility entrance.
- All inbound and outbound traffic is closely monitored.
- Off-loading, loading, and processing preparation are limited to daylight hours.
- The Facility is located in a remote area. It is set back from Brazos 10 Lane with a landscape barrier that obscures the Facility from normal observation from the road, but maintains inspection capabilities by personnel from the road.
- At the Facility, transport units will be stored within the perimeter fencing and locked gate. The OIC will monitor the units. The cab will be locked. All valves will be locked to prevent discharge of liquids. Solid material will be covered.

17.3 Odor Control

Odors will be minimized through the use of best management practices (BMPs), including:

- Liquid feedstocks will be stored in enclosed aboveground storage tanks;
- Application of feedstock will not occur during high winds;
- Adequate bulking material will be used; and
- Bulking material will be turned and tilled immediately after feedstocks are applied.

In addition, an olfactory inspection will be performed daily to that ensure odors are minimized as described Sampling and Monitoring section in Part IV of this application. Nuisance odors will be prevented from leaving the boundary of the Facility. If nuisance odors are found to be passing the Facility boundary, the OIC will suspend odor-producing operations until the nuisance is abated.

The GSS processing area will be located in a remote area with at least 50-foot buffers to prevent creating odor nuisances.

17.4 Dust Control

No hoppers will be located or used for waste collection.

Dust will be controlled with water application, as needed. Graveled areas will be maintained to prevent rutting and potholes.

17.5 Storage Units and Equipment Details

17.5.1 Storage Units

Storage units will be purchased from a vendor and will be welded steel tanks that meet at least the standards contained in either (1) the American Petroleum Institute (API) Specification 12F - Specification for Shop Welded Steel Tanks for Storage of Production Liquids, or (2) the API Standard 650 - Welded Tanks for Oil Storage.

Tanks will be leak resistant, corrosion resistant, and designed to handle thermal stresses for outdoor storage at the Facility. Tanks are planned to be 750 barrels (or approximately 31,500 gallons), but will be no more than 2,000 barrels (840,000 gallons).

Storage tanks for untested, reclaimed water and liquid waste will be placed on a composite liner surrounded by clay berms designed to provide sufficient secondary containment for the largest tank volume, precipitation from the 25-year, 24-hour design storm, and an additional 1 foot of freeboard.

17.5.2 Compost Pad

The 11-acre GSS processing area includes an approximately 3.5-acre stormwater retention pond and a 7.5-acre compost pad. The entire area will include a composite liner as described in Section 22.1. The compost pad is designed to provide a footprint for approximately 20 windrows approximately 600 feet in length. Based on typical windrow dimensions, more than 100 tons of wood chips can be processed per operating day.

Pending the results of compost demand and feedstock availability, the liner for the compost pad is expected to be built in two phases. A temporary berm will be constructed between the two construction phases to the same specifications as the GSS processing area berms. The stormwater retention pond will be constructed during the first construction phase to handle stormwater run-off within the GSS processing area.

17.5.3 Auxiliary Equipment

An evaporator will be installed to enhance evaporation of accumulated stormwater in the stormwater retention pond. The unit will pump aloft up to 115,000 gallons per day. The unit converts water to a mist to accelerate natural evaporation processes. Based on site climate conditions, the unit is expected to eliminate up to 70 percent of the pumped water. Similar to a snow maker, the 40-horsepower motor throws water up to 60 feet in the air.

17.5.4 Feedstock Storage Area

The feedstock storage area is the receiving area for liquid waste transporters and the liquid feedstock storage area. The area is comprised of eight 31,500-gallon, welded steel storage tanks as specified in Section 17.5.1. Secondary containment for this area is described in Section 17.6.

The feedstock storage area is designed to hold a one day supply of feedstock at the maximum incoming daily rate, but will likely provide up to one week of storage under typical daily operations. Feedstock is transferred using the liquid transfer equipment.

17.5.5 Liquid Transfer Equipment

1. *Receiving Transfer.* The transport truck vacuum pump system or equivalent will be used to transfer liquid feedstock into storage tanks.

2. *Liquid Feedstock Transfer.* The Facility vacuum truck or equivalent will extract liquid feedstock from the on-site storage tanks. The pump system on the vacuum truck will be used to spray liquid feedstock directly onto prepared windrows of bulking material located within the processing areas.

17.5.6 Final Product Screening and Stockpile

Finished compost will be stockpiled in an approximately 3.5-acre area north of the compost pad. Assuming a 30 percent volume reduction for compost maturation and an additional 30 percent reduction for screening, the footprint for final product from the 7.5-acre compost pad will be approximately 3.7 acres. The final product area will hold approximately a 90-day supply of finished compost, pending delivery of final product to end users.

17.6 Containment Dikes or Walls

The secondary containment for the feedstock storage area is designed to hold at least the volume of the largest tank (31,500 gallons) and a 25-year, 24-hour rain event (8.5 inches). The secondary containment area will include a composite liner (geomembrane on top of a clay liner) and will be surrounded by compacted clay berms designed to minimize leakage in the event of a release of feedstock.

Section 18. Process Description and Controls

18.1 Process Diagrams and Drawings

This section specifically describes the GSS composting process at the GSS processing area. Composting of other approved materials will occur at either the GSS processing area or at other areas to the north and west, so long as it does not interfere with site drainage or wash off-site.

SouthWaste will perform GSS feedstock mixing, composting, and post-processing on the lined processing area (the lined pad used for composting and curing). However, as a part of this permit application, SouthWaste is requesting a variance from the Executive Director with regard to the screening and storage of finished compost and bulking material.

A process diagram that displays graphically the narratives is presented in Figure 9.

18.1.1 Variance #2

Variance #2: Storage of bulk material and finished Grade 1 or Grade 2 compost.

SouthWaste is requesting an approval from the Executive Director to chip/shred bulking material and screen and store finished Grade 1 or Grade 2 compost (not Waste Grade) at unlined portions of the Facility. Given that only GSS compost meeting the maturity requirements discussed in Section 18.6 and bulking material would be placed outside the liner in this manner, this should not result in any compromise to public health and safety. The finished materials are intended for use in landscaping, vegetable gardens, and similar uses; therefore, storage of these materials on the unlined ground surface should not represent any potential for damage or impact to groundwater resources. Bulk materials and finished compost managed and stored in lined areas would limit the Facility's composting efficiency, resulting in an unnecessary hardship.

18.2 Equipment

Table 7 presents the minimum amount of equipment normally on-site and the provided equipment's operational capacity to adequately conduct the operation in conformance with the engineering design and industry standard operating procedures.

Table 7. Equipment

Equipment Name	Min No.	Capacity	Function	Inspection and Maintenance
Self-Propelled Tiller (a.k.a windrow turner)	1	Up to 800-1000 m³/hour	Blends, mixes, and turns compost	▪ Inspect for hydraulic and oil leaks, water, and engine efficiency. ▪ Inspect for caked on residue. ▪ Repair per manufacturer's recommendations. ▪ Remove residue off blades.
Front-end Loader	2	Up to 15 m^3 bucket capacity	Compost and bulking material handling. Compost pad maintenance and spill and small fire control.	▪ Inspect for hydraulic and oil leaks, water, and engine efficiency. ▪ Repair per manufacturer's recommendations.
Excavator	1	Up to 190,204 lb operating weight	Compost and bulking material handling. Compost pad maintenance.	▪ Inspect for hydraulic and oil leaks, water, and engine efficiency. ▪ Repair per manufacturer's recommendations.
Dump Truck	1	Up to 70.5 tons carrying capacity	Compost and bulking material handling.	▪ Inspect for hydraulic and oil leaks, water, and engine efficiency. ▪ Repair per manufacturer's recommendations.
Chipper / Grinder	1	Up to 100 tons/hour	Chips and Shreds raw bulking material	▪ Inspect for hydraulic and oil leaks, water, and engine efficiency. ▪ Repair per manufacturer's recommendations.
Feedstock storage tank	8	31,500 gal	Hold liquid feedstock materials for processing	▪ Inspect piping, gaskets, orifices, and tanks for leaks. ▪ Repair per manufacturer's recommendation.

Table 7. Equipment (continued)

Equipment Name	Min No.	Capacity	Function	Inspection and Maintenance
Vacuum Truck or equivalent	1	Up to 7,000 gal	Unloads liquid feedstock into the storage tanks / distributes feedstock to windrows	▪ Inspect for hydraulic and oil leaks, water, and engine efficiency. ▪ Inspect for tank compartment for leaks. ▪ Repair per manufacturer's recommendations. ▪ Remove residue.
Water storage tanks	1	20,000 gal	Water storage	▪ Inspect piping, gaskets, orifices, and tanks for leaks. ▪ Repair per manufacturer's recommendation.
Pumps	1	Up to 300 gpm	Transfer liquid raw materials and products	▪ Inspect piping, gaskets, orifices, and motor. Repair per manufacturer's recommendation.
Water truck	1	3,000 gal	Dust control	▪ Inspect tanks for leaks. ▪ Inspect and Repair working parts per manufacturer's instructions.
Evaporator	1	115,000 gal per day	Enhanced evaporation of accumulated stormwater	▪ Inspect piping, gaskets, orifices, pump, and motor for leaks or corrosion. ▪ Repair per manufacturer's recommendation.

18.3 Feedstock Identification

An estimated 270,000 tons of feedstock will be composted annually. The largest portion of the incoming feedstock will be grease trap waste. Initially, incoming grease trap waste will be brown grease, but yellow grease processing may be included in future operations. A permit modification will be requested when this change is anticipated. The estimated quantity of incoming feedstock to be received is up to 930 tons per day (22,300 tons per month, assuming 24 operating days per month) or approximately 250,000 gallons per operating day (assuming 7.44 pounds per gallon typical for grease trap waste). Expected to account for less than 10 percent of the incoming feedstock at this Facility, the other feedstocks accepted at the Facility are:

- Municipal sewage sludge;
- Septate; and
- Dairy/food including meat and fish.

The bulking material used in the process will be chipped and shredded wood and vegetation. Bulking material will be either received already chipped and screened or will be received in raw form and chipped on the property. The Facility may generate approximately 5,200 cubic yards of finished compost per month. Chipping and shredding of bulking material is performed in an area outside the lined portion of the Facility. In addition, chipped and shredded bulking material may also be brought to the Facility from off-site locations. Energy and Mass Balance calculations for the GSS and non-GSS waste composting process are presented in Table 8. These calculations present the amount of product that will be produced based on anticipated amounts of bulking and feedstock materials.

Table 8. Energy and Mass Balance Calculations

Input Information	Calculations
Bulking Material Calculations:	
▪ 1,600 cy wood chips in each windrow x 20 windrows ▪ Process requires approx. 90 calendar days to mature	▪ 32,000 cy of chips on pad (=1,600 cy chips per windrow * 20 number of windrows) ▪ 356 cy chips used / calendar day (=32,000 cy / 90 calendar days) ▪ 8,000 tons chips / 90 days (=32,000 cy * 0.25 ton / cy) ▪ 111 tons chips / operating day (=8,000 tons / 3 months / 24 operating days per month ▪ 2,667 tons chips / month (=8,000 tons / 3 months)
Feedstock Calculations:	
▪ 250,000 gal of feedstock I operating day applied to windrows	▪ 930 tons per operating day of feedstock coming in (=250,000 gal * 7.44 lb per gal / 2,000 lb per ton) ▪ 22,320 tons per month of feedstock coming in (=930 tons * 24 operating days per month) ▪ 66,960 tons of feedstock coming in / 90 days (=22,320 tons per month * 3 months) ▪ 267,840 tons per year of feedstock coming in (=22,320 tons per month * 12 months) ▪ 6,000,000 gal / month of feedstock (=250,000 gal * 24 operating days per month)
Product Calculations:	
▪ 30% volume reduction during composting for maturation ▪ ▪30% further volume reduction when screened	▪ 32,000 cy of chips on pad in 90 days ▪ 22,400 cy of compost / 90 days (after 30% reduction for maturation) ▪ 15,680 cy of finished compost / 90 days (after additional 30% reduction for screening of mature compost) ▪ 5,227 cy finished compost / month ▪ 62,720 cy finished compost / year ▪ 29,792 tons of finished compost / year (assuming a finished compost unit weight of 950 lb / cy) ▪ 2,483 tons of finished compost / month ▪ 83 tons of finished compost / calendar day

Assumptions: 7.44 lb / gallon feedstock
950 lb / cy compost
0.25 ton / cy chips
24 operating days / month
12 months / year

Conversion Factors: 2,000 lb / ton
7.48 gal / cf

The operator will visually examine the feedstock during transfer and processing to remove visual un-compostable material (unauthorized materials). Coarse straining may be used to remove non compostable materials in liquid raw material.

The Facility will not accept household wastes, source-separated recycling, or related materials.

18.4 Receiving/Tipping Process

18.4.1 Feedstock

Both pre-chipped and shredded bulking material and raw bulking material will be delivered by truck to the Facility. Raw bulking material will be stored and then chipped and screened in an on-property area east of the processing area (Sheet 3). The Facility will be equipped with a

chipper/grinder to chip and grind raw bulk material. The chipper/grinder will be equipped with low-velocity spray nozzles to minimize the generation of dust during operation. The chipped and shredded bulking material will be placed on the processing areas in windrows using a front-end loader.

Feedstock is received at the Facility by tanker trunks. The liquid feedstock will be either pumped into one of eight 31,500-gallon aboveground storage tanks for temporary storage or pumped to the Facility vacuum truck or equivalent to be sprayed directly onto prepared windrows of bulking material located within the processing areas. The storage capacity of the aboveground tanks will allow the liquid feedstocks to be applied in a consistent manner and provide additional feedstock storage capacity that can be used during periods of rainfall that limit feedstock application. No feedstock will be accepted in excess of the available capacity of the storage tanks. The OIC monitors traffic and off-loading to prevent spills, leaks, and unauthorized materials or dumping. A Manifest or Bill of Lading is required for each load that describes the load's source, contents, and volume. Haulers are required to have the appropriate licenses or registrations.

Due to the way the liquid feedstocks are handled, the potential for spillage outside the lined processing area will be minimal. In the event that liquid feedstock is spilled outside the composting pad, the feedstock and affected surface soils will be promptly recovered using a front end-loader and incorporated into the composting process. In the event that bulking material is spilled onto the ground, it will be promptly recovered with a front-end loader and returned to the windrows. The front-end loader and shovels will be used daily to maintain the tipping area and windrows.

18.5 Processing

18.5.1 Material Processing

Feedstocks will be applied to the windrows using a vacuum truck or equivalent equipped with a 3- or 4-inch hose. Once the feedstock is applied to a windrow, the windrow will be immediately turned, mixed, and re-homogenized using a self-propelled tiller to thoroughly mix feedstock and bulking material. This process allows the feedstocks to be evenly distributed through the windrows and prevents moisture or liquids from collecting at the base of the compost material.

Once tilled, the windrows will be monitored to ensure the moisture content and carbon to nitrogen ratio are consistent to maintaining adequate composting. Measurements of nitrogen and carbon ratios will be monitored daily.

The desired initial moisture content of the compost is 40 to 60 percent by weight. Moisture content will be evaluated and measured daily. Moisture content will be determined during the composting process using the "squeeze test." The squeeze test is performed by manually gathering and squeezing a handful of the compost material. If water drips out while the compost is under hand pressure, the material is too wet. If the material crumbles apart when the pressure is released, it is too dry. Squeeze test samples will be collected from varying depths and areas of the windrows to evaluate the moisture content throughout the windrow. High moisture contents will be corrected by adding additional bulking material and/or by additional tilling. Low

moisture content will be corrected by adding potable water, liquids collected in the retention pond (for GSS composting only), or liquid feedstock, and then tilling.

Once a windrow is considered to have the appropriate moisture content and mixture of bulking material and feedstock, it will be monitored for 15 days. During the monitoring period, the windrow temperature will be measured and recorded regularly using a bi-metal thermometer with a 4-foot probe. Temperature measurements will be collected every 5 to 10 feet along the length of the windrow at a depth of approximately one-third of the windrow height. A temperature of at least 55 degrees centigrade (131 degrees Fahrenheit) will be maintained during the monitoring period. During the 15-day monitoring period, the windrow will be turned a minimum of five times to maintain an even temperature throughout in order to aid in consistent, thorough composting and to reduce pathogens. The temperature will be measured and recorded each time the windrow is turned during the monitoring period. Once the 15-day monitoring period is completed, the composted material will enter the post- processing phase.

In order to avoid contaminating the final product, no feedstocks or retention pond liquids will be added to a windrow once it enters the monitoring period. In the event that additional feedstocks are inadvertently added to material during the monitoring period, the monitoring period for that material will start over.

18.6 Post-Processing

After the monitoring period, the final GSS product will be placed in a stockpile on the lined processing area for a curing period of at least 60 days. Each batch of final product will be placed in a separate stockpile and assigned a batch number. Each batch will be physically separated to prevent co-mingling of different batches. Each batch will be tested for maturity and final product parameters as described in Section 35.4 in Part IV of this application and will then be assigned a final product grade as described in Section 35.4.2 in Part IV of this application.

Batches that do not meet the maturity parameters will remain on the processing area and continue to be monitored until the maturity parameters are reached. Batches that meet the maturity parameters but do not meet the final product parameters for either Grade 1 or Grade 2 compost (Waste Grade compost) will be disposed off-site at an authorized municipal solid waste facility.

Cured compost meeting either Grade 1 or Grade 2 maturity parameters will be processed through a ½-inch screen to remove over-sized material in the post-processing area outside the lined composting pad. Over-sized material separated during screening will be returned to the windrows to be re-composted.

18.7 Product Distribution

18.7.1 Compost

Compost is currently sold only in bulk form. At some point in the future, the Facility may sell containerized compost. Bulk product will be loaded into the purchaser's truck using a font-end loader. The Facility anticipates producing approximately 62,700 cubic yards annually of

Grade 1 compost material at peak production (produced from 2,700 tons per month of wood chips and up to 22,300 tons per year of incoming liquid feedstock). The Facility does not currently plan to produce any Grade 2 compost, but may at some time in the future. Grade 1 and Grade 2 compost products will not be tracked. The batch number, the permit number of the disposal facility, dates, and the disposed volumes will be tracked for all batches of Waste Grade compost (i.e., compost to be disposed off-site). The product parameters for each grade of compost are described in Part IV of this application.

All compost sold will be labeled in accordance with 30 Texas Administrative Code (TAC) §332.74. Compost sold in bulk form will be labeled in the form of vouchers. A voucher will be provided to the buyer with each load of compost. In the future, if the Facility elects to sell compost in containers, a label will be attached to each container. Each voucher and label will include the following information grouped together and printed in both English and Spanish:

1. *For Grade I Compost*: "This product is considered Grade 1 Compost and meets the requirements and standards described in 30 Texas Administrative Code, §332.72 and has unrestricted use. It is recommended that compost be mixed into the top 6 inches (15 centimeters) of soil."

   For Grade 2 Compost: "This product is considered Grade 2 Compost and meets the requirements and standards described in 30 Texas Administrative Code, §332.72 and cannot be used at a residence or licensed child-care facility. It is recommended that compost be mixed into the top 6 inches (15 centimeters) of soil."

2. *Feedstocks from which the compost was derived (grease trap waste, etc.)*. Feedstocks will be listed in descending order of predominance by wet weight. (Added water is not considered a feedstock.)

18.8 Sanitation

18.8.1 Run-on and Run-off Control

The Facility is designed to control rainfall run-on and run-off. A raised railroad adjacent to the south property boundary and an elevated roadway for Bartlett Road adjacent to the east property boundary will minimize the amount of run-on to the site. The GSS processing area (i.e., the lined pad used for composting and curing) is self-contained (i.e., surrounded by berms that prevent run-on) and is sloped toward a stormwater retention pond on the west side of the bermed area to collect run-off from the composting area. Perimeter berms along the west and north property boundary will be used to route on-site run-off to a central point of concentration near the Facility access gate (north of the office). This centralized location will aid stormwater monitoring without increasing run-off north of the site. This will also improve stormwater management as pre-construction run-off from this property was routed through the residential property to the north.

Secondary containment surrounding the liquid feedstock tanks will allow stormwater to be monitored prior to being repurposed. Pending inspection, accumulated stormwater from the liquid feedstock area will either be applied to the windrows or discharged to the stormwater retention pond.

18.8.2 Cleaning Equipment and Connections

SouthWaste intends to install at least one potable, non-public supply water well to supply water to the office and maintenance building. The water well plumbing will be equipped with multiple connections to distribute water to support the composting process. These water connections will be equipped with a back flow check valve to prevent cross contamination. One connection will be used for weekly cleanup activities which may include sweeping, mopping, and/or washing down with water. A pressure washer will be used periodically to remove residuals not removed with the more conservative cleaning methods. The operator may hire a contracting company to perform the pressure washing, as needed.

18.9 Non Hazardous Waste Storage and Disposal

18.9.1 Non-Hazardous Waste

Solid waste will be stored in a dumpster. Non-hazardous wastes will be transported and disposed of at a permitted landfill on an as needed basis.

18.9.2 Hazardous Wastes

Every effort will be made to exclude hazardous material from the processing system, but in the unlikely event that hazardous wastes are generated, the OIC will apply for a "One-Time Waste Shipment" registration. Hazardous waste will be transported and disposed of at a permitted hazardous waste facility.

Section 19. Endangered Species Protection

DBS&A contracted W&M Environmental Group, LLC to conduct a biological assessment (BA) for the Facility. The BA included review of multiple records, site reconnaissance, and interviews with agency representatives to identify whether the proposed activity associated with the composting permit/operations would have an effect on state or federally listed threatened, endangered, or candidate species or critical habitat. The BA evaluated the potential effects of the proposed action (i.e., construction and operation of the Sealy Composting Facility) on listed and candidate species and listed and proposed critical habitats to determine whether any such species or habitat are likely to be adversely affected by the action, in accordance with the requirements of the Endangered Species Act (ESA) and Title 30 of Texas Administrative Code TAC §330 (municipal solid waste [MSW] permits). The BA was used to determine whether formal consultation (with state and federal wildlife agencies) or conference is necessary. The BA is to be reviewed by state agencies and does not require a full National Environmental Policy Act (NEPA)-compliant review. The BA reported that none of the listed or candidate species with current or historical ranges near the Facility would be negatively affected by the proposed project and no critical habitat for listed or candidate species would be impacted by the proposed development. The BA report is included as Appendix F.

The BA has been submitted to the Texas Parks and Wildlife Department (TPWD) Wildlife Habitat Assessment Program for their review and approval. The TPWD received the BA on

November 2, 2015 and has indicated a 45-day review period. The results of the BA are summarized on the TPWD Review Request Form in Appendix A of the BA report (Appendix F).

The Facility is designed to limit the alteration or modification of a potential habitat. To prevent alteration or adverse modifications of a potential habitat and/or endangering an encountered endangered species, the following precautions will be applied during construction:

- Trees and natural vegetation will be maintained as practical.
- Construction workers will be trained to identify endangered species.
- If an endangered species is encountered during a construction activity, and the construction activity endangers it, that construction activity will cease, the owner will be notified, and mitigation will be developed.
- If trees and vegetation must be removed for fire protection and/or safety, the removal will avoid the migration or nesting times of known species.
- During Facility operations, trees and vegetation will only be removed if they pose a fire, vector, or safety concern. The Facility will manage trees and vegetation to prevent potential fires and control vectors in a manner that will not alter or adversely modify any potential habitat.

Section 20. Surface Water Protection Plan

20.1 Run-On and Run-Off Management System

The Facility is designed to control rainfall run-on and run-off. A raised railroad adjacent to the south property boundary and an elevated roadway for Bartlett Road adjacent to the east property boundary will minimize the amount of run-on to the Facility. The GSS processing area (i.e., the lined pad used for composting and curing) is self-contained (i.e., surrounded by berms that prevent run-on) and is sloped toward a stormwater retention pond on the west side of the bermed area to collect run-off from the composting area. Perimeter berms along the west and north property boundary will be used to route on-site run-off to a central point of concentration near the Facility access gate (north of the office).

The composting process is performed and managed so that leachate should not be produced by the application of feedstocks. However, in the event that leachate is produced by direct rainfall, it will be contained within the processing area by the engineered composite liner system and stormwater retention pond. Details of the berms, composite liner system, and retention pond that provide run-on and run-off control for the processing area are included in the Drawings section.

The GSS processing area stormwater retention pond was sized to contain a 25-year, 24-hour rainfall event on the composting pad. In addition to the minimum capacity needed to contain this design storm (approximately 2.5 million gallons), the 3-acre stormwater retention pond has more than 5 million gallons of additional surplus capacity. Given the nature of the Facility's setting (i.e., net evaporative based on mean precipitation and evaporation data), the pond is not

anticipated to accumulate significant volumes of water. However, the pond has been designed to maintain sufficient capacity to handle a series of larger rainfall events. If it does become necessary to remove liquids from the pond to maintain capacity, an enhanced evaporation unit (e.g., Turbomist Model S30L or equivalent) will be installed at the northwest corner of the stormwater retention pond. These units throw water into the air to produce water droplets, which significantly increases the net evaporation rate over a static pond water surface. Up to 115,000 gallons can be pumped aloft by a single unit, which can eliminate 30 to 70 percent of the pumped water volume, depending on current environmental conditions. This translates to removal of 1 to 2.5 million gallons per month. Pond liquids will also be used as needed to adjust the moisture content of composting materials. Evaporation and the use of pond liquids in the composting process are the primary means of maintaining adequate capacity in the pond. If this approach is inadequate to maintain capacity, then water will be pumped from the pond and trucked to a permitted off-site treatment facility.

Currently on-site drainage includes three primary drainage reaches (Figure 10). On the west side of the site, stormwater flow is directed off-site to the northwest to natural drainage features located on adjacent properties and then to an unnamed tributary to the Brazos River. Run-off from the central portion of the property travels to the north through existing residential property prior to discharging to the same unnamed tributary to the Brazos River. The eastern portion of the property drains to an on-site, man-made stock pond along the eastern property boundary.

Following construction of the Facility, stormwater outside of the GSS processing area will either be collected in a single ditch along the north property boundary or allowed to drain to the existing stormwater pond (Figure 11). The northern portion of the site will be regraded to direct all stormwater from west to east to a single discharge point located near the Facility access gate. This centralized location will aid stormwater monitoring without increasing run-off north of the site (due to a reduction in contributing acreage, the peak flow decreased by nearly 18 percent). This will also improve stormwater management by re-routing run-off around the existing residential property to the north. Run-off from the eastern portion of the property will continue to be directed to the on-site stormwater pond. An overflow culvert will be added under the Facility access road to direct stormwater into the ditch along the north property line.

Run-off from the ditch will be directed through a 12-inch-diameter corrugated high density polyethylene (CHDPE) culvert system and riprap outfall structure to existing drainage ways. The proposed locations of the stormwater collection ditch and outfall structures are shown on the drainage plan drawing (Sheet 6). Cross sections of the ditches and details of the riprap outfall structures are also provided in the Drawings section. Stormwater calculations are provided in Appendix I. The riprap outfall structures will separate and trap suspended material while allowing controlled discharge of stormwater.

Stormwater collection ditches will be periodically inspected, cleaned, and regraded as necessary to maintain unobstructed flow. Riprap outfall structures will be inspected following each rain event. Sediment and other materials trapped at the rock outfall will be removed before the material accumulates to a depth equal to one-fourth the outlet height.

Chipped and shredded wood materials are used for temporary erosion control as needed outside the lined and bermed GSS processing area. In addition, the elevated railway and roadway

upgradient from the site will minimize run-on, reducing potential erosion of on-site surfaces. Within the GSS processing area, the composite liner system includes base coarse and filter fabric designed to reduce erosion of materials above the geomembrane.

20.2 Drainage Calculations

Retention pond sizing calculations are presented in Appendix I. The required minimum volume of the pond was determined using the Natural Resources Conservation Service Curve Number method and the 25-year, 24-hour design storm. This precipitation amount was determined based on the United States Geological Survey (USGS) Depth-Duration Frequency Atlas for Texas published in 2004 in cooperation with Texas Department of Transportation (TxDOT) (USGS, 2004). The retention pond volume was then increased to handle a series of larger rainfall events.

As specified in the TxDOT Bridge Division Hydraulic Manual (TxDOT, 2011), drainage calculations for determination of peak run-off using the Rational Method are also presented in Appendix I for both pre-construction and post-construction conditions. The 25-year design storm most similar to the time of concentration was used to determine peak flow. The self-contained GSS processing area reduced the area contributing run-off to the point of concentration; therefore, construction of the Facility is not expected to impact downgradient properties.

20.3 Erosion Control

Erosion and stormwater controls consist of earthen berms constructed around the perimeter of the processing area and along the western and northern Facility boundaries. In addition, one primary stormwater collection ditch will be used in conjunction with existing drainage features to collect and control run-off from the areas of the Facility lying outside the lined and bermed GSS processing area. These features have been designed to reduce stormwater flow velocities to minimize erosion and scour.

Given the physical and chemical nature of the materials stored in these areas (i.e., wood chips, brush, and mature compost), these materials are not anticipated to be capable of generating leachate that contains dissolved chemicals of concern. However, there is some potential that stormwater run-off may suspend particles of mature compost or wood chips. The stormwater collection features outside the processing area are designed to collect and control both stormwater and any entrained and suspended particulates, and to control the migration of suspended particulates beyond the Facility boundaries.

20.4 Drainage Maps and Plans

Pre- and post-construction on-site drainage maps are provided as Figures 10 and 11. Plan and profile drawings of the Facility GSS processing area and retention pond are included as Sheets 4 and 5 in the Drawings section. Cross sections of proposed stormwater collection ditches and rock outfall structures are also provided in the Drawings. There are no areas of the property that lie within the 100-year flood plain or contain wetlands. Wetlands features are shown in a U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) map in Figure 6. According to the NWI map, the site is not located in a NWI area.

According to the Federal Emergency Management Agency (FEMA) map Panel 48015C0350E, panel 350 of 475, dated September 3, 2010 (Figure 7), the site is not located in a FEMA flood zone. No mitigation for construction or operation in a flood plain is required.

Section 21. Geological Report

The geologic/hydrogeologic report was prepared by Beronica Lee-Brand, a State of Texas Licensed Professional Geoscientist (TX PG #10465). The following sections discuss the general geologic and hydrogeologic conditions in the vicinity/region of the property and also site-specific conditions beneath the proposed Facility from data collected during the subsurface investigation.

21.1 Regional and Local Geology/Hydrogeology

According to the Bureau of Economic Geology, Geologic Atlas of Texas, Seguin Sheet (1974), the property is located within the Beaumont Clay Formation (Pleistocene) and is surrounded by Quaternary-age lithology. A portion of that sheet, showing the location of the property, is provided as the geologic map for this application (Figure 12). The Oligocene-aged sediments make up the base of the Gulf Coast Aquifer in Texas and include the Tertiary rocks into the Frio Formation, the Anahuac Formation, and the Catahoula Tuff or Sandstone (early Miocene); the Oakville Sandstone and the Fleming formation (mid- to late-Miocene); the Goliad Sand (Pliocene); the Willis Sand, Lissie Formation, and the Beaumont Clay (Pleistocene); and the alluvium (Holocene) (Baker, 1979). A regional stratigraphic column showing hydrostratigraphic divisions for corresponding stratigraphic units is provided on Figure 13 (Baker, 1979).

The Gulf Coast Aquifer is a major aquifer that underlies the Facility; no minor aquifer underlies the Facility. The Chicot Aquifer is the shallowest unit of the Gulf Coast Aquifer. The Gulf Coast Aquifer forms an irregularly shaped belt that parallels the Texas coastline and extends northeastward to the Louisiana border. Groundwater quality in the Gulf Coast Aquifer is generally good northeast of the San Antonio River but declines to the southwest. There are multiple water wells within a half mile of the Facility completed in the Gulf Coast Aquifer, as discussed in Section 21.4. The well reports and boring logs presented in the Environmental Data Resources (EDR) half mile and mile radius water well report indicate alternating clay and sands down to over 200 feet (Appendix G).

Locally and regionally, the Beaumont Formation sand bodies are isolated in floodplain muds and lack the interconnected sand bodies that exist in the Lissie Formation; because of this, the Beaumont Formation provides a measurable amount of protection to water level change by hydraulically isolating shallow wells completed within the Beaumont Formation [e.g., wells screened less than 200 feet below ground surface (ft bgs)] from the underlying Lissie Formation (Young, 2015).

21.2 Subsurface Soil Investigation

As described in Section 21.1, the Beaumont Formation is found at the surface at the Facility. The Beaumont is composed of clay-rich sediments transected by sandy fluvial and deltaic-

distributary channels (Young, 2012). The Geologic Atlas of Texas (GAT sheet) (Fisher, 1974) described the Beaumont Formation as clay, silt, and sand with concretions of calcium carbonate, iron oxide, and iron-manganese oxides common in zones of weathering with a thickness of about 100 feet. Two subunits are distinguished in the Seguin Sheet: (1) dominantly clay and mud of low permeability; and (2) dominantly clayey sand and silt of low to moderate permeability.

As part of this permit application, a boring plan was prepared by DBS&A on July 22, 2015 and revised on October 14, 2015 in accordance with Title 30 of the TAC, Chapter 332.47 (30 TAC 332.47), specifically, Part (6)(B)(iv) of 30 TAC 332.47 (DBS&A, 2015). On October 26, 2015, the boring plan was approved by the TCEQ (Tracking Number 19844155). The approved boring plan is included as Appendix J.

The data acquired from the subsurface investigation were used to support the completion of this Geologic/Hydrogeologic evaluation, including design and installation of required piezometers [proposed Part (6)(B)(v)], completion of a groundwater investigation report [proposed Part (6)(B)(v)], and development of a groundwater monitor system [proposed Part (6)(C)(ii)].

The subsurface investigation was conducted on two occasions during September and October 2015. As part of the investigation, five soil borings were installed at the Facility using hollow-stem auger drilling methods. Each boring was logged in order to characterize soils, collect geotechnical samples, and characterize the shallow groundwater-bearing unit encountered below the property.

Currently, the western portion of the property contains thick grasses and large pecan trees, and the east side of the Facility contains plowed fields. Soil borings SB-1 and SB-4 were installed in the western portion of the Facility and SB-2, SB-3, and SB-5 were installed on the eastern portion of the Facility. The borings were located at the boundaries of the proposed composting pad and were converted to 2-inch-diameter monitoring wells for future groundwater monitoring locations. Sheet 3 illustrates the surveyed locations of the monitoring wells.

The borings were advanced using 8¼-inch-outer diameter hollow stem augers. A 5-foot, 3-inch-diameter core barrel was advanced inside of the augers to allow for continuous sampling, and a 2.5-foot, 3-inch-diameter Shelby tube was advanced in front of the augers to allow the collection of geotechnical samples. Soil cores were inspected by the DBS&A geologist and screened for the presence of hydrocarbons using a photoionization detector (PID) with an 11.2-electron volt lamp. There were no elevated PID responses for any interval of any boring. During the field exploration activities, the DBS&A geologist recorded detailed soil descriptions using the Unified Soil Classification System, including the symbol, soil type, color, texture, grain size, sorting, plasticity, and moisture content. Soil borings SB-1 and SB-5 were continuously logged using the core barrel sampler. SB-2 was continuously logged down to 10 feet and then logged by observing the soil cuttings at surface as the augers were advanced to desired depth. SB-3 and SB-4 were logged using soil cuttings only.

Organic soil with sand was encountered at each boring ranging from 1 to 1.5 ft bgs. Below the organic soils, silty and lean clays of low to moderate permeability were logged to a depth of 6 feet at SB-1, 9 feet at SB-2, 15 feet at SB-3, 15 feet at SB-4, and 12 feet at SB-5. Silty and poorly graded sands with silt and gravel were encountered at each boring below the silty and lean clays. At each boring, sands extended down to 85 feet in SB-1, 82 feet in SB-2, 81 feet in SB-3,

83 feet in SB-4, and 82 feet in SB-5. Below the sands, a clay with gravel layer was encountered followed by a stiff, waxy clay at each boring. A claystone was encountered at 87.5 feet in SB-5. Cross sections using the information from each boring and depicting the generalized strata are presented on Figure 14. Boring logs are provided in Appendix K. Based on the information obtained from the soil borings, DBS&A confirms that the Facility overlies the Beaumont Formation as shown by the alternating fine grained clays, silts, sands, and some gravel. The evaluation of the five soil borings indicated no underlying hydraulically interconnected aquifers below the Facility. A discussion of the confining unit identified at the Facility is provided in the Section 21.3 and 21.5.

21.3 Subsurface Soil Investigation

Following soil boring installation and sampling, each boring was completed as a permanent above-grade monitoring well (SB-1/MW-1 through SB-5/MW-5). MW-1, MW-2, MW-3, and MW-4 were screened from 45 to 65 ft bgs. MW-5 was screened from 49 to 69 ft bgs. Well completion diagrams are included on the boring logs provided in Appendix K. The wells were completed with 20 feet of 2-inch-diameter, 0.010-inch slotted polyvinyl chloride (PVC) screen, and sufficient 2-inch-diameter PVC riser pipe to extend from the top of the well screen to approximately 3 feet above the ground surface. The well screen was set to straddle the top of the saturated zone, extending at least 15 feet below the observed saturated zone. A graded clean silica sand filter pack was emplaced in the annulus of the screened interval from the total depth of the soil boring to approximately 2 feet above the top of the screened interval. A hydrated bentonite seal was placed above the sand filter pack.

On October 16, 2015, static water levels from ground surface were measured at 48.00 ft bgs at MW-1, 51.48 ft bgs at MW-2, 58.17 ft bgs at MW-3, 49.83 ft bgs at MW-4, and 56.75 ft bgs at MW-5. The average groundwater gradient at the Facility is 0.00086 feet per foot and flow is to the south (Figure 15). In preparing the boring plan for this Facility, surrounding water well reports were reviewed and a generalized cross section was prepared (Figure 16). Based on the generalized cross section A to A', it appears that there are multiple confining clay units below the shallow groundwater bearing unit at the Facility. As shown in Table 9, the surrounding wells are screened at much deeper depths than the on-site monitoring wells, but static water levels range from 30 to 95 ft bgs, indicating a shallow confined groundwater bearing unit. This is consistent with the Beaumont Formation description in Section 21.1 having isolated sand bodies in flood plain muds. The geotechnical sample results are discussed in Section 21.5.

The groundwater data collected from the Facility to date and in the future will be used to establish and present the groundwater flow characteristics at the site, including groundwater elevation, groundwater gradient, direction, flow characteristics, and most likely pathway(s) for potential pollutant migration.

Table 9. Surrounding Well Information

Well ID	Distance to Site Boundary (mile)	Well Depth (ft bgs)	Static Water Level (ft bgs)	Confining Clay Interval (ft bgs)	Screen Interval (ft bgs)
228635	0.49	200	66	101-163	166-186
113203	0.22	307	95	98-120	287-307
8(5)	0.06	160	60	80-110	140-160
53981	0.04	368	70	92-150	379-389
82106	0.16	271	55	105-125	217-267
284690	0.4	216	30	80-100	205-215
66168AA	0.61	143	55	83-134	135-143

21.4 Surrounding Water Wells

Well data for wells within one mile of the site were aggregated from various sources by EDR and presented in the Texas Water Well Report (2015a) and the Texas Oil & Gas Report (2015b). Additional research was conducted by DBS&A personnel using the TWDB's Water Data Interactive viewer to expand the search radius slightly to encompass an area one mile from the site boundary, rather than the site center. Some older wells found in the TWDB groundwater database are identified by an eight-digit well identification (ID) that corresponds to the specific State Well Grid number in which the well is located and the order in which the well was cataloged. Other wells are identified by a five- or six-digit State of Texas Well Report Tracking Number. All other wells have either incomplete well IDs or no ID associated with them and were assigned map IDs by EDR. The present use of groundwater withdrawn from aquifers in the vicinity of the Facility is domestic, irrigation, industrial, and public supply.

There are no active oil or gas wells within the investigative area, although three dry holes and one canceled location were identified by EDR during their records search (EDR, 2015b). These four locations are greater than 0.5 mile from the site.

There are 38 water wells identified by EDR and DBS&A personnel within the investigative area; 22 of the wells are within 0.5 mile of the site, but all are more than 500 feet from the site (EDR, 2015a; TWDB, 2015). Table 10 presents the wells within 1 mile of the site found during the records search.

Geographic coordinates for Map ID 53981 indicate that the well is less than 500 feet from the site. However, these coordinates lack precision, and site visits have not revealed the presence of a well indicated on the map. It is likely that this well is located closer to the building owned by Vital Link.

Geographic coordinates for Map ID 8(5) are not recorded on the well log. The location by street address, as plotted by EDR, is in the middle of I-10. It is highly unlikely that there is a domestic well at that location, and it is safe to assume that the well, if it exists, is greater than 500 feet from the site.

Field observations have not observed any wells within 500 feet of the site.

Table 10. Wells within 1 Mile

Map ID	Well ID	Owner	Distance to Site Boundary (mile)	Latitude	Longitude	Elevation (feet)	Well Depth (feet)	Static Water Level (feet)	Use [a]
1	82106[1]	Pencco	0.16	29.776667	–96.072222	135	271	55	I
2	8(1)[1]	David & Terri Windsor	0.13	NR	NR	NR	194	30	D
3	37049[1]	Vital Link	0.25	29.774242	–96.070847	NR	389	70	P
4	53981[1]	Vital Link	0.04	29.774167	–96.074722	NR	368	70	I
5	8(3)[1]	Vital Link	0.18	29.775425	–96.071541	NR	401	81	P
6	6616807[1]	Rendrag, Inc.	0.13	29.774443	–96.072777	150	248	54	I
7	8(5)[1]	Bob Young	0.06	NR	NR	NR	160	60	D
8	6616808[1]	Steve Silva	0.23	29.771943	–96.073054	150	78	46	D
9	6616809[1]	Frank Lezak	0.26	29.771943	–96.072221	151	86	35	D
10	U1[1]	I. Zapolac	0.28	NR	NR	NR	80	53	D
11	8(4)[1]	James Ford	0.23	NR	NR	NR	274	NR	D
12	24756[1]	AEM	0.12	29.773056	–96.08	NR	163	52	D
13	6616806[1]	Frank Kucera	0.13	29.773054	–96.081110	150	50	NR	D
14	113203[1]	Adan Chavez	0.22	29.771944	–96.080833	NR	307	95	D
15	38315[1]	Al Konvicka	0.29	29.770556	–96.079444	NR	143	67	D
16	6616804[1]	NR	0.75	29.788055	–96.076110	126	NR	26.55	S
17	396529[1]	Frank Ehon	0.73	29.787222	–96.074167	132	180	35	D
18	175239[1]	Val Eschenberg	0.7	29.786944	–96.074167	NR	167	34	D
19	8(6)[1]	Cliff Jones	0.76	NR	NR	NR	216	27	D
20	66168AA[1]	John Scheffer	0.61	NR	NR	NR	143	55	D
21	284690[1]	Brian Bro	0.4	29.779444	–96.068887	NR	216	30	Ir
22	274817[1]	Brian Bro	0.39	29.774167	–96.068333	NR	218	80	Ir
23	6616811[1]	Vick Boyd	0.49	29.773888	–96.066943	140	300	NR	D
24	6616801[3]	V. L. Boyd	0.84	29.772777	–96.061111	142	100	46.3	U
25	6616802[3]	V. L. Boyd	0.93	29.776388	–96.059444	130	300	38.15	D
26	6616810[1]	Johnny Wells	0.40	29.771666	–96.069443	150	257	52.2	D
27	8(7)[1]	Joseph Manak	0.57	NR	NR	NR	92	50	D
28	66168A[1]	Donald Hamil	0.66	NR	NR	NR	88	48	D
29	8(2)[1]	Adela Hundl	0.82	NR	NR	NR	96	52	D
30	175236[1]	Larry and Cindy Siska	0.65	29.765278	–96.079722	NR	200	64	D
31	66168CC[1]	Charles Mlcak	0.41	NR	NR	NR	86	48	D
32	228635[1]	Larry Siska	0.49	29.767778	–96.081667	NR	200	66	D
33	96325[1]	Apex Stone LLC	0.33	29.773889	–96.085833	NR	240	60	I
34	6616702[1]	Ronnie Ross	0.83	29.774721	–96.094166	150	98	48	D
35	66168K[1]	George Smith	0.65	NR	NR	NR	78	50	D
36	209680[1]	Jose Benitez	0.77	29.782222	–96.091111	NR	220	83	D
37	322099[1]	Jose Arriaga	0.83	29.783056	–96.091111	167	228	91	D

Table 10. Wells within 1 Mile (continued)

Map ID	Well ID	Owner	Distance to Site Boundary (mile)	Latitude	Longitude	Elevation (feet)	Well Depth (feet)	Static Water Level (feet)	Use [a]
38	10070[1]	Debbie Thomas	0.78	29.785278	–96.088611	NR	140	55	D
39	1[2]	NA - dry hole	0.73	29.7853	–96.0680	—	—	—	—
40	2[2]	NA - dry hole	0.6	29.7737	–96.0650	—	—	—	—
41	3[2]	NA - dry hole	0.77	29.7729	–96.0622	—	—	—	—
42	4[2]	NA - canceled	0.55	29.7712	–96.0667	—	—	—	—

[a] D = Domestic
I = Industrial
P = Public Supply
Ir = Irrigation
S = Stock
U = Unused

Sources: [1] EDR Texas Water Well Report, 2015
[2] EDR Texas Oil & Gas Report, 2015
[3] TWDB Water Data Interactive, 2015

NR = Not reported
NA = Not applicable
— = No well

21.5 Geotechnical Study

During the subsurface investigation, DBS&A personnel advanced Shelby tubes for the collection of geotechnical samples at six intervals. The samples were submitted to the DBS&A Soil Testing and Research Laboratory in Albuquerque, New Mexico and were analyzed for dry bulk density (ASTM D7263), moisture content (ASTM D7263, ASTM D2216), calculated porosity (ASTM D7263), saturated hydraulic conductivity (ASTM D 2434), falling head rising tail (ASTM D5084), particle size analysis, USCS (ASTM) Classification (ASTM D422, ASTM D2487), USDA Classification (ASTM D422, USDA Soil Textural Triangle), Atterberg Limits (ASTM D4318), and visual-manual description (ASTM D2488). Geotechnical reports for samples obtained during the subsurface investigation include tabulated results and are provided in Appendix L.

Undisturbed geotechnical samples could not be collected from the base of soil borings SB-1 and SB-5 due to the center drill rod locking up from flowing sands at SB-1 and the extremely hard nature of the claystone encountered at 87.5 ft bgs at SB-5. However, clay was observed as it adhered to the last hollow stem auger advanced at both locations. At each boring, the clay was described as dry to moist clay with gravel with medium plasticity. The clay and claystone encountered at the terminal depth of the borings are consistent with the information presented in the generalized cross section (Figure 16); this observation confirms the clay confining unit of the uppermost aquifer. In addition, two disturbed bottom samples were collected at soil boring SB-5 from the 84-85 feet and 85-87.5 feet depth intervals. These samples were submitted to the laboratory and analyzed for the geotechnical parameters listed above. Based on the geotechnical laboratory report, the two SB-5 bottom samples indicate very low saturated hydraulic conductivities, which further confirms the aquiclude encountered within the uppermost aquifer. Results of the saturated hydraulic conductivities are summarized in Table 11.

Table 11. Saturated Hydraulic Conductivities

		Method of Analysis	
Sample Identification	K_{sat} (cm/s)	Constant Head Flexible Wall	Falling Head Flexible Wall
SB-1 (6'-8.5') Horizontal	7.3×10^{-3}	X	
SB-1 (12'-14.5') Vertical	1.8×10^{-2}	X	
SB-2 (6'-8.5') Horizontal	1.1×10^{-5}		X
SB-4 (3'-5.5') Horizontal	3.3×10^{-7}		X
SB-5 (6'-8.5') Horizontal	3.37×10^{-7}		X
SB-5 (12'-14.5') Vertical	3.68×10^{-6}		X
SB-5 (84'-85') Disturbed	6.42×10^{-9}		X
SB-5 (85'-87.5') Disturbed	4.08×10^{-9}		X

21.6 Active Geologic Processes

There are no differential subsidence or active geologic processes within ½ mile of the site including faults and/or subsidence in the area of the Facility. The nearest fault is approximately 15 miles northeast of the Facility. Faults are noted on the geologic map (Figure 12), as presented in the GAT sheet prepared by the Bureau of Economic Geology digital data set. Active faults are not known to exist within ½ mile of the property; therefore, the Facility is not required to investigate for unknown faults. There are no areas experiencing withdrawal of crude oil, natural gas, sulfur, etc., or significant amounts of groundwater; therefore, the possibility of differential subsidence or faulting investigation is not required.

Section 22. Groundwater Protection Plan

The Facility has been designed and will be constructed and operated to protect groundwater from impact from the Facility operations. The groundwater protection measures in place include a composite geomembrane liner system underlying the GSS processing area, management practices used in the composting process, and a groundwater monitoring system. Protection of the groundwater includes perched water or shallow surface infiltration.

22.1 Liner and Pad System

Composting and processing operations will be performed within an area constructed specifically for this purpose. To reduce the potential for run-off from the lined area, he composting area will be surrounded on all sides by earthen berms. These berms will also reduce the potential for run-on to the composting pad, minimizing the potential presence of liquids above the liner. Three ramps will be constructed to allow access to the processing pad by vehicles and equipment. The ramps will be elevated above the surrounding ground surface, further preventing run-on to the pad. The composting pad has been designed to slope away from the ramps and toward the stormwater retention pond, preventing run-off from the pad.

A composite liner system will be constructed under the compost pad and stormwater retention pond to provide an equivalent hydraulic conductivity of $1x10^{-7}$ centimeters per second (cm/s) or less. The subgrade will be excavated at least 6 inches below the liner and re-compacted to provide a uniformly compacted finished surface. The liner will include 2 feet of compacted, on-site clay soils, placed in 6-inch lifts, under a 40-mil double-textured HDPE liner. Protective soil over the liner will include 1 foot of on-site sandy soils and a minimum 6-inch layer of base-coarse. A 10-ounce nonwoven geotextile will be installed between the sand and base-coarse to provide soil stability and filtration capacity between the two materials. The fabric will also be a visual warning to scour and will help preserve the life of the underlying geomembrane.

Based on the DBS&A soils testing laboratory report (Appendix L), soil samples representative of on-site clay soils consist of more than 30 percent passing a number 200 sieve and have a liquid limit greater than 30 and a plasticity index greater than 15 as required in TAC 330.339.

22.2 Liner Quality Control Plan

In order to document the construction of the composite liner and subgrade, a Liner Quality Control Plan has been developed as the basis for the type and rate of quality control testing performance for the Liner Evaluation Report (LER) as required in 30 TAC §330.341of this title. This report will include an evaluation of both the soil and geomembrane components of the liner system and will be prepared in accordance with the approved Liner Quality Control Plan. The Liner Quality Control Plan is provided in Appendix M.

All field sampling and testing, both during construction and after completion of the lining, will be performed by, or under the direct supervision of, a qualified professional experienced in geotechnical engineering and/or engineering geology. All liners will have continuous on-site inspection during construction by the professional of record, or his designated representative.

All quality control testing of soil liners will be performed during the construction of the liner. Under no circumstance will any quality control field or laboratory testing be undertaken after completion of liner construction, except for that testing which is required of the final constructed lift, confirmation of liner thickness, or cover material thickness.

All soil testing and evaluation of either in situ soil or constructed soil liners will be complete prior to installing the leachate collection system or, if a leachate collection system is not required, prior to adding the 1 foot of protective cover on the evaluation area.

Soil and liner density will be expressed as a percentage of the maximum dry density and at the corresponding optimum moisture content specified as appropriate by a licensed professional engineer experienced in geotechnical engineering. Upon testing in either the laboratory or at a test pad in the field, the compacted soils must demonstrate a coefficient of permeability no greater than 1×10^{-7} cm/s.

Unless alternative construction procedures have prior written approval by the executive director, all constructed soil liners will be keyed into an underlying formation of sufficient strength to ensure stability of the constructed lining.

22.3 Management Practices

Composting operations will be performed to minimize the potential for uncontained free liquids on or off the pad. In the absence of free liquids, the potential for contaminant transport from the composting operations is minimized. Management practices that either contain or minimize free liquids include:

- Containment of all liquid feedstocks in steel, aboveground storage tanks, placed within a bermed spill control area.
- Limitation of feedstock application rates to avoid free liquid formation on the GSS composting pad or approved non-GSS waste composting areas.
- Use of highly sorptive bulking material (i.e., shredded wood and brush).
- The prompt mixing of windrows after feedstock application to maximize absorption of the feedstock liquids.
- Containment of rain falling directly on the GSS composting pad within a lined retention pond.

22.4 Groundwater Monitor System

The groundwater monitoring system is designed to reasonably assure detection of any contamination of the groundwater before it migrates beyond the boundaries of the site. The groundwater monitoring system consists of the five monitoring wells that were installed during the subsurface/groundwater investigation described in Section 21. The groundwater monitoring wells were installed around the perimeter of the processing area (Sheet 3), providing up-, cross-, and downgradient locations, and are screened within the uppermost water-bearing zone observed during drilling and logging activities. Given the construction and placement of the monitoring wells, if groundwater impact were to occur from composting operations, the well system will reasonably assure its detection.

A groundwater sampling program has been developed and is discussed in the Sampling and Monitoring section in Part IV of this application.

Section 23. Facility Closure Plan and Financial Assurance

23.1 Closure Plan Requirements

The following timeline will be used to implement the final closure plan:

1. 90 days prior to the initiation of closure activities, the Operator will:
    a. Submit written notification to TCEQ of the intent to close the Facility and place this notice of intent in the operating record.

b. Provide a public notice for final closure in the newspaper(s) of largest circulation in the vicinity of the Facility. This notice will provide the name, address, and physical location of the Facility, the permit number, and the last date of intended receipt of waste.

2. 10 days prior to final closure, the Operator will:

   a. Submit a certification of final closure to the TCEQ for approval.

3. Upon TCEQ approval of closure plan certification and date, the Operator will:

   a. Make available an adequate number of copies of the approved final closure plan for public access and review.

   b. Post a minimum of one sign at the main entrance and all other frequently used points of access for the Facility notifying all persons who may use the Facility or site of the date of closing for the Facility and the prohibition against further receipt of waste materials after the stated date.

4. Date of closure, the Operator will:

   a. Terminate operations.

   b. Install suitable barriers at all gates to adequately prevent the unauthorized dumping of solid waste at the closed Facility.

5. 180 from date of closure the, Operator will

   a. Complete final closure activities for the Facility in accordance with the approved final closure plan unless additional time is approved in writing by TCEQ.

   b. Submit, if required, a request to the Executive Director for an extension for the completion of final closure activities. The request will include all applicable documentation necessary to demonstrate that final closure will take longer than 180 days, and all steps have been taken and will continue to be taken to prevent threats to human health and the environment from the site.

6. 9 days after completion of all final closure activities the Owner will submit to the TCEQ, for review and approval:

   a. A closure report and certification, signed and sealed by an independent Texas Licensed Professional Engineer, verifying that final closure has been completed in accordance with the approved final closure plan. The submission will include all applicable documentation necessary for certification of final closure.

   b. Certification and request for post closure maintenance variance.

   c. Request a voluntary revocation of the Facility permit.

7. Upon TCEQ approval of the final closure certification, the approved certification will be placed in the operating record.

23.2 Operation Termination Requirements

The following steps will be taken to terminate operations.

1. Place barriers to prevent access for disposal of solid wastes at the Facility;
2. Cease accepting all solid waste deliveries;
3. Process materials on hand;
4. Deliver products on hand to vendors or customers;
5. Terminate all operations; and
6. Engage the services of a qualified Texas Licensed Professional Engineer, who will:
    a. Inspect the site for signs of possible releases and review past release records;
    b. Implement a sampling and analysis plan;
    c. Implement a site cleantfup or mitigation plan;
    d. Certify removal and disposal of residual materials, decontamination of equipment and processing/storage areas, and mitigation results;
    e. Prepare or review and seal the closure report; and
    f. Submit a signed and sealed certification verifying that final closure has been completed in accordance with the approved final closure plan.

23.3 Procedure for Closure of Facility by Operator

After operation termination, the closure of the Facility would be conducted by the Operator in the following sequence.

23.3.1 Removal

The Operator will process material on hand and mitigate residual materials with the following protocol:

1. Empty liquid feedstock storage tanks;
2. Remove sludge from storage/tanks;
3. Remove materials and equipment from GSS processing and bulk material storage areas;
4. Sample and analyze soil and groundwater in accordance with the closure sampling and analysis plan (CSAP) presented in Section 23.4;
5. Transport liquid and/or sludge to a TCEQ-approved disposal or recycling facility; and
6. Dispose or recycle chemicals in storage based on manufacturers' recommendations or results of analytical characterization in accordance with the CSAP.

23.3.2 Decontamination

1. Power wash tanks, hard plumbed pipes, and exposed equipment with a surfactant/water solution;
2. Circulate the surfactant/water solution through piping and ancillary equipment;
3. Rinse decontaminated units and areas, as necessary, with a power wash unit containing water until all surfactant/water solution and residuals are removed;
4. Collect wash waters and any remaining materials and place in appropriate transport containers;
5. Sample and analyze wash down waters and any remaining materials in accordance with the CSAP; and
6. Transport material(s) to an authorized disposal or re-use facility.

23.4 Closure Sampling and Analysis Plan

The following is a preliminary CSAP based on proposed operations and chemical use.

23.4.1 Sampling

23.4.1.1 Residual Materials

Representative composite grab samples will be collected for wash water and residual materials.

Eight to ten individual grab samples will be collected from each matrix to prepare a composite sample of each matrix.

Each matrix composite sample will be analyzed as describe in the CSAP, as appropriate.

23.4.1.2 Chemicals in Storage

Safety Data Sheets (SDS) will be used to characterize chemicals in storage at the time of closure. To characterize chemicals lacking SDS sheets, samples will be collected and analyzed.

23.4.1.3 Soil and Groundwater

Soil and groundwater will be sampled based on evidence of releases and/or visual impacts to soil and groundwater using the following scenarios:

No release evident scenario. If no releases are evident, the following sampling protocol will be implemented:

1. Collect a minimum of four surface soil samples from native material at a minimum depth of 1 foot bgs from the GSS processing area;
2. Check for visual impacts at minimum depth; and
3. If visual impacts are absent, then sampling is concluded.

Release evident or visual impact scenario. If a release is evident or visual impacts are present, the following sampling protocol will be implemented:

1. Collect samples based on evidence of past releases or visual impact observations;
2. Collect subsurface and groundwater samples based on the presence of visual impacts;
3. Sample at 1 foot intervals until visual impact is no longer evident;
4. Conduct analyses described in the CSAP; and
5. Conduct additional analyses based on the nature of chemicals stored in the vicinity of the release.

23.4.2 Analysis

Wash water and residual materials samples, at a minimum, will be analyzed for pH, hazardous metals as defined by the Resource Conservation and Recovery Act (RCRA), and total petroleum hydrocarbons using methods approved by TCEQ or U.S. Environmental Protection Agency. A Laboratory certified to analyze RCRA metals and total petroleum will be used to analyze samples off-site.

23.5 Reporting

The following will be submitted to TCEQ within 10 days of final closure activities:

- Closure report;
- Certification verifying that final closure has been completed in accordance with the approved final closure plan;
- Certification that the Facility is not subject to post-closure care maintenance requirements for MSW management units and request for variance; and
- Request for voluntary revocation of the Facility permit

A qualified Texas Professional Engineer will prepare or review and sign and seal the closure report and certifications. The closure report and certification will include all applicable documentation necessary to demonstrate that closure of the Facility, with no post-closure maintenance, is sufficient to protect human health and the environment and complies with the approved closure plan.

23.6 Procedure for Closure of Facility by an Independent Third Party

The closure of the Facility would be conducted by an independent third party in the following sequence, if required:

1. Characterize contents in the liquid feedstock s tanks, processing equipment, and processing areas.

2. Remove and transport liquid and solids to an appropriate disposal or recycling facility.
3. Characterize sludge from tank bottoms and equipment and transport to an authorized off-site waste disposal facility.
4. Pressure wash empty tanks, hard plumbed pipes, and other equipment with a surfactant/water solution.
5. Decontaminate piping and equipment by circulating the surfactant/water solution through the piping and ancillary equipment.
6. Rinse the tanks and equipment, as necessary, using a pressure washer until all surfactant and residuals are removed.
7. Characterize wash water and transfer to an appropriate transport container for disposal or recycling at an off-site facility.
8. Characterize and dispose or recycle remaining chemicals and equipment at the Facility.
9. Observe the site for signs of possible releases.
10. Sample and analyze soil and groundwater as described in the CSAP.
11. Prepare closure report for submission to TCEQ. The closure report must be prepared or reviewed and sealed by a qualified professional engineer.

The development of an independent third party closure plan should not be construed as the Operator's authorization for voluntary third party closure.

23.7 Financial Assurance

The closure cost estimate included as Appendix N was prepared under the direction of a qualified professional engineer licensed in the State of Texas who has affixed the Professional Engineer's Seal to the cost estimate. The current cost of the anticipated closure is estimated to be $393,981.

In accordance with 30 TAC §37.31, financial assurance documentation will be submitted to the TCEQ at least 60 days after the permit is signed by the executive director or commission.

The operator will review and adjust the Facility's closure cost annually to compensate for inflation. The closure cost will be verified that the current active areas match the areas on which the closure cost estimates are based. If for some reason, the closure cost estimate changes (either increases or decreases) at any time during the life of the Facility, changes to the final closure plan and financial assurance will be made and detailed justification will be provided to the TCEQ. Changes to the closure cost estimate and the financial assurance may be made under a permit modification. Within 10 days prior to final closure, the Operator will submit a certification of final closure to the TCEQ for approval.

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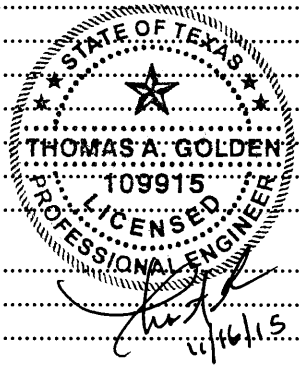
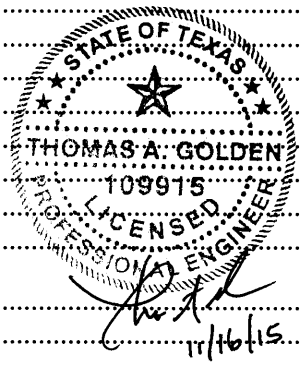
Part IV

Site Operating Plan, Sampling and Monitoring Plan, and Quality Assurance and Quality Control for a Composting Facility

Table of Contents

Part IV *Site Operating Plan, Sampling and Monitoring Plan, and Quality Assurance and Quality Control for a composting facility. This document provides guidance from the design engineer to site management and operating personnel in sufficient detail to enable day-to-day operations in a manner consistent with the engineer's design.*

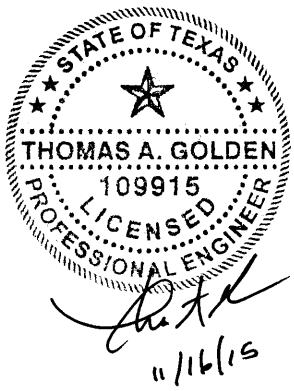




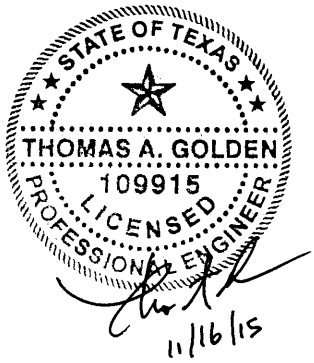
List of Tables

Acronyms

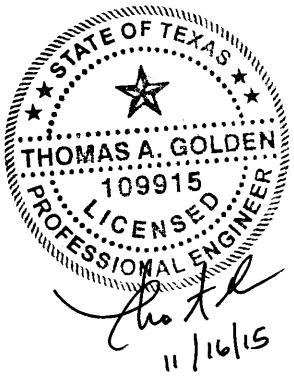
ADT	average daily traffic
ALU	aquatic life use
Avg	average
BACT	best achievable control technology
BOD	biological oxygen demand
CCN	Certificate of Convenience and Necessity
cfh	cubic feet per hour
cfm	cubic feet per minute
CR	County Road
CSAP	Closure Sampling Plan
EPA	United States Environmental Protection Agency
EQ	exceptional quality



°F	Fahrenheit degrees
FM	Farm to Market Road
FOG	fats, oil, and grease
ft	feet
gpm	gallons per minute
GTW	grease trap wastes
hp	horse power
in	inch(es)
kips	kilo pounds per inch
LCN	laboratory case narrative
MCL	maximum contaminate level
MSS	maintenance, start up, and shut down
MSW	municipal solid waste
NAICS	North American Industry Classification System
NIST	National Institute of Standards and Technology
OIC	Operator In Charge
OSSF	on-site sewage facility
pci	pounds per cubic inch
plf	pounds per linear feet
psi	pounds per square inch
PWS	public water system
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance and Quality Control Plan
RCRA	Resource Conservation and Recovery Act
ROM	reduction in organic matter
SDS	safety data sheet
SC-SM	silty, clayey sand
SIC	Standard Classification



SO_2	sulfur dioxide
SOP	Standard Operating Procedures
SSO	sanitary sewer overflows
SUD	Sewer Use District
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality (Executive Director)
TCLP	toxic characteristic leaching procedure
THC	Texas Historical Commission
THSC	Texas Health and Safety Code
TLAP	Texas Land Application Permit
TMDL	total maximum daily load
TPDES	Texas Pollution Discharge Elimination System
TPH	total petroleum hydrocarbon
TSS	total suspended solids
TWC	Texas Water Code
TWDB	Texas Water Development Board
TXDOT	Texas Department of Transportation
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VCP	Vector Control Program
VTCA	Vernon's Texas Codes Annotated
WoC	Wolfpen loamy fine sand
WSC	water supply company
WWTP	wastewater treatment plant
yd	yard(s)



Section 24. Personnel

24.1 Operator in Charge

The operator in charge (OIC) will be present at the Facility when visitors or transporters are present. Deliveries will be scheduled by the OIC.

24.1.1 Training

The following training program will be developed for each OIC at the Facility:

- Identification of material sources and characteristics and manifests;
- Composting operations management of the windrows and feedstock;
- Sampling, inspection, and monitoring;
- Heavy equipment operation;
- Emergency response actions of this plan; and
- Waste acceptance and handling.

24.1.2 Duties

The OIC will be responsible for, at least, the following (new responsibilities will be added to this list as needed):

- Perform day to day operations;
- Schedule waste acceptance and processing;
- Train and supervise staff;
- Implement and supervise emergency response actions and spill clean-up;
- Implement safety and security;
- Complete manifests and return the generator copy, as required, within the stipulated time frame; and
- Sample and monitor feedstocks and products.

24.2 Laborers

Laborers will work under the supervision of the OIC. Laborers will perform day-to-day operations under the supervision of the OIC. A training program for laborers will be developed to include the following:

- Day to day operations;
- Composting operations, including operating equipment, mixing, and tilling;
- Spill reporting;
- Security and safety procedures;
- Pollution prevention;
- Emergency response actions;
- Proper use of chemicals;
- Personal protection equipment; and
- Heavy equipment operation.

Section 25. Equipment

25.1 Equipment Type, Function, Inspection, and Maintenance

The primary pieces of equipment used in the composting process are front-end loader(s), a self-propelled tiller, vacuum truck(s), aboveground storage tanks, a mobile chipper/grinder, and a mechanical screen. At least one of each piece of equipment is required to perform the composting process.

The aboveground storage tanks will be used to store liquid feedstocks until needed in the composting process. Bulking material will either delivered to the Facility already chipped and shredded from off-property sources, or it may be brought to the Facility in raw form and chipped and shredded on the property. A chipper/grinder will be present at the Facility to produce bulking material before it is placed on the processing areas. The front-end loader will be used to build and maintain the stockpiles and windrows and to move compost materials within the processing area. Vacuum trucks, or equivalent, will be used to apply feedstock to the windrows. The self-propelled tiller will be used to mix the bulking material and feedstocks within the windrows. The mechanical screen will be brought to the Facility on an as-needed basis to remove undesirable and oversized material from the mature compost.

Equipment will be inspected according to the standards outlined in Table 7, included in Part III, Section 18.2 of this application. Additional inspection and maintenance will be added to Table 7 as equipment is added.

Inspection, repairs, and maintenance records will be maintained in a weekly log.

Section 26. Production Processes

26.1 Control of Unloading for Unauthorized Materials

Only the designated feedstocks will be accepted at the Facility. The following will be implemented to control the unloading of un-compostable material (unauthorized materials):

- Feedstock will be received by authorized transport vehicles only.
- A sign will be placed at the property entrance that indicates the type of facility, permit number, standard hours of operation, and allowable feedstocks.
- Delivery trucks entering the property are inspected by the OIC for the presence of unauthorized materials during unloading. Loads determined to contain unprocessable, prohibited, or unauthorized materials are refused. In the event that unprocessable, prohibited, or unauthorized materials is discovered after delivery, these materials will be removed from the Facility and disposed of at an authorized municipal solid waste facility.
- Coarse straining may be used to remove non compostable materials in liquid feed stock.
- Manifests or Bill of Lading are examined for each load to ensure that they describe the load's waste source, contents, and volumes.
- The OIC will confirm that all haulers have the appropriate licenses or registrations.

26.2 Material Processing

26.2.1 Liquids

Feedstock is received at the Facility by tanker trunks. The liquid feedstock will be either pumped into one of eight 31,500-gallon aboveground storage tanks for temporary storage or pumped to the Facility vacuum truck to be sprayed directly onto prepared windrows of bulking material located within the processing areas. The storage capacity of the aboveground tanks will allow the liquid feedstocks to be applied in a consistent manner and provide additional feedstock storage capacity that can be used during periods of rainfall that limit feedstock application. No feedstock will be accepted in excess of the available capacity of the storage tanks. The OIC monitors traffic and off-loading to prevent spills, leaks, and unauthorized materials or dumping. A Manifest or Bill of Lading is required for each load that describes the load's source, contents, and volume. Haulers are required to have the appropriate licenses or registrations.

Due to the way the liquid feedstocks are handled, the potential for spillage outside the lined processing area will be minimal. In the event liquid feedstock is spilled outside the composting pad, the feedstock and affected surface soils will be promptly recovered using a front-end loader and incorporated into the composting process. In the event that bulking material is spilled onto the ground, will be promptly recovered with a front-end loader and returned to the windrows. The front-end loader and shovels will be used daily to maintain the tipping area and windrows.

26.2.2 Solids

The OIC will supervise the delivery of bulking material and chemicals and will direct deliveries to the appropriate storage area. Bulking material will be inventoried daily to ensure an adequate amount is on-site to cover or process the feedstock.

Both pre-chipped and shredded bulking material and raw bulking material will be delivered by truck to the property. Raw bulking material will be stored and then chipped and screened in an on-property area east of the processing area (Figure 2). A chipper/grinder will be present at the property to chip and grind raw bulk material. The grinder will be equipped with low-velocity spray nozzles to minimize the generation of dust during operation. The chipped and shredded bulking material will be placed on the processing areas in windrows using a front-end loader.

- Bulking materials
  - Remove solids from the dewaterer onto the intermediate transfer station where it is inspected for un-compostable material.
  - Divert un-compostable material to the waste storage area.
  - Load compostable material with bulking material in composter or moved to the Feed stock storage area for accumulation.
  - Cover solids with bulking material if there is a potential for odor production.
- Receiving solids
  - Receiving solids are materials with less than 50 percent moisture and bulking materials. Receiving solids will be stored in the feedstock holding area.
  - Cover solids that may attract vectors or produce orders with bulking material and process within 72 hours.
  - Limit materials that have a potential for spontaneous combustion to storage depth of 4 feet.
  - Load solids and bulking material into the in-vessel composter at 40 percent moisture.

26.2.3 Composting

Feedstocks will be applied to the windrows using a vacuum truck, or equivalent, equipped with a 3- or 4-inch hose. Once the feedstock is applied to a windrow, the windrow will be immediately turned, mixed, and re-homogenized using a self-propelled tiller to thoroughly mix feedstock and bulking material. This process allows the feedstocks to be evenly distributed through the windrows and prevents moisture or liquids from collecting at the base of the compost material.

Once tilled, the windrows will be monitored and measurements will be taken daily to ensure the moisture content and carbon to nitrogen ratio are consistent to maintaining adequate composting.

The desired initial moisture content of the compost is 40 to 60 percent by weight. Moisture content is evaluated and measured daily. Moisture content will be determined during the composting process using the "squeeze test." The squeeze test is performed by manually

gathering and squeezing a handful of the compost material. If water drips out while the compost is under hand pressure, the material is too wet. If the material crumbles apart when the pressure is released, it is too dry. Squeeze test samples will be collected from varying depths and areas of the windrows to evaluate the moisture content throughout the windrow. High moisture contents will be corrected by adding additional bulking material and/or by additional tilling. Low moisture content will be corrected by adding potable water, liquids collected in the retention pond (for GSS composting only), or liquid feedstock, and then tilling.

Once a windrow is considered to have the appropriate moisture content and mixture of bulking material and feedstock, it will be monitored for 15 days. During the monitoring period, the windrow temperature will be measured and recorded regularly using a bi-metal thermometer with a 4-foot probe. Temperature measurements will be collected every 5 to 10 feet along the length of the windrow at a depth of approximately one-third of the windrow height. A temperature of at least 55 degrees centigrade (131 degrees Fahrenheit) will be maintained during the monitoring period. During the 15-day monitoring period, the windrow will be turned a minimum of five times to maintain an even temperature throughout in order to aid in consistent, thorough composting and to reduce pathogens. The temperature will be measured and recorded each time the windrow is turned during the monitoring period. Once the 15-day monitoring period is completed, the composted material will enter the post- processing phase.

In order to avoid contaminating the final product, no feedstocks or retention pond liquids will be added to a windrow once it enters the monitoring period. In the event that additional feedstocks are inadvertently added to material during the monitoring period, the monitoring period for that material will start over.

26.3 Waste Storage and Disposal

26.3.1 Non-Hazardous Waste

Non-hazardous solid wastes will be stored in a dumpster near the maintenance shop area. Non-hazardous wastes will be transported and disposed of at a permitted landfill on a minimally weekly basis, more often to prevent nuisance conditions.

26.3.2 Hazardous Wastes

Every effort will be made to exclude hazardous material from the processing system. In the unlikely event that hazardous material does accumulate at the Facility, a "One-Time Waste Shipment" registration will be applied for. Hazardous waste will be segregated from non-hazardous waste and transported and disposed at a permitted hazardous waste facility.

26.4 Product Distribution

Under the proposed variance, storage of finished Grade 1 or Grade 2 compost (not Waste Grade) will be placed on an unlined portion of the Facility. Given that only GSS compost meeting the maturity requirements discussed in Section 35.3.1 and bulking material would be placed outside the liner in this manner, this should not result in any compromise to public health and safety. The finished material is intended for use in landscaping, vegetable gardens, and similar uses;

therefore storage on the unlined ground should not present any potential for damage or impact to groundwater resources.

Currently, compost will be sold only in bulk form. At some time in the future, the Facility may sell containerized compost. Bulk product will be loaded into the purchaser's truck using a font-end loader. The Facility does not currently plan to produce any Grade 2 compost, but may at some time in the future. Grade 1 and Grade 2 compost products will not be tracked. The batch number, the permit number of the disposal facility, dates, and disposed volumes will be tracked for all batches of Waste Grade compost (i.e., compost to be disposed off-site).

Section 27. Alternate Disposal

27.1 Non Standard Products

Compost that does not meet the compost Grade 1 or Grade 2 standards will be transported to and disposed of at a permitted landfill.

Compost characterized as hazardous waste will be transported to and disposed of at a permitted hazardous waste facility.

Non-compostable material will be transported to a permitted landfill.

Section 28. Pollution Prevention Plan

28.1 Unauthorized Material

The control of unauthorized material entering the Facility will be enforced by implementing the following:

- At least one employee will be on-site during receiving hours to inspect each delivery of feedstock or bulking agents to ensure that no unauthorized or prohibited material is incorporated into the feedstock.
- Waste unloading will be confined to designated areas, and signs will be maintained that indicate where vehicles unload.
- Traffic will be directed to use only gravel roads. Gates will be locked when not accepting waste. Transporters' licenses will be checked at the Facility entrance.
- Solid waste that will cause or may cause problems in maintaining full and continuous compliance will not be accepted.
- Unloading of waste in unauthorized areas will be prohibited.
- Waste deposited in an unauthorized area will immediately be removed and disposed of properly. Prohibited waste will immediately be returned to the transporter or generator of the waste.

28.2 Sanitation and Litter

28.2.1 Facility Generated Wastes

Non-compostable material, plastics, and metal aggregate found in the feedstock will be transferred to the waste holding area and transferred to a permitted municipal solid waste (MSW) landfill. Wastes will be limited to 1.5 percent of dry weight of solids.

The dumpster will be emptied at an interval that would prevent nuisance conditions but at least weekly. Wastewaters generated by a facility will be processed as feedstock.

Chemicals used during washing activities will not interfere with the feedstock processing, feedstock application, or final compost grade. Sludge will be recycled and processed as feedstock.

Nonstandard sludge and composts passing the Paint Filter Liquids Test, (United States Environmental Protection Agency (EPA) method 9095) as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Publication Number SW-846, September 1986) are acceptable at MSW landfills. If for some reason nonstandard sludge and composts are being disposed of at an off-site permitted landfill, the waste will be screened using a Paint Filter Liquids Test. Additionally, the nonstandard sludge and composts will not exceed the standards presented in Table 12.

Table 12. MSW Disposal Limits

Contaminant	Total Limit (mg/Kg)	TCLP Limit (mg/L)
Benzene	10	0.5
Lead	30	1.5
Total petroleum hydrocarbons (TPH)	1,500	NA

mg/Kg = Milligrams per kilogram
TCLP = Toxicity characteristics leaching procedure'
mg/L = Milligrams per liter

Sludges and composts exceeding these limits will not be disposed in MSW landfills. Nonstandard sludges and composts that are non-hazardous will be disposed at a MSW landfill with dedicated Class 1 solid waste cells. Sludges and composts that are characterized as a hazardous waste will be sent to an authorized treatment, storage, or disposal facility for further processing or disposal.

28.2.2 Storage Requirements

Non-hazardous solid waste will be stored in covered dumpsters.

Liquid feedstock will be pumped into one of eight 31,500-gallon aboveground storage tanks for temporary storage or pumped to the Facility vacuum truck, or equivalent, to be sprayed directly onto prepared windrows of bulking material located within the processing areas.

Haulers and generators will be responsible for storage and transportation of waste in a safe manner prior to delivery to the Facility.

28.2.3 Materials along the Route to the Facility

Vehicles hauling liquid feedstock to the Facility will consist of an enclosed tank hold to effectively secure the load to prevent the escape of any part of the load by blowing or spilling. Vehicles hauling bulking material will be equipped with a tarpaulin, net, or other means to effectively secure the load.

Signs will be posted to direct materials to proper storage areas and to prohibit unauthorized materials or disposal.

Offenders will be reported to proper law enforcement officers or the TCEQ. Surcharges will be charged for unauthorized dumping.

28.2.4 Work Area Sanitation

Potable water will be provided to the Facility. Water connections will be provided with a back flow check valve to prevent cross contamination. This connection will be used for weekly cleanup activities which may include sweeping, mopping, and/or washing down with water. A pressure washer will periodically be used to remove residuals not removed with the more conservative cleaning methods. The owner/operator may hire a contracting company to perform the pressure washing, as needed.

28.2.5 Employee Sanitation Facilities

Potable water and sanitary facilities will be supplied for employees and visitors.

28.2.6 Control of Windblown Material

The feedstocks accepted at the Facility are aqueous and therefore not susceptible to being windblown. The bulking material used at the Facility consists of chipped and shredded wood and vegetative matter that is not susceptible to being windblown. The Facility does not accept paper, cardboard, cloth, or other materials that would be more susceptible to being windblown. The application of feedstock and tilling of windrows is not performed during periods of high wind. In the event that high winds should result in bulking material being blown from windrows or piles, the material will be picked up daily and returned to the windrows or stockpiles from which the material originated. Equipment engines will be maintained in good condition and well-tuned and serviced at manufacturers' recommended service schedules.

Windblown material and litter will be collected and placed in a waste container as necessary, and at least once per day on days that the Facility is in operation.

28.2.7 Road Maintenance

If applicable, the county road servicing the Facility will be swept as needed.

On-site roads and paved areas will be repaired and graded to minimize depressions, ruts, and potholes. On-site roads and paved areas will be watered to control dust.

28.3 Ventilation and Odor Control

An odor audit will be completed daily. If detected odors are creating a nuisance, then an odor investigation will be conducted. The protocol for the audit and investigation is detailed in Section 35.2.

Odors will be minimized through the use of best management practices (BMPs), including:

- Storing liquid feedstocks in enclosed aboveground storage tanks;
- Suspending application of feedstocks during high winds;
- Using adequate bulking material, and
- Turning or tilling bulking material immediately after feedstocks are applied.

If the odor investigation indicates that the compost is the source of the odor, turning rates for the compost will be increased and, if needed, production method modifications will be made, such as adding a layer of bulking material on top of the composted material.

Nuisance odors will be prevented from leaving the boundary of the Facility. If nuisance odors are found to be passing the Facility boundary, the Facility OIC will suspend odor-producing operations until the nuisance is abated.

28.4 Overloading and Breakdown

28.4.1 Design Capacity

The design capacity of a processing will not be exceeded during operation. The Facility will not accumulate waste in quantities that cannot be processed within a time frame that will preclude the creation of odors, insect breeding, or harborage of other vectors. If such accumulations occur, additional waste will not be received until the adverse conditions are abated.

28.4.2 Equipment Failures

Equipment that has failed will be promptly repaired to minimize disruption of normal operations. The necessary equipment to perform normal operations is commonly available for rent. In the event that any piece of equipment cannot be repaired in a timely fashion, the necessary equipment will be rented from a local supplier. In addition, the surplus tankage volume on-site would typically allow the continued acceptance and storage of feedstocks during equipment down time.

If a significant work stoppage should occur due to a mechanical breakdown or other causes, the Facility will restrict the receiving of waste. If the work stoppage is anticipated to last long enough to create objectionable odors, insect breeding, or harborage of vectors, steps will be

taken to remove the accumulated waste from the Facility and transport it to an approved backup processing or disposal facility.

The OIC will refuse wastes or divert wastes to a permitted landfill or processing/disposal facility if processing or disposal procedures for the waste becomes inoperable for periods exceeding 24 hours or if the volume of feedstock within the storage tanks approaches maximum capacity.

28.4.3 Back Up Processing or Disposal

Backup processing facilities include landfills permitted to take liquid wastes and wastewater treatment systems that accept the typical wastes accepted at the Facility. A list of wastewater treatment plants (Wets), MSW processing facilities, and landfills that will accept wastes will be maintained at the Facility.

28.5 Final Product Use

The anticipated final product grade of all compost is Grade 1. The intended final use of the Grade I composted materials is as a soil amendment in residential and commercial applications. In the event that final testing indicates that the composted material is Grade 2, it will either be disposed at a permitted MSW facility, or sold only to commercial users and will be labeled as not for use at residences or child-care facilities. In the event that final testing indicates that the composted material is Waste Grade, it will be disposed at a permitted MSW facility.

Section 29. Vector Control Plan

This Facility controls vectors that include rodents, insects, birds, scavenging animals, bacteria, and viruses through the following vector control (VC) program.

The locations in or around the Facility where vectors maybe problematic are feedstock storage, processed material storage, final product storage, and surrounding landscapes.

29.1 Inspection and Monitoring

Weekly inspections: The OIC or designee will perform an inspection weekly to identify problems and corrective actions needed to prevent and/or manage vector infestations. The OIC will plan and schedule corrective actions.

For current, recent, or likely vector infestations, a weekly monitoring program to detect vector infestations may be implemented as follows:

- Rodents: Baited rodent traps will be placed at the maintenance shop and office and will be checked and emptied as needed.
- Insects: Sticky cardboard monitors will be used to monitor for ants and cockroaches at the maintenance shop and office, as needed.
- All other vectors: Weekly monitoring by visual inspection will be performed by designated staff indoors and outdoors.

- Vector identification: When vectors are detected, the specific identification of the vector will be obtained using professional resources, as needed. The OIC will consult with professional resources to determine methods that will control vectors without impacting the quality of the final products.

Vectors will be controlled through the use of BMPs, including:

- No storage or acceptance of unapproved wastes;
- The immediate incorporation of feedstocks into the bulking material or their storage in steel storage tanks until they are used;
- The use of a selected group of microbes, fungi, yeast, molds, and enzymes in the composting process that accelerate decomposition rate of the feedstocks and that also deter the reproduction of flies and fly larvae;
- A 25-foot vegetative buffer surrounding the processing area will be mowed to reduce habitat of vectors.
- Along with sanitation and maintenance actions to eliminate food, water, shelter, and entryways for vectors, traps will be used to reduce vectors when practicable and effective.
- The maintenance of a temperature of at least 55 degrees centigrade in composting materials which discourages pathogen growth; and
- The immediate cleanup of spills.

29.2 Facility Program Evaluation

The Facility VC plan will be evaluated every at least once a year. The OIC will consult with professional resources to evaluate the effectiveness of the VC program and to develop improvements as needed.

The Facility reserves the right to train its employees and obtain applicable licenses and/or certifications to apply pesticides at the Facility or contract with a professional service provider. Pesticides would be applied in accordance with manufacturers' instructions and in conformance with applicable federal, state, and local regulations.

29.3 Records and Documents

A weekly log will be kept on file by the OIC, or designee, and will include:

- Vector inspection results;
- Applications of pesticides, including type, brand, and purposes; and
- Vector activity sightings, including identification of the vector (if known), number seen, other evidence (such as animal droppings), date, time, and location.

Section 30. Security

30.1 Facility Access

Access to the Facility will be controlled to prevent disposal of unauthorized and prohibited materials, and scavenging. The following measures will be implemented:

- Unauthorized access will be prohibited.
- The Facility will be enclosed with fencing and vehicle access will be controlled through a locked entry gate.
- No trespassing and notification signs will be maintained around the perimeter of the Facility.
- All truck traffic must proceed directly to the material unloading area and supervised by the on-site staff.
- Clearly posted signage at the Facility entrance will specify a 10-mile per hour speed limit on the entrance road. The maximum speed allowed in the processing area will be 5-miles per hour. Parking will be allowed only in designated areas.
- Only vehicles authorized by the OIC, personal vehicles of employees, and authorized haul vehicles will have access beyond the Facility entrance, and all vehicles will be closely monitored.
- The Facility business hours are Monday through Saturday, 7:00 a.m. to 6:00 p.m. During these times, the Facility is open to sell compost. Feedstock receiving, off-loading, loading, and processing preparation will be limited to daylight hours. Composting operations will sometimes be performed outside those hours as required by weather or other factors.
- Security lighting will be provided in the vicinity of the Facility entrance and office trailers.
- The entrance/exit gates will be secured when the Facility is not operational. After-hours access will be allowed only with prior arrangement with the Facility manager.
- Security personnel will be present on-site outside of operating hours. Security personnel will be made aware of the site hazards and will be provided the list of emergency contact information.
- The fence, gates, and roads will be inspected on a weekly basis. Any access breach or unsafe condition will be repaired as soon as practical and will be noted in the Facility weekly log.
- Facility personnel will coordinate with local law enforcement officials (i.e., police/sheriff, highway patrol, emergency medical corps units, fire department, and utility emergency teams) in the event of any emergency situation.

Section 31. Emergency Action Plan

The following plans will be implemented in each emergency.

31.1 Spills

Spills at the Facility will follow steps outlined in the Spill Containment and Contingency Plan described in Section 33.

31.2 Fire

The OIC or designee will perform the following:

- Attend to the immediate safety of personnel and visitors.
- Call 911 and report any fires. All staff will carry cellular phones which will be used to contact emergency assistance.
- If the fire is small and localized, control the spread of the fire.
- If needed, use a loader, bull dozer, or other earth moving equipment to create a fire break or extinguish small fires with dirt.
- The local fire response has equipment and experience to fight rural fires.

31.3 Medical

The OIC or designee will perform the following:

- See to the immediate safety of the injured person(s), personnel, and visitors.
- If the injury is not critical and only requires first aid, first aid will be applied.
- Call 911 and report the medical emergency, if needed. All staff will carry cellular phones which will be used to contact emergency assistance.
- MSDS sheets will be provided in the event of a chemical exposure.

31.4 Adverse Weather

Adverse weather includes tornados, lightening, and high wind conditions. In the event of adverse weather conditions, the OIC will perform the following:

- Receive advance notification from the local weather station as to the extent and nature of the impending weather emergency.
- Relay emergency actions required to staff and visitors.

31.5 Health and Safety Training

Facility personnel will be trained in the Facility's health and safety plan to include required OSHA training. The OIC will assess training needs and develop a training program to meet regulatory requirements.

Section 32. Fire Prevention and Control Plan

32.1 Fire Response

The Sealy Fire Department and San Felipe- Frydek Volunteer Fire Department will receive Tier I reports that list the amount and types of stored materials on a facility map, annually. Additionally, SouthWaste will provide these departments with a description of the nature of the Facility and its location, as well as a copy of this Fire Prevention and Control Plan.

Staff will attempt to control small fires using rural firefighting techniques. Staff will call 911 if the fire is too large to control.

Staff may install fire breaks during fires to reduce off-site migration of the fire. Fire breaks generally consist of plowed areas around fire perimeter or perimeter fencing.

Equipment for staff response to fires consists of fire extinguishers, area soil, and front-end loader.

In the event of a fire with visible flames, SouthWaste will immediately notify the local fire department. Emergency contact information is provided in Table 13.

Table 13. Emergency Contact Information

Agency	Emergency Phone Number	Non-Emergency Phone Number
Sealy Fire Department 1207 Highway 90 W Sealy, TX 77474	911	(979) 885-2222
San Felipe- Frydek Vol. Fire Department 15023 Fm 1458 Rd Sealy, TX 77474	911	(979) 885-7081
Austin County Sherriff 417 N. Chesley St. Bellville, TX 77418	911	979-865-3111

32.2 Fire Prevention

Non-hazardous materials handled by the Facility do not typically pose fire hazards but staff must stay alert for signs of fire such as smoke, steam, or excessive heat. As a cooperative rural community, adjacent agricultural operations will stay alert to signs of fire to assist neighboring operations in the control of fires.

Fire prevention techniques include:

- Equipment will be regularly cleaned to remove combustible waste and caked material which can cause overheating and increase fire potential.
- Smoking will not be permitted near material management areas. Designated smoking areas at the office will be equipped with proper disposal containers.
- No smoking signs will be placed near material management areas.
- The presence of the earthen berms surrounding the processing area will inhibit the spread of fire to or from the composting material.
- Fire lanes will be maintained around the Facility, including feedstock storage tanks and processing areas.
- The potential for fires within the composting material will be limited by the maintenance of a moisture content near 60 percent.
- Vegetation within 25 feet of the processing and storage areas will be watered and mowed as much as practicable.
- As required by the 2003 International Fire Code, bulking material storage piles and compost material piles will not exceed 25 feet in height, 150 feet in width, or 250 feet in length.
- All storage piles will be accessible by fire-fighting equipment via access roads.
- Sufficient ABC type fire extinguishers are located on-site.
- Staff will be alert to signs of fire such as smoke, heat, or odors.
- Fire extinguishers are visually inspected monthly by staff with an annual inspection/maintenance completed by a State licensed fire protection contractor.
- Compost materials that may generate heat will be turned periodically to reduce internal temperature.

32.3 Fire Control

Water will be available for firefighting from a potable well water source. Additionally, water for firefighting will be obtained from the Facility's retention pond.

The local fire department has vehicles specifically outfitted to pump water, including carrying a water reservoir and using drafting and water tenders to obtain further supply typically used in a rural area.

Rural firefighting techniques that include fire breaks and other firefighting techniques will be applied. Equipment available on-site for the use in firefighting will include:

- Fire extinguishers;
- Retention pond, pump, and hoses;
- Vacuum truck, or equivalent; and
- Front-end loader.

In the event of a smoldering fire (i.e., evidenced by smoke but with no visible flames), the vacuum truck, or equivalent, can be filled using water from either the retention pond or the municipal water supply, and then can spray the water directly on the fire and surrounding combustible materials. The front-end loader will be used, as necessary, to physically separate any smoldering or burning materials from other combustible materials. After the fire is extinguished, the front-end loader will be used to break apart the burnt material to allow the material in the interior of the pile or windrow to be saturated with water to prevent re-ignition or smoldering.

Firefighting equipment is readily available for small fires. For fires too large for the Facility staff to handle, the county has an emergency response system that responds to fires. The jurisdictional fire department will respond to fires that cannot be controlled by staff.

32.4 Staff Training

All staff will be trained in fire prevention, to recognize signs of fire, and to inspect equipment. Staff will be trained to properly use fire extinguishers and emergency evacuation procedures.

The OIC will have additional training in fire break construction and fire buffer maintenance to prevent off-site fire migration.

The local fire department will be called in the event the fire is too large for staff to control.

Section 33. Spill Containment and Contingency Plan

Storage and processing areas are designed to control and contain spills or contaminated water from leaving the Facility. The design is sufficient to control and contain a worst case spill or release for precipitation from a 25-year, 24-hour storm.

33.1 Leak Detection

33.1.1 Storage Tanks

A weekly inspection of liquid feedstock storage tanks for leaks or spills will be performed. Accumulated stormwater within the secondary containment berm surrounding the storage tanks will be inspected for contamination and pumped out and sprayed onto the composting pad.

33.1.2 Liner

The geomembrane liner will be periodically inspected for cracks to prevent pollutant transport. Repairs will be made within two weeks. Damaged areas identified throughout the synthetic liner

will be replaced or repaired in accordance with the Liner Quality Control Plan (Appendix M). Repairs for the clay liner include rewetting and packing the surface layer to a depth of 6 inches.

33.2 Spill Prevention and Control

Spill prevention and control have been developed for receiving and transfer areas. The following discusses each measure for each area. When a spill is discovered, the emergency action plan for spills will be followed.

33.2.1 Receiving and Liquid Feedstock Transfers

Liquid feedstock will be pumped into the liquid feedstock storage tank unless it is being directly sprayed onto the composting pad. Liquid waste haulers are directed to the designated unloading area located near the storage tanks.

Liquid feedstock within the storage tanks will be routinely measured to determine the volume stored within each tank. An attendant monitors transfer hoses for leaks and spills.

The tanks will be contained in the secondary containment system and daily inspection will be performed to check for leaks and spills. Spills will be cleaned up by vacuuming liquids and transferring the material into the liquid feedstock storage tanks. Residual solids will be excavated and disposed off-site to a permitted MSW landfill.

Stormwater is inspected for evidence of contamination. If the stormwater is determined to be contaminated, the water is pumped into the liquid feedstock storage tank for processing. If the stormwater is determined to not be contaminated, the stormwater is discharged into the stormwater drainage system in a manner that will prevent erosion and flooding.

33.2.2 Sanitation

Wash-water will be collected and diverted to the liquid feedstock storage tanks for processing. The OIC will monitor the clean-up and collection procedures for leaks and spills. Spills will be cleaned up and liquids will either be applied to the windrows, diverted to the liquid feedstock storage tank, or discharged to the stormwater retention pond.

33.3 Spill Emergency Actions

The emergency action plan procedures in the event of a spill are:

- Liquid spills will consist of the following actions:
  - If spill is outside secondary containment, then earthen berms or spill booms will be utilized in order to contain the spill.
  - If feed stock spills, the reclaimed material will be returned to the liquid feedstock storage tanks.
  - If fuel and chemical spills, the material will be remediated and disposed of to provide the most effective mitigation.

- Solid spills will consist of the following actions:
  - Solids will be protected from stormwater incursion
  - Solids will be remediated and disposed of to provide the most effective mitigation.
- Spills will be remediated to background levels of soil and groundwater or appropriate regulatory assessment levels.
- Reportable quantities will be reported as required by federal, state, or local rules or regulations.

Section 34. Recordkeeping and Reporting Requirements

34.1 Recordkeeping

A copy of the permit, the approved permit application, and any other required plans or other related document will be maintained at the Facility at all times during construction.

After completion of construction, an as-built set of construction plans and specifications will be maintained at the Facility. The plans will be made available for inspection by agency representatives or other interested parties. These documents will be considered a part of the operating record for the Facility.

The OIC will promptly record and retain, in an operating record, the following information:

- All location-restriction demonstrations;
- Inspection records and training procedures;
- Closure plans and any monitoring, testing, or analytical data relating to closure requirements;
- All cost estimates and financial assurance documentation relating to financial assurance for closure;
- Copies of all correspondence and responses relating to the operation of the Facility, modifications to the permit, approvals, and other matters pertaining to technical assistance;
- All documents, manifests, shipping documents, trip tickets, involving special waste;
- Any other document(s) as specified by the approved authority or by the executive director; and
- Record retention provisions for trip tickets as required by 30 TAC §312.145.

The following records will be maintained on-site permanently, or until facility closure:

- TCEQ facility operating permit;

- Sampling plan and procedures;
- Staff training and certification records;
- Maturity protocol test results; and
- Annual groundwater sampling results.

Records will be maintained on-site and available for inspection by the executive director for a period consisting of the two most recent calendar years of the following:

- A log of abnormal events at the Facility, including, but not limited to, hazardous constituents uncovered, fires, explosions, process disruptions, extended equipment failures, injuries, and weather damage; and
- Results of monthly final product testing report. Documentation of final product testing will be maintained for a period of three years after the final product is shipped off-site or after facility closure.

Copies of the annual reports will be kept on-site for a period of five years following submittal to the TCEQ.

34.2 Signatory

For signatories to reports, the following conditions apply:

- An Officer of the Corporation will sign all reports and other information requested by the executive director.
- Any person signing a report will make the certification in accordance with 30 TAC §305.44(b).

34.3 Reporting Requirements

All plans described in the site operating plan presented above will be furnished upon request to the executive director and will be made available at all reasonable times for inspection by the executive director.

The Facility will retain all information contained within the operating record and the different plans required for the Facility for the life of the Facility.

34.3.1 Documentation and Reporting of Final Product Testing

Final product documentation maintained will include:

- Batch numbers identifying the final product sampling batch;
- Quantities, types, and sources of feedstocks received and the dates received (this information is typically documented on the manifest form that accompanies each delivery of feedstock);

- Quantity and final product grade assigned or the permit number of the disposal facility receiving the final product;
- Date of sampling; and
- Analytical results used to characterize the final product including laboratory quality assurance and quality control (QA/QC) data and chain-of-custody documentation.

A monthly final product testing report will be submitted to the TCEQ within two months after the end of the reporting period. The monthly final product testing report will include the above information for each batch of final product sampled that month.

34.3.2 Annual Reporting

An annual report will be prepared and submitted to the TCEQ. The annual report will provide the following information for the year of the report:

- Documentation of compost input and output quantities;
- Description of the end-product distribution;
- All results of any required compost laboratory testing; and
- Groundwater sampling results.

Annual reports will be prepared and submitted to the TCEQ not later than 45 days following the calendar year.

Section 35. Sampling and Monitoring

35.1 Facility Inspections

35.1.1 Inspection Locations and Procedures

The Facility will be inspected for the items listed in Table 14.

35.1.2 Reporting Requirements

Inspections logs will be maintained in Facility records. Noncompliance items will be reported if required to TCEQ.

35.2 Odor Audit/Investigation

Matrix and Location. Monitoring will be conducted along the route to and from the Facility, at the gate, and at the Facility. Particular attention should be paid to odors that are detected beyond the 50-foot buffer of the Facility.

Purpose. The purpose of the audit is to determine the cause of the odor and corrective actions and as a preventive measure for nuisance conditions.

Table 14. Facility Inspections

Item	Task	Frequency
Fence/gates	Inspect perimeter fence and gates for damage. Make repairs if necessary.	Weekly
Windblown material or waste	Check working area, access roads, entrance areas, and perimeter fence for loose trash. Clean up as necessary.	Daily
Facility access road	Inspect Facility access road for damage from vehicle traffic, erosion, or excessive mud accumulation. Maintain as needed.	Daily
Facility signs	Inspect all Facility signs for damage, general location, and accuracy of posted information.	Weekly
Run off or pooled water	Inspect all areas that are exposed to stormwater for erosion or pooling. Inspect all areas for liquids pooled on the composting pad and storage areas. Clean up within 2 weeks. Repair or redesign as necessary.	Weekly
Unauthorized entry	Inspect for signs of unauthorized entry of humans and animals. Make repairs or review security plan.	Weekly
Equipment	Inspect loader, excavator, chipper/grinder, and transfer trucks for leaks, and operation efficiency. Repair as needed.	Weekly
Geomembrane liner	Inspect weekly for cracks. Repair as needed. Wet Clay liner periodically to prevent cracking. Re-compact if crack compromises the integrity of the liner. Patch material can be used as specified by the manufacturer for the synthetic liner.	
Seepage in and around the composting facility.	Inspect areas around the liners for seepage. Makes repairs as needed.	Weekly

Frequencies. A daily audit will be performed during operations hours. A frequency, intensity, duration, and offensiveness (FIDO) (TCEQ, 2007) inspection will be performed if an odor is detected.

Collection Procedures. If an odor is detected, the OIC will perform an odor investigation:

1. Locate and assess the odor
    a. Describe the intensity and offensiveness of any odors observed using the TCEQ Odor Log, which can be downloaded for the TCEQ website at http://www.tceq.texas.gov/assets/public/compliance/odor-log-public.pdf
    b. Describe any physical effects experienced by the investigator which are indicative of adverse effects upon health (burning eyes, nose, throat, headache, vomiting, etc.)
    c. Determine and document the extent of the odor plume. Document on a map of the vicinity the odor survey route, the time the investigator was at each location, and the odor observations at each location. This survey should include upwind and downwind observations at least.
2. Locate the source(s) of the odor.
3. Locate the specific cause of the odor (i.e., the specific compound, equipment, or process emitting the odor, and the reason(s), such as a plant upset).
4. Document estimates of wind speed and direction, temperature, humidity, precipitation, and sky cover.

5. If odors have been detected at the same location at other times, document a comparison of the current observations with the prior observations.

6. Correct or initiate procedures for odor control and eliminate nuisance conditions. Nuisance conditions exist if "an odor has been emitted in such concentration and duration as to be injurious to or adversely affect human health, welfare, animal life, vegetation, or property, or interfere with normal use and enjoyment of animal life, vegetation, or property."

FIDO results will be maintained in Facility records. Corrective actions will be maintained in the Facility records.

35.3 Compost

Compost will have visual inspections and lab analysis as required by TCEQ Compost rules 30 TAC §332.71. Two types of sampling and analysis will be performed; sampling and analysis for maturity and sampling and analysis for final product grading.

35.3.1 Sampling and Analysis for Maturity

At the completion of the composting process, a maturity protocol will be developed by SouthWaste to measure the potential for biological activity in the composted materials. Maturity protocol testing will be performed during the first 18 months after permit issuance.

Development of the maturity protocol will include sampling to measure the reduction of organic matter (ROM) in composting material from the time it is initially mixed until it is mature. The ROM will be calculated using the Loss-on-Ignition Organic Matter (LOI) method. To address seasonal variations in compost feedstock during maturity protocol development, four sets of maturity protocol samples will be collected and analyzed as follows:

1. Sample 1 batch when initially mixed during the first quarter of the first operating year, and then at 60 days, at 120 days, and at 180 days after initial mixing.
2. Sample 1 batch when initially mixed during the second quarter of the first operating year, and then at 60 days, at 120 days, and at 180 days after initial mixing.
3. Sample 1 batch when initially mixed during the third quarter of the first operating year, and then at 60 days, at 120 days, and at 180 days after initial mixing.
4. Sample 1 batch when initially mixed during the fourth quarter of the first operating year, and then at 60 days, at 120 days, and at 180 days after initial mixing.

The results of the ROM analysis of the initially mixed samples will be compared to the ROM results of the 60-day, 120-day, and 180-day samples. Compost will be considered "mature," when the reduction of organic matter from the initially mixed material is between 40 and 60 percent. Compost will be considered cured when the reduction of organic matter from the initially mixed material is greater than 60 percent.

The maturity testing sampling results will be evaluated to establish a typical baseline organic matter content for initial mixes, a typical baseline organic matter content for cured compost, and an estimated composting duration necessary to achieve cured compost. This information will be

used to develop recommended maturity testing methods and frequencies to allow the classification of compost into maturity grades, and the identification of materials that are stable but not mature. This will constitute the maturity protocol. The maturity protocol will be submitted to the TCEQ for review and approval, as well as for any future revision. Once approved, the maturing protocol will be used to classify all future compost.

Maturity protocol testing and the maturity testing results for final products for classification will be documented and maintained as described in Section 35.3.1.

35.3.2 Sampling and Analysis of Final Product

In addition to maturity testing, all batches of final product will be analyzed for the parameters listed in Table 15.

Table 15. Final Product Analytical Requirements and Standards

Parameter	Analytical Method	Final Product Standards for Grade 1 Compost	Final Product Standards for Grade 2 Compost
Total Metals			
As	SW-846, Method 6020	≤ 10 mg/kg	≤ 41 mg/kg [a]
Cd	SW-846, Method 6020	≤ 16 mg/kg	≤ 39 mg/kg [a]
Cr (total)	SW-846, Method 6020	≤ 180 mg/kg	≤ 1,200 mg/kg [a]
Cu	SW-846, Method 6020	≤ 1,020 mg/kg	≤ 1,500 mg/kg [a]
Pb	SW-846, Method 6020	≤ 300 mg/kg	≤ 300 mg/kg [a]
Hg	SW-846, Method 7470	≤ 11 mg/kg	≤ 17 mg/kg [a]
Mo	SW-846, Method 6020	≤ 75 mg/kg	≤ 75 mg/kg [a]
Ni	SW-846, Method 6020	≤ 160 mg/kg	≤ 420 mg/kg [a]
Se	SW-846, Method 6020	≤ 36 mg/kg	≤ 36 mg/kg [a]
Zn	SW-846, Method 6020	≤ 2,190 mg/kg	≤ 2,800 mg/kg [a]
Maturity / Stability	Maturity Protocol (see Section 35.3.1)	> 60% Reduction of Organic Matter	> 20 % Reduction of Organic Matter
Weight% Foreign Matter	Dry weight basis	1.5% on a 4mm screen	1.5% on a 4mm screen
pH	North Central Regional Method 14 for Saturated Media	5.0 to 8.51	5.0 to 8.5 1
Salinity	North Central Regional Method 14 for Saturated Media	10 mmhos/com	10 mmhos/com
Pathogens			
Salmonella	Standard Methods for the Examination of Water and Wastewater, Water Pollution Control Federation	< 3 MPN per 4 grams total solids or meets PFRP	No Value
Fecal Coliform		< 1,000 MPN per gram of solids or meets PFRP	Geometric mean density <2,000,000 MPN per gram of solids or meets PFRP
PCBs	SW-846, Method 8082	1 mg/kg	10 mg/kg

[a] Metals concentrations are for a cured compost. Compost which is semi-mature or mature will have the metal concentrations adjusted to reflect the metal concentration that would be present if the compost met the criteria of a cured compost.

[b] A conductivity or pH outside the indicated range may be appropriate if the compost is specified for a special use.

PFRP = Processes to further reduce pathogens
MPN = Most probable number
PCBs = Polychlorinated biphenyls

A final product grade will be assigned prior to sale based on the standards listed in Table 15 above. The following paragraphs describe sample collection and analyses requirements for final products.

The following paragraphs describe sample collection and analyses requirements for final products.

Collection. At a minimum, one sample will be collected either for every 3,000 cubic yards of final product, or one sample will be collected monthly, whichever is more frequent. Each sample will consist of nine grab samples which will be collected as follows:

- Three grab samples will be collected from the base of the windrow or stockpile, at least 12 inches into the pile at ground level.
- Three grab samples will be collected from the exposed surface of the windrow or stockpile.
- Three grab samples will be collected from a depth of 2 feet from the exposed surface of the windrow or stockpile.

The nine grab samples will be combined and thoroughly mixed to form a composite. A single sample will be collected and analyzed from the composited sample material.

After one year of final product testing, a request for an alternative testing frequency may be submitted to the TCEQ in accordance with 30 TAC §332.71 (f)(3).

Sample Analysis. Final product samples will be analyzed for the parameters and by the methods listed in Table 15, and the analytical results will be used to assign a final product grade. Product grades include Grade 1 Compost, Grade 2 Compost, and Waste Grade Compost. Grade 1 Compost and Grade 2 Compost will not contain foreign matter of a size or shape that can cause human or animal injury, and will meet the other applicable standards presented in Table 15. Waste Grade Compost is any material that does not meet the final product standards for either Grade 1 or Grade 2.

35.4 Groundwater

After completion of the following analysis, an original and two copies of each analysis will be sent to the executive director and a copy will be maintained on-site.

35.4.1 Background Samples

Four background groundwater samples of the monitor well will be provided to TCEQ within 24 months from the date of the issuance of the permit.

Background levels will be established from samples collected from each well at least once during each of the four calendar quarters: January to March; April to June; July to September; and October to December. Samples from any monitoring well will not be collected for at least 45 days fo11owing the collection of the previous sample from that well, unless that new sample

is intended as a replacement. At least one sample per well will be collected and submitted to a laboratory for analysis within 60 days of permit issuance.

Background groundwater samples will be analyzed for the laboratory and field parameters listed in Table 16.

Table 16. Groundwater Sampling Parameters

Sampling Parameter	Background Sampling	Annual Sampling	Method
Heavy metals			
Arsenic	X		EPA 6020
Barium	X		EPA 6020
Cadmium	X		EPA 6020
Chromium	X		EPA 6020
Copper	X		EPA 6020
Iron	X	X	EPA 6020
Lead	X		EPA 6020
Mercury	X		EPA 7470A
Selenium	X		EPA 6020
Zinc	X		EPA 6020
Other parameters			
Calcium	X		EPA 6020
Magnesium	X		EPA 6020
Manganese	X	X	EPA 6020
Sodium	X		EPA 6020
Carbonate	X		SM2320B
Bicarbonate	X		SM2320B
Sulfate	X		EPA 300
Fluoride	X		EPA 300
Nitrate (as N)	X		EPA 300
Total Dissolved Solids	X	X	SM2540C
Phenolphthalein Alkalinity as CaCo3	X		SM2320B
Alkalinity as CaCo3	X		SM2320B
Hardness as CaCo3	X		SM2340B
pH	X	X	In-field measurement
Specific Conductance	X		In-field measurement
Anion-Cation Balance	X		Calculated based on anion/cation lab data
Total Organic Carbon (4 replicates will be collected per sample)	X	X	ASTM D2974/EPA 415.1
Chloride	X	X	EPA 300

Background sampling results will be reported to the TCEQ as discussed in Section 36.1.12.

35.4.2 Annual Samples

Following the completion of background groundwater sampling described in Section 35.4.1, each groundwater monitoring well will be sampled annually. Depth to groundwater and pH will be measured and documented each time a monitoring well is sampled. Annual groundwater samples will be analyzed for total organic carbon (4 replicates per sample), iron, manganese, chloride, and total dissolved solids. Analytical methods for these parameters will be the same as those used for background sampling (Table 16).

35.4.3 Analytical Methods

The analytical methods are noted in Table 16 conform to TCEQ and U. S. Environmental Protection Agency (EPA) approved testing methods. The practical quantitation limits for the constituents of concern will be set by standard methods or detection limits, whichever is lower. The detection limits will be below the maximum contaminant level values or as low as practicably feasible.

The quantitation limits will be set and reviewed with the contract laboratory. The review of limits will take place at least annually or when a new contract laboratory is used.

35.5 Data Precision and Accuracy

Data precision and accuracy will comply with the methods used for each matrix and parameter. The contract laboratory will document the data precision and accuracy requirements and any deviations.

35.6 Documentation

Field conditions and analysis will be documented on the chain of custody for each sampling event. Laboratory analysis procedures, QA/QC, and any deviations will be documented in the Laboratory Case Narrative.

35.7 Reporting Requirements

Sample analytical results will be reported to the TCEQ in a data package that contains, at a minimum, the analytical test reports documenting the analytical results and methods for each sample and analyte. The test reports will include the method-required quality control information needed to evaluate the analytical results of sampling and analysis with comparison to quality control standards and corrective action upon failure.

SouthWaste will ensure that the results of each test analysis carried out by the laboratory will be reported:

- Accurately, clearly, unambiguously, and objectively, and in accordance with any specific instruction in the test method, work plan, permit, or program.
- In a test report and include all the information required for TCEQ submission and necessary for the interpretation of the test results and all information required by the method used, project quality objectives, or permit.

- Unless otherwise specified by project objectives, all analytical results reported for sludge, compost, soil, and sediment samples will be reported on a dry weight basis with the percent solids (or percent moisture) also reported on the test reports, to allow back calculation of the result to a wet weight basis.
- Includes at least the following information, unless the laboratory has valid reasons for not doing so:
    - A title (e.g., "test report");
    - The name and address of the laboratory or facility and the location where the test and calibrations were carried out;
    - Unique identification of the test report, and on each page an identification in order to ensure that the page is recognized as a part of the test report;
    - Name and address of the owner;
    - Identification of the analytical method used;
    - Dates of measurements, as well as the report date;
    - Reference to the sampling plan and procedures used by the laboratory where these are relevant to the validity or application of the results;
    - The test results and units of measurement;
    - The names, functions, and signatures or equivalent identification of persons authorizing the test report; and
    - Where necessary for the interpretation of the test results, a laboratory case narrative as described below.

Section 36. Quality Assurance and Quality Control

36.1 Sampling, Monitoring, and Inspection

A sampling QA/QC program has been developed and will be periodically revised to reflect analysis and contract laboratory QA/QC requirements. The contracts laboratory will be periodically reviewed to ensure the standards in this chapter and future standards are met.

The QA/QC program establishes field and laboratory sampling and analysis procedures for all tested analytes to ensure proper collection preparation and analysis of representative samples. The QA/QC program also evaluates completeness, correctness, and conformance or compliance of a specific data set against method, procedural, or contractual requirements.

To achieve accuracy (correctness) and completeness, the owner adopts acceptable data quality standards and ensures that all sample collection, preparation and analyses, and data management activities are conducted in accordance with the standards. These activities will be reviewed regularly to ensure compliance with the standards. QC checks must be performed and corrective action taken when indicated.

36.1.1 Records Control

The OIC will ensure that all QA/QC records are legible and stored and maintained in such a way that they are readily retrievable and stored in an acceptable environment to prevent damage, deterioration, or loss. At a minimum, analytical records retention will meet a five-year record retention schedule.

36.1.2 Matrix Spikes and Matrix Spike Duplicates

The OIC will ensure that:

- The data package will include matrix spikes and matrix spike duplicate sample recovery percentages and relative percent differences for each matrix and analyte.
- The subset will include analytes representative of the chemical properties of the project analytes of concern, if analytes are not specified for a project only a subset of the project analytes are evaluated with matrix spikes and matrix spike duplicates.
- Each matrix spike and matrix spike duplicate test report will include the following:
  - Spike concentration added to the sample;
  - Measured concentration of the analyte in the unspiked sample;
  - Measured concentration of the analyte in both the matrix spike and matrix spike duplicate;
  - Calculated percentage matrix spike/matrix spike duplicate recoveries and relative percent difference; and
  - Laboratory and/or method quality control limits (acceptance criteria) for both matrix spike/matrix spike duplicate recovery and relative percent difference.
- The data set will include the laboratory batch number and the laboratory identification number of the sample spiked.
- The laboratory will perform matrix spikes at a minimum frequency of one out of every 20 samples per matrix type, except for analytes for which spiking solutions are not available (e.g., total dissolved solids, total volatile solids, total solids, pH, color, temperature, or dissolved oxygen).

When results of the matrix spikes and matrix spike duplicate are outside of the acceptable limits, The OIC will arrange for the laboratory to check other quality control results (e.g., laboratory control sample), and, if appropriate, have the laboratory qualify the results or use another analytical method. The results of the matrix spikes and matrix spike duplicate are sample and matrix- specific and may not normally be used to determine the validity of the entire batch of samples.

36.1.3 Method Blanks

The OIC will ensure that the laboratory reprocess any sample associated with the contaminated blank that exceeds a concentration greater than one-tenth of the measured concentration of any sample in the associated batch or exceeds the concentration present in the samples and is greater than one-tenth of a specified regulatory limit for analysis or the results reported with appropriate data-qualifying codes and submitted in the data package. These are minimum criteria to be used in cases where blank acceptance criteria are not defined in the referenced methodology used for analysis.

36.1.4 Laboratory Control Samples and Laboratory Control Sample Duplicates

The laboratory control sample and laboratory control sample duplicate are composed of a sample matrix that is free from analytes of interest and spiked with known amounts of analytes or material containing known and verified amounts of analyses. The laboratory control sample and laboratory control sample duplicate are used to establish intra-laboratory or analyst-specific precision and accuracy of certain parts of the analytical methodology.

The OIC will ensure that the laboratory:

- Analyzes laboratory control samples at a minimum of 1 each per batch of 20 samples or less, per matrix type, except for analytes for which spiking solutions are not available. A laboratory control sample duplicate will be processed with the batch where needed to demonstrate precision.

- Calculate the results of the laboratory control sample to assess precision based on the recovery percentages of the analytes of interest within the analytical methodology.

36.1.5 Surrogates

The OIC will have the laboratory review the surrogate recoveries used to measure method efficiency. The laboratory can, with qualifications, estimate the overall method efficiency.

36.1.6 Data Reduction, Evaluation, and Review

The OIC will ensure that a data reviewer consider the project data quality objectives to determine if the sample test results meet the project needs with regard to completeness, representativeness, and accuracy (bias and precision).

The OIC will review all data prior to submittal for commission review. The data review will include examination of the quality control results and other supporting data, including any data review by the laboratory, and will identify any potential impacts such as bias on the quality of the data using qualifiers in the test reports tied to explanations in footnotes and in the laboratory case narrative.

The criteria used to evaluate each quality control parameter will be defined in the OIC's sampling and analysis plan, project quality objectives, and/or other reference(s) of documented analytical laboratory or method criteria.

The OIC will ensure that the recordkeeping system allow historical reconstruction of all laboratory activities used in the data reduction, validation, and review of the analytical data.

36.1.7 Matrix Interferences and Sample Dilutions

The OIC will ensure that the laboratory:

- Documents and reports problems and anomalies observed during analysis that might have an impact on the quality of the data. The laboratory must document any evidence of matrix interference or any situation where the analysis is out of control (quality control results outside of laboratory or method limits), as well as the measures taken to eliminate or reduce the interference or corrective action to bring the analysis back into control.
- Uses the smallest dilution factor needed to overcome or minimize a problem of matrix interference or to bring an analysis back into control

36.1.8 Chain of Custody

Chain of custody forms are used to document custody of the samples during collection, transport, and initial receipt of samples at the analytical laboratory. A laboratory may also use chain of custody forms to document the movement and analysis of samples within the laboratory.

The Operator will ensure that the laboratory:

- Submit all data packages with completed field chain of custody forms and other documentation, including the following:
  - Field sample identification;
  - Date and time of sample collection;
  - Preservation type;
  - Analytical methods requested and/or analytes requested;
  - Signatures of all personnel with custody prior to receipt by the laboratory;
  - Signature of laboratory personnel taking custody samples; and
  - Date and time of custody transfers.
- Document if samples are received outside of the recommended holding times for a particular analyte or method.
- Record, upon receipt, the condition of the sample, including any abnormalities or departures from standard conditions as prescribed in the relevant test method.
- Have procedures for checking the chemical preservation using readily available techniques prior to or during sample preparation or analysis.
- Store samples according to the conditions specified by preservation protocols.

All samples that require thermal preservation will be considered acceptable if the arrival temperature is either within 2 degrees Celsius (°C) of the required temperature or the method specified range. For samples requiring thermal preservation to 4°C, a temperature ranging from just above the freezing temperature of water to 6°C will be acceptable.

36.1.9 Sample Collection and Preparation

The OIC will:

- Collect adequate sample volumes for all analytical needs for subsequent testing or analyses, when possible.
- Base sampling plans, whenever reasonable, on appropriate statistical methods. Sampling procedures should describe the selection, sampling plan, collection, and preparation of a sample or samples from a waste or medium.
- Collect representative samples of the waste or medium. The concentration of the analyses of interest, the types of analyses, and the sample media will determine the sample volume requirements.
- Ensure that the method and federal regulatory program requirements for these sample management aspects be followed for all methods of testing and, if violated, have the data flagged and qualified.
- Ensure that field personnel have procedures for recording relevant characteristics and other data relating to the sampling operations that form part of the testing or measurement that is undertaken.
- Ensure that chain of custody records and field notes include the sampling procedure used, the identification of the sampler, environmental conditions (if relevant), diagrams, or other equivalent means to identify the sampling location, and all associated sample identification numbers.

36.1.10 Analytical Method Detection Limits and Method Performance

The OIC will ensure that:

- The laboratory determines detection limits by the protocol in the mandated test method or applicable federal or state regulation.
- The laboratory uses a test method that provides a detection limit that is appropriate and relevant for the intended use of the data and establishes procedures to relate method detection limits with the practical quantitation limits.
- All samples are analyzed according to methods specified by TCEQ or U.S. EPA programs.
- If the protocol for determining detection limits is not specified in the test method, the selection of a procedure must reflect instrument limitations and the intended application

of the test method. Whenever possible, analytical methods must have method detection levels that are one-fifth to one-third of the regulatory action level.

- It reviews all quality control data within the data package subject to compliance with the TCEQ and federal programs which will include information regarding precision, bias, and accuracy.
- Data with quality control results outside of the quality control limits should be flagged in the data package with explanation of problems encountered by the laboratory and the corrective action(s) attempted to resolve the analytical problems.
- The laboratory documents all corrective action associated with the analysis and maintains all records.

Failure to meet the quality control goals in accordance with the data quality standards of the study does not necessarily mean the data are unusable.

36.1.11 Instrument and Equipment Calibration and Frequency

The OIC will ensure that:

- The laboratory maintain equipment in proper working order and calibrate equipment and devices that may not be the actual test instrument, but are necessary to support laboratory operations and measurements as often as recommended by the manufacturer, using National Institute of Standards and Technology (NIST) traceable references when available, over the entire range of their use. These include, but are not limited to: balances, ovens, refrigerators, freezers, incubators, water baths, and temperature measuring devices. Calibration results will be within the specifications required for each application or measurement for which this equipment is used.
- The laboratory will maintain records of corrective actions implemented to correct all measurements.
- Standards used for the calibration of field instruments are, when available, traceable to certified standards or reference material.
- The laboratory equipment is calibrated or standardized against NIST traceable reference materials and standards.
- Documentation of the certificate of analysis and traceability of the standards and reagents is maintained by field or laboratory personnel.
- Calibration of field instruments and equipment is performed at approved intervals as specified by the manufacturer or more frequently as conditions dictate. Calibrations may also be performed at the start and completion of each test run.
- Records of calibration, repair, or replacement are filed and maintained by the designated field staff.

- Calibration and standardization of laboratory equipment are based on procedures described in each contract laboratory quality assurance plan or standard operating procedure.
- Records of calibration, repair, or replacement are filed and maintained by the designated laboratory personnel performing quality control activities in accordance with manufacturer requirements.
- Calibration records are filed and maintained at the laboratory location where the work is performed and subject to commission review during a quality assurance audit.

36.1.12 Laboratory Case Narrative

The OIC will ensure that the laboratory case narrative:

- Explains each failed precision and accuracy measurement determined to be outside of the laboratory and/or method control limits, and the effect of the failure on the results (positive or negative bias) when reporting QC results (precision and accuracy).
- States the exact number of samples, identification numbers, testing parameters, and sample matrix, as well as the name(s) of the laboratory(ies) involved in the analysis.
- Includes a statement of the test objective regarding the samples.
- Identifies the applicable QA/QC samples that require special attention by the reviewer, including field, trip, and laboratory blank(s); duplicate(s); field spike(s); QA audit sample(s); and laboratory control samples.
- Includes an acknowledgment and reference to current standards regarding sample holding, extraction, and analytical times along with a statement explaining whether the standards were met.
- Describes the extent of the delay and, if possible, provides an estimate of the bias within the data if samples are not analyzed within the prescribed holding times.
- Includes a statement that the laboratory conducting the analyses for environmental decision making have a QA program run by a QA officer to include the following:
    - System audits of field and/or laboratory operations using field surrogate samples;
    - Instrument calibration check samples used to determine the accuracy of the instrumentation;
    - Blind spikes of blanks, where the concentration of the blind spike is known only to the QA officer;
    - Verification of calibration accuracy via calibration check standard;
    - Internal surrogate spikes for determination of analytical extraction recovery; and
    - Overall assessment of the data quality based upon the reported QC data.

- Includes all QC results included in each data set that affect the quality of the data.
- Describes the bias within each data set as either positive or negative, when QC results are outside the method established and/or data quality objectives of the Facility groundwater sampling and analysis plan.
- Presents clearly the precision and accuracy determinations with all results calculated.
- Explains each failed precision and accuracy measurement determined to be outside of the method control limits and the effect of the failure on the results.
- Includes a review with comments that identify the problems associated with the sample results and explains the limitations on data usability.
- Includes a statement on the estimated uncertainty of analytical results of the samples involved and/or within the QC of the analytical method of the permit, project, and/or program required analytical recoveries information, when appropriate and/or requested.
- Includes all deviations from, additions to, or exclusions from the test method, and information on specific test conditions.
- Includes a statement of compliance/noncompliance with requirements and/or specifications, where relevant (e.g., holding times, dilutions).

36.2 Final Product Compost QA/QC

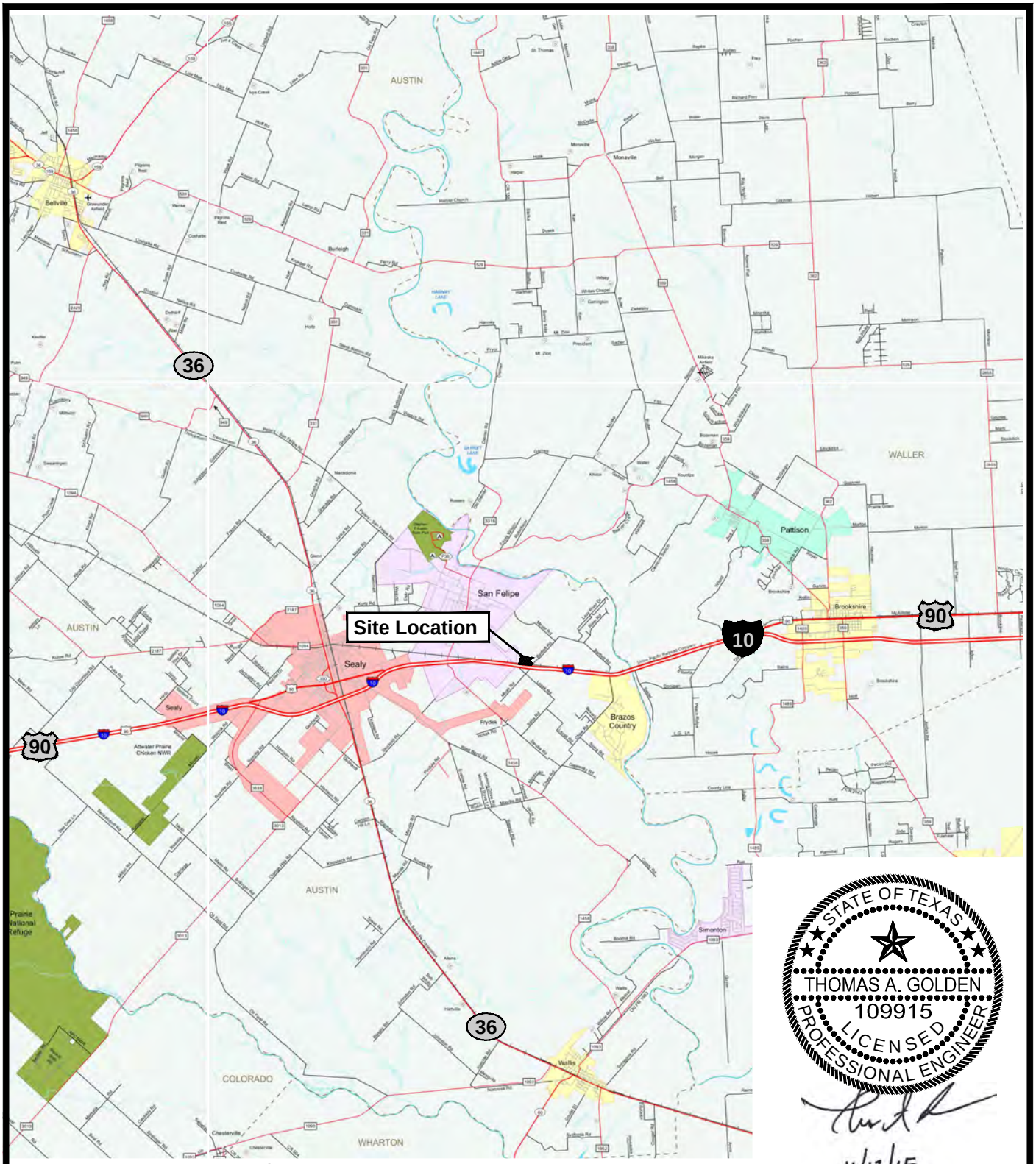
Quality control and assurance procedures will include careful examination of feedstocks. Final compost will be tested and inspected as described in "Test Methods for the Examination of Composting and Compost," US Composting Council [http://compostingcouncil.org].

References

Texas Commission on Environmental Quality (TCEQ). 2007. *Odor complaint investigation procedures*. September 18, 2007.

U. S. Environmental Protection Agency (EPA). *Test methods for evaluating solid wastes, physical/chemical methods.* September 1986. <http://www3.epa.gov/epawaste/hazard/testmethods/index.htm>.

Figures



Source: Texas Department of Transportation, 2014.

N

0 1 2 Miles

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Texas Registered Geosciences Firm No. 50045
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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Facility Location Map

Figure 1

Source: San Felipe, Texas USGS 7.5-minute quadrangle map, 1960, photorevised 1980.

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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Topographic Map

Figure 2

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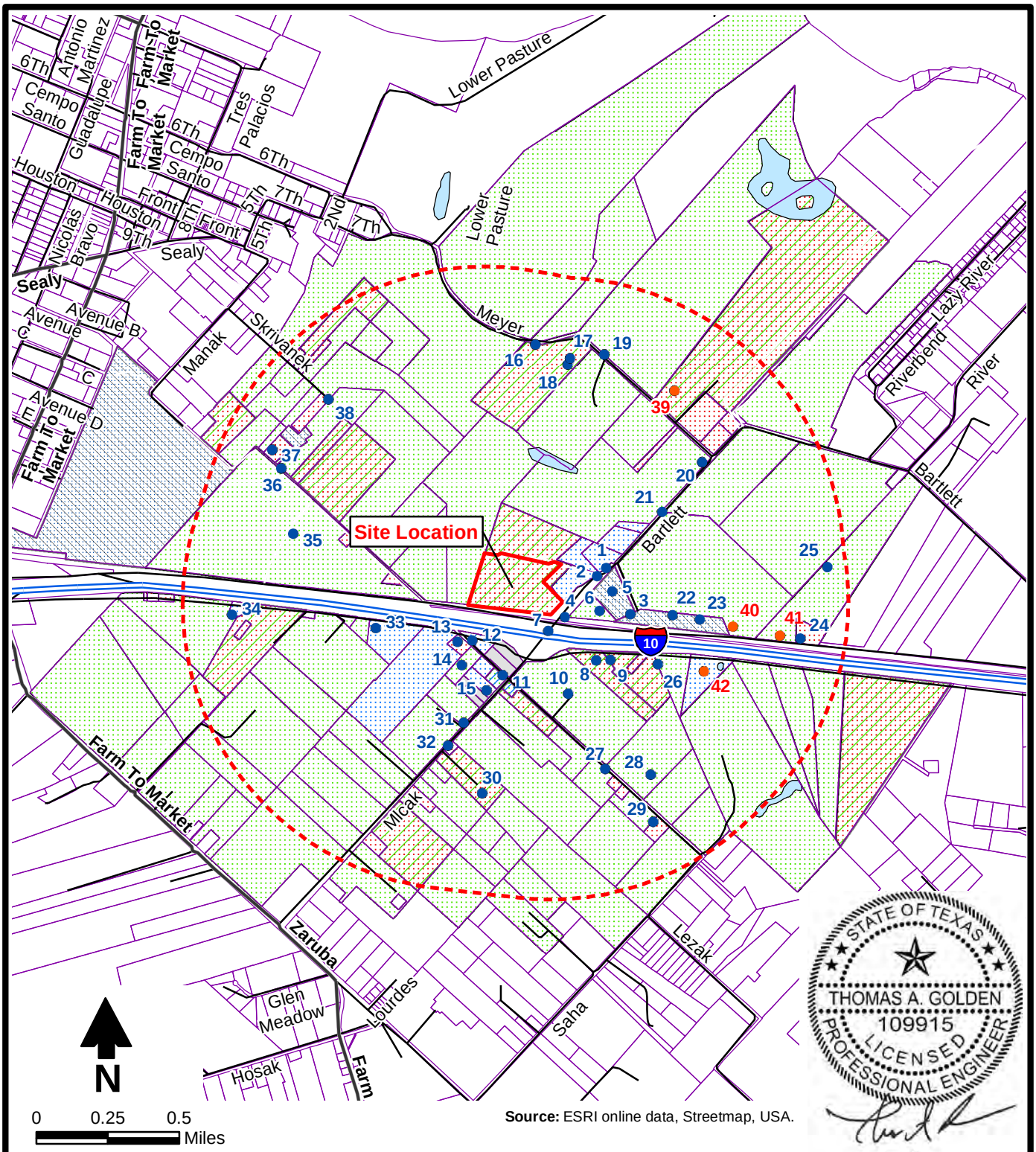
S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Reports\Permit2_stamped\Fig02_topo_map.mxd


Site Location
Lower Pasture
Meyer
Skrivanek
Manak
Bartlett
Riverbend
Lazy River
River
Sealy
Avenue B
Avenue C
Avenue D
Avenue E
Farm To Market
Cempo Santo
Houston
Front
Nicolas Bravo
Antonio Martinez
Guadalupe
Tres Palacios
6Th
7Th
5Th
2Nd
9Th
8Th
Micak
Zaruba
Glen Meadow
Lourdes
Hosak
Farm
Sana
Lezak
10
N
0 0.25 0.5 Miles
Source: ESRI online data, Streetmap, USA.
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Explanation
One mile radius
Parcels
Agricultural
Commercial
Residential
Agricultural/Commercial
Agricultural/Residential
Commercial/Industrial
Vacant
Pond
Water well
Oil and gas well
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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Land Use Map
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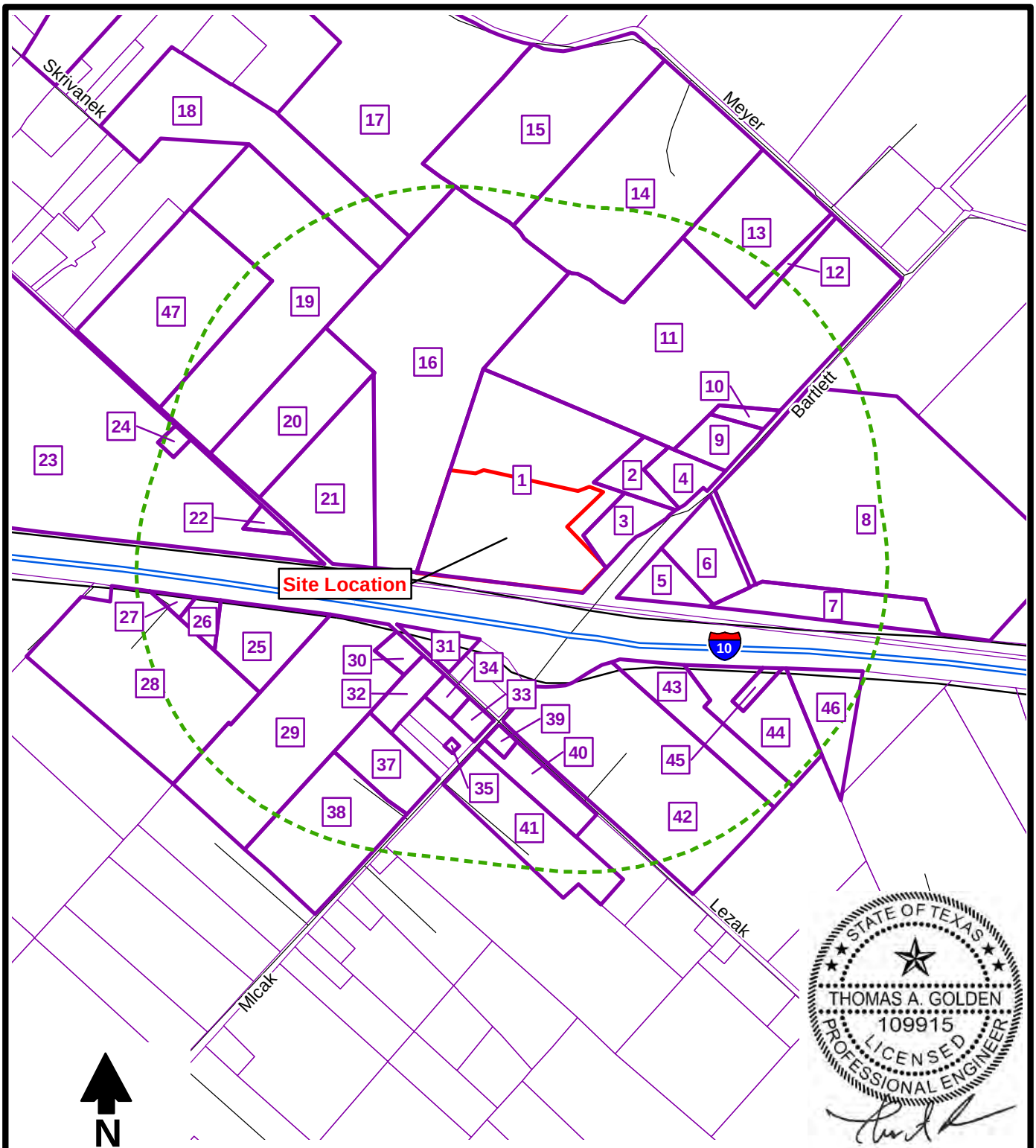
Texas Registered Engineering Firm F-286
Texas Registered Geosciences Firm No. 50045
11/12/2015
JN TX15.0094.00
Figure 3
S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Reports\Permit2_stamped\Fig03_land_use_map.mxd



N

0 0.125 0.25 Miles

Source: ESRI online data, Streetmap, USA.

Explanation

Half mile radius

Parcel

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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Landowner Property Map

Figure 4

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S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Reports\Permit2_stamped\Fig04_land_ownership_map.mxd

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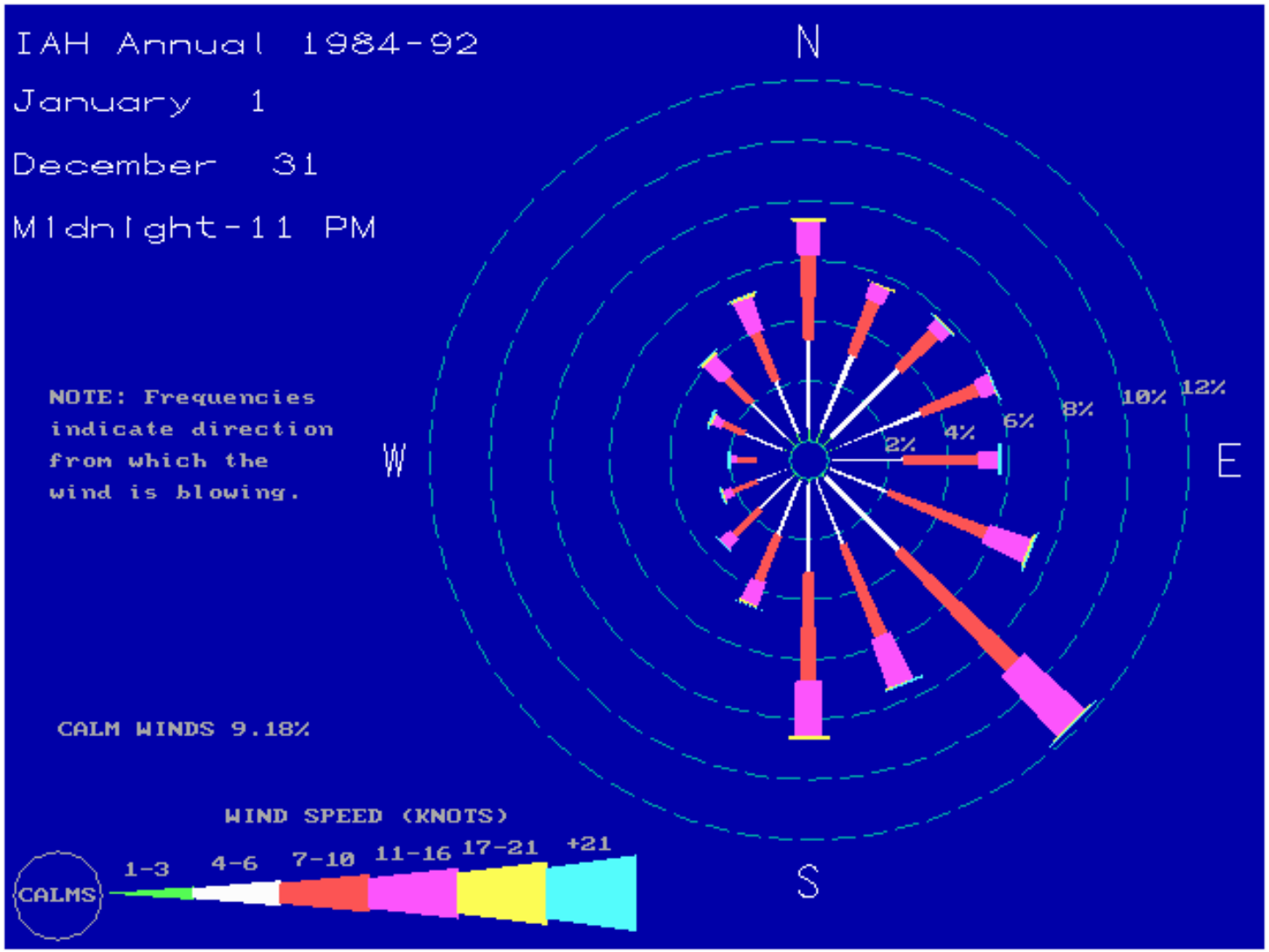

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Figure 5

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Wind Rose Map

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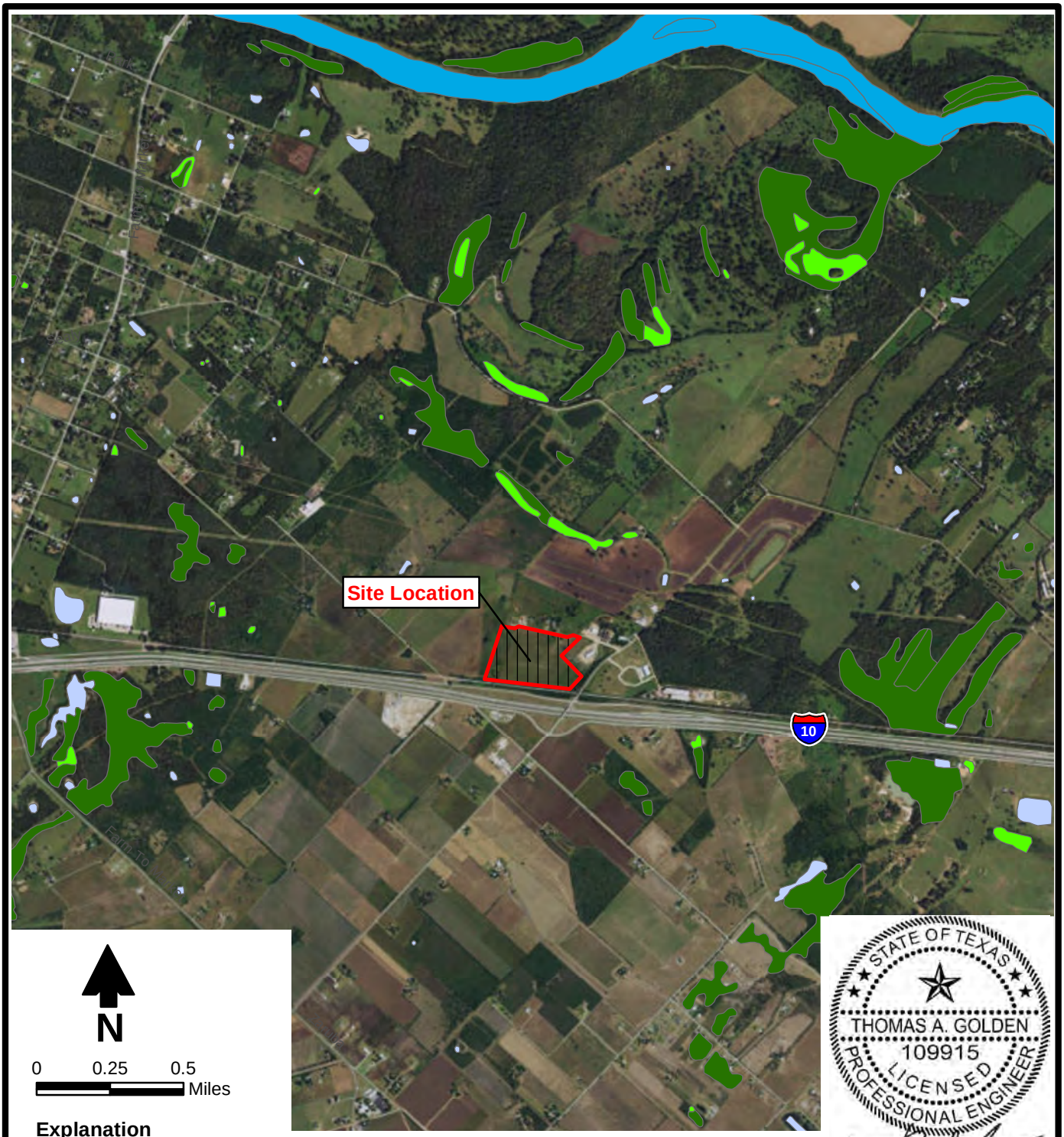

N

0 0.25 0.5 Miles

Explanation

Property Boundary

Wetland Type

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine
- Other

Source: U.S. Fish and Wildlife Service, National Wetlands Inventory, September 22, 2015.

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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Wetland Map

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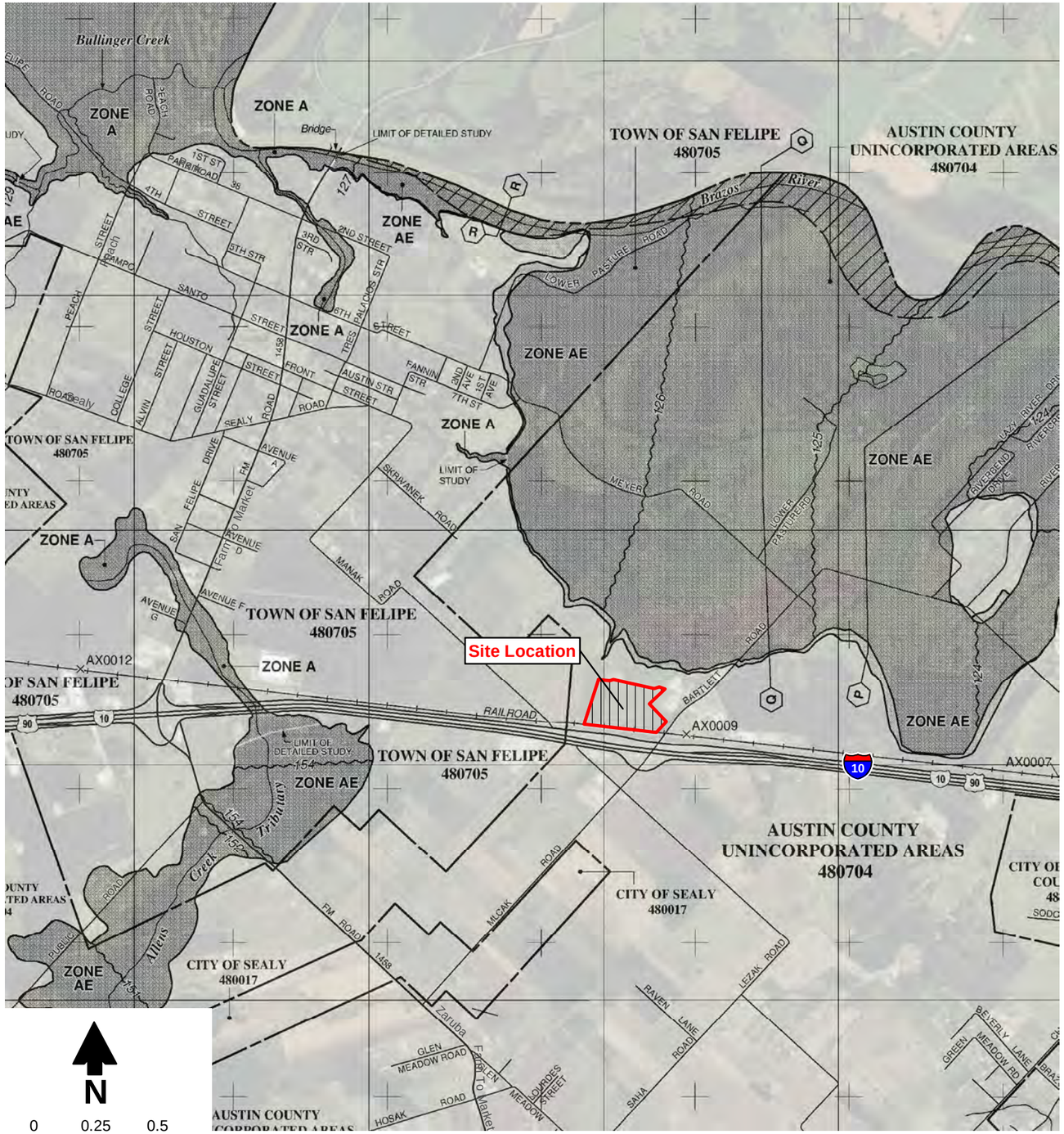
Figure 6



Source: FEMA, Flood Insurance Rate Map, Austin County, Texas, Panel 350. Map number 48015C0350E, Revised September 3, 2010.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275000mN — 1000-meter Universal Transverse Mercator grid, zone 14
- 6000000 FT — 5000-foot grid: Texas State Plane coordinate system, south central zone (FIPSZONE 4204), Lambert Conformal Conic
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
January 17, 1990
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
June 16, 1999 –to update corporate limits and to change base flood elevations.
September 3, 2010 –to update corporate limits, to incorporate previously issued Letters of Map Revision, to change Special Flood Hazard Areas, to revise vertical datum, to update map format, to update roads and road names, and to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

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

MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0350E

FIRM
FLOOD INSURANCE RATE MAP
AUSTIN COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 350 OF 475
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
AUSTIN COUNTY	480704	0350	E
BRAZOS COUNTRY, CITY OF	481693	0350	E
SAN FELIPE, TOWN OF	480705	0350	E
SEALY, CITY OF	480017	0350	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48015C0350E
MAP REVISED
SEPTEMBER 3, 2010

Federal Emergency Management Agency

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SEALY COMPOSTING FACILITY
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Flood Plain Map

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Figure 7

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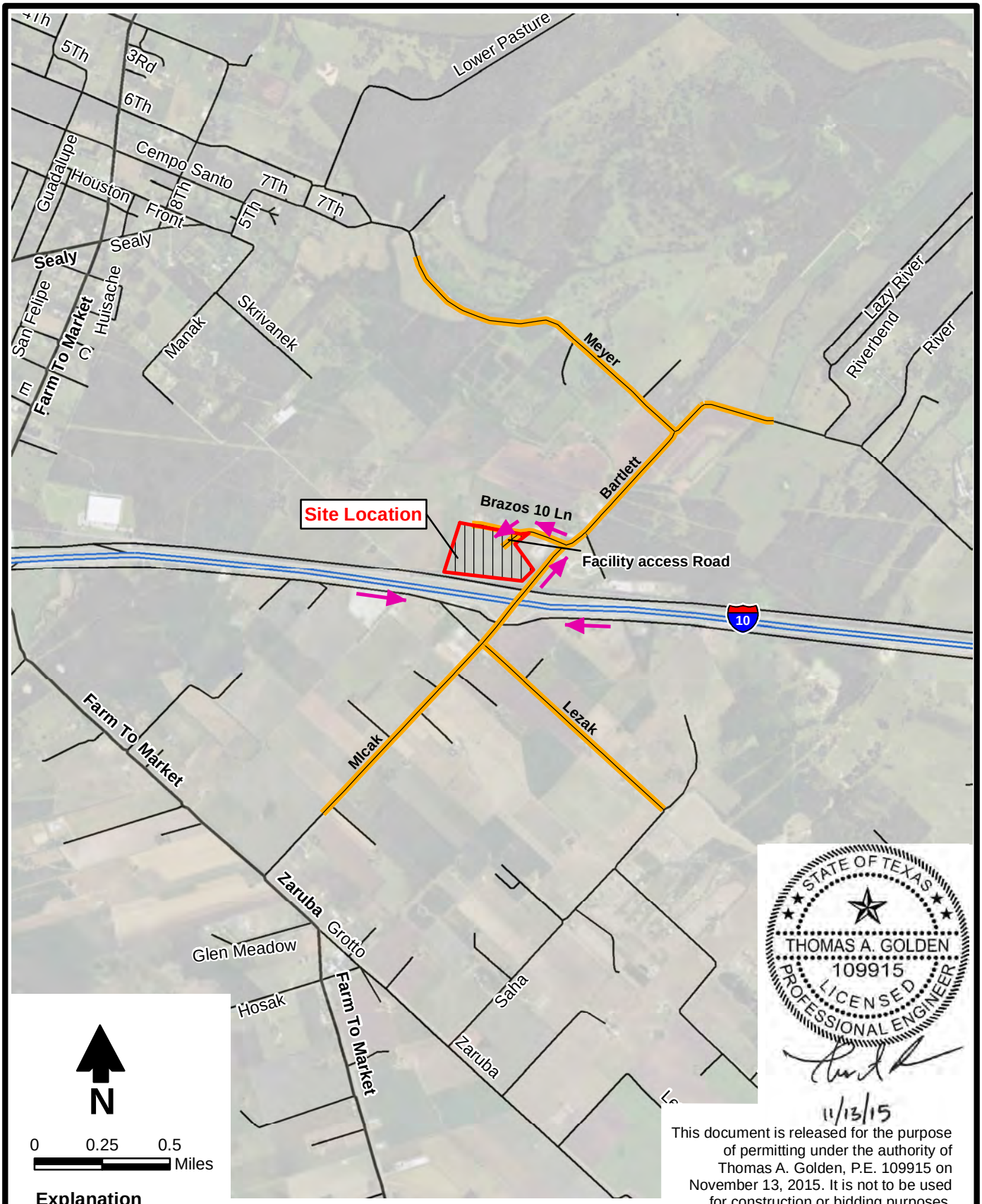

Source: ESRI online data, Streetmap, USA.

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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Access Road Map

Figure 8

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11/12/2015 JN TX15.0094.00

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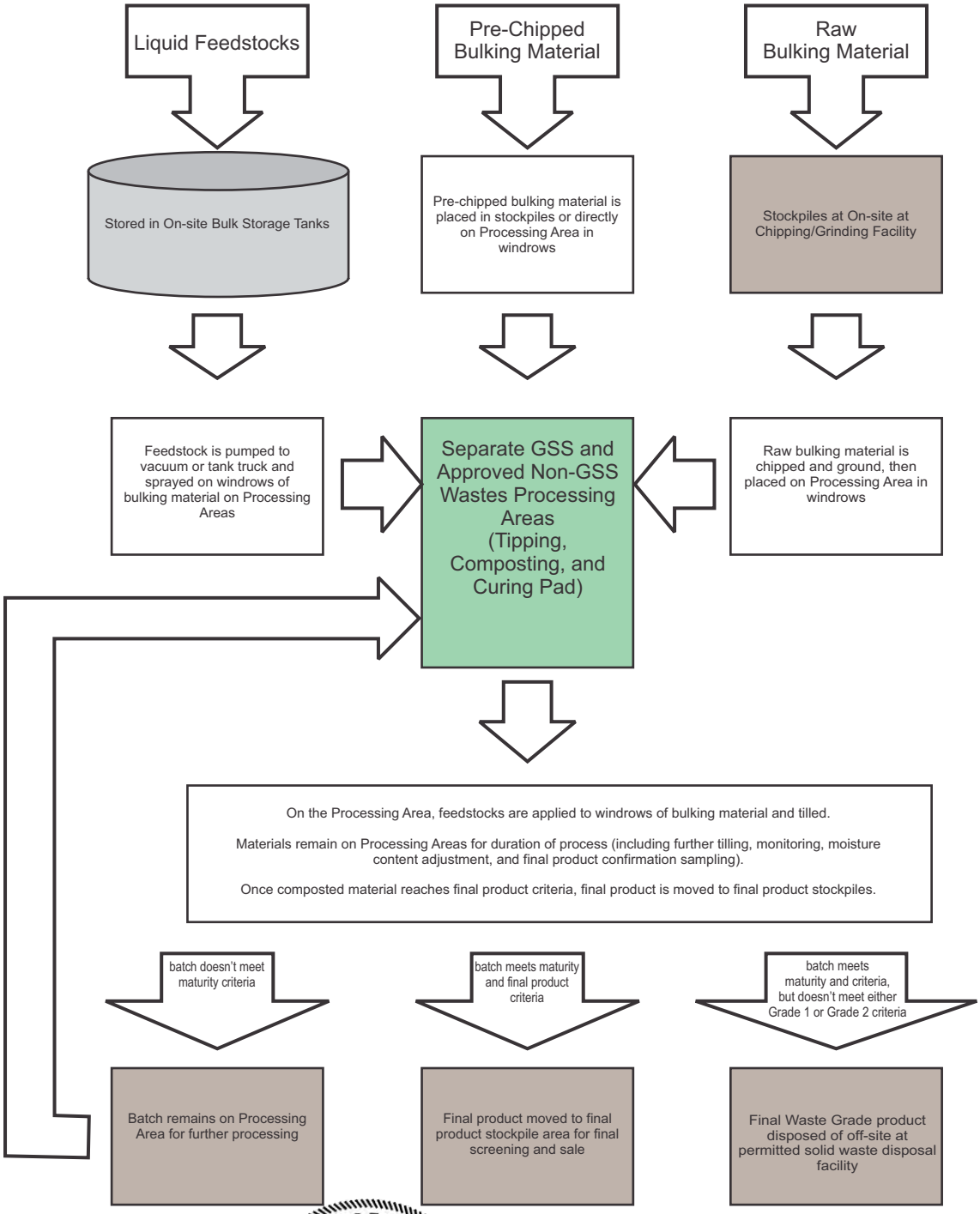

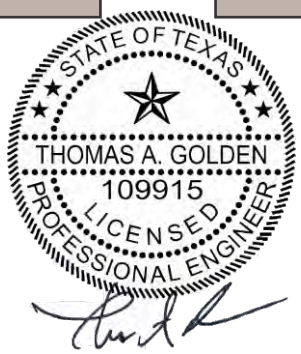

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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Process Diagram

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Texas Registered Geosciences Firm No. 50045

11/12/2015 JN TX15.0094.00

Figure 9

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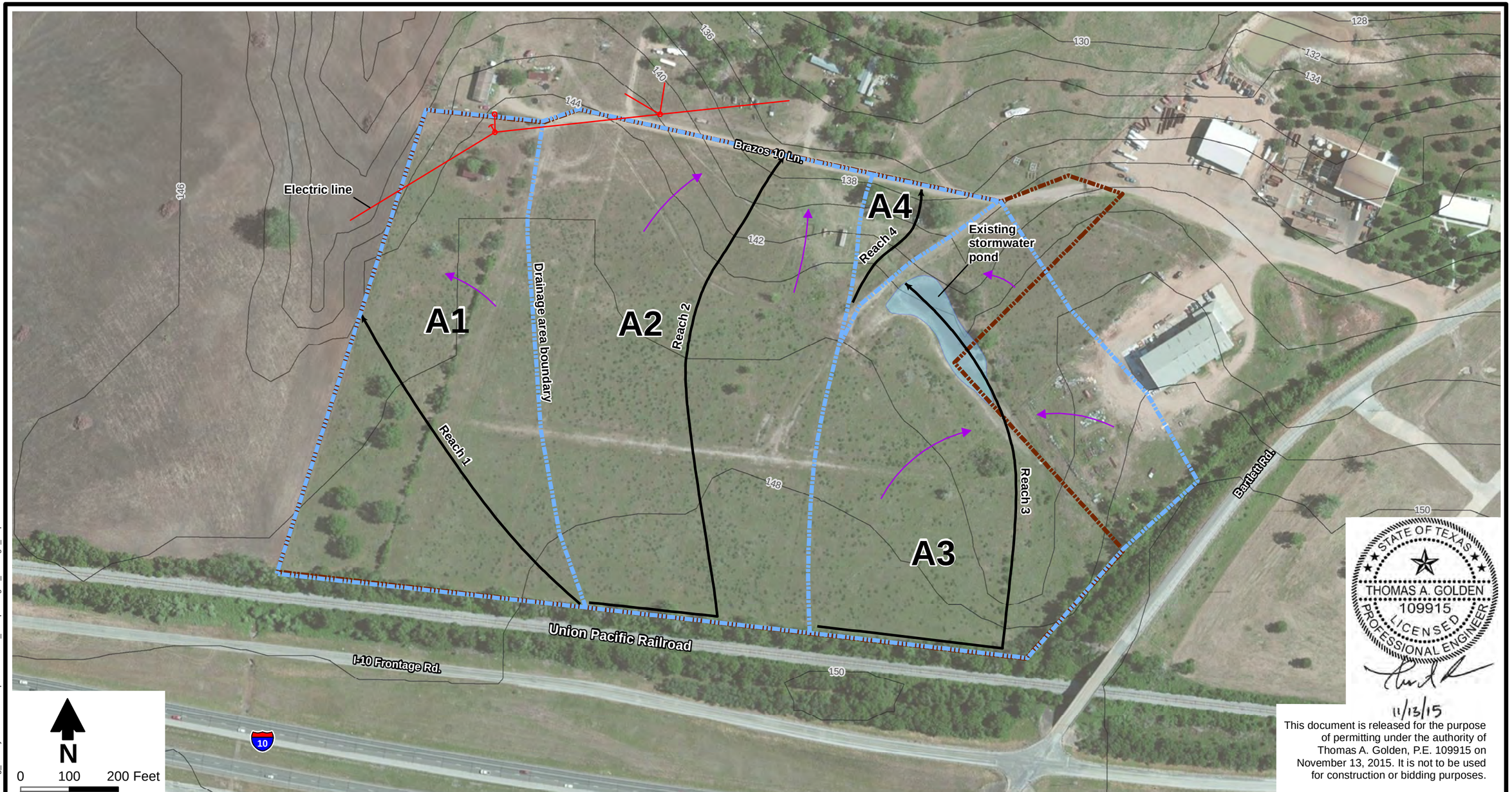

Explanation

- Property Boundary
- 530 Contour interval and elevation (ft msl)
- Rainfall runoff flow direction
- Drainage area reach
- Drainage area boundary
- A1 Drainage area number

	Reach 1	Reach 2	Reach 3	Reach 4
Drainage Area (acres)	8.9	13.5	11.3	.9
Time of Concentration (hr)	5.2	7.0	8.7	1.3
Rainfall Intensity (in/hr)	1.1	0.9	0.7	3.1
Runoff Coeficient	0.3	0.3	0.3	0.3
Flow Rate (cf/sec)	3.0	3.5	2.5	0.8

Note: Calculations provided in appendix C2

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Sources:
1. Alexander Surveying, June 3, 2015.
2. Topography adapted from USGS National Elevation Dataset, 2013.
3. Aerial photo provided by ESRI and the National Agriculture Imagery Program (NAIP) imagery, 2014.

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11/12/2015 JN ES14.0050

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Pre-Construction On-Site Drainage Map

Figure 10

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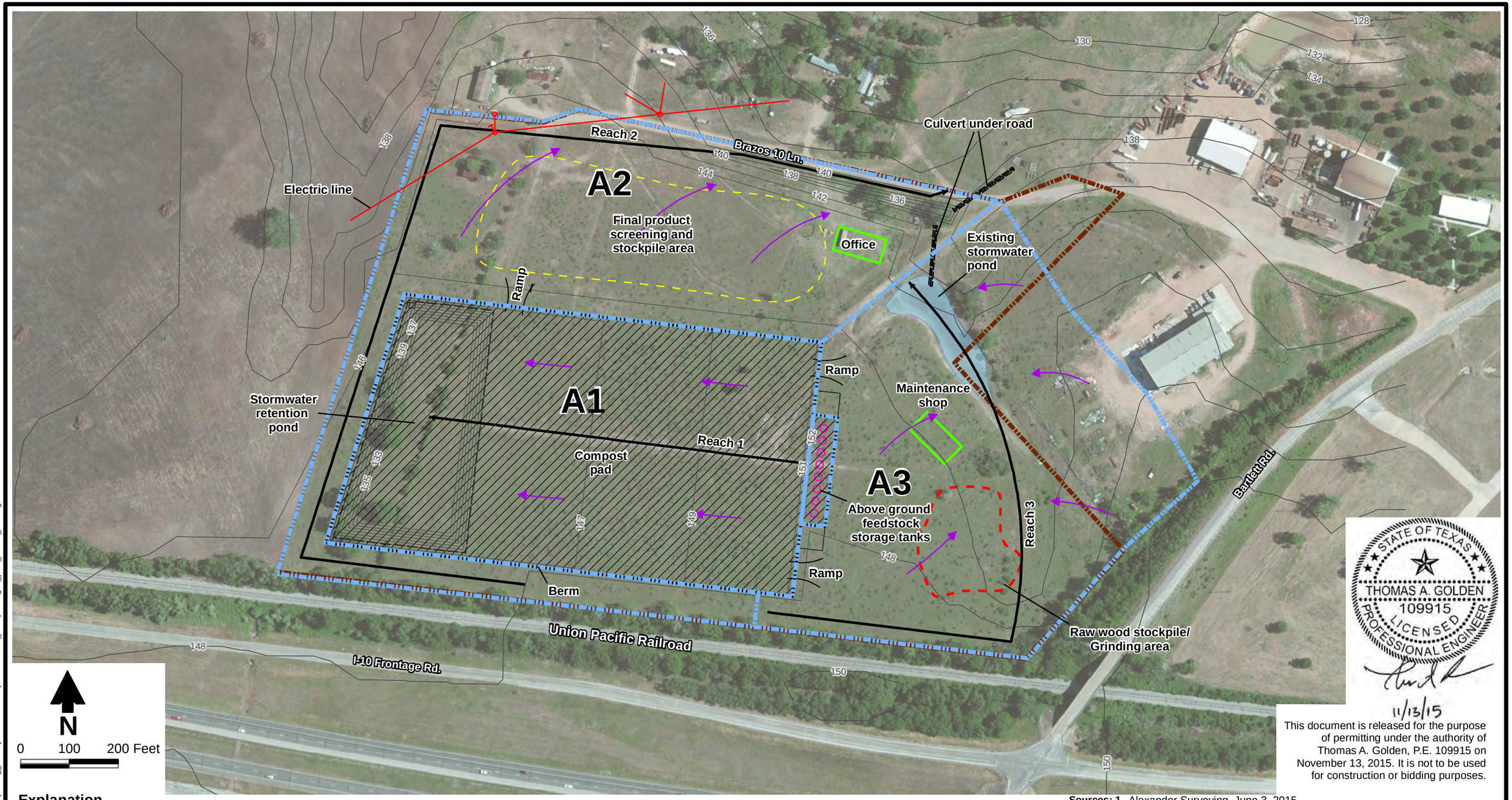

Explanation

- Property Boundary
- Proposed permit area
- 530 Contour interval and elevation (ft msl)
- Rainfall runoff flow direction
- Drainage area reach
- Drainage area boundary
- A1 Drainage area number

	Reach 1	Reach 2	Reach 3
Drainage Area (acres)	11.0	11.9	11.3
Time of Concentration (hr)	1.8	9.1	5.5
Rainfall Intensity (in/hr)	2.8	0.7	1.1
Runoff Coeficient	0.35	0.35	0.3
Flow Rate (cf/sec)	10.9	2.9	3.7

Note: Calculations provided in appendix C2

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Sources: **1.** Alexander Surveying, June 3, 2015.
2. Topography adapted from USGS National Elevation Dataset, 2013.
3. Aerial photo provided by ESRI and the National Agriculture Imagery Program (NAIP) imagery, 2014.

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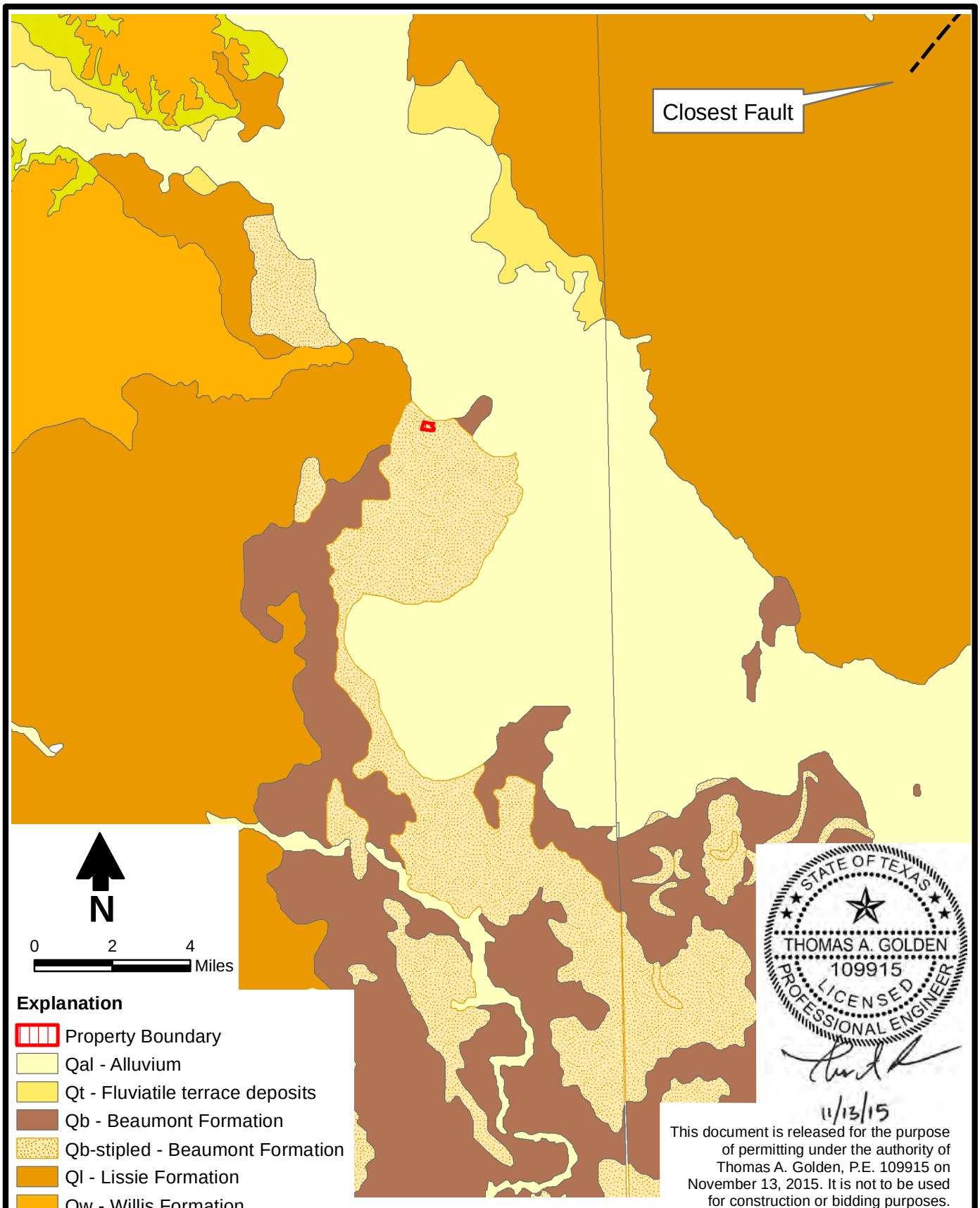
11/12/2015 JN ES14.0050

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Post-Construction On-Site Drainage Map

Figure 11

S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Reports\Permit2_stamped\Fig11_post_constr_drainage.mxd



Source: BEG, 1974

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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Geologic Map

Figure 12

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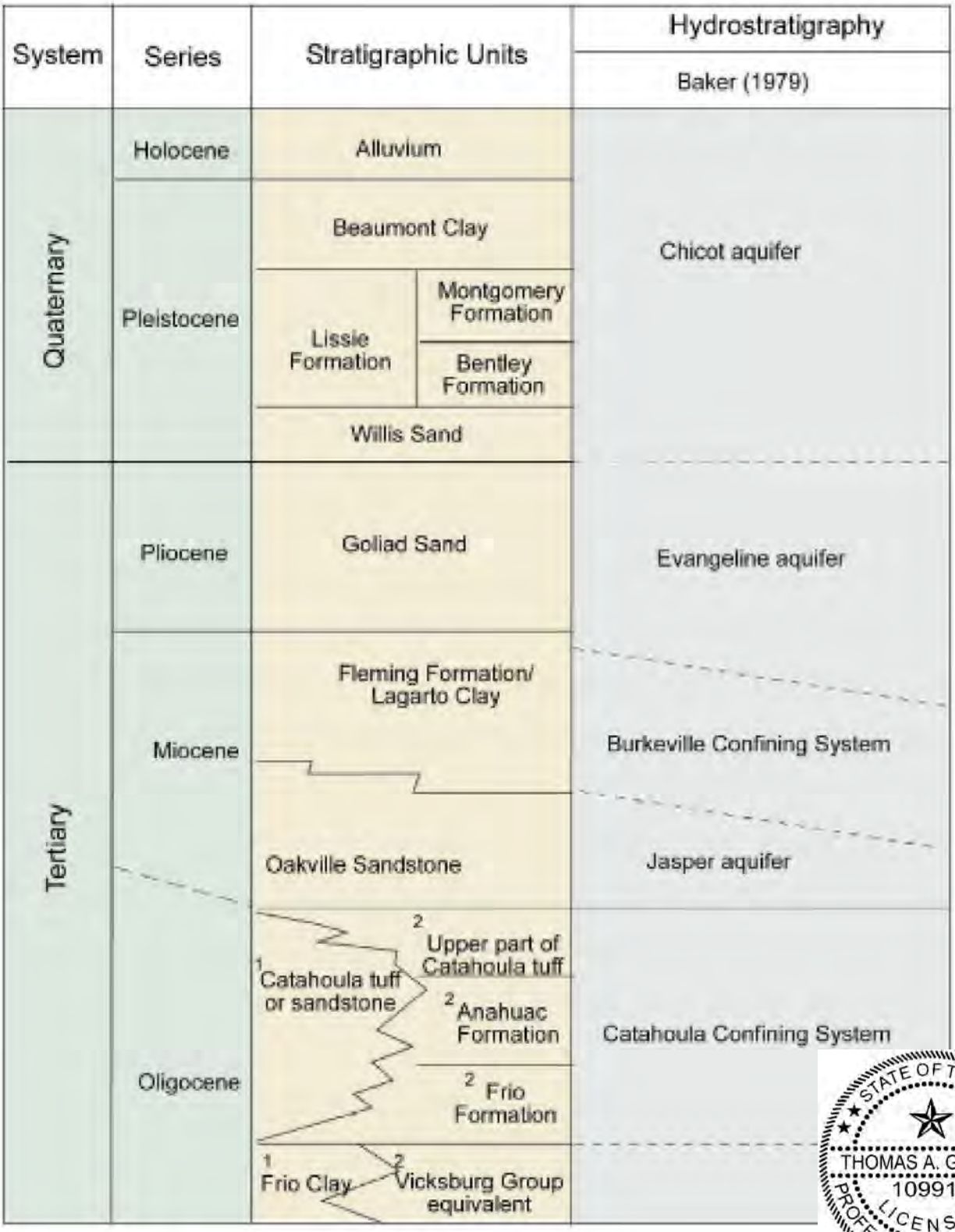

Source: Baker, 1979

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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Stratigraphic Column

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11/12/2015 JN TX15.0094.00

Figure 13

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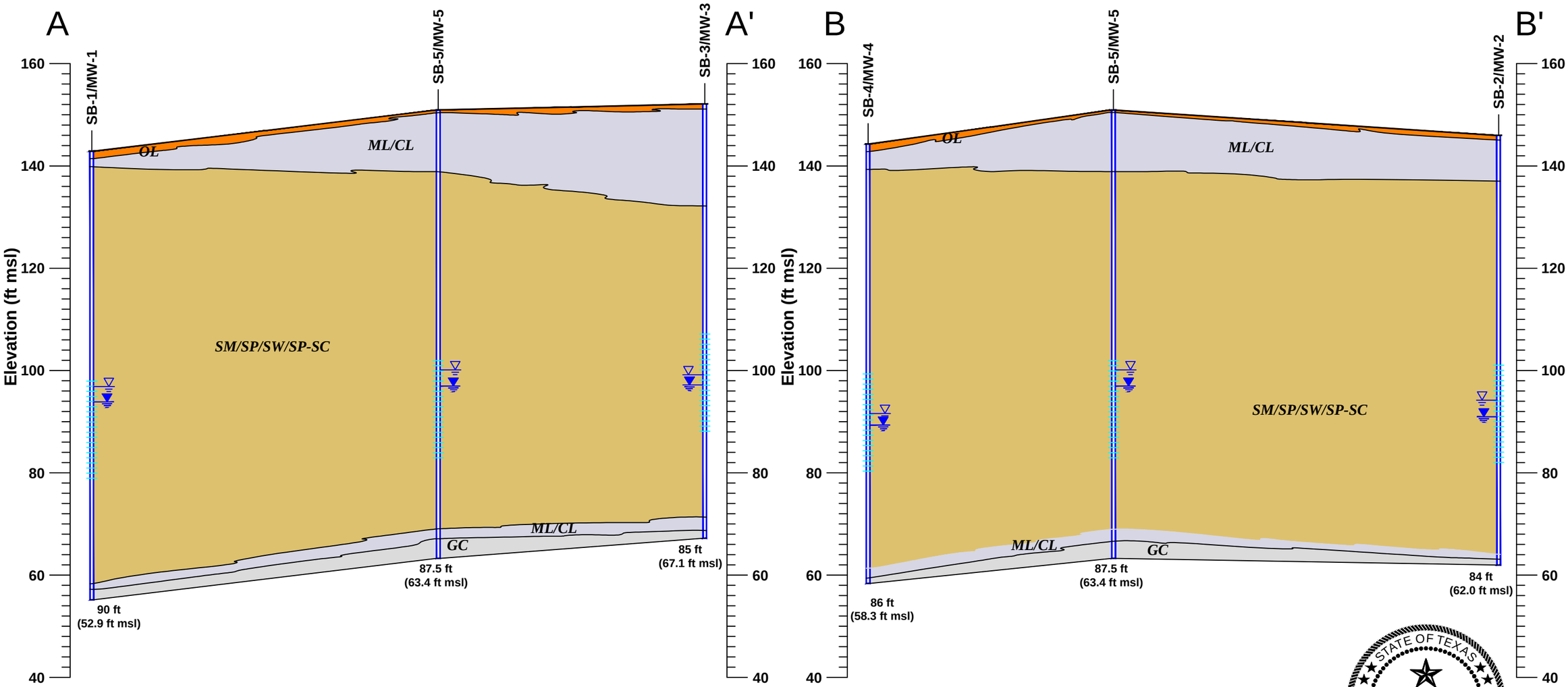


Explanation

MW-3/B-3 — Well/boring identification

Static water level measured on 10-16-2015

Water level encountered during drilling

Screened interval

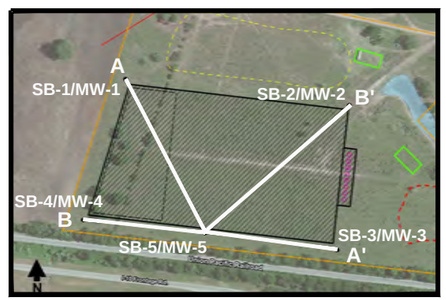
91.5 ft (445.52 ft msl) — Total depth below ground surface

0 100 ft

Vertical exagerration 5x

USCS Soil Type

- *OL* Top soil
- *ML/CL* Silty clay/caly
- *SM/SP/SW/SP-SC* Silty sand/poorly graded sand/clayey and/well-graded sand/sand with clay
- *GC* Clayey gravel



Cross Section Location

STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER

11/13/15

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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Hydrogeologic Cross Section

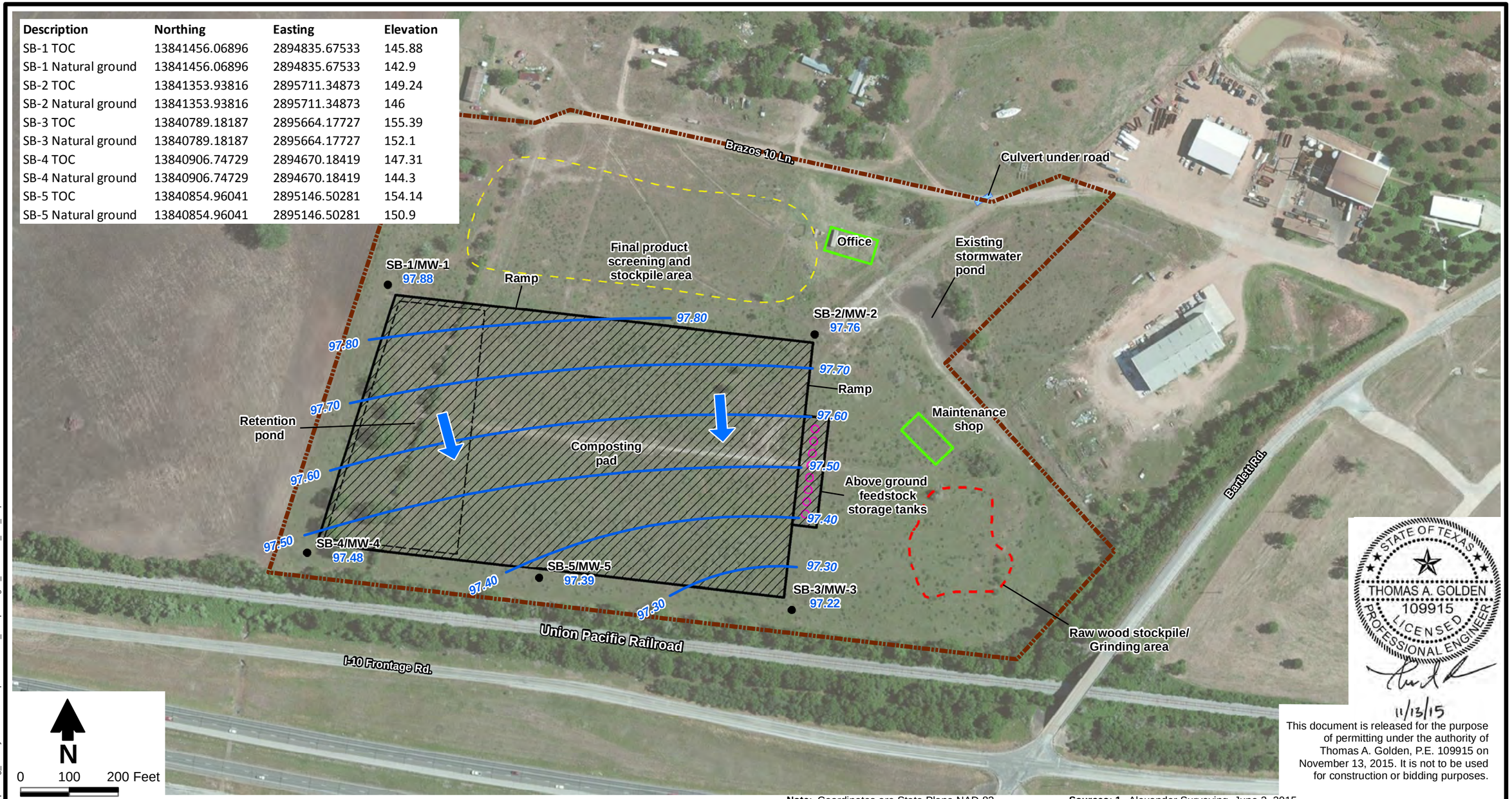
Figure 14

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
Texas Registered Geosciences Firm No. 50045

11/13/2015 JN TX15.0094.00

S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\VR_Drawings\TX_15_0094_00CS_Cross_section.dwg

Description	Northing	Easting	Elevation
SB-1 TOC	13841456.06896	2894835.67533	145.88
SB-1 Natural ground	13841456.06896	2894835.67533	142.9
SB-2 TOC	13841353.93816	2895711.34873	149.24
SB-2 Natural ground	13841353.93816	2895711.34873	146
SB-3 TOC	13840789.18187	2895664.17727	155.39
SB-3 Natural ground	13840789.18187	2895664.17727	152.1
SB-4 TOC	13840906.74729	2894670.18419	147.31
SB-4 Natural ground	13840906.74729	2894670.18419	144.3
SB-5 TOC	13840854.96041	2895146.50281	154.14
SB-5 Natural ground	13840854.96041	2895146.50281	150.9



Explanation

- Property Boundary
- Potentiometric surface contour (ft msl)
- Groundwater flow direction
- Boring/piezometer location
- **SB-1/MW-1** Designation
- **97.88** Groundwater elevation (ft msl)

Note: Coordinates are State Plane NAD 83 Texas South Central Zone

Sources:
1. Alexander Surveying, June 3, 2015.
2. Topography adapted from USGS National Elevation Dataset, 2013.
3. Aerial photo provided by ESRI and the National Agriculture Imagery Program (NAIP) imagery, 2014.

STATE OF TEXAS
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SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Potentiometric Surface Elevation Map
October 2015

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
Texas Registered Geosciences Firm No. 50045

11/12/2015 JN ES14.0050

Figure 15

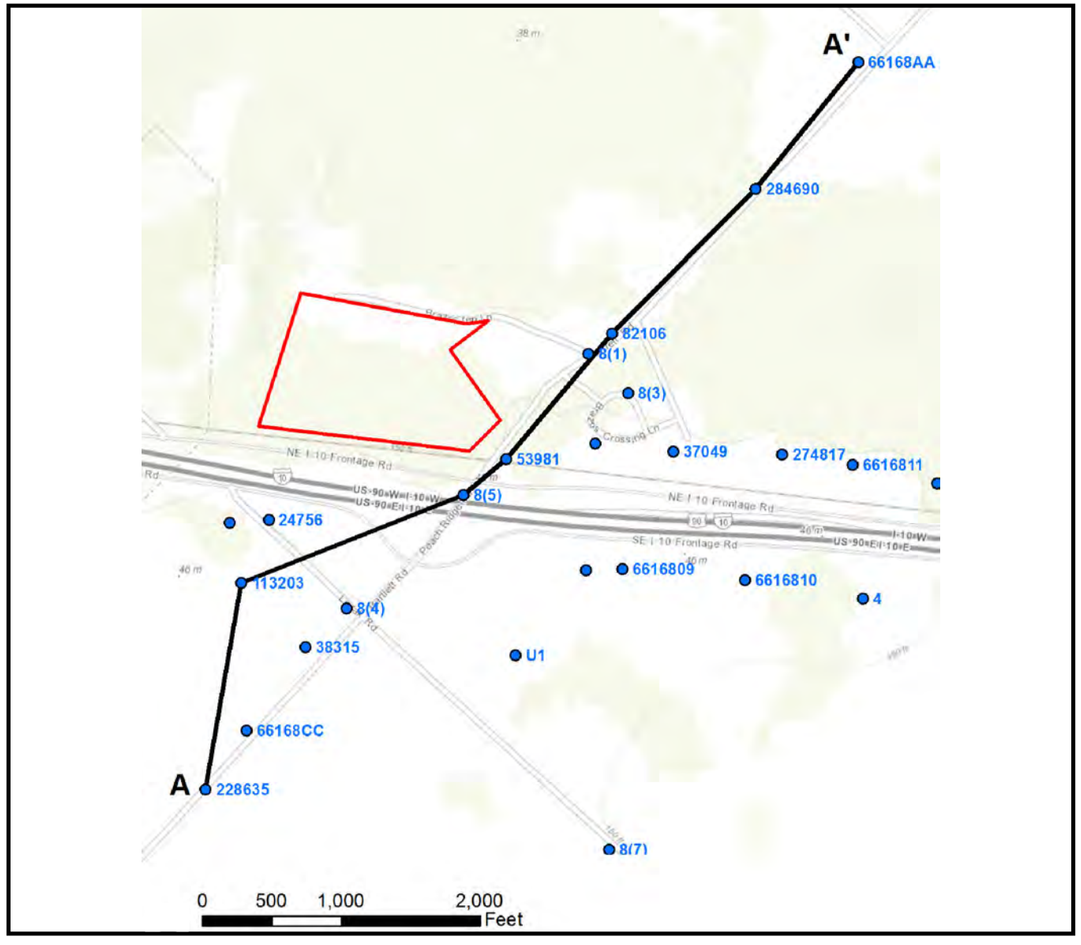
S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Reports\Permit2_stamped\Fig15_20151028_Pot_map.mxd

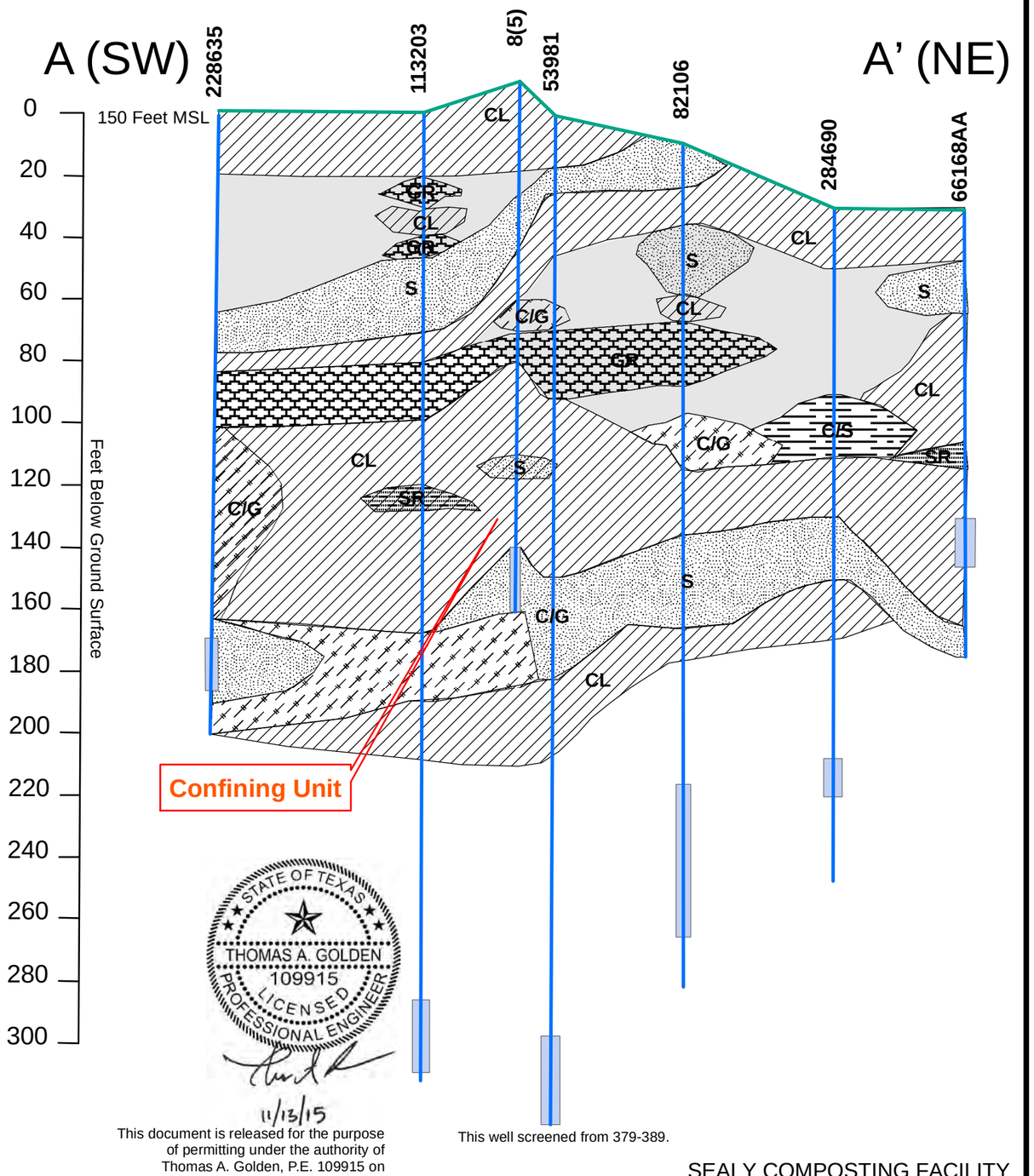
N

Vertical Exaggeraton = 21

Explanation

- Land Surface (120 to 160 Feet Above Mean Sea Level)
- Water Wells Along Cross-Section Line
- Screen Interval (Per Well Reports)
- Clays
- Gravel
- Sand
- Clay and Sand
- Sand Rock (from well boring logs)
- Clay and Gravel
- Alternating Layers Clay, Silt, Sand, Gravel





STATE OF TEXAS
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This well screened from 379-389.

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Generalized Cross-Section A to A'

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
Texas Registered Geosciences Firm No. 50045

10/13/2015 JN TX15.0094.00

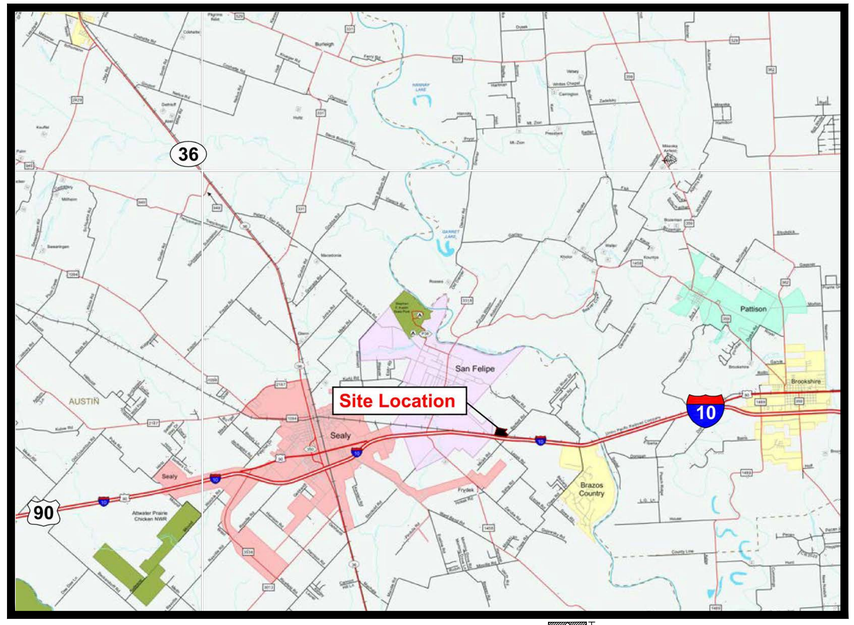
Figure 16

N:\Client\Southwaste\Sealy Texas\GIS\MXDs\CrossSectionAtoAprime.mxd

Drawings

VICINITY MAP
NTS

NORTH



SITE MAP
NTS

NORTH

SEALY
COMPOSTING FACILITY

AUSTIN COUNTY, TEXAS

PREPARED FOR
SOUTHWASTE DISPOSAL, LLC
HOUSTON, TEXAS

INDEX OF DRAWINGS

NOT FOR CONSTRUCTION
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XREF:

NO	DATE	BY	REVISION MADE

FILE NAME:S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
ENVIRONMENTAL SCIENTISTS & ENGINEERS
4030 W. BRAKER LANE, SUITE 325
AUSTIN, TX 78759-5336
(512) 821-2765

DESIGNED BY: TG
DRAWN BY: CS
CHECKED BY: TG
DATE: 11/13/15

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

TITLE SHEET

STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
DATE: 11/13/15

JOB NO. TX15.0094

SHEET 1 of 8
DWG NO. G-0

GENERAL CONSTRUCTION NOTES:

A. ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, ORDINANCES, AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH.

B. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED CONSTRUCTION PERMITS AND APPROVALS OF LIKE KIND PRIOR TO START OF CONSTRUCTION.

C. PROJECT DOCUMENTS CONSIST OF THESE DRAWINGS, PROJECT SPECIFICATIONS, PROJECT CONTRACTS, AND ANY AND ALL SUBSEQUENT EXECUTED PROJECT DOCUMENTATION ISSUED AS, OR WITH, CHANGE ORDERS, AND RFI'S (REQUEST FOR INFORMATION.) THE CONTRACTOR SHALL REVIEW ALL PROJECT DOCUMENTS AND VERIFY ALL DIMENSIONS, QUANTITIES, AND FIELD CONDITIONS. ANY CONFLICTS OR OMISSIONS WITH THE DOCUMENTS SHALL BE REPORTED TO THE ENGINEER/PROJECT MANAGER FOR CLARIFICATION PRIOR TO PERFORMANCE OF ANY WORK IN QUESTION. IN THE EVENT THE CONTRACTOR DOES NOT NOTIFY THE ENGINEER/PROJECT MANAGER, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY AND ANY AND ALL EXPENSE FOR ANY REVISIONS NECESSARY OR CORRECTIONAL WORK REQUIRED.

D. THE LOCATION OF BURIED UTILITIES ARE BASED UPON INFORMATION PROVIDED TO THE ENGINEER BY OTHERS AND MAY NOT REFLECT ACTUAL FIELD CONDITIONS. EXISTING BURIED UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY DAMAGE TO ANY OTHER UTILITIES AND/OR COLLATERAL DAMAGE CAUSED BY THE CONTRACTOR SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR.

E. EXISTING FENCING THAT IS NOT DESIGNATED FOR REMOVAL SHALL NOT BE DISTURBED. ANY FENCING THAT IS DISTURBED OR ALTERED BY THE CONTRACTOR SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE. IF THE CONTRACTOR DESIRES TO REMOVE FENCING TO ACCOMMODATE CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL OBTAIN THE OWNER'S WRITTEN PERMISSION BEFORE FENCE IS REMOVED. CONTRACTOR SHALL RESTORE THE FENCE TO ITS ORIGINAL CONDITION AT THE EARLIEST OPPORTUNITY TO THE SATISFACTION OF THE OWNER. WHILE ANY FENCING IS REMOVED, THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SECURITY OF THE SITE UNTIL THE FENCE IS RESTORED.

F. AT THE END OF EACH WORK DAY, THE CONTRACTOR SHALL CLEAN AND PICK UP THE WORK AREA TO THE SATISFACTION OF THE ENGINEER/PROJECT MANAGER. AT NO TIME SHALL THE WORK BE LEFT IN A MANNER THAT COULD ENDANGER THE WORKERS OR THE PUBLIC.

G. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO PROJECT SPECIFICATIONS AND DRAWINGS, AS AMENDED AND REVISED BY THE ENGINEER. ALL INSTALLATION DETAILS ARE TYPICAL AND MAY BE CHANGED TO BETTER FIT EXISTING LOCAL CONDITIONS UPON APPROVAL BY THE ENGINEER.

H. ONLY THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFETY OF ALL WORK. ALL WORK, INCLUDING WORK WITHIN TRENCHES, SHALL BE IN ACCORDANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA).

I. THE CONTRACTOR SHALL NOT INSTALL ITEMS AS SHOWN ON THESE DRAWINGS WHEN IT IS OBVIOUS THAT FIELD CONDITIONS ARE DIFFERENT THAN SHOWN IN THE DRAWINGS. SUCH CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN A TIMELY MANNER. IN THE EVENT THE CONTRACTOR DOES NOT NOTIFY THE ENGINEER IN A TIMELY MANNER, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY AND EXPENSE FOR ANY REVISIONS NECESSARY, INCLUDING ENGINEERING DESIGN FEES.

J. EXISTING SITE IMPROVEMENTS WHICH ARE DAMAGED OR DISPLACED BY THE CONTRACTOR SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. REPAIRS SHALL BE APPROVED BY THE OWNER PRIOR TO CONSTRUCTION OF THE REPAIRS. REPAIRS SHALL BE ACCEPTED BY THE OWNER PRIOR TO FINAL PAYMENT.

K. CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES WITH OTHER CONTRACTORS AND UTILITY COMPANIES WORKING IN THE SAME AREA.

WORK WITHIN ADJACENT RIGHT-OF-WAY

L. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES WITHIN ADJACENT RIGHT-OF-WAYS OR WITHIN PROPERTY NOT OWNED BY THE OWNER OF THE PROJECT SITE, THE CONTRACTOR SHALL ASSURE THAT ALL PERMITS AND PERMISSIONS REQUIRED HAVE BEEN OBTAINED IN WRITING.

SURVEY MONUMENTS, PROPERTY CORNERS, BENCHMARKS

M. THE CONTRACTOR SHALL NOTIFY THE OWNER AT LEAST SEVEN (7) DAYS BEFORE BEGINNING ANY CONSTRUCTION ACTIVITY THAT COULD DAMAGE OR DISPLACE SURVEY MONUMENTS, PROPERTY CORNERS, OR PROJECT BENCHMARKS SO THESE ITEMS MAY BE RELOCATED.

N. ANY SURVEY MONUMENTS, PROPERTY CORNERS, OR BENCHMARKS THAT ARE NOT IDENTIFIED FOR RELOCATION ARE THE RESPONSIBILITY OF THE CONTRACTOR TO PRESERVE AND PROTECT, RELOCATION OR REPLACEMENT OF THESE ITEMS SHALL BE DONE BY THE OWNER'S SURVEYOR AT THE EXPENSE OF THE CONTRACTOR.

DESIGN SURVEY

O. THIS DESIGN IS BASED ON SURVEY INFORMATION PROVIDED BY OTHERS. THE ENGINEER CANNOT VALIDATE OR WARRANTY THIS INFORMATION. ANY DISCREPANCIES BETWEEN THE DESIGN AND SITE SURFACE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION IMMEDIATELY.

PAVEMENT

P. WHEN ABUTTING NEW PAVEMENT TO EXISTING PAVEMENT, CUT EXISTING PAVEMENT EDGE TO A NEAT, STRAIGHT LINE AS NECESSARY TO REMOVE ANY BROKEN OR CRACKED PAVEMENT AND MATCH NEW PAVEMENT ELEVATION TO EXISTING.

Q. ALL UTILITIES AND UTILITY SERVICE LINES SHALL BE INSTALLED AND APPROVED PRIOR TO PAVING.

UTILITIES

R. UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES SHOWN ON THESE DRAWINGS ARE SHOWN IN AN APPROXIMATE LOCATION ONLY BASED ON THE INFORMATION PROVIDED TO THE ENGINEER BY OTHERS. THIS INFORMATION MAY BE INACCURATE OR INCOMPLETE. ADDITIONALLY, UNDERGROUND LINES MAY EXIST THAT ARE NOT SHOWN.

S. THE CONTRACTOR SHALL CONTACT THE STATEWIDE UTILITY LOCATOR SERVICE AT 1-800-344-8377 AT LEAST TWO WORKING DAYS BEFORE BEGINNING CONSTRUCTION. AFTER THE UTILITIES ARE SPOTTED, THE CONTRACTOR SHALL EXPOSE ALL PERTINENT UTILITIES TO VERIFY THEIR VERTICAL AND HORIZONTAL LOCATION. IF A CONFLICT EXISTS BETWEEN EXISTING UTILITIES AND PROPOSED CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH MINIMAL DELAY.

T. THE CONTRACTOR SHALL EXERCISE DUE CARE TO AVOID DISTURBING ANY EXISTING UTILITIES, ABOVE OR BELOW GROUND. UTILITIES THAT ARE DAMAGED BY CARELESS CONSTRUCTION SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.

U. THE CONTRACTOR SHALL COORDINATE ANY REQUIRED UTILITY INTERRUPTIONS WITH THE OWNER AND AFFECTED UTILITY COMPANY A MINIMUM OF THREE (3) WORKING DAYS BEFORE THE INTERRUPTION.

V. THE CONTRACTOR SHALL MAINTAIN A RECORD SET OF DRAWINGS AND PROMPTLY LOCATE ALL UTILITIES, EXISTING OR NEW, IN THEIR CORRECT LOCATION, HORIZONTAL AND VERTICAL. THIS RECORD SET OF DRAWINGS SHALL BE MAINTAINED ON THE PROJECT SITE AND SHALL BE AVAILABLE TO THE OWNER AND ENGINEER AT ANY TIME DURING CONSTRUCTION. RECORD INFORMATION SHALL INCLUDE HORIZONTAL AND VERTICAL COORDINATE CALLOUTS, LINE SIZES, LINE TYPES, BURIAL DEPTHS, AND ALL OTHER PERTINENT INSTALLATION INFORMATION. IN ADDITION ALL ITEMS THAT ARE INSTALLED EXACTLY DESIGNED SHALL BE NOTED AS SUCH.

EROSION CONTROL, ENVIRONMENTAL PROTECTION, AND SWPPP

W. THE CONTRACTOR SHALL CONFORM TO ALL FEDERAL, STATE, AND LOCAL DUST AND EROSION CONTROL REGULATIONS. THE CONTRACTOR SHALL PREPARE AND OBTAIN ANY DUST CONTROL OR EROSION CONTROL PERMITS FROM THE APPROPRIATE REGULATORY AGENCIES.

X. THE CONTRACTOR SHALL PROMPTLY REMOVE OR STABILIZE ANY MATERIAL EXCAVATED WITHIN THE RIGHT-OF-WAY OR ADJACENT PROPERTY TO KEEP IT FROM WASHING OFF THE PROJECT SITE.

Y. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE SITE ONTO ADJACENT PROPERTY BY CONSTRUCTION OF TEMPORARY EROSION CONTROL BERMS OR INSTALLING WATTLES OR SILT FENCE AT THE PROPERTY LINES (OR LIMITS OF CONSTRUCTION WHERE DESIGNATED) AND WETTING SOIL TO PREVENT IT FROM BECOMING AIRBORNE.

Z. WATERING, AS REQUIRED FOR CONSTRUCTION DUST CONTROL, SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND NO MEASUREMENT OR PAYMENT SHALL BE MADE. CONSTRUCTION AREAS SHALL BE WATERED FOR DUST CONTROL IN COMPLIANCE WITH LOCAL, COUNTY, AND STATE ORDINANCES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE SYSTEM OPERATOR FOR AVAILABILITY AND USE OF WATER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING ALL EQUIPMENT AND MATERIALS NECESSARY FOR OBTAINING WATER.

AA. THE CONTRACTOR SHALL PROPERLY HANDLE AND DISPOSE OF ALL ASPHALT REMOVED ON THE PROJECT BY HAULING TO AN APPROVED DISPOSAL SITE IN ACCORDANCE WITH THE REQUIREMENTS OF AUSTIN COUNTY, TEXAS.

AB. ALL WASTE PRODUCTS FROM THE CONSTRUCTION SITE, INCLUDING ITEMS DESIGNED FOR REMOVAL, CONSTRUCTION WASTE, CONSTRUCTION EQUIPMENT WASTE PRODUCTS (OIL, GAS, TIRES, ETC.), GARBAGE, GRUBBING, EXCESS CUT MATERIAL, VEGETATIVE DEBRIS, ETC. SHALL BE APPROPRIATELY DISPOSED OF OFFSITE AT NO ADDITIONAL COST TO THE OWNER. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ANY PERMITS REQUIRED FOR HAUL OR DISPOSAL OF WASTE PRODUCTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE WASTE DISPOSAL SITE COMPLIES WITH APPROPRIATE REGULATIONS REGARDING THE ENVIRONMENT, ENDANGERED SPECIES, AND ARCHAEOLOGICAL RESOURCES.

AC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEANUP AND REPORTING OF SPILLS OF HAZARDOUS MATERIALS ASSOCIATED WITH THE CONSTRUCTION SITE. HAZARDOUS MATERIALS INCLUDE GASOLINE, DIESEL FUEL, MOTOR OIL, SOLVENTS, CHEMICALS, PAINT, ETC. WHICH MAY BE A THREAT TO THE ENVIRONMENT. THE CONTRACTOR SHALL REPORT THE DISCOVERY OF PAST OR PRESENT SPILLS TO THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND THE ENGINEER.

AD. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REGULATIONS CONCERNING SURFACE AND UNDERGROUND WATER. CONTACT WITH SURFACE WATER BY CONSTRUCTION EQUIPMENT AND PERSONNEL SHALL BE MINIMIZED. EQUIPMENT MAINTENANCE AND REFUELING OPERATIONS SHALL BE PERFORMED IN AN ENVIRONMENTALLY SAFE MANNER IN COMPLIANCE WITH CITY, COUNTY, STATE AND EPA REGULATIONS.

AE. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REGULATIONS CONCERNING CONSTRUCTION NOISE AND HOURS OF OPERATION AS STATES IN THE SPECIFICATIONS OR IMPOSED BY THE OWNER OR CITY AUTHORITIES.

TRAFFIC CONTROL

AF. CONTRACTOR SHALL OBTAIN AN APPROPRIATE PERMIT FROM TXDOT AND/OR AUSTIN COUNTY AT LEAST FIVE (5) WORKING DAYS BEFORE ENGAGING IN ANY CONSTRUCTION, MAINTENANCE, OR REPAIR WORK IN ANY RIGHT-OF-WAY.

AG. CONTRACTOR SHALL PROVIDE ALL REQUIRED TRAFFIC CONTROL PLANS. ALL SIGNS, BARRICADES, CHANNELIZATION DEVICES, SIGN FRAMES AND ERECTION OF SUCH DEVICES SHALL CONFORM TO THE REQUIREMENTS OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD), LATEST EDITION. TRAFFIC CONTROL PLANS SHALL BE APPROVED BY WARD COUNTY AND/OR TXDOT PRIOR TO CONSTRUCTION.

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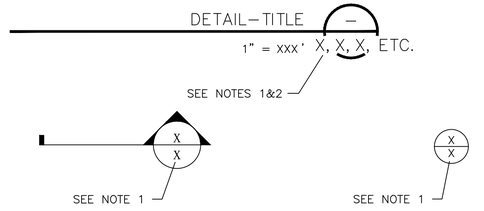
XREF:

LEGEND:



NOTES:

1. IF SECTION, DETAIL, SCHEMATIC, OR DIAGRAM IS DRAWN ON THE SAME SHEET THAT IT IS TAKEN FROM, THE SHEET NUMBER SHALL BE REPLACED WITH A HYPHEN.
2. IF THE SECTION, DETAIL, SCHEMATIC, OR DIAGRAM IS REFERENCED ON MULTIPLE SHEETS, ALL SHEETS SHOULD BE LISTED TO THE OUTSIDE RIGHT OF THE DETAIL–TITLE BUBBLE, AND SEPARATED WITH A COMMA.

NO	DATE	BY	REVISION MADE

FILE NAME:S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
ENVIRONMENTAL SCIENTISTS & ENGINEERS
4030 W. BRAKER LANE, SUITE 325
AUSTIN, TX 78759-5336
(512) 821-2765

DESIGNED BY: TG
DRAWN BY: CS
CHECKED BY: TG
DATE: 11/13/15

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

GENERAL NOTES & LEGEND

STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
DATE: 11/13/15

JOB NO. TX15.0094

SHEET 2 of 8
DWG NO. G-1

NORTH

0 100 ft

SITE PLAN

1" = 100'-0"

NOT FOR CONSTRUCTION

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GENERAL NOTES:

1. AERIAL PHOTOGRAPH PROVIDED BY IMAGEPATCH.COM EARTHSTAR GEOGRAPHICS SIO, 2015 MICROSOFT CORPORATION.
2. PROCESSING FACILITIES PLANNED TO BE CONSTRUCTED IN TWO PHASES. ENTIRE STORMWATER RETENTION POND TO BE CONSTRUCTED IN PHASE 1.
3. COMPOSITE LINER INSTALLED UNDER COMPOSTING PAD, FEEDSTOCK STORAGE AREA, AND STORMWATER RETENTION POND .
4. GRADING PLAN SEE AND .
5. DRAINAGE PLAN SEE .

XREF:

NO	DATE	BY	REVISION MADE

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DESIGNED BY: TG
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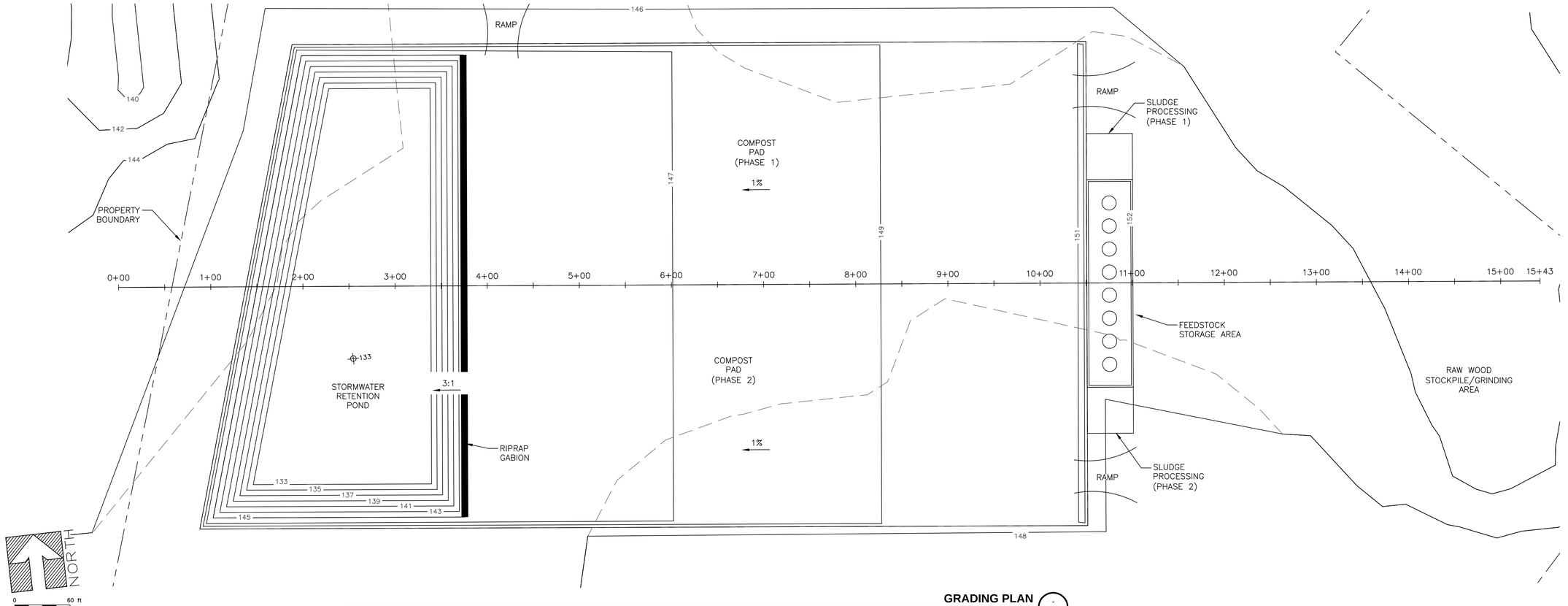
SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

SITE PLAN

STATE OF TEXAS
THOMAS A GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
DATE: 11/13/15

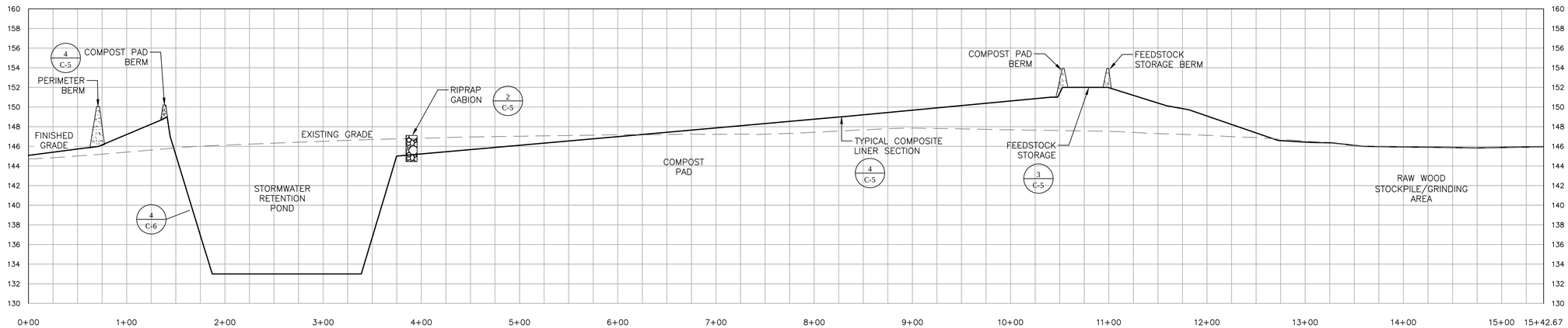
JOB NO. TX15.0094

SHEET 3 of 8
DWG NO. C-1



GRADING PLAN (-, C-1)

1" = 60'-0"



WEST TO EAST - STORMWATER RETENTION POND AND COMPOST PAD (-, -)

SOIL VOLUMES:

CUT: 52,000 CY
FILL: 45,000 CY
BERMS: 7,000 CY
NET CUT/FILL: 0 CY

STORMWATER RETENTION POND

CLAY VOLUME EXCAVATED: 19,700 CY
SAND VOLUME EXCAVATED: 24,900 CY
ELEVATION OF 25-YEAR, 24-HOUR DESIGN
STORM VOLUME: 138 FT

GENERAL NOTES:

1. COMPOSITE LINER INSTALLED UNDER COMPOST PAD, FEEDSTOCK STORAGE AREA, AND STORMWATER RETENTION POND (1, C-5).
2. POND BOTTOMS AND CLAY LINER SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY, STANDARD PROCTOR.

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4030 W. BRAKER LANE, AUSTIN, TX 78759-5336
(512) 821-2765

DESIGNED BY: TG
DRAWN BY: CS
CHECKED BY: TG
DATE: 11/13/15

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

GRADING PLAN AND PROFILE - 1

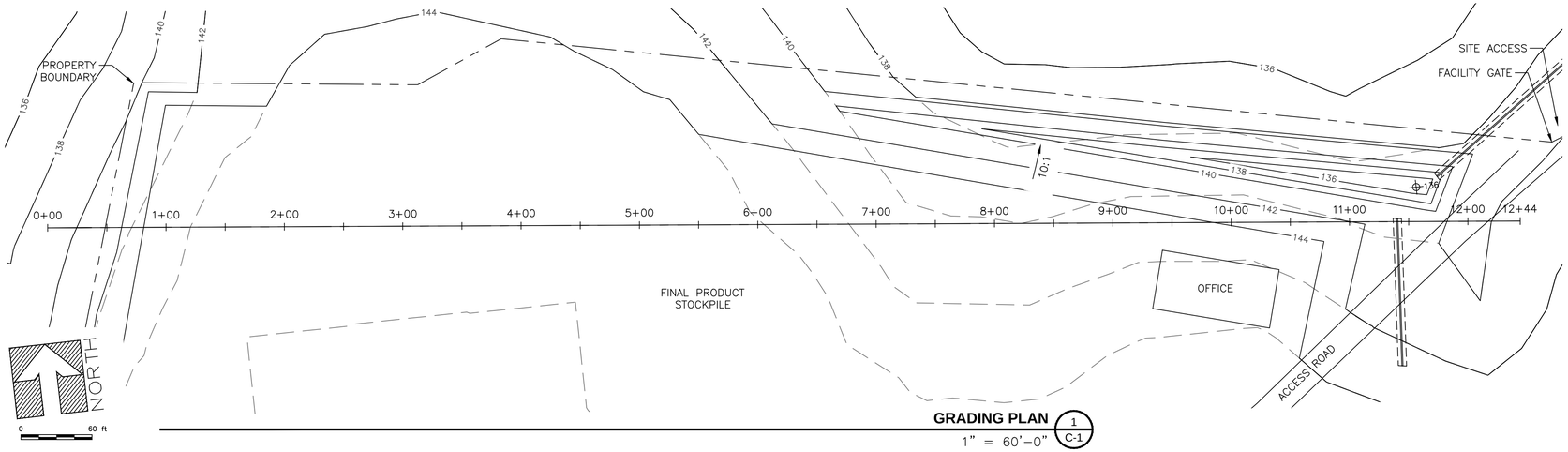
STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
DATE: 11/13/15

JOB NO. TX15.0094

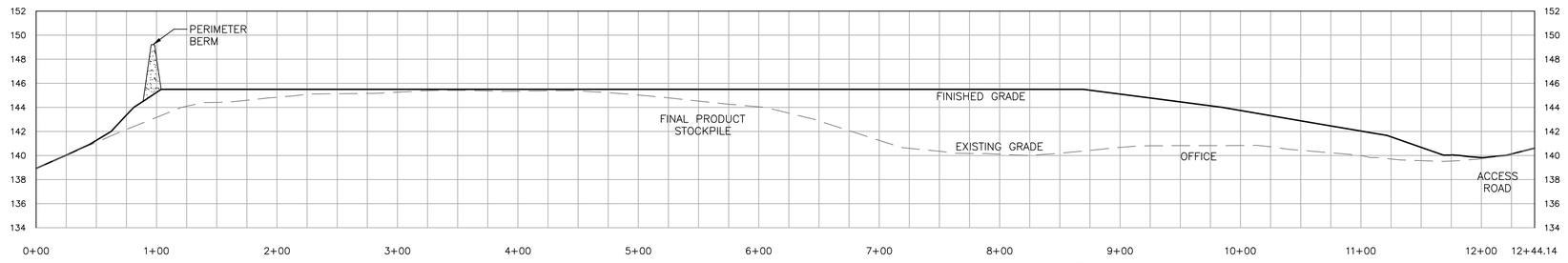
SHEET 4 of 8
DWG NO. C-2

GENERAL NOTES:

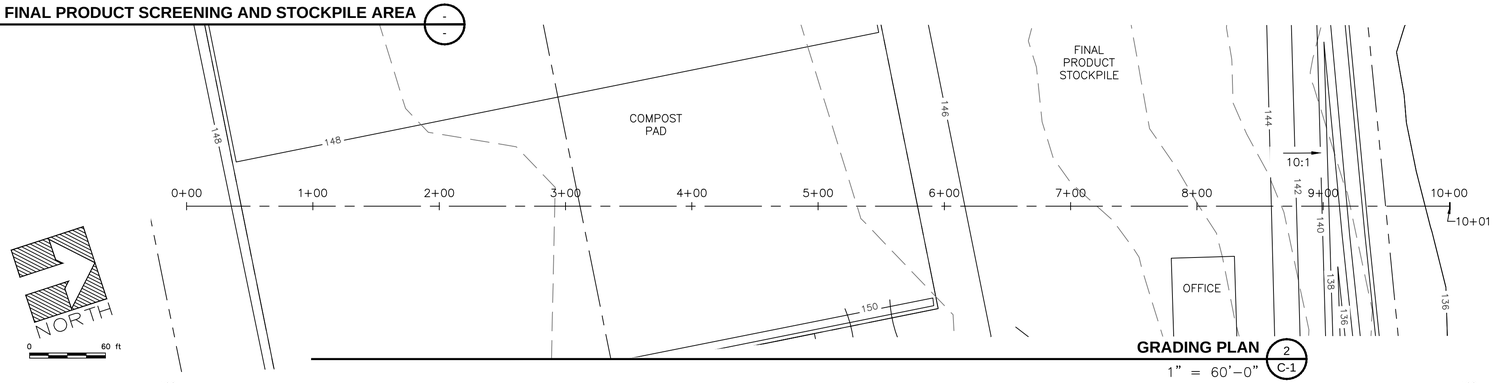
1. COMPOSITE LINER INSTALLED UNDER COMPOST PAD, FEEDSTOCK STORAGE AREA, AND STORMWATER RETENTION POND (1/C-5).
2. POND BOTTOMS AND CLAY LINER SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY, STANDARD PROCTOR.



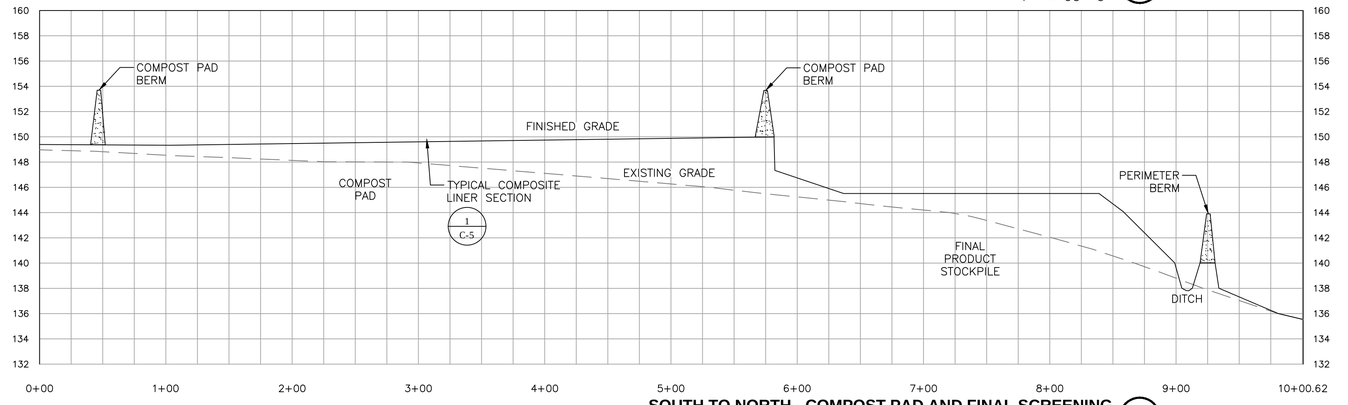
GRADING PLAN (1/C-1)
1" = 60'-0"



WEST TO EAST - FINAL PRODUCT SCREENING AND STOCKPILE AREA (-/-)



GRADING PLAN (2/C-1)
1" = 60'-0"



SOUTH TO NORTH - COMPOST PAD AND FINAL SCREENING (-/-)

NOT FOR CONSTRUCTION
THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF PERMITTING UNDER THE AUTHORITY OF THOMAS A. GOLDEN P.E. TEXAS NO: 109915 ON DATE: 11/13/15
IT IS NOT TO BE USED FOR CONSTRUCTION OR BIDDING PURPOSES.

XREF:

NO	DATE	BY	REVISION MADE

FILE NAME:S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
ENVIRONMENTAL SCIENTISTS & ENGINEERS
4030 W. BRAKER LANE, SUITE 325
AUSTIN, TX 78759-5336
(512) 821-2765

DESIGNED BY: TG
DRAWN BY: CS
CHECKED BY: TG
DATE: 11/13/15

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

GRADING PLAN AND PROFILE - 2

STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
DATE: 11/13/15

JOB NO. TX15.0094

SHEET 5 of 8
DWG NO. C-3

NORTH

0 100 ft

DRAINAGE PLAN (-)

1" = 100'-0"

POST CONSTRUCTION ON-SITE DRAINAGE

	Reach 1	Reach 2	Reach 3
Drainage Area (acres)	11.0	11.9	11.3
Time of Concentration (hr)	1.8	9.1	5.5
Rainfall Intensity (in/hr)	2.8	0.7	1.1
Runoff Coeficient	0.35	0.35	0.3
Flow Rate (cf/sec)	10.9	2.9	3.7

GENERAL NOTES:

1. AERIAL PHOTOGRAPH PROVIDED BY IMAGEPATCH.COM EARTHSTAR GEOGRAPHICS SIO, 015 MICROSOFT CORPORATION.
2. TOPOGRAPHY ADAPTED FROM USGS NATIONAL ELEVATION DATASET 2013.
3. CONTOUR INTERVAL 2 FEET, EXCEPT WHERE INDICATED.

NOT FOR CONSTRUCTION

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AUSTIN, TX 78759-5336
(512) 821-2765

DESIGNED BY: TG
DRAWN BY: CS
CHECKED BY: TG
DATE: 11/13/15

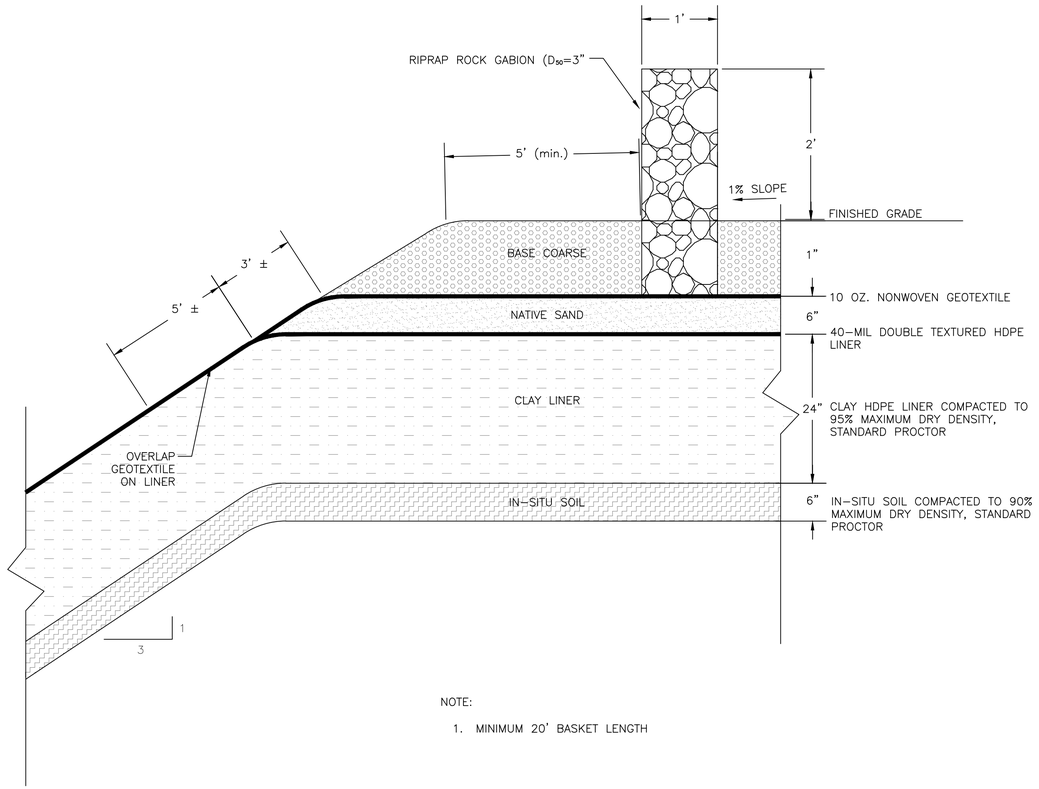
SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

DRAINAGE PLAN

STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
DATE: 11/13/15

JOB NO. TX15.0094

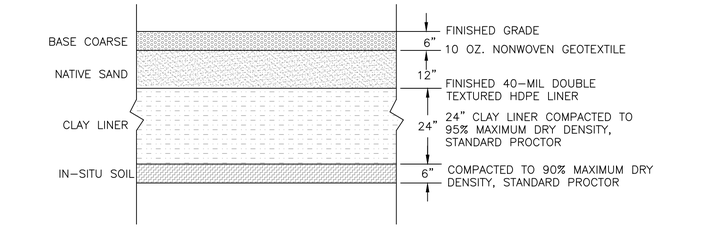
SHEET 6 of 8
DWG NO. C-4



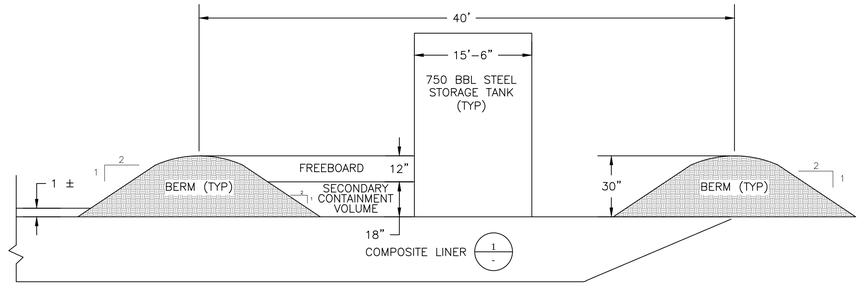
NOTE:

1. MINIMUM 20' BASKET LENGTH

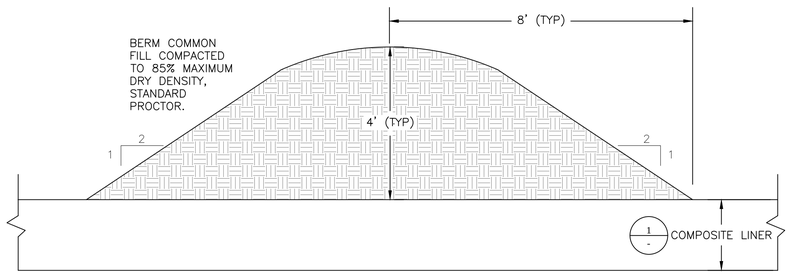
TYPICAL RIPRAP ROCK GABION SECTION 2 / C-1
NTS



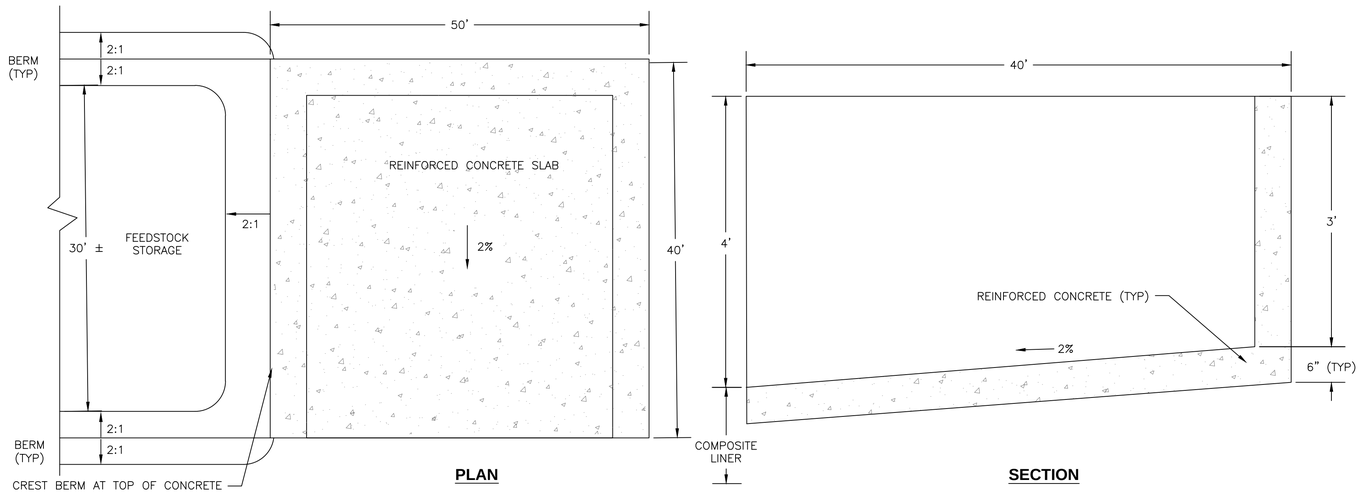
TYPICAL COMPOSITE LINER SECTION 1 / C-1,C-2,C-3
NTS



FEEDSTOCK STORAGE SECTION 3 / C-1
NTS



TYPICAL BERM SECTION 4 / C-2
NTS



SLUDGE PROCESSING PLAN AND SECTION 5 / C-1
NTS

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AUSTIN, TX 78759-5336
(512) 821-2765

DESIGNED BY: TG
DRAWN BY: JA
CHECKED BY: TG
DATE: 11/13/15

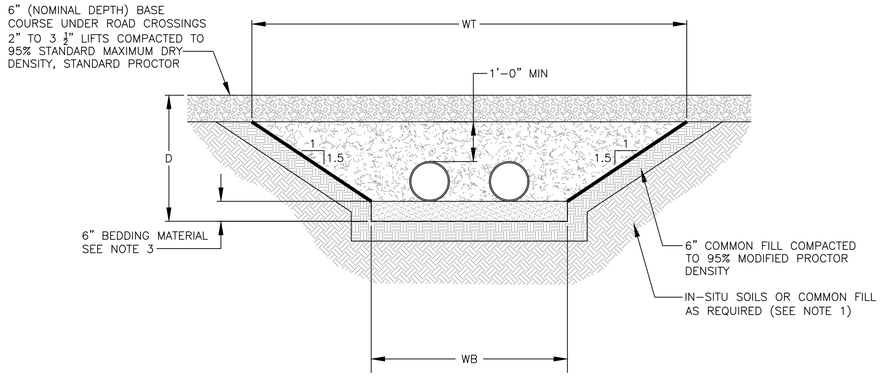
SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

CIVIL DETAILS

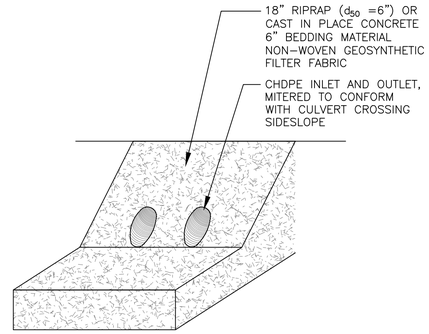
STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
DATE: 11/13/15

JOB NO. TX15.0094

SHEET 7 of 8
DWG NO. C-5



SECTION



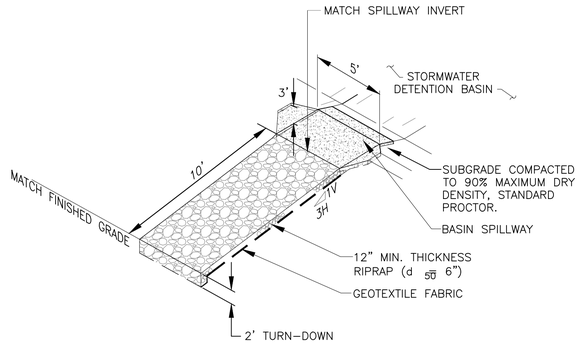
TYPICAL CULVERT INLET AND OUTLET DETAIL

CULVERT DESIGN SUMMARY TABLE										
Culvert	25-yr Peak Flow (cfs)	Invert Upstream (ft)	Invert Downstream (ft)	Length (ft)	Number	Size (inch)	Exit Velocity (fps)	WB	WT	D
East overflow	4.1	141	139	150	2	12	5.6	5	11	2.5
North	7.3	137	136	150	3	12	4.4	6	12	2.5

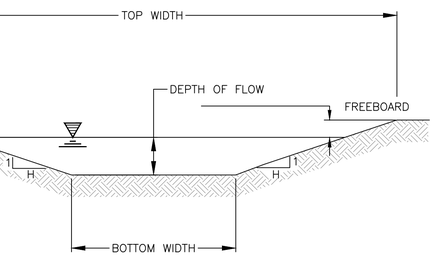
NOTES:

1. IN-SITU SOILS OR FILL BENEATH CULVERT STRUCTURES (RCP AND EROSION PROTECTION) SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY STANDARD PROCTOR.
2. SEE DRAINAGE PLAN FOR LOCATIONS OF CULVERT CROSSINGS.
3. BEDDING MATERIAL SHALL BE NATIVE SILTY SAND AND SHAPED TO PROVIDE UNIFORM CONTACT WITH THE BOTTOM OF THE CULVERTS. NO MATERIALS GREATER THAN 0.25".
4. NUMBER OF CULVERT PIPES SHALL VARY ACCORDING TO CULVERT SCHEDULE.
5. 6" MINIMUM SPACING BETWEEN EACH CULVERT PIPE, WALL TO WALL.

TYPICAL CULVERT DETAILS 1 / C-4
N.T.S.



STORMWATER DETENTION BASIN SPILLWAY 3 / C-4
N.T.S.



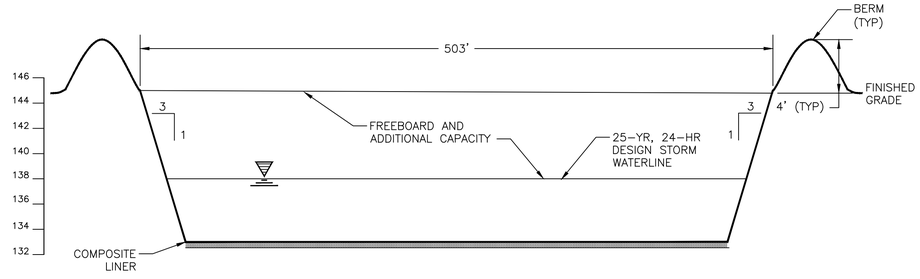
SECTION

DITCH DESIGN SUMMARY TABLE											
Ditch	25-yr, Peak Flow (cfs)	Average Slope (%)	Bottom Width (ft)	Sideslope H:1V	Top Width (ft)	Depth of Flow (ft)	Velocity (fps)	Freeboard (ft)	Minimum Total Depth (ft)	Ditch Depth (ft)	Erosion Protection
North	3.2	0.1	0	3	12	0.6	3.2	1.0	1.6	2.0	none

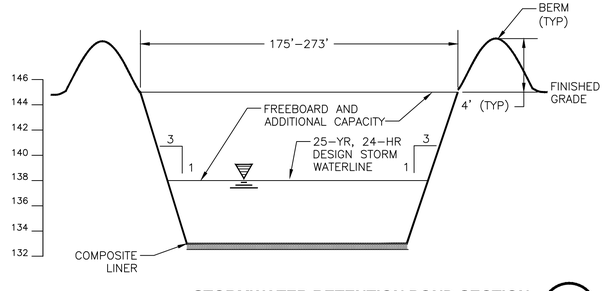
NOTES:

1. MAXIMUM ALLOWABLE VELOCITY FOR DITCHES WITHOUT EROSION PROTECTION 5 FPS.
2. DEPTH OF FLOW DETERMINED FROM MINIMUM GRADE OF CHANNEL.
3. FLOW VELOCITY DETERMINED FROM MAXIMUM GRADE OF CHANNEL.

TYPICAL DITCH DETAILS 2 / C-4
N.T.S.



STORMWATER RETENTION POND SECTION A / C-4
N.T.S.



STORMWATER RETENTION POND SECTION B / C-4
N.T.S.

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AUSTIN, TX 78759-5336
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DESIGNED BY: TG
DRAWN BY: JA
CHECKED BY: TG
DATE: 11/13/15

STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
DATE: 11/13/15

JOB NO. TX15.0094

SHEET 8 of 8
DWG NO. C-6

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

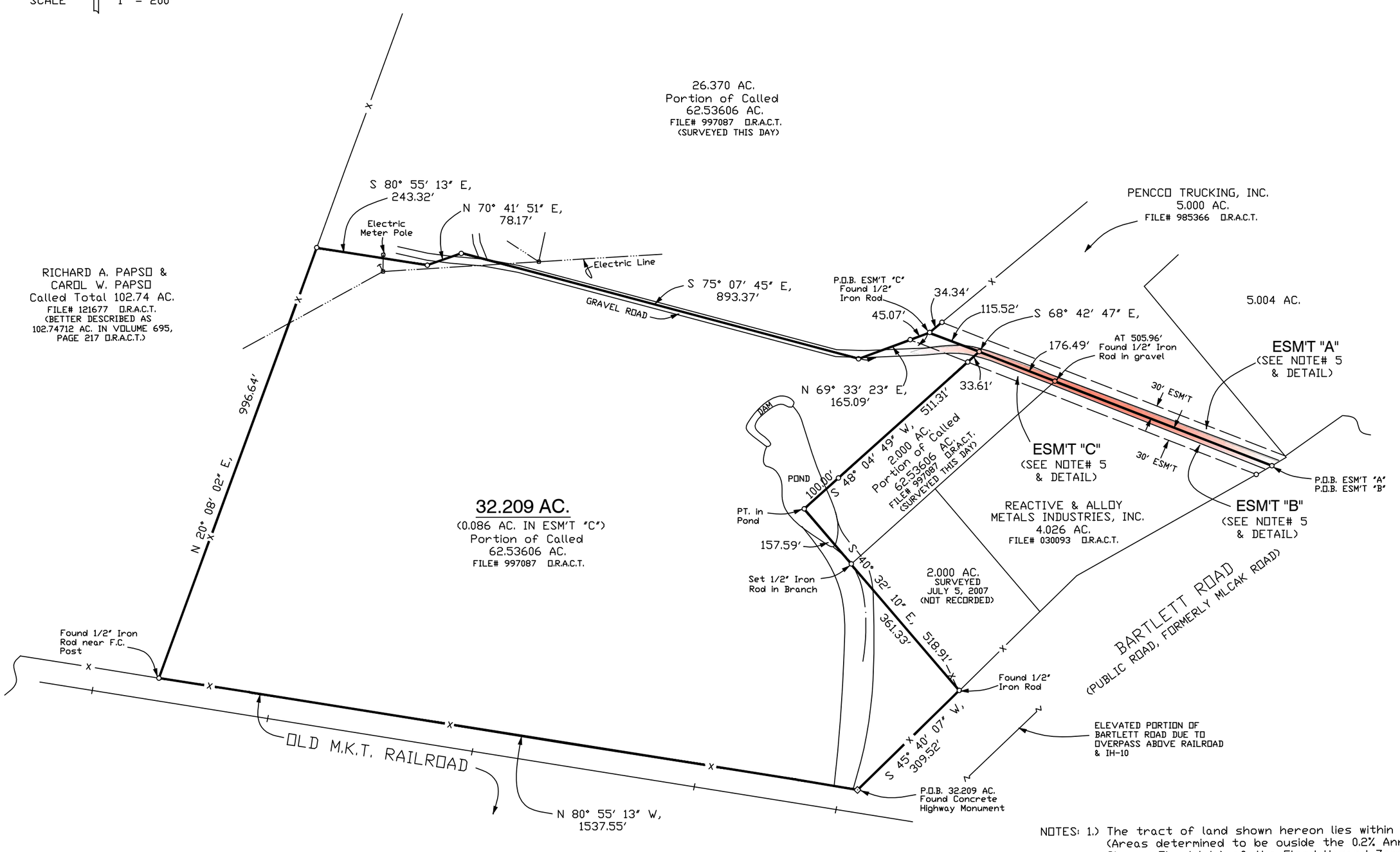
DRAINAGE DETAILS

Appendix A

Boundary Metes and Bounds with Drawing

STEPHEN F. AUSTIN SURVEY
A-7
AUSTIN COUNTY, TEXAS

SCALE 1" = 200'



NOTES: 1.) The tract of land shown hereon lies within Zone "X" (Areas determined to be ouside the 0.2% Annual Chance Floodplain) of the Flood Hazard Zone according to the F.I.R.M., Flood Insurance Rate Map# 48015C 0350E, Map Revised September 3, 2010.

2.) Bearings shown hereon are based on the 5.000 Acre Pencco Tract recorded in File# 985366 O.R.A.C.T.

3.) Reference is hereby made to metes and bounds description, of the subject tract, prepared this day.

4.) o denotes set 1/2" iron rod, unless otherwise noted.

5.) ESM'T "A" - 0.552 Acres is that same easement, called 30' wide, Reserved in deed to Pencco Trucking, Inc. recorded in File# 985366 O.R.A.C.T.

ESM'T "B" - 0.345 Acres -30.0' Easement across and a portion of the 4.026 Acre tract recorded in File# 030093 O.R.A.C.T. and is also mentioned in Reservation, recorded in File# 985366 O.R.A.C.T.

ESM'T "C" - Total of 0.208 Acres - 30.0' Easement across and a portion of the residue of the 62.53606 Acre tract, now surveyed as 2.000 Acres and 32.209 Acres - of the 0.208 Acres, 0.122 Acres are out of the 2.000 Acre tract and 0.086 Acres are out of the 32.209 Acre tract.

6.) That easement to Houston Lighting & Power Co., recorded in Volume 772, Page 20 O.R.A.C.T. is not described well enough to locate, on the ground.

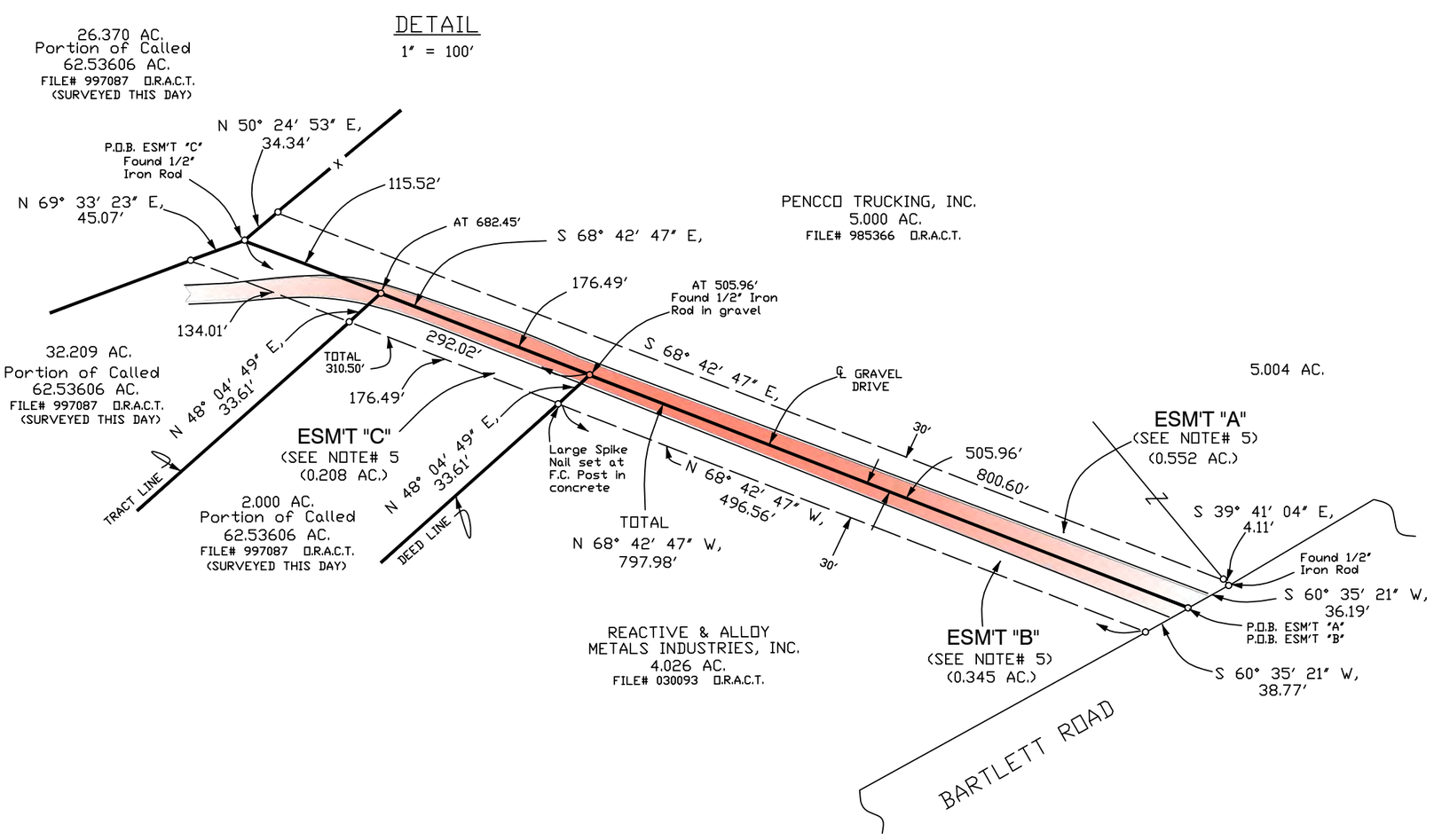
7.) That pipeline Right-of-way to Texas Pipe Line Company, recorded in Volume 79, Page 383 D.R.A.C.T., as restricted and modified in Volume 403, Page 567 D.R.A.C.T. and as evidenced, on the ground, is not located on the tract of land shown hereon.

8.) That pipeline Right-of-way to United Pipe Line Co., recorded in Volume 248, Page 640 D.R.A.C.T. and as evidenced, on the ground, is not located on the tract of land shown hereon.

9.) This plat was prepared for the exclusive use of the individuals and/or institutions named on this survey. It is non transferable to additional institutions or individuals without expressed recertification by Alexander Surveying.

10.) This plat is the property of Alexander Surveying. Reproduction of this plat for any purpose is expressly forbidden without the written consent of an authorized agent of Alexander Surveying.

DETAIL
1" = 100'



I, Glen S. Alexander, Registered Professional Land Surveyor, do hereby certify that the plat and/or the description shown hereon accurately represents the results of an on the ground survey made under my direction and supervision on _____JUNE 3, 2015_____, and all corners and acreage are shown hereon. There are no conflicts, protrusions or easements apparent on the ground, except as shown and/or noted hereon.

This survey was performed in connection with the transaction described in G.F. No. ____6712000942____ of __FIDELITY NATIONAL TITLE___ and is certified for that transaction only.

USE OF THIS SURVEY FOR ANY OTHER PURPOSE OR BY OTHER PARTIES SHALL BE AT THEIR OWN RISK AND THE UNDERSIGNED SURVEYOR IS NOT RESPONSIBLE FOR ANY LOSS RESULTING THEREFROM.

_____
Glen S. Alexander - Registered Professional Land Surveyor, #4194

JULY 22, 2015 - Revised plat and description of the 32.209 Acre tract

OWNER: MICHAEL P. & CAROLYN S. HICKS
BUYER: SOUTHWASTE DISPOSAL, LLC

ALEXANDER SURVEYING
105 E. Luhn Street P. O. BOX 386
Bellville, Texas 77418
Phone: 979-865-9145 Fax: 979-865-5988
alexandersurveying@sbcglobal.net

Glen S. Alexander	County AUSTIN	Field Crew E.W.
R.P.L.S. No. #4194	Survey STEPHEN F. AUSTIN SURVEY, A-7	Computations G.A.
TBPLS FIRM NO. 10134400	City	Drafting D.C.
Date JUNE 3, 2015	Addition	Work Order 15-7115

ALEXANDER SURVEYING
LAND SURVEYORS

OWNER: MICHAEL P. & CAROLYN S. HICKS

BUYER: SOUTHWASTE DISPOSAL, LLC

32.209 ACRES

ALL THAT TRACT OR PARCEL OF LAND consisting of 32.209 Acres located in the Stephen F. Austin Survey, A-7, Austin County, Texas. Subject tract being a portion of the 62.53606 Acre tract described in Deed to Michael P. & Carolyn S. Hicks recorded in File# 997087 of the Official Records of Austin County, Texas and being more particularly described as follows:

BEGINNING at a concrete highway monument found at the intersection of the North Right-of-way of the Old M.K.T. Railroad Right-of-way and the West Right-of-way of Bartlett Road (Public Road, Formerly Mlcak Road) for the Southeast corner of the 62.53606 Acre tract mentioned above and the Southeast corner of the herein described tract;

THENCE N 80d 55′ 13″ W, with the North Right-of-way of the Old M.K.T. Railroad Right-of-way and generally with an existing fence, a distance of 1537.55 ft. to a 1/2″ iron rod found near a fence corner post for the Southeast corner of the called total 102.74 Acre tract belonging to Richard A. Papso & Carol W. Papso recorded in File# 121677 O.R.A.C.T. and being better described as 102.74712 Acres in Volume 695, Page 217 O.R.A.C.T., for the Southwest corner of the 62.53606 Acre parent tract and the Southwest corner of the herein described tract;

THENCE N 20d 08′ 02″ E, with the common line with the 102.74 Acre adjoining tract and generally with an existing fence, a distance of 996.64 ft. to a 1/2″ iron rod set for the Southwest corner of the 26.370 Acre tract that has been surveyed and described this day, for the Northwest corner of the herein described tract;

THENCE with the common line with the 26.370 Acre adjoining tract the following courses and distances (all angle points are monumented by 1/2″ iron rods set this day):
S 80d 55′ 13″ E, 243.32 ft.;
N 70d 41′ 51″ E, 78.17 ft.;
S 75d 07′ 45″ E, with the centerline of an existing Gravel Road, a distance of 893.37 ft.;
N 69d 33′ 23″ E, 165.09 ft. to a 1/2″ iron rod found for the

June 3, 2015
Revised July 22, 2015
W.O.# 15-7115

105 E. Luhn P.O. Box 386 Bellville, Texas 77418 979 / 865-9145 Fax 979 / 865-5988
alexandersurveying@sbcglobal.net TBPLS Firm No. 10134400

OWNER: MICHAEL P. & CAROLYN S. HICKS

BUYER: SOUTHWASTE DISPOSAL, LLC

32.209 ACRES (continued)

Southwest corner of the 5.000 Acre tract described in Deed to Pencco Trucking, Inc. recorded in File# 985366 O.R.A.C.T., the same being an angle point in the 26.370 Acre adjoining tract and the Northwest corner of an Easement consisting of 0.208 Acres that has been designated as Easement "C" and having been surveyed and described this day, for an angle point in the North line of the herein described tract;

THENCE S 68d 42' 47" E, with the Southerly line of the 5.000 Acre Pencco tract, the same being a Southerly line of the 0.552 Acre Easement Tract designated as Easement "A" and having been surveyed and described this day and said easement being that same easement, called 30 ft. wide reserved in Deed to Pencco Trucking, Inc. recorded in File# 985366 O.R.A.C.T., a distance of 115.52 ft. to a 1/2" iron rod set in the Gravel Road for the North corner of the 2.000 Acre tract that has been surveyed and described this day, for the Northeasterly corner of the herein described tract;

THENCE S 48d 04' 49" W, with the common line with said 2.000 Acre tract and passing at 33.61 ft. a 1/2" iron rod set in the South line of Easement "C" being the Southeast corner of the 0.086 Acres of Easement "C" which is within the 32.209 Acre tract described hereon, the same being the Southwesterly corner of the 0.122 Acres, which is a portion of Easement "C" being a portion of the 2.000 Acre adjoining tract and continuing with the common line with the 2.000 Acre tract, a total distance of 511.31 ft. to a point in an existing pond for the West corner of 2.000 Acre tract and an "L" corner in the herein described tract. From said point, a 1/2" iron rod set for reference, brs. N 48d 04' 49" E, 100.00 ft.;

THENCE S 40d 32' 10" E, continuing with the common line with the 2.000 Acre adjoining tract and passing at 157.59 ft. a 1/2" iron rod set in a Branch for the Southeasterly corner of the 2.000 Acre tract, the same being the West corner of another 2.000 Acre tract that was surveyed and described for Michael P. Hicks by survey, dated July 5, 2007 (not recorded) and continuing with the common line with that 2.000 Acre tract, a total distance of 518.91 ft. to a 1/2" iron rod found in the Westerly or Northwesterly Right-of-way of Bartlett Road for the South corner of the 2.000 Acre tract that was surveyed on July 5, 2007 and being the Easterly corner of the herein described tract;

June 3, 2015
Revised July 22, 2015
W.O.# 15-7115

105 E. Luhn P.O. Box 386 Bellville, Texas 77418 979 / 865-9145 Fax 979 / 865-5988
alexandersurveying@sbcglobal.net TBPLS Firm No. 10134400

OWNER: MICHAEL P. & CAROLYN S. HICKS

BUYER: SOUTHWASTE DISPOSAL, LLC

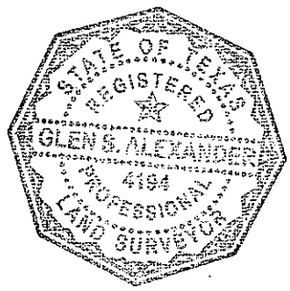
32.209 ACRES

THENCE S 45d 40' 07" W, with the Westerly Right-of-way of Bartlett Road (elevated portion of Bartlett Road due to overpass above Railroad & IH-10), a distance of 309.52 ft. to the **PLACE OF BEGINNING** and containing 32.209 Acres, of which 0.086 Acres are within the limits of Easement "C" mentioned above.

NOTES: Bearings shown hereon are based on the 5.000 Acre Pencco Tract recorded in File# 985366 O.R.A.C.T.

Reference is hereby made to plat, of the subject tract, prepared this day.

June 3, 2015
Revised July 22, 2015
W.O.# 15-7115



Glen S. Alexander

Glen S. Alexander
Registered Professional Land Surveyor, #4194

105 E. Luhn P.O. Box 386 Bellville, Texas 77418 979 / 865-9145 Fax 979 / 865-5988
alexandersurveying@sbcglobal.net TBPLS Firm No. 10134400

Appendix B

Lease Agreement

TEXAS ASSOCIATION OF REALTORS®
COMMERCIAL CONTRACT - UNIMPROVED PROPERTY

1. **PARTIES:** Seller agrees to sell and convey to Buyer the Property described in Paragraph 2. Buyer agrees to buy the Property from Seller for the sales price stated in Paragraph 3. The parties to this contract are:

Seller: Mike Hicks

Address: 1228 Brazos Ten Lane / Sealy, TX 77474
Phone: 832-643-0576 E-mail: counthix@aol.com
Fax: 979-872-0926 Other:

Buyer: Southwaste Disposal LLC, affiliates / assigns

Address: 9575 Katy Freeway, Suite 130 / Houston, TX 77024
Phone: 713-490-9696 E-mail: dclarke@southwaste.com
Fax: 713-413-4179 Other:

2. **PROPERTY:**

A. "Property" means that real property situated in Austin County, Texas at Northwest corner of Bartlett Rd. & Interstate 10 Service Rd *(address)* and that is legally described on the attached Exhibit A or as follows:

B. Seller will sell and convey the Property together with:
(1) all rights, privileges, and appurtenances pertaining to the Property, including Seller's right, title, and interest in any minerals, utilities, adjacent streets, alleys, strips, gores, and rights-of-way;
(2) Seller's interest in all leases, rents, and security deposits for all or part of the Property; and
(3) Seller's interest in all licenses and permits related to the Property.

(Describe any exceptions, reservations, or restrictions in Paragraph 12 or an addendum.)
(If mineral rights are to be reserved an appropriate addendum should be attached.)

3. **SALES PRICE:**

A. At or before closing, Buyer will pay the following sales price for the Property:

(1) Cash portion payable by Buyer at closing . . . . . $ 875,000.00
(2) Sum of all financing described in Paragraph 4 . . . . . $ *
(3) Sales price (sum of 3A(1) and 3A(2)) . . . . . $ 875,000.00

* Application of Rental Payments are addressed in Section 12

B. Adjustment to Sales Price: *(Check (1) or (2) only.)*

☐ (1) The sales price will not be adjusted based on a survey.

☒ (2) The sales price will be adjusted based on the latest survey obtained under Paragraph 6B.

(a) The sales price is calculated on the basis of $ 25,000 per:
☐ (i) square foot of ☐ total area ☐ net area.
☒ (ii) acre of ☒ total area ☐ net area.

(b) "Total area" means all land area within the perimeter boundaries of the Property. "Net area" means total area less any area of the Property within:
☐ (i) public roadways;
☐ (ii) rights-of-way and easements other than those that directly provide utility services to the Property; and
☐ (iii) _____

(c) ~~If the sales price is adjusted by more than 10 % of the stated sales price, either party may terminate this contract by providing written notice to the other party within 5 days after the terminating party receives the survey. If neither party terminates this contract or if the variance is less than the stated percentage, the adjustment to the sales price will be made to the cash portion of the sales price payable by Buyer.~~

4. **FINANCING:** Buyer will finance the portion of the sales price under Paragraph 3A(2) as follows:

☒ A. Third Party Financing: One or more third party loans in the total amount of $_____. This contract:
☒ (1) is not contingent upon Buyer obtaining third party financing.
☐ (2) is contingent upon Buyer obtaining third party financing in accordance with the attached Commercial Contract Financing Addendum (TAR-1931).

☐ B. Assumption: In accordance with the attached Commercial Contract Financing Addendum (TAR-1931), Buyer will assume the existing promissory note secured by the Property, which balance at closing will be $_____.

☐ C. Seller Financing: The delivery of a promissory note and deed of trust to Seller under the terms of the attached Commercial Contract Financing Addendum (TAR-1931) in the amount of $_____.

5. **EARNEST MONEY:**

A. Not later than 3 days after the effective date, Buyer must deposit $ 25,000 as earnest money with Fidelity National Title (title company) at 1400 Post Oak Blvd, Ste 740, Houston, TX 77056 (address) Lolly Avant (closer). If Buyer fails to timely deposit the earnest money, Seller may terminate this contract or exercise any of Seller's other remedies under Paragraph 15 by providing written notice to Buyer before Buyer deposits the earnest money.

B. Buyer will deposit an additional amount of $_____ with the title company to be made part of the earnest money on or before:
☐ (i) _____ days after Buyer's right to terminate under Paragraph 7B expires; or
☐ (ii) _____
Buyer will be in default if Buyer fails to deposit the additional amount required by this Paragraph 5B within 3 days after Seller notifies Buyer that Buyer has not timely deposited the additional amount.

C. Buyer may instruct the title company to deposit the earnest money in an interest-bearing account at a federally insured financial institution and to credit any interest to Buyer.

6. TITLE POLICY AND SURVEY:

A. Title Policy:

(1) Seller, at Seller's expense, will furnish Buyer an Owner's Policy of Title Insurance (the title policy) issued by any underwriter of the title company in the amount of the sales price, dated at or after closing, insuring Buyer against loss under the title policy, subject only to:
(a) those title exceptions permitted by this contract or as may be approved by Buyer in writing; and
(b) the standard printed exceptions contained in the promulgated form of title policy unless this contract provides otherwise.

(2) The standard printed exception as to discrepancies, conflicts, or shortages in area and boundary lines, or any encroachments or protrusions, or any overlapping improvements:
☐ (a) will not be amended or deleted from the title policy.
☐ (b) will be amended to read "shortages in areas" at the expense of ☐ Buyer ☒ Seller.

(3) Within 10 days after the effective date, Seller will furnish Buyer a commitment for title insurance (the commitment) including legible copies of recorded documents evidencing title exceptions. Seller authorizes the title company to deliver the commitment and related documents to Buyer at Buyer's address.

B. Survey: Within 7 days after the effective date:

☐ (1) Buyer will obtain a survey of the Property at Buyer's expense and deliver a copy of the survey to Seller. The survey must be made in accordance with the: (i) ALTA/ACSM Land Title Survey standards, or (ii) Texas Society of Professional Surveyors' standards for a Category 1A survey under the appropriate condition. Seller will reimburse Buyer _____ *(insert amount)* of the cost of the survey at closing, if closing occurs.

☐ (2) Seller, at Seller's expense, will furnish Buyer a survey of the Property dated after the effective date. The survey must be made in accordance with the: (i) ALTA/ACSM Land Title Survey standards, or (ii) Texas Society of Professional Surveyors' standards for a Category 1A survey under the appropriate condition.

Buyer Buyer's

☒ (3) Seller will deliver to Buyer and the title company a true and correct copy of Seller's most recent survey of the Property along with an affidavit required by the title company for approval of the existing survey. If the existing survey is not acceptable to the title company, ~~Seller~~, at ~~Seller's~~ expense, will obtain a new or updated survey acceptable to the title company and deliver the acceptable survey to ~~Buyer and the~~ title company ~~within 20 days after Seller receives notice that the existing survey is not acceptable to the title company~~. The closing date will be extended daily up to Buyer 20 days if necessary for Seller to deliver an acceptable survey within the time required. ~~Buyer~~ will reimburse ~~Seller~~ $2,500.00 *(insert amount)* of the cost of the new or updated survey at closing, if closing occurs. prior to closing Seller

C. Buyer's Objections to the Commitment and Survey:

(1) Within 10 days after Buyer receives the commitment, copies of the documents evidencing the title exceptions, and any required survey, Buyer may object in writing to matters disclosed in the items if: (a) the matters disclosed are a restriction upon the Property or constitute a defect or encumbrance to title other than those permitted by this contract or liens that Seller will satisfy at closing or Buyer will assume at closing; or (b) the items show that any part of the Property lies in a

special flood hazard area (an "A" or "V" zone as defined by FEMA). If Paragraph 6B(1) applies, Buyer is deemed to receive the survey on the earlier of: (i) the date of Buyer's actual receipt of the survey; or (ii) of the deadline specified in Paragraph 6B.

(2) Seller may, but is not obligated to, cure Buyer's timely objections within 15 days after Seller receives the objections. The closing date will be extended as necessary to provide such time to cure the objections. If Seller fails to cure the objections by the time required, Buyer may terminate this contract by providing written notice to Seller within 5 days after the time by which Seller must cure the objections. If Buyer terminates, the earnest money, less any independent consideration under Paragraph 7B(1), will be refunded to Buyer.

(3) Buyer's failure to timely object or terminate under this Paragraph 6C is a waiver of Buyer's right to object except that Buyer will not waive the requirements in Schedule C of the commitment.

7. PROPERTY CONDITION:

A. Present Condition: Buyer accepts the Property in its present condition except that Seller, at Seller's expense, will complete the following before closing: N/A

B. Feasibility Period: Buyer may terminate this contract for any reason within 60 days after the effective date (feasibility period) by providing Seller written notice of termination. *(Check only one box.)*

☒ (1) If Buyer terminates under this Paragraph 7B, the earnest money will be refunded to Buyer less $ 100.00 that Seller will retain as independent consideration for Buyer's unrestricted right to terminate. Buyer has tendered the independent consideration to Seller upon payment of the amount specified in Paragraph 5A to the title company. The independent consideration is to be credited to the sales price only upon closing of the sale. If no dollar amount is stated in this Paragraph 7B(1) or if Buyer fails to deposit the earnest money, Buyer will not have the right to terminate under this Paragraph 7B.

☐ (2) Not later than 3 days after the effective date, Buyer must pay Seller $ _____ as independent consideration for Buyer's right to terminate by tendering such amount to Seller or Seller's agent. If Buyer terminates under this Paragraph 7B, the earnest money will be refunded to Buyer and Seller will retain the independent consideration. The independent consideration will be credited to the sales price only upon closing of the sale. If no dollar amount is stated in this Paragraph 7B(2) or if Buyer fails to pay the independent consideration, Buyer will not have the right to terminate under this Paragraph 7B.

C. Inspections, Studies, or Assessments:

(1) During the feasibility period, Buyer, at Buyer's expense, may complete or cause to be completed any and all inspections, studies, or assessments of the Property (including all improvements and fixtures) desired by Buyer.

(2) Buyer must:
(a) employ only trained and qualified inspectors and assessors;
(b) notify Seller, in advance, of when the inspectors or assessors will be on the Property;
(c) abide by any reasonable entry rules or requirements of Seller;
(d) not interfere with existing operations or occupants of the Property; and
(e) restore the Property to its original condition if altered due to inspections, studies, or assessments that Buyer completes or causes to be completed.

(3) Except for those matters that arise from the negligence of Seller or Seller's agents, Buyer is responsible for any claim, liability, encumbrance, cause of action, and expense resulting from Buyer's inspections, studies, or assessments, including any property damage or personal injury. Buyer will indemnify, hold harmless, and defend Seller and Seller's agents against any claim involving a matter for which Buyer is responsible under this paragraph. This paragraph survives termination of this contract.

D. Property Information:

(1) Delivery of Property Information: Within 5 days after the effective date, Seller will deliver to Buyer: *(Check all that apply.)*

☒ (a) copies of all current leases pertaining to the Property, including any modifications, supplements, or amendments to the leases;

☒ (b) copies of all notes and deeds of trust against the Property that Buyer will assume or that Seller will not pay in full on or before closing;

☒ (c) copies of all previous environmental assessments, geotechnical reports, studies, or analyses made on or relating to the Property;

☒ (d) copies property tax statements for the Property for the previous 2 calendar years;

☒ (e) plats of the Property;

☒ (f) copies of current utility capacity letters from the Property's water and sewer service provider; and

☐ (g) _____

(2) Return of Property Information: If this contract terminates for any reason, Buyer will, not later than 10 days after the termination date: *(Check all that apply.)*

☐ (a) return to Seller all those items described in Paragraph 7D(1) that Seller delivered to Buyer in other than an electronic format and all copies that Buyer made of those items;

☐ (b) delete or destroy all electronic versions of those items described in Paragraph 7D(1) that Seller delivered to Buyer or Buyer copied; and

☒ (c) deliver copies of all inspection and assessment reports related to the Property that Buyer completed or caused to be completed.

This Paragraph 7D(2) survives termination of this contract.

E. Contracts Affecting Operations: Until closing, Seller: (1) will operate the Property in the same manner as on the effective date under reasonably prudent business standards; and (2) will not transfer or dispose of any part of the Property, any interest or right in the Property, or any of the personal property or other items described in Paragraph 2B or sold under this contract. After the feasibility period ends, Seller may not enter into, amend, or terminate any other contract that affects the operations of the Property without Buyer's written approval.

8. LEASES:

A. Each written lease Seller is to assign to Buyer under this contract must be in full force and effect according to its terms. Seller may not enter into any new lease, fail to comply with any existing lease, or make any amendment or modification to any existing lease without Buyer's written consent. Seller must disclose, in writing, if any of the following exist at the time Seller provides the leases to the Buyer or subsequently occur before closing:

(1) any failure by Seller to comply with Seller's obligations under the leases;

(2) any circumstances under any lease that entitle the tenant to terminate the lease or seek any offsets or damages;

(3) any advance sums paid by a tenant under any lease;

(4) any concessions, bonuses, free rents, rebates, brokerage commissions, or other matters that affect any lease; and
(5) any amounts payable under the leases that have been assigned or encumbered, except as security for loan(s) assumed or taken subject to under this contract.

If Applicable

B. Estoppel Certificates: Within 14 days after the effective date, Seller will deliver to Buyer estoppel certificates signed not earlier than April 20, 2015 by each tenant that leases space in the Property. The estoppel certificates must include the certifications contained in the current version of TAR Form 1938 – Commercial Tenant Estoppel Certificate and any additional information requested by a third party lender providing financing under Paragraph 4 if the third party lender requests such additional information at least 10 days prior to the earliest date that Seller may deliver the signed estoppel certificates.

9. BROKERS:

A. The brokers to this sale are:

Principal Broker: Jones Lang LaSalle Brokerage, Inc.	**Cooperating Broker:**
Agent: Richard Quarles & Cliff West	Agent:
Address: 1400 Post Oak Blvd., Ste 1100 Houston, TX 77056	Address:
Phone & Fax: 713-888-4000 / 713-888-4040	Phone & Fax:
E-mail: richard.quarles@am.jll.com / cliff.west@am.jll.com	E-mail:
License No.: 591725	License No.:

Principal Broker: *(Check only one box)*
☐ represents Seller only.
☒ represents Buyer only.
☐ is an intermediary between Seller and Buyer.

Cooperating Broker represents Buyer.

B. Fees: *(Check only (1) or (2) below.)*
(Complete the Agreement Between Brokers on page 13 only if (1) is selected.)

☐ (1) Seller will pay Principal Broker the fee specified by separate written commission agreement between Principal Broker and Seller. Principal Broker will pay Cooperating Broker the fee specified in the Agreement Between Brokers found below the parties' signatures to this contract.

☒ (2) At the closing of this sale, Seller will pay:

Principal Broker a total cash fee of:	Cooperating Broker a total cash fee of:
☒ 3 % of the sales price.	☐ % of the sales price.
☐	☐

The cash fees will be paid in Harris County, Texas. Seller authorizes the title company to pay the brokers from the Seller's proceeds at closing.

NOTICE: Chapter 62, Texas Property Code, authorizes a broker to secure an earned commission with a lien against the Property.

C. The parties may not amend this Paragraph 9 without the written consent of the brokers affected by the amendment.

Commercial Contract - Unimproved Property concerning Northwest corner of Bartlett Rd. & Interstate 10 Service Rd Austin County, TX

10. CLOSING:

A. The date of the closing of the sale (closing date) will be on or before the later of:
(1) ☐ _____ days after the expiration of the feasibility period.
☐ _____ *(specific date)*.
☒ The earlier of 30 days after the expiration of the lease term or upon Buyer providing 10 days written notice to Seller to accelerate Closing to a day selected by Buyer.
(2) 7 days after objections made under Paragraph 6C have been cured or waived.

B. If either party fails to close by the closing date, the non-defaulting party may exercise the remedies in Paragraph 15.

C. At closing, Seller will execute and deliver, at Seller's expense, a ☒ general ☐ special warranty deed. The deed must include a vendor's lien if any part of the sales price is financed. The deed must convey good and indefeasible title to the Property and show no exceptions other than those permitted under Paragraph 6 or other provisions of this contract. Seller must convey the Property:
(1) with no liens, assessments, or other security interests against the Property which will not be satisfied out of the sales price, unless securing loans Buyer assumes;
(2) without any assumed loans in default; and
(3) with no persons in possession of any part of the Property as lessees, tenants at sufferance, or trespassers except tenants under the written leases assigned to Buyer under this contract.

D. At closing, Seller, at Seller's expense, will also deliver to Buyer:
(1) tax statements showing no delinquent taxes on the Property;
(2) an assignment of all leases to or on the Property;
(3) to the extent assignable, an assignment to Buyer of any licenses and permits related to the Property;
(4) evidence that the person executing this contract is legally capable and authorized to bind Seller;
(5) an affidavit acceptable to the title company stating that Seller is not a foreign person or, if Seller is a foreign person, a written authorization for the title company to: (i) withhold from Seller's proceeds an amount sufficient to comply applicable tax law; and (ii) deliver the amount to the Internal Revenue Service (IRS) together with appropriate tax forms; and
(6) any notices, statements, certificates, affidavits, releases, and other documents required by this contract, the commitment, or law necessary for the closing of the sale and issuance of the title policy, all of which must be completed by Seller as necessary.

E. At closing, Buyer will:
(1) pay the sales price in good funds acceptable to the title company;
(2) deliver evidence that the person executing this contract is legally capable and authorized to bind Buyer;
(3) sign and send to each tenant in a lease for any part of the Property a written statement that:
(a) acknowledges Buyer has received and is responsible for the tenant's security deposit; and
(b) specifies the exact dollar amount of the security deposit;
(4) sign an assumption of all leases then in effect; and
(5) execute and deliver any notices, statements, certificates, or other documents required by this contract or law necessary to close the sale.

F. Unless the parties agree otherwise, the closing documents will be as found in the basic forms in the current edition of the State Bar of Texas Real Estate Forms Manual without any additional clauses.

11. POSSESSION: Seller will deliver possession of the Property to Buyer upon closing and funding of this sale in its present condition with any repairs Seller is obligated to complete under this contract, ordinary wear and tear excepted. Any possession by Buyer before closing or by Seller after closing that is not authorized by a separate written lease agreement is a landlord-tenant at sufferance relationship between the parties.

12. SPECIAL PROVISIONS: The following special provisions apply and will control in the event of a conflict with other provisions of this contract. *(If special provisions are contained in an Addendum, identify the Addendum here and reference the Addendum in Paragraph 22D.)*

See Exhibit B

13. SALES EXPENSES:

A. Seller's Expenses: Seller will pay for the following at or before closing:
(1) releases of existing liens, other than those liens assumed by Buyer, including prepayment penalties and recording fees;
(2) release of Seller's loan liability, if applicable;
(3) tax statements or certificates;
(4) preparation of the deed;
(5) one-half of any escrow fee;
(6) costs to record any documents to cure title objections that Seller must cure; and
(7) other expenses that Seller will pay under other provisions of this contract.

B. Buyer's Expenses: Buyer will pay for the following at or before closing:
(1) all loan expenses and fees;
(2) preparation of any deed of trust;
(3) recording fees for the deed and any deed of trust;
(4) premiums for flood insurance as may be required by Buyer's lender;
(5) one-half of any escrow fee;
(6) other expenses that Buyer will pay under other provisions of this contract.

14. PRORATIONS:

A. Prorations:
(1) Interest on any assumed loan, taxes, rents, and any expense reimbursements from tenants will be prorated through the closing date.
(2) If the amount of ad valorem taxes for the year in which the sale closes is not available on the closing date, taxes will be prorated on the basis of taxes assessed in the previous year. If the taxes for the year in which the sale closes vary from the amount prorated at closing, the parties will adjust the prorations when the tax statements for the year in which the sale closes become available. This Paragraph 14A(2) survives closing.
(3) If Buyer assumes a loan or is taking the Property subject to an existing lien, Seller will transfer all reserve deposits held by the lender for the payment of taxes, insurance premiums, and other charges to Buyer at closing and Buyer will reimburse such amounts to Seller by an appropriate adjustment at closing.

B. Rollback Taxes: If Seller changes the use of the Property before closing or if a denial of a special valuation on the Property claimed by Seller results in the assessment of additional taxes, penalties, or interest (assessments) for periods before closing, the assessments will be the obligation of the Seller. If this sale or Buyer's use of the Property after closing results in additional assessments for periods before closing, the assessments will be the obligation of ~~Buyer~~ Seller. This Paragraph 14B survives closing.

C. Rent and Security Deposits: At closing, Seller will tender to Buyer all security deposits and the following advance payments received by Seller for periods after closing: prepaid expenses, advance

rental payments, and other advance payments paid by tenants. Rents prorated to one party but received by the other party will be remitted by the recipient to the party to whom it was prorated within 5 days after the rent is received. This Paragraph 14C survives closing.

15. DEFAULT:

A. If Buyer fails to comply with this contract, Buyer is in default and Seller, as Seller's sole remedy(ies), may terminate this contract and receive the earnest money, as liquidated damages for Buyer's failure except for any damages resulting from Buyer's inspections, studies or assessments in accordance with Paragraph 7C(3) which Seller may pursue, or
(Check if applicable)
☐ enforce specific performance, or seek such other relief as may be provided by law.

B. If, without fault, Seller is unable within the time allowed to deliver the estoppel certificates, survey or the commitment, Buyer may:
(1) terminate this contract and receive the earnest money, less any independent consideration under Paragraph 7B(1), as liquidated damages and as Buyer's sole remedy; or
(2) extend the time for performance up to 15 days and the closing will be extended as necessary.

C. Except as provided in Paragraph 15B, if Seller fails to comply with this contract, Seller is in default and Buyer may:
(1) terminate this contract and receive the earnest money, less any independent consideration under Paragraph 7B(1), as liquidated damages and as Buyer's sole remedy; or
(2) enforce specific performance, or seek such other relief as may be provided by law, or both.

16. CONDEMNATION: If before closing, condemnation proceedings are commenced against any part of the Property, Buyer may:

A. terminate this contract by providing written notice to Seller within 15 days after Buyer is advised of the condemnation proceedings and the earnest money, less any independent consideration paid under Paragraph 7B(1), will be refunded to Buyer; or

B. appear and defend in the condemnation proceedings and any award will, at Buyer's election, belong to:
(1) Seller and the sales price will be reduced by the same amount; or
(2) Buyer and the sales price will not be reduced.

17. ATTORNEY'S FEES: If Buyer, Seller, any broker, or the title company is a prevailing party in any legal proceeding brought under or with relation to this contract or this transaction, such party is entitled to recover from the non-prevailing parties all costs of such proceeding and reasonable attorney's fees. This Paragraph 17 survives termination of this contract.

18. ESCROW:

A. At closing, the earnest money will be applied first to any cash down payment, then to Buyer's closing costs, and any excess will be refunded to Buyer. If no closing occurs, the title company may require payment of unpaid expenses incurred on behalf of the parties and a written release of liability of the title company from all parties.

B. If one party makes written demand for the earnest money, the title company will give notice of the demand by providing to the other party a copy of the demand. If the title company does not receive written objection to the demand from the other party within 15 days after the date the title company sent the demand to the other party, the title company may disburse the earnest money to the party making demand, reduced by the amount of unpaid expenses incurred on behalf of the party receiving the earnest money and the title company may pay the same to the creditors.

C. The title company will deduct any independent consideration under Paragraph 7B(1) before disbursing any earnest money to Buyer and will pay the independent consideration to Seller.

D. If the title company complies with this Paragraph 18, each party hereby releases the title company from all claims related to the disbursal of the earnest money.

E. Notices under this Paragraph 18 must be sent by certified mail, return receipt requested. Notices to the title company are effective upon receipt by the title company.

F. Any party who wrongfully fails or refuses to sign a release acceptable to tte title company within 7 days after receipt of the request will be liable to the other party for liquidated damages in an amount equal to the sum of: (i) three times the amount of the earnest money; (ii) the earnest money; (iii) reasonable attorney's fees; and (iv) all costs of suit.

G. ☐ Seller ☐ Buyer intend(s) to complete this transaction as a part of an exchange of like-kind properties in accordance with Section 1031 of the Internal Revenue Code, as amended. All expenses in connection with the contemplated exchange will be paid by the exchanging party. The other party will not incur any expense or liability with respect to the exchange. The parties agree to cooperate fully and in good faith to arrange and consummate the exchange so as to comply to the maximum extent feasible with the provisions of Section 1031 of the Internal Revenue Code. The other provisions of this contract will not be affected in the event the contemplated exchange fails to occur.

19. MATERIAL FACTS: To the best of Seller's knowledge and belief: *(Check only one box.)*

☐ A. Seller is not aware of any material defects to the Property except as stated in the attached Commercial Property Condition Statement (TAR-1408).

☐ B. Except as otherwise provided in this contract, Seller is not aware of:
(1) any subsurface: structures, pits, waste, springs, or improvements;
(2) any pending or threatened litigation, condemnation, or assessment affecting the Property;
(3) any environmental hazards or conditions that materially affect the Property;
(4) whether the Property is or has been used for the storage or disposal of hazardous materials or toxic waste, a dump site or landfill, or any underground tanks or containers;
(5) whether radon, asbestos containing materials, urea-formaldehyde foam insulation, lead-based paint, toxic mold (to the extent that it adversely affects the health of ordinary occupants), or other pollutants or contaminants of any nature now exist or ever existed on the Property;
(6) any wetlands, as defined by federal or state law or regulation, on the Property;
(7) any threatened or endangered species or their habitat on the Property;
(8) any present or past infestation of wood-destroying insects in the Property's improvements;
(9) any contemplated material changes to the Property or surrounding area that would materially and detrimentally affect the ordinary use of the Property;
(10) any condition on the Property that violates any law or ordinance.

(Describe any exceptions to (1)-(10) in Paragraph 12 or an addendum.)

20. NOTICES: All notices between the parties under this contract must be in writing and are effective when hand-delivered, mailed by certified mail return receipt requested, or sent by facsimile transmission to the parties addresses or facsimile numbers stated in Paragraph 1. The parties will send copies of any notices to the broker representing the party to whom the notices are sent.

☒ A. Seller also consents to receive any notices by e-mail at Seller's e-mail address stated in Paragraph 1.
☒ B. Buyer also consents to receive any notices by e-mail at Buyer's e-mail address stated in Paragraph 1.

21. DISPUTE RESOLUTION: The parties agree to negotiate in good faith in an effort to resolve any dispute related to this contract that may arise. If the dispute cannot be resolved by negotiation, the parties will submit the dispute to mediation before resorting to arbitration or litigation and will equally share the costs of

a mutually acceptable mediator. This paragraph survives termination of this contract. This paragraph does not preclude a party from seeking equitable relief from a court of competent jurisdiction.

22. AGREEMENT OF THE PARTIES:

A. This contract is binding on the parties, their heirs, executors, representatives, successors, and permitted assigns. This contract is to be construed in accordance with the laws of the State of Texas. If any term or condition of this contract shall be held to be invalid or unenforceable, the remainder of this contract shall not be affected thereby.

B. This contract contains the entire agreement of the parties and may not be changed except in writing.

C. If this contract is executed in a number of identical counterparts, each counterpart is an original and all counterparts, collectively, constitute one agreement.

D. Addenda which are part of this contract are: *(Check all that apply.)*
- ☐ (1) Property Description Exhibit identified in Paragraph 2;
- ☐ (2) Commercial Contract Financing Addendum (TAR-1931);
- ☐ (3) Commercial Property Condition Statement (TAR-1408);
- ☐ (4) Commercial Contract Addendum for Special Provisions (TAR-1940);
- ☐ (5) Notice to Purchaser of Real Property in a Water District (MUD);
- ☐ (6) Addendum for Coastal Area Property (TAR-1915);
- ☐ (7) Addendum for Property Located Seaward of the Gulf Intracoastal Waterway (TAR-1916);
- ☐ (8) Information About Brokerage Services (TAR-2501); and
- ☒ (9) Exhibit A - Legal Descriptions
  Exhibit B - Supplemental Provisions

(Note: Counsel for the Texas Association of REALTORS® (TAR) has determined that any of the foregoing addenda which are promulgated by the Texas Real Estate Commission (TREC) or published by TAR are appropriate for use with this form.)

E. Buyer ☒ may ☐ may not assign this contract. If Buyer assigns this contract, Buyer will be relieved of any future liability under this contract only if the assignee assumes, in writing, all obligations and liability of Buyer under this contract.

23. TIME: Time is of the essence in this contract. The parties require strict compliance with the times for performance. If the last day to perform under a provision of this contract falls on a Saturday, Sunday, or legal holiday, the time for performance is extended until the end of the next day which is not a Saturday, Sunday, or legal holiday.

24. EFFECTIVE DATE: The effective date of this contract for the purpose of performance of all obligations is the date the title company receipts this contract after all parties execute this contract.

25. ADDITIONAL NOTICES:

A. Buyer should have an abstract covering the Property examined by an attorney of Buyer's selection, or Buyer should be furnished with or obtain a title policy.

B. If the Property is situated in a utility or other statutorily created district providing water, sewer, drainage, or flood control facilities and services, Chapter 49, Texas Water Code, requires Seller to deliver and Buyer to sign the statutory notice relating to the tax rate, bonded indebtedness, or standby fees of the district before final execution of this contract.

C. Notice Required by §13.257, Water Code: "The real property, described below, that you are about to purchase may be located in a certificated water or sewer service area, which is authorized by law to provide water or sewer service to the properties in the certificated area. If your property is located in a certificated area there may be special costs or charges that you will be required to pay before you can

receive water or sewer service. There may be a period required to construct lines or other facilities necessary to provide water or sewer service to your property. You are advised to determine if the property is in a certificated area and contact the utility service provider to determine the cost that you will be required to pay and the period, if any, that is required to provide water or sewer service to your property. The undersigned purchaser hereby acknowledges receipt of the foregoing notice at or before the execution of a binding contract for the purchase of the real property described in the notice or at closing of purchase of the real property." The real property is described in Paragraph 2 of this contract.

D. If the Property adjoins or shares a common boundary with the tidally influenced submerged lands of the state, §33.135 of the Texas Natural Resources Code requires a notice regarding coastal area property to be included as part of this contract.

E. If the Property is located seaward of the Gulf Intracoastal Waterway, §61.025, Texas Natural Resources Code, requires a notice regarding the seaward location of the Property to be included as part of this contract.

F. If the Property is located outside the limits of a municipality, the Property may now or later be included in the extra-territorial jurisdiction (ETJ) of a municipality and may now or later be subject to annexation by the municipality. Each municipality maintains a map that depicts its boundaries and ETJ. To determine if the Property is located within a municipality's ETJ, Buyer should contact all municipalities located in the general proximity of the Property for further information.

G. Brokers are not qualified to perform property inspections, surveys, engineering studies, environmental assessments, or inspections to determine compliance with zoning, governmental regulations, or laws. Buyer should seek experts to perform such services. Buyer should review local building codes, ordinances and other applicable laws to determine their effect on the Property. Selection of experts, inspectors, and repairmen is the responsibility of Buyer and not the brokers. Brokers are not qualified to determine the credit worthiness of the parties.

26. **CONTRACT AS OFFER:** The execution of this contract by the first party constitutes an offer to buy or sell the Property. Unless the other party accepts the offer by 5:00 p.m., in the time zone in which the Property is located, on Wednesday, May 6, 2015, the offer will lapse and become null and void.

READ THIS CONTRACT CAREFULLY. The brokers and agents make no representation or recommendation as to the legal sufficiency, legal effect, or tax consequences of this document or transaction. CONSULT your attorney BEFORE signing.

Seller: Mike Hicks

By: _____

By (signature): _____

Printed Name: Michael P. Hicks

Title: Owner

By: _____

By (signature): _____

Printed Name: _____

Title: _____

Buyer: Southwaste Disposal LLC., affiliates / assigns

By: _____

By (signature): _____

Printed Name: _____

Title: CEO

By: _____

By (signature): _____

Printed Name: _____

Title: _____

Commercial Contract - Unimproved Property concerning Northwest corner of Bartlett Rd. & Interstate 10 Service Rd Austin County, TX

AGREEMENT BETWEEN BROKERS

(use only if Paragraph 9B(1) is effective)

Principal Broker agrees to pay _____ (Cooperating Broker) a fee when the Principal Broker's fee is received. The fee to be paid to Cooperating Broker will be:

- ☐ $_____ or
- ☐ _____% of the sales price, or
- ☐ _____% of the Principal Broker's fee.

The title company is authorized and directed to pay Cooperating Broker from Principal Broker's fee at closing. This Agreement Between Brokers supersedes any prior offers and agreements for compensation between brokers.

Principal Broker: _____ Cooperating Broker: _____

By: _____ By: _____

ATTORNEYS

Seller's attorney: _____ Buyer's attorney: _____

Address: _____ Address: _____

Phone & Fax: _____ Phone & Fax: _____

E-mail: _____ E-mail: _____

Seller's attorney requests copies of documents, notices, and other information:
- ☐ the title company sends to Seller.
- ☐ Buyer sends to Seller.

Buyer's attorney requests copies of documents, notices, and other information:
- ☐ the title company sends to Buyer.
- ☐ Seller sends to Buyer.

ESCROW RECEIPT

The title company acknowledges receipt of:
- ☐ A. the contract on this day May 8, 2015 (effective date);
- ☐ B. earnest money in the amount of $ 25000 in the form of wire on 5/11/15

Title company: Fidelity National Title Address: 1400 Post Oak Blvd #740 Houston, TX 77056

By: _____ Phone & Fax: 713-621-9960 / 713-623-4406

Assigned file number (GF#): 1711200942 E-mail: lavant@fnf.com deborah.montgomery@fnf.com

Exhibit B

Supplemental Provisions

This Exhibit B is appended to, and made a part of, that certain Commercial Contract – Unimproved Property, dated as of 4th May, 2015 (as amended from time to time, the "**Purchase Agreement**"), between Mike Hicks, as seller ("**Seller**") and Southwaste Disposal LLC (together with its successors and assigns, "**Buyer**").

For good and valid consideration, Seller and Buyer agree as follows:

1. Seller hereby leases the Property to Buyer, and Buyer hereby leases the Property from Seller, for a term of twenty-four (24) months (the "**Term**"), which term shall commence upon the date that is sixty (60) days following the effective date, provided that Buyer does not elect to terminate the Purchase Agreement pursuant to Section 7.B. Seller covenants that Tenant shall have quiet and peaceful possession of the Property as against anyone claiming by or through Seller during the Term. On the commencement date of the Term, and on or before the first day of each calendar month during the Term, Buyer shall pay to Seller rent in the amount of $4,500 per month, which amount shall be prorated in any partial month based upon the number of days in such month. Buyer and Seller agree that the each payment of rent shall be deducted from the Earnest Money and shall be released to Seller in accordance with Seller's instructions. All rent paid by Buyer shall be credited to the sale price payable by Buyer at Closing. During the Term, Buyer shall have unrestricted access to the Property for, among other things, the purpose of performing such studies, investigations and reports, and may file such applications and obtain such permits, as may Buyer determines are reasonably necessary or appropriate in connection with its proposed construction of a composting facility on the Property. If Buyer fails to make any payment of rent on the date due, Buyer shall not be in default hereunder unless Buyer fails to pay such delinquent payment to Seller within fifteen (15) days following delivery of written notice by Seller to Buyer.

2. Buyer shall have the right to terminate this Purchase Agreement, and the lease granted hereunder, at any time upon 30 days written notice. For the avoidance of doubt, except to the extent otherwise provided in the Purchase Agreement, if Buyer elects to terminate the Purchase Agreement following the expiration of the feasibility period set forth in Section 7.A. of the Purchase Agreement, Seller may retain the Earnest Money and all rents paid by Buyer prior to the termination date.

3. Buyer may elect to close the transactions contemplated hereunder on any business day prior to such date by delivering written notice to Seller at least ten (10) days in advance of the date upon which Buyer desires such closing to occur.

4. Buyer shall have the right to adjust the legal description of the Property from time to time, provided that the total acreage purchased shall not be less than 32 acres and shall not exceed 37 acres. The final purchase price shall be based upon the total acreage of the Property, as determined by a final survey prepared by the Buyer.

5. At the Closing, Seller shall cause (a) any and all monetary liens (except for taxes that are a lien then due and payable, which shall be prorated between Seller and Buyer in accordance with the Purchase Agreement) to be paid in full and released at or prior to the Closing; (b) any and all leases affecting the Property (other than the lease granted pursuant to Section 1 of this Exhibit B) to be terminated; and (c) any and all matters to which Buyer has objected pursuant to Section 6.C. of the Purchase Agreement to be cured. If Seller fails to cure such matters, Buyer shall have the right to cure such matters and deduct the expense thereof from the sales price otherwise payable to Seller under Section 3.A. of the Purchase Agreement.

6. If Buyer determines that a subdivision, lot line adjustment or recorded plat is required in order for Seller to convey good and marketable title to the Property to Buyer, Seller shall cooperate with Buyer in good faith, and shall execute and deliver such plats and other documents as may be reasonably necessary in connection therewith within ten (10) days following delivery thereof to Seller. At Buyer's request, Seller shall execute and deliver to Buyer a limited power of attorney permitting Buyer to execute and file, on Seller's behalf, such plats and other documents as may be reasonably required in order to subdivide the Property from the remainder of any larger parcel of which it is a part or, if required by the County of Austin, to plat the Property, and Seller shall cooperate in good faith with Buyer to grant such access and utility easements as may be required by the County of Austin in connection therewith.

7. Seller shall cooperate with Buyer in good faith to obtain such governmental approvals (including, without limitation, executing permit and SER applications) as may be reasonably necessary to complete the transaction contemplated under the Purchase Agreement.

8. Seller agrees that, during the term of the Purchase Agreement, Seller shall not (a) convey fee title to the Property to any person or entity other than Buyer, (b) grant any lease (other than the lease described in Section 1 of this Exhibit B), easement or other occupancy right to any person other than Purchaser or (c) file any plans, request any approval or obtain any permit to construct any improvement on the Property, unless, in each case, Seller first obtains the written consent of Buyer, which may be withheld by Buyer in its sole and absolute discretion.

9. Seller further agrees that he shall not make any objection, orally or in writing, or otherwise contest or interfere with the issuance of any permit to Buyer in connection with its proposed development of the Property. This Section 9 shall survive the Closing for a period of twelve (12) months.

10. Seller acknowledges that Buyer intends to undertake certain permitting activities prior to the Closing and will suffer significant monetary damage in the event Seller breaches its obligations under the Purchase Agreement. As such, Seller agrees that Buyer shall be entitled, in addition to its other remedies at law or in equity (including, without limitation, specific performance), to seek monetary damages from Seller in the event of a

default by Seller of its obligations under the Purchase Agreement, including, without limitation, any and all costs and expenses incurred by Buyer in connection with its due diligence investigation of the Property and the preparation, filing and prosecution of any permit application filed by Buyer.

11. Unless Buyer has terminated this Purchase Agreement, Buyer and Seller shall, within thirty (30) days following the effective date, enter into a memorandum setting forth (a) the commencement date of the lease, (b) the termination date of the lease and (c) a statement that Buyer has the right to purchase the Property at any time on or before April __, 2017, which memorandum shall be recorded in the official real property records of Austin County, Texas.

12. The Property conveyed to Buyer shall not include any interest in the oil, gas or mineral estate, which shall be reserved by Seller at Closing without any right of entry through the surface of the Property.

13. Buyer agrees that it will not store trash (excluding wood chips and the like) on the Property other than in dumpsters and similar receptacles.

14. Buyer and Seller shall cooperate in good faith to grant such easements as may be reasonably necessary to permit each of Buyer and Seller to use the existing roadway located along the northeastern boundary of the Property.

JLL

Appendix C

Secretary of State
Certificate of Incorporation

Corporations Section
P.O.Box 13697
Austin, Texas 78711-3697

John Steen
Secretary of State

Office of the Secretary of State

Certificate of Fact

The undersigned, as Secretary of State of Texas, does hereby certify that the document, Articles of Organization for SouthWaste Disposal, LLC (file number 800553020), a Domestic Limited Liability Company (LLC), was filed in this office on October 03, 2005.

It is further certified that the entity status in Texas is in existence.

In testimony whereof, I have hereunto signed my name officially and caused to be impressed hereon the Seal of State at my office in Austin, Texas on December 11, 2012.

John Steen
Secretary of State

Appendix D

Historical Aerial Photographs

Source: Aerial photo provided by USGS, 1977.

Explanation

Property Boundary

One mile radius

PROPOSED SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Aerial Photograph 1977

Daniel B. Stephens & Associates, Inc.
9/2/2015
JN TX15.0094.00

S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Aerial_photos\1977.mxd

Source: Aerial photo provided by Google Earth Pro., 1995.

Explanation

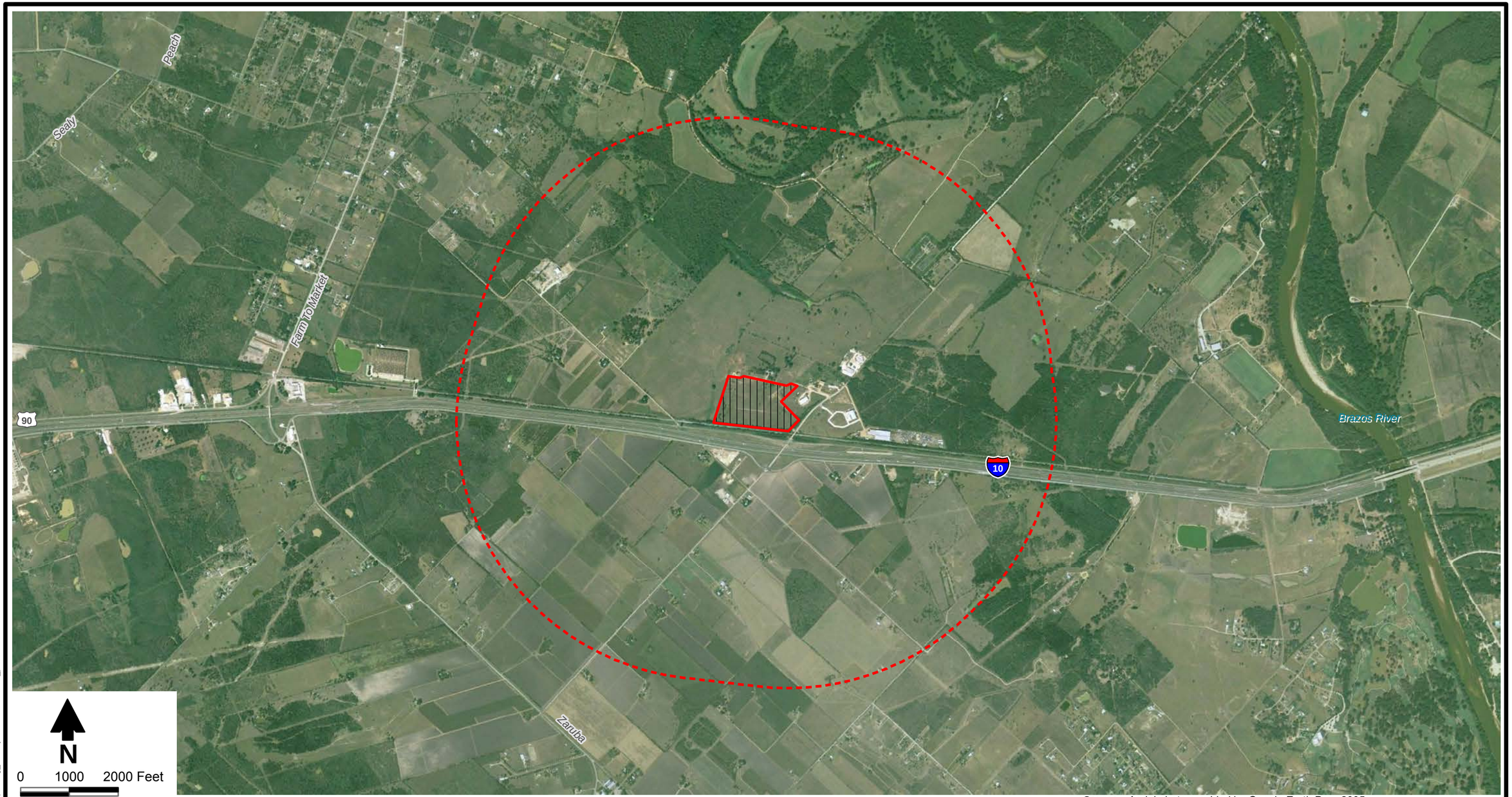
Property Boundary

One mile radius

PROPOSED SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Aerial Photograph 1995

Daniel B. Stephens & Associates, Inc.
9/2/2015 JN TX15.0094.00

S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Aerial_photos\11995.mxd



N

0 1000 2000 Feet

Source: Aerial photo provided by Google Earth Pro., 2005.

Explanation

Property Boundary

One mile radius

PROPOSED SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Aerial Photograph 2005

Daniel B. Stephens & Associates, Inc.
9/2/2015 JN TX15.0094.00

S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Aerial_photos\2005.mxd

Source: Aerial photo provided by Google Earth Pro., 2010.

Explanation

Property Boundary

One mile radius

PROPOSED SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Aerial Photograph 2010

Daniel B. Stephens & Associates, Inc.
9/2/2015 JN TX15.0094.00

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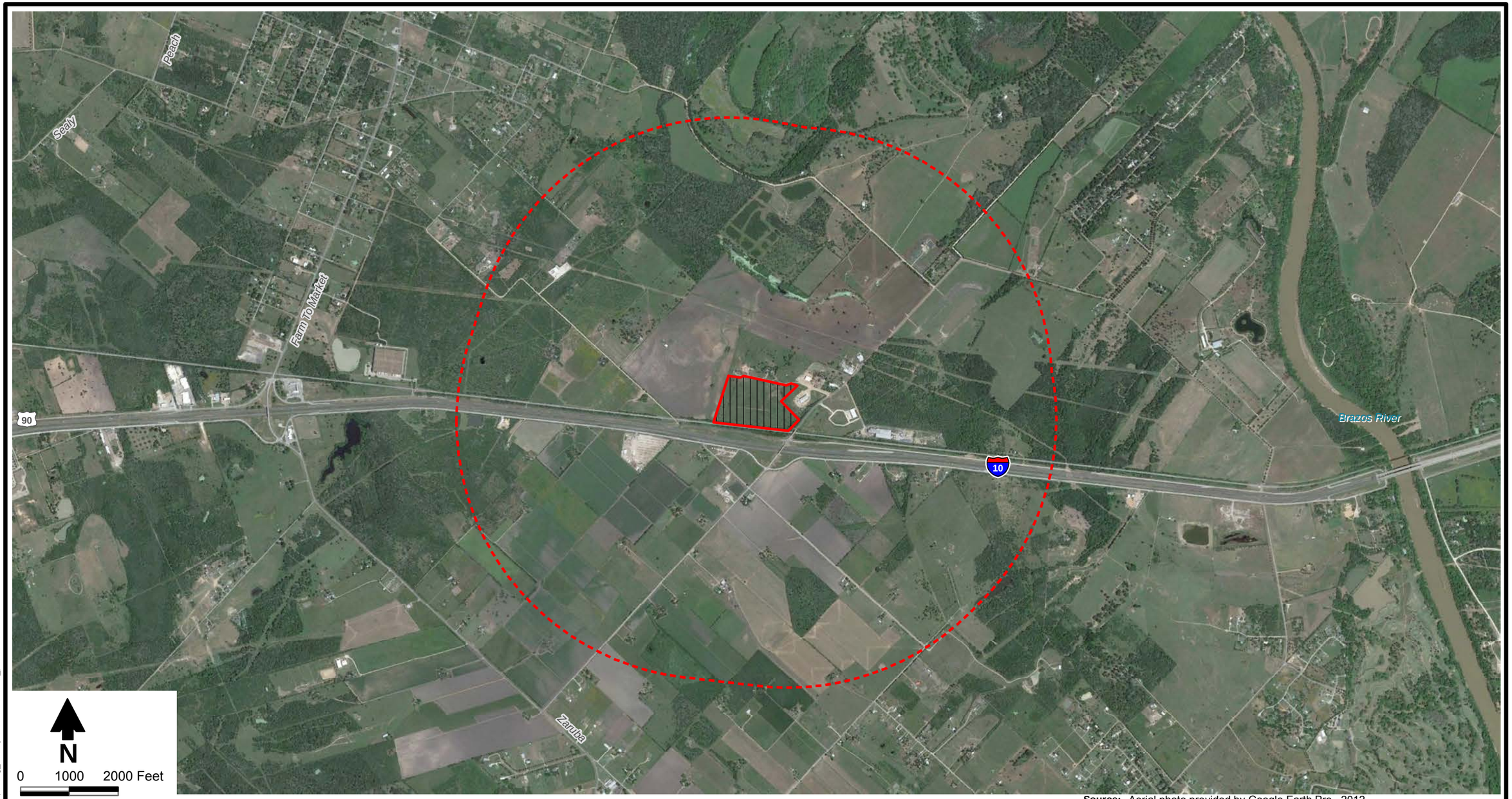

N

0 1000 2000 Feet

Source: Aerial photo provided by Google Earth Pro., 2012.

Explanation

Property Boundary

One mile radius

PROPOSED SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Aerial Photograph 2012

Daniel B. Stephens & Associates, Inc.
9/2/2015 JN TX15.0094.00

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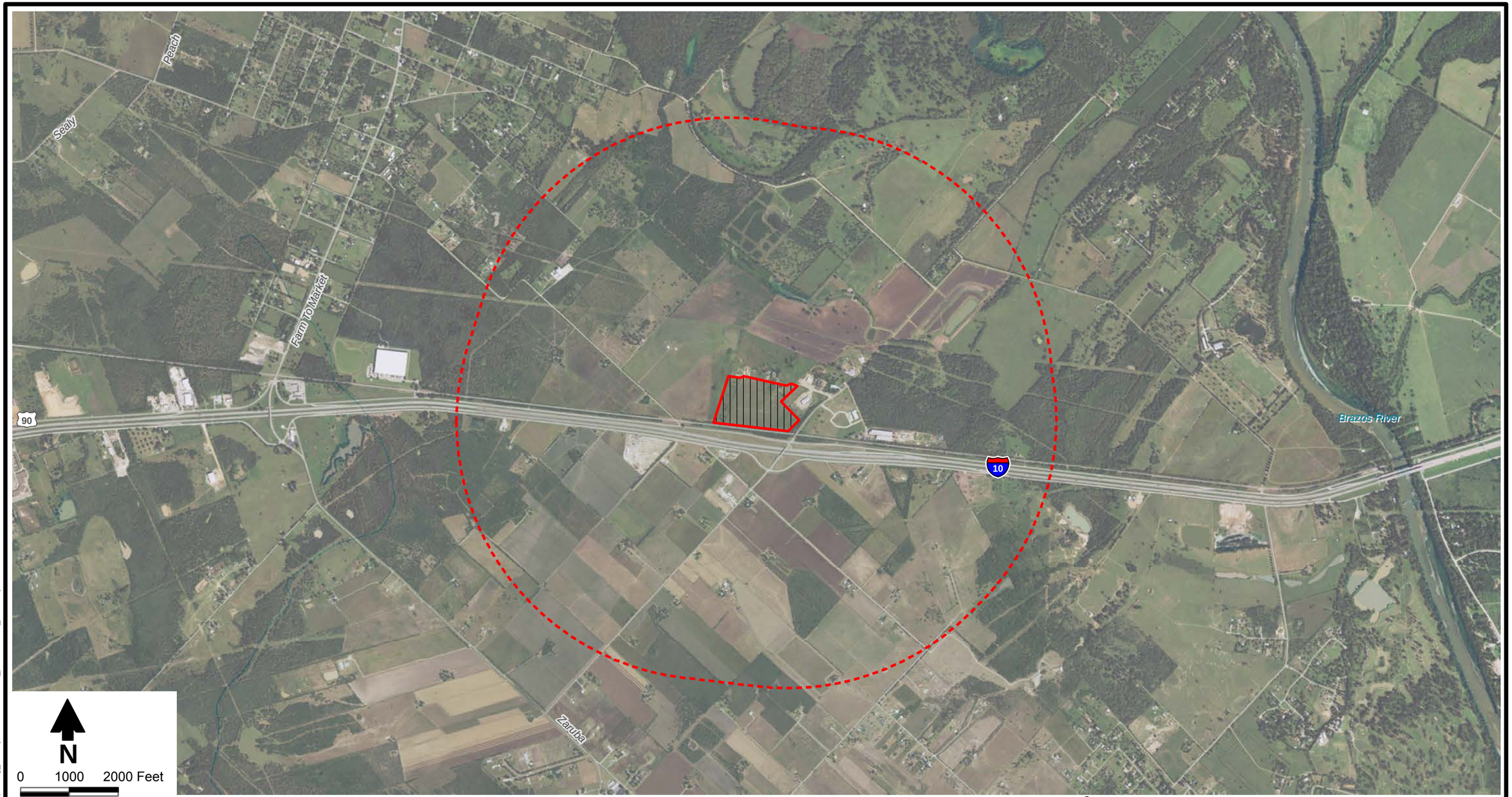

Source: Aerial photo provided by ESRI and the National Agriculture Imagery Program (NAIP) imagery, 2014.

Explanation

- Property Boundary
- One mile radius

PROPOSED SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Aerial Photograph 2014

Daniel B. Stephens & Associates, Inc.
9/2/2015 JN TX15.0094.00

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Appendix E

NRCS Custom Soil Resource Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Austin and Waller Counties, Texas

Proposed Sealy Composting Facility

September 22, 2015

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Austin and Waller Counties, Texas
Survey Area Data: Version 10, Sep 29, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 27, 2011—May 14, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Austin and Waller Counties, Texas (TX600)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
LaD	Lake Charles clay, 3 to 8 percent slopes	10.2	32.4%
MdA	Verland clay loam, 0 to 1 percent slopes	2.7	8.7%
MdB	Verland clay loam, 1 to 3 percent slopes	18.4	58.3%
StC	Styx loamy fine sand, 1 to 5 percent slopes	0.2	0.6%
Totals for Area of Interest		**31.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic

classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Austin and Waller Counties, Texas

LaD—Lake Charles clay, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: dk0z
Elevation: 10 to 100 feet
Mean annual precipitation: 42 to 55 inches
Mean annual air temperature: 68 to 70 degrees F
Frost-free period: 250 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Lake charles and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lake Charles

Setting

Landform: Flats
Landform position (three-dimensional): Rise
Microfeatures of landform position: Gilgai
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey fluviomarine deposits of late pleistocene age

Typical profile

H1 - 0 to 12 inches: clay
H2 - 12 to 46 inches: clay
H3 - 46 to 65 inches: clay
H4 - 65 to 80 inches: clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: Blackland 24-44" PZ (R150AY526TX)

Minor Components

Unnamed

Percent of map unit: 15 percent

MdA—Verland clay loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: dk18
Elevation: 20 to 400 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 245 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Verland and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Verland

Setting

Landform: Meander scrolls
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits of late pleistocene age

Typical profile

H1 - 0 to 6 inches: clay loam
H2 - 6 to 72 inches: clay
H3 - 72 to 80 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Minor Components

Unnamed

Percent of map unit: 10 percent

Waller

Percent of map unit: 5 percent
Landform: Depressions

MdB—Verland clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: dk19
Elevation: 20 to 100 feet
Mean annual precipitation: 40 to 48 inches
Mean annual air temperature: 66 to 70 degrees F
Frost-free period: 265 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Verland and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Verland

Setting

Landform: Meander scrolls
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits of late pleistocene age

Typical profile

H1 - 0 to 8 inches: clay loam
H2 - 8 to 70 inches: clay
H3 - 70 to 80 inches: clay

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent

Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D

Minor Components

Unnamed

Percent of map unit: 20 percent

StC—Styx loamy fine sand, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: dk1x
Elevation: 180 to 500 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 64 to 70 degrees F
Frost-free period: 240 to 270 days
Farmland classification: Not prime farmland

Map Unit Composition

Styx and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Styx

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy and loamy alluvium of pleistocene age derived from mixed sources

Typical profile

H1 - 0 to 8 inches: loamy fine sand
H2 - 8 to 22 inches: loamy fine sand
H3 - 22 to 80 inches: sandy clay loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 42 to 54 inches
Frequency of flooding: None

Frequency of ponding: None
Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Sandy 28-40" PZ (R087AY234TX)

Minor Components

Unnamed

Percent of map unit: 20 percent

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Appendix F

Biological Assessment

W&M ENVIRONMENTAL GROUP, LLC

Biological Assessment

Proposed Sealy Compost Facility
NWC IH-10 and Bartlett Road
Sealy, Austin County, Texas

BIOLOGICAL ASSESSMENT

PROPOSED SEALY COMPOST FACILITY
NORTHWEST CORNER OF IH-10 AND BARTLETT ROAD
SEALY, AUSTIN COUNTY, TEXAS

OCTOBER 30, 2015

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PROJECT NO. 1057.028

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EXECUTIVE SUMMARY AND RECOMMENDATION

W&M Environmental Group, LLC (W&M) completed this Biological Assessment (BA) for the proposed Sealy Compost Facility located northwest of the intersection of Interstate Highway 10 and Bartlett Road in Sealy, Austin County, Texas (Site). The BA was completed on behalf of Daniel B. Stephens & Associates, Inc. to support their client, SouthWaste Disposal, LLC, in their pursuit of a Municipal Solid Waste (MSW) permit from the Texas Commission on Environmental Quality (TCEQ). The BA is to be reviewed by the Texas Parks and Wildlife Department (TPWD) Wildlife Habitat Assessment Program as part of the MSW permit application process.

The BA includes review of multiple records, Site reconnaissance, and interviews with agency representatives to identify whether the proposed activity associated with the MSW permit would have an effect on state or federally-listed threatened, endangered, or candidate species or critical habitat. The result of the BA found that none of the listed or candidate species with current or historical ranges near the Site would be negatively affected by the proposed project and no critical habitat for listed or candidate species would be impacted by the proposed development. As a result, W&M does not recommend further evaluation of potential effects to listed species in connection with this project or further agency coordination or conference regarding potential effects. The results of this BA are summarized on the TPWD Review Request Form in **Appendix A.**

1.0 INTRODUCTION

W&M Environmental Group, LLC (W&M) prepared this Biological Assessment (BA) as a supplement to the application for Municipal Solid Waste Landfill (MSW) for the proposed Sealy Compost Facility near the east extent of Sealy in Austin County, Texas (Site). The BA was completed on behalf of Daniel B. Stephens & Associates, Inc. to support their client, SouthWaste Disposal, LLC in their pursuit of a MSW permit from the Texas Commission on Environmental Quality (TCEQ). The BA is to be reviewed by the Texas Parks and Wildlife Department (TPWD) Wildlife Habitat Assessment Program as part of the MSW permit application process. The results of the BA are summarized on the TPWD Review Request Form in **Appendix A.**

The proposed Site consists of an approximately 32-acre property that is developed for use as pasture and cropland. The Site is located northwest of the intersection of Interstate Highway (IH)-10 and Bartlett Road. **Figure** 1 shows the regional location of the Site and study area on a topographic map (USGS, 1981). An aerial photograph showing the approximate Site boundary, survey boundaries (including portions of adjoining properties) and Site details is presented as **Figure 2**. Photographs of the Site are presented in **Appendix B**. References utilized during this BA are included in **Appendix C**.

1.1 Purpose

The purpose of a BA is to evaluate the potential effects of the proposed action (i.e., construction and operation of the proposed Sealy Compost Facility) on listed and candidate species and listed and proposed critical habitat and determine whether any such species or habitat are likely to be adversely affected by the action and is used to determine whether formal consultation (with state and federal wildlife agencies) or conference is necessary. This BA is intended to address requirements in the Endangered Species Act (ESA) and Title 30 of Texas Administrative Code §330 (MSW permits) to assess the potential of the proposed project to adversely affect threatened or endangered species or their critical habitat.

The applicant proposes to construct and build a municipal compost facility at the Site. The composting facility will consist of piles of incoming woody debris, above ground storage tanks for holding incoming organic waste for composting, a pad where upon the composting materials will be mixed and maintained, a finished material pile, and office and maintenance facilities to support the operation. The MSW permit requires that the applicant evaluate the project for its potential to affect listed threatened and endangered species when there is potential for such species to occur at the Site. The MSW permit also has requirements for wetlands in Title 30 rule §330.553; therefore, a wetland determination was conducted to determine whether wetlands are present as defined in 40 CFR 230.3(t).

1.2 Methods

The BA was conducted in general accordance with the preparation requirements listed in 50 CFR 402.12, which are referenced in U.S. Fish and Wildlife Service (USFWS) guidelines for completing a BA and reflected in the TPWD Suggested Guidelines for Preparation of Environmental Assessment Documents. The methods and procedures to complete the BA are summarized in the following list:

1. Consult list of possible listed species and species of greatest conservation concern (SGCC) occurring in Austin County from the TPWD and U.S. Fish and Wildlife Service (USFWS);
2. Review of standard physical records that included the U.S. Geological Survey (USGS) 7.0-Minute Topographic Map (**Figure 1**), Natural Resource Conservation Agency (NRCS) Web Soil Survey, Federal Emergency Management Agency (FEMA) Flood Rate Insurance Maps (FIRM),

USFWS National Wetland Inventory Map, and historical aerial photographs available through Google Earth dating between February 3, 1995, and May 2, 2014;
3. On-Site assessment of the area affected by the proposed project to determine if listed species or their habitat are present;
4. Review of relevant literature;
5. Informal consultation with state and federal agencies;
6. Analysis of the effects of the proposed action on the species and habitat;
7. Alternatives analysis; and,
8. Description of mitigation measures where appropriate.

The Site visit consisted of walking the perimeter of the property, along access roads, and into each vegetation type in order to observe for evidence of species and describe the vegetation types and habitats present at the Site and at the adjacent properties. No take of endangered species was anticipated for the survey; therefore, no USFWS or TPWD permit was secured. Other than informal consultation with local species experts, no federal or state consultation was initiated during the BA.

A wetland determination was conducted in general accordance with the *U.S. Army Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1* (January 1987) and the *Regional Supplement to the U.S Army Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)*, dated November 2010. Streams and open waters were identified based on the presence of an ordinary high water mark (OHWM) as defined in the Code of Federal Regulations Title 33, Chapter 2, Part 328.3e (33 CFR 328.3e) and the U.S. Army Corps of Engineers (USACE) Regulatory Guidance Letter 05-05, dated December 7, 2005. Wetlands and other aquatic features were identified, but not delineated by these methods. The boundaries of any wetlands or other aquatic features identified at the Site were estimated by field observation and interpretation of physical records documented in this report.

2.0 SITE LOCATION AND DESCRIPTION

The Site is located at a 32-acre property that is currently being used for a pearl millet crop and fallow pasture.

2.1 Topography

The Site is located at the edge of a plateau with elevation of approximately 140 feet National Geodetic Vertical Datum (NGVD). The Site is relatively level with some relief developing near the west, north, and east boundaries. The area north of the property descends to the Brazos River valley with the Brazos River located approximately 2 miles east of the Site at its closest point. Contour lines on the map suggest the presence of a swale in the east portion of the property forming near the south boundary and extending downslope to the north. Another swale is located west of the Site and extends to the north. The nearest watercourse represented on the topographic map is an intermittent stream within the Brazos River valley approximately 0.3 mile north of the Site.

2.2 Geology

According to the Geologic Map of Texas (1992), the Site is located within the predominantly clay area of the Beaumont Formation (Qbc). The formation is described as consisting of predominantly clay and mud of low permeability.

2.3 Soils

Details of the soil unit mapped at the study area were obtained from the Soil Series Descriptions (USDA, 2015) and the Web Soil Survey (USDA Soil Survey 2015). The predominant soil map units at the Site are Lake Charles Clay, 3 to 8 percent slopes, and Verland clay loam, 0 to 3 percent slopes. Styx loamy fine sand is mapped outside the northeast boundary of the Site with a slight incursion across the north boundary following a topographic contour. The soil map is presented in **Appendix C**.

The Lake Charles series consists of very deep, moderately well drained, very slowly permeable soils that formed in clayey sediments. These soils are on broad coastal prairies and are mainly in cultivated and native pasture. Common crops on these soils are corn, cotton, rice, and grain sorghum. Native grasses include little bluestem, Indiangrass, eastern gamagrass, switchgrass, big bluestem, and brownseed Paspalum. Most areas have scattered live oak, water oak, elm, hackberry, and huisache trees.

The Verland series consists of very deep, somewhat poorly drained, very slowly permeable soils. These nearly level to very gently sloping soils formed in clayey and loamy sediments of the Beaumont Formation of Pleistocene age. Most of the soil is used for pasture or for growing rice and soybeans. Native vegetation is tall prairie grasses consisting primarily of Andropogons, Paspalums, switchgrass, and Indiangrass. Various species of trees have encroached on some areas.

The Styx series consists of very deep, well drained, moderately permeable soils that formed in sandy and loamy sediments. These nearly level to gently sloping soils are on high stream terraces. Most areas are used for pasture. A few areas are used for growing small grains for cool season grazing and truck crop production. Native vegetation is mainly post oak and blackjack oak, and greenbrier, with an understory of mid and tall grasses.

2.4 Floodplain

According to the FEMA FIRM for the Site (48015C0350E), the study area is entirely within and adjacent to areas mapped as Zone X; outside the 100-year floodplain. The nearest floodplain is associated with the Brazos River valley located north of the Site.

2.5 Ecoregion

According to the publication titled *Vegetation Types of Texas* by Craig A. McMahon et al. (TPWD, 1984), the Site is located in an area identified as "crops" as the term best describes the predominant condition of the surrounding area during the 1970s era photographs used to develop this source.

The Site is located in an area described by the NRCS as the Atlantic and Gulf Coast Lowland Forest and Crop Land Resource Region (LRR-T) and is further identified as the Gulf Coast and Prairies region. The area is characterized as gulf coastal plains that are dissected by rivers and streams that drain to the Gulf of Mexico. Precipitation in the area is approximately 41 inches per year (AgACIS, 2015) and it is relatively evenly distributed throughout the year.

The area was originally occupied by natural grass prairie with hardwood trees along the rivers and streams (NRCS, 2006). The dominant species were little bluestem, big bluestem, Indiangrass, and switchgrass. Now most of the area is in farms/ranches with pasture more abundant than cropland. Urban development is rapidly expanding into agricultural areas throughout the county.

Major wildlife species of this area are white-tailed deer, raccoon, opossum, rabbit, fox, coyote, squirrel, armadillo, nutria, quail, and mourning dove. Migratory waterfowl such as ducks and geese, and neotropical migratory songbirds winter in the area.

2.6 Observed Habitat

During W&M's reconnaissance on October 15, 2015, the project area was observed for habitat and indications of listed species, while observing the terrain and dominant vegetation present. The proposed activity area is located in agricultural pasture and cropland that is adjacent to a railroad right-of-way and surrounded by residential, agricultural and industrial properties.

The Site has four predominant vegetation communities: 1. Wooded fence row and railroad right-of-way; 2. Cropland; 3. Pasture; and, 4. Wetland.

The cropland was planted with pearl millet (*Pennisetum glaucum*) that was in bloom at the time of the Site visit. The wetland was located in a sparsely vegetated depression partly colonized with jungle rice (*Echinochloa colona*) growing in the depression based on aerial photograph review is inundated during wetter periods.

The dominant plant species of the wooded fence row and railroad right-of-way include the following:

- Huisache (*Acacia farnesiana*)
- Sugarberry (*Celtis laevigata*)
- Elbowbush (*Forestiera pubescens*)
- Yaupon (*Ilex vomitoria*)
- Gum bumellia (*Sideroxylon lanuginosum*)
- Saw greenbrier (*Smilax bona-nox*)
- Wax-leaf ligustrum (*Ligustrum japonicum*)

- Poison oak (*Toxicodendron pubescens*)
- Southern dewberry (*Rubus trivialis*)

The dominant species of the pasture areas include the following:

- Western ragweed (*Ambrosia psilostachya*)
- King Ranch bluestem (*Bothriochloa ischaemum*)
- Bahiagrass (*Paspalum notatum*)
- Jungle rice (*Echinochloa colona*)
- Knot-root bristle grass (*Setaria parviflora*)
- Silver bluestem (*Bothriochloa laguroides*)
- Virginia wildrye (*Elymus virginicus*)
- Wooly croton (*Croton capitatus*)
- Pecan (*Carya Illinoisensis*)

Evidence of the following wildlife animal species was observed on the Site: whitetail deer (Odocoileus virginianus), turkey vulture (Cathartes aura), house sparrow (*Passer domesticus*), and red harvester ants (*Pogonomyrmex barbatus*). Other species likely to inhabit the Site based on the habitats present include raccoon, opossum, rabbit, fox, coyote, armadillo, quail, mourning dove, and neotropical migratory songbirds.

2.7 Archeological and Cultural Sites

According to the Texas Historic Sites Atlas published by the Texas Historical Commission, there are no documented historic properties such as cemeteries, museums, historical markers, or properties on the National Register of Historic Places within 1 mile of the facility.

2.8 Waters of U.S. and Wetlands Determination

A Waters of the U.S. (WOTUS) and wetland determination was conducted in the study area. As part of the WOTUS and wetlands determination, W&M reviewed several of the standard record sources for indications of streams and wetlands in the study area. The notes from the records review are presented below followed by field observations for streams and wetlands and a summary of the findings.

NWI Map

W&M reviewed the National Wetlands Inventory (NWI) map (USFWS, NWI 2015), for indications of wetlands on or adjacent to the study areas. The NWI map does not indicate the presence of wetlands on or adjacent to the Site. The nearest mapped wetlands are represented within the Brazos River valley north of the Site.

Hydric Soils

W&M reviewed the soil survey for indications of hydric (wetland-associated) soils on or near the Site. The soil survey indicates that the primary soil map units represented on or near the Site have a hydric rating of zero with the exception of Verland clay loam, 0 to 5 percent slopes, mapped in the extreme southeast corner of the Site which has a hydric rating of 5. A hydric rating of 5 relates the possibility that approximately 5 percent of the soil unit by area contains hydric soils in depressions.

Floodplain

As indicated in Section 2.4, the FEMA FIRM indicates that the Site and surrounding area are in Zone X, outside the 100-year floodplain.

Field Observations

One wetland was identified on the Site as documented in the Field Data Form included in **Appendix C**. It is located within a swale in the eastern portion of the Site and appears to be created by an excavation and impoundment at the Site. Hydrology to the wetland appears to be provided by surface drainage from the Site aided by a drainage swale through the cropland. The extent of the wetland as estimated by field observation and records review is 0.4 acre. The swales draining to the impoundment and on the downslope side of the impoundment do not have indications of ordinary high water marks or wetlands beyond the impoundment.

The swales and wetland do not have a surface hydrologic connection or significant nexus to a downstream navigable water; therefore, they do not constitute jurisdictional *waters of the U.S.*

Stream and Wetland Determination Summary and Conclusions

One wetland was identified at the Site. It is approximately 0.4 acre in size and located within an impoundment within a swale. Swales leading to and from the impoundment do not contain ordinary high water marks. The swales and wetland do not appear to constitute jurisdictional *waters of the U.S.* No impacts to *waters of the U.S.* have been identified in association with the proposed activity.

3.0 PROPOSED ACTIVITIES

The proposed construction and operation details for the Sealy Composting Facility were provided by the applicant as described below: The SouthWaste Disposal, LLC, Sealy Composting Facility (the Facility) will be constructed once a permit has been issued by the TCEQ. The estimated construction period will be during the Fall of 2016. The Facility will consist of bulk material chipping and storage areas, a lined grease trap waste/septic/sewage sludge (GSS) processing area (composting pad), a composting area for other approved non-GSS waste, a 12-foot deep lined retention pond, a post-processing area, above ground feedstock storage tanks, and office areas (which include toilet and potable water facilities). GSS composting and curing processes will be restricted to the lined GSS processing area.

The facility is designed to control rainfall run-on and run-off. The GSS processing area (i.e., the lined pad used for composting and curing) is surrounded by berms that prevent run-on, and is sloped toward a retention pond within the bermed area that collects run-off from the composting area. The composting process is performed and managed such that leachate should not be produced by the application of feedstocks. In the event that leachate is produced by direct rainfall, however, it will be contained within the processing area by the engineered liner system and retention pond. Secondary containment surrounding the liquid feedstock tanks will prevent potentially polluted storm water from discharging prior to inspection. Storm water will be inspected for contamination prior to discharging.

During the operation of the Facility, feedstock will be received by appointment only via tanker trucks. The liquid feedstock will be either pumped into one of ten above ground storage tanks for temporary storage, or may be pumped to the facility vacuum truck to be sprayed directly onto prepared windrows of bulking material located within the processing areas. Liquid feedstocks will be typically stored in the above ground tanks for a maximum of ten days. Typically, only one of the ten 18,000-gallon storage tanks will contain feedstock. The storage capacity of the above ground tanks will allow the liquid feedstocks to be applied in a consistent manner and provide additional feedstock storage capacity that can be used during periods of rainfall that limit feedstock application. In any event, no feedstock will be accepted in excess of the available capacity of the storage tanks. The operator will monitor traffic and off-loading to prevent spills, leaks, and unauthorized materials or dumping. "Manifests" or "Bill of Lading" are required for each load that describe its source, contents, and amount. Haulers are required to have the appropriate licenses or registrations.

Due to the way the liquid feedstocks are handled, the potential for spillage outside the lined processing area will be minimal. In the event liquid feedstock is spilled outside the composting pad, the feedstock and affected surface soils will be promptly recovered using the front end loader and incorporated into the composting process. Bulking materials that spill onto the ground will be promptly recovered with a front-end loader and returned to the windrows. The front-end loader and shovels will be used to maintain the tipping area and windrows daily.

Feedstocks will be applied to the windrows using a vacuum truck equipped with a 3- or 4-inch hose. Once the feedstock is applied to a windrow, the windrow will be immediately turned, mixed, and re-homogenized using a self-propelled tiller to mix feedstock and bulking material. This process allows the feedstocks to be evenly distributed through the windrows and prevents moisture or liquids from collecting at the base of the compost material. Once tilled, the windrows will be monitored to ensure the moisture content and carbon to nitrogen ratio are consistent to maintaining adequate composting. Measurements of nitrogen and carbon ratios are monitored daily.

The desired initial moisture content of the compost is 40 to 60 percent by weight. Moisture content is evaluated and measured daily. Moisture content will be determined during the composting process using the "squeeze test." The squeeze test is performed by manually gathering and squeezing a handful of the

compost material. If water drips out while the compost is under hand pressure, the material is too wet. If the material crumbles apart when the pressure is released, it is too dry. Squeeze test samples will be collected from different depths and areas of the windrows to evaluate the moisture content throughout the windrow. High moisture contents will be corrected by adding additional bulking material and/or by additional tilling. Low moisture content will be corrected by adding potable water, liquids collected in the retention pond (for GSS composting only), or liquid feedstock, and then tilling.

Once a windrow is considered to have the appropriate moisture content and mixture of bulking material and feedstock, it will be monitored for 15 days. During the monitoring period, the windrow temperature will be measured regularly using a bi-metal thermometer with a 4-foot probe. Temperature measurements will be collected every 5 to 10 feet along the length of the windrow at a depth of approximately one third of the windrow height. A temperature of at least 55 degrees centigrade will be maintained during the monitoring period. Temperature measurements will be recorded. During the 15-day monitoring period, the windrow will be turned a minimum of five times to maintain an even temperature throughout. This will aid in consistent thorough composting and the reduction of pathogens. The temperature will be measured and recorded each time the windrow is turned during the monitoring period. Once the 15-day monitoring period is completed, the composted material will enter the post processing phase.

In order to avoid contaminating the final product, no feedstocks or retention pond liquids will be added to a windrow once it enters the monitoring period. In the event that additional feedstocks are inadvertently added to material during the monitoring period, the monitoring period for that material will be re-started.

After the monitoring period, the final GSS product will be placed in a stockpile on the lined processing area for a curing period of at least 60 days. Each batch of final product will be placed in a separate stockpile and assigned a "Batch Number". Each batch will be physically separated to prevent co-mingling of different batches. Batches that do not meet the maturity parameters will remain on the processing area and continue to be monitored until the maturity parameters are reached. Batches that meet the maturity parameters, but do not meet the final product parameters for either Grade 1 or Grade 2 compost (Waste Grade compost), will be disposed off-Site at an authorized municipal solid waste facility. Cured compost meeting either Grade 1 or Grade 2 maturity parameters will be processed through a half-inch screen to remove over-sized material in the Post-Processing area outside the lined composting pad. Over-sized material separated during screening will be returned to the windrows to be re-composted.

4.0 AGENCY COORDINATION

W&M contacted the TPWD and USFWS personnel to inquire about inventory data for listed species in the vicinity of the Site. Contacts made during this assessment in October 2015 include the following list of contacts and a summary of information relayed:

- Jeff Hill, Fish and Wildlife Biologist, Clear Lake Ecological Services, U.S. Fish & Wildlife Services: Mr. Hill provided informal consultation about the potential for occurrence of Houston toad in the vicinity of the project area. Based on our description of the Site and the known range of the Houston toad in Austin County, Mr. Hill agreed that the Houston toad would not occur at the Site and the proposed project would not likely have an effect on the Houston toad.

- Terry Rossignol, Refuge Manager, Attwater Prairie Chicken National Wildlife Refuge: Mr. Rossignol thought that the closest population to the Site would be at the Attwater Prairie Chicken National Wildlife Refuge located approximately 12 miles southwest of the Site. Due to the Site proximity to IH-10 and prior conversion to cropland there is little chance of the Attwater's greater prairie chicken occurring at the Site. He thought any such occurrence would be ephemeral and no chance of the proposed project affecting the species.

- Julie Wicker, Program Supervisor, Wildlife Habitat Assessment Program, TPWD: Ms. Wicker looked at the location while on the phone referencing the TPWD global information system (GIS) layers. No species specific data was revealed except for the nearby prairie identified south of the Site in the TXNDD findings. No easements or refuges were identified in the vicinity. Ms. Wicker suggested that we contact Mr. Brent Ortego of TPWD to inquire about Attwater's Greater Prairie Chicken populations.

- Mr. Brent Ortego, Wildlife Diversity Biologist, TPWD: According to Mr. Ortego, some Attwater's greater prairie chickens have been released at the refuge, some in Texas City, and some in Goliad County. Most of the birds have transmitters and are tracked. None have been release to private land in the vicinity of Sealy or are known to inhabit that area. Mr. Ortego also referenced a 2005 survey for bald eagle nests in Austin County. There are some known nests in the general vicinity associated with the Brazos River, but none mapped in the immediate vicinity of the Site. Mr. Ortego described the bald eagle population as shifting and expanding.

5.0 SPECIES CONSIDERED AND EFFECTS EVALUATION

W&M checked the following sources to identify threatened, endangered, and candidate species with current or historical range near the Site:

1. TPWD County List of Federally- and State-Listed Threatened, Endangered, Candidate and Special Status species for Austin County (http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/). The list is produced with data from the USFWS and was last updated on March 23, 2015. Species listed as Species of Concern (SOC) or Species of Greatest Conservation Concern (SGCC) were included in the evaluation as potential candidate species.

2. USFWS Endangered Species List for Austin County, Texas, at their internet site (http://www.fws.gov/endangered/) last accessed by W&M on October 26, 2015.

3. TPWD Texas Natural Diversity Database (TXNDD) element occurrence records for threatened and endangered species and other rare species and communities. Element occurrences recorded in the same or adjacent quadrangle as the San Felipe, Texas 7.5-Minute quadrangle are listed in the TXNDD list. The TXNDD response for the USGS topographic quadrangle containing the Site and adjoining quadrangles was received on September 29, 2015.

The TPWD and USFWS lists are enclosed in **Appendix D**. The TXNDD data map is presented as **Figure 3** with element occurrence list and records included in **Appendix D**. Based upon the lists and data for species as described above, the species considered for this BA are listed in **Table 1** below. The table lists the Federal and/or State of Texas status and habitat requirements as they relate to the Site and as reported by *TPWD Annotated County Lists of Rare Species*. Based on the Site conditions and habitat requirements, the potential for the species to occur in the vicinity of the Site is presented in the table along with a summary of the effects.

Observations were made for the species listed in **Table 1** and their habitat during the reconnaissance by Mr. Aaron Brewer of W&M Environmental Group, LLC on October 15, 2015. W&M walked the property boundary, along swales, along access roads, and into each area of the property to identify the habitat type and dominant species present. There were no indications of listed species observed during the Site visit. There were no records of these listed species for the Site or adjacent properties identified by the sources listed in this or previous sections. The TXNDD identified a native prairie type south of IH-10, but no intact native prairie was observed on or adjacent to the Site. Based on a review of the USFWS Critical Habitat Mapper (http://ecos.fws.gov/crithab/), no designated critical habitats are located on or in the vicinity of the Site. **Table 1** is followed by additional baseline data and effects evaluation for select endangered species.

Table 1 is presented on the following page:

Table 1 – State- and Federally-Listed Species Summary

Species Name[1]	Federal Status	State Status	Habitat[2]	Potential To Occur[3]	Effects Summary
Houston toad (*Anaxyrus houstonensis*)	LE	E	Endemic to Texas, sandy substrate, water in pools, ephemeral pools, stock tanks, breeds in spring especially after rains, burrows in soil of adjacent uplands when inactive; breeds February-June.	None – Clay soil away from known populations, storm water protections planned	No effect
Southern Crawfish Frog (*Lithobates areolatus areolanthus*)	NL	SOC	Found in abandoned crawfish holes and small mammal burrows. This species inhabits moist meadows, pasturelands, pine scrub, and river flood plains. Eggs are laid and larvae develop in temporary water such as flooded fields, ditches, farm ponds and small lakes. Habitat includes shallow water, herbaceous wetlands, riparian, temporary pool, cropland/hedgerow, grassland/herbaceous, suburban/orchard, woodland – conifer.	Not likely - No crayfish burrows or small mammal burrows noted, storm water protections planned	No impact
American Peregrine Falcon (*Falco peregrinus anatum*)	DL	T	Migrant, nests in tall cliff eyries, winters along coast, stopovers at leading landscape edges	None – No such habitat noted	No effect
Arctic Peregrine Falcon (*Falco peregrinus tundrius*)	DL	SOC	Migrant, winters along coast, stopovers at leading landscape edges	None – No such habitat noted	No impact
Attwater's Greater Prairie-Chicken (*Tympanuchus cupido attwateri*)	LE	E	County is in historic range. Endemic to Texas. Occurs in open prairies of mostly thick grass one to three feet tall in northern two-thirds of Texas coast from near sea level to 200 feet elevation, males form communal display flocks during late winter-early spring, booming grounds consist of short to no vegetative cover	None – Lacks specific habitat, IH-10 barrier, prior converted cropland at Site, no known populations in area	No effect
Bald Eagle (*Haliaeetus luecocephalus*)	DL	T	Found near perennial open water, nests in tall trees or on cliffs near water	None – No nests on Site or in adjacent trees	No effect
Henslow's sparrow (*Ammodramus henslowii*)	NL	SOC	Wintering individuals found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles. A key component of habitat is bare ground for running/walking.	None – No bunch grasses	No impact
Interior Least Tern (*Sterna antillarum athalassos*)	LE	E	Sand and gravel bars within braded streams	None – No such habitat in area, storm water protections planned	No effect
Mountain Plover (*Charadrius montanus*)	NL	SOC	Nests on high plains or shortgrass prairie on ground in shallow depression. Non-breeding migrants in shortgrass plains and bare fields.	None – No such habitat in area	No impact
Red knot (*Calidris canutus rufa*)	T	SOC	Prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Habitat is primarily seacoasts on tidal flats and beaches, herbaceous wetland, and tidal flat/shore.	None – No such habitat in area	No effect

Species Name[1]	Federal Status	State Status	Habitat[2]	Potential To Occur[3]	Effects Summary
Sprague's Pipit (*Anthus spragueii*)	C	SOC	Non-breeding migrant, native upland prairie, coastal grasslands, sensitive to patch size, avoids edges.	None – No suitable habitat	No effect
Western Burrowing Owl (*Athene cunicularia hypugaea*)	NL	SOC	Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots. Nests and roosts in abandoned burrows.	None – No suitable burrows observed	No impact
White-faced Ibis (*Plegadis chihi*)	NL	T	Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats. Nest in marshes, in low trees, on the ground in bulrushes or reeds or on floating mats.	None – No suitable habitat in area	No effect
White-tailed hawk (*Buteo albicaudatus*)	NL	T	Near coast on prairies, cordgrass flats, and scrub-live oak. Further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral.	None – No suitable habitat in area	No effect
Whooping Crane (*Grus Americana*)	LE	E	Potential migrant to coast, winters in coastal marshes	None – No suitable stopover habitat	No effect
Wood stork (*Mycteria Americana*)	NL	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water. Usually roosts communally in tall snags. Breeds in Mexico and moves into Gulf States in search of mud flats and other wetlands.	None – No suitable forage	No effect
Sharpnose shiner (*Notropis oxyrhynchus*)	LE	SOC	Endemic to Brazos River drainage and apparently introduced to Colorado River drainage. Large turbid river with bottom a combination of sand, gravel, and clay-mud.	None – No habitat and storm water protection planned	No effect
A mayfly (*Pseudocentroptiloides morihari*)	NL	SOC	Mayflies distinguished by aquatic larval stage. Adult stage generally found in shoreline vegetation.	None- Large bounce in water level of small pond that dries out limits aquatic stage and vegetation at shoreline	No impact
Louisiana black bear (*Ursus Americanus luteolus*)	LT	T	Possible as transient. Bottomland hardwoods and large tracts of inaccessible forested areas.	None – No suitable habitat	No effect
Plains Spotted Skunk (*Spilogale putorius interrupta*)	NL	SOC	Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands	Possible due to non-specific habitat, but no records in area and adjacent properties with similar habitat	No impact
Red Wolf (*Canis rufus*)	E	E	Extirpated; formerly known in brushy and forested areas as well as coastal prairies	Extirpated	No effect

Species Name[1]	Federal Status	State Status	Habitat[2]	Potential To Occur[3]	Effects Summary
False spike mussel (*Quadrula mitchelli*)	NL	T	Possibly extirpated in Texas. Probably medium to large rivers. Substrates varying from mud through mixtures of sand, gravel and cobble. Range includes Brazos River.	None – No habitat and storm water protection planned	No effect
Smooth pimpleback (*Quadrula houstonensis*)	C	T	Small to moderate streams and rivers as well as moderate sized reservoirs. Mixed mud, sand, and fine gravel. Tolerates very slow to moderate flow rates. Appears to not tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms.	None – No habitat and storm water protection planned	No effect
Texas fawnfoot (*Truncilla macrodon*)	C	T	Little known about habitat. Possibly rivers and larger streams and intolerant of impoundment. Flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows.	None – No habitat and storm water protection planned	No effect
Alligator snapping turtle (*Macrochelys temminckii*)	NL	T	Perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water. Usually in water with mud bottom and abundant aquatic vegetation.	None – No habitat and storm water protection planned	No effect
Smooth green snake (*Liochlorophis vernalis*)	NL	T	Extirpated, formerly Gulf Coastal Plain. Mesic coastal shortgrass prairie vegetation.	None – Extirpated	No effect
Texas Horned Lizard (*Phrynosoma cornutum*)	NL	T	Open, arid and semi-arid regions with sparse vegetation. Soil may vary in texture from sandy to rocky, burrows into soil or hides under rocks when inactive	None – No suitable habitat	No effect
Timber Rattlesnake (*Crotalus horridus*)	NL	T	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland at limestone bluffs, sandy soil, or black clay. Prefers dense ground cover such as grapevines or palmetto.	None – No suitable habitat	No effect
Panicled indogobush (*Amorpha paniculata*)	NL	SOC	Stout shrub in acid seep forests, peat bogs, wet floodplain forests, and seasonal wetlands on the edge of saline prairies in East Texas.	None – No suitable habitat	No impact
Shinner's sunflower (*Helianthus occidentalis ssp plantagineus*)	NL	SOC	Mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country.	None – No intact coastal prairie at Site	No impact
Texas meadow-rue (*Thalictrum texanum*)	NL	SOC	Texas endemic. Mostly found in woodlands and woodland margins on soils with a surface layer of sandy loam, but also occurs on prairie pimple mounds; both on uplands and creek terraces, but perhaps most common on claypan savannas. Soils are very moist during its active growing season.	None- No suitable habitat or soil moisture regimes	No impact

[1]There were no observations of species in study area. There were no records of the PETS species on the Site or in the vicinity of the Site. Other records of PETS species are described below.
[2]Abbreviated habitat requirements as it relates to Site.
[3]Potential for species to occur at the treatment area along with justification.
DL – De-listed; T – Threatened; SOC – Species of Concern (TPWD designation); E – Endangered; PT – Proposed Threatened; C – Candidate Species; NL – Not Listed

5.1 Houston Toad – Federally- and State-Listed Endangered

Environmental Baseline

According to the USFWS Ecological Services, Southwest Region website, Houston toads are found in pine and/or oak woodlands underlain by pockets of deep sandy soils, with temporary pools of water available for breeding. This habitat type occurs within narrow bands of geologic formations in south-central Texas. Small, isolated Houston toad populations have been found scattered across these formations in remnant woodlands.

Site Observations

The proposed activity at the Site is located in an area that is primarily pasture and cropland. The only wooded areas were along narrow fencerows and a narrow railroad right-of-way south of the Site. A small pond was observed at the Site excavated into a swale within clay soil. During the Site visit, a drilling rig was at the Site installing a groundwater monitoring well. The soil cuttings were laid out on plastic and demonstrated that clay soils were present at depths greater than 10 feet below surface grade.

Available Inventories Information

No inventory information was identified for the Site. Mr. Jeff Hill of USFWS has conducted Houston toad surveys in Austin County, but had no data for the Site or areas near the Site.

Determination of Effects

Due to the lack of suitable habitat within and adjacent to the proposed activity area, the proposed activity is determined to have no direct effect or indirect effects on the Houston toad.

Effects Summary

The proposed activity will have no effect on the Houston toad population.

5.2 Attwater's Greater Prairie Chicken – Federally- and State-Listed Endangered

Environmental Baseline

The Attwater Prairie Chicken National Wildlife Refuge (refuge) is located approximately 12 miles southwest of the Site in Colorado County. According to information on the refuge's website, the species habitat and fate are closely tied to the availability of native coastal prairie.

Site Observations

No native coastal prairie was observed on or adjacent to the Site. The Site is bordered by uses that also do not support the Attwater greater prairie chicken. The Site is separated from the Attwater refuge by at least 12 miles and by a railroad line and interstate highway as physical barriers.

Available Inventories Information

The sources consulted did not identify populations near the Site or provide data for species in the vicinity of the Site. The lack of species accounts in the area is useful for determining the probability of occupancy at the Site. That negative data and information from the Site visit were used to support the determination of effects.

Determination of Effects

Due to the lack of suitable habitat within the proposed activity area and lack of species accounts in the vicinity of the Site, the proposed activity is determined to have no direct effect or indirect effects for the Attwater's greater prairie chicken.

Effects Summary

The proposed activity will have no effect on the Attwater's greater prairie chicken.

5.3 Whooping Crane – Federally- and State-Listed Endangered

Environmental Baseline

According to the *TPWD Annotated County Lists of Rare Species*, the whooping crane (*Grus americana*) is a potential migrant via plains throughout most of the state to the coast. The species winters in coastal marshes of Aransas, Calhoun, and Refugio Counties.

Site Observations

The Site proposed activity is located in an area that is primarily used as pasture and cropland. No landscape features were observed at the Site that would provide suitable habitat for the whooping crane.

Available Inventories Information

According to Mr. Morse of the USFWS Arlington Field Office, concerns for the whooping crane along migration routes are primarily limited to the construction of structures that may interfere with migration such as transmission lines or cell towers. No records of the species were identified for the Site or adjacent properties. The lack of species accounts in the area is useful for determining the probability of occupancy at the Site. That negative data and information from the Site visit were used to support the determination of effects.

Determination of Effects

Due to the lack of suitable habitat within the proposed activity area and the relatively small area of pasture that would be affected by the project, the proposed activity is determined to have no direct effect or indirect effects for the whooping crane.

Effects Summary

The proposed activity will have no effect on the whooping crane.

6.0 MITIGATION

The applicant (SouthWaste Disposal, LLC) or their agent (Daniel B. Stephens & Associates, Inc.) provided the following mitigation measures that are part of the project plan and design. These mitigation measures constitute avoidance and minimization of impacts to natural resources on and near the Site. No compensatory mitigation is required for the proposed project.

6.1 Mitigation Measures During Construction

Avoidance and minimization efforts during construction to minimize impacts to Site habitat and unanticipated species encounters, the following will be applied during construction:

- Trees and natural vegetation will be maintained as practical.
- Construction workers will be trained to identify endangered species.
- If an endangered species is encountered during construction activity, the owner will be notified, and the encounter further assessed.
- During Facility operations, trees and vegetation will only be removed if they pose a fire, vector, or safety concern. The Facility will manage trees and vegetation to prevent potential fires and control vectors in a manner that will not alter or adversely modify any potential habitat.
- A construction Storm Water Pollution Prevention Plan (SWPPP) will be implemented prior to construction.

6.2 Mitigation Measures During Operation

Storm Water Controls

This Facility is required to submit a Notice of Intent (NOI) for the Multi Sector Storm Water Discharge Permit. The NOI will be submitted electronically 24 hours prior to beginning operations. A Storm Water Pollution Prevention Plan (SWPPP) will be developed by the applicant to comply with the conditions of the General Permit prior to submitting the NOI.

The pond will be used as an outfall as part of the SWPPP and will be monitored in accordance with the SWPPP requirements. Storm water outside of the GSS processing area will be collected in ditches directed through rock outfall structures toward the storm water pond. The rock outfall structures will separate and trap suspended material while allowing the controlled discharge of storm water. The ditches will allow for the collection and control of storm water runoff from the Facility. Storm water collection ditches will be periodically inspected and cleaned and regraded as-necessary to maintain unobstructed flow. Rock outfall structures will be inspected following each rain event. Sediment and other materials trapped at the rock outfall will be removed before the material accumulates to a depth equal to one-half the outlet height.

Erosion controls consist of earthen berms constructed at the perimeter of the processing area and along the western and southern Facility boundaries. In addition, a series of storm water collection ditches are proposed to be constructed to collect and control runoff from the areas of the Facility lying outside the lined and bermed GSS processing area. Given the physical and chemical nature of the materials stored in these areas (i.e., wood chips, brush, and mature compost), these materials are not anticipated to be capable of generating a leachate containing dissolved chemicals of concern. There is some potential, however, that infiltrating storm water may suspend particles of mature compost or wood chips. The storm water collection ditches outside the processing area are designed to collect and control both storm water and

entrained and suspended particulates, and to control the migration of suspended particulates beyond the facility boundaries.

Vector Controls

The Facility plans to implement design and operation features to control vectors that include rodents, insects, birds, scavenging animals, bacteria, viruses, and other vectors through the following Vector Control Program (VCP). The locations in or around the Facility where vectors may be problematic are Feedstock storage, Processed Material storage, Final Product storage, and surrounding landscapes.

The Officer In Charge (OIC) or designee will perform an inspection weekly to identify problems and corrective actions needed to prevent and/or manage vector infestations. The OIC will plan and schedule corrective actions.

For current, recent, or likely vector infestations, a weekly monitoring program to detect vector infestations may be implemented as follows:

- Rodents: Baited rodent traps will be placed at the Maintenance shop and office; checked and emptied as needed.
- Insects: Sticky cardboard monitors will be used to monitor for ants and cockroaches at the Maintenance shop and office, as needed.
- All other vectors: Weekly monitoring by visual inspection will be performed by designated staff indoors and outdoors.
- Vector Identification: When vectors are detected, the specific identification of the vector will be obtained using professional resources, as needed. The OIC will consult with professional resources to determine methods that will control vectors without impacting the quality of the final products.

Vectors will be controlled through the use of best management practices (BMPs). The BMPs employed at the Facility include:

- No storage or acceptance of unapproved wastes.
- The immediate incorporation of feedstocks into the bulking material or their storage in steel storage tanks until they are used.
- The use of a select group of microbes, fungi, yeast, molds, and enzymes in the composting process that accelerate the rate of decomposition of the feedstocks and also deter the reproduction of flies and fly larvae.
- A 25 foot vegetative buffer surrounding the processing area will be mowed to reduce habitat of vectors.
- Along with sanitation and maintenance actions to eliminate food, water, shelter, and entryways for vectors, traps will be used to reduce vectors when practicable and effective.
- The maintenance of a temperature of at least 55 degrees centigrade in composting materials which discourages pathogen growth.
- The immediate cleanup of spills.

The facility VCP plan will be evaluated at least annually. The OIC will consult with professional resources to evaluate the effectiveness of the VCP program and to develop needed improvements.

The facility reserves the right to train its employees and obtain applicable licenses and/or certifications to apply pesticides at the facility or contract with a professional service provider. Pesticides would be applied in accordance with manufacturer's instructions and in conformance with applicable federal, state, and local regulations.

Vector inspection results; chemical applications to include control type, brand, and purposes; and vector activity sightings to include the identification of the vector (if known), number seen, other evidence (such as animal droppings), date, time, and location will be included on the weekly log and kept on file by the OIC or designee.

7.0 ALTERNATIVES ANALYSIS

The BA is to be reviewed by state agencies and does not require a full National Environmental Policy Act (NEPA)-compliant review. However, information about the Site setting and purpose and need of the proposed compost facility as provided by the applicant or their representative are presented below for any state-level consideration of project alternatives.

Land use in the vicinity of the Facility was determined based on a review of USGS topographic maps, aerial photographs, Austin County tax records, and visual observations made from public roads. Land use within a mile radius of the Facility is predominantly agricultural, with some commercial and light industrial sites located adjacent to the property, and scattered residential sites. The following summarizes the quantities of various land use types within one mile of the Facility:

- 86 agricultural properties
- 38 residential properties
- 11 commercial businesses
- 3 commercial / industrial businesses
- 2 commercial / agricultural businesses

There are no licensed day cares, recreational sites, recreational facilities, sites having exceptional aesthetic quality, commentaries, or schools within one mile of the Facility. In summary, the area surrounding the Facility and property has a relatively low population density, and is used primarily for agricultural purposes. The presence and operation of a composting facility is fully compatible with this setting and land use. The Facility will not impact wetlands, flood plains, or water ways.

The potential population serviced is 6,412,450 persons (US Census 2014). The Facility will serve at least the following counties and is centralized to support these counties: Austin, Bastrop, Burleson, Chambers, Colorado, Fayette, Fort Bend, Galveston, Grimes, Harris, Lee, Liberty, Montgomery, Waller, Washington, and Wharton.

According to the applicant, a 1998 study by the National Renewable Energy Laboratory of 30 metropolitan areas found that about 13 pounds of grease trap waste are generated per person per year. The approximate volume of grease trap waste for the total service area is estimated to be 83,361,850 pounds per year. The facility will provide a much-needed recycling method for area food processing, domestic On-Site Sewage Facility (OSSF) pumpings, and "bedroom community" biosolids. The facility will process grease trap, OSSF wastes, and bulking material for composting.

The Facility will be located on property that was never developed or used to store materials. According to the property owner, the Site was owned by Sea Corps prior to 1995. The construction area for the facility is located on land without structures that has been cleared for agricultural use since at least 1953 based on a review of the earliest known aerial photograph.

The Site is located adjacent to IH-10; therefore, composting operations would produce minimal disruption to rural portions of the county. According to the applicant, the impact on the roadway system is minimal.

The finished materials are intended for use in landscaping, vegetable gardens, and similar uses, therefore storage of these materials on Site should not represent potential for damage or impact to groundwater or surface water resources.

8.0 GENERAL QUALIFICATIONS AND SIGNATURES

This BA has been prepared on behalf of Daniel B. Stephens & Associates, Inc. to provide information about the potential impact of the proposed activity at the proposed Sealy Compost Facility to state- and federally-listed threatened, endangered, and candidate species or their critical habitat. The standard of care exercised for this type of project is similar to that used by other professionals currently practicing in this field at this location. No warranty, express or implied, is made regarding the environmental condition of the Site.

W&M appreciates the opportunity to be of service on this project. If you have any questions or need additional information, please feel free to contact us at 512-501-4058.

W&M ENVIRONMENTAL GROUP, LLC

Aaron Brewer, P.G.
Project Manager

Diana Rader, P.G.
Senior Consultant

FIGURES

Legend

Approximate Site Boundary

OE Overhead Electric Line

Source: USGS Topographic Map, San Felipe Quadrangle (1981)

0 1,000 2,000 4,000 Feet

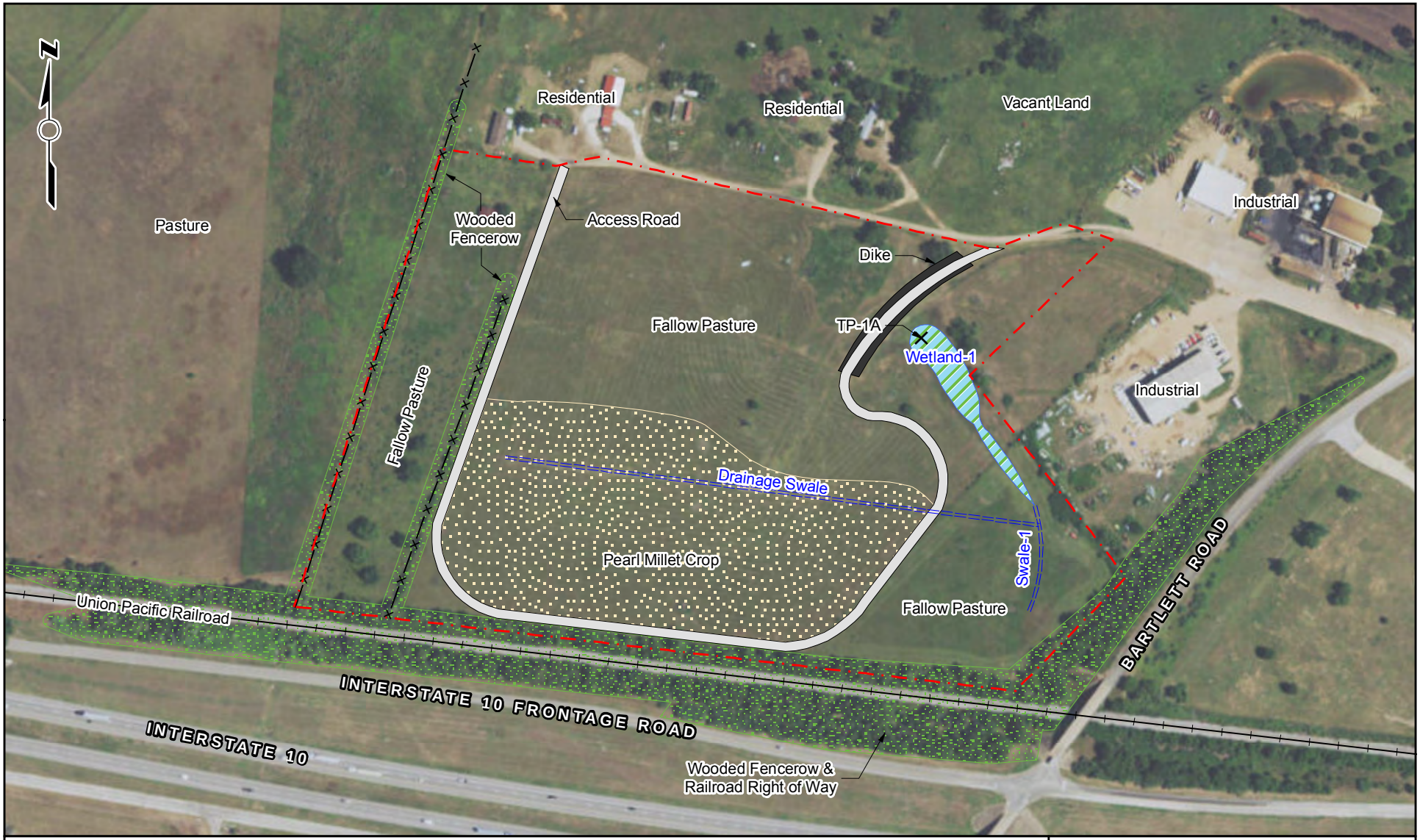
SCALE: 1:24,000 (1"=2,000')

Figure 1
Site Location Map

Proposed Sealy Compost Facility
Austin County, Texas

W&M Environmental Group LLC

10/26/2015	W&M Project No.: 1057.028	Drawn by: JPM	Checked by: AB	Revised:



Legend

- Approximate Site Boundary
- Test Plot (TP-#)
- Railroad Tracks
- Fence
- Swale
- Wooded Area
- Pearl Millet Crop
- Dike
- Approximate Wetland Boundary
- Gravel Surface

0 150 300 600 Feet

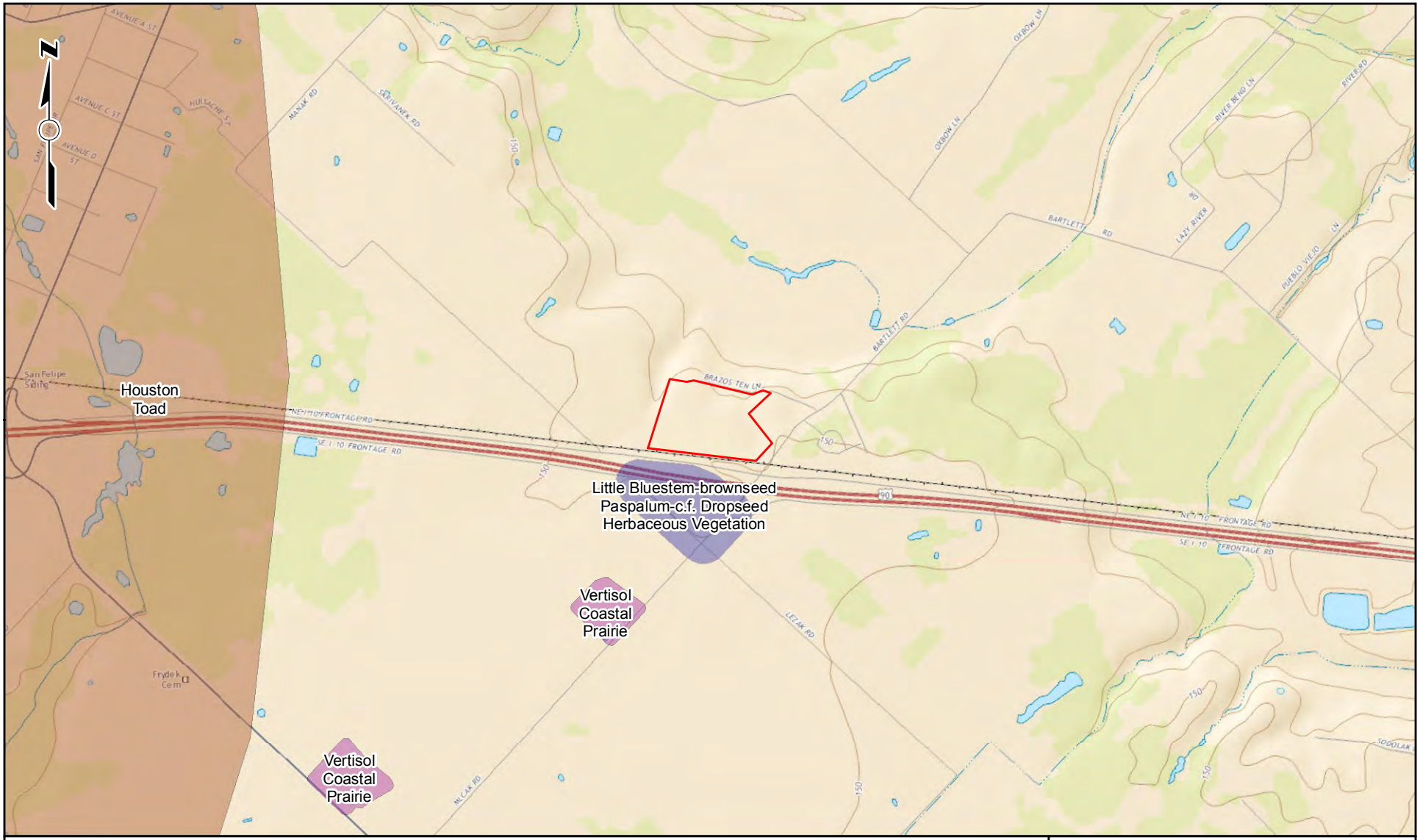
SCALE: 1"=300'

Source: ESRI, USDA (7/2014)

Figure 2
Site Layout Map
Proposed Sealy Compost Facility
Austin County, Texas

W&M Environmental Group, LLC

10/29/2015	W&M Project No.: 1057.028	Drawn by: JPM	Checked by: AB	Revised:



Legend

Approximate Site Boundary

Texas National Diversity Database

- Houston Toad
- Little Bluestem-brownseed Paspalum-c.f. Dropseed Herbaceous Vegetation
- Vertisol Coastal Prairie

Source: Texas National Diversity Database (TXNDD), USGS National Map

0 1,000 2,000 4,000 Feet

SCALE: 1:24,000 (1"=2,000')

Figure 3
TXNDD Map
Proposed Sealy Compost Facility
Austin County, Texas

10/27/2015	W&M Project No.: 1057.028	Drawn by: JPM	Checked by: AB	Revised:

TPWD REVIEW REQUEST FORM

APPENDIX A

Project Coordination and Review Requests

(Including Threatened and Endangered Species)

EARLY PROJECT COORDINATION

If you are in the information gathering phase of project coordination and assessment, ***in lieu of*** submitting a Project Review form or a letter request, you may obtain information from the following Texas Parks and Wildlife Department (TPWD) sources regarding sensitive resource information for use in your analyses. TPWD recommends you use at least the following two sources of information when analyzing for project impacts to sensitive resources, including before submitting a request for TPWD review and recommendations.

RARE, THREATENED, AND ENDANGERED SPECIES OF TEXAS BY COUNTY - This database includes lists of species known to occur and potentially occurring in Texas at the county level. It can be accessed online at: http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/ or by contacting our administrative staff at (512) 389-4571. Appropriate use and interpretation of the county level lists are the responsibility of the recipient.

TEXAS NATURAL DIVERSITY DATABASE (TXNDD) – The TXNDD is publicly available location specific data on rare, threatened and endangered species, natural communities and other significant features of conservation concern to TPWD. This information can be obtained by submitting a data request to txndd@tpwd.state.tx.us. Response to a data request will include available TXNDD records, reports, and geographic information system compatible shapefiles of recorded locations for species and other rare resources on the U.S. Geological Survey (USGS) 7.5 minute topographic quadrangle of the project and surrounding area. Responses generally take a maximum of five business days from receipt of the request. Appropriate use and interpretation of TXNDD data are the responsibility of the recipient.

WILDLIFE HABITAT ASSESSMENT (WHAB) PROGRAM REVIEW

PROJECT REVIEW REQUESTS – The WHAB Program can provide a review of your assessment, after your analysis for impacts using the above two data sources. Please complete the WHAB Review Request form (attached; use Word format for fill-in version), or use the form as an outline of information to include with your letter request. The WHAB Program response will provide an evaluation of your environmental assessment for impacts to fish and wildlife and their habitats, including rare, threatened, and endangered species, other significant resources and concerns presently known or potentially occurring in the vicinity of your project. WHAB Program responses generally take 4 to 6 weeks on average from receipt, depending on the size of your request.

The request should include all the information listed on the next two pages and be sent to the address shown on the last page. The more pertinent information you provide, the more customized our review, and the faster our turnaround. Review requests submitted without adequate project detail may cause a delay in our response as we will need to contact you and wait for supplemental information. The potential for adverse impacts to natural resources from project activities varies based on the type of activity; location; season; vegetation; present physical features (both natural and man-made); degree of disturbance; planned avoidance, minimization, mitigation, enhancement, and restoration measures; species-specific tolerance levels; etc. Current color photographs and aerial photographs of the site greatly facilitate the review process. Complete information allows us to more accurately assess the potential for project impacts, as well as, assists us in narrowing the list of rare, threatened, and endangered species and other natural resources that may need to be addressed further.

WILDLIFE HABITAT ASSESSMENT PROGRAM
Review Requests
(Including Threatened and Endangered Species)

Name: **Aaron Brewer, P.G.** Date: **October 23, 2015**

Your Company: **W&M Environmental Group, LLC** Phone: (**512**) **501-4085**

Your Company Address: **3706 Speedway** Fax: (**512**) **493-9693**

City, State, Zip: **Austin Texas 78705** E-mail: **abrewer@wh-m.com**

Project Title, Number and Site Location: **Sealy Compost Facility near Sealy, Texas** County(ies): **Austin County**

1. Scope of Project:

(a) What regulations will this review help you to comply with? OR, if not regulatory, why is the review being requested? Who is the project sponsor?

Municipal Solid Waste Permit from the Texas Commission on Environmental Quality in accordance with Texas Administrative Code Title 30, Part 1, Chapter 330.

(b) What and where is the project site? What activities will be conducted at the site? (Especially activity types, extent, boundaries, length & width, waterways, vegetation disturbance, and total acreage of site and acreage of the site that will be disturbed)

The project consists of construction of a composting facility at an approximatley 32-acre property currently used for crop and pasture on the east side of Sealy, Texas. The entire property will be graded and constructed to facilitate municipal composting operations.

(c) If this request is for a site investigation or risk assessment, why is the site being investigated? If applicable, what contaminant pathways are being evaluated?

Not applicable.

(d) Schedule of activities – Approximately when (which calendar months, how many years) will the project be active on the site?

The project is scheduled for construction within the next year and will operate continuously.

2. Vegetation: Species, dominant plants, structure and composition, vegetation layers, height of layers, natural vegetation community types.

The Site is occupied by cropland that was sown with milo at the time of the Site visit in October 2015. Other areas of the Site are native pastureland that is dominated by grasses and forbs including King Ranch bluestem and western ragweed. A small fencerow separates two pastures at the Site and the Site is bounded to the south by a wooded railroad right-of-way where the dominant species are Huisache, yaupon, sugarberry, and elbowbush. There are a few solitary mature pacan trees on the Site. Additional vegetation descriptions are presented in the Biological Assessment.

3. Other Natural Resources/Physical Features:

(a) Soils, geology, watercourses, aquifers, flood zones, etc.

The predominant soil map units at the Site are Lake Charles Clay, 3 to 8 percent slopes, and Verland clay loam, 0 to 3 percent slopes. Styx loamy fine sand is mapped outside the northeast boundary of the Site with a slight incursion across the north boundary following a topographic contour. The Site contains no streams, flood zones, or rock outcrops. A small wetland at the Site was created by excavation and impoundment of a small swale in the east portion of the Site.

(b) Habitat, animals, animal assemblages, other sensitive features, etc.

The Site is used primarily for pasture and cropland. There is a small wetland in the east portion of the Site where an impoundment and depression were constructed within a slight swale. The wetland was not inundated at the time of the Site visit and did not have a stream or ordinary high water marks entering of exiting the impoundment.

4. Existing Site Development: Extent of pavement, gravel, shell, or other cover; buildings, landscaped, xeriscaped, drainage system, etc.

No structures are currently present at the Site other than perimeter fence at the east, south, and west boundaries and a dilapidated barbed wire fence separating one of the pastures. The pasture contains a low ditch that drains to a swale on the east portion of the Site.

5. **Historic Use/Function of Site:** Pasture, forest, urban, row crops, rangeland, wetland, etc. If the request is for a risk assessment, when was, or for how long, has the site been active, inactive? Are cultural resources present on the site or will the project cross or impact state or federal lands, local parklands?

Based on review of aerial photographs available at Google Earth dating back to 1995 and based on observations from the Site visit, the historical use of the Site appears to be for pasture and cropland.

6. **Has a threatened and endangered species survey or assessment,** wetland delineation, or other biological assessment already been performed? (In general, TPWD recommends an on-site habitat assessment be performed.) [x] Yes [ ] No

(a) If yes, provide surveyor name, qualifications, methods or protocols, acreage surveyed, level of effort, weather conditions, time of day, and dates the survey was performed.

A Biological Assessment and wetland determination of the 32-acre Site plus perimeter was completed by Mr. Aaron Brewer, P.G. of W&M Environmental Group, LLC in October 2015. The qualifications of Mr. Brewer and other contributing staff at W&M are included in the Biological Assessment. The assessment is limited to a habitat assessment for threatened, endangered, candidate, and listed Species of Greatest Conservation Need.

WILDLIFE HABITAT ASSESSMENT PROGRAM
Review Requests (Continued)
(Including Threatened and Endangered Species)

6. (b) If yes, please provide results and copy of survey/assessment report.

7. **Could current on-site or adjacent habitat support rare species?** ☐ Yes ☒ No
Specifically, explain why or why not.

The habitat present at the Site does not suit the habitat needs of listed or candidate species for Austin County.

8. **Provide a description of potential negative direct and indirect impacts** from proposed project activities or former and current site activities, such as types of habitat and acreage to be degraded or lost, temporarily and permanently. Also, describe cumulative effects that could be anticipated from the project on the natural environment.

Most of the 32-acre site will be directly and permantently impacted by construction and operation of the composting facility, but the Site is disturbed and no threatened or endangered species would be effected.

9. **Provide a description of planned beneficial mitigation and enhancements** or restoration efforts. Be sure to note the avoidance, minimization, and compensatory mitigation measures planned to address the threat of negative impacts (e.g. which erosion control measures will be used, what will site restoration activities encompass, etc.).

Mitigation measures are summarized in the Biological Assessment.

10. **Include copies of coordination with other agencies** relevant to impacts or enhancements of natural resources for this project, or agency & contact name.

11. **Clearly delineate exact location of site and its boundaries** using an applicable USGS quad (most preferable) as the base layer or best map available. The topographic map citation should include the USGS quad name. The map must contain identifiable features and a scale that allows us to find your site **and** accurately pinpoint your site boundaries. When using internet maps, provide both a location map (zoomed out for highway reference) and a layout map (zoomed in for site features, boundaries, and neighboring street reference)

12. **Originals or color-copy photographs** of site and surrounding area with captions or narratives.

13. **Aerial photographs with pertinent features labeled**. Aerials should show the year photograph was taken.

Send completed form to:

Texas Parks and Wildlife Department
Wildlife Division
Wildlife Habitat Assessment Program
4200 Smith School Road
Austin, Texas 78744-3291
(512) 389-4571 (Phone) (512) 389-4599 (Fax)

PHOTOGRAPHIC LOG

APPENDIX B

Photo 1: Pasture in west portion of Site. View is to south from near mid-point of Site.

Photo 2: Pasture in west portion of Site with view of west fence-row where huisache trees are predominant. West adjoining open pasture visible in background.

Photo 3: Fallow pasture and pearl millet cropland at Site. View is to south from access road along west side of the cropland.

Photo 4: Fallow pasture in the southwest portion of the Site with cropland and wooded railroad right-of-way visible in the background. Adjacent industrial building also in background. View is to east from access road on west side of Site.

Photo 5: Wooded railroad right-of-way along southern boundary of Site. View from access road on south side of Site looking south-west.

Photo 6: West adjacent pasture viewed to northwest from the west property fence line in vicinity of off-Site swale indicated on topographic map.

Photo 7: Dike on northwest side of impoundment. View is to the northwest from location of wetland test plot.

Photo 8: View of swale and impoundment in east portion of Site. View is to the south-southeast from location of test plot in wetland.

Photo 9: Approximate start of Swale-1 in southeast corner of Site looking north.

Photo 10: Area up slope from start of Swale-1 in southeast corner of Site. View is to the south with south adjoining railroad right-of-way visible in background.

REFERENCES, SELECT RECORDS, FIELD DATA FORMS

APPENDIX C

REFERENCES

Agricultural Applied Climate Information System (AgACIS). Climate data accessed via the web in October 2015 at: http://agacis.rcc-acis.org/48015/mtot

Bureau of Economic Geology, 1992, *Geologic Map of Texas*: University of Texas at Austin, Virgil E. Barnes, project supervisor, Hartmann, B.M. and Scranton, D.F., cartography, scale 1:500,000.

Bureau of Economic Geology, 1975, Corpus Christi Sheet, *Geologic Atlas of Texas*, Bureau of Economic Geology, University of Texas at Austin, scale 1:250,000

Google Earth historical imagery that is a mix of private collections and photographs provided by the USGS and USDA Farm Service Agency with coverage of the Site between February 3, 1995 and May 2, 2014.

Texas Parks and Wildlife Department (TPWD). *Annotated County Lists of Rare Species.* (http://www.tpwd.state.tx.us/gis/ris/es/)

TPWD. *Vegetation Types of Texas* by Craig A. McMahon et al. 1984.

U.S. Department of Agriculture (USDA) National Resource Conservation Service (NRCS) *Web Soil Survey* (http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm) for soil map and hydric rating (percentage of wetland-associated soil within soil map unit) (**Attached**)

USDA. NRCS. *Official Soil Series Descriptions* (http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi)

USDA. Handbook 296 *Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin.* June 2006.

USDA Field Office Climate Data for WETS tables and precipitation data (http://agacis.rcc-acis.org/)

U.S. Fish and Wildlife Service (USFWS). Attwater Prairie Chicken National Wildlife Refuge, Texas. http://www.fws.gov/refuge/Attwater_Prairie_Chicken/wildlife/APC.html

USFWS. *Critical Habitat Mapper* (http://ecos.fws.gov/crithab/)

USFWS. *Guidance for Preparing a Biological Assessment*. Accessed via internet in October 2015 at: http://www.fws.gov/midwest/endangered/section7/ba_guide.html

USFWS. *National Wetlands Inventory* (NWI) (http://www.fws.gov/wetlands/Data/Google-Earth.html)

United States Geological Survey (USGS) 7.5 Minute Topographic Quadrangle Map for San Felipe (1981) (**Figure 1**)

Map Scale: 1:8,900 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Austin and Waller Counties, Texas
Survey Area Data: Version 10, Sep 29, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 27, 2011—May 14, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Austin and Waller Counties, Texas (TX600)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Bs	Churnabog clay, 0 to 1 percent slopes, frequently flooded	90	61.4	20.7%
LaA	Lake Charles clay, 0 to 1 percent slopes	0	32.8	11.1%
LaD	Lake Charles clay, 3 to 8 percent slopes	0	55.0	18.6%
MdA	Verland clay loam, 0 to 1 percent slopes	5	81.2	27.4%
MdB	Verland clay loam, 1 to 3 percent slopes	0	38.1	12.9%
StC	Styx loamy fine sand, 1 to 5 percent slopes	0	26.1	8.8%
TaC	Tabor fine sandy loam, 1 to 5 percent slopes	0	1.8	0.6%
Totals for Area of Interest			**296.3**	**100.0%**

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Searly Compost Facility City/County: Austin County Sampling Date: 10-15-15

Applicant/Owner: Southern Waste Disposal State: TX Sampling Point: SP-1A

Investigator(s): A Brewer Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Depression at impoundment Local relief (concave, convex, none): Concave Slope (%): 1-3

Subregion (LRR or MLRA): LRR-T Lat: 29.776369 Long: -96.676195 Datum: WGS 84

Soil Map Unit Name: Lake Charles clay 3-8% Slopes NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil X, or Hydrology X significantly disturbed? Y Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: Graded swale & depression upslope from impoundment. Precipitation dryer than normal.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: TP-1A

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Shrub Stratum (Plot size:)			
1. Echinochloa colona	20	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20 = Total Cover		
Herb Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (If observed, list morphological adaptations below).

10-15-15

SOIL Sampling Point: TP-1A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1						Clay	
6-12	10YR 4/1	60	10YR 3/6	10	C	M	clay	
	10YR 4/3	30						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

USFWS AND TPWD LISTS, TXNDD ELEMENT OCCURRENCE RECORDS

APPENDIX D

AUSTIN COUNTY

AMPHIBIANS

		Federal Status	State Status
Houston toad	*Anaxyrus houstonensis*	LE	E

endemic; sandy substrate, water in pools, ephemeral pools, stock tanks; breeds in spring especially after rains; burrows in soil of adjacent uplands when inactive; breeds February-June; associated with soils of the Sparta, Carrizo, Goliad, Queen City, Recklaw, Weches, and Willis geologic formations

Southern Crawfish Frog *Lithobates areolatus areolatus*

The Southern Crawfish Frog can be found in abandoned crawfish holes and small mammal burrows. This species inhabits moist meadows, pasturelands, pine scrub, and river flood plains. This species spends nearly all of its time in burrows and only leaves the burrow area to breed. Although this species can be difficult to detect due to its reclusive nature, the call of breeding males can be heard over great distances. Eggs are laid and larvae develop in temporary water such as flooded fields, ditches, farm ponds and small lakes. Habitat: Shallow water, Herbaceous Wetland, Riparian, Temporary Pool, Cropland/hedgerow, Grassland/herbaceous, Suburban/orchard, Woodland – Conifer.

BIRDS

		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon *Falco peregrinus tundrius* DL

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Attwater's Greater Prairie-Chicken	*Tympanuchus cupido attwateri*	LE	E

this county within historic range; endemic; open prairies of mostly thick grass one to three feet tall; from near sea level to 200 feet along coastal plain on upper two-thirds of Texas coast; males form communal display flocks during late winter-early spring; booming grounds important; breeding February-July

Bald Eagle	*Haliaeetus leucocephalus*	DL	T

found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Henslow's Sparrow *Ammodramus henslowii*

wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking

AUSTIN COUNTY

BIRDS

		Federal Status	State Status
Interior Least Tern	*Sterna antillarum athalassos*	LE	E

subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Mountain Plover *Charadrius montanus*

breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous

Peregrine Falcon	*Falco peregrinus*	DL	T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

Red Knot	*Calidris canutus rufa*	T

Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.

Sprague's Pipit	*Anthus spragueii*	C

only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.

Western Burrowing Owl *Athene cunicularia hypugaea*

open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

White-faced Ibis	*Plegadis chihi*	T

prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats

White-tailed Hawk	*Buteo albicaudatus*	T

near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May

AUSTIN COUNTY

BIRDS		Federal Status	State Status
Whooping Crane	*Grus americana*	LE	E

potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties

Wood Stork	*Mycteria americana*		T

forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

FISHES		Federal Status	State Status
Sharpnose shiner	*Notropis oxyrhynchus*	LE	

endemic to Brazos River drainage; also, apparently introduced into adjacent Colorado River drainage; large turbid river, with bottom a combination of sand, gravel, and clay-mud

INSECTS		Federal Status	State Status
A mayfly	*Pseudocentroptiloides morihari*		

mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation

MAMMALS		Federal Status	State Status
Louisiana black bear	*Ursus americanus luteolus*	LT	T

possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas

Plains spotted skunk	*Spilogale putorius interrupta*		

catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Red wolf	*Canis rufus*	LE	E

extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies

MOLLUSKS		Federal Status	State Status
False spike mussel	*Quadrula mitchelli*		T

possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins

AUSTIN COUNTY

MOLLUSKS		Federal Status	State Status
Smooth pimpleback	*Quadrula houstonensis*	C	T

small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins

Texas fawnsfoot	*Truncilla macrodon*	C	T

little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins

REPTILES		Federal Status	State Status
Alligator snapping turtle	*Macrochelys temminckii*		T

perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October

Smooth green snake	*Liochlorophis vernalis*		T

Extirpated, formerly Gulf Coastal Plain; mesic coastal shortgrass prairie vegetation

Texas horned lizard	*Phrynosoma cornutum*		T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

Timber rattlesnake	*Crotalus horridus*		T

swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto

PLANTS		Federal Status	State Status
Panicled indigobush	*Amorpha paniculata*		

A stout shrub, 3 m (9 ft) tallthat grows in acid seep forests, peat bogs, wet floodplain forests, and sesaonal wetlands on the edge of Saline Prairies in East Texas. It is distinguished from other Amorpha species by its fuzzy leaflets with prominent raised veins underneath, and the flower panicles, which are 8 to 16 inches long and slender, held above the foliage.

Shinner's sunflower	*Helianthus occidentalis ssp plantagineus*		

mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country

AUSTIN COUNTY

PLANTS

Federal Status State Status

Texas meadow-rue *Thalictrum texanum*

Texas endemic; mostly found in woodlands and woodland margins on soils with a surface layer of sandy loam, but it also occurs on prairie pimple mounds; both on uplands and creek terraces, but perhaps most common on claypan savannas; soils are very moist during its active growing season; flowering/fruiting (January-)February-May, withering by midsummer, foliage reappears in late fall(November) and may persist through the winter

Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Amphibians	Houston toad (Bufo	Entire	Endangered	Austin Ecological Services Field	Houston Toad Recovery Plan	Final
Birds	Whooping crane (Grus	except where EXPN	Endangered	Assistant Regional Director-	Whooping Crane Recovery	Final Revision 3
Birds	Whooping crane (Grus	U.S.A. (CO, ID, FL, NM, UT,	Experimental Population, Non-	Office Of The Regional Director		
Birds	Bald eagle (Haliaeetus	lower 48 States	Recovery	Rock Island Ecological Services	Chesapeake Bay Bald Eagle	Final Revision 1
Birds	Bald eagle (Haliaeetus	lower 48 States	Recovery	Rock Island Ecological Services	Southwestern Bald Eagle	Final
Birds	Bald eagle (Haliaeetus	lower 48 States	Recovery	Rock Island Ecological Services	Northern States Bald Eagle	Final
Birds	Bald eagle (Haliaeetus	lower 48 States	Recovery	Rock Island Ecological Services	Southeastern States Bald Eagle	Final Revision 1
Birds	Bald eagle (Haliaeetus	lower 48 States	Recovery	Rock Island Ecological Services	Recovery Plan for the Pacific	Final
Birds	Attwater's greater prairie-	Entire	Endangered	Attwater Prairie Chicken	Attwater's Prairie-Chicken	Final Revision 2
Clams	Texas fawnsfoot (Truncilla		Candidate	Austin Ecological Services Field		
Clams	Smooth pimpleback (Quadrula		Candidate	Austin Ecological Services Field		

U.S. Fish & Wildlife Service
Environmental Conservation Online System
Species by County Report for Austin County, Texas

Occurrence List for Quads Surrounding Request Area

Scientific Name:	Common Name:	Occurrence Number:	State Status:	Federal Status:	Eo Id:
Anaxyrus houstonensis	Houston Toad	5	E	LE	4392
Andropogon gerardii - Panicum virgatum - Schizachyrium scoparium - Schizachyrium tenerum - Helianthus mollis Herbaceous Vegetation	Eastern Upland Coastal Prairie	4			11391
Charadrius montanus	Mountain Plover	1			1446
Echinacea atrorubens	Topeka purple-coneflower	8			10221
Haliaeetus leucocephalus	Bald Eagle	15	T		3476
Haliaeetus leucocephalus	Bald Eagle	55	T		5430
Liatris bracteata	coastal gay-feather	33			8317
Liochlorophis vernalis	Smooth Green Snake	1	T		5443
Liochlorophis vernalis	Smooth Green Snake	2	T		2355
Lithobates areolatus areolatus	Southern Crawfish Frog	41			11481
Lithobates areolatus areolatus	Southern Crawfish Frog	46			11503
Lithobates areolatus areolatus	Southern Crawfish Frog	60			12227
Muhlenbergia capillaris Herbaceous Vegetation	Houston Coastal Prairie	1			11392
Muhlenbergia capillaris Herbaceous Vegetation	Houston Coastal Prairie	3			11394
Muhlenbergia capillaris Herbaceous Vegetation	Houston Coastal Prairie	4			11395
Quadrula houstonensis	Smooth Pimpleback	57	T	C	12510
Quadrula houstonensis	Smooth Pimpleback	58	T	C	12513
Quadrula houstonensis	Smooth Pimpleback	59	T	C	12515
Quadrula houstonensis	Smooth Pimpleback	60	T	C	12518
Quadrula houstonensis	Smooth Pimpleback	61	T	C	12522
Quadrula houstonensis	Smooth Pimpleback	62	T	C	12523

Scientific Name:	Common Name:	Occurrence Number:	State Status:	Federal Status:	Eo Id:
Quadrula houstonensis	Smooth Pimpleback	63	T	C	12525
Rookery		540			6197
Rookery		541			2248
Schizachyrium scoparium - Paspalum plicatulum - Sorghastrum nutans - Dichanthelium oligosanthes - Paspalum setaceum - Symphyotrichum pratense Alfisol Herbaceous Vegetation	Alfisol Coastal Prairie	26			11696
Schizachyrium scoparium - Paspalum plicatulum - Sorghastrum nutans - Dichanthelium oligosanthes - Paspalum setaceum - Symphyotrichum pratense Alfisol Herbaceous Vegetation	Alfisol Coastal Prairie	27			11697
Schizachyrium scoparium - Sorghastrum nutans - Paspalum plicatulum - Carex microdonta - Neptunia lutea Vertisol Herbaceous Vegetation	Vertisol Coastal Prairie	29			11818
Schizachyrium scoparium - Sorghastrum nutans - Paspalum plicatulum - Carex microdonta - Neptunia lutea Vertisol Herbaceous Vegetation	Vertisol Coastal Prairie	69			11858
Schizachyrium scoparium - Sorghastrum nutans - Paspalum plicatulum - Carex microdonta - Neptunia lutea Vertisol Herbaceous Vegetation	Vertisol Coastal Prairie	87			11876
Schizachyrium scoparium - Sorghastrum nutans - Paspalum plicatulum - Carex microdonta - Neptunia lutea Vertisol Herbaceous Vegetation	Vertisol Coastal Prairie	89			11878
Schizachyrium scoparium - Sorghastrum nutans - Paspalum plicatulum - Carex microdonta - Neptunia lutea Vertisol Herbaceous Vegetation	Vertisol Coastal Prairie	90			11879
Schizachyrium scoparium - Sorghastrum nutans - Paspalum plicatulum - Carex microdonta - Neptunia lutea Vertisol Herbaceous Vegetation	Vertisol Coastal Prairie	93			11882
Schizachyrium scoparium - Sorghastrum nutans - Paspalum plicatulum - Carex microdonta - Neptunia lutea Vertisol Herbaceous Vegetation	Vertisol Coastal Prairie	94			11883
Schizachyrium scoparium-paspalum plicatulum series	Little Bluestem-brownseed Paspalum Series	3			1587
Schizachyrium scoparium-paspalum plicatulum series	Little Bluestem-brownseed Paspalum Series	4			5597
Schizachyrium scoparium-paspalum plicatulum series	Little Bluestem-brownseed Paspalum Series	5			325
Schizachyrium scoparium-paspalum plicatulum series	Little Bluestem-brownseed Paspalum Series	6			4033
Schizachyrium scoparium-paspalum plicatulum series	Little Bluestem-brownseed Paspalum Series	19			7840
Schizachyrium scoparium-paspalum plicatulum series	Little Bluestem-brownseed Paspalum Series	20			7841

Scientific Name:	Common Name:	Occurrence Number:	State Status:	Federal Status:	Eo Id:
Schizachyrium scoparium-paspalum plicatulum series	Little Bluestem-brownseed Paspalum Series	22			2752
Schizachyrium scoparium-paspalum plicatulum series	Little Bluestem-brownseed Paspalum Series	34			4884
Schizachyrium scoparium-sorghastrum nutans series	Little Bluestem-indiangrass Series	52			337
Schoenolirion wrightii	Texas sunnybell	12			8897
Seymeria texana	Texas seymeria	26			10520
Spigelia texana	Florida pinkroot	21			11117
Spilogale putorius interrupta	plains spotted skunk	7			1727
Thalictrum texanum	Texas meadow-rue	10			2522
Tripsacum dactyloides - Panicum virgatum - Sorghastrum nutans - Helianthus maximiliani Herbaceous Vegetation	Gammagrass - Switchgrass Tallgrass Prairie	2			11427
Tripsacum dactyloides-panicum virgatum series	Gammagrass-switchgrass Series	2			4346
Truncilla macrodon	Texas Fawnsfoot	30	T	C	12511
Truncilla macrodon	Texas Fawnsfoot	31	T	C	12512
Truncilla macrodon	Texas Fawnsfoot	32	T	C	12514
Truncilla macrodon	Texas Fawnsfoot	33	T	C	12516
Truncilla macrodon	Texas Fawnsfoot	34	T	C	12519
Truncilla macrodon	Texas Fawnsfoot	35	T	C	12520
Truncilla macrodon	Texas Fawnsfoot	36	T	C	12521
Truncilla macrodon	Texas Fawnsfoot	37	T	C	12524
Truncilla macrodon	Texas Fawnsfoot	38	T	C	12526
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	2	E	LE	256
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	3	E	LE	7896
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	4	E	LE	2910
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	5	E	LE	534

Scientific Name:	Common Name:	Occurrence Number:	State Status:	Federal Status:	Eo Id:
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	6	E	LE	5293
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	7	E	LE	3560
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	8	E	LE	6198
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	9	E	LE	2206
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	10	E	LE	2207
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	11	E	LE	6716
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	12	E	LE	6120
Tympanuchus cupido attwateri	Attwater's Greater Prairie-chicken	13	E	LE	3468

Element Occurrence Record

Scientific Name: Anaxyrus houstonensis
Occurrence #: 5 **Eo Id:** 4392
Track Status: Track all extant and selected historical EOs
Common Name: Houston Toad
TX Protection Status: E
Global Rank: G1 **State Rank:** S1
Federal Status: LE

Location Information:

Directions:

AUSTIN COUNTY, SPECIFIC LOCATION UNKNOWN.

Survey Information:

First Observation: 1953 **Survey Date:** **Last Observation:** 1953?

Eo Type: **Eo Rank:** D **Eo Rank Date:**

Observed Area:

Comments:

General Description: SANDY SUBSTRATE, OFTEN WITH LOBLOLLY PINE. EPHEMERAL POOLS AND STOCK TANKS.

Comments: NEED TO SEE SPECIMEN, NEED TO REFINE LOCALITY.

Protection Comments:

Management Comments:

Data:

EO Data: NEEDS SAND SUBSTRATE, WATER IN POOLS. BREEDS IN FEBRUARY AFTER RAINS. RELICTUAL FROM MORE EQUABLE CLIMATE. OCCASIONALLY HYBRIDIZES WITH OTHER BUFO SP.

Reference:

Citation:

BROWN, LAUREN E., 1971. NATURAL HYBRIDIZATION AND TREND TOWARD EXTINCTION IN SOME RELICT TEXAS TOAD POPULATIONS. SOUTHWESTERN NATURALIST 16(2):185-199.

BROWN, L.E., ET. AL., 1983. AGENCY REVIEW DRAFT OF THE RECOVERY PLAN FOR THE HOUSTON TOAD (BUFO HOUSTONENSIS). USF& WS, ALBUQUERQUE, NM. 48PP.

SANDERS, O. 1953. A NEW SPECIES OF TOAD WITH A DISCUSSION OF MORPHOLOGY OF THE BUFONID SKULL. HERPETOLOGICA 9:25-47.

Specimen:

Element Occurrence Record

Scientific Name: Quadrula houstonensis
Occurrence #: 40 **Eo Id:** 9834
Track Status: Track all extant and selected historical EOs
Common Name: Smooth Pimpleback
TX Protection Status: T
Global Rank: G2 **State Rank:** S1S2
Federal Status: C

Location Information:

Directions:

Mussels were observed in the Brazos River approx. 1 mile downstream of IH-10 approx. 7.3 miles east of Sealy. The directions were created by database staff.

Survey Information:

First Observation: 2006-10-06 **Survey Date:** 2006-10-06 **Last Observation:** 2006-10-06
Eo Type: **Eo Rank:** E **Eo Rank Date:** 2006-10-06
Observed Area:

Comments:

General Description: 6 Oct 2006:The substrate ranged from silt and sand to sand; water conditions were described as low.

Comments: Survey methodology included a timed search of 1.75 man-hours and quadrat sampling (10, 0.25 square meter).

Protection Comments:

Management Comments:

Data:

EO Data: 6 Oct 2006: A total of 50 live mussels, 24 recently dead shells and 9 shells of older condition were observed.

Reference:

Citation:

Burlakova, Lyubov E., A. Y. Karatayev, V. A. Karatayev, M. E. May, D. L. Bennett, M. J. Cook. 2011. Endemic species: Contribution to community uniqueness, effect of habitat alteration, and conservation priorities. Biological Conservation 144(1):155-165.

Karatayev, Alexander Y. and L. E. Burlakova. 2008. Final report: Distributional survey and habitat utilization of freshwater mussels. Interagency final report to the Texas Water Development Board. January 2008. 47 pp.

Burlakova, Lyubov and A. Karatayev. 2009. Multiple spreadsheets of mussel data for surveys conducted in Texas, 2004-2009.

Burlakova, Lyubov E. and A. Y. Karatayev. 2013. Update on the status of rare and endemic species in Texas. Report submitted to the International Union for Conservation of Nature.

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium - Sorghastrum nutans - Paspalum plicatulum - Carex microdonta - Neptunia lutea Vertisol Herbaceous Vegetation

Occurrence #: 91 **Eo Id:** 11880

Common Name: Vertisol Coastal Prairie

Track Status: Track all extant and selected historical EOs

TX Protection Status:

Global Rank: G1 **State Rank:** SNR

Federal Status:

Location Information:

Directions:

Survey Information:

First Observation: 2007-08 **Survey Date:** 2007-08 **Last Observation:** 2007-08

Eo Type: **Eo Rank:** **Eo Rank Date:** 2007-08

Observed Area:

Comments:

General Description: See the Composition Tab for other species within the area.

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: Aug 2007: This plant community is of high quality grass species dominated by Paspalum spp. such as P. floridanum, Sorghastrum nutans, and Setaria parviflora. Forb species are of medium quality consisting of Liatris sp., and Chamaecrista fasciculata. Exotics and woody cover are absent.

Reference:

Citation:

Native Prairies Association of Texas. 2011. Tallgrass prairie survey project that includes shapefiles, excel files, documents, images, and protocol for multiple counties in Texas (2000-2013).

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium - Sorghastrum nutans - Paspalum plicatulum - Carex microdonta - Neptunia lutea Vertisol Herbaceous Vegetation

Occurrence #: 92 **Eo Id:** 11881

Common Name: Vertisol Coastal Prairie

Track Status: Track all extant and selected historical EOs

TX Protection Status:

Global Rank: G1 **State Rank:** SNR

Federal Status:

Location Information:

Directions:

Survey Information:

First Observation: 2007-08 **Survey Date:** 2007-08 **Last Observation:** 2007-08

Eo Type: **Eo Rank:** **Eo Rank Date:** 2007-08

Observed Area:

Comments:

General Description: See the Composition Tab for other species within the area.

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: Aug 2007: This plant community is of high quality grass species dominated by Paspalum spp. such as P. floridanum, Sorghastrum nutans, and Setaria parviflora. Forb species are of medium quality consisting of Liatris sp., and Chamaecrista fasciculata. Exotics and woody cover are absent.

Reference:

Citation:

Native Prairies Association of Texas. 2011. Tallgrass prairie survey project that includes shapefiles, excel files, documents, images, and protocol for multiple counties in Texas (2000-2013).

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium-paspalum plicatulum series

Occurrence #: 23 **Eo Id:** 5371

Common Name: Little Bluestem-brownseed Paspalum Series

Track Status: Track all extant and selected historical EOs

TX Protection Status:

Global Rank: G1 **State Rank:** S2

Federal Status:

Location Information:

Directions:

"INTERSTATE 10, 2.5 MILES WEST OF BRAZOS RIVER AT MICAK ROAD"; MAP IN MCFARLANE'S REPORT INDICATE SITE LIES ON SOUTH SIDE OF I-10, CA. 1.7-2.0 ROAD MILES EAST OF FM 1458 OVERPASS

Survey Information:

First Observation: 1995-03-02 **Survey Date:** **Last Observation:** 1995-04-03

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: REMNANT COASTAL PRAIRIE, MOSTLY LITTLE BLUESTEM AND BROOMSEDGE BLUESTEM; CA. 9 ACRES; FOR SALE IN MARCH 1995

Comments: NUMBER 22 ON TABLE 6 IN PART ONE OF REPORT; SEE MAPS AND DESCRIPTIONS IN AUSTIN COUNTY SECTION OF PART TWO OF REPORT

Protection Comments:

Management Comments:

Data:

EO Data:

Reference:

Citation:

McFarlane, R.W. 1995. Upland coastal prairie of Texas and Louisiana: description, human impacts and management options. Prepared for Houston Audubon Society. 92 pp. March 1995.

Specimen:

Element Occurrence Record

Scientific Name: Spigelia texana
Occurrence #: 15 **Eo Id:** 8779
Track Status: Track all extant and selected historical EOs
Common Name: Florida pinkroot
TX Protection Status:
Global Rank: G3 **State Rank:** S3
Federal Status:

Location Information:

Directions:

Survey Information:

First Observation: **Survey Date:** **Last Observation:**

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Reference:

Citation:

Specimen:

Element Occurrence Record

Scientific Name: Spigelia texana
Occurrence #: 21 **Eo Id:** 11117
Track Status: Track all extant and selected historical EOs
Common Name: Florida pinkroot
TX Protection Status:
Global Rank: G3 **State Rank:** S3
Federal Status:

Location Information:

Directions:

IN FLOODPLAINS WOODS ALONG THE BRAZOS RIVER, STEPHEN F. AUSTIN STATE PARK, NEAR SEALY.

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 1957-05-25
Eo Type: **Eo Rank:** **Eo Rank Date:**
Observed Area:

Comments:

General Description:

Comments: THIS SPECIMEN IS SOMETIMES ATTRIBUTED TO WALLER CO (AS IN HENRICKSON, 1996.).

Protection Comments:

Management Comments:

Data:

EO Data:

Reference:

Citation:

CORRELL, D.S. 1957. (16444). SPECIMEN # NONE (TEX-LL).

Specimen:

CORRELL, D.S. 1957. (16444). SPECIMEN # NONE (TEX-LL). (S57COR01TXUS)

Element Occurrence Record

Scientific Name: Thalictrum texanum
Occurrence #: 14 **Eo Id:** 5113
Track Status: Track all extant and selected historical EOs
Common Name: Texas meadow-rue
TX Protection Status:
Global Rank: G2Q **State Rank:** S2
Federal Status:

Location Information:

Directions:

CA. 0.3 MILE NORTH OF JUNCTION OF GARRETT ROAD AND BULLER ROAD; AT DRY BRANCH, EAST SIDE OF BULLER ROAD AND SOUTH SIDE OF DRY BRANCH

Survey Information:

First Observation: 2004-01-28 **Survey Date:** 2004-01-28 **Last Observation:** 2004-01-28

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: GENTLE SLOPING ROAD BANK AND CUT OVER BOTTOMLAND ADJACENT TO DRY BRANCH, EDGE OF WOODLAND AND IN WOODLAND; QUERCUS NIGRA AND PLANTANAS OCCIDENTALIS DOMINANT

Comments: SLIGHTLY WEEDY ROAD BANK MERGING INTO SEMI-NATURAL VEGETATION

Protection Comments:

Management Comments:

Data:

EO Data: CA. 100 PLANTS

Reference:

Citation:

SINGHURST, JASON. 2004. FIELD NOTES ON THALICTRUM TEXANUM IN HARRIS AND WALLER COUNTIES, 28 JANUARY 2004.

Specimen:

BAYLOR UNIVERSITY HERBARIUM. 2004. JASON SINGHURST #12541, SPECIMEN # ? BAYLU. 28 JANUARY 2004.

Element Occurrence Record

Scientific Name: Thalictrum texanum
Occurrence #: 18 **Eo Id:** 8778
Track Status: Track all extant and selected historical EOs
Common Name: Texas meadow-rue
TX Protection Status:
Global Rank: G2Q **State Rank:** S2
Federal Status:

Location Information:

Directions:

80 METERS SOUTHEAST OF STEPHEN F. AUSTIN STATE PARK HEADQUARTERS, AND CA. 30 METERS SOUTHWEST OF PARK SUPERINTENDENT HOUSE

Survey Information:

First Observation: 2003-02-23 **Survey Date:** 2003-02-23 **Last Observation:** 2003-02-23
Eo Type: **Eo Rank:** B **Eo Rank Date:** 2003-02-23
Observed Area:

Comments:

General Description: PECAN-CEDAR ELM-SEDGE RIPARIAN TERRACE; GROWING IN PECAN-ELM CLAYPAN SOILS

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Reference:

Citation:

SINGHURST, JASON. 2003. SURVEY OF THALICTRUM TEXANUM (TEXAS MEADOW-RUE) IN BRAZOS, GRIMES, WALLER, AND WASHINGTON COUNTIES, TEXAS.

Specimen:

BAYLOR UNIVERSITY HERBARIUM. 2003. J. SINGHURST #11,671 BAYLU.

UNIVERSITY OF TEXAS AT AUSTIN HERBARIUM. 2003. J. SINGHURST #? TEX.

Element Occurrence Record

Scientific Name: Thamnophis sirtalis annectens
Occurrence #: 25 **Eo Id:** 977
Track Status: Track all extant and selected historical EOs
Common Name: Texas Garter Snake
TX Protection Status:
Global Rank: G5T4 **State Rank:** S2
Federal Status:

Location Information:

Directions:
STEPHEN F. AUSTIN STATE PARK, 8 MILES EAST OF SEALY

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 1942-04-04
Eo Type: **Eo Rank:** H **Eo Rank Date:** 2006-12-07
Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: TAKEN FROM UNDER LOG IN RIVER BOTTOM AT 1700 HOURS ON A SUNNY DAY, 80 DEGREES F.

Reference:

Citation:

UNKNOWN COLLECTOR. 1942. ONE SPECIMEN, BCB 437.

Specimen:

Baylor University, Bryce C. Brown Collection. 1942. Unknown Collector, Catalog # 437 BCB. 4 April 1942.

UNKNOWN COLLECTOR. 1942. ONE SPECIMEN, BCB 437. (S42XXXBCTXUS)

Element Occurrence Record

Scientific Name: Truncilla macrodon
Occurrence #: 23 **Eo Id:** 9663
Track Status: Track all extant and selected historical EOs
Common Name: Texas Fawnsfoot
TX Protection Status: T
Global Rank: G2Q **State Rank:** S1
Federal Status: C

Location Information:

Directions:

Mussels were observed in the Brazos River approx. 1.0 mile downstream of IH-10 approx. 7.3 miles east of Sealy. The directions were created by database staff.

Survey Information:

First Observation: 2006-10-06 **Survey Date:** 2006-10-06 **Last Observation:** 2006-10-06
Eo Type: **Eo Rank:** E **Eo Rank Date:** 2006-10-06
Observed Area:

Comments:

General Description: 6 Oct 2006: The site had low water conditions and the substrate ranged from silt and sand to sand.

Comments: 6 Oct 2006: Survey methods included a timed search (1.75 man-hours) and quadrats (10, 0.25 meters square).

Protection Comments:

Management Comments:

Data:

EO Data: 6 Oct 2006: A total of one live individual and 12 shells and 3 valves of recently dead to sub-fossil condition were observed.

Reference:

Citation:

Burlakova, Lyubov E., A. Y. Karatayev, V. A. Karatayev, M. E. May, D. L. Bennett, M. J. Cook. 2011. Endemic species: Contribution to community uniqueness, effect of habitat alteration, and conservation priorities. Biological Conservation 144(1):155-165.

Burlakova, Lyubov and A. Karatayev. 2009. Multiple spreadsheets of mussel data for surveys conducted in Texas, 2004-2009.

Karatayev, Alexander Y. and L. E. Burlakova. 2008. Final report: Distributional survey and habitat utilization of freshwater mussels. Interagency final report to the Texas Water Development Board. January 2008. 47 pp.

Specimen:

QUALIFICATIONS

APPENDIX E

QUALIFICATIONS

Aaron D. Brewer, P.G.
Project Consultant
B.S., Plant Biology, University of Minnesota
Licensed Professional Geoscientist (Soil Science) in Texas (TX 10824)
Certified Wetland Delineator (#1006, Minnesota)
Aaron has over 15 years of experience in environmental consulting specializing in the following areas: Phase I Environmental Site Assessment (ESA), Phase II ESA, Response Action Plans, tank removal, State Voluntary Cleanup Programs, wetland delineation, wetland permit, wetland mitigation, vegetation surveys, biological evaluations, NEPA documentation, ecological risk assessment, litigation support, and quality assurance/quality control.

Trudy S. Hasan, P.G.
Project Consultant
B.S., Geology, Trinity University
Trudy has more than 20 years of environmental consulting and regulatory experience, primarily with soil and groundwater assessment, remediation, and management of leaking petroleum storage tank (LPST) sites. Working under Texas Risk Reduction Program (TRRP) and LPST rules, Trudy has overseen closure of numerous projects throughout Texas, beginning with release determination through assessment and cleanup of soil and groundwater. She also has field and project management experience at industrial facilities such as petroleum refineries, bulk plants, and foundries. Other experience includes Phase I environmental site assessments and document research and litigation support for EPA Superfund sites.

Diana S. Rader, P.G.
Senior Consultant
B.S., Geology, University of Texas at Austin
Diana has more than 20 years of experience in conducting Phase I ESAs, environmental site investigations and environmental assessments. Her experience includes sites evaluated under the Texas Risk Reduction Program (TRRP), the Louisiana Risk Evaluation/Corrective Action Program (RECAP), including sites enrolled in the Leaking Petroleum Storage Tank (LPST) Program and Voluntary Cleanup Program (VCP). Diana is a registered professional geoscientist in Texas and Mississippi (TX License No. 1179, MS License No. 0823).

Appendix G

EDR TX Water Well Report & Oil and Gas Report

Proposed Sealy Composting Facility
Intersection of Bartlett Road and Brazos 10 Lane
Sealy, TX 77474

Inquiry Number: 4417539.2
September 30, 2015

The EDR TX Water Well Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Environmental Data Resources, Inc.
Water Well Review Report

EDR reviewed available records made public by the state of Texas at the Texas Water Development Board (TWDB) and the Texas Commission Environmental Quality (TCEQ) and obtained information identifying the approximate location of public and private water wells within the requested Area of Review (AOR). EDR researched the located and plotted water wells identified on county highway maps or USGS 7.5 minute topographic maps at the TWDB. EDR transferred the approximate water well locations onto a map for the client's review.

EDR cannot guarantee the accuracy of the information provided by state agencies. This review is intended to provide the user with a "working approximation" of reported well locations. The following are guidelines used to review available driller logs for water wells associated with client site information within the AOR.

- Identify Located Wells within the AOR according to the TWDB maps.
- Identify Plotted Wells within the AOR according to the TWDB maps.
- Identify Partially Numbered Wells within the AOR according to the TCEQ files containing records submitted by the well driller.
- Identify Unnumbered Wells within the AOR according to the TCEQ files containing records submitted by the well driller.

Description of Terms

Area of Review-(AOR):
Area of review is a 1 mile radius around client specified coordinate of target property.

Located Water Well:
Well locations that have been field checked by a TWDB or USGS staff member, spotted on a USGS 7.5' Topographical or county highway map, assigned a unique identification number, and filed at the TWDB.

Plotted Water Well:
Approximate well locations spotted on county highway maps by the TWDB staff members according to information submitted on the driller's log. The accuracy of the location for these wells is dependent on the driller. The state assigned unique identification numbers to these wells, but in high-density areas, a single identification number may represent multiple well locations. The TWDB eliminated this plotting activity in June 1986.

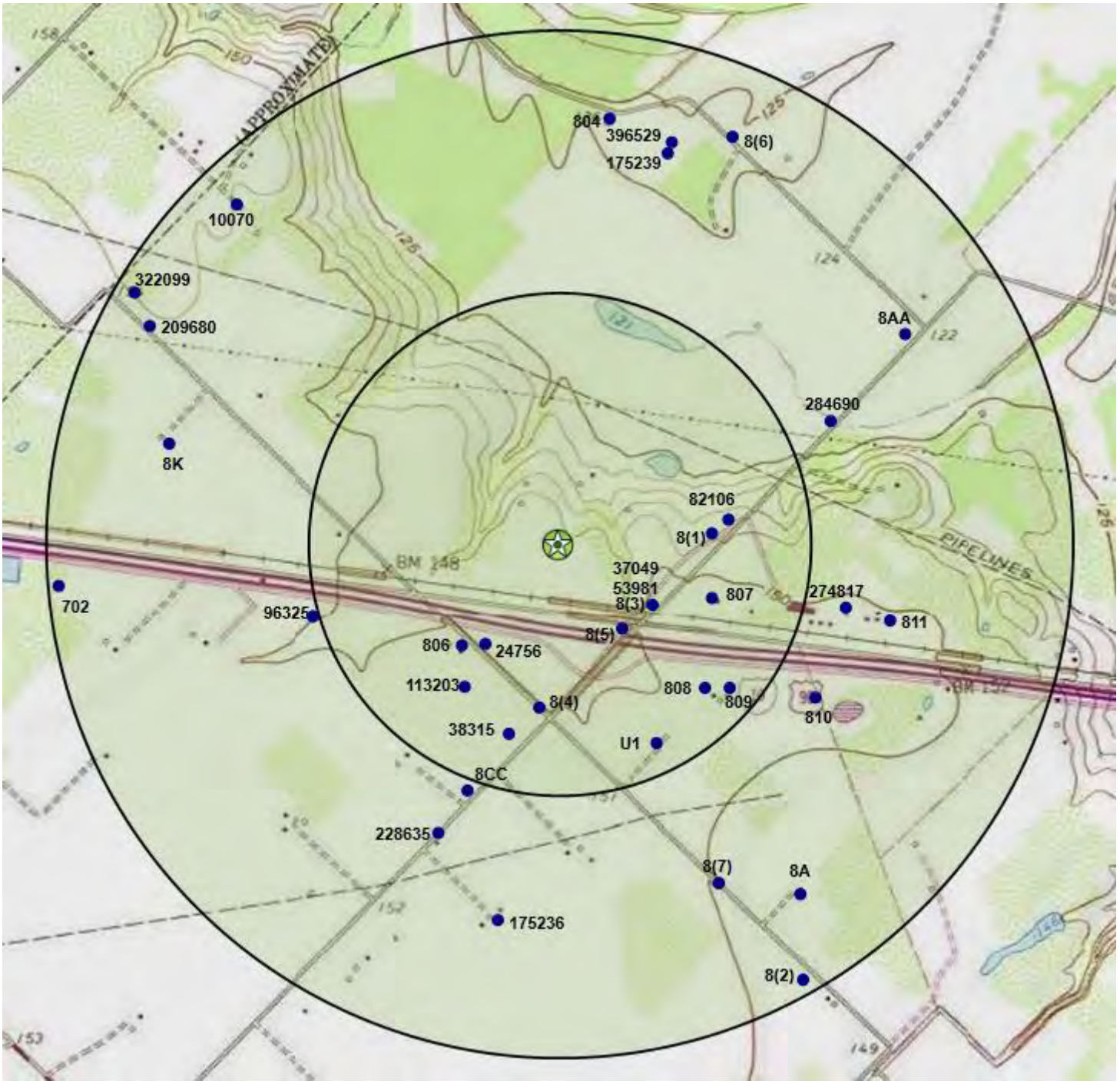
Partially Numbered Water Well:
Water well locations established to within a 2.5 minute topographic quadrangle and identified by the TCEQ according to maps submitted with the driller's log. Each water well was assigned a State ID number by the TCEQ. **Note:** This method for recording water well locations was procedure from 1986 to 1991.

Unnumbered Water Well:
Well locations identified on the driller's logs and corresponding driller's maps maintained by the TCEQ records. **Note:** The TCEQ implemented this procedure in 1991.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Disclaimer - Copyright and Trademark Notice

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report AS IS. Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.



SEARCH DISTANCES SHOWN **.5 MILE** **1 MILE**	**WATER WELL LOCATION MAP** **WELLS WITHIN 1 MILE RADIUS** **PROPOSED SEALY COMPOSTING FACILITY** **INTERSECTION OF BARTLETT ROAD AND BRAZOS 10 LANE** **SEALY, TX 77474** **AUSTIN COUNTY** **USGS 7.5 MINUTE QUAD** **SAN FELIPE**	EDR™ Environmental Data Resources Inc *ENVIRONMENTAL DATA RESOURCES* **6 ARMSTRONG ROAD** **SHELTON, CT 06484** **800-352-0050 FAX: 800-231-6802**

Environmental Data Resources, Inc.

Water Well Review

Site Name: Proposed Sealy Composting Facility **Inquiry #: 4417539.2**

Site Address: Intersection of Bartlett Road and Brazos 10 Lane

City: Sealy **State: TX** **Zip: 77474**

WELL CLASSIFICATION	NUMBER IDENTIFIED WITHIN AOR
LOCATED	23
PLOTTED	4
PARTIALLY NUMBERED	7
UNNUMBERED	1
TOTAL NUMBER IDENTIFIED	35

LOCATED WELLS: SEARCHED TWDB STATE GRID 66-16-8 – IDENTIFIED WATER WELL LOGS 66-16-702, 804, 806, 807, 808, 809, 811, 10070, 24756, 37049, 38315, 53981, 82106, 96325, 113203, 175236, 175239, 209680, 228635, 274817, 284690, 322099, 396529

PLOTTED WELLS: SEARCHED TCEQ STATE GRID 66-16-8 - IDENTIFIED WATER WELL LOGS 66-16-8A, 8K, 8AA, 8CC

PARTIALLY NUMBERED WELLS: SEARCHED TCEQ STATE GRID 66-16-8 - IDENTIFIED WATER WELL LOGS 66-16-8(1), 8(2), 8(3), 8(4), 8(5), 8(6), 8(7)

UNNUMBERED WELLS: SEARCHED TCEQ UNNUMBERED WELL FILES FOR AUSTIN COUNTY – IDENTIFIED WATER WELL LOG U1

TEXAS WATER DEVELOPMENT BOARD (TWDB)

LOCATED WELL LOG EXHIBIT

Texas Water Development Board

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616702

Scanned Images

REPORTED WATER WELL DATA ON 6616702

No.	FIELD	VALUE	EXPLANATION
1	STATE WELL NUMBER	6616702	
2	COUNTY CODE	15	Austin County, Texas
3	BASIN	12	Brazos River Basin
4	PREVIOUS WELL NUMBER		
5	LATITUDE	294629	DMS (in decimal degrees: 29.774721)
6	LAT DEC	29.7747210	
7	LONGITUDE	960539	DMS (in decimal degrees: -96.094166)
8	LONG DEC	-96.0941660	
9	OWNER 1	Ronnie Ross	
10	OWNER 2		
11	DRILLER 1	Floyd Blakey	
12	DRILLER 2		
13	SOURCE OF COORDINATES	1	
14	AQUIFER CODE	121EVGL	Evangeline Aquifer
15	AQUIFER ID1	15	Gulf Coast Aquifer
16	AQUIFER ID2		
17	AQUIFER ID3		
18	ELEVATION	150	feet
19	ELEVATION MEASUREMENT METHOD	M	Interpolated From Topo Map
20	ALPHA CODE		
21	DATE DRILLED	04271976	
22	WELL TYPE	W	Withdrawal of Water

No.	FIELD	VALUE	EXPLANATION
23	WELL DEPTH	98	feet
24	SOURCE OF DEPTH	D	Driller's Log
25	TYPE OF LIFT	S	Submersible Pump
26	TYPE OF POWER	E	Electric Motor
27	HORSEPOWER		
28	PRIMARY WATER USE	H	Domestic
29	SECONDARY WATER USE		
30	TERTIARY WATER USE		
31	WATER LEVEL AVAILABLE	M	
32	WATER QUALITY AVAILABLE	Y	
33	WELL LOGS AVAILABLE	D	
34	OTHER DATA AVAILABLE		
35	DATE COLLECTED OR UPDATED	12071976	
36	REPORTING AGENCY	01	TWDB or Predecessor Agency
37	WELL SCHEDULE IN FILE		
38	CONTRUCTION METHOD	H	Hydraulic Rotary
39	COMPLETION	S	Screen
40	CASING MATERIAL	P	PVC, Fiberglass, other Plastic
41	SCREEN MATERIAL	P	PVC, Fiberglass, other Plastic
42	GMA	14	
43	RWPA	H	
44	DISTRICTID	200114HG	

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616702

Scanned Images

NO REPORTED INFREQUENT CONSTITUENT DATA ON 6616702

No.	STATE WELL NUMBER	MONTH	DAY	YEAR	SAMPLE NUMBER	STORET CODE	VALUE	PLUS MINUS

REPORTED WATER LEVEL DATA ON 6616702

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK
1	6616702	P	-48.00	4	27	1976	01	07	7	

NO REPORTED USGS 5 DAY WATER LEVEL DATA ON 6616702

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK

REPORTED WELL CASING DATA ON 6616702

No.	STATE WELL NUMBER	CASING/SCREEN/OPEN HOLE INDICATOR	DIAMETER OF CASING OR SCREEN	TOP DEPTH	BOTTOM DEPTH
1	6616702	C - Casing	4		

NO REPORTED REMARKS DATA ON 6616702

No.	STATE WELL NUMBER	REMARKS 1	REMARKS 2

REPORTED WATER QUALITY DATA ON 6616702 (Column 1 - 19)

No.	STATE WELL NUMBER	MONTH	DAY/Year	YEAR	SAMPLE NUMBER	SAMPLE TIME	TEMPERATURE CELSIUS	TOP OF SAMPLED INTERVAL	BOTTOM OF SAMPLED INTERVAL	SAMPLED INTERVAL AQUIFER CODE	COLLECTION REMARKS	RELIABILITY REMARK	COLLECTING AGENCY	LAB CODE	BALANCED / UNBALANCED	SILICA MG/L	CALCIUM MG/L	MAGNESIUM MG/L
1	**6616702**	12	7	1976	1							03	01	01	B	24.00	67.00	4.60

REPORTED WATER QUALITY DATA ON 6616702 (Column 20 - 39)

No.	STATE WELL NUMBER	SODIUM MG/L	POTASSIUM MG/L	STRONTIUM MG/L	CARBONATE MG/L	BICARBONATE MG/L	SULFATE MG/L	CHLORIDE MG/L	FLUORIDE MG/L	NITRATE MG/L	PH	TDS MG/L	PHENOLPHTHALEIN ALKALINITY	TOTAL ALKALINITY	TOTAL HARDNESS	PERECNT SODIUM	SAR	RSC	SPECIFIC CONDUCTANCE
1	**6616702**	26.00			0.00	228.20	4.80	37.00	0.20	1.60	7.70	277	0.00	187.00	186	23	0.83	0.02	488

TWDB Groundwater Database Result

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responsibilities for any errors appearing in rules ot otherwise. Further, TWDB assumes no responsibility for the use of the information provided.
PLEASE NOTE that users of these data are responsible for checking the accuracy, completeness, currency, or suitability of all information themselves. TWDB makes no gurantees or warrabties as to the accuracy, completeness, currency, or suitability of the information provided via the GroundWater Database (GWDB). TWDB specificially disclaims any and all liability for any claims or damages that may result from providing GWDB data or the information it contains.

For additional information or answers to questions concerning the TWDB GWDB contact David Thorkildsen at (512) 936-0871 or Bryan Anderson at (512) 475-3302.

You can download Groundwater Database Reports in ASCII text files from this link. The files are organized by Texas counties.

Explanation of Groundwater Data

TEXAS WATER DEVELOPMENT BOAR

WELL SCHEDULE

Work No. 6102
Project CI-7705
Temp 66-16-7AA

Aquifer Evangeline | Field No. 6 | State Well No. 66-16-702
Owner's Well No. | County Austin

1. Location: 1/4, 1/4 Sec., Block, Survey On the south side of I10, 0.8 mile east of the intersection of I10 and FM Road 1458.
2. Owner: Ronnie Ross Address: Rt 1 Sealy 77474
   Tenant: Address:
   Driller: Floyd Blakey Address: Rt 3 Box 20 Sealy 77474
3. Elevation of land surface @ well is 150' ft. above msl, determined by topo map
4. Drilled: 4-27 1976; Dug, Cable Tool (Rotary),
5. Depth: Rept. 98 ft. Meas. ft.
6. Completion: Open Hole, (Straight Wall), Underreamed, Gravel Packed
7. Pump: Mfgr. Type Submersible
   No. Stages, Bowls Diam. in., Setting ft.
   Column Diam. in., Length Tailpipe ft.
8. Motor: Fuel electric Make & Model HP.
9. Yield: Flow gpm, Pump gpm, Meas., Rept., Est.
10. Performance Test: Date Length of Test Made by
    Static Level ft. Pumping Level ft. Drawdown ft.
    Production gpm Specific Capacity gpm/ft.
11. Water Level: 48 ft. (rept.) meas. 4-27 1976 above (below) land surface which is 0 ft. above below surface.
    VTM ft. rept. meas. 12-7 1976 above below which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
12. Use: (Dom), Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used,
13. Quality: (Remarks on taste, odor, color, etc.)
    Temp. °F, Date sampled for analysis 12-7-76 Laboratory TDHR
    Temp. °F, Date sampled for analysis Laboratory
    Temp. °F, Date sampled for analysis Laboratory
14. Other data available as circled: (Driller's Log), Radioactivity Log, Electric Log, Formation Samples, Pumping Test,
15. Record by: R.F. Gian Date 12-7 1976
    Source of Data observation and driller's log
16. Remarks:

CASING & BLANK PIPE
Cemented From ft. to ft.

Diam. (in.)	Type	Setting, ft. from	to
4	plastic	--	--

WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	to
4	plastic	--	98

Log:

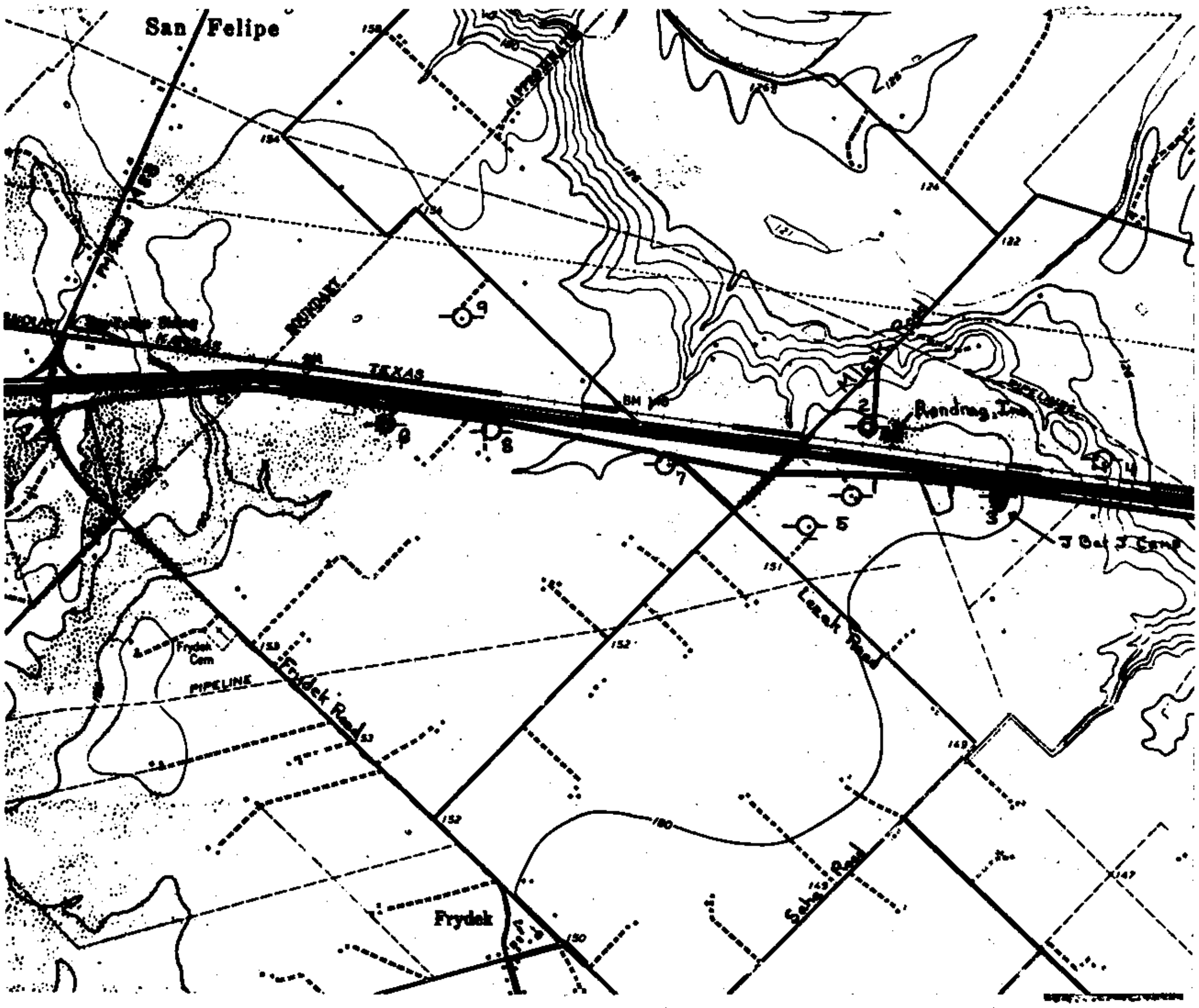
0-5' top soil
5-9' yellow clay
9-36' sand
36-63' red clay
63-79' rock
79-98' sand

TWDBE-WD-2

(Sketch)

N

66-16-702



Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Resources Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDBE ONLY
Program No. 401-6102-50
Work No. 57-7705

CHEMICAL WATER ANALYSIS REPORT

Send report to:
Ground Water Division
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

KEY PUNCHED

County 008 Austin
State Well No. 66-16-702
field Well No. 6
Date Collected 12-07-76

Location On the south side of I 10, 0.8 mile east of the int. of I 10 and FM Road 1468 Sample No. 1 By R.F. Gaines

Source (type of well) sub. elect. Owner Ronnie Ross

Date Drilled 4/27/76 Depth 98 ft. WBF Evangeline

Producing intervals -- Water level 4/27/76 48 ft. Sample depth ft.

Sampled after pumping 5 min Yield GPM meas. est. Temperature °F °C

Point of collection faucet beside trailer house Appearance ☒ cleer ☐ turbid ☐ cclored ☐ other

Use domestic Remarks

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

Laboratory No. 363162

Date Received DEC 8 1976

Date Reported DEC 14 1976

	MG/L	ME/L
Silica	24	
Calcium	67	3.33
Magnesium	5	0.38
Sodium	26	1.14
Total		4.85
☐ Potassium	.	
☐ Manganese	.	
☐ Boron	.	
3/ ☐ Total Iron	.	
☐ (other)	MG/L	

%Na
SAR
RSC

	MG/L	ME/L
Carbonate	0	0
Bicarbonate 112	228	3.74
Sulfate	5	0.10
Chloride	37	1.04
Fluoride	0.2	—
Nitrate	1.6	—
pH	7.7	
Total		4.88

Specific Conductance (micromhos/cm³)	460
Diluted Conductance (micromhos/cm³)	4 x 122 = 488
1/ Dissolved Solids (sum in MG/L)	278
Phenolphthalein Alkalinity as C aCO₃	0
Total Alkalinity as C aCO₃	(3.74) 187
Total Hardness as C aCO₃	(3.71) 186

2/ Nitrogen Cycle

Ammonia - N	
Nitrite - N	
Nitrate - N	
Organic Nitrogen	

"☐" items will be analyzed if checked.

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.
2/ Nitrogen cycle requires separate sample.
3/ Total Iron requires separate sample.

TWDBE-WD-1 (Rev. 8-30-76)

Analyst _____ Checked By _____

Dup GW 7

Send original copy by certified mail to the
Texas Water Development Board
P. O. Box 12386
Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No. 66-16-7AA
Located on map yes
Received: 76
Form GW 8 ______
Form GW 9 ______

1) OWNER:
Person having well drilled *Ronnie Ross* (Name) Address *R 1* (Street or RFD) *Sealy,* (City) *Tex* (State)

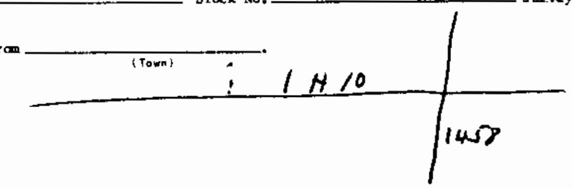
Landowner *Same* (Name) Address ______ (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County *Austin* Labor ______ League ______ Abstract No. ______

NW¼ NE¼ SW¼ SE¼ of Section ______ Block No. ______ Survey ______
(Circle as many as are known)

miles in *N E* (NE, SW, etc.) direction from ______ (Town)

NORTH



Sketch map of well location with distances from adjacent section or survey lines, and to landmarks, roads, and creeks.

3) TYPE OF WORK (Check):
New Well ☑ Deepening ☐
Reconditioning ☐ Plugging ☐

4) PROPOSED USE (Check):
Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

5) TYPE OF WELL (Check):
Rotary ☑ Driven ☐ Dug ☐
Cable ☐ Jetted ☐ Bored ☐

6) WELL LOG:
Diameter of hole *4* in. Depth drilled *98* ft. Depth of completed well *98* ft. Date drilled *4-27-76*

All measurements made from ______ ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material	From (ft.)	To (ft.)	Description and color of formation material
0	5	Top Soil			
5	9	yellow clay			
9	36	Sand			
36	63	Red clay			
63	79	Rock			
79	98	Sand			

(Use reverse side if necessary)

7) COMPLETION (Check):
Straight wall ☑ Gravel packed ☐ Other ☐
Under reamed ☐ Open hole ☐

8) WATER LEVEL:
Static level *48* ft. below land surface Date *4-27-76*
Artesian pressure ______ lbs. per square inch Date ______

9) CASING:
Type: old ☐ New ☑ Steel ☐ Plastic ☑ Other ☐
Cemented from ______ ft. to ______ ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage

10) SCREEN:
Type *Wrapped Plastic*
Perforated ☐ Slotted ☐

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot size

11) WELL TESTS:
Was a pump test made? ☐ Yes ☐ No If yes by whom?
Yield: ______ gpm with ______ ft. drawdown after ______ hrs
Bailer test ______ gpm with ______ ft. drawdown after ______ hrs
Artesian flow ______ gpm Date ______
Temperature of water ______
Was a chemical analysis made? ☐ Yes ☐ No
Did any strata contain undesirable water? ☐ Yes ☐ No
Type of water? ______ depth of strata ______

12) PUMP DATA:
Manufacturer's Name ______
Type ______ H.P. ______
Designed pumping rate ______ gpm ☐ gph ☐
Type power unit ______
Depth to bowls, cylinder, jet, etc., ______ ft. below land surface.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME *FLOYD BLAKEY* (Type or Print) Water Well Drillers Registration No. *778*

Address *R3 Box 20* (Street or RFD) *Sealy,* (City) *Tex* (State)

(Signed) *Floyd Blakey* (Water Well Driller) ______ (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available. *AP66-16-702*

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616804

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REPORTED WATER WELL DATA ON 6616804

No.	FIELD	VALUE	EXPLANATION
1	STATE WELL NUMBER	6616804	
2	COUNTY CODE	15	Austin County, Texas
3	BASIN	12	Brazos River Basin
4	PREVIOUS WELL NUMBER		
5	LATITUDE	294717	DMS (in decimal degrees: 29.788055)
6	LAT DEC	29.7880550	
7	LONGITUDE	960434	DMS (in decimal degrees: -96.076110)
8	LONG DEC	-96.0761100	
9	OWNER 1	Unknown	
10	OWNER 2		
11	DRILLER 1	Unknown	
12	DRILLER 2		
13	SOURCE OF COORDINATES	1	
14	AQUIFER CODE	112GLFC	Gulf Coast Aquifer
15	AQUIFER ID1	15	Gulf Coast Aquifer
16	AQUIFER ID2		
17	AQUIFER ID3		
18	ELEVATION	126	feet
19	ELEVATION MEASUREMENT METHOD	M	Interpolated From Topo Map
20	ALPHA CODE		
21	DATE DRILLED		
22	WELL TYPE	W	Withdrawal of Water

No.	FIELD	VALUE	EXPLANATION
23	WELL DEPTH		feet
24	SOURCE OF DEPTH		
25	TYPE OF LIFT	P	Piston
26	TYPE OF POWER	W	Windmill
27	HORSEPOWER		
28	PRIMARY WATER USE	S	Stock
29	SECONDARY WATER USE		
30	TERTIARY WATER USE		
31	WATER LEVEL AVAILABLE	M	
32	WATER QUALITY AVAILABLE	N	
33	WELL LOGS AVAILABLE		
34	OTHER DATA AVAILABLE		
35	DATE COLLECTED OR UPDATED	04141964	
36	REPORTING AGENCY	02	US GEOLOGICAL SURVEY
37	WELL SCHEDULE IN FILE		
38	CONTRUCTION METHOD	H	Hydraulic Rotary
39	COMPLETION		
40	CASING MATERIAL	S	Steel
41	SCREEN MATERIAL		
42	GMA	14	
43	RWPA	H	
44	DISTRICTID	200114HG	

Texas Water Development Board

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616804

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NO REPORTED INFREQUENT CONSTITUENT DATA ON 6616804

No.	STATE WELL NUMBER	MONTH	DAY	YEAR	SAMPLE NUMBER	STORET CODE	VALUE	PLUS MINUS

REPORTED WATER LEVEL DATA ON 6616804

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK
1	6616804	P	-27.70	4	14	1964	01	04	1	
2	6616804	P	-26.55	2	18	1966	01	04	1	

NO REPORTED USGS 5 DAY WATER LEVEL DATA ON 6616804

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK

REPORTED WELL CASING DATA ON 6616804

No.	STATE WELL NUMBER	CASING/SCREEN/OPEN HOLE INDICATOR	DIAMETER OF CASING OR SCREEN	TOP DEPTH	BOTTOM DEPTH
1	6616804	C - Casing	3		

NO REPORTED REMARKS DATA ON 6616804

No.	STATE WELL NUMBER	REMARKS 1	REMARKS 2

NO REPORTED WATER QUALITY DATA ON 6616804 (Column 1 - 19)

No.	STATE WELL NUMBER	MONTH	DAY/Year	YEAR	SAMPLE NUMBER	SAMPLE TIME	TEMPERATURE CELSIUS	TOP OF SAMPLED INTERVAL	BOTTOM OF SAMPLED INTERVAL	SAMPLED INTERVAL AQUIFER CODE	COLLECTION REMARKS	RELIABILITY REMARK	COLLECTING AGENCY	LAB CODE	BALANCED / UNBALANCED	SILICA MG/L	CALCIUM MG/L	MAGNESIUM MG/L

NO REPORTED WATER QUALITY DATA ON 6616804 (Column 20 - 39)

No.	STATE WELL NUMBER	SODIUM MG/L	POTASSIUM MG/L	STRONTIUM MG/L	CARBONATE MG/L	BICARBONATE MG/L	SULFATE MG/L	CHLORIDE MG/L	FLUORIDE MG/L	NITRATE MG/L	PH	TDS MG/L	PHENOLPHTHALEIN ALKALINITY	TOTAL ALKALINITY	TOTAL HARDNESS	PERECNT SODIUM	SAR	RSC	SPECIFIC CONDUCTANCE

TWDB Groundwater Database Result

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For additional information or answers to questions concerning the TWDB GWDB contact David Thorkildsen at (512) 936-0871 or Bryan Anderson at (512) 475-3302.

You can download Groundwater Database Reports in ASCII text files from this link. The files are organized by Texas counties.

Explanation of Groundwater Data

July 193
Revised

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES BRANCH

WELL SCHEDULE

AP6616804

Date 4/14, 1964 Field No.

Record by cun Office No.

Source of data field

1. *Location:* State Tex County Austin

Map

¼ ¼ sec. T N/S R E/W

2. *Owner:* Address

Tenant Address

Driller Address

3. *Topography* Brazos bottom

4. *Elevation* 126 ft. above/below inter top topo sheet

5. *Type:* Dug, (drilled), driven, bored, jetted 19

6. *Depth:* Rept. probably ft. Meas. shallow ±60 ft.?

7. *Casing:* Diam. 2½ in., to in., Type pipe

Depth ft., Finish

8. *Chief Aquifer* alluvium ? From ft. to ft.

Others G.M. 2/18/66 – 26.55

9. *Water level* 29.2 ft. rept./(meas.) 4/14 1964 above/(below) MP = top casing which is 1.50 ft. (above)/below surface

10. *Pump:* Type windmill (cyl.) Capacity G. M.

Power: Kind wind Horsepower

11. *Yield:* Flow G. M., Pump G. M., Meas., Rept. Est.

Drawdown ft. after hours pumping G. M.

12. *Use:* Dom., (Stock), PS., RR., Ind., Irr., Obs.

Adequacy, permanence

13. *Quality* Temp °F.

Taste, odor, color Sample Yes/No

Unfit for

14. *Remarks:* (Log, Analyses, etc.) depth was unknown. W.L. is rather high for an alluvium well, but it appears well is rather close to Bea. - Qal contact.

Texas Water Development Board

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616806

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REPORTED WATER WELL DATA ON 6616806

No.	FIELD	VALUE	EXPLANATION
1	STATE WELL NUMBER	6616806	
2	COUNTY CODE	15	Austin County, Texas
3	BASIN	12	Brazos River Basin
4	PREVIOUS WELL NUMBER		
5	LATITUDE	294623	DMS (in decimal degrees: 29.773054)
6	LAT DEC	29.7730540	
7	LONGITUDE	960452	DMS (in decimal degrees: -96.081110)
8	LONG DEC	-96.0811100	
9	OWNER 1	Frank Kucera	
10	OWNER 2		
11	DRILLER 1	Unknown	
12	DRILLER 2		
13	SOURCE OF COORDINATES	1	
14	AQUIFER CODE	112GLFC	Gulf Coast Aquifer
15	AQUIFER ID1	15	Gulf Coast Aquifer
16	AQUIFER ID2		
17	AQUIFER ID3		
18	ELEVATION	150	feet
19	ELEVATION MEASUREMENT METHOD	M	Interpolated From Topo Map
20	ALPHA CODE		
21	DATE DRILLED		
22	WELL TYPE	W	Withdrawal of Water

No.	FIELD	VALUE	EXPLANATION
23	WELL DEPTH	50	feet
24	SOURCE OF DEPTH	M	Memory of Owner
25	TYPE OF LIFT	S	Submersible Pump
26	TYPE OF POWER	E	Electric Motor
27	HORSEPOWER		
28	PRIMARY WATER USE	H	Domestic
29	SECONDARY WATER USE		
30	TERTIARY WATER USE		
31	WATER LEVEL AVAILABLE	N	
32	WATER QUALITY AVAILABLE	N	
33	WELL LOGS AVAILABLE		
34	OTHER DATA AVAILABLE		
35	DATE COLLECTED OR UPDATED	12071976	
36	REPORTING AGENCY	01	TWDB or Predecessor Agency
37	WELL SCHEDULE IN FILE		
38	CONTRUCTION METHOD		
39	COMPLETION		
40	CASING MATERIAL		
41	SCREEN MATERIAL		
42	GMA	14	
43	RWPA	H	
44	DISTRICTID	200114HG	

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616806

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NO REPORTED INFREQUENT CONSTITUENT DATA ON 6616806

No.	STATE WELL NUMBER	MONTH	DAY	YEAR	SAMPLE NUMBER	STORET CODE	VALUE	PLUS MINUS

NO REPORTED WATER LEVEL DATA ON 6616806

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK

NO REPORTED USGS 5 DAY WATER LEVEL DATA ON 6616806

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK

NO REPORTED WELL CASING DATA ON 6616806

No.	STATE WELL NUMBER	CASING/SCREEN/OPEN HOLE INDICATOR	DIAMETER OF CASING OR SCREEN	TOP DEPTH	BOTTOM DEPTH

NO REPORTED REMARKS DATA ON 6616806

No.	STATE WELL NUMBER	REMARKS 1	REMARKS 2

NO REPORTED WATER QUALITY DATA ON 6616806 (Column 1 - 19)

No.	STATE WELL NUMBER	MONTH	DAY/Year	YEAR	SAMPLE NUMBER	SAMPLE TIME	TEMPERATURE CELSIUS	TOP OF SAMPLED INTERVAL	BOTTOM OF SAMPLED INTERVAL	SAMPLED INTERVAL AQUIFER CODE	COLLECTION REMARKS	RELIABILITY REMARK	COLLECTING AGENCY	LAB CODE	BALANCED / UNBALANCED	SILICA MG/L	CALCIUM MG/L	MAGNESIUM MG/L

NO REPORTED WATER QUALITY DATA ON 6616806 (Column 20 - 39)

No.	STATE WELL NUMBER	SODIUM MG/L	POTASSIUM MG/L	STRONTIUM MG/L	CARBONATE MG/L	BICARBONATE MG/L	SULFATE MG/L	CHLORIDE MG/L	FLUORIDE MG/L	NITRATE MG/L	PH	TDS MG/L	PHENOLPHTHALEIN ALKALINITY	TOTAL ALKALINITY	TOTAL HARDNESS	PERECNT SODIUM	SAR	RSC	SPECIFIC CONDUCTANCE

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TWDB Groundwater Database Result

STATE WELL NUMBER : 6616806

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Explanation of Groundwater Data

TEXAS WATER DEVELOPMENT BOARD

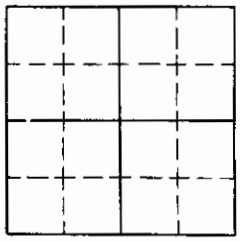
WELL SCHEDULE

Work No. 6102
Project CI-7705

Aquifer Evangeline Field No. 7 State Well No. 66-16-806

Owner's Well No. County Austin

1. Location: 1/4, 1/4 Sec., Block, On the south side of I10, 0.3 mile west of the intersection of Mcoak Rd and the south frontage road



2. Owner: Frank Tuccera Address:

Tenant: Address:

Driller: owner & brother-in-law Address:

3. Elevation of land surface @ well is 150+ ft. above msl, determined by topo map

4. Drilled: (reworked) 19__; Dug, Cable Tool, Rotary,

5. Depth: Rept. 50 ft. Meas. ft.

6. Completion: Open Hole, (Straight Wall) Underreamed, Gravel Packed

7. Pump: Mfgr. Type Submersible

No. Stages, Bowls Diam. in., Setting ft.

Column Diam. in., Length Tailpipe ft.

8. Motor: Fuel electric Make & Model HP.

9. Yield: Flow gpm, Pump gpm, Meas., Rept., Est.

10. Performance Test: Date Length of Test Made by

Static Level ft. Pumping Level ft. Drawdown ft.

Production gpm Specific Capacity gpm/ft.

CASING & BLANK PIPE
Cemented From ft. to ft.

Diam. (in.)	Type	Setting, ft. from	to
— —	— —	— —	— —

11. Water Level: UTM ft. rept. meas. 12-7 1976 above/below which is ft. above/below surface.

ft. rept. meas. 19 above/below which is ft. above/below surface.

ft. rept. meas. 19 above/below which is ft. above/below surface.

ft. rept. meas. 19 above/below which is ft. above/below surface.

12. Use: (Dom.) Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used,

13. Quality: (Remarks on taste, odor, color, etc.)

Temp. °F, Date sampled for analysis Laboratory

Temp. °F, Date sampled for analysis Laboratory

Temp. °F, Date sampled for analysis Laboratory

WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	to
— —	——	— —	— —

14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log, Formation Samples, Pumping Test,

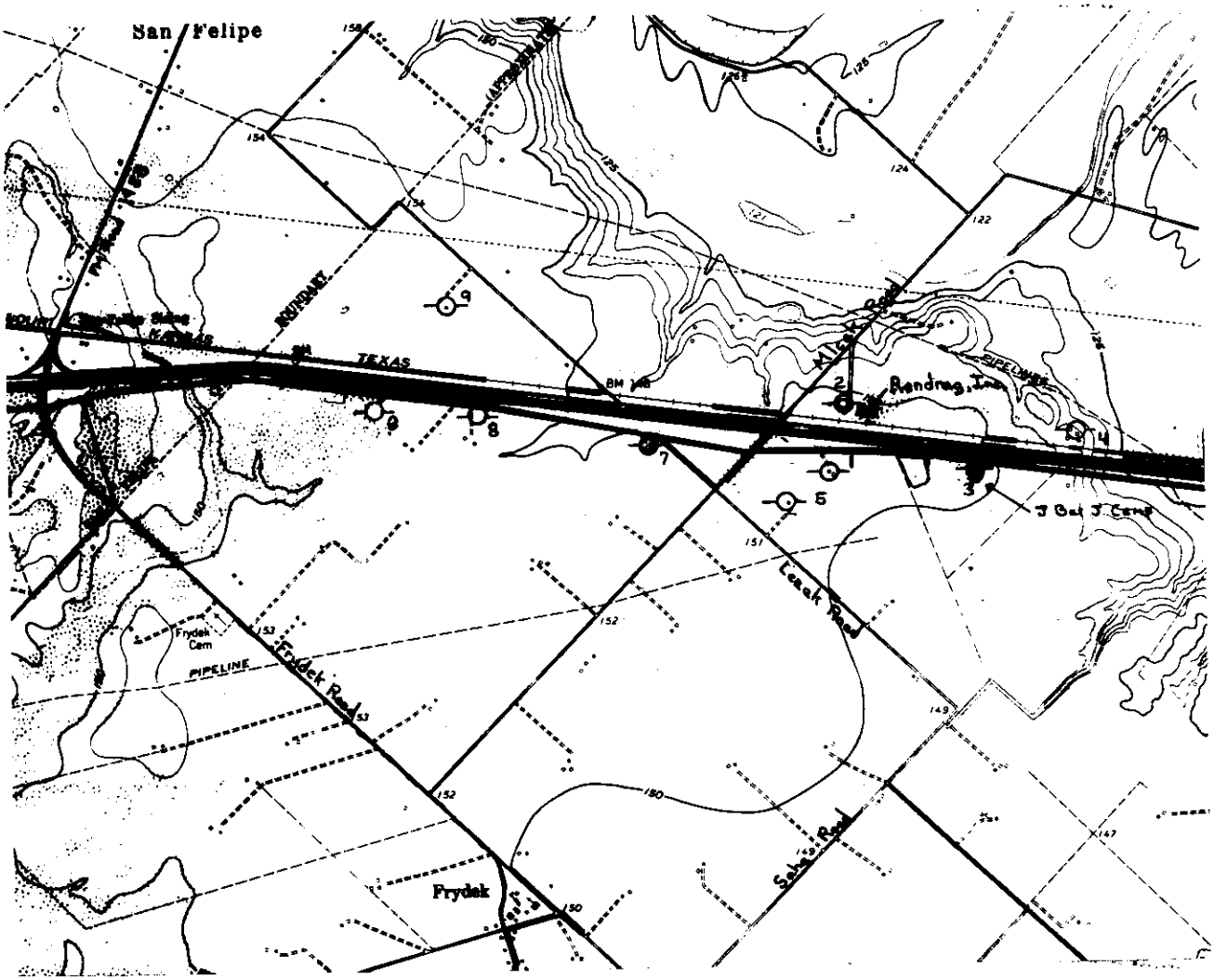
15. Record by: R.F. Gino Date 12-7 1976

Source of Data owner

16. Remarks:

TWDBE-WD-2

(Sketch)


San Felipe
TEXAS
Rendrag, Inc.
Frydek Cem
PIPELINE
Frydek Road
Frydek
Leask Road
Schulz Road

Texas Water Development Board

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616807

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REPORTED WATER WELL DATA ON 6616807

No.	FIELD	VALUE	EXPLANATION
1	STATE WELL NUMBER	6616807	
2	COUNTY CODE	15	Austin County, Texas
3	BASIN	12	Brazos River Basin
4	PREVIOUS WELL NUMBER		
5	LATITUDE	294628	DMS (in decimal degrees: 29.774443)
6	LAT DEC	29.7744430	
7	LONGITUDE	960422	DMS (in decimal degrees: -96.072777)
8	LONG DEC	-96.0727770	
9	OWNER 1	Rendrag, Inc.	
10	OWNER 2		
11	DRILLER 1	George Johnson	
12	DRILLER 2		
13	SOURCE OF COORDINATES	1	
14	AQUIFER CODE	121EVGL	Evangeline Aquifer
15	AQUIFER ID1	15	Gulf Coast Aquifer
16	AQUIFER ID2		
17	AQUIFER ID3		
18	ELEVATION	150	feet
19	ELEVATION MEASUREMENT METHOD	M	Interpolated From Topo Map
20	ALPHA CODE		
21	DATE DRILLED	06001973	
22	WELL TYPE	W	Withdrawal of Water

No.	FIELD	VALUE	EXPLANATION
23	WELL DEPTH	248	feet
24	SOURCE OF DEPTH	D	Driller's Log
25	TYPE OF LIFT	S	Submersible Pump
26	TYPE OF POWER	E	Electric Motor
27	HORSEPOWER	5.0	
28	PRIMARY WATER USE	N	Industrial
29	SECONDARY WATER USE		
30	TERTIARY WATER USE		
31	WATER LEVEL AVAILABLE	M	
32	WATER QUALITY AVAILABLE	Y	
33	WELL LOGS AVAILABLE	D	
34	OTHER DATA AVAILABLE		
35	DATE COLLECTED OR UPDATED	12061976	
36	REPORTING AGENCY	01	TWDB or Predecessor Agency
37	WELL SCHEDULE IN FILE		
38	CONTRUCTION METHOD	H	Hydraulic Rotary
39	COMPLETION	S	Screen
40	CASING MATERIAL	S	Steel
41	SCREEN MATERIAL	R	Stainless Steel
42	GMA	14	
43	RWPA	H	
44	DISTRICTID	200114HG	

Texas Water Development Board

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616807

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NO REPORTED INFREQUENT CONSTITUENT DATA ON 6616807

No.	STATE WELL NUMBER	MONTH	DAY	YEAR	SAMPLE NUMBER	STORET CODE	VALUE	PLUS MINUS

REPORTED WATER LEVEL DATA ON 6616807

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK
1	6616807	P	-54.00	6	15	1973	01	07	7	
2	6616807	N		12	6	1976	01	01		42

NO REPORTED USGS 5 DAY WATER LEVEL DATA ON 6616807

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK

REPORTED WELL CASING DATA ON 6616807

No.	STATE WELL NUMBER	CASING/SCREEN/OPEN HOLE INDICATOR	DIAMETER OF CASING OR SCREEN	TOP DEPTH	BOTTOM DEPTH
1	6616807	C - Casing	4	0	228
2	6616807	S - Screen (including all types of screens or other devices allowing water to enter the well)	4	228	248

NO REPORTED REMARKS DATA ON 6616807

No.	STATE WELL NUMBER	REMARKS 1	REMARKS 2

REPORTED WATER QUALITY DATA ON 6616807 (Column 1 - 19)

No.	STATE WELL NUMBER	MONTH	DAY/Year	YEAR	SAMPLE NUMBER	SAMPLE TIME	TEMPERATURE CELSIUS	TOP OF SAMPLED INTERVAL	BOTTOM OF SAMPLED INTERVAL	SAMPLED INTERVAL AQUIFER CODE	COLLECTION REMARKS	RELIABILITY REMARK	COLLECTING AGENCY	LAB CODE	BALANCED / UNBALANCED	SILICA MG/L	CALCIUM MG/L	MAGNESIUM MG/L
1	**6616807**	12	6	1976	1							03	01	01	B	27.00	43.00	2.30

REPORTED WATER QUALITY DATA ON 6616807 (Column 20 - 39)

No.	STATE WELL NUMBER	SODIUM MG/L	POTASSIUM MG/L	STRONTIUM MG/L	CARBONATE MG/L	BICARBONATE MG/L	SULFATE MG/L	CHLORIDE MG/L	FLUORIDE MG/L	NITRATE MG/L	PH	TDS MG/L	PHENOLPHTHALEIN ALKALINITY	TOTAL ALKALINITY	TOTAL HARDNESS	PERECNT SODIUM	SAR	RSC	SPECIFIC CONDUCTANCE
1	**6616807**	16.00			0.00	134.24	3.85	26.00	0.20	2.70	7.90	187	0.00	110.00	116	22	0.64	0.00	312

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616807

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PLEASE NOTE that users of these data are responsible for checking the accuracy, completeness, currency, or suitability of all information themselves. TWDB makes no gurantees or warrabties as to the accuracy, completeness, currency, or suitability of the information provided via the GroundWater Database (GWDB). TWDB specificially disclaims any and all liability for any claims or damages that may result from providing GWDB data or the information it contains.

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Explanation of Groundwater Data

EXAS WATER DEVELOPMENT BOAR

WELL SCHEDULE

Work No. 6102
Project CI-7705

Aquifer Evangeline Field No. 2 State Well No. 66-16-807
Owner's Well No. County Austin

1. Location: 1/4, 1/4 Sec., Block, On the north side of I10, 0.4 mile east of the intersection of I10 and Mlcak Rd. Also, 2.1 miles west of Brazos River bridge
2. Owner* Redrag, Inc. Address: P.O. Box 359 Sealy 77474
   Tenant: Address:
   Driller: George T. Johnsen Address: Box 675 Belville, Texas
3. Elevation of land surface @ well is 150+ ft. above msl, determined by topo map
4. Drilled: June 1973; Dug, Cable Tool, (Rotary)
5. Depth: Rept. 248 ft. Meas. ft.
6. Completion: Open Hole, (Straight Wall), Underreamed, Gravel Packed
7. Pump: Mfgr. Type submersible
   No. Stages, Bowls Diam. in., Setting 172 ft.
   Column Diam. in., Length Tailpipe ft.
8. Motor: Fuel electric Make & Model HP. 5 3 phase
9. Yield: Flow gpm, Pump 70 gpm, Meas., Rept., Est.
10. Performance Test: Date Length of Test Made by
    Static Level ft. Pumping Level ft. Drawdown ft.
    Production gpm Specific Capacity gpm/ft.

CASING & BLANK PIPE
Cemented From ft. to ft.

Diam. (in.)	Type	Setting, ft. from	to
4	Steel	0	228

11. Water Level: 54 ft. (rept) meas. June 1973 (above) below land surface which is 0 ft. above below surface.
    UTM ft. rept. meas. 12-6 1976 above below which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
12. Use: Dom., Stock, (Public) Supply, (Ind.), Irr., Waterflooding, Observation, Not Used,
13. Quality: (Remarks on taste, odor, color, etc.)
    Temp. °F, Date sampled for analysis 12-6-76 Laboratory TDHR
    Temp. °F, Date sampled for analysis Laboratory
    Temp. °F, Date sampled for analysis Laboratory
14. Other data available as circled: (Driller's Log), Radioactivity Log, Electric Log, Formation Samples, Pumping Test,
15. Record by: R.F. Gibbs Date 12-6 1976
    Source of Data observation & driller's log
16. Remarks:
    * J.L. Harris, president

WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	to
4	Stainless steel	228	248

Log:
0-5' black loam
5-16' clay
16-24' gravel
24-109' clay
109-114' sand
114-208' clay
208-216' sand & rock
216-225' clay
225-248' sand

TWDBE-WD-2 (Sketch)

Y

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Resources Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDBE ONLY
Program No. 401-6102-50
Work No. CI-7705

CHEMICAL WATER ANALYSIS REPORT

Send report to:
Ground Water Division
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

A.Y PUNCHED

County 008 Austin
State Well No. 66-16-607
Field Well No. 2
Date Collected 12-06-76

Location On the north side of I 10, 0.4 mile east of the int of I10 & Mcalk Rd. Also, 2.1 miles west of the Brazos River bridge. Sample No. 1 By R.F. Ginn
Source (type of well) Sub., electric Owner Rendrag, Inc.
Date Drilled June 1973 Depth 248 ft. WBF Evangeline aquifer
Producing intervals 228-248 ft. Water level 6-73 54 ft. Sample depth ft.
Sampled after pumping 5 min Yield GPM meas. est. Temperature °F °C
Point of collection faucet in front of office Appearance ☒ clear ☐ turbid ☐ colored ☐ other
Use public Remarks

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

Laboratory No. 326160
Date Received DEC 6 1976
Date Reported DEC 14, 1976

	MG/L	ME/L
Silica	27	
Calcium	43	2.14
Magnesium	2	0.19
Sodium	16	0.70
Total		3.03
☐ Potassium		
☐ Manganese		
☐ Boron		
3/ ☐ Total Iron		
☐ (other)	MG/L	

%Na
SAR
RSC

Specific Conductance (micromhos/cm³) 301
Diluted Conductance (micromhos/cm³) 2 x 156 = 312

	MG/L	ME/L
Carbonate	0	0
Bicarbonate (66)	134	2.20
Sulfate	4	0.08
Chloride	26	0.72
Fluoride	0.2	—
Nitrate	2.7	—
pH	7.9	
Total		3.00
1/ Dissolved Solids (sum in MG/L)		187
Phenolphthalein Alkalinity as C aCO₃		0
Total Alkalinity as C aCO₃ (2.20)		110
Total Hardness as C aCO₃ (2,33)		117
2/ Nitrogen Cycle		
Ammonia - N		
Nitrite - N		
Nitrate - N		
Organic Nitrogen		

" ☐ " items will be analyzed if checked.

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.
2/ Nitrogen cycle requires separate sample.
3/ Total Iron requires separate sample.

Analyst _____ Checked By _____

TWDBE-WD-1 (Rev. 8-30-76)

Send original copy by certified mail to the Texas Water Development Board
P. O. Box 13087
Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No. 66-16-84
Located on map
Received:

REndrag

1) OWNER:
Person having well drilled REND DRAG (Name) Address (Street or RFD) Houston (City) TEX. (State)

Landowner SAME (Name) Address (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County AUSTIN, 8 1/2 miles in NE (N.E., S.W., etc.) direction from SEALY (Town)

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.*

IH 10
SEALY
North
(Use reverse side if necessary)

or Give legal location with distances and directions from adjacent sections or survey lines.

Labor League
Block Survey
Abstract No.
(NW¼ NE¼ SW¼ SE¼) of Section

3) TYPE OF WORK (Check):
(New Well) Deepening
Reconditioning Plugging

4) PROPOSED USE (Check):
(Domestic) (Industrial) Municipal
Irrigation Test Well Other

5) TYPE OF WELL (Check):
(Rotary) Driven Dug
Cable Jetted Bored

6) WELL LOG:
Diameter of hole 6 1/2 in. Depth drilled 248 ft. Depth of completed well 248 ft. Date drilled JUNE 13

All measurements made from ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	5	Black Loam
5	16	Clay
16	24	sand gravel
24	109	clay
109	114	sand
114	208	Clay
208	216	sand + rock
216	225	Clay
225	248	sand

(Use reverse side if necessary)

9) Casing:
Type: Old (New) (Steel) Plastic Other
Cemented from ft. to ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage
4" I.D.	0	228	Sch. 40

10) SCREEN:
Type Stainless Steel Key
Perforated Slotted

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot Size
4"	228	248	.018

7) COMPLETION (Check):
(Straight wall) Gravel packed Other
Under reamed Open Hole

8) WATER LEVEL:
Static level 54 ft. below land surface Date JUNE 13
Artesian pressure lbs. per square inch Date
Depth to pump bowls, cylinder, jet, etc., 192 ft.
below land surface. 5 H.P. high CAPACITY 3 PHASE SUBMERSIBLE

11) WELL TESTS:
Was a pump test made? Yes (No) If yes, by whom?
Yield: 10 gpm with 0 ft. drawdown after 24 hrs.
Bailer test gpm with ft. drawdown after hrs.
Artesian flow gpm
Temperature of water

12) WATER QUALITY:
Was a chemical analysis made? Yes (No)
Did any strata contain undesirable water? Yes (No)
Type of water? depth of strata

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME GEO. T. JOHNSON (Type or Print) Water Well Drillers Registration No. 121

ADDRESS BOX 615 (Street or RFD) BELLVILLE (City) TEXAS (State)

(Signed) Geo. T. Johnson (Water Well Driller) J & S WELL SERVICE (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available. AP66-16-807

*Additional instructions on reverse side.

TWDBE-WD-8

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616808

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REPORTED WATER WELL DATA ON 6616808

No.	FIELD	VALUE	EXPLANATION
1	STATE WELL NUMBER	6616808	
2	COUNTY CODE	15	Austin County, Texas
3	BASIN	12	Brazos River Basin
4	PREVIOUS WELL NUMBER		
5	LATITUDE	294619	DMS (in decimal degrees: 29.771943)
6	LAT DEC	29.7719430	
7	LONGITUDE	960423	DMS (in decimal degrees: -96.073054)
8	LONG DEC	-96.0730540	
9	OWNER 1	Steve Sliva	
10	OWNER 2		
11	DRILLER 1	Wendt Well Service	
12	DRILLER 2		
13	SOURCE OF COORDINATES	1	
14	AQUIFER CODE	121EVGL	Evangeline Aquifer
15	AQUIFER ID1	15	Gulf Coast Aquifer
16	AQUIFER ID2		
17	AQUIFER ID3		
18	ELEVATION	150	feet
19	ELEVATION MEASUREMENT METHOD	M	Interpolated From Topo Map
20	ALPHA CODE		
21	DATE DRILLED	06161976	
22	WELL TYPE	W	Withdrawal of Water

No.	FIELD	VALUE	EXPLANATION
23	WELL DEPTH	78	feet
24	SOURCE OF DEPTH	D	Driller's Log
25	TYPE OF LIFT	S	Submersible Pump
26	TYPE OF POWER	E	Electric Motor
27	HORSEPOWER		
28	PRIMARY WATER USE	H	Domestic
29	SECONDARY WATER USE		
30	TERTIARY WATER USE		
31	WATER LEVEL AVAILABLE	M	
32	WATER QUALITY AVAILABLE	Y	
33	WELL LOGS AVAILABLE	D	
34	OTHER DATA AVAILABLE		
35	DATE COLLECTED OR UPDATED	12061976	
36	REPORTING AGENCY	01	TWDB or Predecessor Agency
37	WELL SCHEDULE IN FILE		
38	CONTRUCTION METHOD	H	Hydraulic Rotary
39	COMPLETION	S	Screen
40	CASING MATERIAL	P	PVC, Fiberglass, other Plastic
41	SCREEN MATERIAL	P	PVC, Fiberglass, other Plastic
42	GMA	14	
43	RWPA	H	
44	DISTRICTID	200114HG	

Texas Water Development Board

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616808

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NO REPORTED INFREQUENT CONSTITUENT DATA ON 6616808

No.	STATE WELL NUMBER	MONTH	DAY	YEAR	SAMPLE NUMBER	STORET CODE	VALUE	PLUS MINUS

REPORTED WATER LEVEL DATA ON 6616808

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK
1	6616808	P	-46.00	6	16	1976	01	07	7	
2	6616808	N		12	6	1976	01	01		42

NO REPORTED USGS 5 DAY WATER LEVEL DATA ON 6616808

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK

REPORTED WELL CASING DATA ON 6616808

No.	STATE WELL NUMBER	CASING/SCREEN/OPEN HOLE INDICATOR	DIAMETER OF CASING OR SCREEN	TOP DEPTH	BOTTOM DEPTH
1	6616808	C - Casing	4	0	70
2	6616808	S - Screen (including all types of screens or other devices allowing water to enter the well)	4	70	78

NO REPORTED REMARKS DATA ON 6616808

No.	STATE WELL NUMBER	REMARKS 1	REMARKS 2

REPORTED WATER QUALITY DATA ON 6616808 (Column 1 - 19)

No.	STATE WELL NUMBER	MONTH	DAY/Year	YEAR	SAMPLE NUMBER	SAMPLE TIME	TEMPERATURE CELSIUS	TOP OF SAMPLED INTERVAL	BOTTOM OF SAMPLED INTERVAL	SAMPLED INTERVAL AQUIFER CODE	COLLECTION REMARKS	RELIABILITY REMARK	COLLECTING AGENCY	LAB CODE	BALANCED / UNBALANCED	SILICA MG/L	CALCIUM MG/L	MAGNESIUM MG/L
1	**6616808**	12	6	1976	1							03	01	01	B	23.00	124.00	14.00

REPORTED WATER QUALITY DATA ON 6616808 (Column 20 - 39)

No.	STATE WELL NUMBER	SODIUM MG/L	POTASSIUM MG/L	STRONTIUM MG/L	CARBONATE MG/L	BICARBONATE MG/L	SULFATE MG/L	CHLORIDE MG/L	FLUORIDE MG/L	NITRATE MG/L	PH	TDS MG/L	PHENOLPHTHALEIN ALKALINITY	TOTAL ALKALINITY	TOTAL HARDNESS	PERECNT SODIUM	SAR	RSC	SPECIFIC CONDUCTANCE
1	**6616808**	20.00			0.00	397.83	22.00	36.00	0.20	12.00	7.30	446	0.00	326.00	366	10	0.45	0.00	816

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616808

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PLEASE NOTE that users of these data are responsible for checking the accuracy, completeness, currency, or suitability of all information themselves. TWDB makes no gurantees or warrabties as to the accuracy, completeness, currency, or suitability of the information provided via the GroundWater Database (GWDB). TWDB specificially disclaims any and all liability for any claims or damages that may result from providing GWDB data or the information it contains.

For additional information or answers to questions concerning the TWDB GWDB contact David Thorkildsen at (512) 936-0871 or Bryan Anderson at (512) 475-3302.

You can download Groundwater Database Reports in ASCII text files from this link. The files are organized by Texas counties.

Explanation of Groundwater Data

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Work No. C102
Project CI-7705

Aquifer Evangeline | Field No. 1 | State Well No. temp 66-16-807 66-16-808 | Owner's Well No. | County Austin

1. Location: 1/4, 1/4 Sec., Block, Survey On the south side of I 10, 0.3 mile east of the intersection of I 10 and Mlcak Rd. Also 2.2 miles west of Brazos River
2. Owner: Steve Sliva Address: Rt 3 Box 52 Sealy 77474
   Tenant: Address:
   Driller: Kenneth Wendt Address: Rt 1 Cat Spring, Texas 78933
3. Elevation of land surface @ well is 150+ ft. above msl, determined by topo map
4. Drilled: 6-16 1976; Dug, Cable Tool, (Rotary)
5. Depth: Rept. 78 ft. Meas. ft.
6. Completion: Open Hole, (Straight Wall) Underreamed, Gravel Packed
7. Pump: Mfgr. Type submersible
   No. Stages, Bowls Diam. in., Setting 70 ft.
   Column Diam. in., Length Tailpipe ft.
8. Motor: Fuel electric Make & Model HP.
9. Yield: Flow gpm, Pump gpm, Meas., Rept., Est.
10. Performance Test: Date Length of Test Made by
    Static Level ft. Pumping Level ft. Drawdown ft.
    Production gpm Specific Capacity gpm/ft.
11. Water Level: 46 ft. (rept) meas. 6-16 1976 (above) below land surface which is 0 ft. above below surface.
    VTM ft. rept. meas. 12-6 1976 above (below) which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
12. Use: (Dom), Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used,
13. Quality: (Remarks on taste, odor, color, etc.)
    Temp. °F, Date sampled for analysis 12-6-76 Laboratory TDHR
    Temp. °F, Date sampled for analysis Laboratory
    Temp. °F, Date sampled for analysis Laboratory
14. Other data available as circled: (Driller's Log) Radioactivity Log, Electric Log, Formation Samples, Pumping Test,
15. Record by: R.F. Gibbs Date 12-6 1976
    Source of Data observation and driller's log
16. Remarks:

Log:
0-48 feet red clay
48-78 feet sand & gravel

CASING & BLANK PIPE
Cemented From ft. to ft.

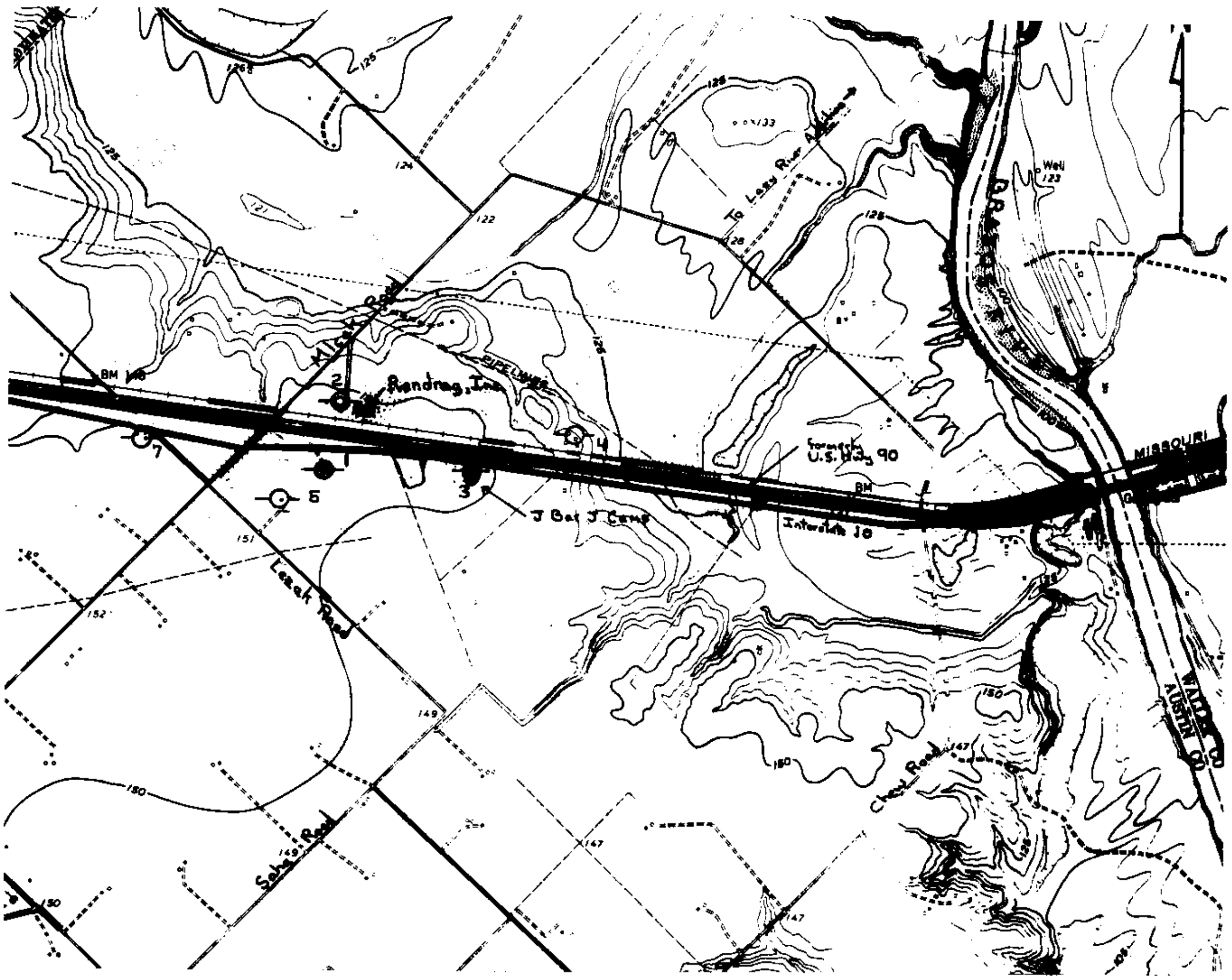
Diam. (in.)	Type	Setting, ft. from	to
4	plastic	0	70

WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	to
4	plastic	70	78

TWDBE-WD-2

(Sketch)



Rendrag, Inc.
PIPELINES
J Bar J Camp
Interstate 10
Leeah Road
MISSOURI
AUSTIN CO

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Resources Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDBE ONLY
Program No. 401-6102-50
Work No. CI-7705

CHEMICAL WATER ANALYSIS REPORT

Send report to:
Ground Water Division
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

KEY PUNCHED

County 008 Austin
State Well No. 66-16-808
Field Well No. 1
Date Collected 12-06-76

Location On the south side of I10, 0.3 mile east of the int. of I10 and Mcalb Rd. Also, 2.2 miles west of the Brazos River bridge Sample No. 1 By R. F. Gaino
Source (type of well) sand, gravel Owner Steve Sliva
Date Drilled 6-16-76 Depth 78 ft. WBF Evangeline aquifer
Producing intervals 70-78 ft Water level 46ft 6/16/76 ft. Sample depth ft.
Sampled after pumping 10 min hrs. Yield GPM meas. est. Temperature °F °C
Point of collection faucet in laundry room Appearance ☑ clear ☐ turbid ☐ colored ☐ other
Use domestic Remarks

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

Laboratory No. 26156

Date Received DEC 8 1976

Date Reported DEC 14 1976

	MG/L	ME/L
Silica	23	
Calcium	124	6.20
Magnesium	14	1.12
Sodium	20	0.88
Total		8.20
☐ Potassium		
☐ Manganese		
☐ Boron		
3/☐ Total Iron		
☐ (other)		MG/L

%Na
SAR
RSC

	MG/L	ME/L
Carbonate	0	0
Bicarbonate	196 / 398	6.52
Sulfate	22	0.45
Chloride	36	1.01
Fluoride	0.2	—
Nitrate	12.0	0.19
pH	7.3	Total 8.17

Specific Conductance (micromhos/cm³)	729
Diluted Conductance (micromhos/cm³)	6 x 136 = 816
1/ Dissolved Solids (sum in MG/L)	447
Phenolphthalein Alkalinity as C aCO₃	0
Total Alkalinity as C aCO₃	(6.52) 326
Total Hardness as C aCO₃	(7.32) 366

2/ Nitrogen Cycle

	ME/L
Ammonia - N	
Nitrite - N	
Nitrate - N	
Organic Nitrogen	

"☐" items will be analyzed if checked.

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.
2/ Nitrogen cycle requires separate sample.
3/ Total Iron requires separate sample.

Analyst _____ Checked By _____

TWDBE-WD-1 (Rev. 8-30-76)

Send original copy by certified mail to the Texas Water Development Board
P. O. Box 13087
Austin, Texas 78711

State of Texas

WATER WELL REPORT

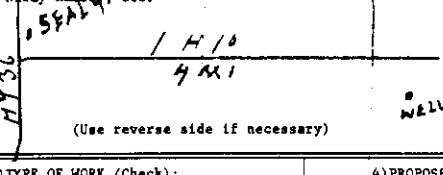
For TWDB use only
Well No. 66-16-8
Located on map
Received:

1) OWNER:
Person having well drilled Steve Sliva (Name) Address Rt. 3, Box 52 (Street or RFD) Sealy (City) Texas (State)

Landowner Steve Sliva (Name) Address Rt. 3, Box 52 (Street or RFD) Sealy (City) Texas (State)

2) LOCATION OF WELL:
County Austin, 4 miles in East (N.E., S.W., etc.) direction from Sealy (Town), Texas

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.*



(Use reverse side if necessary)

or Give legal location with distances and directions from adjacent sections or survey lines.

Labor _____ League _____
Block _____ Survey Stephen F. Austin
Abstract No. 7
(NW¼ NE¼ SW¼ SE¼) of Section _____

3) TYPE OF WORK (Check): New Well X, Deepening, Reconditioning, Plugging

4) PROPOSED USE (Check): Domestic X, Industrial, Municipal, Irrigation, Test Well, Other

5) TYPE OF WELL (Check): Rotary X, Driven, Dug, Cable, Jetted, Bored

6) WELL LOG:
Diameter of hole 5 1/2 in. Depth drilled 78 ft. Depth of completed well 78 ft. Date drilled 6-16-76
All measurements made from 1 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	48	Red Clay
48	78	Sand & Gravel

(Use reverse side if necessary)

9) Casing:
Type: Old, New X, Steel, Plastic X, Other
Cemented from _____ ft. to _____ ft.

Diameter (inches)	Setting From (ft.)	To (ft.)	Gage
4	0	70	Sch. 40

10) SCREEN:
Type Plastic Under Bar
Perforated, Slotted

Diameter (inches)	Setting From (ft.)	To (ft.)	Slot Size
4	70	78	.016

7) COMPLETION (Check):
Straight wall X, Gravel packed, Other, Under reamed, Open Hole

8) WATER LEVEL:
Static level 46 ft. below land surface Date 6-16-76
Artesian pressure _____ lbs. per square inch Date _____
Depth to pump bowls, cylinder, jet, etc., 70 ft. below land surface.

11) WELL TESTS:
Was a pump test made? Yes, No X If yes, by whom?
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.
Bailer test _____ gpm with _____ ft. drawdown after _____ hrs.
Artesian flow _____ gpm
Temperature of water _____

12) WATER QUALITY:
Was a chemical analysis made? Yes, No X
Did any strata contain undesirable water? Yes, No X
Type of water? _____ depth of strata 38'

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Kenneth Wendt (Type or Print) Water Well Drillers Registration No. 1138

ADDRESS Route 1 (Street or RFD) Cat Spring (City), Texas 78933 (State)

(Signed) Kenneth Wendt (Water Well Driller) Wendt Well Service (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available. AP66-16-808

*Additional instructions on reverse side.

TWDBE-WD-8

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616809

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REPORTED WATER WELL DATA ON 6616809

No.	FIELD	VALUE	EXPLANATION
1	STATE WELL NUMBER	6616809	
2	COUNTY CODE	15	Austin County, Texas
3	BASIN	12	Brazos River Basin
4	PREVIOUS WELL NUMBER		
5	LATITUDE	294619	DMS (in decimal degrees: 29.771943)
6	LAT DEC	29.7719430	
7	LONGITUDE	960420	DMS (in decimal degrees: -96.072221)
8	LONG DEC	-96.0722210	
9	OWNER 1	Frank Lezak	
10	OWNER 2		
11	DRILLER 1	Unknown	
12	DRILLER 2		
13	SOURCE OF COORDINATES	1	
14	AQUIFER CODE	121EVGL	Evangeline Aquifer
15	AQUIFER ID1	15	Gulf Coast Aquifer
16	AQUIFER ID2		
17	AQUIFER ID3		
18	ELEVATION	151	feet
19	ELEVATION MEASUREMENT METHOD	M	Interpolated From Topo Map
20	ALPHA CODE		
21	DATE DRILLED	00001964	
22	WELL TYPE	W	Withdrawal of Water

No.	FIELD	VALUE	EXPLANATION
23	WELL DEPTH	86	feet
24	SOURCE OF DEPTH	M	Memory of Owner
25	TYPE OF LIFT	S	Submersible Pump
26	TYPE OF POWER	E	Electric Motor
27	HORSEPOWER		
28	PRIMARY WATER USE	H	Domestic
29	SECONDARY WATER USE		
30	TERTIARY WATER USE		
31	WATER LEVEL AVAILABLE	M	
32	WATER QUALITY AVAILABLE	Y	
33	WELL LOGS AVAILABLE		
34	OTHER DATA AVAILABLE		
35	DATE COLLECTED OR UPDATED	12071976	
36	REPORTING AGENCY	01	TWDB or Predecessor Agency
37	WELL SCHEDULE IN FILE		
38	CONTRUCTION METHOD		
39	COMPLETION		
40	CASING MATERIAL	P	PVC, Fiberglass, other Plastic
41	SCREEN MATERIAL		
42	GMA	14	
43	RWPA	H	
44	DISTRICTID	200114HG	

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616809

Scanned Images

NO REPORTED INFREQUENT CONSTITUENT DATA ON 6616809

No.	STATE WELL NUMBER	MONTH	DAY	YEAR	SAMPLE NUMBER	STORET CODE	VALUE	PLUS MINUS

REPORTED WATER LEVEL DATA ON 6616809

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK
1	6616809	P	-35.00	0	0	1964	01	11	7	

NO REPORTED USGS 5 DAY WATER LEVEL DATA ON 6616809

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK

REPORTED WELL CASING DATA ON 6616809

No.	STATE WELL NUMBER	CASING/SCREEN/OPEN HOLE INDICATOR	DIAMETER OF CASING OR SCREEN	TOP DEPTH	BOTTOM DEPTH
1	6616809	C - Casing	4	0	86

NO REPORTED REMARKS DATA ON 6616809

No.	STATE WELL NUMBER	REMARKS 1	REMARKS 2

REPORTED WATER QUALITY DATA ON 6616809 (Column 1 - 19)

No.	STATE WELL NUMBER	MONTH	DAY/Year	YEAR	SAMPLE NUMBER	SAMPLE TIME	TEMPERATURE CELSIUS	TOP OF SAMPLED INTERVAL	BOTTOM OF SAMPLED INTERVAL	SAMPLED INTERVAL AQUIFER CODE	COLLECTION REMARKS	RELIABILITY REMARK	COLLECTING AGENCY	LAB CODE	BALANCED / UNBALANCED	SILICA MG/L	CALCIUM MG/L	MAGNESIUM MG/L
1	**6616809**	12	7	1976	1							03	01	01	B	22.00	104.00	16.00

REPORTED WATER QUALITY DATA ON 6616809 (Column 20 - 39)

No.	STATE WELL NUMBER	SODIUM MG/L	POTASSIUM MG/L	STRONTIUM MG/L	CARBONATE MG/L	BICARBONATE MG/L	SULFATE MG/L	CHLORIDE MG/L	FLUORIDE MG/L	NITRATE MG/L	PH	TDS MG/L	PHENOLPHTHALEIN ALKALINITY	TOTAL ALKALINITY	TOTAL HARDNESS	PERECNT SODIUM	SAR	RSC	SPECIFIC CONDUCTANCE
1	**6616809**	44.00			0.00	366.10	30.00	60.00	0.20	6.00	7.50	462	0.00	300.00	325	22	1.06	0.00	870

TWDB Groundwater Database Result

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Explanation of Groundwater Data

EXAS WATER DEVELOPMENT BOA.

WELL SCHEDULE

Work No 6102
Project No. CI-7705

Aquifer Evangeline Field No. 5 State Well No. 66-16-809

Owner's Well No. County Austin

1. Location: 1/4, 1/4 Sec., Block, 0.1 mile southwest on Mlgate Rd from its intersection with the I10 south frontage road, then 0.2 SE on Lezak Rd.
2. Owner: Frank Lezak Address:
   Tenant: Address:
   Driller: Kenneth Wendt Address: Rt1 Cat Spring, Texas 78933
3. Elevation of land surface @ well is ~151 ft. above msl, determined by topo map
4. Drilled: 1964; Dug, Cable Tool, Rotary,
5. Depth: Rept. 86 ft. Meas. ft.
6. Completion: Open Hole, (Straight Wall) Underreamed, Gravel Packed
7. Pump: Mfgr. Type Submersible
   No. Stages, Bowls Diam. in., Setting ft.
   Column Diam. in., Length Tailpipe ft.
8. Motor: Fuel electric Make & Model HP.
9. Yield: Flow gpm, Pump gpm, Meas., Rept., Est.
10. Performance Test: Date Length of Test Made by
    Static Level ft. Pumping Level ft. Drawdown ft.
    Production gpm Specific Capacity gpm/ft.
11. Water Level: 35 ft. rept. meas. 1964 above/below which is ft. above/below surface.
    UTM ft. rept. meas. 12-7 1976 above/below which is ft. above/below surface.
    ft. rept. meas. 19 above/below which is ft. above/below surface.
    ft. rept. meas. 19 above/below which is ft. above/below surface.
12. Use: (Dom.) Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used,
13. Quality: (Remarks on taste, odor, color, etc.)
    Temp. °F, Date sampled for analysis 12-7-76 Laboratory TDHR
    Temp. °F, Date sampled for analysis Laboratory
    Temp. °F, Date sampled for analysis Laboratory
14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log,
    Formation Samples, Pumping Test,
15. Record by: R.E. Gipp Date 12-7 1976
    Source of Data observation & owner
16. Remarks:

CASING & BLANK PIPE
Cemented From ft. to ft.

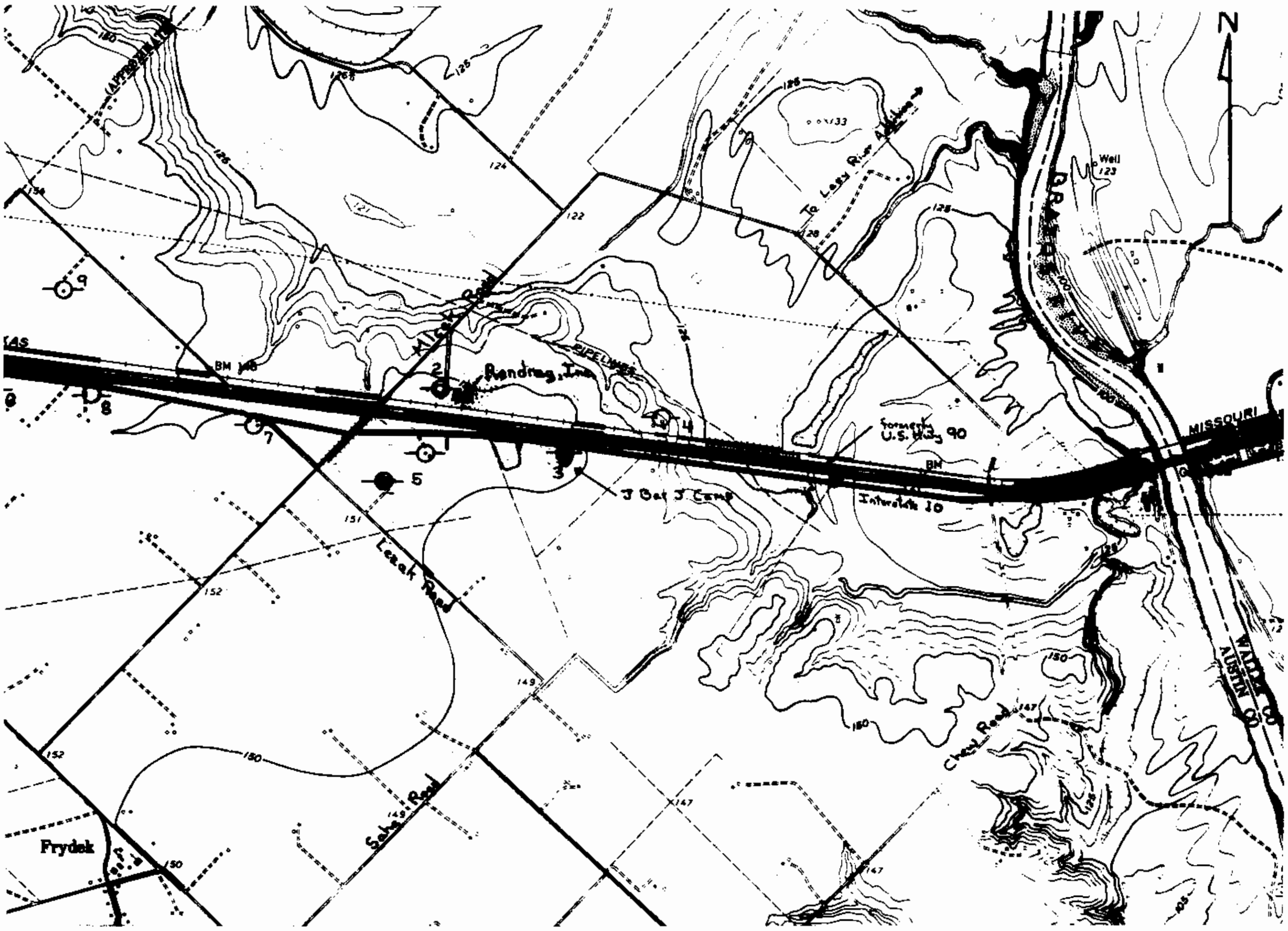
Diam. (in.)	Type	Setting, ft. from	to
4	plastic	0	86

WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	to
4	— —	— —	— —

TWDBE-WD-2

(Sketch)


N
Rendrag, Inc.
PIPELINE
formerly U.S. Hwy 90
Interstate 10
J Bar J Camp
Lezak Road
MISSOURI
AUSTIN CO
Well
123
Frydek
1
2
3
4
5
7
8
9

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(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Resources Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDBE ONLY
Program No. 401-6102-50
Work No. CI-7705

CHEMICAL WATER ANALYSIS REPORT

Send report to:
Ground Water Division
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

KEY PUNCHED

County 008 Austin
State Well No. 66-16-809
Field Well No. 5
Date Collected 12-07-76

Location 0.1 mile southwest of Mlcak Rd intersection with I-10 and then 0.2 mile southeast on Lemak Rd from Mlcak Rd. Sample No. 1 By R.F. Ginn
Source (type of well) sub; electric Owner Frank Lemak
Date Drilled 1964 Depth 86 ft. WBF Evangeline
Producing intervals ~~ Water level (1964) 35 ft. Sample depth ft.
Sampled after pumping 5 min. Yield GPM meas. est. Temperature °F °C
Point of collection faucet near well Appearance ☑ clear ☐ turbid ☐ colored ☐ other
Use domestic Remarks

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

Laboratory No. 328159
Date Received [illegible]
Date Reported DEC 14 1976

	MG/L	ME/L
Silica	22	
Calcium	104	5.20
Magnesium	16	1.30
Sodium	44	1.90
Total		8.40
☐ Potassium	.	
☐ Manganese	.	
☐ Boron	.	
3/ ☐ Total Iron	.	
☐ (other)	MG/L	

%Na
SAR
RSC

	MG/L	ME/L
Carbonate	0	0
Bicarbonate (180)	366	6.00
Sulfate	30	0.62
Chloride	60	1.68
Fluoride	0.2	[illegible]
Nitrate	6.0	0.10
pH	7.5	Total 8.40
1/ Dissolved Solids (sum in MG/L)		462
Phenolphthalein Alkalinity as C aCO3		0
Total Alkalinity as C aCO3 (6.00)		300
Total Hardness as C aCO3 (6.50)		325

Specific Conductance (micromhos/cm3) 766
Diluted Conductance (micromhos/cm3) 6 x 145 = 870

2/ Nitrogen Cycle

	ME/L
Ammonia - N	
Nitrite - N	
Nitrate - N	
Organic Nitrogen	

" ☐ " items will be analyzed if checked.

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.
2/ Nitrogen cycle requires separate sample.
3/ Total Iron requires separate sample.

TWDBE-WD-1 (Rev. 8-30-76)

Analyst Checked By

Texas Water Development Board

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616810

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REPORTED WATER WELL DATA ON 6616810

No.	FIELD	VALUE	EXPLANATION
1	STATE WELL NUMBER	6616810	
2	COUNTY CODE	15	Austin County, Texas
3	BASIN	12	Brazos River Basin
4	PREVIOUS WELL NUMBER		
5	LATITUDE	294618	DMS (in decimal degrees: 29.771666)
6	LAT DEC	29.7716660	
7	LONGITUDE	960410	DMS (in decimal degrees: -96.069443)
8	LONG DEC	-96.0694430	
9	OWNER 1	Johnny Wells	
10	OWNER 2		
11	DRILLER 1	Floyd Blakey	
12	DRILLER 2		
13	SOURCE OF COORDINATES	2	
14	AQUIFER CODE	121EVGL	Evangeline Aquifer
15	AQUIFER ID1	15	Gulf Coast Aquifer
16	AQUIFER ID2		
17	AQUIFER ID3		
18	ELEVATION	150	feet
19	ELEVATION MEASUREMENT METHOD	M	Interpolated From Topo Map
20	ALPHA CODE		
21	DATE DRILLED	07121969	
22	WELL TYPE	W	Withdrawal of Water

No.	FIELD	VALUE	EXPLANATION
23	WELL DEPTH	257	feet
24	SOURCE OF DEPTH	D	Driller's Log
25	TYPE OF LIFT	S	Submersible Pump
26	TYPE OF POWER	E	Electric Motor
27	HORSEPOWER		
28	PRIMARY WATER USE	H	Domestic
29	SECONDARY WATER USE	P	Public Supply
30	TERTIARY WATER USE		
31	WATER LEVEL AVAILABLE	M	
32	WATER QUALITY AVAILABLE	Y	
33	WELL LOGS AVAILABLE	D	
34	OTHER DATA AVAILABLE		
35	DATE COLLECTED OR UPDATED	12071976	
36	REPORTING AGENCY	01	TWDB or Predecessor Agency
37	WELL SCHEDULE IN FILE		
38	CONTRUCTION METHOD	H	Hydraulic Rotary
39	COMPLETION	S	Screen
40	CASING MATERIAL	S	Steel
41	SCREEN MATERIAL	S	Steel
42	GMA	14	
43	RWPA	H	
44	DISTRICTID	200114HG	

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616810

Scanned Images

NO REPORTED INFREQUENT CONSTITUENT DATA ON 6616810

No.	STATE WELL NUMBER	MONTH	DAY	YEAR	SAMPLE NUMBER	STORET CODE	VALUE	PLUS MINUS

REPORTED WATER LEVEL DATA ON 6616810

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK
1	6616810	P	-52.50	7	12	1969	01	07	7	

NO REPORTED USGS 5 DAY WATER LEVEL DATA ON 6616810

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK

REPORTED WELL CASING DATA ON 6616810

No.	STATE WELL NUMBER	CASING/SCREEN/OPEN HOLE INDICATOR	DIAMETER OF CASING OR SCREEN	TOP DEPTH	BOTTOM DEPTH
1	6616810	C - Casing	4	0	247
2	6616810	S - Screen (including all types of screens or other devices allowing water to enter the well)	4	247	257

NO REPORTED REMARKS DATA ON 6616810

No.	STATE WELL NUMBER	REMARKS 1	REMARKS 2

REPORTED WATER QUALITY DATA ON 6616810 (Column 1 - 19)

No.	STATE WELL NUMBER	MONTH	DAY/Year	YEAR	SAMPLE NUMBER	SAMPLE TIME	TEMPERATURE CELSIUS	TOP OF SAMPLED INTERVAL	BOTTOM OF SAMPLED INTERVAL	SAMPLED INTERVAL AQUIFER CODE	COLLECTION REMARKS	RELIABILITY REMARK	COLLECTING AGENCY	LAB CODE	BALANCED / UNBALANCED	SILICA MG/L	CALCIUM MG/L	MAGNESIUM MG/L
1	**6616810**	12	7	1976	1							03	01	01	B	28.00	54.00	2.70

REPORTED WATER QUALITY DATA ON 6616810 (Column 20 - 39)

No.	STATE WELL NUMBER	SODIUM MG/L	POTASSIUM MG/L	STRONTIUM MG/L	CARBONATE MG/L	BICARBONATE MG/L	SULFATE MG/L	CHLORIDE MG/L	FLUORIDE MG/L	NITRATE MG/L	PH	TDS MG/L	PHENOLPHTHALEIN ALKALINITY	TOTAL ALKALINITY	TOTAL HARDNESS	PERECNT SODIUM	SAR	RSC	SPECIFIC CONDUCTANCE
1	**6616810**	22.00			0.00	151.32	4.80	48.00	0.10	2.00	7.90	236	0.00	124.00	145	24	0.79	0.00	423

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616810

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PLEASE NOTE that users of these data are responsible for checking the accuracy, completeness, currency, or suitability of all information themselves. TWDB makes no gurantees or warrabties as to the accuracy, completeness, currency, or suitability of the information provided via the GroundWater Database (GWDB). TWDB specificially disclaims any and all liability for any claims or damages that may result from providing GWDB data or the information it contains.

For additional information or answers to questions concerning the TWDB GWDB contact David Thorkildsen at (512) 936-0871 or Bryan Anderson at (512) 475-3302.

You can download Groundwater Database Reports in ASCII text files from this link. The files are organized by Texas counties.

Explanation of Groundwater Data

EXAS WATER DEVELOPMENT BOA.

WELL SCHEDULE

Work No. 6102
Project CI-7705

Aquifer Evangeline Field No. 3 State Well No. 66-16-810
Owner's Well No. County Austin

1. Location: 1/4, 1/4 Sec., Block, Survey On the south side of I 10, 1.8 mi. west of the Brazos River bridge
2. Owner: Johnny Wells Address: RFD 1 Sealy, Texas 77474
   Tenant: Address:
   Driller: Floyd Blakey Address: Rt 3 Sealy 77474
3. Elevation of land surface @ well is 150' ft. above msl, determined by topo map
4. Drilled: July 12 1969; Dug, Cable Tool (Rotary)
5. Depth: Rept. 257 ft. Meas. ft.
6. Completion: Open Hole, (Straight Wall) Underreamed, Gravel Packed
7. Pump: Mfgr. Type Submersible
   No. Stages, Bowls Diam. in., Setting 105 ft.
   Column Diam. in., Length Tailpipe ft.
8. Motor: Fuel electric Make & Model HP.
9. Yield: Flow gpm, Pump 150 gpm, Meas., Rept., Est.
10. Performance Test: Date Length of Test Made by
    Static Level ft. Pumping Level ft. Drawdown ft.
    Production gpm Specific Capacity gpm/ft.
11. Water Level: 52.5 ft. (rept) meas. 7-12 1969 (above) below land surface which is 0 ft. above below surface.
    UTM ft. rept. meas. 12-7 1976 above (below) which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
12. Use: (Dom), Stock, (Public) Supply, Ind., Irr., Waterflooding, Observation, Not Used,
13. Quality: (Remarks on taste, odor, color, etc.)
    Temp. °F, Date sampled for analysis 12-7-76 Laboratory TDHR
    Temp. °F, Date sampled for analysis Laboratory
    Temp. °F, Date sampled for analysis Laboratory
14. Other data available as circled: (Driller's Log), Radioactivity Log, Electric Log, Formation Samples, Pumping Test,
15. Record by: R. F. Cain Date 12-7 1976
    Source of Data observation & driller's log
16. Remarks:

CASING & BLANK PIPE
Cemented From ft. to ft.

Diam. (in.)	Type	Setting, ft. from	to
4	Steel	0	247

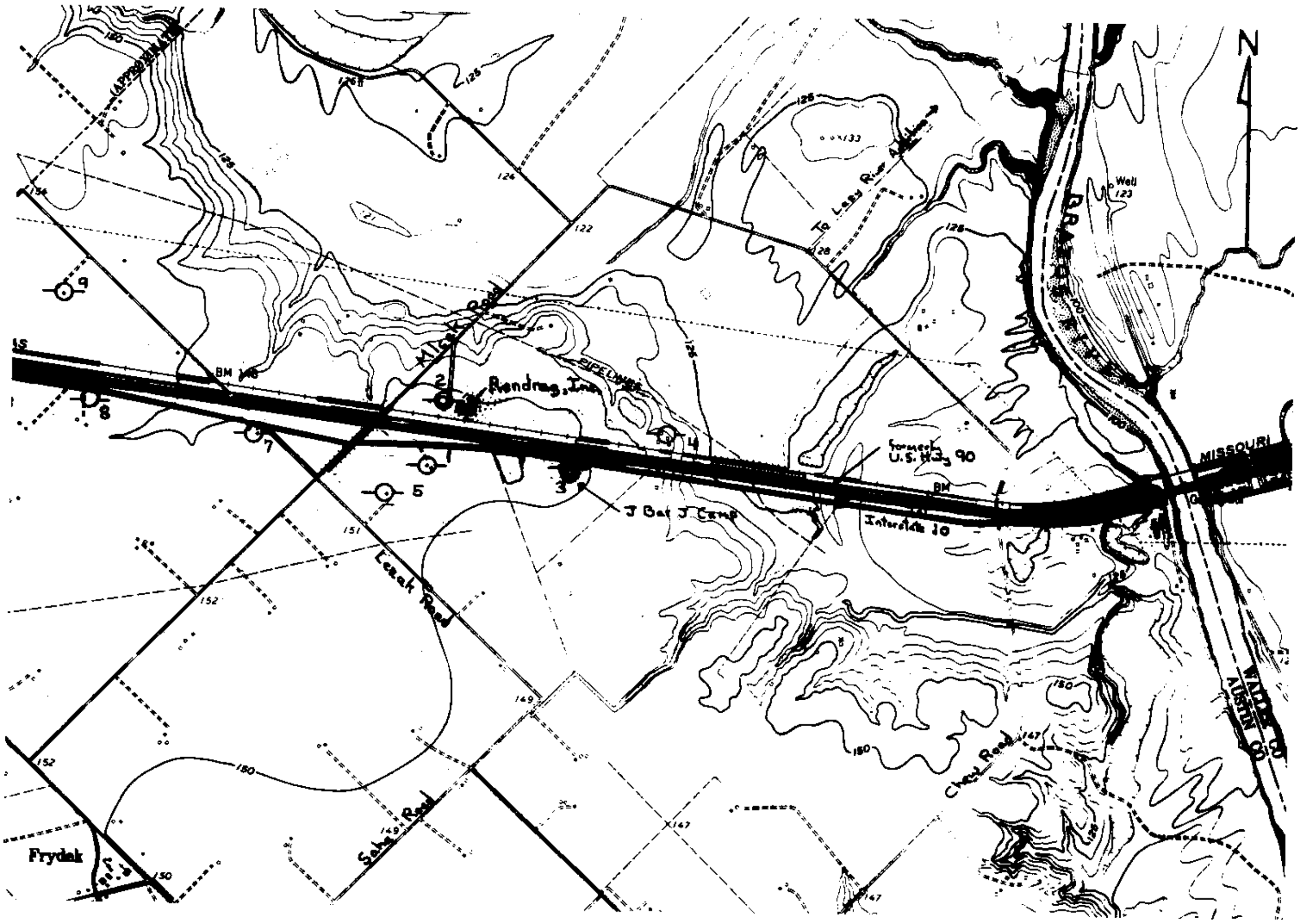
WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	to
4	--	247	257

0-6' top soil
6-19' red clay
19-73 sand
73-80' gravel
80-109' white clay
109-143' sandstone
143-154' red clay
154-173' sandstone
173-191' sand
191-232' white clay
232-257' water sand

TWDBE-WD-2

(Sketch)



N
MISSOURI
Interstate 10
Former U.S. Hwy 90
J Bar J Camp
Rendrag, Inc.
PIPELINE
Leach Road
Saha Road
Chevy Road
To Lazy River Addition
Frydak
Well
BM

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Resources Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDBE ONLY
Program No. 401-6102-50
Work No. CI-7705

CHEMICAL WATER ANALYSIS REPORT

Send report to:
Ground Water Division
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

KEY PUNCHED

County 008 Austin
State Well No. 66-16-910
Field Well No. 3
Date Collected 12-07-76

Location On the south side of I 10, 1.8 miles west of the Brazos River bridge Sample No. 1 By R.F. Ginn
Source (type of well) sub, electric Owner Johnny Wells
Date Drilled 7-12-69 Depth 257 ft. WBF Evangeline Evangeline
Producing intervals 247-257 feet Water level 7/12/69 52.5 ft. Sample depth ft.
Sampled after pumping 5 min Yield GPM meas. est. Tempereture °F °C
Point of collection faucet @ well Appearance ☒ clear ☐ turbid ☐ colored ☐ other
Use public Remarks

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

Laboratory No. 82816
Date Received DEC 8 1976
Date Reported DEC 14 1976

	MG/L	ME/L
Silica	28	
Calcium	54	2.72
Magnesium	3	0.22
Sodium	22	0.97
Total		3.91
☐ Potassium		
☐ Manganese		
☐ Boron		
3/ ☐ Total Iron		
☐ (other)	MG/L	

%Na
SAR
RSC

	MG/L	ME/L
Carbonate		0
Bicarbonate (74)	151	2.48
Sulfate	5	0.10
Chloride	48	1.34
Fluoride	0.1	—
Nitrate	2.0	—
pH	7.9	
Total		3.92
1/ Dissolved Solids (sum in MG/L)		236
Phenolphthalein Alkalinity as $CaCO_3$		0
Total Alkalinity as $CaCO_3$ (2.48)		124
Total Hardness as $CaCO_3$ (2.94)		147

Specific Conductance (micromhos/cm³) 398
Diluted Conductance (micromhos/cm³) 3 x 141 = 423

2/ Nitrogen Cycle

Ammonia - N	
Nitrite - N	
Nitrate - N	
Organic Nitrogen	

" ☐ " items will be analyzed if checked.

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.
2/ Nitrogen cycle requires separate sample.
3/ Total Iron requires separate sample.

TWDBE-WD-1 (Rev. 8-30-76)

Analyst _____ Checked By _____

Send original copy by certified mail to the Texas Water Development Board
P. O. Box 12386
Austin, Texas 78711

State of Texas

WATER WELL REPORT

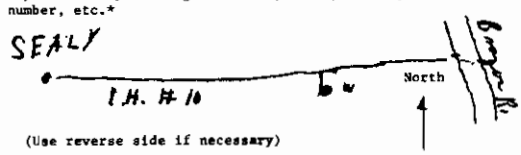
For TWDB use only
Well No. [illegible]
Located on map
Received:

1) OWNER:
Person having well drilled Jonny Wells (Name) Address RFD 1 (Street or RFD) Sealy (City) Tex (State)

Landowner (Name) Address (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Austin, 4 miles in E (N.E., S.W., etc.) direction from Sealy (Town)

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.*



(Use reverse side if necessary)

or

Give legal location with distances and directions from adjacent sections or survey lines.

Labor League
Block Survey
Abstract No.
(NW¼ NE¼ SW¼ SE¼) of Section

3) TYPE OF WORK (Check):
New Well ✓ Deepening
Reconditioning Plugging

4) PROPOSED USE (Check):
Domestic ✓ Industrial Municipal
Irrigation Test Well Other

5) TYPE OF WELL (Check):
Rotary ✓ Driven Dug
Cable Jetted Boreo

6) WELL LOG:
Diameter of hole 4" in. Depth drilled 257' ft. Depth of completed well 257 ft. Date drilled 7-12-69
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	6'	Top soil
6'	19'	Red clay
19'	73'	Sand
73'	80'	Gravel
80'	109'	White clay
109'	143'	Sand stone
143'	154'	Red clay
154	173	Sand Stone
173	191	Sand
191	232	White clay
232	257	Water Sand

(Use reverse side if necessary)

9) Casing:
Type: Old New ✓ Steel ✓ Plastic Other
Cemented from ft. to ft.

Diameter (inches)	Setting From (ft.)	To (ft.)	Gage

10) SCREEN:
Type Wrapped
Perforated Slotted

Diameter (inches)	Setting From (ft.)	To (ft.)	Slot Size
	247	257	020

7) COMPLETION (Check):
Straight wall ✓ Gravel packed Other
Under reamed Open Hole

8) WATER LEVEL:
Static level 52-5 ft. below land surface Date
Artesian pressure lbs. per square inch Date
Depth to pump bowls, cylinder, jet, etc., 105' ft.
below land surface.

11) WELL TESTS:
Was a pump test made? Yes No If yes, by whom?
Yield: 150 gpm with ft. drawdown after hrs.
Bailer test gpm with ft. drawdown after hrs.
Artesian flow gpm
Temperature of water

12) WATER QUALITY:
Was a chemical analysis made? Yes No
Did any strata contain undesirable water? Yes No —
Type of water? depth of strata

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME FLOYD BLAKEY (Type or Print) Water Well Drillers Registration No. 778

ADDRESS Rt 3 (Street or RFD) Sealy (City) Tex 77474 (State)

(Signed) Floyd Blakey (Water Well Driller) (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available. AP66-16-810

*Additional instructions on reverse side.

TWDBE-GW-53

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616811

Scanned Images

REPORTED WATER WELL DATA ON 6616811

No.	FIELD	VALUE	EXPLANATION
1	STATE WELL NUMBER	6616811	
2	COUNTY CODE	15	Austin County, Texas
3	BASIN	12	Brazos River Basin
4	PREVIOUS WELL NUMBER		
5	LATITUDE	294626	DMS (in decimal degrees: 29.773888)
6	LAT DEC	29.7738880	
7	LONGITUDE	960401	DMS (in decimal degrees: -96.066943)
8	LONG DEC	-96.0669430	
9	OWNER 1	Vick Boyd	
10	OWNER 2		
11	DRILLER 1	Unknown	
12	DRILLER 2		
13	SOURCE OF COORDINATES	2	
14	AQUIFER CODE	121EVGL	Evangeline Aquifer
15	AQUIFER ID1	15	Gulf Coast Aquifer
16	AQUIFER ID2		
17	AQUIFER ID3		
18	ELEVATION	140	feet
19	ELEVATION MEASUREMENT METHOD	M	Interpolated From Topo Map
20	ALPHA CODE		
21	DATE DRILLED	00001953	
22	WELL TYPE	W	Withdrawal of Water

No.	FIELD	VALUE	EXPLANATION
23	WELL DEPTH	300	feet
24	SOURCE OF DEPTH	R	Person Other than Owner
25	TYPE OF LIFT	S	Submersible Pump
26	TYPE OF POWER	E	Electric Motor
27	HORSEPOWER		
28	PRIMARY WATER USE	H	Domestic
29	SECONDARY WATER USE		
30	TERTIARY WATER USE		
31	WATER LEVEL AVAILABLE	N	
32	WATER QUALITY AVAILABLE	Y	
33	WELL LOGS AVAILABLE		
34	OTHER DATA AVAILABLE		
35	DATE COLLECTED OR UPDATED	12071976	
36	REPORTING AGENCY	01	TWDB or Predecessor Agency
37	WELL SCHEDULE IN FILE		
38	CONTRUCTION METHOD		
39	COMPLETION		
40	CASING MATERIAL	S	Steel
41	SCREEN MATERIAL		
42	GMA	14	
43	RWPA	H	
44	DISTRICTID	200114HG	

TWDB Groundwater Database Result

STATE WELL NUMBER : 6616811

Scanned Images

NO REPORTED INFREQUENT CONSTITUENT DATA ON 6616811

No.	STATE WELL NUMBER	MONTH	DAY	YEAR	SAMPLE NUMBER	STORET CODE	VALUE	PLUS MINUS

NO REPORTED WATER LEVEL DATA ON 6616811

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK

NO REPORTED USGS 5 DAY WATER LEVEL DATA ON 6616811

No.	STATE WELL NUMBER	PUBLISHABLE/NON-PUBLISHABLE	DEPTH FROM LAND SURFACE	MONTH	DAY	YEAR	MEASUREMENT NUMBER	MEASURING AGENCY	METHOD OF MEASUREMENT	REMARK

REPORTED WELL CASING DATA ON 6616811

No.	STATE WELL NUMBER	CASING/SCREEN/OPEN HOLE INDICATOR	DIAMETER OF CASING OR SCREEN	TOP DEPTH	BOTTOM DEPTH
1	6616811	C - Casing	4		

REPORTED REMARKS DATA ON 6616811

No.	STATE WELL NUMBER	REMARKS 1	REMARKS 2
1	6616811	Reportedly drilled as rig supply.	

REPORTED WATER QUALITY DATA ON 6616811 (Column 1 - 19)

No.	STATE WELL NUMBER	MONTH	DAY/Year	YEAR	SAMPLE NUMBER	SAMPLE TIME	TEMPERATURE CELSIUS	TOP OF SAMPLED INTERVAL	BOTTOM OF SAMPLED INTERVAL	SAMPLED INTERVAL AQUIFER CODE	COLLECTION REMARKS	RELIABILITY REMARK	COLLECTING AGENCY	LAB CODE	BALANCED / UNBALANCED	SILICA MG/L	CALCIUM MG/L	MAGNESIUM MG/L
1	**6616811**	12	7	1976	1							02	01	01	B	25.00	46.00	2.80

REPORTED WATER QUALITY DATA ON 6616811 (Column 20 - 39)

No.	STATE WELL NUMBER	SODIUM MG/L	POTASSIUM MG/L	STRONTIUM MG/L	CARBONATE MG/L	BICARBONATE MG/L	SULFATE MG/L	CHLORIDE MG/L	FLUORIDE MG/L	NITRATE MG/L	PH	TDS MG/L	PHENOLPHTHALEIN ALKALINITY	TOTAL ALKALINITY	TOTAL HARDNESS	PERECNT SODIUM	SAR	RSC	SPECIFIC CONDUCTANCE
1	**6616811**	22.00			0.00	147.66	5.75	33.00	0.20	1.20	8.00	208	0.00	121.00	126	27	0.85	0.00	365

TWDB Groundwater Database Result

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Explanation of Groundwater Data

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Work No. 6102
Project CI-7705

Aquifer Evangeline Field No. 4 State Well No. 66-16-811
Owner's Well No. County Austin

1. Location: 1/4, 1/4 Sec., Block, On the north side of I-10 1.5 miles west of the Brazos River bridge
2. Owner: Vick Boyd Address: --
   Tenant: Address:
   Driller: -- Address:
3. Elevation of land surface @ well is 140 ft. above msl, determined by topo map
4. Drilled: 1953; Dug, Cable Tool, (Rotary)
5. Depth: Rept. 300 ft. Meas. ft.
6. Completion: Open Hole, Straight Wall, Underreamed, Gravel Packed
7. Pump: Mfgr. Type Submersible
   No. Stages, Bowls Diam. in., Setting ft.
   Column Diam. in., Length Tailpipe ft.
8. Motor: Fuel electric Make & Model HP.
9. Yield: Flow gpm, Pump gpm, Meas., Rept., Est.
10. Performance Test: Date Length of Test Made by
    Static Level ft. Pumping Level ft. Drawdown ft.
    Production gpm Specific Capacity gpm/ft.
11. Water Level: 0TM ft. rept. meas. 12-7 1976 above below which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
    ft. rept. meas. 19 above below which is ft. above below surface.
12. Use: (Dom.), Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used,
13. Quality: (Remarks on taste, odor, color, etc.)
    Temp. °F, Date sampled for analysis 12-7-76 Laboratory TDHR
    Temp. °F, Date sampled for analysis Laboratory
    Temp. °F, Date sampled for analysis Laboratory
14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log, Formation Samples, Pumping Test,
15. Record by: R.F. Ginn Date 12-7 1976
    Source of Data observation and owner
16. Remarks:
    Mrs. Boyd reported that the well was originally drilled for an oil-test water supply

CASING & BLANK PIPE
Cemented From ft. to ft.

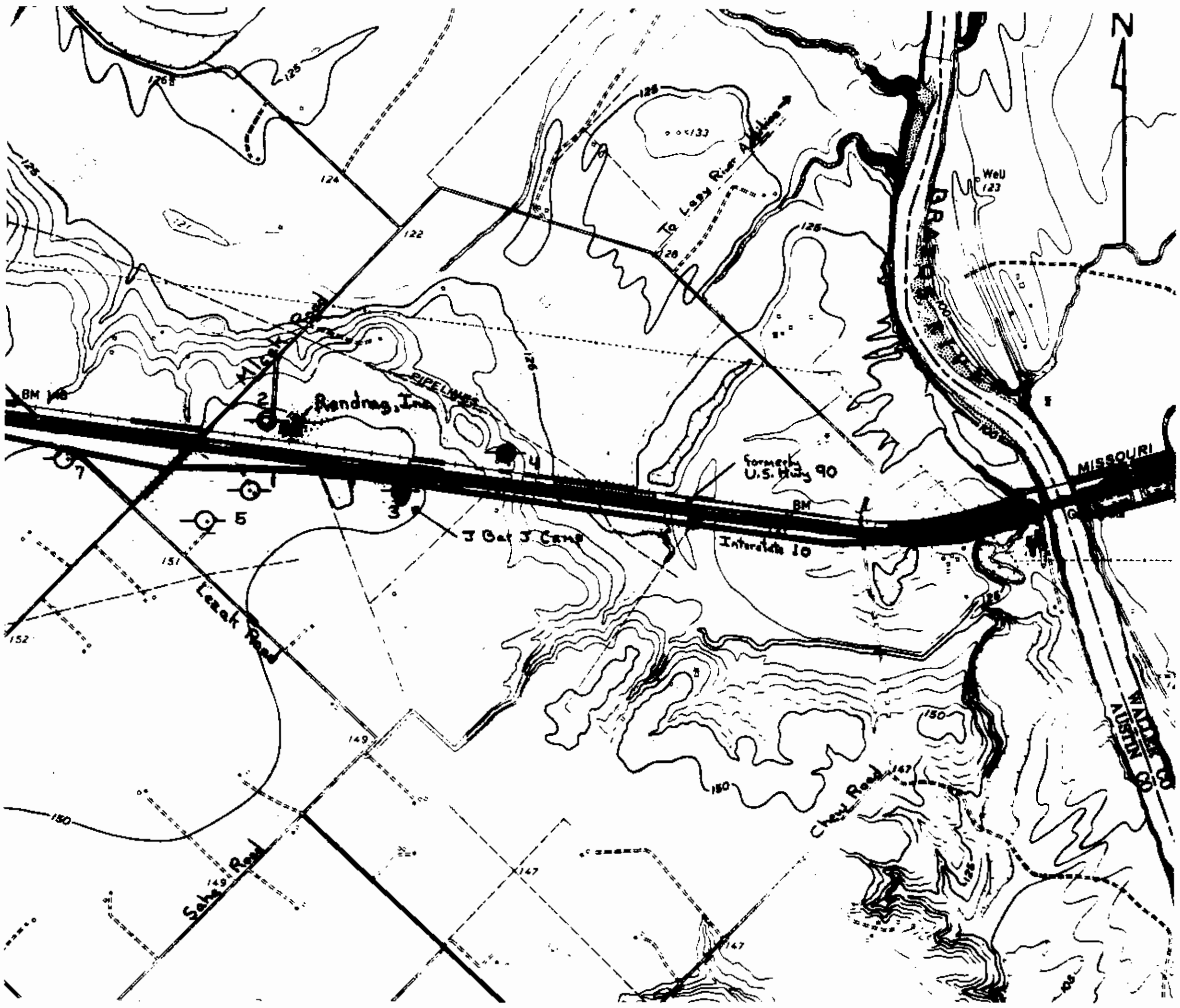
Diam. (in.)	Type	Setting, ft. from	Setting, ft. to
4	Steel	--	--

WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	Setting, ft. to
--	--	--	--

(Sketch)

TWDBE-WD-2


N
Interstate 10
formerly U.S. Hwy 90
J Bar J Cane
Rendrag, Inc.
PIPELINES
Leach Road
Sahs Road
Cheney Road
To Lazy River Addition
MISSOURI
WALLER CO
AUSTIN CO
Well
BM
BM 148
1
2
3
4
5
7

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Resources Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDBE ONLY
Program No. 401-6102-50
Work No. CI-7705

CHEMICAL WATER ANALYSIS REPORT

Send report to:
Ground Water Division
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

KEY PUNCHED

County 008 Austin
State Well No. 66-16-811
Field Well No. 4
Date Collected 12-07-76

Location On the north side of I 10, 1.5 miles west of the Brazos River bridge Sample No. 1 By R.F.Ginn
Source (type of well) sub., electric Owner Vicki Boyd
Date Drilled 1953 Depth 300± ft. WBF Evangeline
Producing intervals — — Water level UTM ft. Sample depth ____ ft.
Sampled after pumping 5 min hrs. Yield ____ GPM meas. est. Temperature ____ °F ____ °C
Point of collection kitchen sink Appearance ☑ clear ☐ turbid ☐ colored ☐ other
Use domestic Remarks ____

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

Laboratory No. D2087 Date Received DEC 8 1976 Date Reported DEC 14 1976

	MG/L	ME/L
Silica	25	
Calcium	46	2.32
Magnesium	3	0.23
Sodium	22	0.95
Total		3.50
☐ Potassium		
☐ Manganese		
☐ Boron		
3/ ☐ Total Iron		
☐ (other) ____	MG/L	

%Na ____
SAR ____
RSC ____

	MG/L	ME/L
Carbonate	0	0
Bicarbonate 73	148	2.42
Sulfate	6	0.12
Chloride	33	0.93
Fluoride	0.2	—
* Nitrate	1.2	—
pH	8.0	
Total		3.47

Specific Conductance (micromhos/cm³)	348
Diluted Conductance (micromhos/cm³)	2½ x 146 / 365
1/ Dissolved Solids (sum in MG/L)	209
Phenolphthalein Alkalinity as CaCO₃	0
Total Alkalinity as CaCO₃	(2.42) 121
Total Hardness as CaCO₃	(2.55) 128

" ☐ " items will be analyzed if checked.

2/ Nitrogen Cycle	
Ammonia - N	
Nitrite - N	
Nitrate - N	
Organic Nitrogen	

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.
2/ Nitrogen cycle requires separate sample.
3/ Total Iron requires separate sample.

TWDBE-WD-1 (Rev. 8-30-76)

Analyst ____ Checked By ____

STATE OF TEXAS WELL REPORT for Tracking #10070

Owner:	**Debbie Thomas**	Owner Well #:	**No Data**
Address:	**2511 Marble Falls Spring, TX 77373**	Grid #:	**66-16-7**
Well Location:	**2325 Skrivanek Rd. Sealy, TX 77474**	Latitude:	**29° 47' 07" N**
		Longitude:	**096° 05' 19" W**
Well County:	**Austin**	Elevation:	**No Data**

Type of Work: **New Well** Proposed Use: **Domestic**

Drilling Start Date: **8/8/2002** Drilling End Date: **8/9/2002**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7.75**	**0**	**140**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Open Hole; Straight Wall**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**10**	**10**

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **NA**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Sleeve Installed**

Water Level: **55 ft.** below land surface on **2002-08-09** Measurement Method: **Unknown**

Packers: **1 Rubber 115**

Type of Pump: **Submersible**

Well Tests: **Jetted** **No Test Data Specified**

Water Quality:

Strata Depth (ft.)	Water Type
140	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **A.W. Flentge Service**

10742 HWY 159 W.
Bellville, TX 77418

Driller Name: **Brian Flentge** License Number: **54766**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0	**5**	**blackland**
5	**25**	**clay**
25	**80**	**sand**
80	**112**	**sand-clay-gravel**
112	**120**	**clay**
120	**140**	**sand (water)**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	**New**	**PVC**	**Casing 0 120**
4	**New**	**PVC**	**Screen 120 140 .013**

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(512) 463-7880

STATE OF TEXAS WELL REPORT for Tracking #24756

Owner:	**AEM**	Owner Well #:	**No Data**
Address:	**516 Acres Lane Sealy, TX 77474**	Grid #:	**66-16-8**
Well Location:	**6980 E I 10 Frontage Rd Sealy, TX 77474**	Latitude:	**29° 46' 23" N**
		Longitude:	**096° 04' 48" W**
Well County:	**Austin**	Elevation:	**No Data**

Type of Work: **New Well** Proposed Use: **Domestic**

Drilling Start Date: **7/14/2003** Drilling End Date: **7/17/2003**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
8.5	**0**	**10**
6.75	**10**	**163**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**142**	**18**

Seal Method: **pressure cement**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **no septic**

Surface Completion: **Surface Slab Installed**

Water Level: **52 ft.** below land surface on **2003-07-16** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **120**

Well Tests: **Jetted** **Yield: 30 GPM with 0 ft. drawdown after 5 hours**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Skutca Water Well**

1013 Dungens Mill
Columbus, TX 78934

Driller Name: **Bennie Joe Skutca** License Number: **2704**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

No Data

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	**n**	**pvc**	**0-143 #40**
4	**n**	**pvc**	**143-163 .012**

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STATE OF TEXAS WELL REPORT for Tracking #37049

Owner:	**Vital Link**	Owner Well #:	**No Data**
Address:	**110 Bartlett Road Sealy, TX**	Grid #:	**66-16-8**
Well Location:	**110 Bartlett Road Sealy, TX**	Latitude:	**29° 46' 27" N**
		Longitude:	**096° 04' 29" W**
Well County:	**Austin**	Elevation:	**No Data**

Type of Work: **New Well** Proposed Use: **Public Supply**

Drilling Start Date: **12/7/2002** Drilling End Date: **12/7/2002** **Plans Approved by TCEQ - NO**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7.875**	**0**	**389**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Straight Wall**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**368**	**48 cement**

Seal Method: **Pressure**

Sealed By: **ODCI**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: **70 ft.** below land surface on **2002-12-07** Measurement Method: **Unknown**

Packers: **B P Seal 368**

Type of Pump: **Submersible** Pump Depth (ft.): **210**

Well Tests: **Jetted** **Yield: 80 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
16	**n/a**

Chemical Analysis Made: **Yes**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **O'Day Drilling Company**

2357 Garden Road
Pearland, TX 77581

Driller Name: **Rogelio Meza** License Number: **4884**

Comments: **$dfs**
Original lat long out of range. TWDB updated lat long on 6/16/06 by Anderson.

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	**3**	**Top Soil**
3	**18**	**Clay**
18	**35**	**Sand**
35	**45**	**Clay**
45	**92**	**Gravel**
92	**150**	**Clay**
150	**182**	**Sand**
182	**208**	**Clay**
208	**230**	**Sand**
230	**266**	**Clay**
266	**278**	**Sand**
278	**281**	**Clay**
281	**285**	**Sand**
285	**287**	**Rock**
287	**371**	**Clay**
371	**387**	**Sand**
387	**389**	**Clay**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
5 New PVC Casing 0 368 SDR17
3 New Galvanized Liner 368 379 WW
3 New S/S Pipe Base Screen 379 389 08

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(512) 463-7880

STATE OF TEXAS WELL REPORT for Tracking #38315

Owner:	**Al Konvicka**	Owner Well #:	**No Data**
Address:	**516 Acres Lane Sealy, TX 78934**	Grid #:	**66-16-8**
		Latitude:	**29° 46' 14" N**
Well Location:	**12001 Mecak Sealy, TX 77474**	Longitude:	**096° 04' 46" W**
Well County:	**Austin**	Elevation:	**No Data**

Type of Work: **New Well** Proposed Use: **Domestic**

Drilling Start Date: **3/25/2004** Drilling End Date: **3/31/2004**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
8.5	**0**	**10**
6.75	**10**	**143**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**10**	

Seal Method: **hand mix**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **no septic**

Surface Completion: **Surface Slab Installed**

Water Level: **67 ft.** below land surface on **2004-03-30** Measurement Method: **Unknown**

Packers: **shirt-tail 10**
rubber 122

Type of Pump: **Submersible** Pump Depth (ft.): **100**

Well Tests: **Unknown** **Yield: 50 GPM with 0 ft. drawdown after 3 hours**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Skutca Water Well**

1013 Dungens Mill
Columbus, TX 78934

Driller Name: **Bennie Joe Skutca** License Number: **2704**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	**7**	**black clay**
7	**25**	**red clay**
25	**35**	**sand**
35	**90**	**pea-gravel**
90	**122**	**clay & rock**
122	**123**	**rock**
123	**143**	**sand**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	**n**	**pvc**	**0-123 #40**
4	**n**	**pvc**	**123-143 .012**

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STATE OF TEXAS WELL REPORT for Tracking #53981

Owner:	**Vital Link**	Owner Well #:	**Log 25708**
Address:	**110 Bartlett Road Sealy, TX**	Grid #:	**66-16-8**
Well Location:	**110 Bartlett Road Sealy, TX**	Latitude:	**29° 46' 27" N**
		Longitude:	**096° 04' 29" W**
Well County:	**Austin**	Elevation:	**No Data**

Type of Work: **New Well** Proposed Use: **Industrial**

Drilling Start Date: **12/7/2002** Drilling End Date: **12/7/2002**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7.875**	**0**	**368**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Straight Wall**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**368**	**48**

Seal Method: **Pressure**

Sealed By: **ODCI**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: **70 ft.** below land surface on **2002-12-07** Measurement Method: **Unknown**

Packers: **B P Seal 368'**

Type of Pump: **Submersible** Pump Depth (ft.): **210**

Well Tests: **Jetted** **Yield: 80 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
16	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **O'Day Drilling Company, Inc.**

2357 Garden Road
Pearland, TX 77581

Driller Name: **Rogelio Meza** License Number: **4884**

Comments: **$dfs**
Original lat long out of range. TWDB updated lat long on 6/16/06 by Anderson.

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	**3**	**Top Soil**
3	**18**	**Clay**
18	**35**	**Sand**
35	**45**	**Clay**
45	**92**	**Gravel**
92	**150**	**Clay**
150	**182**	**Sand**
182	**208**	**Clay**
208	**230**	**Sand**
230	**266**	**Clay**
266	**278**	**Sand**
278	**281**	**Clay**
281	**285**	**Sand**
285	**287**	**Rock**
287	**371**	**Clay**
371	**387**	**Sand**
387	**389**	**Clay**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
5 New PVC Casing 0 368 SDR17
3 New Galvanized Liner 368 379 WW
3 New S/S Pipe Base Scrn 379 389 08

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STATE OF TEXAS WELL REPORT for Tracking #82106

Owner:	**Pencco**	Owner Well #:	**2**
Address:	**831 Bartlett Sealy, TX 77474**	Grid #:	**66-16-8**
		Latitude:	**29° 46' 36" N**
Well Location:	**831 Bartlett Sealy, TX 77474**	Longitude:	**096° 04' 20" W**
Well County:	**Austin**	Elevation:	**135 ft. above sea level**

Type of Work: **New Well** Proposed Use: **Industrial**

Drilling Start Date: **4/26/2006** Drilling End Date: **4/28/2006**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
7.5	**0**	**23**
6.75	**23**	**271**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**21**	**11 cement**

Seal Method: **concrete poured**

Sealed By: **nwwsi**

Distance to Property Line (ft.): **50+**

Distance to Septic Field or other concentrated contamination (ft.): **100+**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **visual**

Surface Completion: **Surface Sleeve Installed**

Water Level: **55 ft.** below land surface on **2006-04-28** Measurement Method: **Unknown**

Packers: **none**

Type of Pump: **none yet**

Well Tests: **Jetted** **Yield: 100+ GPM**

Plug Information:

Description (number of sacks & material)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
not applicable		

Water Quality:

Strata Depth (ft.)	Water Type
182 - 271	**good**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Neuendorff's Water Well Svc., Inc.**

P. O. Box 131
Columbus, TX 78934

Driller Name: **Kenny Neuendorff** License Number: **2867**

Apprentice Name: **Chris Jones** Apprentice Number: **3232**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
0-6 Blackland
6-14 Red Sand
14-25 Red Clay & Sand streaks
25-45 Sand & few Clay streaks
45-47 Sand
47-56 Brown Clay
56-78 Pea Gravel
78-81 Clay
81-85 Gravel
85-105 Gravel & Clay streaks
105-125 White Clay & Gravel streaks
125-145 Sand & few Clay streaks
145-158 Sand & Rock
158-165 White Clay
165-182 Sandy White Clay
182-185 Sand
185-271 Sand w/few Rock streaks

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 N s/40 pvc +2 - 217
4 N s/40 pvc SFSS 217 - 267 .010"
4 N s/40 pvc 267 - 270

271 Rock

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STATE OF TEXAS WELL REPORT for Tracking #96325

Owner:	**Apex Stone L.L.C.**	Owner Well #:	**No Data**
Address:	**P.O. Box 277 San Felipe, TX 77473**	Grid #:	**66-16-7**
Well Location:	**65935 E. I10 Frontage Rd Sealy, TX 77474**	Latitude:	**29° 46' 26" N**
		Longitude:	**096° 05' 09" W**
Well County:	**Austin**	Elevation:	**No Data**

Type of Work: **New Well** Proposed Use: **Industrial**

Drilling Start Date: **10/23/2006** Drilling End Date: **10/23/2006**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7**	**0**	**240**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Open Hole; Straight Wall**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**3**	**2 cement**
3	**15**	**2 benseal**

Seal Method: **sack type**

Sealed By: **Flentge Well Service**

Distance to Property Line (ft.): **100+**

Distance to Septic Field or other concentrated contamination (ft.): **no septic**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **estimate**

Surface Completion: **Surface Sleeve Installed**

Water Level: **60 ft.** below land surface on **2006-10-24** Measurement Method: **Unknown**

Packers: **Rubber 15'**
Rubber 172'
Rubber 178'
Rubber 184'

Type of Pump: **Submersible** Pump Depth (ft.): **120**

Well Tests: **Estimated** **Yield: 80 GPM**

Plug Information:

Description (number of sacks & material)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
n/a		

Water Quality:

Strata Depth (ft.)	Water Type
184	**Good**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Leon Flentge Water Well Drilling and Service**

9190 Hwy 159 West
Bellville, TX 77418

Driller Name: **Leon Flentge** License Number: **2205**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	**5**	**black land**
5	**17**	**red clay**
17	**68**	**fine brown sand + rock**
68	**80**	**gravel**
80	**100**	**white clay + rock mix**
100	**112**	**white sand + Rock**
112	**130**	**white + brown clay**
130	**154**	**fine white sand rock + clay mix**
154	**184**	**brown + white clay + rock mix**
184	**232**	**fine white sand + rock**
232	**240**	**clay**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 new plastic pvc 0-216 40
4 new .008 double slot pvc screen 216-226 40
4 new plastic pvc 226-234 40

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(512) 463-7880

STATE OF TEXAS WELL REPORT for Tracking #113203

Owner:	**Adan Chavez**	Owner Well #:	**n/a**
Address:	**1030 Hahlo St. Houston, TX 77020**	Grid #:	**66-16-8**
Well Location:	**12984 McDade Rd. Hempstead, TX 77445**	Latitude:	**29° 46' 19" N**
		Longitude:	**096° 04' 51" W**
Well County:	**Waller**	Elevation:	**No Data**

Type of Work: **New Well** Proposed Use: **Domestic**

Drilling Start Date: **4/24/2001** Drilling End Date: **4/25/2001**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7**	**0**	**307**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Pressure Cemented**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**10**	**8 RediMix**
120	**287**	**20 Portland**

Seal Method: **Positive Displacement**

Sealed By: **Driller**

Variance Number: **n/a**

Distance to Property Line (ft.): **50+**

Distance to Septic Field or other concentrated contamination (ft.): **n/a**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Tape**

Surface Completion: **Alternative Procedure Used**

Water Level: **95 ft.** below land surface on **2001-04-25** Measurement Method: **Unknown**

Packers: **K-Packers RxR (2) 283'**

Type of Pump: **Submersible** Pump Depth (ft.): **273**

Well Tests: **Jetted** **Yield: 75 GPM after 1 hours, no drawdown specified**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	**Good**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Kenco Water Well Service**

30269 FM 1488 Rd.
Waller, TX 77484

Driller Name: **Kenneth Robinson** License Number: **2214**

Comments: **This report mailed to TDLR 06/18/2001.**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	**20**	**Clay**
20	**30**	**Gravel**
30	**40**	**Clay**
40	**45**	**Gravel**
45	**70**	**Sand**
70	**80**	**Clay**
80	**87**	**Sand & Rock**
87	**98**	**Rock & Sand**
98	**120**	**Clay**
120	**127**	**Sand & Rock**
127	**169**	**Clay**
169	**189**	**Clay & Rock**
189	**210**	**Clay**
210	**212**	**Rock**
212	**221**	**Clay**
221	**239**	**Sand**
239	**251**	**Clay**
251	**266**	**Rock & Clay**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4" N PVC 0 - 297 Sch. 40
2 1/2" N Jayco WOP 287 - 307 .008 gauge
2 1/2" N PVC Liner 283 - 287 Sch. 40

266	**270**	**Sand**
270	**289**	**Clay**
289	**303**	**Sand**
303	**305**	**Rock**
305	**307**	**Clay**

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P.O. Box 12157
Austin, TX 78711
(512) 463-7880

STATE OF TEXAS WELL REPORT for Tracking #175236

Owner:	**Larry and Cindy Siska**	Owner Well #:	**No Data**
Address:	**11734 Micak Rd Sealy, TX 77474**	Grid #:	**66-16-8**
Well Location:	**11734 Micak Rd Sealy, TX 77474**	Latitude:	**29° 45' 55" N**
		Longitude:	**096° 04' 47" W**
Well County:	**Austin**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **8/26/2004** Drilling End Date: **8/26/2004**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
7	**0**	**200**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed; Open Hole; Straight Wall**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
190	**195**	**Gravel**	**plug**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**6**	**4 cement**
6	**13**	**1 1/2 benseal**

Seal Method: **sack type**

Sealed By: **Flentge Well Service**

Distance to Property Line (ft.): **50+**

Distance to Septic Field or other concentrated contamination (ft.): **110**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **tape measure**

Surface Completion: **Surface Sleeve Installed**

Water Level: **64 ft.** below land surface on **2004-08-27** Measurement Method: **Unknown**

Packers: **rubber, 143'**
rubber, 148'
rubber, 153'
rubber, 158'

Type of Pump: **Submersible** Pump Depth (ft.): **120**

Well Tests: **Estimated** **Yield: 45 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
158	**good**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Leon Flentge Water Well Drilling and Service**

9190 Hwy 159 W
Bellville, TX 77418

Driller Name: **Leon T. Flentge** License Number: **2205**

Comments: **$scd**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
1	**8**	**black land**
8	**23**	**red clay**
23	**71**	**fine brown sand**
71	**91**	**gravel and sand**
91	**100**	**brown and blue clay**
100	**105**	**fine light brown sand, rock and clay mix**
105	**110**	**fine white sand**
110	**158**	**brown and white clay**
158	**191**	**fine white sand rock and sand**
191	**200**	**clay and rock**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 N plastic PVC 0-160 40
- - .008 double slot PVC screen 160-180 -
- - .010 double slot PVC screen 180-190 -
- - plastic PVC 190-195 -

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STATE OF TEXAS WELL REPORT for Tracking #175239

Owner:	**Val Eschenberg**	Owner Well #:	**No Data**
Address:	**211 Rosalie Ln Sealy, TX 77474**	Grid #:	**66-16-8**
Well Location:	**3300 Meyer Rd Sealy, TX 77474**	Latitude:	**29° 47' 13" N**
		Longitude:	**096° 04' 27" W**
Well County:	**Austin**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **8/27/2004** Drilling End Date: **8/27/2004**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7**	**0**	**167**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed; Open Hole; Straight Wall**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	**162**	**167**	**Gravel**	**plug**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**1**	**2**	**2 1/4 cement**
	2	**15**	**3 1/4 benseal**

Seal Method: **sack type**

Sealed By: **Flentge Well Service**

Distance to Property Line (ft.): **51**

Distance to Septic Field or other concentrated contamination (ft.): **no septic**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **tape measure**

Surface Completion: **Surface Sleeve Installed**

Water Level: **34 ft.** below land surface on **2004-08-27** Measurement Method: **Unknown**

Packers: **rubber, 121'**
rubber, 126'
rubber, 131'
rubber, 136'

Type of Pump: **Submersible** Pump Depth (ft.): **80**

Well Tests: **Estimated** **Yield: 50 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
136	**good**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Leon Flentge Water Well Drilling and Service**

9190 Hwy 159 W
Bellville, TX 77418

Driller Name: **Leon T. Flentge** License Number: **2205**

Comments: **$scd**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
1	**8**	**red sand and clay mix**
8	**19**	**red sand**
19	**52**	**gravel**
52	**64**	**white sand rock and clay mix**
64	**72**	**white sand and rock**
72	**77**	**white clay and rock mix**
77	**111**	**white and brown clay**
111	**114**	**white sand rock**
114	**136**	**white and brown clay**
136	**163**	**fine white sand rock and sand**
163	**167**	**clay**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 N plastic PVC 0-142 40
- - .008 double slot PVC screen 142-162 -
- - plastic PVC 162-167 -

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STATE OF TEXAS WELL REPORT for Tracking #209680

Owner:	**Jose O. Benitez**	Owner Well #:	**No Data**
Address:	**19051 Country Square Houston, TX**	Grid #:	**66-16-7**
Well Location:	**1166 Manak Rd San Felipe, TX**	Latitude:	**29° 46' 56" N**
		Longitude:	**096° 05' 28" W**
Well County:	**Austin**	Elevation:	**No Data**

Type of Work: **New Well** Proposed Use: **Domestic**

Drilling Start Date: **10/29/2008** Drilling End Date: **10/31/2008**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
7	**0**	**180**
3.875	**180**	**220**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Under-reamed**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**1**	**1 ready mix**
1	**180**	**12 Portland**

Seal Method: **Pressure**

Sealed By: **Mesecke**

Distance to Property Line (ft.): **70**

Distance to Septic Field or other concentrated contamination (ft.): **no septic**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **stepped**

Surface Completion: **Surface Sleeve Installed**

Water Level: **83 ft.** below land surface on **2008-11-02** Measurement Method: **Unknown**

Packers: **cement, 0'-180'**

Type of Pump: **Submersible** Pump Depth (ft.): **160**

Well Tests: **Pump** **Yield: 18 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
195-220	**fair, some iron**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Mesecke Water Well**

8102 Leroy Road
Richmond, TX 77469

Driller Name: **Alton Mesecke** License Number: **2032**

Comments: **Well location is based on well address, not grid number, on original report. $scd**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	**3**	**sanded topsoil**
3	**12**	**red clay**
12	**110**	**sand**
110	**130**	**red clay**
130	**184**	**sand**
187	**195**	**white clay**
195	**220**	**sand**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	**N**	**PVC**	**0-180 sch 40**
2.5	**N**	**PVC**	**170-210 sch 40**
2.5	**N**	**plastic slot 008**	**210-220 sch 80**

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STATE OF TEXAS WELL REPORT for Tracking #228635

Owner:	**Larry Siska**	Owner Well #:	**No Data**
Address:	**11734 Mlcak Rd. Sealy, TX 77474**	Grid #:	**66-16-8**
Well Location:	**11748 Mlcak Rd. Sealy, TX 77474**	Latitude:	**29° 46' 04" N**
		Longitude:	**096° 04' 54" W**
Well County:	**Austin**	Elevation:	**No Data**

Type of Work: **New Well** Proposed Use: **Domestic**

Drilling Start Date: **8/26/2010** Drilling End Date: **8/26/2010**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7**	**0**	**200**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Straight Wall**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**2**	**2 1/2 cement**
2	**15**	**1 3/4 benseal**

Seal Method: **sack type**

Sealed By: **Flentge Well Service**

Distance to Property Line (ft.): **86**

Distance to Septic Field or other concentrated contamination (ft.): **150+**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **measure**

Surface Completion: **Surface Sleeve Installed**

Water Level: **66 ft.** below land surface on **2010-08-27** Measurement Method: **Unknown**

Packers: **Rubber 15'**
Rubber 153'
Rubber 158'
Rubber 163'

Type of Pump: **Submersible** Pump Depth (ft.): **140**

Well Tests: **Estimated** **Yield: 35 GPM**

Plug Information:

Description (number of sacks & material)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
n/a		

Water Quality:

Strata Depth (ft.)	Water Type
163	**Good**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Leon Flentge Water Well Drilling and Service**

9190 Hwy 159 West
Bellville, TX 77418

Driller Name: **Leon Flentge** License Number: **2205**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	**8**	**Black land**
8	**20**	**Red clay**
20	**57**	**fine brown sand + rock + clay mix**
57	**61**	**red clay**
61	**78**	**fine brown sand**
78	**81**	**red + gray clay**
81	**101**	**white sand gravel + sand rock**
101	**163**	**white rock + clay mix**
163	**192**	**medium white sand rock + sand**
192	**200**	**white clay + rock**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 new plastic pvc 0-166 40
4 new .008 double slot pvc screen 166-186 40
4 new plastic pvc 186-192 40

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STATE OF TEXAS WELL REPORT for Tracking #274817

Owner:	**Brian Bro**	Owner Well #:	**No Data**
Address:	**3200 SW Frwy Houston, TX 77027**	Grid #:	**66-16-8**
Well Location:	**1418 Bartlett Rd. Brookshire, TX 77423**	Latitude:	**29° 46' 27" N**
		Longitude:	**096° 04' 06" W**
Well County:	**Austin**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Irrigation**

Drilling Start Date: **11/12/2011** Drilling End Date: **11/13/2011**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
8	**0**	**204**
5	**204**	**218**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **2 string**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**25**	**4**
0	**200**	**10**

Seal Method: **Positive Displacement**

Sealed By: **GDI**

Distance to Property Line (ft.): **200+**

Distance to Septic Field or other concentrated contamination (ft.): **none**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **stepped**

Surface Completion: **Pitless Adapter Used**

Water Level: **80 ft.** below land surface on **2011-11-22** Measurement Method: **Unknown**

Packers: **tri seal 200**

Type of Pump: **Submersible** Pump Depth (ft.): **180**

Well Tests: **Jetted** **Yield: 100 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
30+	**good**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geophysical Driller INC**

664
Fulshear, TX 77441

Driller Name: **Greg Hill** License Number: **2888**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0	**20**	**black gumbo**
20	**80**	**gravel**
80	**100**	**Tan clay**
100	**220**	**sand,rock, sand**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
5	**N**	**PVC**	**0-----204 sdr17**
2.5	**N**	**PVC**	**200-208 sch80**
2.5	**N**	**SSRB- ALLOY metal**	**208-218----.008**

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STATE OF TEXAS WELL REPORT for Tracking #284690

Owner:	**Brian Bro**	Owner Well #:	**No Data**
Address:	**3200 Southwest Frwy Houston, TX 77027**	Grid #:	**66-16-8**
Well Location:	**1185 Bartlett Rd. Brookshire, TX 77423**	Latitude:	**29° 46' 46" N**
		Longitude:	**096° 04' 08" W**
Well County:	**Waller**	Elevation:	**No Data**

Type of Work: **New Well** Proposed Use: **Irrigation**

Drilling Start Date: **4/18/2012** Drilling End Date: **4/19/2012**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
8	**0**	**204**
5.75	**204**	**216**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Two-String**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**4**	**3 Top**
4	**204**	**24 Cement**

Seal Method: **Halliburton Fully Pressure Cemented**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Pitless Adapter Used**

Water Level: **30 ft.** below land surface on **No Data** Measurement Method: **Unknown**

Packers: **Formation Packer @ 18ft**
Tri - Seal Packer @ 198-200ft

Type of Pump: **Submersible** Pump Depth (ft.): **180**

Well Tests: **Jetted** **Yield: 100 GPM with 10 ft. drawdown after 12 hours**

Water Quality:

Strata Depth (ft.)	Water Type
20ft	**Good**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geophysical Drilling, Inc.**

4410 FM-359 Rd. South
Brookshire, TX 77423

Driller Name: **Greg Hill** License Number: **2888**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0	**20**	**Blackland, Sandy Clay**
20	**60**	**Clay, Sand & Gravel, Rock, White Clay**
60	**80**	**Tan & White Clay, Sand**
80	**100**	**Tan & White Clay**
100	**120**	**Sand w/ Rock**
120	**140**	**Clay, Rock, Sand**
140	**160**	**Sand & Rock**
160	**216**	**Sand**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
5	**New**	**PVC Well Casing**	**0-204**
2.5	**New**	**PVC Blank Pipe**	**200-205**
2.5	**New**	**SSRodbaseScreen**	**205-215**
2.5	**New**	**Sawtooth Nipple**	**215-216**

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(512) 463-7880

STATE OF TEXAS WELL REPORT for Tracking #322099

Owner:	**Jose Arriaga**	Owner Well #:	**1**
Address:	**P O Box 1569 Sealy, TX 77474**	Grid #:	**66-16-7**
Well Location:	**864 & 866 Manak Rd Sealy, TX 77474**	Latitude:	**29° 46' 59" N**
		Longitude:	**096° 05' 28" W**
Well County:	**Austin**	Elevation:	**167 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **5/9/2013** Drilling End Date: **6/20/2013**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**6.75**	**0**	**228**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Pressure Cemented**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**10**	**Saks Redimix**
10	**203**	**20 Saks Portlan**

Seal Method: **Halliburton/Poured**

Sealed By: **KWWS**

Distance to Property Line (ft.): **100**

Distance to Septic Field or other concentrated contamination (ft.): **N/A**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Estimate**

Surface Completion: **Alternative Procedure Used**

Water Level: **91 ft.** below land surface on **2013-05-20** Measurement Method: **Unknown**

Packers: **2 - 4" x 2 1/2" RxR K- Packers 202'**

Type of Pump: **Submersible** Pump Depth (ft.): **140**

Well Tests: **Jetted** **Yield: 45 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
25	**Good**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Kenco Water Well Svc**

30269 FM 1488
Waller, TX 77484

Driller Name: **Kenneth Robinson** License Number: **2214**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
2	**16**	**Red Clay**
16	**86**	**Rock , and Clay**
86	**95**	**Sand and Rock**
95	**127**	**White Clay**
127	**150**	**Red Clay**
150	**190**	**Sand and Rock**
190	**228**	**Sand with Clay Break**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	**New**	**PVC**	**Casing 0-193 Sch 40**
2 1/2	**New**	**PVC**	**Casing 203-218 Sch 40**
2 1/2	**New**	**PVC WOP**	**Screen 203-213, Sch 80 .010**
2 1/2	**New**	**Slotted PVC**	**Screen 218-228 Sch 40 .008**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

STATE OF TEXAS WELL REPORT for Tracking #396529

Owner:	**Frank Ehon**	Owner Well #:	**1**
Address:	**2585 Mayer Road Sealy, TX 77474**	Grid #:	**66-16-8**
Well Location:	**2585 Mayer Road Sealy, TX 77474**	Latitude:	**29° 47' 14" N**
		Longitude:	**096° 04' 27" W**
Well County:	**Austin**	Elevation:	**132 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **4/27/2015** Drilling End Date: **4/29/2015**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
8	**0**	**180**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
135	**180**	**Gravel**	**1/16 inch**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**17**	**23 sacks cement**
130	**135**	**2 sacks bentoni**
135	**180**	**31 sacks gravel**

Seal Method: **trimmie**

Sealed By: **N Yoakley**

Distance to Property Line (ft.): **100**

Distance to Septic Field or other concentrated contamination (ft.): **180**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Sleeve Installed**

Water Level: **35 ft.** below land surface on **2015-04-28** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **120**

Well Tests: **Jetted** **Yield: 35 GPM with 2 ft. drawdown after 2 hours**

Water Quality:

Strata Depth (ft.)	Water Type
140	**good clean water**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Terra Power Drilling LLC**

9532 FM 682
Yoakum, TX 77995

Driller Name: **Nathan Yoakley** License Number: **54752**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	**30**	**dark brown clay**
30	**45**	**Fine Sand**
45	**90**	**gravel and sand**
90	**115**	**gravel with clay layers**
115	**135**	**light gray clay**
135	**150**	**clay and sand**
150	**180**	**medium sand**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4 inch	**new**	**PVC**	**casing +2 to 140 sch 40**
4 inch	**new**	**PVC**	**screen .008 slot 140 to 180 sch 40**

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Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)

PLOTTED WELL LOG EXHIBIT

DUP

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. 66-16-8A
Located on map YES
Received: TH

1) OWNER Donald M. Hamil (Name) Address 8602 Riverside Walk (Street or RFD) Houston (City) Texas (State) 77064 (Zip)

2) LOCATION OF WELL: County Austin 6 miles in East (N.E., S.W., etc.) direction from Sealy, Texas (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ **Legal description:**
Section No. _____ Block No. _____ Township _____
Abstract No. 7 Survey Name Stephen F. Austin
Distance and direction from two intersecting section or survey lines _____

☒ See attached map.

3) **TYPE OF WORK** (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) **PROPOSED USE** (Check):
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other _____

5) **DRILLING METHOD** (Check):
☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) **WELL LOG:**
Date drilled 3-14-80

DIAMETER OF HOLE Dia. (in.)	From (ft.)	To (ft.)
	Surface	
5½	0	88

7) **BOREHOLE COMPLETION:**
☐ Open Hole ☒ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	10	Red Clay
10	25	Sand
25	63	Red Clay
63	88	Sand & Gravel

8) **CASING, BLANK PIPE, AND WELL SCREEN DATA:**

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing	Gage Screen
4	New	Plastic	0	80	Sch40	
4	New	Plastic Under Bar	80	88		.016

CEMENTING DATA
Cemented from _____ ft. to _____ ft.
Method used _____
Cemented by _____ (Company or Individual)

9) **WATER LEVEL:**
Static level 48 ft. below land surface Date 3-14-80
Artesian flow _____ gpm. Date _____

10) **PACKERS:** Type Depth

11) **TYPE PUMP:**
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 65 ft.

(Use reverse side if necessary)

13) **WATER QUALITY:**
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata 25'
Was a chemical analysis made? ☐ Yes ☒ No

12) **WELL TESTS:**
☐ Type Test: ☒ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 13 gpm with 6 ft. drawdown after 7 hrs.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Kenneth Wendt (Type or Print) Water Well Drillers Registration No. 1138

ADDRESS Route 1 (Street or RFD) Cat Spring, (City) Texas (State) 78933 (Zip)

(Signed) Kenneth Wendt (Water Well Driller) Wendt Well Service (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

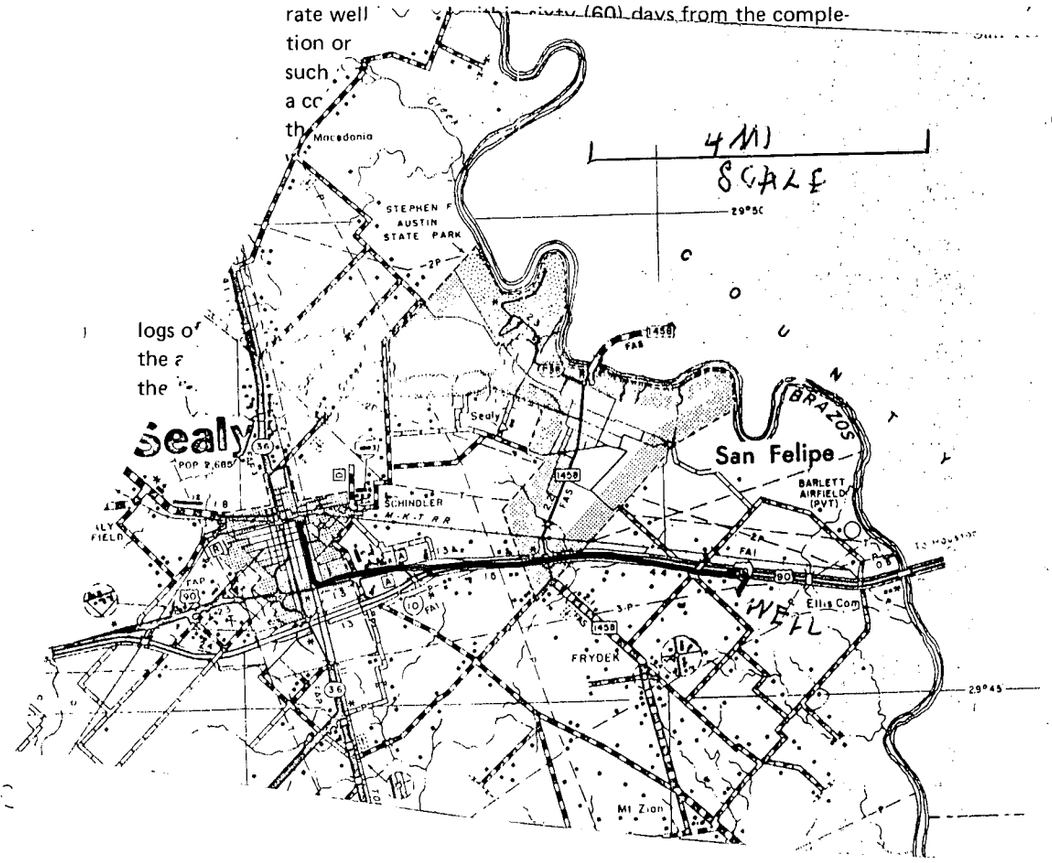
TDWR-0392 (Rev. 1-12-79)

DEPARTMENT OF WATER RESOURCES COPY

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

The Water Well Drillers Board and the Department of Water Resources are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

"Every registered water well driller drilling, deepening, or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well [illegible] sixty (60) days from the completion or [illegible] such [illegible] a co[illegible] th[illegible] logs o[illegible] the [illegible] the [illegible]



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SEP 19 198[illegible]
CR/TD

RECEIVED
MAY 22 1980
DEPT. OF
WATER RESOURCES

Send original copy by certified mail to the Texas Water Development Board
P. O. Box 13087
Austin, Texas 78711

State of Texas

WATER WELL REPORT

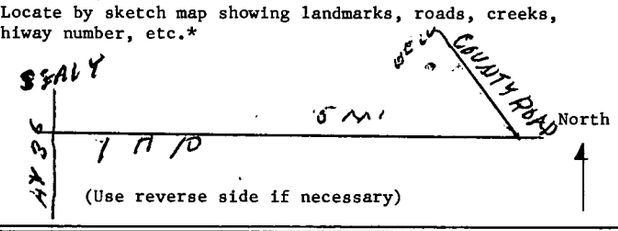
For TWDB use only
Well No. 66-16-8K
Located on map yes
Received: 73
ab

1) OWNER:
Person having well drilled George T. Smith (Name) Address Rt. 3, Box 132 Sealy, Texas (Street or RFD) (City) (State)

Landowner George T. Smith (Name) Address Rt. 3, Box 132 Sealy, Texas (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Austin, 5 miles in East (N.E., S.W., etc.) direction from Sealy, Texas (Town)

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.*



(Use reverse side if necessary)

or Give legal location with distances and directions from adjacent sections or survey lines.

Labor _____ League _____
Block _____ Survey Stephen F. Austin
Abstract No. _____
(NW¼ NE¼ SW¼ SE¼) of Section _____

3) TYPE OF WORK (Check):
New Well X | Deepening | Reconditioning | Plugging

4) PROPOSED USE (Check):
Domestic X | Industrial | Municipal | Irrigation | Test Well | Other

5) TYPE OF WELL (Check):
Rotary X | Driven | Dug | Cable | Jetted | Bored

6) WELL LOG:
Diameter of hole 5 1/2 in. Depth drilled 78 ft. Depth of completed well 78 ft. Date drilled 11-5-73
All measurements made from 1 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	40	Red Clay
40	55	Fine Sand
55	78	Sand & Gravel

(Use reverse side if necessary)

9) Casing:
Type: Old | New X | Steel | Plastic X | Other
Cemented from _____ ft. to _____ ft.

Diameter (inches)	Setting From (ft.)	To (ft.)	Gage
4	0	70	Sch. 40

10) SCREEN:
Type Plastic Under Bar
Perforated | Slotted

Diameter (inches)	Setting From (ft.)	To (ft.)	Slot Size
4	70	78	.016

7) COMPLETION (Check):
Straight wall X | Gravel packed | Other
Under reamed | Open Hole

8) WATER LEVEL:
Static level 50 ft. below land surface Date 11-5-73
Artesian pressure _____ lbs. per square inch Date _____
Depth to pump bowls, cylinder, jet, etc., 67 ft. below land surface.

11) WELL TESTS:
Was a pump test made? Yes | No X If yes, by whom?
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.
Bailer test _____ gpm with _____ ft. drawdown after _____ hrs.
Artesian flow _____ gpm
Temperature of water _____

12) WATER QUALITY:
Was a chemical analysis made? Yes | No X
Did any strata contain undesirable water? Yes | No X
Type of water? _____ depth of strata 23'

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Kenneth Wendt (Type or Print) Water Well Drillers Registration No. 1138

ADDRESS Route 1 (Street or RFD) Cat Spring, Texas 78933 (City) (State)

(Signed) Kenneth Wendt (Water Well Driller) Wendt Well Service (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

TWDBE-WD-8

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. 66-16-8AA
Located on map YES
Received: TH

1) **OWNER** John E. Scheffer (Name) Address 7301 Anzac (Street or RFD) Houston, Texas (City) 77020 (State) (Zip)

2) **LOCATION OF WELL:** County Austin 0 miles in In (N.E., S.W., etc.) direction from San Felipe, Texas (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ **Legal description:**
Section No. _____ Block No. _____ Township _____
Abstract No. 5 Survey Name San Felipe De Austin
Distance and direction from two intersecting section or survey lines Towntract

☒ See attached map.

3) **TYPE OF WORK** (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) **PROPOSED USE** (Check):
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other _____

5) **DRILLING METHOD** (Check):
☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) **WELL LOG:**
Date drilled 9-11-79

DIAMETER OF HOLE Dia. (in.)	From (ft.)	To (ft.)
	Surface	
5½	0	143

7) **BOREHOLE COMPLETION:**
☐ Open Hole ☒ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	16	White Clay
16	34	Sand
34	76	White Clay
76	83	Rock
83	134	Red Clay
134	143	Sand

8) **CASING, BLANK PIPE, AND WELL SCREEN DATA:**

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	New	Plastic	0	135	Sch40
4	New	Plastic Under Bar	135	143	.016

(Use reverse side if necessary)

CEMENTING DATA
Cemented from _____ ft. to _____ ft.
Method used _____
Cemented by _____ (Company or Individual)

9) **WATER LEVEL:**
Static level 55 ft. below land surface Date 9-11-79
Artesian flow _____ gpm. Date _____

10) **PACKERS:** Type Depth

11) **TYPE PUMP:**
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 125 ft.

12) **WELL TESTS:**
☐ Type Test: ☒ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 10 gpm with 20 ft. drawdown after 6 hrs.

13) **WATER QUALITY:**
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata 9'
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Kenneth Wendt (Type or Print) Water Well Drillers Registration No. 1138

ADDRESS Route 1 (Street or RFD) Cat Spring, (City) Texas (State) 78933 (Zip)

(Signed) Kenneth Wendt (Water Well Driller) Wendt Well Service (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDWR-0392 (Rev. 1-12-79)

DEPARTMENT OF WATER RESOURCES COPY

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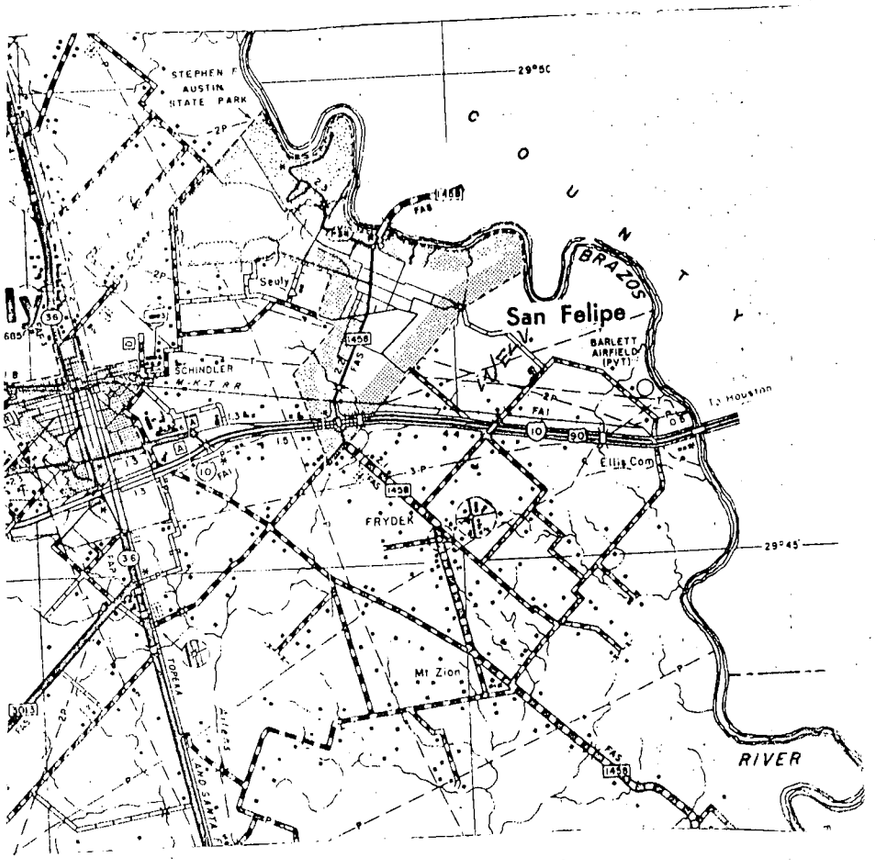
> "Every registered water well driller drilling, deepening, or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within sixty (60) days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential. Please note that the term "Commission" in the above-quoted section and elsewhere in the Water Well Drillers Act now properly means the Texas Department of Water Resources (P. O. Box 13087; Austin, Texas 78711).



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DEPT. OF WATER RESOURCES

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. 66-16-8CC
Located on map YES
Received: TH

1) OWNER Charles V. Mlcak (Name) Address 13810 Hempstead Rd. (Street or RFD) Houston, Texas 77040 (City) (State) (Zip)

2) LOCATION OF WELL:
County Austin 3 miles in East (N.E., S.W., etc.) direction from Frydek, Texas (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name Stephen F. Austin
Distance and direction from two intersecting section or survey lines _____

☒ See attached map.

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other _____

5) DRILLING METHOD (Check):
☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG:
Date drilled 10-17-79

DIAMETER OF HOLE Dia. (in.)	From (ft.)	To (ft.)
	Surface	
5½	0	86

7) BOREHOLE COMPLETION:
☐ Open Hole ☒ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	48	Red Clay
48	86	Sand & Gravel

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	New	Plastic Pipe	0	78	Sch40
4	New	Plastic Under Bar	78	86	.016

CEMENTING DATA
Cemented from _____ ft. to _____ ft.
Method used _____
Cemented by _____ (Company or Individual)

9) WATER LEVEL:
Static level 48 ft. below land surface Date 10-17-79
Artesian flow _____ gpm. Date _____

10) PACKERS: Type Depth

11) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 80 ft.

12) WELL TESTS:
☐ Type Test: ☒ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 10 gpm with 6 ft. drawdown after 3 hrs.

(Use reverse side if necessary)

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata 38'
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Kenneth Wendt (Type or Print) Water Well Drillers Registration No. 1138

ADDRESS Route 1 (Street or RFD) Cat Spring, (City) Texas (State) 78933 (Zip)

(Signed) Kenneth Wendt (Water Well Driller) Wendt Well Service (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDWR-0392 (Rev. 1-12-79)

DEPARTMENT OF WATER RESOURCES COPY

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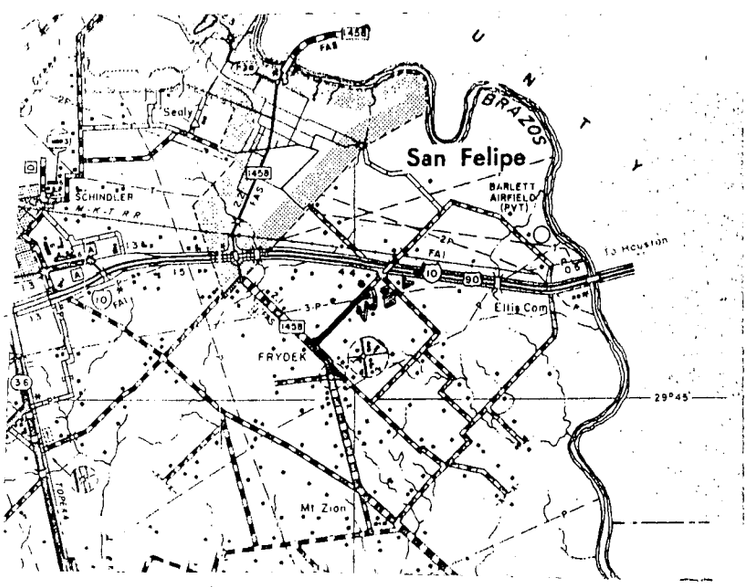
The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential. Please note that the term "Commission" in the above-quoted section and elsewhere in the Water Well Drillers Act now properly means the Texas Department of Water Resources (P. O. Box 13087; Austin, Texas 78711).



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)

PARTIALLY NUMBERED WELL LOG EXHIBIT

Send original copy by certified mail to: Texas Water Commission, P.O. Box 13087, Austin, Texas 78711 8(1) (6) Please use black ink.

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas WELL REPORT

Texas Water Well Drillers Board
P.O. Box 13087
Austin, Texas 78711

1) OWNER David & Terri Windsor (Name) ADDRESS 1002 Bartlett Rd. Sealy, Tx. (Street or RFD) (City) (State) (Zip)

2) LOCATION OF WELL: County Austin , 55 miles in West (NE, SW, etc.) direction from Houston (Town)

Driller must complete the legal description below with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ LEGAL DESCRIPTION:

Section No. _____ Block No. _____ Township _____ Abstract No. _____ Survey Name _____

Distance and direction from two intersecting section or survey lines _____

☐ SEE ATTACHED MAP

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ De-Watering

5) DRILLING METHOD (Check):
☒ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Other _____ ☐ Driven

6) WELL LOG:
Date Drilling: Started 8/12 1992 Completed 8/13 1992

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
	Surface	
6 3/4	0	186
3 7/8	186	194

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☒ Other 2 String Cemented
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	60	Sand & Gravel
60	100	Clay & Shale
100	140	Gravel & Rock
140	160	Clay
160	194	Sand & Rock

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AUG 30 1993
TEXAS WATER COMMISSION

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
4	N	Casing	0	174	sch 40
2 1/2	N	Liner	170	176	sch 40
2 1/2	N	Screen	176	194	.012

9) CEMENTING DATA [Rule 287.44(1)]
Cemented from 180 ft. to 60 ft. No. of Sacks Used 6
0 ft. to 10 ft. No. of Sacks Used 3
Method used Halliburton
Cemented by RWW

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 287.44(2)(A)]
☐ Pitless Adapter Used [Rule 287.44(3)(B)]
☒ Approved Alternative Procedure Used [Rule 287.71]

11) WATER LEVEL:
Static level 30 ft. below land surface Date 8/13/92
Artesian flow _____ gpm. Date _____

12) PACKERS: Type K Depth 170

13) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 190 ft.

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:
Did the drilling penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Robinson Water Well Ser. Inc (Type or print) WELL DRILLER'S LICENSE NO. 2212

ADDRESS 11819 Tomball Parkway (Street or RFD) Houston, Texas (City) 77086 (State) (Zip)

(Signed) _____ (Licensed Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only: Well No. 6 Located on map 66-16-8

WWD-012 (Rev. 09/21/88)

TEXAS WATER COMMISSION COPY

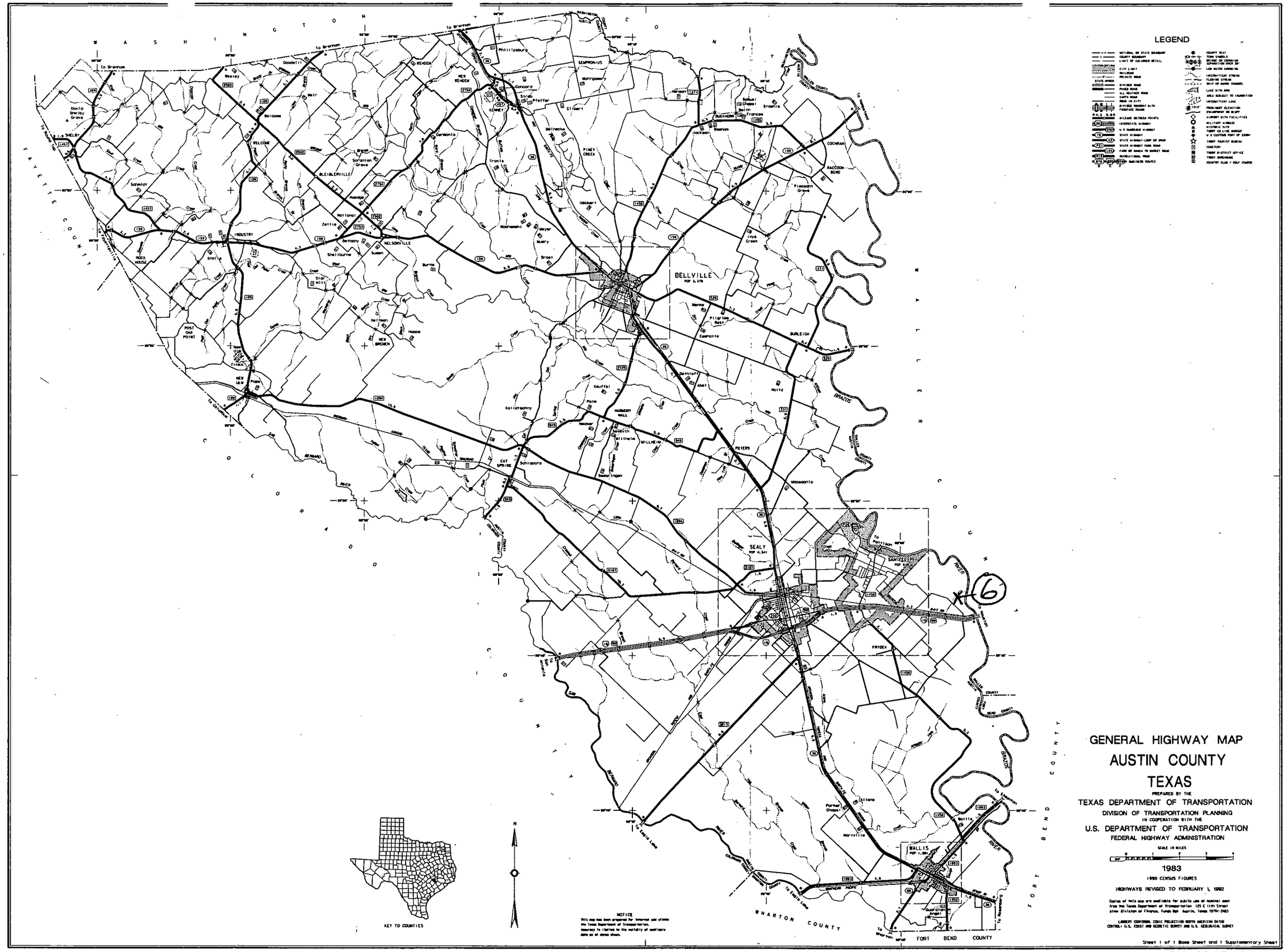
IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

The Water Well Drillers Board and the Texas Water Commission are concerned that some persons having wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

> "Every licensed water well driller drilling, deepening or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within 60 days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. Each copy of a well log, other than a Commission copy, shall include the name, mailing address, and telephone number of the Board and the Commission. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

From (ft.)	To (ft.)	Description and color of formation material



GENERAL HIGHWAY MAP
AUSTIN COUNTY
TEXAS

PREPARED BY THE
TEXAS DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION PLANNING
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE IN MILES

1983

1990 CENSUS FIGURES

HIGHWAYS REVISED TO FEBRUARY 1, 1992

Copies of this map are available for public use at nominal cost from the Texas Department of Transportation 125 E 11th Street Attn: Division of Finance, Funds Mgt Austin, Texas 78701-2483

LAMBERT CONFORMAL CONIC PROJECTION NORTH AMERICAN DATUM
CONTROL: U.S. COAST AND GEODETIC SURVEY AND U.S. GEOLOGICAL SURVEY

Sheet 1 of 1 Base Sheet and 1 Supplementary Sheet

AUSTIN COUNTY TEXAS 8

8(2)

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

Texas Water Well Drillers Board P. O. Box 13087 Austin, Texas 78711

1) OWNER Adela Hundl (Name) Address 162 Lezak Rd. (Street or RFD) Sealy, Texas (City) (State) (Zip)

2) LOCATION OF WELL: County Austin, 9 miles in East (N.E., S.W., etc.) direction from Sealy, Texas (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. 7 Survey Name Stephen F. Austin
Distance and direction from two intersecting section or survey lines _____

☒ See attached map.

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other _____

5) DRILLING METHOD (Check):
☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG:

Date drilled 6-26-84

DIAMETER OF HOLE Dia. (in.)	From (ft.)	To (ft.)
	Surface	
3	0	96

From (ft.)	To (ft.)	Description and color of formation material
0	60	Red Clay
60	96	Sand

7) BOREHOLE COMPLETION:
☐ Open Hole ☒ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
2	New	Plastic	0	90	Sch 40
2	New	Plastic Under Bar	90	96	.016

CEMENTING DATA
Cemented from 0 ft. to 10 ft.
Method used Cement Slurry
Cemented by Wendt Well Service (Company or Individual)

9) WATER LEVEL:
Static level 52 ft. below land surface Date 6-26-84
Artesian flow _____ gpm. Date _____

10) PACKERS: Type Depth

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AUG 20 1985
DEPT. OF WATER RESOURCES

(Use reverse side if necessary)

11) TYPE PUMP:
☐ Turbine ☒ Jet ☐ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 60 ft.

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 10 gpm with 0 ft. drawdown after 4 hrs.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata 36'
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

COMPANY NAME Wendt Well Service (Type or Print) Water Well Driller's License No. 001138

ADDRESS Route 1, Box 124 (Street or RFD) Cat Spring, (City) Texas (State) 78933 (Zip)

(Signed) Kenneth Wendt (Licensed Water Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TDWR use only
Well No. 66-16-802
Located on map yes C.F.S.

TDWR-0392 (Rev. 5-27-82)

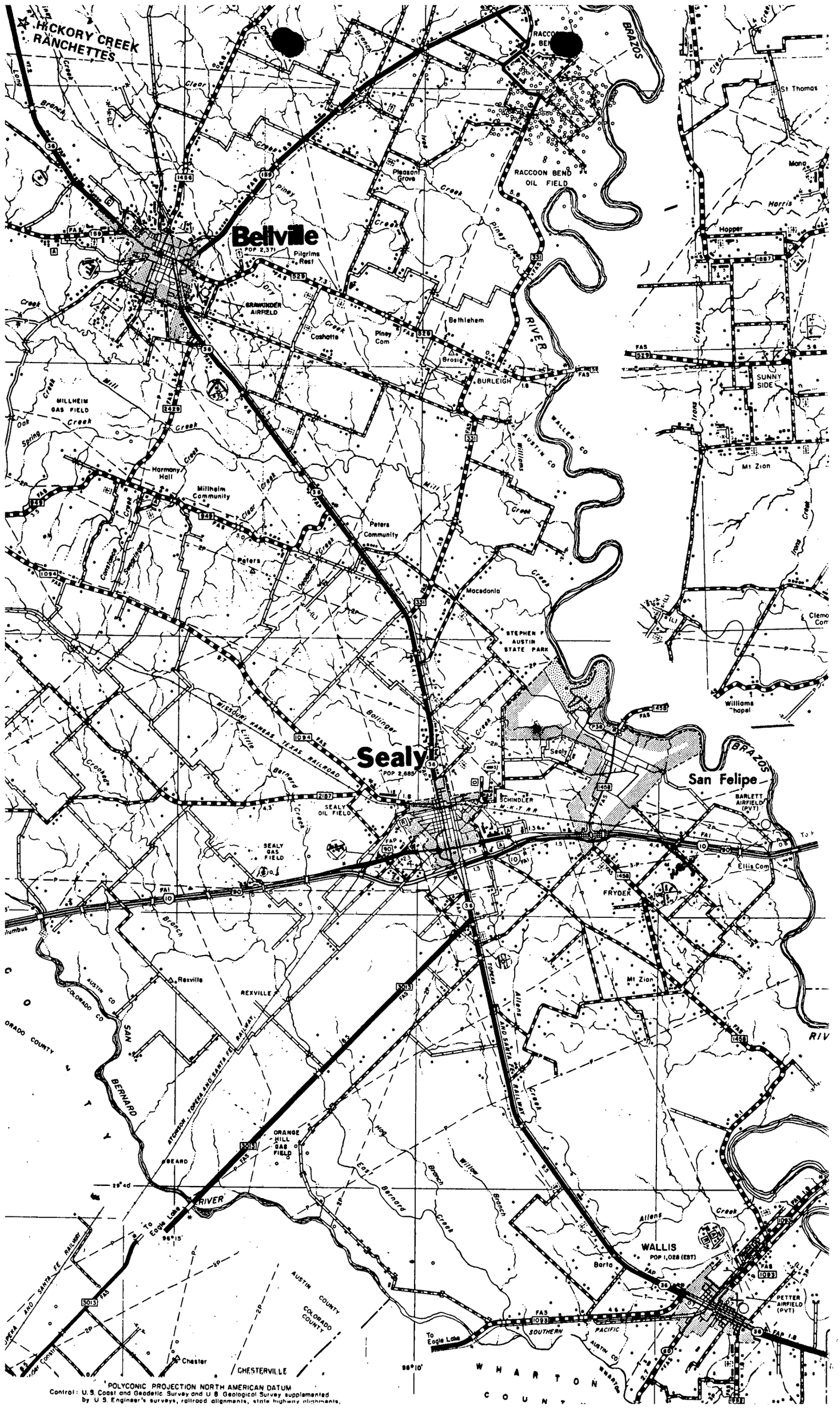
DEPARTMENT OF WATER RESOURCES COPY

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

The Water Well Drillers Board and the Department of Water Resources are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

> "Every registered water well driller drilling, deepening, or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within sixty (60) days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential. Please note that the term "Commission" in the above-quoted section and elsewhere in the Water Well Drillers Act now properly means the Texas Department of Water Resources (P. O. Box 13087; Austin, Texas 78711).



POLYCONIC PROJECTION NORTH AMERICAN DATUM
Control: U.S. Coast and Geodetic Survey and U.S. Geological Survey supplemented by U.S. Engineer's surveys, railroad alignments, state highway alignments,

ATTENTION OWNER - Confidentiality Privilege Notice on Reverse Side

STATE OF WATER WELL REPORT 8(3)

1) OWNER: VITAL LINK ADDRESS: 110 BARTLETT RD CITY: SEALY STATE: TX ZIP: -

2) ADDRESS OF WELL:
County: AUSTIN GRID # 66-16-8
Street or RFD: 110 BARTLETT RD
City, State, Zip code: SEALY , TX

8

5)

3) TYPE OF WORK: NEW WELL

4) PROPOSED USE: PUBLIC SUPPLY
If Public Supply well, were plans submitted to the TNRCC? No

6) WELL LOG: 24448

DATE DRILLING:
STARTED: 07/19/02
COMPLETED: 07/22/02

DIAMETER OF HOLE

DIAMETER	FROM	TO
9	0	380
6.5	380	401

7) DRILLING METHOD: MUD ROTARY

8) BOREHOLE COMPLETION: STRAIGHT WALL
IF GRAVEL... FROM FT. TO FT.
FROM FT. TO FT.

N^

CASING, BLANK PIPE, AND WELL SCREEN DATA:

DIA	NEW/USED	DESCRIPTION	FROM	TO	GAGE CASING SCREEN
5	N	PVC CASING	0	378	SDR17
3	N	GALVANIZED LINER	360	381	WW
3	N	S/S PIPE BASE SCREEN	381	401	08

GEOLOGICAL DESCRIPTION:

FROM	TO	DESCRIPTION
0	3	TOP SOIL
3	18	CLAY
18	38	SAND
38	46	CLAY
46	90	GRAVEL
90	155	CLAY
155	188	SAND
188	195	CLAY
195	218	SAND
218	222	ROCK
222	249	SAND
249	252	ROCK
252	280	CLAY
280	295	SAND
295	380	CLAY

9) CEMENTING DATA:
Cemented from 378 FT. TO 0 FT. No. of Sacks Used 45
FT. TO FT.
Method used: PRESSURE
Cemented by: ODCI
Distance to septic field lines: ft.
Method of verification of above distance:

10) SURFACE COMPLETION:
SLAB BY OWNER

11) WATER LEVEL:
STATIC LEVEL : 81 FT. DATE: 07/22/02
ARTESIAN FLOW: GPM. DATE:

12) PACKERS: TYPE DEPTH
B P SEAL 360

13) TYPE PUMP:
SUBMERSIBLE
DEPTH TO PUMP: 189

14) WELL TEST:
PUMP
YIELD: 75 GPM WITH 25 FT DRAWDOWN AFTER 36 HRS

15) WATER QUALITY:
TYPE OF WATER: N/A DEPTH OF STRATA: 21 CHEMICAL ANALYSIS MADE
NO STRATA OF UNDESIRABLE WATER PENETRATED

COMPANY NAME: O'DAY DRILLING CO., INC. WATER WELL DRILLER'S LICENSE NO.: 1877,4111,4884
ADDRESS: 2357 GARDEN RD CITY: PEARLAND STATE: TX ZIP CODE: 77581-8744

FOR TWC USE ONLY
WELL NO. _____
LOCATED ON MAP _____

I HEREBY CERTIFY THAT THIS WELL WAS DRILLED BY ME (OR UNDER MY SUPERVISION) AND THAT EACH AND ALL OF THE STATEMENTS HEREIN ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I UNDERSTAND THAT FAILURE TO COMPLETE ITEMS 1 THRU 15 WILL RESULT IN THE LOG(S) BEING RETURNED FOR COMPLETION AND RESUBMITTAL.

(signed) Rogelio Meza (LICENSED WATER WELL DRILLER)

(signed) _____ (REGISTERED DRILLER TRAINEE)

RECEIVED
TDLR MAIL ROOM SH
AUG 26 2002
RECEIPT # AMOUNT

STATE EXAS WATER WELL REPORT (PAGE 2)

OWNER: VITAL LINK ADDRESS: 110 BARTLETT RD CITY: SEALY STATE: TX ZIP: -

380 401 SAND

8(4)

Please use black ink.
Send original copy by certified mail to the
Texas Water Commission
P.O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

1) OWNER James Ford (Name) Address Rt. #1 371 Lezak Rd. (Street or RFD) Sealy (City) Tx. (State) 77474 (Zip)

2) LOCATION OF WELL: County Austin 4 miles in S.E. (N.E., S.W., etc.) direction from Sealy (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ **Legal description:**
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☐ See attached map. on 66-16-4

3) **TYPE OF WORK** (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) **PROPOSED USE** (Check):
☒ Domestic ☐ Industrial ☐ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ Other _____

5) **DRILLING METHOD** (Check): ☐ Driven
☒ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Other _____

6) **WELL LOG:**
Date Drilling: Started 7-24-87 19__ Completed _____ 19__

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
6½"	Surface	314

7) **BOREHOLE COMPLETION:**
☐ Open Hole ☒ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	10	Top Soil & Clay
10	74	Sand
74	94	Pea Gravel
94	130	Clay
130	160	Sand
160	174	Clay
174	190	Sand
190	200	Clay
200	214	Sand
214	230	Clay
230	234	Sand
234	254	Sandstone & Sand
254	274	Sand
274		Sand

(Use reverse side if necessary)

8) **CASING, BLANK PIPE, AND WELL SCREEN DATA:**

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	N	Sch 40 PVC	0	230	
4	N	Pvc Slotted Screen	230	270	.014

9) **CEMENTING DATA** [Rule 319.44(b)]
Cemented from 0 ft. to 15 ft. No. of Sacks Used _____
_____ ft. to _____ ft. No. of Sacks Used _____
Method used _____
Cemented by ACWWS

10) **SURFACE COMPLETION**
☐ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☒ Approved Alternative Procedure Used [Rule 319.71]

11) **WATER LEVEL:**
Static level _____ ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

12) **PACKERS:** Type Shale Depth

13) **TYPE PUMP:**
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) **WELL TESTS:**
Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 85 gpm with ½ ft. drawdown after 2 hrs.

15) **WATER QUALITY:**
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

I here by certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME AUSTIN COUNTY WATER WELL SERVICE INC. (Type or Print) Water Well Driller's License No. 1874

ADDRESS 1401 Columbus Rd. (Street or RFD) Sealy (City) Tx. (State) 77474 (Zip)

(Signed) _____ (Licensed Water Well Driller)

(Signed) Jerry J. Barta (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only
Well No. 66-16-8
Located on map _____

TWC-0392 (Rev. 06-10-85)

TEXAS WATER COMMISSION COPY

Send original copy by certified return receipt requested mail to: TDLR, P.O. Bo[8(5)] Austin, TX 78711

ATTENTION OWNER: *Confidentiality Privilege Notice on reverse side of Well Owner's copy*

State of Texas WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER BOB YOUNG (Name) ADDRESS 191 BARTLETT ROAD (Street or RFD) SEALY (City) TX (State) 77474 (Zip)

2) ADDRESS OF WELL: County AUSTIN 191 BARTLETT RD (Street, RFD or other) SEALY (City) TX (State) 77474 (Zip) Long. ____ Lat. ____ GRID # 66-16-8

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boding ☒ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) X

6) WELL LOG:
Date Drilling: Started 9/03/99 Completed 9-04/99

DIAMETER OF HOLE

Dia.. (in.)	From (ft.)	To (ft.)
7.75	Surface	160

7) DRILLING METHOD (Check): ☐ Driven ☐ Air Rotary ☒ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other

N

From (ft.)	To (ft.)	Description and color of formation material
0	5	BLACK CLAY
5	60	SAND & GRAVEL
60	70	CLAY & ROCK
70	80	GRAVEL
80	110	WHITE CLAY
110	115	SAND
115	140	RED & WHITE CLAY
140	160	SAND & ROCK

(Use reverse side if necessary)

8) Borehole Completion (Check): ☐ Open Hole X Straight Wall ☐ Underreamed ☐ Gravel Packed ☐ Other
If Gravel Packed give interval ... from ____ ft. to ____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting	Gage Screen
4	N	PVC	0	140		
4	N	PVC SLOTTED	140	160		.010

9) CEMENTING DATA
Cemented from 0 ft. to 15 ft. No. of sacks used 12
ft. to ft. No. of sacks used
Method used SLURRY
Cemented by BURLESON SERVICES INC
Distance to septic system field lines or other concentrated contamination ____ ft.
Method of verification of above distance NONE ON SITE

13) ☐ Well plugged within 48 hours

Casing left in well: From (ft)	Casing left in well: To (ft)	Cement/bentonite placed in From (ft)	Cement/bentonite placed in To (ft)	Sacks used:

14) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other
Depth to pump bowls, cylinder, jet, etc., ____ ft.

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed
☒ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

15) WELL TESTS:
Type test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 40 Gpm with 25 ft. drawdown after 2 hrs.

11) WATER LEVEL
Static Level 60 ft. below land surface Date 9/04/99
Artesian flow ____ gpm Date ____

16) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ____ Depth of strata ____
Was a chemical analysis made? ☐ Yes ☐ No

12) PACKERS:

Type	Depth
ONE SHALE	15'

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME BURLESON SERVICES INC (Type or print) WELL DRILLER'S LICENSE NO. 3039WPK

ADDRESS PO BOX 1091 (Street or RFD) SEALY (City) TX (State) 77474 (Zip)

(Signed) ____ (Licensed Well Driller) (Signed) ____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDLR FORM 001WWD (4/98) Forms On-A-Disk, Inc. · Dallas, Texas · (214) 340-9429

Copies to TDLR, DRILLER, and WELL OWNER

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

STATE OF 8(6)
WATER WELL REPORT

1) OWNER: JONES, CLIFF ADDRESS: P.O.BOX 420 CITY: SEALY STATE: TX ZIP: 77474-

2) ADDRESS OF WELL:
County: AUSTIN STATE WELL#
Street or RFD: 1100 MEYER ROAD (LOST RIVER RANCH)
City, State, Zip code: SEALY , TX 77474-

5)

3) TYPE OF WORK: NEW WELL

4) PROPOSED USE: DOMESTIC
If Public Supply well, were plans submitted to the TNRCC?

6) WELL LOG: 00046
DATE DRILLING:
STARTED: 02/07/96
COMPLETED: 02/08/96

DIAMETER OF HOLE

DIAMETER	FROM	TO
7.75	0	205
4.75	205	216

7) DRILLING METHOD: MUD ROTARY

8) BOREHOLE COMPLETION: TWO-STRING
IF GRAVEL... FROM FT. TO FT.
FROM FT. TO FT.

66-16-8
N^

CASING, BLANK PIPE, AND WELL SCREEN DATA:

DIA	NEW/USED	DESCRIPTION	FROM	TO	GAGE CASING SCREEN
5.0	N	PVC WELL CASING	+2	205	SDR.17
2.5	N	PVC BLANK PIPE	198	205	SCH.80
2.5	N	STAINLESS ROD BASE	205	215	10 GA.
2.5	N	PVC BLANK PIPE	215	216	SCH.80

GEOLOGICAL DESCRIPTION:

FROM	TO	DESCRIPTION
0	20	BLACK TOPSOIL, RED CLAY WHITE CLAY
20	40	SAND & GRAVEL CLAY
40	60	ROCK WHITE CLAY
60	80	CLAY ROCK CLAY
80	100	ROCK,SAND,ROCK,SAND CLAY,SAND
100	120	CLAY ROCK CLAY
120	140	SAND ROCK SAND
140	160	ROCK,SAND,ROCK,SAND
160	180	SAND,CLAY
180	200	CLAY ROCK CLAY ROCK
200	216	COARSE SAND

RECEIVED
MAR 25 1996

9) CEMENTING DATA:

Cemented from				No. of Sacks Used
205 FT.	TO	18 FT.		24
18 FT.	TO	1 FT.		8

Method used: HALLIBURTON METHOD
Cemented by: GDI-FULL RETURN
Distance to septic field lines: ft.
Method of verification of above distance:
NOT INSTALLED

10) SURFACE COMPLETION:
PITLESS ADAPTER USED

11) WATER LEVEL:
STATIC LEVEL : 27 FT. DATE: 02/08/96
ARTESIAN FLOW: GPM. DATE:

12) PACKERS:

TYPE	DEPTH
BP SEAL	198
FORMATION PACKER	18

13) TYPE PUMP:
SUBMERSIBLE
DEPTH TO PUMP: 100

14) WELL TEST:
JETTED
YIELD: 80 GPM WITH FT DRAWDOWN AFTER HRS

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

15) WATER QUALITY:
TYPE OF WATER: EXCELLENT DEPTH OF STRATA: 16' OF SAND NO CHEMICAL ANALYSIS MADE
NO STRATA OF UNDESIRABLE WATER PENETRATED

COMPANY NAME: GEOPHYSICAL DRILLING,INC. WATER WELL DRILLER'S LICENSE NO.: 4898WPK
ADDRESS: P.O. BOX 664 CITY: FULSHEAR STATE: TX ZIP CODE: 77441

FOR TWC USE ONLY
WELL NO. _____
LOCATED ON MAP _____

I HEREBY CERTIFY THAT THIS WELL WAS DRILLED BY ME (OR UNDER MY SUPERVISION) AND THAT EACH AND ALL OF THE STATEMENTS HEREIN ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I UNDERSTAND THAT FAILURE TO COMPLETE ITEMS 1 THRU 15 WILL RESULT IN THE LOG(S) BEING RETURNED FOR COMPLETION AND RESUBMITTAL.

(signed) Jimmy D. Brun (LICENSED WATER WELL DRILLER)

(signed) _____ (REGISTERED DRILLER TRAINEE)

T

1.0mi N/SL
1.1mi E/WL

8(7)

Please use black ink.
Send original copy by certified mail to the Texas Department of Water Resources
P. O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

1) OWNER Joseph D. Manak (Name) Address 158 Lezek Rd. (Street or RFD) Sealy, Texas 77474 (City) (State) (Zip)

2) LOCATION OF WELL: County Austin 6 miles in East (N.E., S.W., etc.) direction from Sealy, Texas (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. 7 Survey Name Stephen F. Austin
Distance and direction from two intersecting section or survey lines _____

☒ See attached map.

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other _____

5) DRILLING METHOD (Check):
☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG:

Date drilled 6-17-85

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
	Surface	
5 1/2	0	92

From (ft.)	To (ft.)	Description and color of formation material
0	52	Red Clay
52	92	Sand & Gravel

7) BOREHOLE COMPLETION:
☐ Open Hole ☒ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	New	Plastic	0	84	Sch40
4	New	PLastic Under Bar	84	92	.016

9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 9 ft. to 10 ft.
_____ ft. to _____ ft.
Method used Cement Slurry
Cemented by Wendt Well Service

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☐ Approved Alternative Procedure Used [Rule 319.71]

RECEIVED
DEC 4 1985
TEXAS WATER COMMISSION

11) WATER LEVEL:
Static level 50 ft. below land surface Date 6-17-85
Artesian flow _____ gpm. Date _____

12) PACKERS: Type Depth

13) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 70 ft.

(Use reverse side if necessary)

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata 40'
Was a chemical analysis made? ☐ Yes ☒ No

14) WELL TESTS:
Type Test: ☒ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 10 gpm with 4 ft. drawdown after 4 hrs.

I here by certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Wendt Well Service (Type or Print) Water Well Driller's License No. 001138

ADDRESS Route 1, Box 124 (Street or RFD) Cat Spring, (City) Texas (State) 78933 (Zip)

(Signed) Kenneth Wendt (Licensed Water Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TDWR use only
Well No. 66-16-8
Located on map _____

DEPARTMENT OF WATER RESOURCES COPY

TDWR-0392 (12/29/83)

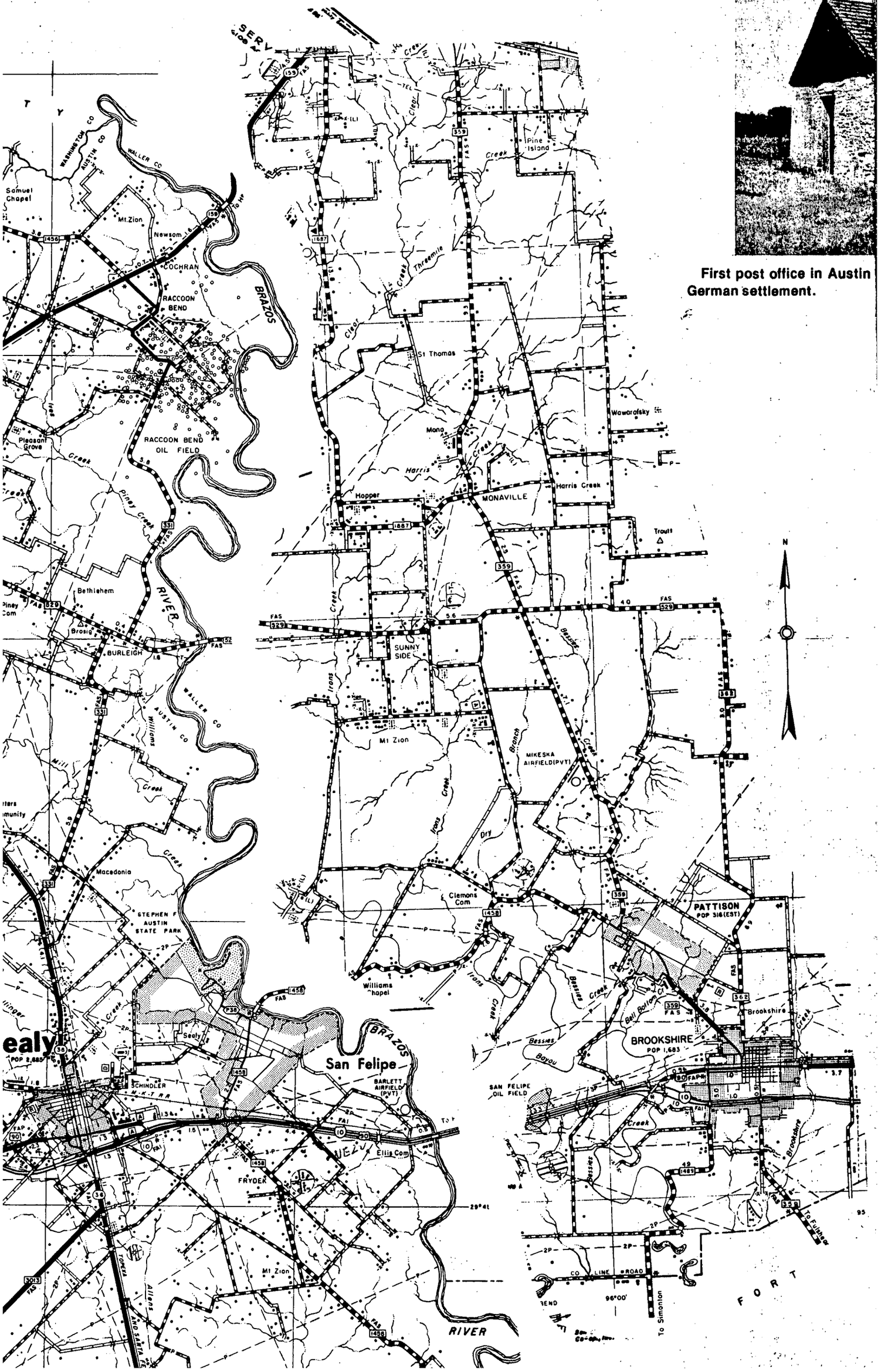
IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

The Water Well Drillers Board and the Department of Water Resources are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

> "Every licensed water well driller drilling, deepening or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within 30 days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the department, and the owner thereof or the person having had such well drilled. Each copy of a well log, other than a department copy, shall include the name, mailing address, and telephone number of the Board and the department. The well log required herein shall at the request in writing to the department, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

First post office in Austin German settlement.



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ)

UNNUMBERED WELL LOG EXHIBIT

U1

GW 7

Send original copy by certified mail to the Texas Water Development Board P. O. Box 12386 Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No.
Located on map NO
Received: 68
Form GW 8
Form GW 9

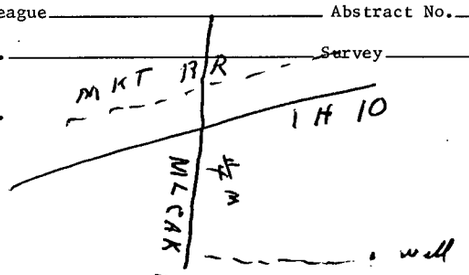
1) OWNER:
Person having well drilled D. Jagolas (Name) Address RFD (Street or RFD) Sealy (City) Tex (State)

Landowner (Name) Address (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Austin Labor League Abstract No.

NW¼ NE¼ SW¼ SE¼ of Section Block No. Survey
(Circle as many as are known)

miles in (NE., SW., etc.) direction from (Town).



Sketch map of well location with distances from adjacent section or survey lines, and to landmarks, roads, and creeks.

3) TYPE OF WORK (Check):
New Well ☑ Deepening ☐
Reconditioning ☐ Plugging ☐

4) PROPOSED USE (Check):
Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

5) TYPE OF WELL (Check):
Rotary ☑ Driven ☐ Dug ☐
Cable ☐ Jetted ☐ Bored ☐

6) WELL LOG:
Diameter of hole 4" in. Depth drilled 80 ft. Depth of completed well 80 ft. Date drilled 12-13-68

All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	30	Top Soil & Red clay
30	36	Sand
36	62	Red clay
62	68	Sand
68	80	Gravel

From (ft.)	To (ft.)	Description and color of formation material
		(Use reverse side if necessary)

7) COMPLETION (Check):
Straight wall ☑ Gravel packed ☐ Other ☐
Under reamed ☐ Open hole ☐

8) WATER LEVEL:
Static level 53 ft. below land surface Date
Artesian pressure lbs. per square inch Date

9) CASING:
Type: old ☐ New ☑ Steel ☑ Plastic ☑ Other ☐
Cemented from ft. to ft.

10) SCREEN:
Type Plastic Wrapped
Perforated ☐ Slotted ☐

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot size

11) WELL TESTS:
Was a pump test made? ☐ Yes ☐ No If yes by whom?

Yield: gpm with ft. drawdown after hrs
Bailer test gpm with ft. drawdown after hrs
Artesian flow gpm Date
Temperature of water
Was a chemical analysis made? ☐ Yes ☐ No
Did any strata contain undesirable water? ☐ Yes ☑ No
Type of water? depth of strata

12) PUMP DATA:
Manufacturer's Name
Type H.P.
Designed pumping rate gpm ☐ gph ☐
Type power unit
Depth to bowls, cylinder, jet, etc., ft.
below land surface.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME FLOYD BLAKEY (Type or Print) Water Well Drillers Registration No. 778

Address (Street or RFD) Sealy (City) Tex (State)

(Signed) Floyd Blakey (Water Well Driller) (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

12

Proposed Sealy Composting Facility
Intersection of Bartlett Road and Brazos 10 Lane
Sealy, TX 77474

Inquiry Number: 4417539.1
September 30, 2015

The EDR TX Oil & Gas Report

Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Environmental Data Resources, Inc.
Oil and Gas Well Review

EDR reviewed available records made public by the state of Texas at the Texas Railroad Commission (TRC) and obtained information about oil and gas wells within the standard Area of Review (AOR-1 mile). EDR researched the oil and gas wells identified on county base maps at the Texas Railroad Commission and transferred the approximate oil and gas well locations onto a map for the client's review.

EDR cannot guarantee the accuracy of the information provided by state agencies. This review is intended to provide the user with a "working approximation" of reported oil and gas well locations and their associated data. Data provided in this report may include the following:

- Owner/Operator
- Total Depth (recorded in feet)
- Date Drilled
- Date Plugged
- API Number
- Well Type (Oil, Gas, Salt, Dry)

Please call EDR Nationwide Customer Service at
1-800-352-0050 (8am-8pm ET)
with questions or comments about your report.
Thank you for your business!

SEARCH DISTANCES SHOWN **.5 MILE** **1 MILE**	**OILGAS WELL LOCATION MAP** **WELLS WITHIN 1 MILE RADIUS** **PROPOSED SEALY COMPOSTING FACILITY** **INTERSECTION OF BARTLETT ROAD AND BRAZOS 10 LANE** **SEALY, TX 77474** **AUSTIN COUNTY** **USGS 7.5 MINUTE QUAD** **SAN FELIPE**	EDR™ Environmental Data Resources Inc ***ENVIRONMENTAL DATA RESOURCES*** **6 ARMSTRONG ROAD** **SHELTON, CT 06484** **800-352-0050 FAX: 800-231-6802**

EDR OIL/GAS REVIEW

Site Name: Proposed Sealy Composting Facility **Inquiry #: 4417539.1**

Site Address: Intersection of Bartlett Road and Brazos 10 Lane

City: Sealy **State: TX** **Zip: 77474**

Well #	Owner/ Operator	Total Depth	Date Drilled	Date Plugged	API#	Type
1	NA	NA	NA	NA	NA	DRY HOLE
	29.7853 / -96.0680					
	WELL LOCATION PLOTTED BY TEXAS RAILROAD COMMISSION. NO API REGISTERED TO WELL LOCATION. NO DATA AVAILABLE.					
2	NA	NA	NA	NA	NA	DRY HOLE
	29.7737 / -96.0650					
	WELL LOCATION PLOTTED BY TEXAS RAILROAD COMMISSION. NO API REGISTERED TO WELL LOCATION. NO DATA AVAILABLE.					
3	NA	NA	NA	NA	NA	DRY HOLE
	29.7729 / -96.0622					
	WELL LOCATION PLOTTED BY TEXAS RAILROAD COMMISSION. NO API REGISTERED TO WELL LOCATION. NO DATA AVAILABLE.					
4	NA	NA	NA	NA	NA	CANCELED LOCATION
	29.7712 / -96.0667					
	WELL LOCATION PLOTTED BY TEXAS RAILROAD COMMISSION. NO API REGISTERED TO WELL LOCATION. NO DATA AVAILABLE.					

Source: Texas Railroad Commission GIS Mapping Center

Appendix H

Texas Historical Commission Review

TEXAS HISTORICAL COMMISSION

REQUEST FOR SHPO CONSULTATION:
Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas

Please see instructions for completing this form and additional information on Section 106 and Antiquities Code consultation on the Texas Historical Commission website at http://www.thc.state.tx.us/crm/crmsend.shtml.

☒ This is a new submission.

☐ This is additional information relating to THC tracking number(s): _____

Project Information

PROJECT NAME
SouthWaste Proposed Composting Facility

PROJECT ADDRESS	PROJECT CITY	PROJECT ZIP CODE(S)
Near 1228 Brazos Ten Lane	**Sealy**	**77474**

PROJECT COUNTY OR COUNTIES
Austin County

PROJECT TYPE (Check all that apply)

☐ Road/Highway Construction or Improvement	☐ Repair, Rehabilitation, or Renovation of Structure(s)
☒ Site Excavation	☐ Addition to Existing Structure(s)
☐ Utilities and Infrastructure	☐ Demolition or Relocation of Existing Structure(s)
☒ New Construction	☐ None of these

BRIEF PROJECT DESCRIPTION: Please explain the project in one or two sentences. More details should be included as an attachment to this form.
The proposed project is for SouthWaste Disposal, LLC to construct and operate a composting facility by storing, handling, and processing municipal solid waste (grease trap waste/septic/sewage sludge). This type of facility is regulated by the Texas Commission on Environmental Quality (TCEQ); therefore, the proposed facility must obtain a permit and is subject to 30 TAC §330, 30 TAC §332, and other sundry rules.

Project Contact Information

PROJECT CONTACT NAME	TITLE	ORGANIZATION	
Ben Camacho	**Environmental Scientist**	**Daniel B. Stephens&Associates**	
ADDRESS	CITY	STATE	ZIP CODE
4030 West Braker Lane, Ste. 325	**Austin**	**Texas**	**78759**
PHONE	EMAIL		
512-651-6019 (direct)	**bcamacho@dbstephens.com**		

Federal Involvement (Section 106 of the National Historic Preservation Act)

Does this project involve approval, funding, permit, or license from a federal agency?

☐ Yes (Please complete this section) ☒ No (Skip to next section)

FEDERAL AGENCY	FEDERAL PROGRAM, FUNDING, OR PERMIT TYPE
CONTACT PERSON	PHONE
ADDRESS	EMAIL

State Involvement (Antiquities Code of Texas)

Does this project occur on land or property owned by the State of Texas or a political subdivision of the state?

☐ Yes (Please complete this section) ☒ No (Skip to next section)

CURRENT OR FUTURE OWNER OF THE PUBLIC LAND	
CONTACT PERSON	PHONE
ADDRESS	EMAIL

REQUEST FOR SHPO CONSULTATION -- PROJECT NAME: SouthWaste Proposed Composting Facility
Near 1228 Brazos Ten Lane Sealy Austin County

Identification of Historic Properties: Archeology
Does this project involve ground-disturbing activity? ☒ Yes (Please complete this section) ☐ No (Skip to next section)
Describe the nature of the ground-disturbing activity, including but not limited to depth, width, and length. **The composting and processing area will include a pad equipped with a 30-mil high density polyethylene liner to control excavated to a depth of 2-feet below grade and a lined retention to contain run-off from the composting area excavated to a depth of 12-feet below grade. Other portions of the facility (such as the office, maintenance shop, and stockpiles) may be graded for site leveling (ranging from 1-3 feet below grade). A scaled plan and facility map is included as an attachment.**
Describe the previous and current land use, conditions, and disturbances. **The Site is currently undeveloped. According to Mr. Mike Hicks, current property owner, the Site was never developed or used to store materials. According to Mr. Hicks, the Site was owned by Sea Corps prior to 1995 and was undeveloped during Sea Corps ownership. According to Mr. Hicks, no underground pipelines are located at the Site and the Site is not serviced by any known utilities. Drainage swales were created at the property to direct stormwater flow into a man-made stock pond.**

Identification of Historic Properties: Structures		
Does the project area or area of potential effects include buildings, structures, or designed landscape features (such as parks or cemeteries) that are 45 years of age or older? ☐ Yes (Please complete this section) ☒ No (Skip to next section)		
Is the project area or area of potential effects within or adjacent to a property or district that is listed in or eligible for listing in the National Register of Historic Places? ☐ Yes, name of property or district: ☐ No ☐ Unknown		
In the space below or as an attachment, describe each building, structure, or landscape feature within the project area or area of potential effect that is 45 years of age or older.		
ADDRESS	DATE OF CONSTRUCTION	SOURCE FOR CONSTRUCTION DATE
ADDRESS	DATE OF CONSTRUCTION	SOURCE FOR CONSTRUCTION DATE
ADDRESS	DATE OF CONSTRUCTION	SOURCE FOR CONSTRUCTION DATE

Attachments

Please see detailed instructions regarding attachments.

Include the following with each submission:

- ☒ Project Work Description
- ☒ Maps
- ☒ Identification of Historic Properties
- ☒ Photographs

For Section 106 reviews only, also include:

- ☐ Consulting Parties/Public Notification
- ☐ Area of Potential Effects
- ☐ Determination of Eligibility
- ☐ Determination of Effect

Submit completed form and attachments to the address below. Faxes and email are not acceptable.

Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
P.O. Box 12276, Austin, TX 78711-2276 (mail service)
108 W. 16th Street, Austin, TX 78701 (courier service)

For SHPO Use Only

ANTIQUITIES CODE OF TEXAS REVIEW
NO SIGNIFICANT SITES
PROJECT MAY PROCEED
by _____
for Mark Wolfe
Executive Director, THC
Date 10/22/15
Track# _____

Appendix I

Stormwater Drainage Analysis

November 9, 2015

Texas Commission on Environmental Quality
Municipal Solid Waste Permit Section (MC-124)
Waste Permits Division
12100 Park 35 Circle, Bldg. F
Austin, Texas 78753

Re: Stormwater Drainage Analysis
South Waste Disposal [Proposed] Sealy Compost Facility - Austin County
Municipal Solid Waste - Permit No. [To be Assigned]

To Whom It May Concern:

Daniel B. Stephens & Associates, Inc. (DBS&A) is pleased to submit this report documenting stormwater drainage calculations completed during design of the referenced compost facility. The required minimum volume of the pond was determined using the Natural Resources Conservation Service (NRCS) Curve Number method and the 25-year, 24-hour design storm. As specified in the Texas Department of Transportation (TxDOT) Bridge Division Hydraulic Manual, drainage calculations for determination of peak discharge using the Rational Method were performed for both pre-construction and post-construction conditions. The 25-year design storm most similar to the time of concentration was used to determine peak flow.

Surface Water Protection

The facility is designed to control rainfall run-on and run-off. A raised railroad track adjacent to the south property boundary and an elevated roadway for Bartlett Road adjacent to the east property boundary will minimize the amount of run-on to the site from these upgradient locations. The compost processing area (i.e., the lined pad used for composting and curing) is self-contained (i.e., surrounded by berms that prevent run-on), and is sloped toward a stormwater retention pond on the west side of the bermed area to collect run-off from the composting area. Perimeter berms along the west and north property boundary will be utilized to route on-site run-off to a central point of concentration near the facility access gate. This centralized location will aid stormwater monitoring without increasing run-off north of the site (due to a reduction in contributing acreage, the peak flow decreased by nearly 18 percent). This will also improve stormwater management by re-routing run-off around the existing residential property to the north.

Retention Pond Design

Based on the 25-year, 24-hour design storm precipitation event and including a 10 percent factor of safety, the minimum required capture volume for the 11 acre compost pad and stormwater retention pond is approximately 2.7 million gallons (13,500 cubic yards). In

addition to the minimum capacity needed to contain this design storm, the 3-acre, 12-foot-deep stormwater retention pond has more than 5 million gallons (25,000 cubic yards) in additional surplus capacity. Given the nature of the facility's setting (i.e., net evaporative based on mean precipitation and evaporation data), the pond is not anticipated to accumulate significant volumes of water. However, the pond has been designed to maintain sufficient capacity to handle a series of larger rainfall events. As designed, the stormwater retention pond has approximately 7 feet of freeboard (over the design storm), and is surrounded by a 4-foot-tall berm. The pond has been designed with an overflow spillway set 1 foot above the bottom of the berm.

Peak Discharge

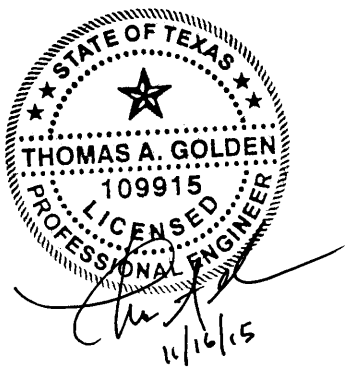
Evaluation of peak discharge for each of the on-site sub-basin was performed to ensure that site development will not cause increases to downstream, off-site drainage. Drainage to the natural water course west and north of the site will be eliminated due to construction of the self-contained stormwater retention pond and regrading of the northwest corner of the site. Run-off on the east side of the site is expected to increase from 2.5 to 3.7 cubic feet per second (cfs), but will be conveyed to an existing, on-site stormwater pond. The only planned off-site discharge point will be located near the facility access gate. Based on the 25-year design storm, peak discharge at this location is expected to decrease from 3.5 to 2.9 cfs.

Flow from this area will be conveyed in an unlined ditch along the northern property boundary. A 12-inch-diameter corrugated high density polyethylene (CHDPE) culvert system will convey stormwater under the unimproved road north of the site, prior to being discharged onto a riprap outfall structure. These drainage improvements will allow stormwater flow to be rerouted around the existing residential property north of the site into a natural drainage course. Although drainage on the east side of the site is also self-contained, an additional 12-inch-diameter CHDPE culvert system will be installed under the facility access road to handle overflow from the existing stormwater retention pond.

Thank you for your review of this permit application. If you have any questions or require additional information, please contact our office at (505) 822-9400.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.



Thomas Golden, P.E.
Project Engineer

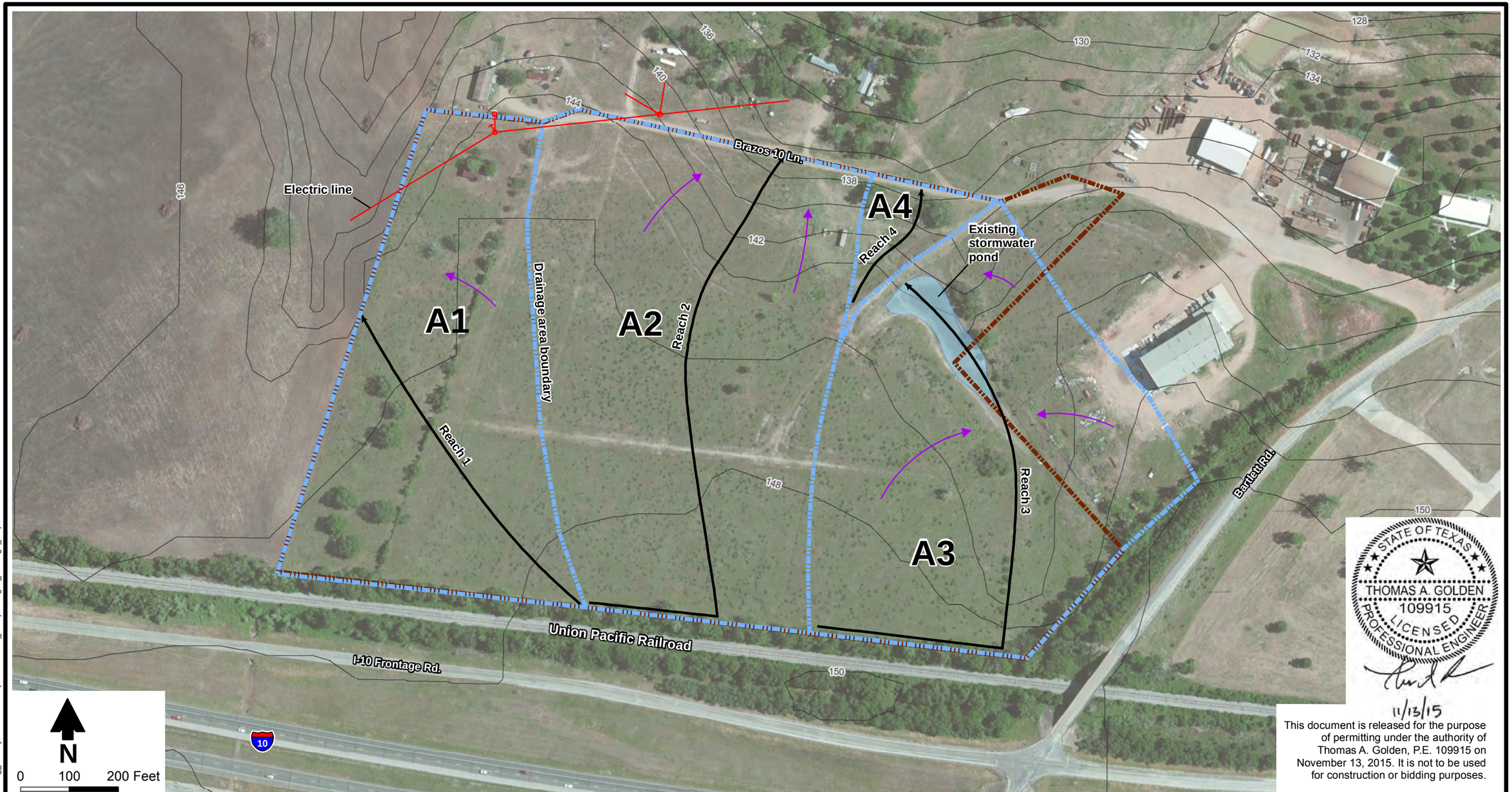
TG

Attachments

1. Pre-Construction On-Site Drainage Map
2. Post-Construction On-Site Drainage Map
3. Required Stormwater Retention Pond Volume Calculations
4. Stormwater Retention Pond Design Volume Calculations
5. Peak Discharge Calculations

Attachment 1

Pre-Construction
On-Site Drainage Map



Explanation

- Property Boundary
- 530 Contour interval and elevation (ft msl)
- Rainfall runoff flow direction
- Drainage area reach
- Drainage area boundary
- A1 Drainage area number

	Reach 1	Reach 2	Reach 3	Reach 4
Drainage Area (acres)	8.9	13.5	11.3	.9
Time of Concentration (hr)	5.2	7.0	8.7	1.3
Rainfall Intensity (in/hr)	1.1	0.9	0.7	3.1
Runoff Coeficient	0.3	0.3	0.3	0.3
Flow Rate (cf/sec)	3.0	3.5	2.5	0.8

Note: Calculations provided in appendix C2

STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER

11/13/15

This document is released for the purpose of permitting under the authority of Thomas A. Golden, P.E. 109915 on November 13, 2015. It is not to be used for construction or bidding purposes.

Sources:
1. Alexander Surveying, June 3, 2015.
2. Topography adapted from USGS National Elevation Dataset, 2013.
3. Aerial photo provided by ESRI and the National Agriculture Imagery Program (NAIP) imagery, 2014.

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
Texas Registered Geosciences Firm No. 50045

11/12/2015 JN ES14.0050

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

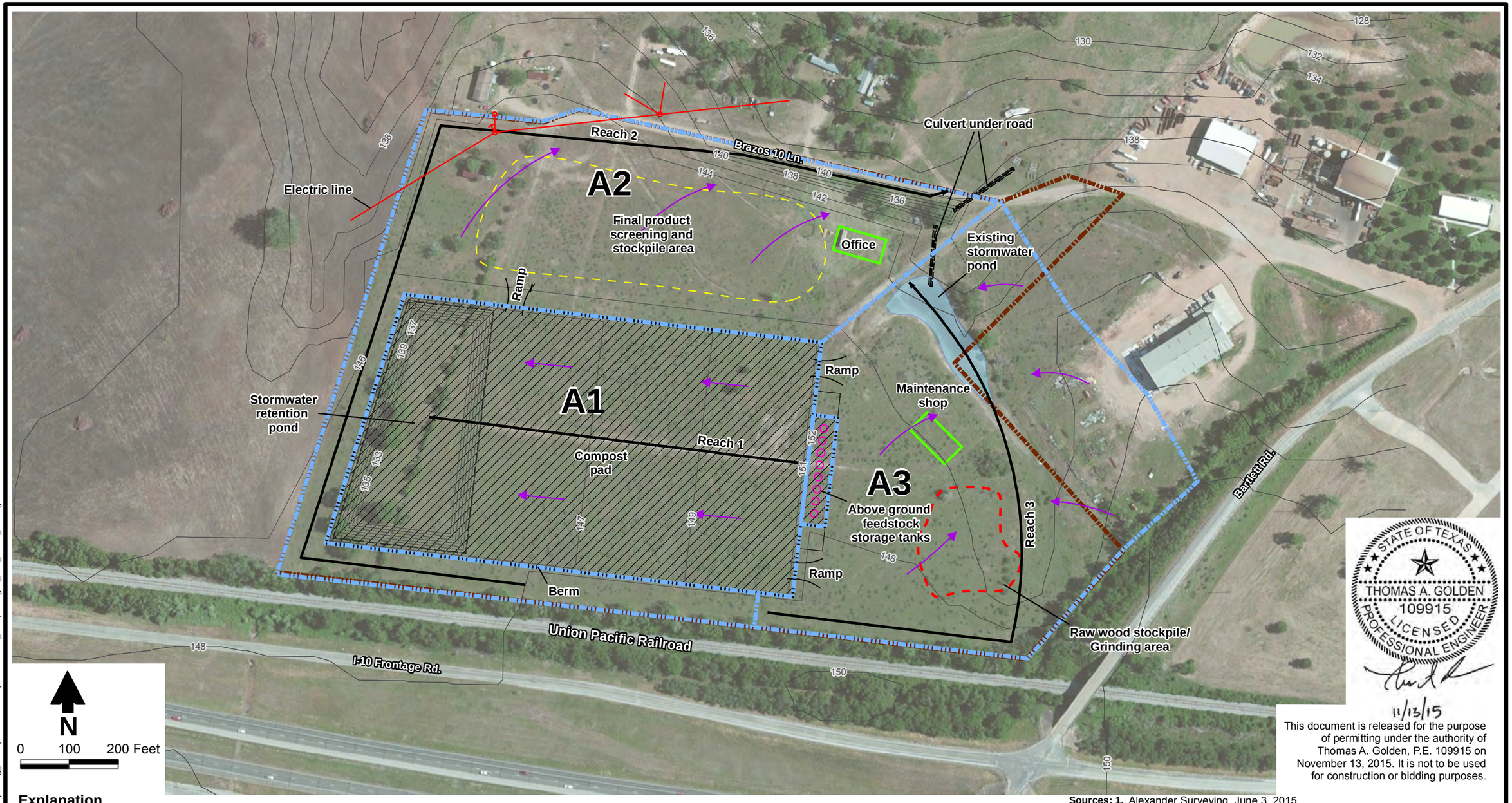
Pre-Construction On-Site Drainage Map

Figure 10

S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Reports\Permit2_stamped\Fig10_drainage_map.mxd

Attachment 2

Post-Construction
On-Site Drainage Map



Explanation

- Property Boundary
- Proposed permit area
- 530 Contour interval and elevation (ft msl)
- Rainfall runoff flow direction
- Drainage area reach
- Drainage area boundary
- A1 Drainage area number

	Reach 1	Reach 2	Reach 3
Drainage Area (acres)	11.0	11.9	11.3
Time of Concentration (hr)	1.8	9.1	5.5
Rainfall Intensity (in/hr)	2.8	0.7	1.1
Runoff Coeficient	0.35	0.35	0.3
Flow Rate (cf/sec)	10.9	2.9	3.7

Note: Calculations provided in appendix C2

STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER

11/13/15

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Sources:
1. Alexander Surveying, June 3, 2015.
2. Topography adapted from USGS National Elevation Dataset, 2013.
3. Aerial photo provided by ESRI and the National Agriculture Imagery Program (NAIP) imagery, 2014.

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
Texas Registered Geosciences Firm No. 50045
11/12/2015 JN ES14.0050

SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Post-Construction On-Site Drainage Map

Figure 11

S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Reports\Permit2_stamped\Fig11_post_constr_drainage.mxd

Attachment 3

Required Stormwater Retention Pond Volume Calculations

Introduction

This calculation determines the volume of stormwater runoff from a 25-year, 24-hour storm.

Assumptions

1. Processing area is 11 acres
2. Due to presence of liner, assume land use behaves like paved roads with curb and gutter.

Variables/Conversion Factors

CN[1] =	98		(Wurbs, 2002, Table 8.3)
Precip[2] =	8.5	inches	(USGS, 2004, Figure 47)
1 acre-ft =	43,560	ft^3	
1 ft^3 =	7.48	gallons	
1 ft =	12	inches	

Stormwater runoff depth:

The NRCS rainfall-runoff relationship is usually expressed as (Vr, P, S in inches) [1]

$$S = \frac{1000}{CN} - 10$$ (Wurbs, 2002, Equation 8.18)

$$V_r = \frac{(P - 0.2S)^2}{P + 0.8S}$$ (Wurbs, 2002, Equation 8.15)

S =	0.20	inches
Vr =	8.26	inches

The total volume of runoff from the site is calculated by multiplying the runoff depth (Vr, inches) by the total area of the site

$$Total\ V = V_r * Area$$

Total V =	91	in-acres
=	329,818	ft^3
=	2,467,212	gallons
=	12,215	CY

Notes

Perimeter berm will divert runon around the site.

Site will be graded to form two relatively equal stormwater basins of approximately 90 acres each.

References

1. Wurbs, Water Resources Engineering (2002)
2. USGS DDF Atlas for Texas (2004), http://pubs.usgs.gov/sir/2004/5041/pdf/sir2004-5041.pdf

Attachment 4

Stormwater Retention Pond Design Volume Calculations

Contour	Area	V (cf)	V (cy)	Cum V (cy)
133	65110			
135	72277	137387	5088	5088
137	79731	152008	5630	10718
139	87476	167207	6193	16911
141	95511	182987	6777	23688
143	103837	199348	7383	31072
145	112453	216290	8011	39082

Design storm volume:	13,500	CY
Design storm volume:	2,726,460	gallons
Design storm elevation:	137.8	elevation
Additional capacity:	25,582	CY
Additional capacity:	5,166,638	gallons

Attachment 5

Peak Discharge Calculations

Introduction

The stormwater channels and pipes will be sized to handle the peak discharge (runoff) from the 25-year storm. This calculation determines the peak discharge for pre-construction sub-basin A1.

Assumptions

1. Drainage area A1 is 8.9 acres[4]
2. Assume pre-construction land use is "unimproved".

Variables/Conversion Factors

1 hr = 3600 sec
1 acre-ft = 43,560 ft^3
1 ft = 12 inches

Outline of Approach

The rational method for calculating the peak runoff (applicable to watersheds less than 200 acres)[1,2]

$$Q_P = CiA$$

where
Q_p = peak discharge (acres-in/hr)
C = dimensionless runoff coefficient
i = rainfall intensity (in/hr)
A = drainage area (acres)

Intensity is determined from a depth-duration-frequency curve and the time of concentration for the watershed[2]:

$$i = \frac{P}{t_c}$$ (Wurbs, 2002, Equation 4-21)

where
P = depth of rainfall for the design storm of duration tc
tc = time of concentration for the watershed

Time of concentration of the watershed can be estimated using the curve number
First, the NRCS lag equation is used to calculated the lag time for the watershed[1]:

$$t_L = \frac{l^{0.8}\left(1{,}000 - 9CN\right)^{0.7}}{1{,}900CN^{0.7}Y^{0.5}}$$ (Wurbs, 2002, Equation 8.3)

where
t_L = lag time of watershed (hr)
l = hydraulic length from the outlet to the most hydraulically remote point in the watershed (ft)
Y = average land slope of the watershed in percent

Time of concentration is related to lag time:

$$t_c = \frac{5}{3}t_L$$ (Wurbs, 2002, Equation 8.7)

Calculation

From GIS figures, the hydraulically most distant point is

l = 750 ft

The average land slope of the watershed measured from USGS topo data is

slope (Y) = 0.007 ft/ft

Therefore,

t_L = 3.2 hr

tc = 5.3 hr

Based on the design storm for a duration similar to the time of concentration

From USGS DDF Atlas for Texas[3] Figure 45, P = 6 inches

therefore,

i = 1.13 in/hr

For land use of "unimproved", C can vary from 0.1-0.3 (Wurbs, 2002 Table 8.2)

0.3 selected as conservative (will produce more runoff)

Peak Discharge Calculation

Qp = 3.0 acre-in/hr

3.0 cfs

Consider factor of safety for pipe and channel sizing:

1.1 factor of safety

Qp = 3.3 cfs

References

1. Wurbs, Water Resources Engineering (2002)
2. TXDOT Hydraulic Design Manual, http://onlinemanuals.txdot.gov/txdotmanuals/hyd/rational_method.htm
3. USGS DDF Atlas for Texas (2004), http://pubs.usgs.gov/sir/2004/5041/pdf/sir2004-5041.pdf
4. Areas taken from GIS

Introduction

The stormwater channels and pipes will be sized to handle the peak discharge (runoff) from the 25-year storm. This calculation determines the peak discharge for pre-construction sub-basin A2.

Assumptions

1. Drainage area A1 is 13.5 acres[4]
2. Assume pre-construction land use is "unimproved".

Variables/Conversion Factors

1 hr =	3600	sec
1 acre-ft =	43,560	ft^3
1 ft =	12	inches

Outline of Approach

The rational method for calculating the peak runoff (applicable to watersheds less than 200 acres)[1,2]

$$Q_P = CiA$$

where

Q_p = peak discharge (acres-in/hr)

C = dimensionless runoff coefficient

i = rainfall intensity (in/hr)

A = drainage area (acres)

Intensity is determined from a depth-duration-frequency curve and the time of concentration for the watershed[2]:

$$i = \frac{P}{t_c}$$ (Wurbs, 2002, Equation 4-21)

where

P = depth of rainfall for the design storm of duration tc

tc = time of concentration for the watershed

Time of concentration of the watershed can be estimated using the curve number

First, the NRCS lag equation is used to calculated the lag time for the watershed[1]:

$$t_L = \frac{l^{0.8}\left(1{,}000 - 9CN\right)^{0.7}}{1{,}900CN^{0.7}Y^{0.5}}$$ (Wurbs, 2002, Equation 8.3)

where

t_L = lag time of watershed (hr)

l = hydraulic length from the outlet to the most hydraulically remote point in the watershed (ft)

Y = average land slope of the watershed in percent

Time of concentration is related to lag time:

$$t_c = \frac{5}{3}t_L$$ (Wurbs, 2002, Equation 8.7)

Calculation

From GIS figures, the hydraulically most distant point is

l = 1300 ft

The average land slope of the watershed measured from USGS topo data is

slope (Y) 0.009 ft/ft

Therefore,

t_L = 4.2 hr

tc = 7.0 hr

Based on the design storm for a duration similar to the time of concentration

From USGS DDF Atlas for Texas[3] Figure 45, P = 6 inches

therefore,

i = 0.86 in/hr

For land use of "unimproved", C can vary from 0.1-0.3 (Wurbs, 2002 Table 8.2)

0.3 selected as conservative (will produce more runoff)

Peak Discharge Calculation

Qp = 3.5 acre-in/hr

3.5 cfs

Consider factor of safety for pipe and channel sizing:

1.1 factor of safety

Qp = 3.8 cfs

References

1. Wurbs, Water Resources Engineering (2002)
2. TXDOT Hydraulic Design Manual, http://onlinemanuals.txdot.gov/txdotmanuals/hyd/rational_method.htm
3. USGS DDF Atlas for Texas (2004), http://pubs.usgs.gov/sir/2004/5041/pdf/sir2004-5041.pdf
4. Areas taken from GIS

Introduction

The stormwater channels and pipes will be sized to handle the peak discharge (runoff) from the 25-year storm. This calculation determines the peak discharge for pre-construction sub-basin A3.

Assumptions

1. Drainage area A1 is 11.3 acres[4]
2. Assume pre-construction land use is "unimproved".

Variables/Conversion Factors

1 hr =	3600	sec
1 acre-ft =	43,560	ft^3
1 ft =	12	inches

Outline of Approach

The rational method for calculating the peak runoff (applicable to watersheds less than 200 acres)[1,2]

$$Q_P = CiA$$

where

Q_p = peak discharge (acres-in/hr)

C = dimensionless runoff coefficient

i = rainfall intensity (in/hr)

A = drainage area (acres)

Intensity is determined from a depth-duration-frequency curve and the time of concentration for the watershed[2]:

$$i = \frac{P}{t_c}$$ (Wurbs, 2002, Equation 4-21)

where

P = depth of rainfall for the design storm of duration tc

tc = time of concentration for the watershed

Time of concentration of the watershed can be estimated using the curve number

First, the NRCS lag equation is used to calculated the lag time for the watershed[1]:

$$t_L = \frac{l^{0.8}\left(1{,}000 - 9CN\right)^{0.7}}{1{,}900CN^{0.7}Y^{0.5}}$$ (Wurbs, 2002, Equation 8.3)

where

t_L = lag time of watershed (hr)

l = hydraulic length from the outlet to the most hydraulically remote point in the watershed (ft)

Y = average land slope of the watershed in percent

Time of concentration is related to lag time:

$$t_c = \frac{5}{3}t_L$$ (Wurbs, 2002, Equation 8.7)

Calculation

From GIS figures, the hydraulically most distant point is

l = 1250 ft

The average land slope of the watershed measured from USGS topo data is

slope (Y) 0.006 ft/ft

Therefore,

t_L = 5.2 hr

tc = 8.7 hr

Based on the design storm for a duration similar to the time of concentration

From USGS DDF Atlas for Texas[3] Figures 45 and 46, P = 6.375 inches

therefore,

i = 0.73 in/hr

For land use of "unimproved", C can vary from 0.1-0.3 (Wurbs, 2002 Table 8.2)

0.3 selected as conservative (will produce more runoff)

Peak Discharge Calculation

Qp = 2.5 acre-in/hr

2.5 cfs

Consider factor of safety for pipe and channel sizing:

1.1 factor of safety

Qp = 2.7 cfs

References

1. Wurbs, Water Resources Engineering (2002)
2. TXDOT Hydraulic Design Manual, http://onlinemanuals.txdot.gov/txdotmanuals/hyd/rational_method.htm
3. USGS DDF Atlas for Texas (2004), http://pubs.usgs.gov/sir/2004/5041/pdf/sir2004-5041.pdf
4. Areas taken from GIS

Introduction

The stormwater channels and pipes will be sized to handle the peak discharge (runoff) from the 25-year storm. This calculation determines the peak discharge for pre-construction sub-basin A4.

Assumptions

1. Drainage area A1 is 0.9 acres[4]
2. Assume pre-construction land use is "unimproved".

Variables/Conversion Factors

1 hr = 3600 sec
1 acre-ft = 43,560 ft^3
1 ft = 12 inches

Outline of Approach

The rational method for calculating the peak runoff (applicable to watersheds less than 200 acres)[1,2]

$$Q_P = CiA$$

where
Q_p = peak discharge (acres-in/hr)
C = dimensionless runoff coefficient
i = rainfall intensity (in/hr)
A = drainage area (acres)

Intensity is determined from a depth-duration-frequency curve and the time of concentration for the watershed[2]:

$$i = \frac{P}{t_c}$$ (Wurbs, 2002, Equation 4-21)

where
P = depth of rainfall for the design storm of duration tc
tc = time of concentration for the watershed

Time of concentration of the watershed can be estimated using the curve number
First, the NRCS lag equation is used to calculated the lag time for the watershed[1]:

$$t_L = \frac{l^{0.8}(1{,}000 - 9CN)^{0.7}}{1{,}900CN^{0.7}Y^{0.5}}$$ (Wurbs, 2002, Equation 8.3)

where
t_L = lag time of watershed (hr)
l = hydraulic length from the outlet to the most hydraulically remote point in the watershed (ft)
Y = average land slope of the watershed in percent

Time of concentration is related to lag time:

$$t_c = \frac{5}{3}t_L$$ (Wurbs, 2002, Equation 8.7)

Calculation

From GIS figures, the hydraulically most distant point is

l = 300 ft

The average land slope of the watershed measured from USGS topo data is

slope (Y) 0.027 ft/ft

Therefore,

t_L = 0.8 hr

tc = 1.3 hr

Based on the design storm for a duration similar to the time of concentration

From USGS DDF Atlas for Texas[3] Figures 42 and 43, P = 3.95 inches

therefore,

i = 3.09 in/hr

For land use of "unimproved", C can vary from 0.1-0.3 (Wurbs, 2002, Table 8.2)

0.3 selected as conservative (will produce more runoff)

Peak Discharge Calculation

Qp = 0.8 acre-in/hr

0.8 cfs

Consider factor of safety for pipe and channel sizing:

1.1 factor of safety

Qp = 0.9 cfs

References

1. Wurbs, Water Resources Engineering (2002)
2. TXDOT Hydraulic Design Manual, http://onlinemanuals.txdot.gov/txdotmanuals/hyd/rational_method.htm
3. USGS DDF Atlas for Texas (2004), http://pubs.usgs.gov/sir/2004/5041/pdf/sir2004-5041.pdf
4. Areas taken from GIS

Introduction

The stormwater channels and pipes will be sized to handle the peak discharge (runoff) from the 25-year storm. This calculation determines the peak discharge for post-construction sub-basin A1.

Assumptions

1. Site area is 11 acres[4]
2. Assume post-construction land use behaves like a "railroad yard".

Variables/Conversion Factors

1 hr = 3600 sec
1 acre-ft = 43,560 ft^3
1 ft = 12 inches

Outline of Approach

The rational method for calculating the peak runoff (applicable to watersheds less than 200 acres)[1,2]

$$Q_P = CiA$$

where
Q_p = peak discharge (acres-in/hr)
C = dimensionless runoff coefficient
i = rainfall intensity (in/hr)
A = drainage area (acres)

Intensity is determined from a depth-duration-frequency curve and the time of concentration for the watershed[2]:

$$i = \frac{P}{t_c}$$ (Wurbs, 2002, Equation 4-21)

where
P = depth of rainfall for the design storm of duration tc
tc = time of concentration for the watershed

Time of concentration of the watershed can be estimated using the curve number
First, the NRCS lag equation is used to calculated the lag time for the watershed[1]:

$$t_L = \frac{l^{0.8}(1{,}000 - 9CN)^{0.7}}{1{,}900CN^{0.7}Y^{0.5}}$$ (Wurbs, 2002, Equation 8.3)

where
t_L = lag time of watershed (hr)
l = hydraulic length from the outlet to the most hydraulically remote point in the watershed (ft)
Y = average land slope of the watershed in percent

Time of concentration is related to lag time:

$$t_c = \frac{5}{3}t_L$$ (Wurbs, 2002, Equation 8.7)

Calculation

From GIS figures, the hydraulically most distant point is

l = 650 ft

The average land slope of the watershed based on anticipated finished grade

slope (Y) 0.010 ft/ft

Therefore,

t_L = 1.1 hr

tc = 1.8 hr

Based on the design storm for a duration similar to the time of concentration

From USGS DDF Atlas for Texas[3] Figure 44, P = 5 inches

therefore,

i = 2.81 in/hr

For land use of "railroad yard", C can vary from 0.2-0.35 (Wurbs, 2002 Table 8.2)

0.35 selected as conservative (will produce more runoff)

Peak Discharge Calculation

Qp = 10.8 acre-in/hr

10.9 cfs

Consider factor of safety for pipe and channel sizing:

1.1 factor of safety

Qp = 12.0 cfs

References

1. Wurbs, Water Resources Engineering (2002)
2. TXDOT Hydraulic Design Manual, http://onlinemanuals.txdot.gov/txdotmanuals/hyd/rational_method.htm
3. USGS DDF Atlas for Texas (2004), http://pubs.usgs.gov/sir/2004/5041/pdf/sir2004-5041.pdf
4. Areas taken from GIS

Introduction

The stormwater channels and pipes will be sized to handle the peak discharge (runoff) from the 25-year storm. This calculation determines the peak discharge for post-construction sub-basin A2.

Assumptions

1. Site area is 11.9 acres[4]
2. Assume post-construction land use behaves like a "railroad yard".

Variables/Conversion Factors

1 hr = 3600 sec
1 acre-ft = 43,560 ft^3
1 ft = 12 inches

Outline of Approach

The rational method for calculating the peak runoff (applicable to watersheds less than 200 acres)[1,2]

$$Q_P = CiA$$

where
Q_p = peak discharge (acres-in/hr)
C = dimensionless runoff coefficient
i = rainfall intensity (in/hr)
A = drainage area (acres)

Intensity is determined from a depth-duration-frequency curve and the time of concentration for the watershed[2]:

$$i = \frac{P}{t_c}$$ (Wurbs, 2002, Equation 4-21)

where
P = depth of rainfall for the design storm of duration tc
tc = time of concentration for the watershed

Time of concentration of the watershed can be estimated using the curve number
First, the NRCS lag equation is used to calculated the lag time for the watershed[1]:

$$t_L = \frac{l^{0.8}(1{,}000 - 9CN)^{0.7}}{1{,}900CN^{0.7}Y^{0.5}}$$ (Wurbs, 2002, Equation 8.3)

where
t_L = lag time of watershed (hr)
l = hydraulic length from the outlet to the most hydraulically remote point in the watershed (ft)
Y = average land slope of the watershed in percent

Time of concentration is related to lag time:

$$t_c = \frac{5}{3}t_L$$ (Wurbs, 2002, Equation 8.7)

Calculation

From GIS figures, the hydraulically most distant point is

l = 2450 ft

The average land slope of the watershed based on anticipated finished grade

slope (Y) 0.005 ft/ft

Therefore,

t_L = 5.5 hr

tc = 9.1 hr

Based on the design storm for a duration similar to the time of concentration

From USGS DDF Atlas for Texas[3] Figures 45 and 46, P = 6.375 inches

therefore,

i = 0.70 in/hr

For land use of "railroad yard", C can vary from 0.2-0.35 (Wurbs, 2002 Table 8.2)

0.35 selected as conservative (will produce more runoff)

Peak Discharge Calculation

Qp = 2.9 acre-in/hr

2.9 cfs

Consider factor of safety for pipe and channel sizing:

1.1 factor of safety

Qp = 3.2 cfs

References

1. Wurbs, Water Resources Engineering (2002)
2. TXDOT Hydraulic Design Manual, http://onlinemanuals.txdot.gov/txdotmanuals/hyd/rational_method.htm
3. USGS DDF Atlas for Texas (2004), http://pubs.usgs.gov/sir/2004/5041/pdf/sir2004-5041.pdf
4. Areas taken from GIS

Introduction

The stormwater channels and pipes will be sized to handle the peak discharge (runoff) from the 25-year storm. This calculation determines the peak discharge for post-construction sub-basin A3.

Assumptions

1. Site area is 11.3 acres[4]
2. Assume post-construction land use behaves like a "railroad yard".

Variables/Conversion Factors

1 hr = 3600 sec
1 acre-ft = 43,560 ft^3
1 ft = 12 inches

Outline of Approach

The rational method for calculating the peak runoff (applicable to watersheds less than 200 acres)[1,2]

$$Q_P = CiA$$

where
Q_p = peak discharge (acres-in/hr)
C = dimensionless runoff coefficient
i = rainfall intensity (in/hr)
A = drainage area (acres)

Intensity is determined from a depth-duration-frequency curve and the time of concentration for the watershed[2]:

$$i = \frac{P}{t_c}$$ (Wurbs, 2002, Equation 4-21)

where
P = depth of rainfall for the design storm of duration tc
tc = time of concentration for the watershed

Time of concentration of the watershed can be estimated using the curve number
First, the NRCS lag equation is used to calculated the lag time for the watershed[1]:

$$t_L = \frac{l^{0.8}(1{,}000 - 9CN)^{0.7}}{1{,}900CN^{0.7}Y^{0.5}}$$ (Wurbs, 2002, Equation 8.3)

where
t_L = lag time of watershed (hr)
l = hydraulic length from the outlet to the most hydraulically remote point in the watershed (ft)
Y = average land slope of the watershed in percent

Time of concentration is related to lag time:

$$t_c = \frac{5}{3}t_L$$ (Wurbs, 2002, Equation 8.7)

Calculation

From GIS figures, the hydraulically most distant point is

l = 1350 ft

The average land slope of the watershed based on anticipated finished grade

slope (Y) 0.005 ft/ft

Therefore,

t_L = 3.3 hr

tc = 5.5 hr

Based on the design storm for a duration similar to the time of concentration

From USGS DDF Atlas for Texas[3] Figure 45, P = 6 inches

therefore,

i = 1.09 in/hr

For land use of "railroad yard", C can vary from 0.2-0.35 (Wurbs, 2002 Table 8.2)

0.3 selected due to anticipated volume of raw stockpiled materials

Peak Discharge Calculation

Qp = 3.7 acre-in/hr

3.7 cfs

Consider factor of safety for pipe and channel sizing:

1.1 factor of safety

Qp = 4.1 cfs

References

1. Wurbs, Water Resources Engineering (2002)
2. TXDOT Hydraulic Design Manual, http://onlinemanuals.txdot.gov/txdotmanuals/hyd/rational_method.htm
3. USGS DDF Atlas for Texas (2004), http://pubs.usgs.gov/sir/2004/5041/pdf/sir2004-5041.pdf
4. Areas taken from GIS

Appendix J

Approved Boring Plan

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

October 26, 2015

Mr. Ben Camacho
Compliance and Permit Specialist
Daniel B. Stephens & Associates, Inc.
4030 West Braker Lane, Suite 325
Austin, Texas 78759

Re: South Waste Disposal [Proposed] Sealy Compost Facility – Austin County
Municipal Solid Waste – Permit No. [To be Assigned]
Revised Site Investigation
Tracking No. 19844155; RN [to be assigned]/CN603436114

Dear Mr. Camacho:

The Texas Commission on Environmental Quality (TCEQ) received the soil boring plan (SBP) dated July 22, 2015 and the revision dated October 14, 2015 for the above-referenced compost facility in Austin County. The revised SBP specified 5 borings in an approximately 11.26-acre project area. Our review of the plan indicates that it complies with the Municipal Solid Waste Regulations and this letter constitutes approval of your plan.

Please be advised that under Section 330.63(e)(4)(B) of Title 30, Texas Administrative Code, the uppermost aquifer and any hydraulically interconnected aquifers below the site must be identified, as well as the underlying confining unit. It is anticipated that this SBP, when implemented, will accurately characterize the in-situ geologic, hydrologic, and engineering properties of the surface and subsurface strata at this site. Although this plan complies with the Municipal Solid Waste Regulations concerning site investigations, additional soil borings and piezometers could be required by the Commission should the data generated by this SBP prove to be inconclusive.

If you should find it necessary to modify this approved plan, another plan detailing any proposed modifications must be submitted to the Commission for approval before implementation of the modifications. If you have questions regarding this letter, please contact me at (512) 239-2305. When addressing written correspondence, please use mail code MC 124.

Sincerely,

Mamadou Balde, P.G.
Municipal Solid Waste Permits Section
Waste Permits Division

MB/cgm

CORRESPONDENCE COVER SHEET
WASTE PERMITS DIVISION
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Date: October 14, 2015
Facility Name: SouthWaste Disposal, LLC Sealy Composting Facility

Permit No.: not assigned
Registration No: not assigned

This cover sheet should accompany all correspondences submitted to the Waste Permits Division and should be affixed to the front of your submittal as a cover page. Please check the appropriate box for the type of correspondence being submitted. For questions regarding this form, please contact the Waste Permits Division at (512) 239-2335.

Table 1 - Municipal Solid Waste

APPLICATIONS	REPORTS and RESPONSES
☐ New Notification	☐ Closure Report
☐ New Permit (including Subchapter T)	☐ Groundwater Alternate SRC Demonstration
☐ New Registration (including Subchapter T)	☐ Groundwater Corrective Action
☐ Major Amendment	☐ Groundwater Monitoring Report
☐ Minor Amendment	☐ Groundwater Statistical Evaluation
☐ Limited Scope Major Amendment	☐ Landfill Gas Corrective Action
☐ Notice Modification	☐ Landfill Gas Monitoring
☐ Non-Notice Modification	☐ Liner Evaluation Report
☐ Transfer/Name Change Modification	☒ Soil Boring Plan
☐ Temporary Authorization	☐ Special Waste Request
☐ Voluntary Revocation	☐ Other:
☐ Subchapter T Workplan	
☐ Other:	

Table 2 - Industrial & Hazardous Waste

APPLICATIONS	REPORTS and RESPONSES
☐ New	☐ Annual/Biennial Site Activity Report
☐ Renewal	☐ CfPT Plan/Result
☐ Post-Closure Order	☐ Closure Certification/Report
☐ Major Amendment	☐ Construction Certification/Report
☐ Minor Amendment	☐ CPT Plan/Result
☐ Class 3 Modification	☐ Extension Request
☐ Class 2 Modification	☐ Groundwater Monitoring Report
☐ Class 1 ED Modification	☐ Interim Status Change
☐ Class 1 Modification	☐ Interim Status Closure Plan
☐ Endorsement	☐ Soil Core Monitoring Report
☐ Temporary Authorization	☐ Treatability Study
☐ Voluntary Revocation	☐ Trial Burn Plan/Result
☐ 335.6 Notification	☐ Unsaturated Zone Monitoring Report
☐ Other:	☐ Waste Minimization Report
	☐ Other:

October 14, 2015

Mr. Mamadou Balde. P.G.
Texas Commission on Environmental Quality
Municipal Solid Waste Permit Section (MC-124)
Waste Permits Division
12100 Park 35 Circle, Bldg. F
Austin, Texas 78753

Subject: Response to Notice of Deficiency, South Waste Disposal [Proposed]
Sealy Compost Facility - Austin County
Municipal Solid Waste - Permit No. [To be Assigned]
Tracking No. 19534829; RN [to be assigned] / CN603436114

Dear Mr. Balde:

On behalf of SouthWaste Disposal, LLC. (SouthWaste), Daniel B. Stephens & Associates, Inc. (DBS&A) is providing responses to the Texas Commission on Environmental Quality (TCEQ) comments in the referenced notice of deficiency (NOD) letter dated October 2, 2015. For clarity purposes, the TCEQ comments are reproduced in italics; DBS&A responses immediately follow each comment. Additionally, the revised Soil Boring Plan (SBP) is in included with this response along with other requested documentation.

TCEQ Item 1: *Please have the applicant complete and submit a Core Data Form (TCEQ-10400), in accordance with the requirements in Title 30 Texas Administrative Code, Chapter 305, §305-44; the form can be found at www.tceq.texas.gov/permitting/ central registry/guidance.html. Please submit also a statement documenting your authority to submit the SBP on behalf of the applicant.*

Response: A signed TCEQ Core Data Form and signed Engineer's Appointment are provided in **Attachment A**.

TCEQ Item 2: *The SBP we received was not sealed. Per §332-47(6)(B), SBPs, including figures and drawings, must be prepared and sealed by a "qualified groundwater scientist", which is defined in §330.3(120). Please ensure that the SBP bears the necessary signatures and seals by a qualified groundwater scientist.*

Response: The SBP has been updated to include the proper certification in accordance with 30 TAC Chapter 330, §332.47(6)(B). The updated SBP is included as **Attachment B**.

TCEQ Item 3: *Figure 2 shows 4 proposed boring sites for the proposed permit area of 10.98 acres. According to §332-47(6)(B)(iv)(I), a minimum of 5 boreholes and 5 piezometers is required for 10.98 acres area. Please add at least one borehole and one piezometer to bring the total to five borings and piezometers.*

Response: One borehole and one piezometer have been added to the updated SBP (**Attachment B**). Additionally, Figure 2 of the SBP has been updated to show a proposed permit area of 11.26 acres. According to the regulations, for composting operations greater than five acres, three borings are required plus one boring for each additional 5-acre increment. Therefore, based on the size of the proposed

Daniel B. Stephens & Associates, Inc.
4030 W. Braker Lane, Suite 325 512-821-2765
Austin, TX 78759 FAX 512-821-2724

permitted area of approximately 11.26 acres, five borings will be installed at the Facility. Borings will be advanced to the base of the uppermost aquifer, with all borings installed at least 30 feet below the deepest site excavation.

TCEQ Item 4: *In the "Regulatory Requirements" section on page 2 of the SBP, it is stated that "no water is anticipated to be encountered within 50 feet below grade". Please explain the basis of this anticipation, including information from pre-existing data, results of any investigations you conducted on-site, and/or references to peer reviewed publications.*

Response: Based on four preliminary test borings that were advanced at the Facility on September 14-16 and 22, 2015, the depth to water of the uppermost aquifer was encountered at 49 feet bgs in boring SB-1 and 55 feet bgs in borings SB-2, SB-3, and SB-4. Therefore, the statement regarding "no water is anticipated to be encountered within 50 feet below grade" has been removed from the SBP. The SBP has been updated to include the a summary of findings from the preliminary investigation.

TCEQ Item 5: *In the "Regulatory Requirements" section on page 2 of the SBP, it is stated that "the alternate approach requires at least one deep boring to the top of the first aquifer. Please note that per §332.47(6)(B)(iv)(II), boring shall penetrate the uppermost aquifer and all deeper hydraulically interconnected aquifers and be deep enough to identify the aquiclude at the lower boundary. Please plan to drill enough boreholes to adequately characterize the uppermost aquifer and underlying hydraulically interconnected aquifers. Should you have specific and substantial information indicating that no aquifer exist within 50 feet of the elevation of the deepest excavation, please submit that information so that you may drill one test borehole to the top of the first perennial aquifer beneath the site.*

Response: The "Regulatory Requirements" section has been revised to exclude any reference to an alternative approach since the alternative approach will no longer apply to this facility. The proposed retention pond bottom (the deepest excavation) will be 12 feet below grade. The depth to water of the uppermost aquifer was encountered at 49 feet bgs in boring SB-1; therefore, the alternative approach is not applicable at this Facility. A total of five borings will be installed to allow the identification of the uppermost aquifer, any underlying hydraulically interconnected aquifers, and the aquiclude at the lower boundary.

TCEQ Item 6: *Please include a table showing the proposed depths and elevations of all soil borings and piezometers.*

Response: A table showing the proposed depths and elevations of all proposed soil borings and piezometers has been included in the revised SBP.

TCEQ Item 7: *Please add a statement(s) indicating that wells installation, abandonment and plugging shall be performed in accordance with State regulations, including applicable rules in Title 16 TAC Chapter 76, §76.72 and §76.104.*

Response: A statement that all activities pertaining to well installation, abandonment and plugging will be performed in accordance with State regulations, including applicable rules in Title 16 TAC Chapter 76, §76.72 and §76.104 has been included in the revised SBP.

Should you have any questions or comments, please do not hesitate to contact me at (512) 651-6019.

Sincerely,
DANIEL B. STEPHENS & ASSOCIATES, INC.

Ben Camacho
Compliance and Permitting Specialist.

Cc: TCEQ Region 13 Office, San Antonio, TX
Mr. Tim Cox, Market Manager, SouthWaste Disposal, LLC.

Attachment A

TCEQ Core Data Form

TCEQ Use Only

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

SECTION I: General Information

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

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

☐ Renewal (Core Data Form should be submitted with the renewal form) ☒ Other Soil Boring Plan for New Permit

2. Customer Reference Number (if issued)	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number (if issued)
CN 603436114		RN N/A

SECTION II: Customer Information

4. General Customer Information	5. Effective Date for Customer Information Updates (mm/dd/yyyy)	10/13/2015

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

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

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

6. Customer Legal Name (If an individual, print last name first: e.g.: Doe, John)	If new Customer, enter previous Customer below:
SOUTHWASTE DISPOSAL LLC	

7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number (if applicable)
800553020		203596390	

11. Type of Customer:	☒ Corporation	☐ Individual	Partnership: ☐ General ☐ Limited
Government: ☐ City ☐ County ☐ Federal ☐ State ☐ Other		☐ Sole Proprietorship	☐ Other:

12. Number of Employees	13. Independently Owned and Operated?
☐ 0-20 ☒ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher	☒ Yes ☐ No

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

☐ Owner ☐ Operator ☒ Owner & Operator

☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other:

15. Mailing Address:	9575 Katy Freeway, Suite 130							
	City	Houston	State	TX	ZIP	77024	ZIP + 4	

16. Country Mailing Information (if outside USA)	17. E-Mail Address (if applicable)
N/A	tcox@southwaste.com

18. Telephone Number	19. Extension or Code	20. Fax Number (if applicable)
(866) 413 - 9494		(713) 413 - 4179

SECTION III: Regulated Entity Information

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

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

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

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

SouthWaste Disposal, LLC Sealy Composting Facility

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

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	Northwest corner of Bartlett Road and U.S. Interstate 10 in Austin County, Texas. The Facility is located in a rural area east of the corporate city limits of San Felipe, Texas, near the intersection of Bartlett Road and Brazos 10 Lane

26. Nearest City	State	Nearest ZIP Code
San Felipe	TX	77474

27. Latitude (N) In Decimal:	29.775986		28. Longitude (W) In Decimal:	-96.078056	
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
29	46	33.55	-96	04	41.00

29. Primary SIC Code (4 digits)	30. Secondary SIC Code (4 digits)	31. Primary NAICS Code (5 or 6 digits)	32. Secondary NAICS Code (5 or 6 digits)
2875		325314	

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

Organic Composting

34. Mailing Address:	9575 Katy Freeway, Suite 130						
	City	Houston	State	TX	ZIP	77024	ZIP + 4

35. E-Mail Address:	tcox@southwaste.com

36. Telephone Number	37. Extension or Code	38. Fax Number (if applicable)
(866) 413 - 9494		(713) 413 - 4179

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

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

SECTION IV: Preparer Information

40. Name:	Ben Camacho		41. Title: Compliance Permitting Specialist
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(512) 651 - 6019		(512) 821 - 2724	bcamacho@dbstephens.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	SouthWaste Disposal, LLC	Job Title:	Vice President of Operations
Name(*In Print*):	Tim Cox	Phone:	(866)413-9494
Signature:	Tim Cox	Date:	10-13-2015

September 17, 2015

ENGINEER 'S APPOINTMENT

SouthWaste Disposal, LLC.
9575 Katy Freeway, Suite 130 Houston,
Harris County, Texas 77024
866-413-9494

Texas Commission on Environmental Quality
Attention: Waste Permits Division, MC 124
12100 Park 35 Circle, Bldg. F
Austin, Texas 78753

Dear Executive Director,

The following Engineering Firm has been appointed to submit application information with Thomas Golden, P.E. as Project Engineer.

Daniel B. Stephens & Associates, Inc.
Thomas Golden, P.E. as Project Engineer
4030 West Braker Lane, Suite 325
Austin, Texas 78759
(800) 933-3105
tgolden@dbstephens.com

Mr. Golden is a Texas Licensed Professional Environmental Engineer with more than 12 years of experience in engineering design for water, wastewater, and landfill projects; environmental investigations and remediation; field and laboratory soil analysis; and management of enterprise-wide geographic information systems (GIS) for well, groundwater, land use, soil, and water resources management.

Daniel B. Stephens & Associates, Inc. will be responsible for the submission of drawings, specifications, and any other technical data to be evaluated by the commission regarding the applications for the SouthWaste Disposal, LLC. Sealy Composting Facility.

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.

Tim Cox
Vice President of Operations

9-17-2015
DATE

Thomas Golden, P.E.
Project Engineer

September 17, 2015
DATE

Attachment B

Original: July 22, 2015
Revised: October 14, 2015

Mr. Mamadou Balde, P.G.
Texas Commission on Environmental Quality
Municipal Solid Waste Permit Section (MC-124)
Waste Permits Division
12100 Park 35 Circle, Bldg. F
Austin, Texas 78753

Re: Revised Boring Plan for Proposed Permit Application for SouthWaste Disposal, LLC., Sealy Facility; Intersection of Bartlett Road and Brazos 10 Lane, Austin County, Texas.

Dear Mr. Balde,

On behalf of SouthWaste Disposal, LLC. (SouthWaste), Daniel B. Stephens & Associates, Inc. (DBS&A) is submitting this Revised Boring Plan as part of the permit application process for the proposed composting facility located at the intersection of Bartlett Road and Brazos 10 Lane in Austin County, Texas. At this time, the permit application is being drafted by DBS&A and an assigned permit application control number has not been issued by the Texas Commission on Environmental Quality (TCEQ) for the referenced facility.

This Boring Plan submittal is intended to satisfy the permit application requirements in accordance with Title 30 of the Texas Administrative Code, Chapter 332.47 (30 TAC 332.47). Specifically, this submittal is intended to satisfy the requirement for a boring plan submittal detailed in the proposed Part (6)(B)(iv) of 30 TAC 332.47. The data acquired from the described scope of work will then be used by DBS&A to support the completion of the Geologic/Hydrogeologic Report, including design and installation of required piezometers [proposed Part (6)(B)(v)], completion of a groundwater investigation report [proposed Part (6)(B)(v)], and development of a groundwater monitor system [proposed Part (6)(C)(ii)]. This Boring Plan provides a description of the planned objectives, scope, and methods for both the exploratory soil borings and the subsequent piezometer installation and groundwater investigation.

Setting and Facility Description

The property is located in a rural area east of the corporate city limits of Sealy, Texas, near the intersection of Bartlett Road and Brazos 10 Lane (**Figure 1**). The property is undeveloped with a few residential areas located north of the property, undeveloped land located west of the property and industrial facilities located east and northeast of the property. The proposed

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
Registered Texas P.G. Firm #50045

4030 West Braker Lane, Suite 325 512-821-2765
Austin, Texas 78759 FAX 512-821-2724

facility design, which illustrates the components of the processing area, is included as **Figure 2**.

The property has a topographic high at the center portion of the property and storm water runoff flows as sheet flow in an outward direction from the center portions of the property. Based on a review of an available USGS 7.5-minute topographic quadrangle map (SAN FELIPE, dated 1980) for the property and vicinity, the general topographic gradient at the property is north-northeast; therefore, surface water runoff from the property would be expected to flow toward the north-northeast. The nearest surface water bodies are an unnamed artificial stream located approximately 2,300 feet north of the property, which drains to an unnamed freshwater pond and a tributary to the Brazos River. The Brazos River located approximately two miles east of the property.

Based on a review of the U.S. Department of Agriculture's Soil Conservation Service SSURGO data, surface soils were classified as Lake Charles clay and Verland clay loam. Lake Charles clay is moderately well drained and exhibits very slow infiltration rates. A typical soil profile is described as clay from 0 to 79 inches. Verland clay loam is somewhat poorly drained and exhibits very slow infiltration rates. A typical soil profile is described as clay loam from 0 to 7 inches and clay from 7 to 79 inches.

According to the Bureau of Economic Geology, Geologic Atlas of Texas, Seguin Sheet (1974), the property is located within the Beaumont Clay Formation (Pleistocene) and surrounded by Quaternary age lithology. The Beaumont Clay and alluvium are the shallowest units of the Chicot Aquifer; the shallowest unit of the Gulf Coast aquifer which is considered to be a major aquifer in Texas. The Oligocene-aged sediments make up the base of the Gulf Coast Aquifer in Texas and include the Tertiary rocks into the Frio Formation, the Anahuac Formation, and the Catahoula Tuff or Sandstone (early Miocene); the Oakville Sandstone and the Fleming formation (mid- to late-Miocene); the Goliad Sand (Pliocene); the Willis Sand, Lissie Formation, and the Beaumont Clay (Pleistocene); the alluvium (Holocene).

The Gulf Coast Aquifer underlies the Facility; there is no minor aquifer that underlies the Facility. There are multiple water wells near the Facility completed in the Beaumont, Lissie, Willis and Goliad Formations (Chicot and Evangeline Aquifers). According to Texas Water Development Board (TWDB) Report 365, Aquifers of the Gulf Coast of Texas, the Beaumont thickness in the area of the property ranges from 50 to 150 feet (TWDB, 2006). The Beaumont Formation sand bodies are isolated in floodplain muds and lack the interconnected sand bodies that exist in the Lissie Formation, because of this; the Beaumont Formation provides a measurable amount of protection to water level change by hydraulically isolating shallow wells from the underlying Lissie Formation (Young, 2015). Well data for wells near the property was researched by DBS&A utilizing the TWDB's Water Data Interactive viewer. The well reports and boring logs (**Attachment A**) used to generate the generalized cross-section shown in **Figure 3** indicate alternating clay, sands and gravels down to over 200 feet. From the surrounding wells (Well #s 8(5) and 53981) a clay confining unit is expected to be encountered below the proposed facility at approximately 80 to 90 feet below ground surface (bgs) and is expected to be at least 20 feet thick.

Four preliminary investigation borings were advanced at the Facility using hollow stem auger drilling methods on September 14-16 and 22, 2015 in order to characterize the lithology of the subsurface and to confirm the clay confining unit of the uppermost aquifer. Organic soil with sand was encountered at each boring ranging from 1 to 1.5 feet bgs. Below the organic soils, silty and lean clays were logged to a depth of 6 feet at B-1, 9 feet at B-2, 15 feet at B-3 and 15 feet at B-4. Silty and poorly graded sands with silt and gravel were encountered at each boring below the silty and lean clays. In soil boring B-1, the sands extended down to approximately 85 feet bgs where a clayey gravel was encountered followed by a stiff, waxy clay at 86 feet. The clay unit encountered at 86 feet bgs confirms the aquiclude for the uppermost aquifer at the Facility. The depth to water observed in each boring ranged from approximately 49 feet bgs in boring B-1 and 55 feet bgs in borings B-2, B-3, and B-4.

Regulatory Requirements

According to the regulations, for composting operations greater than five acres, three borings are required plus one boring for each additional 5-acre increment. Therefore, based on the size of the proposed permitted area of approximately 11.26 acres, five borings will be installed at the Facility. Borings will be advanced to the base of the uppermost aquifer, with all borings installed at least 30 feet below the deepest site excavation.

The regulations also require that the piezometers be installed to assess the depth and gradient of groundwater. The number of piezometers required is calculated identically to the number of borings, as discussed above. This data is then used to develop a groundwater monitoring program for the facility.

Scope of Field Activities

The subsurface investigation will consist of the following field sequence of activities:

1. Prior to commencing with the field activities, DBS&A will develop a work plan and will prepare a Site Safety and Health Plan (SSHP). Additionally, at least 48 hours prior to commencement of drilling activities, DBS&A will contact a utility location notification service that serves the Austin County, Texas area to provide notification to utility companies listed with the service. However, notified utility companies may not necessarily include all utilities located at the property. Therefore, the drilling subcontractor will probe with a steel rod to five feet in advance of the drill rig at each boring location.

2. The approximate depth and elevations for proposed borings and piezometers are presented in Table 1 below.

Table 1. Proposed Depth and Elevations for Borings

Boring ID	Ground Elevation (ft amsl) [1]	Total Boring Depth (ft bgs) [2]	Total Well Depth (ft btoc) [3]
SB-1	143	80-90	64-70
SB-2	146	80-90	64-70
SB-3	152	80-90	64-70
SB-4	144	80-90	64-70
SB-5	148	80-90	64-70

Notes:
bgs = below ground surface
btoc = below top of well casing
ft = feet
amsl = above mean sea level
[1] Elevations based on current site topography
[2] Aquiclude of the uppermost aquifer is anticipated to be encountered between 80 and 90 feet bgs
[3] Total well depth based on top of saturated zone (49-55 feet bgs) of the upper most aquifer encountered in preliminary investigation borings

3. Based on the generalized cross-section shown in **Figure 3**, it is anticipated that the aquiclude of the uppermost aquifer will be encountered at approximately 80-90 feet below ground surface. Therefore, one soil boring (SB-5) will be advance by a licensed drilling contractor using Hollow Stem Auger drilling techniques to approximately 10 feet into the aquiclude to allow the identification of the uppermost aquifer, any underlying hydraulically interconnected aquifers, and the aquiclude at the lower boundary. Soil boring SB-5 will be continuously sampled from the ground surface to the terminal depth of the boring so that DBS&A field personnel can log the soil core in accordance with the Unified Soil Classification System (USCS). The DBS&A field personnel will also continuously screen the soil core from the ground surface to the terminal depth of the boring using a photoionization detector (PID). Undisturbed geotechnical soil samples from soil boring SB-5 will be collected from each lithological unit encountered from and each soil layer or stratum that will form the side (at feet 6 bgs) and bottom (at 12 feet bgs) of the proposed excavation and from those that are less than 30 feet below the lowest elevation of the proposed excavation. No laboratory work will be performed on highly permeable soil layers such as sand or gravel. In addition, two undisturbed geotechnical soil samples will be collected at the upper portion of the aquiclude encountered in soil boring SB-5 and at a depth of 10-feet below the top of the aquiclude in order to characterize the lithology of the aquiclude. The soil samples will be tested by an accredited soils laboratory operated by DBS&A.

4. Permeability tests will be performed for the soil boring SB-5 soil samples using tap water. Those undisturbed samples that represent the sidewall of the excavation will be tested for the coefficient of permeability on the sample's in-situ horizontal axis; all others shall be tested on the in-situ vertical axis. The test results will indicate the type of tests used and the orientation of each tested sample. All calculations for the final coefficient of permeability tests result for each sample tested will be included in the report:

    a) Constant head with back pressure per Appendix VII of Corps of Engineers Manual EM1110-2-1906, "Laboratory Soils Testing;" American Society for Testing and Materials (ASTM) D5084 "Saturated Porous Materials Using a Flexible Wall Permeameter";

    b) Falling head per Appendix VII of Corps of Engineers Manual EM1110-2-1906, "Laboratory Soils Testing";

    c) Sieve analysis for the 200, and less than 200 fraction per ASTM D1140;

    d) Atterberg limits per ASTM D4318; and

    e) moisture content per ASTM D2216;

5. Upon completion of drilling and sample collection, soil boring SB-5 will be backfilled with bentonite chips or other acceptable sealing material to approximately 15 feet below the depth to water identified in the uppermost aquifer.

6. A piezometer (MW-5) will be constructed within soil boring SB-5 with 2-inch diameter, 0.010-inch machine-cut, flush-threaded Schedule 40 polyvinyl chloride (PVC) well screen and 2-inch diameter PVC well casing to ground surface. The well screen will be set so as to straddle the top of the saturated zone, extending at least 15 feet below the observed saturated zone. The well will be equipped with a 6-inch PVC bottom cap and a locking top cap. The annular area of the piezometer will be backfilled with 20/40 grade filter sand installed from the total depth of the well to approximately two feet above the top of the screen. An approximately two foot thick hydrated bentonite seal will be located above the filter sand. The remaining annular area will be backfilled with a cement/bentonite grout mixture. Typical piezometer construction is depicted in **Figure 4**.

7. The remaining borings (SB-1 to SB-4) will be drilled to total depths of approximately 5 feet below the bottom of the saturated zone encountered in the uppermost aquifer in order to confirm the lateral extent of the aquiclude and to allow the identification of the uppermost aquifer any underlying hydraulically

interconnected aquifers. Soil boring SB-1 will be continuously sampled and borings SB-2 through SB-4 will be logged by visually observing the drill cuttings in order to characterize lithology of soils.

8. Piezometers will be constructed within borings SB-1 through SB-4 in the same manner as SB-5, again placing the screen approximately 15 feet below the static water level and constructing the piezometer in general accord with **Figure 4**.

9. All five piezometers will be completed a few feet above ground surface and protected with a 4 foot long, steel monument cover set into a 4-foot square concrete pad that is at least 6 inches thick. Four protective concrete bollards will be installed on the corners of the well pad.

10. Each piezometer will be developed for up to two hours, or until the produced groundwater is relatively free of suspended sediment.

11. Upon completion of the well installation activities, static water levels within all piezometers will be measured to within 0.01 foot using an electronic water level meter.

12. The top-of-casing (TOC) elevations and horizontal location of each piezometer will be surveyed relative by a Texas Licensed Registered Professional Land Surveyor.

All soil boring/piezometer installation activities will be directed by an on-site DBS&A geologist. All activities pertaining to well installation, abandonment and plugging will be performed in accordance with State regulations, including applicable rules in Title 16 TAC Chapter 76, §76.72 and §76.104. These activities will be conducted in a manner consistent with industry standards, applicable state requirements, and DBS&A's applicable standard operating procedures. Soils will be logged in general accord with the USCS, as well as specific regulatory requirements in Part (6)(B)(iv) of 30 TAC 332.47.

DBS&A assumes that soil and groundwater impact will not be encountered during this assessment. DBS&A believes this assumption is reasonable given that the property has never been developed. Soil cuttings, development water, and drilling fluids generated during boring installation activities will be placed on the ground surface. However, if field evidence of impact is identified, these procedures will be modified as appropriate. Decontamination will not be performed between borings, based on the same rationale. However, all drilling equipment will be cleaned prior to arrival on site.

Reporting

At the conclusion of the field activities, DBS&A will summarize the findings of the subsurface assessment to meet the requirements of Parts (6)(B)(iv) and (v) and incorporate these findings in

the permit application The summary will include DBS&A's interpretations of the subsurface setting and stratigraphy, conclusions regarding the adequacy of the number of borings and piezometers, and cross sections illustrating site lithology

References

BEG. 1974. Geologic Atlas of Texas. Seguin Sheet. University of Texas at Austin, W L. Fisher, director. Scale 1,250,000.

Natural Resources Conservation Service (NRCS).2015. Austin County, Texas Web Soil Survey <http://websoilsurvey nrcs.usda gov> Accessed September 22, 2015

TWDB. Report 365 Aquifers of the Gulf Coast of Texas. February 2006.

Young, S.C , Investigation of Declining Water Levels in Shallow Wells Located Near Lissie, Texas. February 2015

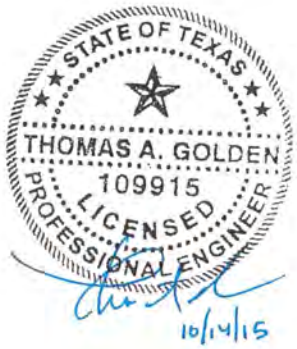
This boring plan was prepared to be consistent with the applicable proposed regulations. We appreciate your expedited review and approval of this plan Should you have any questions, please contact me at (512) 651-6019 or at bcamacho@dbstephens.com.

Sincerely,

DANIEL B STEPHENS & ASSOCIATES, INC.

Ben Camacho
Compliance and Permitting Specialist

Thomas Golden, P.E.
Project Engineer



Cc TCEQ Region 12 Office, Houston, TX
Mr Tim Cox, Market Manager, SouthWaste Disposal, LLC

Figures

S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Reports\Borings\Fig02_Boring_plan.mxd

N

0 150 300 Feet

STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
10/14/15

This document is released for the purpose of permitting under the authority of Thomas A. Golden, P.E. 109915 on October 14, 2015. It is not to be used for construction or bidding purposes.

Source: Alexander Surveying, June 3, 2015.
Aerial: ESRI ArcGIS Online and data partners.

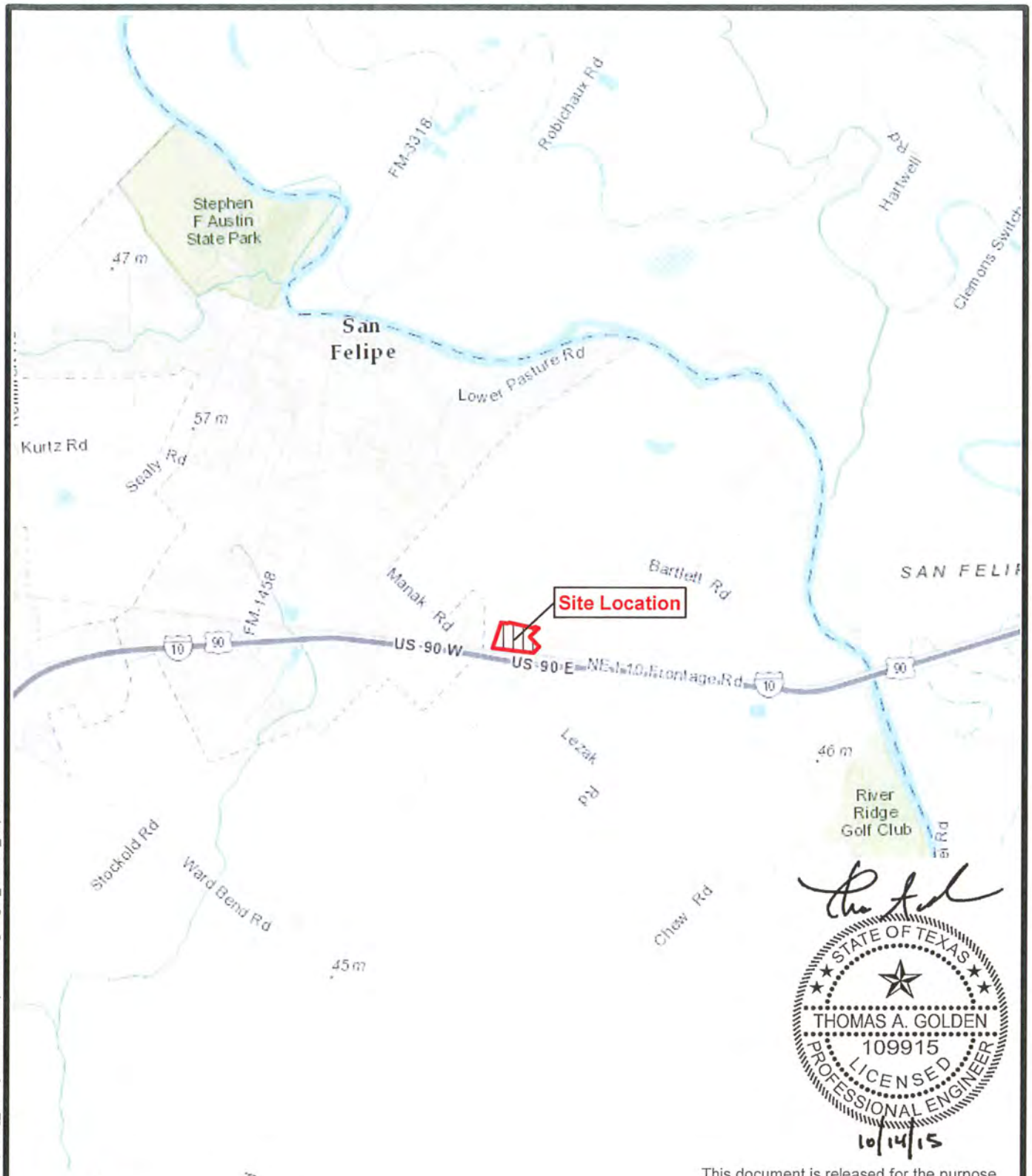
Explanation

- Property Boundary
- Proposed permit area
- Boring/piezometer location and number

Figure 2

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
Texas Registered Geosciences Firm No. 50045
10/14/2015 JN TX15.0094.00

PROPOSED SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Boring Plan



STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
10/14/15

This document is released for the purpose of permitting under the authority of Thomas A. Golden, P.E. 109915 on October 14, 2015. It is not to be used for construction or bidding purposes.

Source: San Felipe, Texas USGS 7.5-minute quadrangle map, 1960, photorevised 1980.

PROPOSED SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS
Site Location Map

Figure 1

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
Texas Registered Geosciences Firm No. 50045
10/13/2015 JN TX15.0094.00

S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\GIS\MXDs\Reports\Borings\Fig01_Site Loc_map.mxd

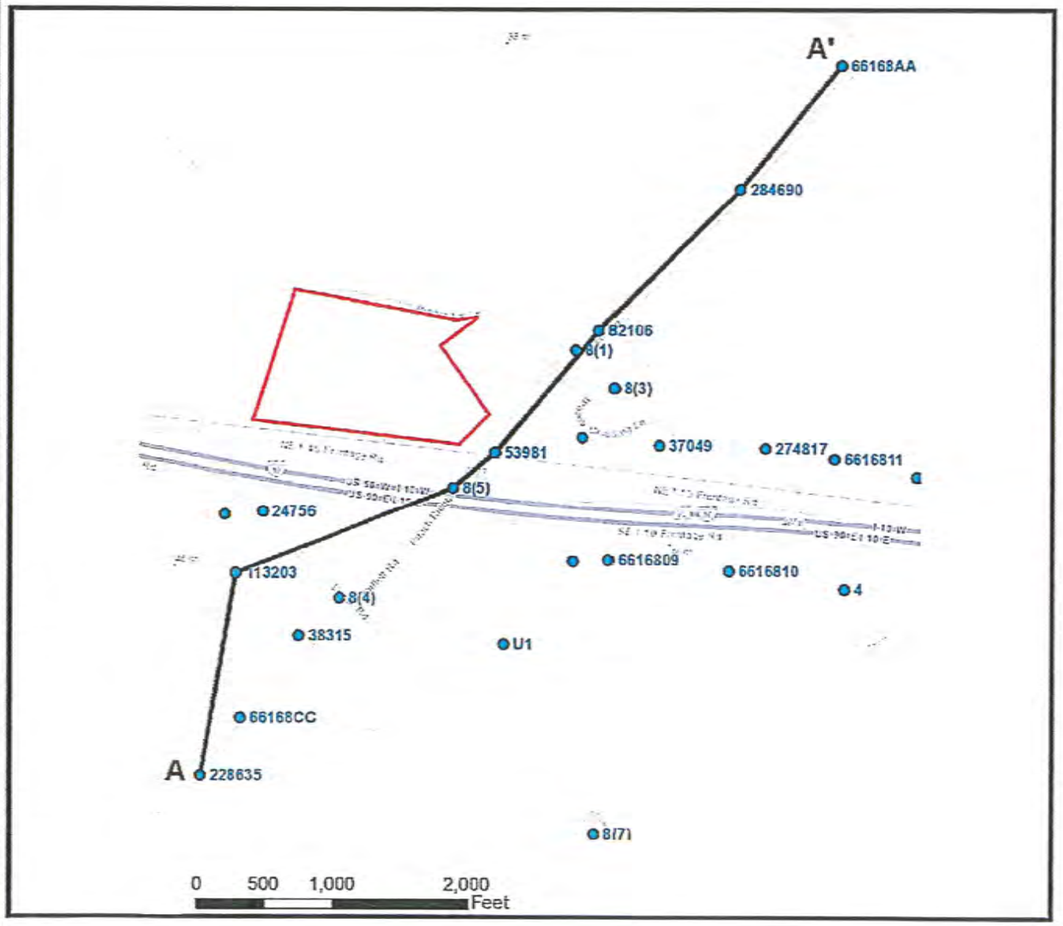
N

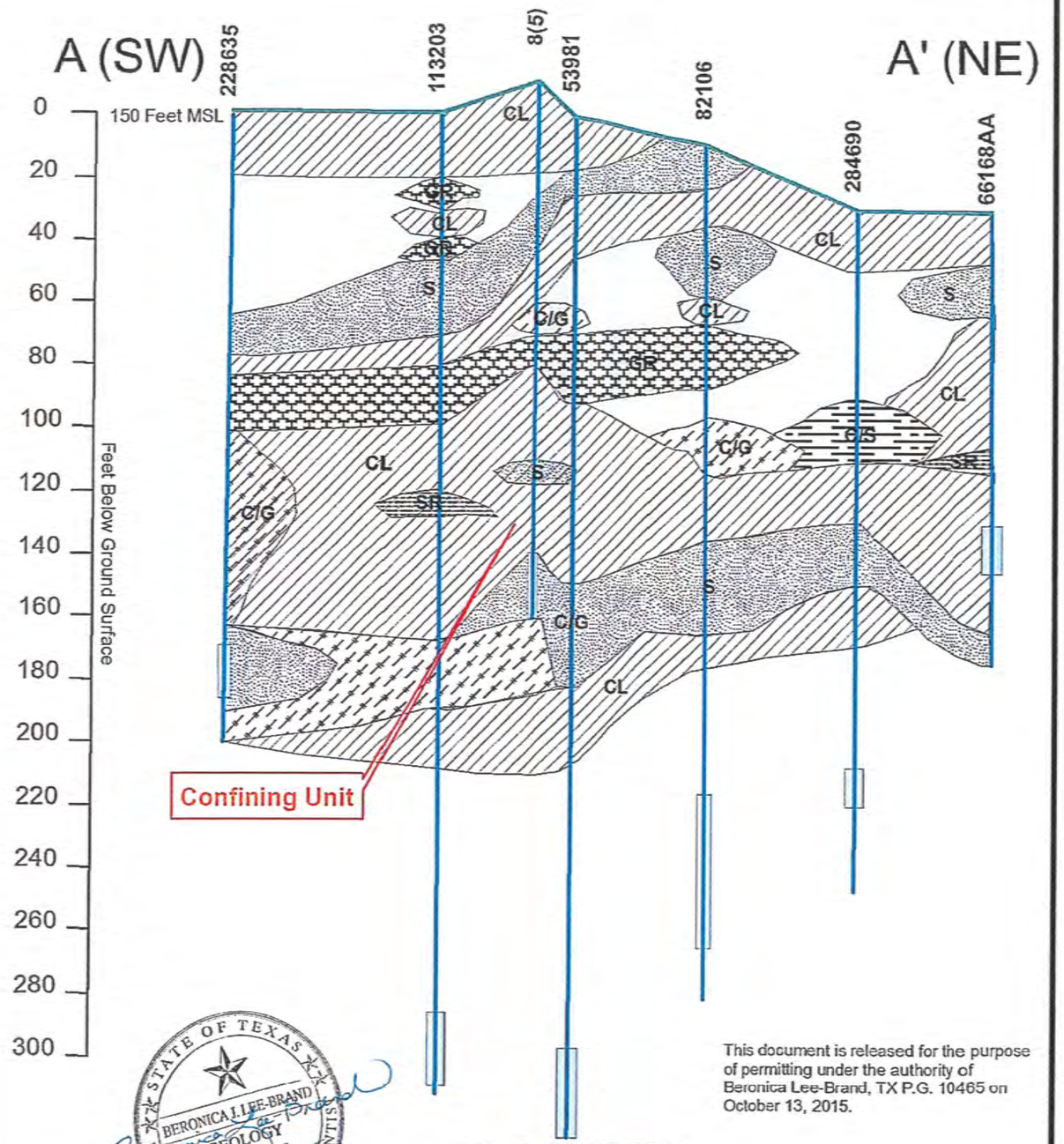
Vertical Exaggeraton = 21

Explanation

- Land Surface (120 to 160 Feet Above Mean Sea Level)
- Water Wells Along Cross-Section Line
- Screen Interval (Per Well Reports)
- Clays
- Gravel
- Sand
- Clay and Sand
- Sand Rock (from well boring logs)
- Clay and Gravel

Alternating Layers Clay, Silt, Sand, Gravel





STATE OF TEXAS
BERONICA J. LEE-BRAND
GEOLOGY
LIC. #10465
10/13/2015
LICENSED PROFESSIONAL GEOSCIENTIST

This document is released for the purpose of permitting under the authority of Beronica Lee-Brand, TX P.G. 10465 on October 13, 2015.

PROPOSED SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

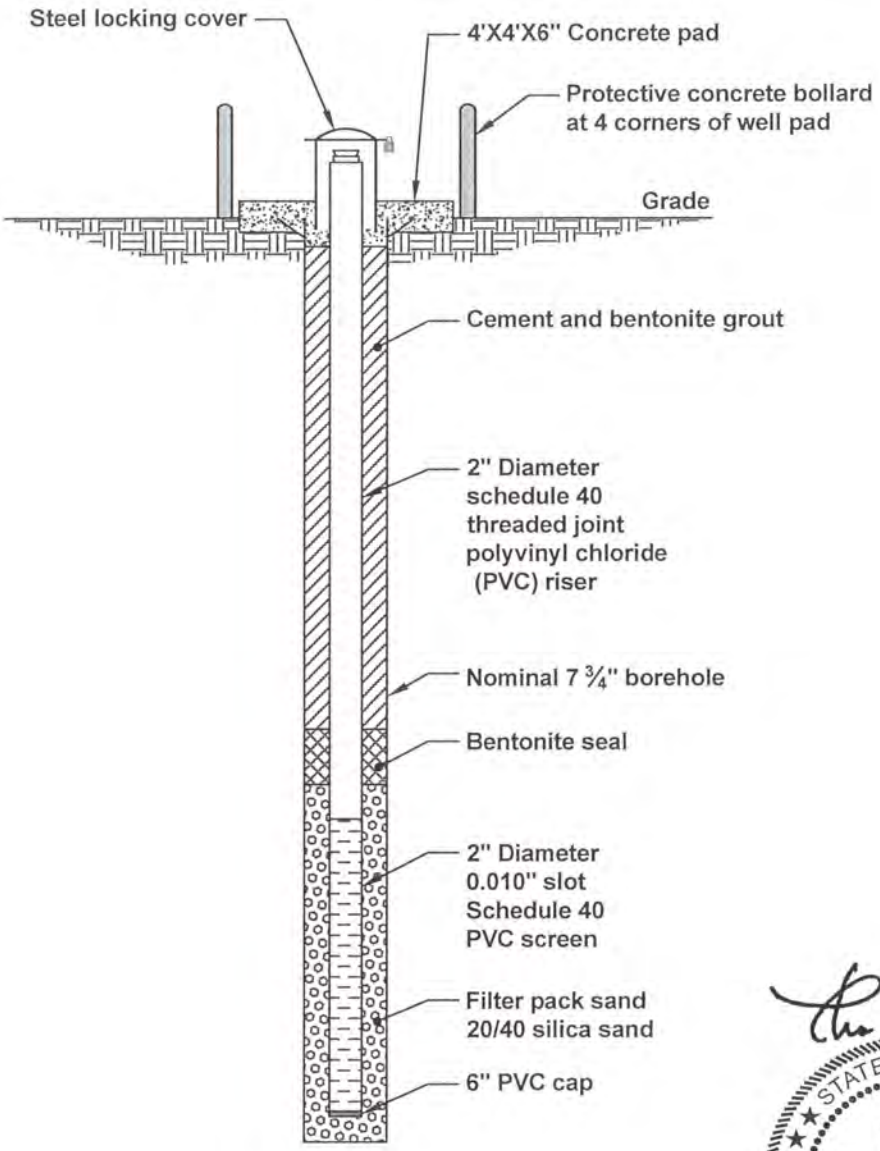
Generalized Cross-Section A to A'

Figure 3

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
Texas Registered Geosciences Firm No. 50045

10/13/2015 JN TX15.0094.00

N:\Client\Southwaste\Sealy Texas\GIS\MXD\CrossSectionAtoAprime.mxd



STATE OF TEXAS
THOMAS A. GOLDEN
109915
LICENSED
PROFESSIONAL ENGINEER
10/14/15

This document is released for the purpose of permitting under the authority of Thomas A. Golden, P.E. 109915 on October 14, 2015. It is not to be used for construction or bidding purposes.

PROPOSED SEALY COMPOSTING FACILITY
AUSTIN COUNTY, TEXAS

Well Construction Diagram

Daniel B. Stephens & Associates, Inc.
Texas Registered Engineering Firm F-286
Texas Registered Geosciences Firm No. 50045

9/30/2015 JN TX15.0094.00

Figure 4

S:\Projects\TX15.0094_Sealy_Proposed_Composting_Facility\VR_Drawings\well_design.dwg

Attachment A

STATE OF TEXAS WELL REPORT for Tracking #228635

Owner:	**Larry Siska**	Owner Well #:	**No Data**
Address:	**11734 Mlcak Rd. Sealy, TX 77474**	Grid #:	**66-16-8**
Well Location:	**11748 Mlcak Rd. Sealy, TX 77474**	Latitude:	**29° 46' 04" N**
		Longitude:	**096° 04' 54" W**
Well County:	**Austin**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **8/26/2010** Drilling End Date: **8/26/2010**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7**	**0**	**200**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Straight Wall**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**2**	**2 1/2 cement**
	2	**15**	**1 3/4 benseal**

Seal Method: **sack type**

Sealed By: **Flentge Well Service**

Distance to Property Line (ft.): **86**

Distance to Septic Field or other concentrated contamination (ft.): **150+**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **measure**

Surface Completion: **Surface Sleeve Installed**

Water Level: **66 ft.** below land surface on **2010-08-27** Measurement Method: **Unknown**

Packers: **Rubber 15'**
Rubber 153'
Rubber 158'
Rubber 163'

Type of Pump: **Submersible** Pump Depth (ft.): **140**

Well Tests: **Estimated** **Yield: 35 GPM**

	Description (number of sacks & material)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Plug Information:	**n/a**		

	Strata Depth (ft.)	Water Type
Water Quality:	163	Good

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Leon Flentge Water Well Drilling and Service**

9190 Hwy 159 West
Bellville, TX 77418

Driller Name: **Leon Flentge** License Number: **2205**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	8	Black land
8	20	Red clay
20	57	fine brown sand + rock + clay mix
57	61	red clay
61	78	fine brown sand
78	81	red + gray clay
81	101	white sand gravel + sand rock
101	163	white rock + clay mix
163	192	medium white sand rock + sand
192	200	white clay + rock

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	new	plastic	pvc 0-166 40
4	new	.008 double slot	pvc screen 166-186 40
4	new	plastic	pvc 186-192 40

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

STATE OF TEXAS WELL REPORT for Tracking #113203

Owner:	**Adan Chavez**	Owner Well #:	**n/a**
Address:	**1030 Hahlo St. Houston, TX 77020**	Grid #:	**66-16-8**
Well Location:	**12984 McDade Rd. Hempstead, TX 77445**	Latitude:	**29° 46' 19" N**
		Longitude:	**096° 04' 51" W**
Well County:	**Waller**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **4/24/2001** Drilling End Date: **4/25/2001**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7**	**0**	**307**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Pressure Cemented**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**10**	**8 RediMix**
	120	**287**	**20 Portland**

Seal Method: **Positive Displacement**

Sealed By: **Driller**

Variance Number: **n/a**

Distance to Property Line (ft.): **50+**

Distance to Septic Field or other concentrated contamination (ft.): **n/a**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Tape**

Surface Completion: **Alternative Procedure Used**

Water Level: **95 ft.** below land surface on **2001-04-25** Measurement Method: **Unknown**

Packers: **K-Packers RxR (2) 283'**

Type of Pump: **Submersible** Pump Depth (ft.): **273**

Well Tests: **Jetted** **Yield: 75 GPM after 1 hours, no drawdown specified**

	Strata Depth (ft.)	Water Type
Water Quality:	No Data	Good

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Kenco Water Well Service**

30269 FM 1488 Rd.
Waller, TX 77484

Driller Name: **Kenneth Robinson** License Number: **2214**

Comments: **This report mailed to TDLR 06/18/2001.**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	20	Clay
20	30	Gravel
30	40	Clay
40	45	Gravel
45	70	Sand
70	80	Clay
80	87	Sand & Rock
87	98	Rock & Sand
98	120	Clay
120	127	Sand & Rock
127	169	Clay
169	189	Clay & Rock
189	210	Clay
210	212	Rock
212	221	Clay
221	239	Sand
239	251	Clay
251	266	Rock & Clay

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4"	N	PVC	0 - 297 Sch. 40
2 1/2"	N	Jayco WOP	287 - 307 .008 gauge
2 1/2"	N	PVC Liner	283 - 287 Sch. 40

266	270	Sand
270	289	Clay
289	303	Sand
303	305	Rock
305	307	Clay

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

8(5) 4 8(5)

Send original copy by certified return receipt requested mail to: TDLR, P.O. Box 12157, Austin, TX 78711

ATTENTION OWNER: *Confidentiality Privilege Notice on reverse side of Well Owner's copy*

State of Texas WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER BOB YOUNG (Name) ADDRESS 191 BARTLETT ROAD (Street or RFD) SEALY (City) TX (State) 77474 (Zip)

2) ADDRESS OF WELL: County AUSTIN 191 BARTLETT RD (Street, RFD or other) SEALY (City) TX (State) 77474 (Zip) Long. Lat. GRID # 66-16-8

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☐ Environmental Soil Boring ☒ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) X

6) WELL LOG: Date Drilling: Started 9/03/99 Completed 9-04/99

DIAMETER OF HOLE		
Dia.. (in.)	From (ft.)	To (ft.)
7.75	Surface	160

7) DRILLING METHOD (Check): ☐ Driven ☐ Air Rotary ☒ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other

N

From (ft.)	To (ft.)	Description and color of formation material
0	5	BLACK CLAY
5	60	SAND & GRAVEL
60	70	CLAY & ROCK
70	80	GRAVEL
80	110	WHITE CLAY
110	115	SAND
115	140	RED & WHITE CLAY
140	160	SAND & ROCK

(Use reverse side if necessary)

8) Borehole Completion (Check): ☐ Open Hole X Straight Wall ☐ Underreamed ☐ Gravel Packed ☐ Other
If Gravel Packed give interval ... from ft. to ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting	Gage Screen
4	N	PVC	0	140		
4	N	PVC SLOTTED	140	160		.010

9) CEMENTING DATA
Cemented from 0 ft. to 15 ft. No. of sacks used 12
ft. to ft. No. of sacks used
Method used SLURRY
Cemented by BURLESON SERVICES INC
Distance to septic system field lines or other concentrated contamination ft.
Method of verification of above distance NONE ON SITE

13) ☐ Well plugged within 48 hours

Casing left in well: From (ft)	Casing left in well: To (ft)	Cement/bentonite placed in: From (ft)	Cement/bentonite placed in: To (ft)	Sacks used:

14) TYPE PUMP: ☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other
Depth to pump bowls, cylinder, jet, etc., ft.

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed
☒ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

15) WELL TESTS: Type test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 40 Gpm with 25 ft. drawdown after 2 hrs.

11) WATER LEVEL
Static Level 60 ft. below land surface Date 9/04/99
Artesian flow gpm Date

16) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata
Was a chemical analysis made? ☐ Yes ☐ No

12) PACKERS:

Type	Depth
ONE SHALE	15'

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME BURLESON SERVICES INC (Type or print) WELL DRILLER'S LICENSE NO. 3039WPK

ADDRESS PO BOX 1091 (Street or RFD) SEALY (City) TX (State) 77474 (Zip)

(Signed) (Licensed Well Driller) (Signed) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDLR FORM 001WWD (4/98) Forms On-A-Disk, Inc. · Dallas, Texas · (214) 340-9429

Copies to TDLR, DRILLER, and WELL OWNER

WL - 60
Screen = 140 - 160'

STATE OF TEXAS WELL REPORT for Tracking #53981

Owner:	**Vital Link**	Owner Well #:	**Log 25708**
Address:	**110 Bartlett Road Sealy, TX**	Grid #:	**66-16-8**
Well Location:	**110 Bartlett Road Sealy, TX**	Latitude:	**29° 46' 27" N**
		Longitude:	**096° 04' 29" W**
Well County:	**Austin**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Industrial**

Drilling Start Date: **12/7/2002** Drilling End Date: **12/7/2002**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7.875**	**0**	**368**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Straight Wall**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**368**	**48**

Seal Method: **Pressure**

Sealed By: **ODCI**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: **70 ft.** below land surface on **2002-12-07** Measurement Method: **Unknown**

Packers: **B P Seal 368'**

Type of Pump: **Submersible** Pump Depth (ft.): **210**

Well Tests: **Jetted** **Yield: 80 GPM**

	Strata Depth (ft.)	Water Type
Water Quality:	16	No Data

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **O'Day Drilling Company, Inc.**

2357 Garden Road
Pearland, TX 77581

Driller Name: **Rogelio Meza** License Number: **4884**

Comments: **$dfs**
Original lat long out of range. TWDB updated lat long on 6/16/06 by Anderson.

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	3	Top Soil
3	18	Clay
18	35	Sand
35	45	Clay
45	92	Gravel
92	150	Clay
150	182	Sand
182	208	Clay
208	230	Sand
230	266	Clay
266	278	Sand
278	281	Clay
281	285	Sand
285	287	Rock
287	371	Clay
371	387	Sand
387	389	Clay

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
5	New	PVC Casing	0 368 SDR17
3	New	Galvanized Liner	368 379 WW
3	New	S/S Pipe Base Scrn	379 389 08

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

STATE OF TEXAS WELL REPORT for Tracking #82106

Owner:	**Pencco**	Owner Well #:	**2**
Address:	**831 Bartlett Sealy, TX 77474**	Grid #:	**66-16-8**
		Latitude:	**29° 46' 36" N**
Well Location:	**831 Bartlett Sealy, TX 77474**	Longitude:	**096° 04' 20" W**
Well County:	**Austin**	Elevation:	**135 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Industrial**

Drilling Start Date: **4/26/2006** Drilling End Date: **4/28/2006**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**7.5**	**0**	**23**
	6.75	**23**	**271**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Straight Wall**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**21**	**11 cement**

Seal Method: **concrete poured**

Sealed By: **nwwsi**

Distance to Property Line (ft.): **50+**

Distance to Septic Field or other concentrated contamination (ft.): **100+**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **visual**

Surface Completion: **Surface Sleeve Installed**

Water Level: **55 ft.** below land surface on **2006-04-28** Measurement Method: **Unknown**

Packers: **none**

Type of Pump: **none yet**

Well Tests: **Jetted** **Yield: 100+ GPM**

	Description (number of sacks & material)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Plug Information:	**not applicable**		

	Strata Depth (ft.)	Water Type
Water Quality:	182 - 271	good

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Neuendorff's Water Well Svc., Inc.**

P. O. Box 131
Columbus, TX 78934

Driller Name: **Kenny Neuendorff** License Number: **2867**

Apprentice Name: **Chris Jones** Apprentice Number: **3232**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0	6	Blackland
6	14	Red Sand
14	25	Red Clay & Sand streaks
25	45	Sand & few Clay streaks
45	47	Sand
47	56	Brown Clay
56	78	Pea Gravel
78	81	Clay
81	85	Gravel
85	105	Gravel & Clay streaks
105	125	White Clay & Gravel streaks
125	145	Sand & few Clay streaks
145	158	Sand & Rock
158	165	White Clay
165	182	Sandy White Clay
182	185	Sand
185	271	Sand w/few Rock streaks

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	N	s/40 pvc	+2 - 217
4	N	s/40 pvc SFSS	217 - 267 .010"
4	N	s/40 pvc	267 - 270

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

STATE OF TEXAS WELL REPORT for Tracking #284690

Owner:	**Brian Bro**	Owner Well #:	**No Data**
Address:	**3200 Southwest Frwy Houston, TX 77027**	Grid #:	**66-16-8**
		Latitude:	**29° 46' 46" N**
Well Location:	**1185 Bartlett Rd. Brookshire, TX 77423**	Longitude:	**096° 04' 08" W**
Well County:	**Waller**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Irrigation**

Drilling Start Date: **4/18/2012** Drilling End Date: **4/19/2012**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8**	**0**	**204**
	5.75	**204**	**216**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Two-String**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	**0**	**4**	**3 Top**
	4	**204**	**24 Cement**

Seal Method: **Halliburton Fully Pressure Cemented**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Pitless Adapter Used**

Water Level: **30 ft.** below land surface on **No Data** Measurement Method: **Unknown**

Packers: **Formation Packer @ 18ft**
Tri - Seal Packer @ 198-200ft

Type of Pump: **Submersible** Pump Depth (ft.): **180**

Well Tests: **Jetted** **Yield: 100 GPM with 10 ft. drawdown after 12 hours**

	Strata Depth (ft.)	Water Type
Water Quality:	**20ft**	**Good**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geophysical Drilling, Inc.**
4410 FM-359 Rd. South
Brookshire, TX 77423

Driller Name: **Greg Hill** License Number: **2888**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0	20	Blackland, Sandy Clay
20	60	Clay, Sand & Gravel, Rock, White Clay
60	80	Tan & White Clay, Sand
80	100	Tan & White Clay
100	120	Sand w/ Rock
120	140	Clay, Rock, Sand
140	160	Sand & Rock
160	216	Sand

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
5	New	PVC Well Casing	0-204 * SDR-17
2.5	New	PVC Blank Pipe	200-205 * sch80
2.5	New	SSRodbaseScreen	205-215 * 8ga
2.5	New	Sawtooth Nipple	215-216 * sch40

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

66-16-8AA

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. 66-16-8AA
Located on map YES
Received: TH

1) OWNER John E. Scheffer (Name) Address 7301 Anzac (Street or RFD) Houston, Texas (City) (State) 77020 (Zip)

2) LOCATION OF WELL: County Austin 0 miles in In (N.E., S.W., etc.) direction from San Felipe, Texas (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. 5 Survey Name San Felipe De Austin
Distance and direction from two intersecting section or survey lines Towntract

☒ See attached map.

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other _____

5) DRILLING METHOD (Check):
☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG:

Date drilled 9-11-79

DIAMETER OF HOLE Dia. (in.)	From (ft.)	To (ft.)
5½	Surface 0	143

From (ft.)	To (ft.)	Description and color of formation material
0	16	White Clay
16	34	Sand
34	76	White Clay
76	83	Rock
83	134	Red Clay
134	143	Sand

(Use reverse side if necessary)

7) BOREHOLE COMPLETION:
☐ Open Hole ☒ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	New	Plastic	0	135	Sch40
4	New	Plastic Under Bar	135	143	.016

CEMENTING DATA
Cemented from _____ ft. to _____ ft.
Method used _____
Cemented by _____ (Company or Individual)

9) WATER LEVEL:
Static level 55 ft. below land surface Date 9-11-79
Artesian flow _____ gpm. Date _____

10) PACKERS: Type Depth

WL = 55
Screen - 135-143

11) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 125 ft.

12) WELL TESTS:
☐ Type Test: ☒ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 10 gpm with 20 ft. drawdown after 6 hrs.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata 9'
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Kenneth Wendt (Type or Print) Water Well Drillers Registration No. 1138

ADDRESS Route 1 (Street or RFD) Cat Spring, (City) Texas (State) 78933 (Zip)

(Signed) Kenneth Wendt (Water Well Driller) Wendt Well Service (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDWR-0392 (Rev. 1-12-79)

DEPARTMENT OF WATER RESOURCES COPY

Appendix K

Boring Logs

Monitoring Well: **SB-1 / MW-1**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet **1** of **3**

Project Location: **Near Sealy, Texas**		Logged By: **J. Hinojosa**	Checked By: **B. Lee-Brand**
Drilling Contractor: **Best Drilling Services, Inc.**		Date Started: **9/14/15**	Date Finished: **9/15/15**
Drilling Equipment: **CME 75**	Driller: **B. Milton**	Total Boring Depth: (feet) **90.0**	Depth to Static Water: (feet) **48.04**
Drilling Method: **Hollow Stem Auger**	Borehole Diameter: **8.25"**	TOC Elevation: **145.88**	Ground Elevation: **142.90**
Sampling Method: **Core Barrel - Shelby Tube**		Diameter and Type of Well Casing: **2" Schedule 40 PVC**	
Comments: **Groundwater encountered at 49 feet below ground surface**		Slot Size: **0.010**	Filter Material: **20/40**
		Development Method: **Submersible Pump**	

Depth (feet)	USC Soil Type	Description	PID Readings	Recovery (feet)	Sample ID	Monitoring Well Remarks
						-3.0 Above-grade completion with pressure cap. Enclosed in steel protected casing
0	OL	OL; dark brown 7.5 YR 2.5/1; dry to moist; low plasticity; top soil	0	4		0.0 Logged by 5' Core
2	ML	SILTY CLAY (ML); orange brown 7.5 YR 4/6; dry; nonplastic; w/ some calcareous shell fragments				
4	CL	CLAY (CL); orange brown 7.5 YR 4/6; firm; medium plasticity; w/ some calcareous shell fragments / caliche; waxy	0			
6	SM	SILTY SAND (SM); light orange tan 7.5 YR 6/6; dry to moist; very fine grained sand		5	SB-1 (6'-8.5')	2.5' Shelby Tube sample collected
10			0	4		
12	SP	SAND (SP); light orange tan 7.5 YR 6/6; dry to moist; very fine grained sand			SB-1 (12'-14.5')	2.5' Shelby Tube sample collected
15		light tan 10 YR 6/4; well sorted	0	4		
18	SM	SILTY SAND (SM); very light tan 10 YR 7/4; dry to moist; fine to coarse grained sand; subrounded				
20		orange brown 7.5 YR 4/6; dry; very fine grained sand	0	4		
23	SC	CLAYEY SAND with Gravel (SC); orange brown 7.5 YR 4/6; dry to moist; smooth quartz pebbles 0.25-0.5 inch				
25	SM	SILTY SAND (SM); light tan 10 YR 6/4; dry to moist; very fine grained sand; well sorted	0	4		2" Diameter Schedule 40 PVC Riser.

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Monitoring Well: SB-1 / MW-1

Project Name: SouthWaste Proposed Sealy Composting Facility Project Number: TX15.0094.00 Sheet 2 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID
32					0		4	
34					0		4	
36								
38		SW		SAND (SW); 7.5 YR 5/4; dry to moist; medium to coarse grained sand; poorly sorted				
40		SM		SILTY SAND (SM); light tan 10 YR 6/4; dry to moist; very fine grained sand; well sorted	0		4.5	
42								
44		SC		CLAYEY SAND with Gravel (SC); orange brown 7.5 YR 4/6; dry to moist; smooth quartz pebbles 0.25-0.5 inch				
46		SM		SILTY SAND (SM); 10 YR 6/4; dry to moist	0		3	
48	▽							
	▼			wet; water at 49' bgs				
50		SW		SAND (SW); 7.5 YR 5/4; wet; medium to coarse grained sand; poorly sorted	0		2	
52								
54								
56				10 YR 5/3; very fine grained sand	0		2.5	
58								
60					0		2.5	
62								
64								
66					0		2	
68								

Monitoring Well Remarks	
40.0	Bentonite Seal
43.0	
	20/40 Silica Sand Filter Pack.
	2" Diameter Schedule 40 PVC Screen 0.01" Slot.
64.7	
65.0	2" Diameter Schedule 40 PVC Bottom Cap.
	Borehole collapsed from 47' to 88' filling in the annular space. Borehole redrilled to 65' for well installation.

Monitoring Well: SB-1 / MW-1

Project Name: SouthWaste Proposed Sealy Composting Facility Project Number: TX15.0094.00 Sheet 3 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
70					0		2		
72									
74					0		2.5		
76									
78									
80					0		3		
82									
84					0		2		
86		GC		CLAYEY GRAVEL (GC); 10 YR 5/3; wet; fine to coarse grained sand with fine gravel; poorly sorted; gravels 0.25-1 inch					Logged from Auger
		CL		CLAY with Gravel (CL); 10 YR 5/3; soft; dry; medium plasticity; gravels 0.25-1 inch					
88									88.0
90									

Monitoring Well: **SB-2 / MW-2**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet **1** of **2**

Project Location: **Near Sealy, Texas**		Logged By: **J. Hinojosa**	Checked By: **B. Lee-Brand**
Drilling Contractor: **Best Drilling Services, Inc.**		Date Started: **9/16/15**	Date Finished: **9/16/15**
Drilling Equipment: **CME 75**	Driller: **B. Milton**	Total Boring Depth: (feet) **65.0**	Depth to Static Water (feet) **51.47**
Drilling Method: **Hollow Stem Auger**	Borehole Diameter: **8.25"**	TOC Elevation: **149.24**	Ground Elevation: **146.00**
Sampling Method: **Core Barrel - Shelby Tube - Auger**		Diameter and Type of Well Casing: **2" Schedule 40 PVC**	
Comments: **Groundwater encountered at 55 feet below ground surface**		Slot Size: **0.010**	Filter Material: **20/40**
		Development Method: **Submersible Pump**	

Depth (feet)	USC Soil Type	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID
0	OL	OL; 10 YR 4/2; dry to moist; low plasticity; top soil; w/ some rootlets and rock fragments	0			
2	CL	CLAY (CL); 10 YR 3/1; stiff; dry to moist; medium plasticity; waxy; w/ some organic material down to 2' bgs			4	
4	ML	SILTY CLAY (ML); 5 YR 5/6; dry to moist; low plasticity; <5% sand present	0			
6	CL	SANDY CLAY (CL); 5 YR 5/6; dry to moist; medium plasticity			2.5	SB-2 (6'-8.5')
8						
10	SP	SAND (SP); 10 YR 6/4; dry to moist; well sorted; subangular; very fine sand 7.5 YR 5/6; moist	0			
12						
14			0			
16						
18						
20		10 YR 6/4; fine sand	0			
22						
24						
26		7.5 YR 5/6; very fine sand	0			
28						

-3.2

Monitoring Well Remarks

Above-grade completion with pressure cap
Enclosed in steel protected casing

0.0

Logged by 5' Core

2.5' Shelby Tube sample collected

Logged by cuttings

2" Diameter Schedule 40 PVC Riser

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Monitoring Well: **SB-2 / MW-2**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet 2 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
32		SP-SC		SAND with Clay (SP-SC); 7.5 YR 5/6; moist; medium plasticity; clay seam(s) 1-2 inches	0				
34									
36		SP		SAND (SP); 7.5 YR 5/6; moist; well sorted; subangular; very fine sand	0				
38									
40					0				40.0 Bentonite Seal
42									43.0
44									
46					0				
48									
50				10 YR 6/4; fine sand	0				20/40 Silica Sand Filter Pack.
52	▽								
54	▼			7.5 YR 5/6; wet; water at 55' bgs	0				2" Diameter Schedule 40 PVC Screen 0.01" Slot.
56									
58									
60					0				
62									
64									64.7
66					0				65.0 2" Diameter Schedule 40 PVC Bottom Cap. annular space filled in with surrounding formation.
68									

Monitoring Well: **SB-2 / MW-2**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet 3 of 3

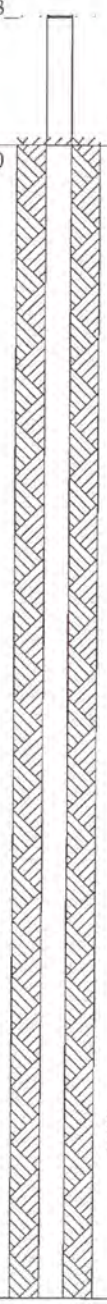
Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
70					0				
72									
74					0				
76									
78									
80					0				
82		GC		CLAYEY GRAVEL (GC); 10 YR 5/3; wet; fine to coarse grained sand with fine gravel; poorly sorted; gravels 0.25-1 inch					
84		CL		CLAY with Gravel (CL); 10 YR 5/3; soft; dry; medium plasticity; gravels 0.25-1 inch					84.0 Logged by cuttings

Monitoring Well: **SB-3 / MW-3**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet 1 of 2

Project Location: **Near Sealy, Texas**		Logged By: **J. Hinojosa**	Checked By: **B. Lee-Brand**
Drilling Contractor: **Best Drilling Services, Inc.**		Date Started: **9/22/15**	Date Finished: **9/22/15**
Drilling Equipment: **CME 75**	Driller: **B. Milton**	Total Boring Depth: (feet) **65.0**	Depth to Static Water: (feet) **58.19**
Drilling Method: **Hollow Stem Auger**	Borehole Diameter: **8.25"**	TOC Elevation: **155.39**	Ground Elevation: **152.10**
Sampling Method: **Auger**		Diameter and Type of Well Casing: **2" Schedule 40 PVC**	
Comments: **Groundwater encountered at 55 feet below ground surface**		Slot Size: **0.010**	Filter Material: **20/40**
		Development Method: **Submersible Pump**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID
0		OL		OL; 10 YR 4/2; dry; top soil; w/ some rootlets	0			
2		CH		CLAY (CH); 10 YR 3/1; dry to moist; high plasticity; w/ some rootlets down to 3' bgs				
4								
6		CL		CLAY with Silt (CL); 5 YR 5/6; dry to moist; medium to high plasticity; lean clay; waxy	0			
8								
10				dry to moist; low plasticity; increasing amounts of silt	0			
12								
14					0			
16								
18								
20		SP		SAND (SP); 7.5 YR 6/6; dry to moist; very fine sand	0			
22								
24					0			
26								
28								



Monitoring Well Remarks

Above-grade completion with pressure cap
Enclosed in steel protected casing
Logged by cuttings

2" Diameter Schedule 40 PVC Riser.

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Monitoring Well: SB-3 / MW-3

Project Name: SouthWaste Proposed Sealy Composting Facility Project Number: TX15.0094.00 Sheet 2 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
32				10 YR 6/4; dry; very fine to fine grained sand; subangular	0				
34					0				
36									
38									
40					0				40.0 Bentonite Seal
42									43.0
44									
46		SP-SC		SAND with Clay (SP-SC); 7.5 YR 5/6; moist; medium plasticity; fine grained sand; subangular; clay seam(s) 1-2 inches	0				
48									
50		SP		SAND (SP); 10 YR 6/6; moist; fine grained sand; subangular	0				20/40 Silica Sand Filter Pack.
52									
54	▼								
56				10 YR 5/6; wet; fine to medium grained sand; water at 55' bgs	0				2" Diameter Schedule 40 PVC Screen 0.01" Slot.
58	▽								
60					0				
62									
64									64.7
66					0				65.0 2" Diameter Schedule 40 PVC Bottom Cap. annular space filled in with surrounding formation.
68									

Monitoring Well: **SB-3 / MW-3**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet 3 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
70					0				
72									
74					0				
76									
78									
80					0				
82		GC		CLAYEY GRAVEL (GC); 10 YR 5/3; wet; fine to coarse grained sand with fine gravel; poorly sorted; gravels 0.25-1 inch					
84		CL		CLAY with Gravel (CL); 10 YR 5/3; soft; dry; medium plasticity; gravels 0.25-1 inch					85.0 Logged by cuttings

Monitoring Well: **SB-4 / MW-4**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet **1** of **2**

Project Location: **Near Sealy, Texas**		Logged By: **J. Hinojosa**	Checked By: **B. Lee-Brand**
Drilling Contractor: **Best Drilling Services, Inc.**		Date Started: **9/15/15**	Date Finished: **9/15/15**
Drilling Equipment: **CME 75**	Driller: **B. Milton**	Total Boring Depth: (feet) **65.0**	Depth to Static Water: (feet) **49.88**
Drilling Method: **Hollow Stem Auger**	Borehole Diameter: **8.25"**	TOC Elevation: **147.31**	Ground Elevation: **144.30**
Sampling Method: **Auger - Shelby Tube**		Diameter and Type of Well Casing: **2" Schedule 40 PVC**	
Comments: **Groundwater encountered at 55 feet below ground surface**		Slot Size: **0.010**	Filter Material: **20/40**
		Development Method: **Submersible Pump**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID
0		OL		OL; 7.5 YR 3/2; dry to moist; high plasticity; top soil	0			
2		CL		CLAY (CL); 5 YR 4/6; dry to moist; medium to high plasticity; lean			1.5	SB-4 (3'-5.5')
4								
6		ML		SILT (ML); 5 YR 4/6; dry to moist; low plasticity	0			
8								
10					0			
12								
14								
16		SP		SAND (SP); 10 YR 6/6; dry to moist; very fine grained sand; subangular	0			
18								
20					0			
22								
24					0			
26								
28								

-3.0

Monitoring Well Remarks

Above-grade completion with pressure cap
Enclosed in steel protected casing

0.0 Logged by cuttings

2.5' Shelby Tube sample collected

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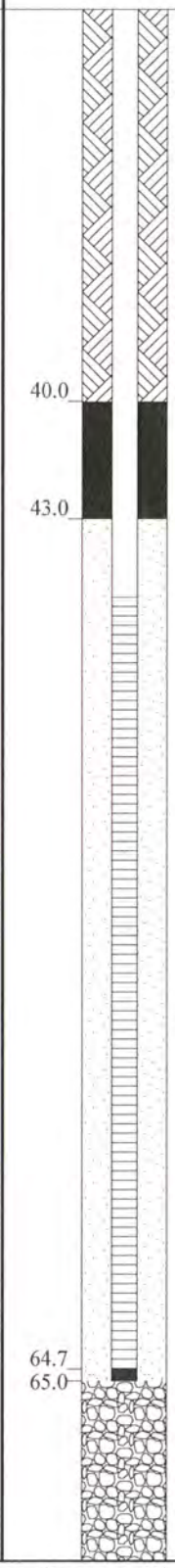
2" Diameter Schedule 40 PVC Riser.

Monitoring Well: **SB-4 / MW-4**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet 2 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
32–68	▽ 50			7.5 YR 5/8; moist	0				
	▼ 54			wet; water at 55' bgs	0				
					0				
					0				
					0				
					0				
					0				
					0				
					0				
					0				



Monitoring Well: **SB-4 / MW-4**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet 3 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
70					0				
72									
74					0				
76									
78									
80					0				
82									
84		GC		CLAYEY GRAVEL (GC); 10 YR 5/3; wet; fine to coarse grained sand with fine gravel; poorly sorted; gravels 0.25-1 inch	0				
86		CL		CLAY with Gravel (CL); 10 YR 5/3; soft; dry; medium plasticity; gravels 0.25-1 inch					86.0 Logged by cuttings

Monitoring Well: **SB-5 / MW-5**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet **1** of **3**

Project Location: **Near Sealy, Texas**		Logged By: **J. Hinojosa**	Checked By: **G. Gonzales**
Drilling Contractor: **Best Drilling Services, Inc.**		Date Started: **10/15/15**	Date Finished: **10/15/15**
Drilling Equipment: **CME 75**	Driller: **B. Milton**	Total Boring Depth: (feet) **87.5**	Depth to Static Water: (feet) **56.75**
Drilling Method: **Hollow Stem Auger**	Borehole Diameter: **8.25"**	TOC Elevation: **154.14**	Ground Elevation: **150.90**
Sampling Method: **Core Barrel - Shelby Tube - Auger**		Diameter and Type of Well Casing: **2" Schedule 40 PVC**	
Comments: **Groundwater encountered at 54 feet below ground surface**		Slot Size: **0.010**	Filter Material: **20/40**
		Development Method: **Submersible Pump**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID
0		OL		OL; dark brown 7.5 YR 3/2; dry to moist; low plasticity; top soil, <5% soil and sand, rootlets	0			
2		CL		CLAY (CL); dark brown 7.5 YR 3/2; stiff; dry to moist; medium plasticity; rootlets			4	
4				medium plasticity; w/ some gravel and pebbles 1mm-10mm	0			
6				CLAY with Silt; orange-red 7.5 YR 4/6; very stiff; dry to moist; waxy			5	SB-5 (6'-8.5')
8								
10					0			
12		SC		CLAYEY SAND (SC); tan 7.5 YR 6/6; firm; dry to moist; low plasticity; very fine grained sand			5	SB-5 (12'-14.5')
14								
16		SP		SAND (SP); tan 7.5 YR 6/6; loose; dry; fine grained sand; well sorted; subangular	0		4	
18								
20				very fine grained sand	0		4	
22								
24				medium grained sand	0		4	
26								
28								

-3.2

Monitoring Well Remarks

Above-grade completion with pressure cap
Enclosed in steel protected casing

0.0

Logged by 5' Core

2.5' Shelby Tube sample collected

2.5' Shelby Tube sample collected

2" Diameter Schedule 40 PVC Riser

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Monitoring Well: SB-5 / MW-5

Project Name: SouthWaste Proposed Sealy Composting Facility Project Number: TX15.0094.00 Sheet 2 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
32				fine grained sand	0		4		
34									
36				dark tan 7.5 YR 6/8; dry to moist	0		4		
38									
40					0		4.5		
42									
44				moist	0		4.5		44.0 Bentonite Seal 47.0
46									
48				yellow-tan 10 YR 6/8					
50					0		4.5		20/40 Silica Sand Filter Pack.
52									
54	▼			tan 7.5 YR 5/6; wet; water at 54' bgs					
56	▽	SW		SAND with Gravel (SW); tan 7.5 YR 5/6; wet; poorly sorted; subangular; coarse grained sand to very coarse grained sand	0		2		2" Diameter Schedule 40 PVC Screen 0.01" Slot.
58		SP		SAND (SP); tan 7.5 YR 5/6; wet; medium to coarse grained sand; poorly sorted; subangular					
60					0				
62									
64					0				
66									
68									68.7 2" Diameter Schedule 40 PVC Bottom Cap. 69.0

Monitoring Well: **SB-5 / MW-5**

Project Name: **SouthWaste Proposed Sealy Composting Facility** Project Number: **TX15.0094.00** Sheet 3 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID
70					0			
72								
74								
76		SP-SC		SAND with Clay (SP-SC); orange-red 7.5 YR 4/6; moist to wet; medium plasticity; fine grained sand; well sorted; subangular; clay seam(s) 1-2 inches	0			
78								
80		SP		SAND (SP); tan 7.5 YR 5/6; moist to wet; medium to coarse grained sand; poorly sorted; subangular	0			
82		GC		CLAYEY GRAVEL (GC); 10 YR 5/3; wet; fine to coarse grained sand with fine gravel; poorly sorted; gravels 0.25-1 inch				
84		CL		CLAY with Gravel (CL); yellow-gray 5 Y 6/3; soft; dry to moist; gravels 0.25-1 inch, <5% fine grained sand	0			SB-5 (84'-85')
86								SB-5 (85'-87.5')

Monitoring Well Remarks
20/40 Silica Sand Filter Pack.
72.0
Bentonite Seal
75.0
Borehole collapsed from 75' to 87.5' filling in the annular space.
Grab sample collected
Grab sample collected
87.5
Driller encountered claystone. Unable to advance augers.

Appendix L

Geotechnical Laboratory Reports

Laboratory Report for

Daniel B. Stephens & Associates, Inc.

South Waste Sealy Facility

(TX15.0094.00)

November 6, 2015

Daniel B. Stephens & Associates, Inc.

4400 Alameda Blvd. NE, Suite C • Albuquerque, New Mexico 87113

November 6, 2015

Ben Camacho
Daniel B. Stephens & Associates, Inc.
4030 W. Braker Lane
Austin, TX 78759
(512) 651-6019

Re: DBS&A Laboratory Report for the Daniel B. Stephens & Associates, Inc. TX15.0094.00 South Waste Sealy Facility Project

Dear Mr. Camacho:

Enclosed is the report for the Daniel B. Stephens & Associates, Inc. TX15.0094.00 South Waste Sealy Facility project samples. Please review this report and provide any comments as samples will be held for a maximum of 30 days. After 30 days samples will be returned or disposed of in an appropriate manner.

All testing results were evaluated subjectively for consistency and reasonableness, and the results appear to be reasonably representative of the material tested. However, DBS&A does not assume any responsibility for interpretations or analyses based on the data enclosed, nor can we guarantee that these data are fully representative of the undisturbed materials at the field site. We recommend that careful evaluation of these laboratory results be made for your particular application.

The testing utilized to generate the enclosed report employs methods that are standard for the industry. The results do not constitute a professional opinion by DBS&A, nor can the results affect any professional or expert opinions rendered with respect thereto by DBS&A. You have acknowledged that all the testing undertaken by us, and the report provided, constitutes mere test results using standardized methods, and cannot be used to disqualify DBS&A from rendering any professional or expert opinion, having waived any claim of conflict of interest by DBS&A.

We are pleased to provide this service to DBS&A and look forward to future laboratory testing on other projects. If you have any questions about the enclosed data, please do not hesitate to call.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.
SOIL TESTING & RESEARCH LABORATORY

Joleen Hines
Laboratory Supervising Manager

Enclosure

Summaries

Summary of Tests Performed

Laboratory Sample Number	Initial Soil Properties[1]			Saturated Hydraulic Conductivity[2]			Moisture Characteristics[3]								Particle Size[4]			Specific Gravity[5]		Air Perm-eability	Atterberg Limits	Proctor Compaction
	G	VM	VD	CH	FH	FW	HC	PP	FP	DPP	RH	EP	WHC	K_{unsat}	DS	WS	H	F	C			
SB-5 (6'-8.5')																X	X				X	
SB-5 (6'-8.5') Horizontal	X	X				X																
SB-5 (12'-14.5')																X	X				X	
SB-5 (12'-14.5') Vertical	X	X				X																
SB-5 (84'-85')																X	X				X	
SB-5 (84'-85') Disturbed	X	X				X																
SB-5 (85'-87.5')																X	X				X	
SB-5 (85'-87.5') Disturbed	X	X				X																

[1] G = Gravimetric Moisture Content, VM = Volume Measurement Method, VD = Volume Displacement Method

[2] CH = Constant Head Rigid Wall, FH = Falling Head Rigid Wall, FW = Falling Head Rising Tail Flexible Wall

[3] HC = Hanging Column, PP = Pressure Plate, FP = Filter Paper, DPP = Dew Point Potentiometer, RH = Relative Humidity Box, EP = Effective Porosity, WHC = Water Holding Capacity, Kunsat = Calculated Unsaturated Hydraulic Conductivity

[4] DS = Dry Sieve, WS = Wet Sieve, H = Hydrometer

[5] F = Fine (<4.75mm), C = Coarse (>4.75mm)

Notes

Sample Receipt:
Four samples were received on October 20, 2015. Two of the samples were received as undisturbed samples in 3" x 30" Shelby tubes sealed tape and end caps, and headspace filled with bubble wrap. The remaining two samples were each received as a small (~1"-2" x 3"-4") intact 'clod' of clayey material, sealed in quart bags. The bags were packaged in a bubble envelope inside a box, and the Shelby tubes were each surrounded by bubble wrap and were packaged in FedEx tubes. All samples were received in good order.

Sample Preparation and Testing Notes:
An intact sub-sample was obtained from the top of both shelby tubes; and, intact sub-samples were obtained from each clod sample by gently advancing a test ring into each clod. These sub-samples were used to determine the appropriate confining pressure to be used during saturated hydraulic conductivity testing. Estimated applicable confining pressures were determined based on each sub-sample dry bulk density and depth.

Secondary sub-samples were then obtained from each shelby tube sample for saturated hydraulic conductivity testing. The sub-sample to be used for horizontal saturated hydraulic conductivity testing was obtained by first extruding the sample material from the shelby tube into a length of pvc pipe equipped with an access hole in the side. A test ring was then advanced into the access hole in order to obtain the horizontal sub-sample. The sub-sample to be used for vertical saturated hydraulic conductivity testing was obtained by advancing a test ring directly into the material in the shelby tube. The sub-sample ID's were appended with either "Horizontal" or "Vertical", as appropriate, to indicate the sample preparation method.

Secondary sub-samples were also prepared for each clod sample for saturated hydraulic conductivity testing by remolding the material into a test ring, targeting the initial density and moisture content. The sub-sample ID's were appended with "Disturbed" to indicate the sample preparation method.

All secondary sub-samples were subjected to initial properties analysis and saturated hydraulic conductivity testing. Saturated hydraulic conductivity testing was performed using a flexible wall method and the confining pressure calculated based on the initial sample densities and the sample depths.

In all cases, directly adjacent sample material was used for particle size analysis and Atterberg limits testing.

Porosity calculations, and the particle diameter calculations in the hydrometer portion of the particle size analysis testing, are based on the use of an assumed specific gravity value of 2.65.

Summary of Sample Preparation/Volume Changes

Sample Number	Initial Sample Data[1]		Remold Data			Volume Change Post Saturation[2]		
	Moisture Content (%, g/g)	Dry Bulk Density (g/cm^3)	Moisture Content (%, g/g)	Dry Bulk Density (g/cm^3)	% of Initial Density (%)	Dry Bulk Density (g/cm^3)	% Volume Change (%)	% of Initial Density (%)
SB-5 (6'-8.5') Horizontal	14.9	1.83	NA	NA	NA	1.67	+9.5%	91.3%
SB-5 (12'-14.5') Vertical	13.2	1.67	NA	NA	NA	1.55	+7.9%	92.7%
SB-5 (84'-85') Disturbed	16.6	1.80	16.5	1.80	100.3%	1.91	-5.4%	106.1%
SB-5 (85'-87.5') Disturbed	18.8	1.73	19.0	1.73	100.0%	1.81	-4.8%	105.0%

[1]Initial Sample Data: The 'as received' dry bulk density and moisture content.

[2]Volume Change Post Saturation: Volume change measurements were obtained after saturated hydraulic conductivity testing.

Notes:

"+" indicates sample swelling, "-" indicates sample settling, and "---" indicates no volume change occurred. NA = Not Applicable

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Moisture Content				Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
	As Received		Remolded				
	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)			
SB-5 (6'-8.5') Horizontal	14.9	27.3	---	---	1.83	2.11	30.8
SB-5 (12'-14.5') Vertical	13.2	22.0	---	---	1.67	1.89	37.1
SB-5 (84'-85') Disturbed	NA	NA	16.5	29.8	1.80	2.10	32.0
SB-5 (85'-87.5') Disturbed	NA	NA	19.0	32.7	1.73	2.05	34.9

NA = Not analyzed

--- = This sample was not remolded

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis: Constant Head Flexible Wall	Method of Analysis: Falling Head Flexible Wall
SB-5 (6'-8.5') Horizontal	3.37E-07	NA		X
SB-5 (12'-14.5') Vertical	3.68E-06	NA		X
SB-5 (84'-85') Disturbed	6.42E-09	NA		X
SB-5 (85'-87.5') Disturbed	4.08E-09	NA		X

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NR = Not requested
NA = Not applicable

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
SB-5 (6'-8.5')	0.00017	0.0039	0.0058	34	0.82	WS/H	Lean clay (CL)	Silty Clay Loam	(Est)
SB-5 (12'-14.5')	0.00023	0.012	0.018	78	1.6	WS/H	Lean clay (CL)	Silty Clay Loam	(Est)
SB-5 (84'-85')	0.00063	0.28	0.35	556	24	WS/H	Clayey sand (SC)	Sandy Loam †	(Est)
SB-5 (85'-87.5')	8.9E-05	0.18	0.28	3146	109	WS/H	Clayey sand (SC)	Sandy Loam	(Est)

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Percent Gravel, Sand, Silt and Clay*

Sample Number	% Gravel (>4.75mm)	% Sand (<4.75mm, >0.075mm)	% Silt (<0.075mm, >0.002mm)	% Clay (<0.002mm)
SB-5 (6'-8.5')	0.0	1.6	58.7	39.7
SB-5 (12'-14.5')	0.0	1.1	71.2	27.8
SB-5 (84'-85')	2.8	66.6	18.2	12.4
SB-5 (85'-87.5')	0.6	61.3	21.0	17.0

*USCS classification does not classify clay fraction based on particle size. USDA definition of clay (<0.002mm) used in this table.

Summary of Atterberg Tests

Sample Number	Liquid Limit	Plastic Limit	Plasticity Index	Classification
SB-5 (6'-8.5')	48	19	29	CL
SB-5 (12'-14.5')	33	18	15	CL
SB-5 (84'-85')	30	13	17	CL
SB-5 (85'-87.5')	29	13	16	CL

--- = Soil requires visual-manual classification due to non-plasticity

Initial Properties

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Moisture Content				Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
	As Received		Remolded				
	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)			
SB-5 (6'-8.5') Horizontal	14.9	27.3	---	---	1.83	2.11	30.8
SB-5 (12'-14.5') Vertical	13.2	22.0	---	---	1.67	1.89	37.1
SB-5 (84'-85') Disturbed	NA	NA	16.5	29.8	1.80	2.10	32.0
SB-5 (85'-87.5') Disturbed	NA	NA	19.0	32.7	1.73	2.05	34.9

NA = Not analyzed

--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (6'-8.5') Horizontal
Ring Number: NA
Depth: 6'-8.5'

	As Received	Remolded
Test Date:	3-Nov-15	---
Field weight of sample* (g)*:*	141.02	
Tare weight, ring (g)*:*	0.00	
Tare weight, pan/plate (g)*:*	0.00	
Tare weight, other (g)*:*	0.00	
Dry weight of sample (g)*:*	122.76	
Sample volume (cm^3)*:*	66.98	
Assumed particle density (g/cm^3)*:*	2.65	
Gravimetric Moisture Content (% g/g)*:*	14.9	
Volumetric Moisture Content (% vol)*:*	27.3	
Dry bulk density (g/cm^3)*:*	1.83	
Wet bulk density (g/cm^3)*:*	2.11	
Calculated Porosity (% vol)*:*	30.8	
Percent Saturation:	88.4	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (12'-14.5') Vertical
Ring Number: NA
Depth: 12'-14.5'

	As Received	Remolded
Test Date:	3-Nov-15	---
Field weight of sample* (g)*:*	129.04	
Tare weight, ring (g)*:*	0.00	
Tare weight, pan/plate (g)*:*	0.00	
Tare weight, other (g)*:*	0.00	
Dry weight of sample (g)*:*	114.00	
Sample volume (cm^3)*:*	68.36	
Assumed particle density (g/cm^3)*:*	2.65	
Gravimetric Moisture Content (% g/g)*:*	13.2	
Volumetric Moisture Content (% vol)*:*	22.0	
Dry bulk density (g/cm^3)*:*	1.67	
Wet bulk density (g/cm^3)*:*	1.89	
Calculated Porosity (% vol)*:*	37.1	
Percent Saturation:	59.4	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (84'-85') Disturbed
Ring Number: NA
Depth: 84'-85'

	As Received	Remolded
Test Date:	NA	3-Nov-15
Field weight of sample* (g)*:*		107.64
Tare weight, ring (g)*:*		0.00
Tare weight, pan/plate (g)*:*		0.00
Tare weight, other (g)*:*		0.00
Dry weight of sample (g)*:*		92.36
Sample volume (cm^3)*:*		51.22
Assumed particle density (g/cm^3)*:*		2.65
Gravimetric Moisture Content (% g/g)*:*		16.5
Volumetric Moisture Content (% vol)*:*		29.8
Dry bulk density (g/cm^3)*:*		1.80
Wet bulk density (g/cm^3)*:*		2.10
Calculated Porosity (% vol)*:*		32.0
Percent Saturation:		93.4

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (85'-87.5') Disturbed
Ring Number: NA
Depth: 85'-87.5'

	As Received	Remolded
Test Date:	NA	3-Nov-15
Field weight of sample* (g)*:*		105.06
Tare weight, ring (g)*:*		0.00
Tare weight, pan/plate (g)*:*		0.00
Tare weight, other (g)*:*		0.00
Dry weight of sample (g)*:*		88.30
Sample volume (cm^3)*:*		51.18
Assumed particle density (g/cm^3)*:*		2.65
Gravimetric Moisture Content (% g/g)*:*		19.0
Volumetric Moisture Content (% vol)*:*		32.7
Dry bulk density (g/cm^3)*:*		1.73
Wet bulk density (g/cm^3)*:*		2.05
Calculated Porosity (% vol)*:*		34.9
Percent Saturation:		93.8

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Saturated Hydraulic Conductivity

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis: Constant Head Flexible Wall	Method of Analysis: Falling Head Flexible Wall
SB-5 (6'-8.5') Horizontal	3.37E-07	NA		X
SB-5 (12'-14.5') Vertical	3.68E-06	NA		X
SB-5 (84'-85') Disturbed	6.42E-09	NA		X
SB-5 (85'-87.5') Disturbed	4.08E-09	NA		X

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NR = Not requested
NA = Not applicable

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job name: South Waste Sealy Facility
Job number: TX15.0094.00
Sample number: SB-5 (6'-8.5') Horizontal
Ring number: NA
Depth: 6'-8.5'

Remolded or Initial Sample Properties		Post Permeation Sample Properties		Test and Sample Conditions	
Initial Mass (g):	141.02	*Saturated Mass (g):*	150.77	*Permeant liquid used:*	Tap Water
Diameter (cm):	4.861	*Dry Mass (g):*	122.76	*Sample Preparation:*	☑ In situ sample, extruded
Length (cm):	3.609	*Diameter (cm):*	5.075		☐ Remolded Sample
Area (cm^2):	18.56	*Length (cm):*	3.626	*Number of Lifts:*	NA
Volume (cm^3):	66.98	*Deformation (%)**:*	0.47	*Split:*	NA
Dry Density (g/cm^3):	1.83	*Area (cm^2):*	20.23	*Percent Coarse Material (%):*	NA
Dry Density (pcf):	114.42	*Volume (cm^3):*	73.35	*Particle Density(g/cm^3):*	2.65 ☑ Assumed ☐ Measured
Water Content (%, g/g):	14.9	*Dry Density (g/cm^3):*	1.67	*Cell pressure (PSI):*	69.8
Water Content (%, vol):	27.3	*Dry Density (pcf):*	104.48	*Influent pressure (PSI):*	67.5
Void Ratio (e):	0.45	*Water Content (%, g/g):*	22.8	*Effluent pressure (PSI):*	66.5
Porosity (%, vol):	30.8	*Water Content (%, vol):*	38.2	*Panel Used:*	☐ A ☑ B ☐ C
Saturation (%):	88.4	*Void Ratio(e):*	0.58	*Reading:*	☐ Annulus ☑ Pipette
		Porosity (%, vol):	36.8		Date/Time
		Saturation (%):*	103.6	B-Value (% saturation) prior to test*:	0.95 11/04/15 945
				B-Value (% saturation) post to test:	0.95 11/04/15 1225

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated or skewed during depressurizing and sample removal.

**Percent Deformation: based on initial sample length and post permeation sample length.

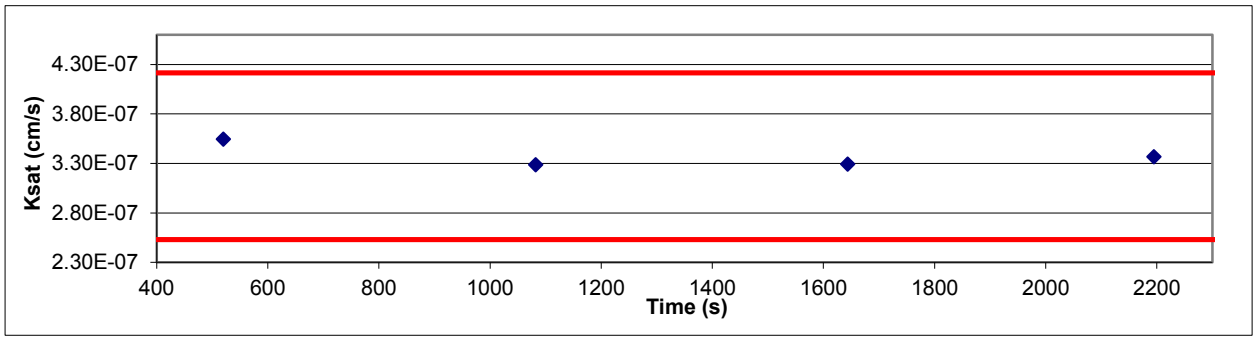
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job name: South Waste Sealy Facility
Job number: TX15.0094.00
Sample number: SB-5 (6'-8.5') Horizontal
Ring number: NA
Depth: 6'-8.5'

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
04-Nov-15	11:42:30	21.6	2.00	22.30	25.86	0.09	520	1.00	0%	3.68E-07	3.54E-07
04-Nov-15	11:51:10	21.6	2.10	22.20	25.80						
Test # 2:											
04-Nov-15	11:51:10	21.6	2.10	22.20	25.80	0.09	562	1.00	0%	3.41E-07	3.29E-07
04-Nov-15	12:00:32	21.6	2.20	22.10	25.74						
Test # 3:											
04-Nov-15	12:00:32	21.6	2.20	22.10	25.74	0.09	562	1.00	0%	3.42E-07	3.29E-07
04-Nov-15	12:09:54	21.6	2.30	22.00	25.67						
Test # 4:											
04-Nov-15	12:09:54	21.6	2.30	22.00	25.67	0.09	551	1.00	0%	3.50E-07	3.37E-07
04-Nov-15	12:19:05	21.6	2.40	21.90	25.61						

***Average Ksat* (cm/sec):** **3.37E-07**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 2.53E-07

Ksat (+25%) (cm/s): 4.22E-07

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job name: South Waste Sealy Facility
Job number: TX15.0094.00
Sample number: SB-5 (12'-14.5') Vertical
Ring number: NA
Depth: 12'-14.5'

Remolded or Initial Sample Properties		Post Permeation Sample Properties		Test and Sample Conditions	
Initial Mass (g):	129.04	*Saturated Mass (g):*	144.30	*Permeant liquid used:*	Tap Water
Diameter (cm):	4.896	*Dry Mass (g):*	114.00	*Sample Preparation:*	☑ In situ sample, extruded
Length (cm):	3.631	*Diameter (cm):*	5.082		☐ Remolded Sample
Area (cm^2):	18.83	*Length (cm):*	3.636	*Number of Lifts:*	NA
Volume (cm^3):	68.36	*Deformation (%)**:*	0.14	*Split:*	NA
Dry Density (g/cm^3):	1.67	*Area (cm^2):*	20.28	*Percent Coarse Material (%):*	NA
Dry Density (pcf):	104.11	*Volume (cm^3):*	73.75	*Particle Density(g/cm^3):*	2.65 ☑ Assumed ☐ Measured
Water Content (%, g/g):	13.2	*Dry Density (g/cm^3):*	1.55	*Cell pressure (PSI):*	69.9
Water Content (%, vol):	22.0	*Dry Density (pcf):*	96.49	*Influent pressure (PSI):*	65.0
Void Ratio (e):	0.59	*Water Content (%, g/g):*	26.6	*Effluent pressure (PSI):*	65.0
Porosity (%, vol):	37.1	*Water Content (%, vol):*	41.1	*Panel Used:*	☑ D ☐ E ☐ F
Saturation (%):	59.4	*Void Ratio(e):*	0.71	*Reading:*	☐ Annulus ☑ Pipette
		Porosity (%, vol):	41.7		Date/Time
		Saturation (%):*	98.6	B-Value (% saturation) prior to test*:	0.95 11/4/15 933
				B-Value (% saturation) post to test:	0.95 11/4/15 1012

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated during depressurizing and sample removal.

**Percent Deformation: based on initial sample length and post permeation sample length.

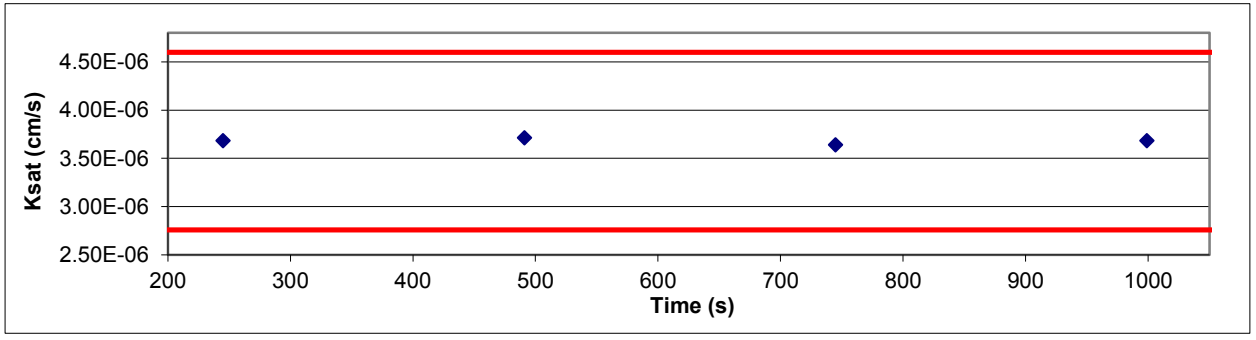
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job name: South Waste Sealy Facility
Job number: TX15.0094.00
Sample number: SB-5 (12'-14.5') Vertical
Ring number: NA
Depth: 12'-14.5'

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
04-Nov-15	09:52:05	21.4	4.10	20.90	5.34	0.09	245	1.00	1%	3.81E-06	3.68E-06
04-Nov-15	09:56:10	21.4	4.20	20.80	5.27						
Test # 2:											
04-Nov-15	09:56:10	21.4	4.20	20.80	5.27	0.09	246	1.00	1%	3.84E-06	3.71E-06
04-Nov-15	10:00:16	21.4	4.30	20.70	5.21						
Test # 3:											
04-Nov-15	10:00:16	21.4	4.30	20.70	5.21	0.09	254	1.00	1%	3.76E-06	3.64E-06
04-Nov-15	10:04:30	21.4	4.40	20.60	5.14						
Test # 4:											
04-Nov-15	10:04:30	21.4	4.40	20.60	5.14	0.09	254	1.00	1%	3.81E-06	3.68E-06
04-Nov-15	10:08:44	21.4	4.50	20.50	5.08						

***Average Ksat* (cm/sec):** **3.68E-06**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 2.76E-06

Ksat (+25%) (cm/s): 4.60E-06

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job name: South Waste Sealy Facility
Job number: TX15.0094.00
Sample number: SB-5 (84'-85') Disturbed
Ring number: NA
Depth: 84'-85'

Remolded or Initial Sample Properties		Post Permeation Sample Properties		Test and Sample Conditions	
Initial Mass (g):	107.64	*Saturated Mass (g):*	105.69	*Permeant liquid used:*	Tap Water
Diameter (cm):	4.901	*Dry Mass (g):*	92.36	*Sample Preparation:*	☐ In situ sample, extruded
Length (cm):	2.715	*Diameter (cm):*	4.776		☑ Remolded Sample
Area (cm^2):	18.87	*Length (cm):*	2.704	*Number of Lifts:*	3
Volume (cm^3):	51.22	*Deformation (%)**:*	0.41	*Split:*	NA
Dry Density (g/cm^3):	1.80	*Area (cm^2):*	17.92	*Percent Coarse Material (%):*	NA
Dry Density (pcf):	112.57	*Volume (cm^3):*	48.44	*Particle Density(g/cm^3):*	2.65 ☑ Assumed ☐ Measured
Water Content (%, g/g):	16.5	*Dry Density (g/cm^3):*	1.91	*Cell pressure (PSI):*	72.9
Water Content (%, vol):	29.8	*Dry Density (pcf):*	119.02	*Influent pressure (PSI):*	41.0
Void Ratio (e):	0.47	*Water Content (%, g/g):*	14.4	*Effluent pressure (PSI):*	39.0
Porosity (%, vol):	32.0	*Water Content (%, vol):*	27.5	*Panel Used:*	☐ D ☑ E ☐ F
Saturation (%):	93.4	*Void Ratio(e):*	0.39	*Reading:*	☐ Annulus ☑ Pipette
		Porosity (%, vol):	28.1		Date/Time
		Saturation (%):*	98.1	B-Value (% saturation) prior to test*:	0.95 11/4/15 935
				B-Value (% saturation) post to test:	0.95 11/5/15 1643

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated during depressurizing and sample removal.

**Percent Deformation: based on initial sample length and post permeation sample length.

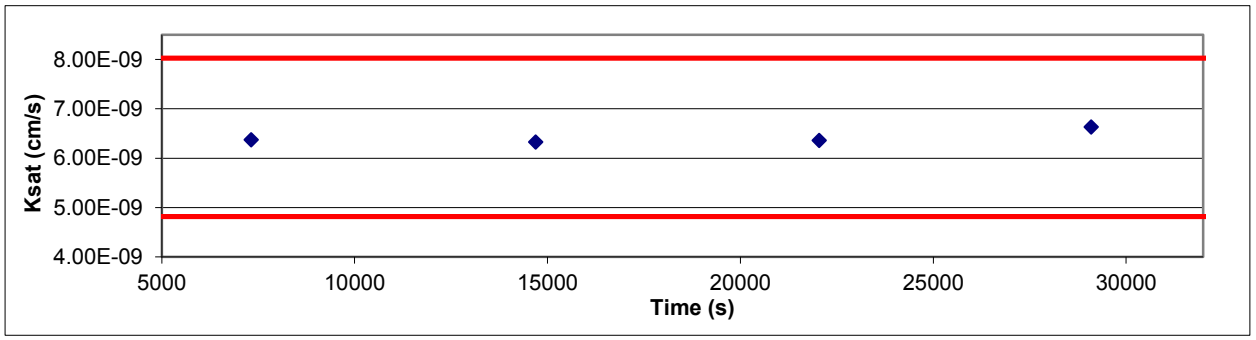
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job name: South Waste Sealy Facility
Job number: TX15.0094.00
Sample number: SB-5 (84'-85') Disturbed
Ring number: NA
Depth: 84'-85'

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
05-Nov-15	08:30:00	20.0	5.00	24.00	60.14	0.04	7320	1.00	0%	6.36E-09	6.37E-09
05-Nov-15	10:32:00	20.0	5.05	23.95	60.10						
Test # 2:											
05-Nov-15	10:32:00	20.0	5.05	23.95	60.10	0.04	7380	1.00	0%	6.32E-09	6.33E-09
05-Nov-15	12:35:00	20.0	5.10	23.90	60.06						
Test # 3:											
05-Nov-15	12:35:00	20.0	5.10	23.90	60.06	0.04	7350	1.00	0%	6.35E-09	6.36E-09
05-Nov-15	14:37:30	20.0	5.15	23.85	60.01						
Test # 4:											
05-Nov-15	14:37:30	20.0	5.15	23.85	60.01	0.04	7050	1.00	0%	6.62E-09	6.63E-09
05-Nov-15	16:35:00	20.0	5.20	23.80	59.97						

***Average Ksat* (cm/sec):** **6.42E-09**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 4.82E-09

Ksat (+25%) (cm/s): 8.03E-09

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job name: South Waste Sealy Facility
Job number: TX15.0094.00
Sample number: SB-5 (85'-87.5') Disturbed
Ring number: NA
Depth: 85'-87.5'

Remolded or Initial Sample Properties		Post Permeation Sample Properties		Test and Sample Conditions	
Initial Mass (g):	105.06	*Saturated Mass (g):*	103.42	*Permeant liquid used:*	Tap Water
Diameter (cm):	4.901	*Dry Mass (g):*	88.3	*Sample Preparation:*	☐ In situ sample, extruded
Length (cm):	2.713	*Diameter (cm):*	4.785		☑ Remolded Sample
Area (cm^2):	18.87	*Length (cm):*	2.709	*Number of Lifts:*	3
Volume (cm^3):	51.18	*Deformation (%)**:*	0.15	*Split:*	NA
Dry Density (g/cm^3):	1.73	*Area (cm^2):*	17.98	*Percent Coarse Material (%):*	NA
Dry Density (pcf):	107.70	*Volume (cm^3):*	48.72	*Particle Density(g/cm^3):*	2.65 ☑ Assumed ☐ Measured
Water Content (%, g/g):	19.0	*Dry Density (g/cm^3):*	1.81	*Cell pressure (PSI):*	72.3
Water Content (%, vol):	32.7	*Dry Density (pcf):*	113.16	*Influent pressure (PSI):*	41.0
Void Ratio (e):	0.54	*Water Content (%, g/g):*	17.1	*Effluent pressure (PSI):*	39.0
Porosity (%, vol):	34.9	*Water Content (%, vol):*	31.0	*Panel Used:*	☐ D ☐ E ☑ F
Saturation (%):	93.8	*Void Ratio(e):*	0.46	*Reading:*	☐ Annulus ☑ Pipette
		Porosity (%, vol):	31.6		Date/Time
		Saturation (%):*	98.2	B-Value (% saturation) prior to test*:	0.95 11/4/15 940
				B-Value (% saturation) post to test:	0.95 11/5/15 2115

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated during depressurizing and sample removal.

**Percent Deformation: based on initial sample length and post permeation sample length.

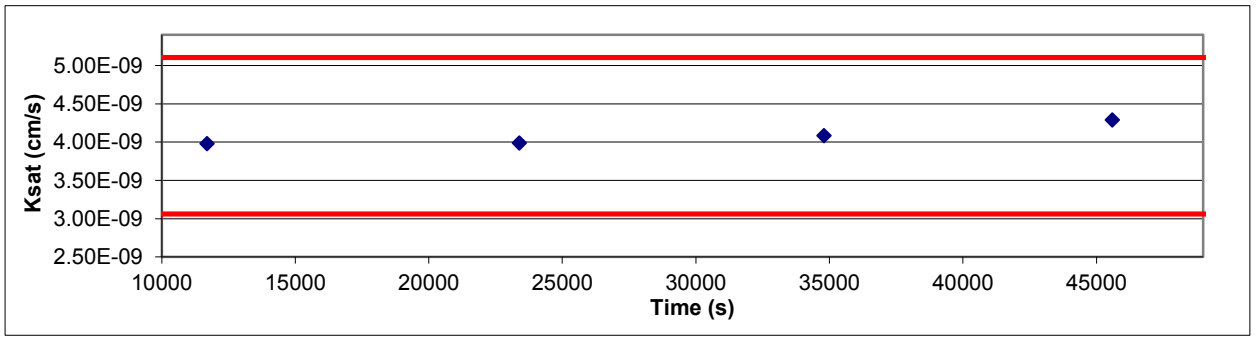
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job name: South Waste Sealy Facility
Job number: TX15.0094.00
Sample number: SB-5 (85'-87.5') Disturbed
Ring number: NA
Depth: 85'-87.5'

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
05-Nov-15	08:30:00	20.0	5.00	24.10	60.07	0.04	11700	1.00	0%	3.97E-09	3.98E-09
05-Nov-15	11:45:00	19.9	5.05	24.05	60.03						
Test # 2:											
05-Nov-15	11:45:00	19.9	5.05	24.05	60.03	0.04	11700	1.00	0%	3.97E-09	3.99E-09
05-Nov-15	15:00:00	19.9	5.10	24.00	59.99						
Test # 3:											
05-Nov-15	15:00:00	19.9	5.10	24.00	59.99	0.04	11400	1.00	0%	4.08E-09	4.08E-09
05-Nov-15	18:10:00	20.2	5.15	23.95	59.94						
Test # 4:											
05-Nov-15	18:10:00	20.2	5.15	23.95	59.94	0.04	10800	1.00	0%	4.31E-09	4.29E-09
05-Nov-15	21:10:00	20.3	5.20	23.90	59.90						

***Average Ksat* (cm/sec):** **4.08E-09**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 3.06E-09

Ksat (+25%) (cm/s): 5.10E-09

Particle Size Analysis

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
SB-5 (6'-8.5')	0.00017	0.0039	0.0058	34	0.82	WS/H	Lean clay (CL)	Silty Clay Loam	(Est)
SB-5 (12'-14.5')	0.00023	0.012	0.018	78	1.6	WS/H	Lean clay (CL)	Silty Clay Loam	(Est)
SB-5 (84'-85')	0.00063	0.28	0.35	556	24	WS/H	Clayey sand (SC)	Sandy Loam †	(Est)
SB-5 (85'-87.5')	8.9E-05	0.18	0.28	3146	109	WS/H	Clayey sand (SC)	Sandy Loam	(Est)

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Percent Gravel, Sand, Silt and Clay*

Sample Number	% Gravel (>4.75mm)	% Sand (<4.75mm, >0.075mm)	% Silt (<0.075mm, >0.002mm)	% Clay (<0.002mm)
SB-5 (6'-8.5')	0.0	1.6	58.7	39.7
SB-5 (12'-14.5')	0.0	1.1	71.2	27.8
SB-5 (84'-85')	2.8	66.6	18.2	12.4
SB-5 (85'-87.5')	0.6	61.3	21.0	17.0

*USCS classification does not classify clay fraction based on particle size. USDA definition of clay (<0.002mm) used in this table.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (6'-8.5')
Ring Number: NA
Depth: 6'-8.5'
Test Date: 20-Oct-15

Initial Dry Weight of Sample (g): 318.64
Weight Passing #10 (g): 318.13
Weight Retained #10 (g): 0.51
Weight of Hydrometer Sample (g): 40.02
Calculated Weight of Sieve Sample (g): 40.08

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	318.64	100.00
	2"	50	0.00	0.00	318.64	100.00
	1.5"	38.1	0.00	0.00	318.64	100.00
	1"	25	0.00	0.00	318.64	100.00
	3/4"	19.0	0.00	0.00	318.64	100.00
	3/8"	9.5	0.00	0.00	318.64	100.00
	4	4.75	0.00	0.00	318.64	100.00
	10	2.00	0.51	0.51	318.13	99.84
-10			(Based on calculated sieve wt.)			
	20	0.85	0.28	0.34	39.74	99.14
	40	0.425	0.09	0.43	39.65	98.92
	60	0.250	0.06	0.49	39.59	98.77
	140	0.106	0.12	0.61	39.47	98.47
	200	0.075	0.02	0.63	39.45	98.42
	dry pan		0.02	0.65	39.43	
	wet pan			39.43	0.00	

d_{10} (mm): 0.00017
d_{16} (mm): 0.00029
d_{30} (mm): 0.00090
d_{50} (mm): 0.0039
d_{60} (mm): 0.0058
d_{84} (mm): 0.022

Median Particle Diameter --d_{50} (mm): 0.0039
Uniformity Coefficient, Cu --[d_{60}/d_{10}] (mm): 34
Coefficient of Curvature, Cc --[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 0.82
Mean Particle Diameter --[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.0087

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CL

ASTM Soil Classification: Lean clay (CL)
USDA Soil Classification: Silty Clay Loam

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (6'-8.5')
Ring Number: NA
Depth: 6'-8.5'
Test Date: 26-Oct-15
Start Time: 9:42

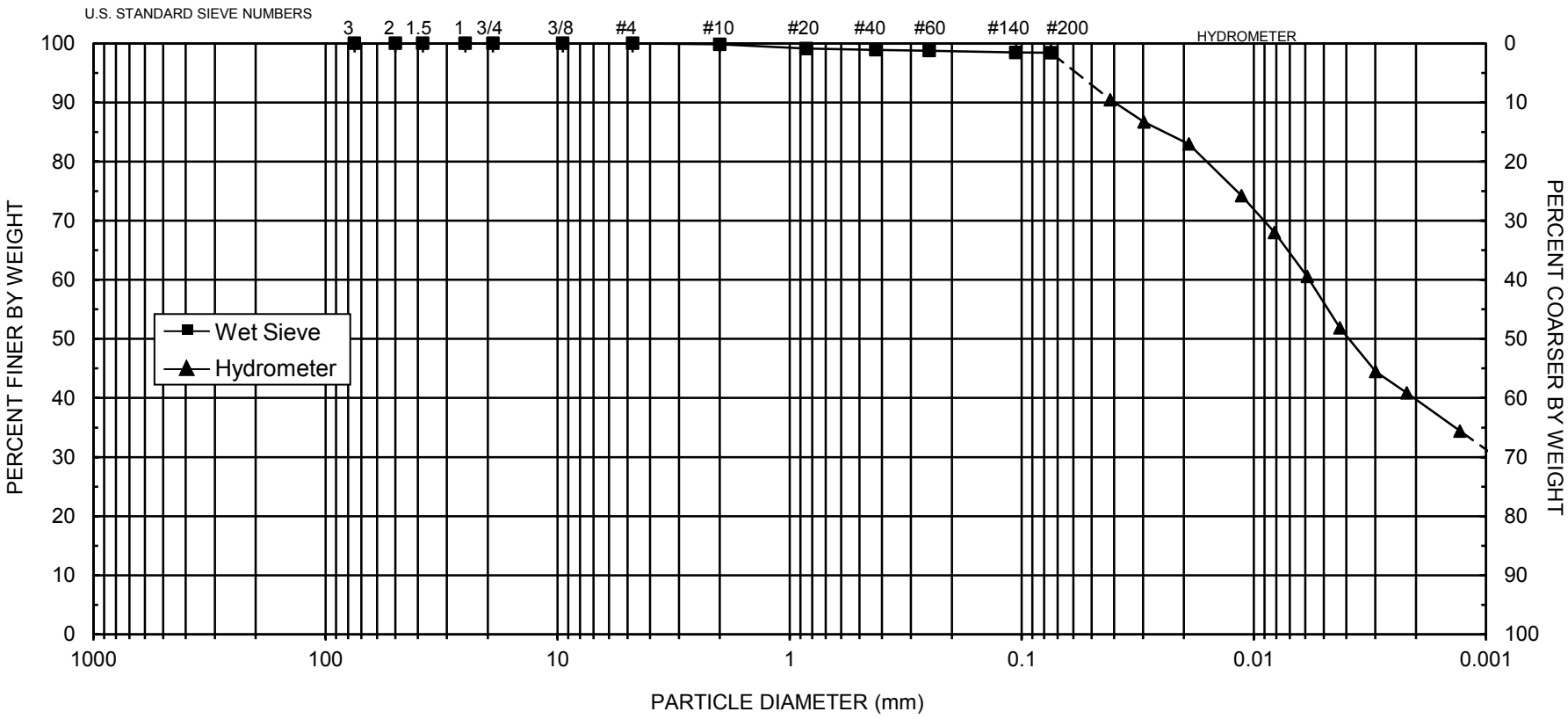
Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g)*:* 40.02
Total Sample Wt. (g)*:* 318.64
Wt. Passing #10 (g): 318.13

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
26-Oct-15	1	20.6	42.0	5.7	36.3	9.4	0.04149	90.6	90.5
	2	20.6	40.5	5.7	34.8	9.7	0.02972	86.9	86.7
	5	20.6	39.0	5.7	33.3	9.9	0.01903	83.1	83.0
	15	20.6	35.5	5.7	29.8	10.5	0.01130	74.4	74.2
	30	20.6	33.0	5.7	27.3	10.9	0.00815	68.1	68.0
	60	20.7	30.0	5.7	24.3	11.4	0.00588	60.6	60.5
	120	20.8	26.5	5.7	20.8	12.0	0.00426	51.9	51.9
	253	21.0	23.5	5.7	17.8	12.4	0.00298	44.5	44.5
	475	21.4	22.0	5.6	16.4	12.7	0.00219	40.9	40.8
27-Oct-15	1430	20.8	19.5	5.7	13.8	13.1	0.00129	34.5	34.4

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: D. O'Dowd
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		Coarse	Fine	Coarse	Medium	Fine				
USDA	COBBLES	GRAVEL		SAND				SILT	CLAY	
				Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.00017**	d_{30} = **0.00090**	d_{50} = **0.0039**	d_{60} = **0.0058**	C_u = **34**	C_c = **0.82**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
SB-5 (6'-8.5')	**6'-8.5'**	**Lean clay (CL)**	**Silty Clay Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (12'-14.5')
Ring Number: NA
Depth: 12'-14.5'
Test Date: 21-Oct-15

Initial Dry Weight of Sample (g): 255.60
Weight Passing #10 (g): 255.60
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 42.33
Calculated Weight of Sieve Sample (g): 42.33

Shape: Angular
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	255.60	100.00
	2"	50	0.00	0.00	255.60	100.00
	1.5"	38.1	0.00	0.00	255.60	100.00
	1"	25	0.00	0.00	255.60	100.00
	3/4"	19.0	0.00	0.00	255.60	100.00
	3/8"	9.5	0.00	0.00	255.60	100.00
	4	4.75	0.00	0.00	255.60	100.00
	10	2.00	0.00	0.00	255.60	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.06	0.06	42.27	99.86
	40	0.425	0.03	0.09	42.24	99.79
	60	0.250	0.03	0.12	42.21	99.72
	140	0.106	0.08	0.20	42.13	99.53
	200	0.075	0.25	0.45	41.88	98.94
	dry pan		0.43	0.88	41.45	
	wet pan			41.45	0.00	

d_{10} (mm): 0.00023
d_{16} (mm): 0.00048
d_{30} (mm): 0.0026
d_{50} (mm): 0.012
d_{60} (mm): 0.018
d_{84} (mm): 0.047

Median Particle Diameter --d_{50} (mm): 0.012
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 78
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 1.6
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.020

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CL

ASTM Soil Classification: Lean clay (CL)
USDA Soil Classification: Silty Clay Loam

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (12'-14.5')
Ring Number: NA
Depth: 12'-14.5'
Test Date: 26-Oct-15
Start Time: 9:36

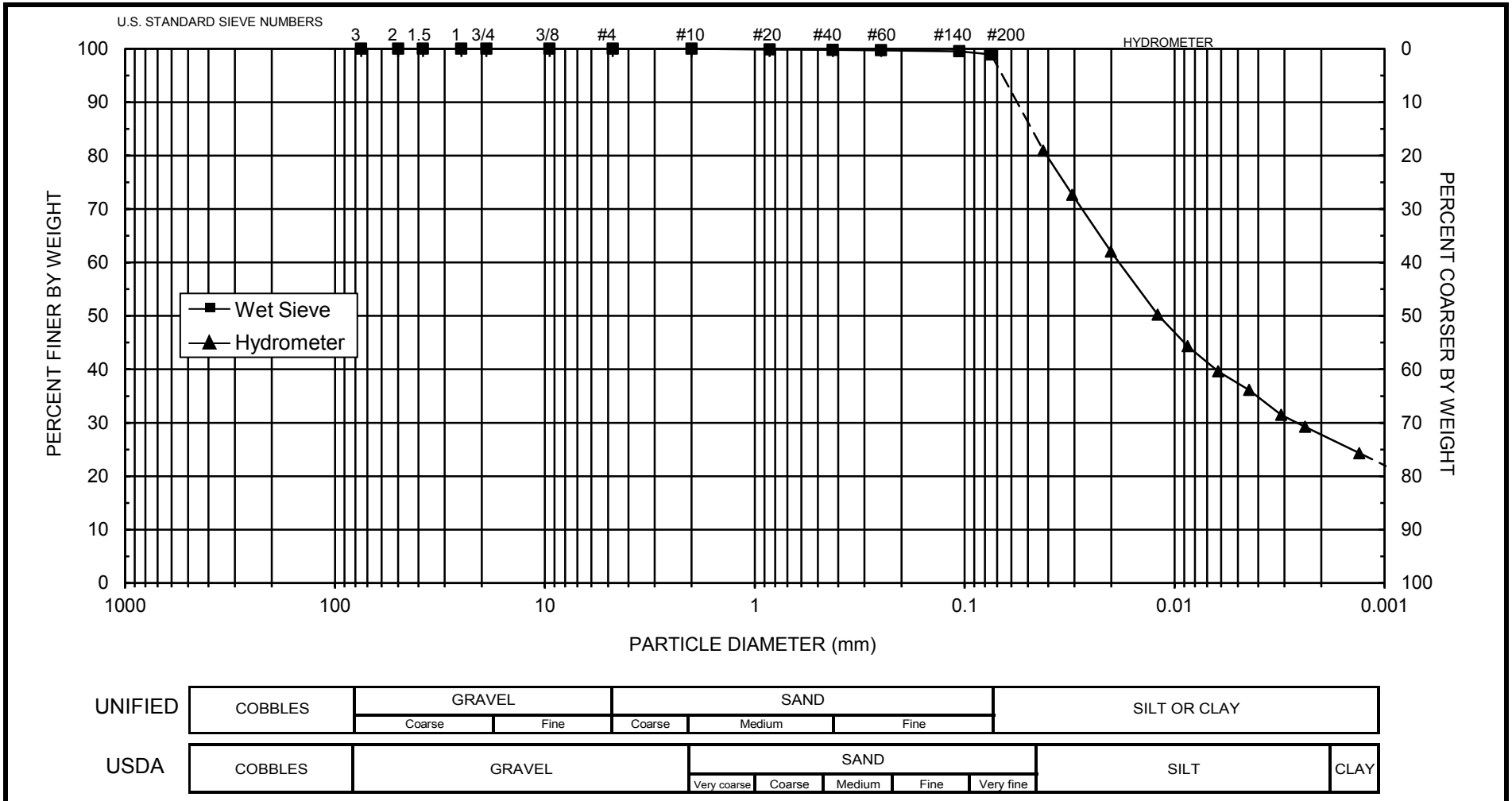
Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g)*:* 42.33
Total Sample Wt. (g)*:* 255.60
Wt. Passing #10 (g): 255.60

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
26-Oct-15	1	20.6	40.0	5.7	34.3	9.7	0.04221	80.9	80.9
	2	20.6	36.5	5.7	30.8	10.3	0.03071	72.7	72.7
	5	20.6	32.0	5.7	26.3	11.1	0.02011	62.0	62.0
	15	20.6	27.0	5.7	21.3	11.9	0.01203	50.2	50.2
	30	20.6	24.5	5.7	18.8	12.3	0.00865	44.3	44.3
	60	20.7	22.5	5.7	16.8	12.6	0.00619	39.6	39.6
	120	20.8	21.0	5.7	15.3	12.9	0.00442	36.1	36.1
	248	21.0	19.0	5.7	13.3	13.2	0.00310	31.5	31.5
	420	21.4	18.0	5.6	12.4	13.3	0.00239	29.2	29.2
27-Oct-15	1434	20.8	16.0	5.7	10.3	13.7	0.00132	24.3	24.3

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: D. O'Dowd
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		Coarse	Fine	Coarse	Medium	Fine			
USDA	COBBLES	GRAVEL		SAND				SILT	CLAY
				Very coarse	Coarse	Medium	Fine	Very fine	

d_{10} = **0.00023**	d_{30} = **0.0026**	d_{50} = **0.012**	d_{60} = **0.018**	C_u = **78**	C_c = **1.6**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
SB-5 (12'-14.5')	**12'-14.5'**	**Lean clay (CL)**	**Silty Clay Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (84'-85')
Ring Number: NA
Depth: 84'-85'
Test Date: 21-Oct-15

Initial Dry Weight of Sample (g): 188.98
Weight Passing #10 (g): 165.83
Weight Retained #10 (g): 23.15
Weight of Hydrometer Sample (g): 40.07
Calculated Weight of Sieve Sample (g): 45.66

Shape: Angular
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	188.98	100.00
	2"	50	0.00	0.00	188.98	100.00
	1.5"	38.1	0.00	0.00	188.98	100.00
	1"	25	0.00	0.00	188.98	100.00
	3/4"	19.0	0.00	0.00	188.98	100.00
	3/8"	9.5	0.99	0.99	187.99	99.48
	4	4.75	4.21	5.20	183.78	97.25
	10	2.00	17.95	23.15	165.83	87.75
-10			(Based on calculated sieve wt.)			
	20	0.85	2.49	8.08	37.58	82.30
	40	0.425	6.06	14.14	31.52	69.03
	60	0.250	10.69	24.83	20.83	45.62
	140	0.106	5.68	30.51	15.15	33.18
	200	0.075	1.17	31.68	13.98	30.62
	dry pan		0.34	32.02	13.64	
	wet pan			13.64	0.00	

d_{10} (mm): 0.00063
d_{16} (mm): 0.0066
d_{30} (mm): 0.073
d_{50} (mm): 0.28
d_{60} (mm): 0.35
d_{84} (mm): 1.1

Median Particle Diameter --d_{50} (mm): 0.28
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 556
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 24
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.46

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CL

ASTM Soil Classification: Clayey sand (SC)
USDA Soil Classification: Sandy Loam †

† Greater than 10% of sample is coarse material

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (84'-85')
Ring Number: NA
Depth: 84'-85'
Test Date: 26-Oct-15
Start Time: 9:54

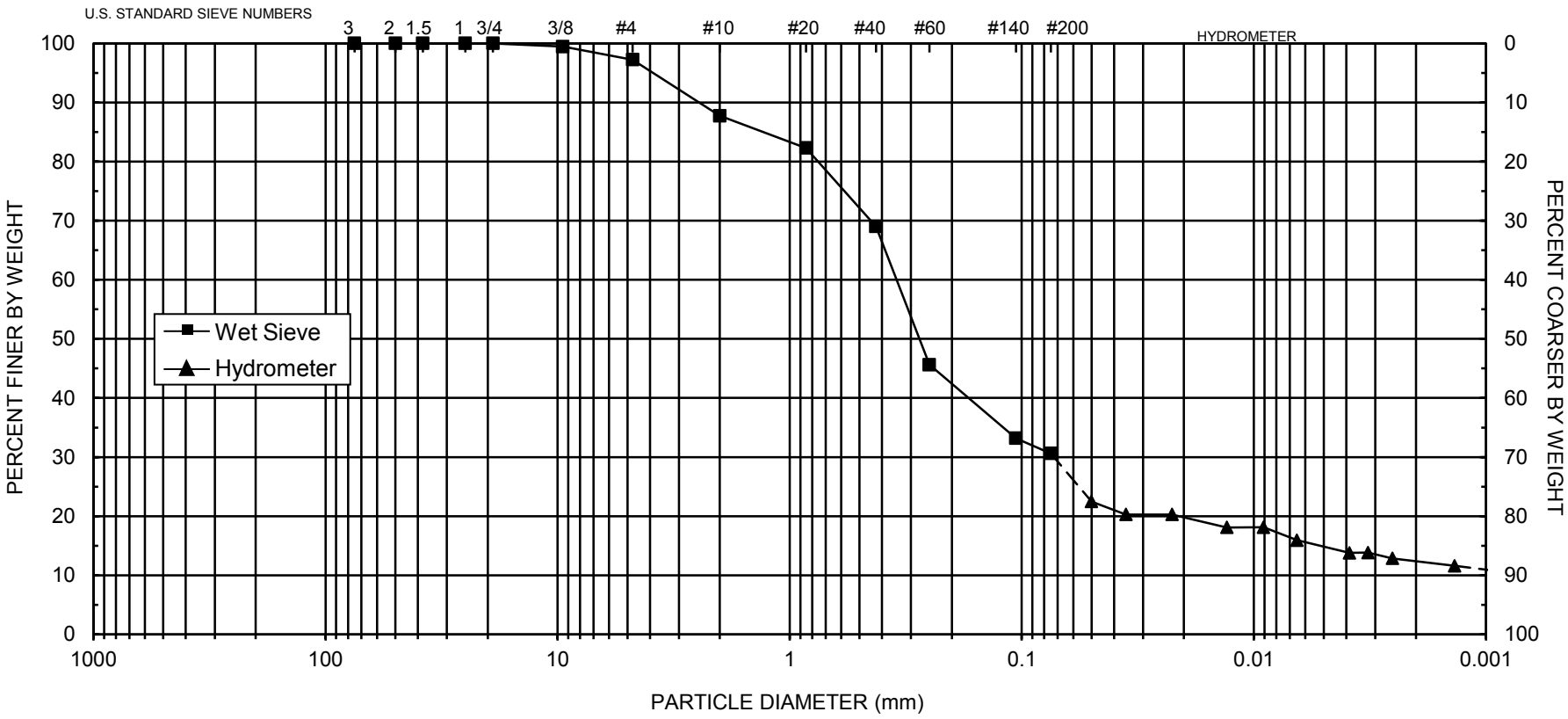
Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g)*:* 40.07
Total Sample Wt. (g)*:* 188.98
Wt. Passing #10 (g): 165.83

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
26-Oct-15	1	20.6	16.0	5.7	10.3	13.7	0.05001	25.6	22.5
	2	20.6	15.0	5.7	9.3	13.8	0.03557	23.1	20.3
	5	20.6	15.0	5.7	9.3	13.8	0.02250	23.1	20.3
	15	20.6	14.0	5.7	8.3	14.0	0.01307	20.6	18.1
	31	20.7	14.0	5.7	8.3	14.0	0.00908	20.6	18.1
	61	20.7	13.0	5.7	7.3	14.2	0.00651	18.1	15.9
	174	20.8	12.0	5.7	6.3	14.3	0.00387	15.7	13.8
	250	21.0	12.0	5.7	6.3	14.3	0.00322	15.8	13.8
	405	21.4	11.5	5.6	5.9	14.4	0.00253	14.6	12.9
27-Oct-15	1419	20.8	11.0	5.7	5.3	14.5	0.00136	13.2	11.6

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: D. O'Dowd
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		Coarse	Fine	Coarse	Medium	Fine				
USDA	COBBLES	GRAVEL		SAND				SILT	CLAY	
				Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.00063**	d_{30} = **0.073**	d_{50} = **0.28**	d_{60} = **0.35**	C_u = **556**	C_c = **24**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
SB-5 (84'-85')	**84'-85'**	**Clayey sand (SC)**	**Sandy Loam †**

† Greater than 10% of sample is coarse material

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (85'-87.5')
Ring Number: NA
Depth: 85'-87.5'
Test Date: 21-Oct-15

Initial Dry Weight of Sample (g): 276.56
Weight Passing #10 (g): 268.23
Weight Retained #10 (g): 8.33
Weight of Hydrometer Sample (g): 40.88
Calculated Weight of Sieve Sample (g): 42.15

Shape: Angular
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	276.56	100.00
	2"	50	0.00	0.00	276.56	100.00
	1.5"	38.1	0.00	0.00	276.56	100.00
	1"	25	0.00	0.00	276.56	100.00
	3/4"	19.0	0.00	0.00	276.56	100.00
	3/8"	9.5	0.00	0.00	276.56	100.00
	4	4.75	1.73	1.73	274.83	99.37
	10	2.00	6.60	8.33	268.23	96.99
-10			(Based on calculated sieve wt.)			
	20	0.85	1.21	2.48	39.67	94.12
	40	0.425	5.54	8.02	34.13	80.97
	60	0.250	10.80	18.82	23.33	55.35
	140	0.106	5.93	24.75	17.40	41.28
	200	0.075	1.37	26.12	16.03	38.03
	dry pan		0.18	26.30	15.85	
	wet pan			15.85	0.00	

d_{10} (mm): 8.9E-05
d_{16} (mm): 0.0013
d_{30} (mm): 0.052
d_{50} (mm): 0.18
d_{60} (mm): 0.28
d_{84} (mm): 0.50

Median Particle Diameter --d_{50} (mm): 0.18
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 3146
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 109
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.23

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CL

ASTM Soil Classification: Clayey sand (SC)
USDA Soil Classification: Sandy Loam

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (85'-87.5')
Ring Number: NA
Depth: 85'-87.5'
Test Date: 26-Oct-15
Start Time: 9:48

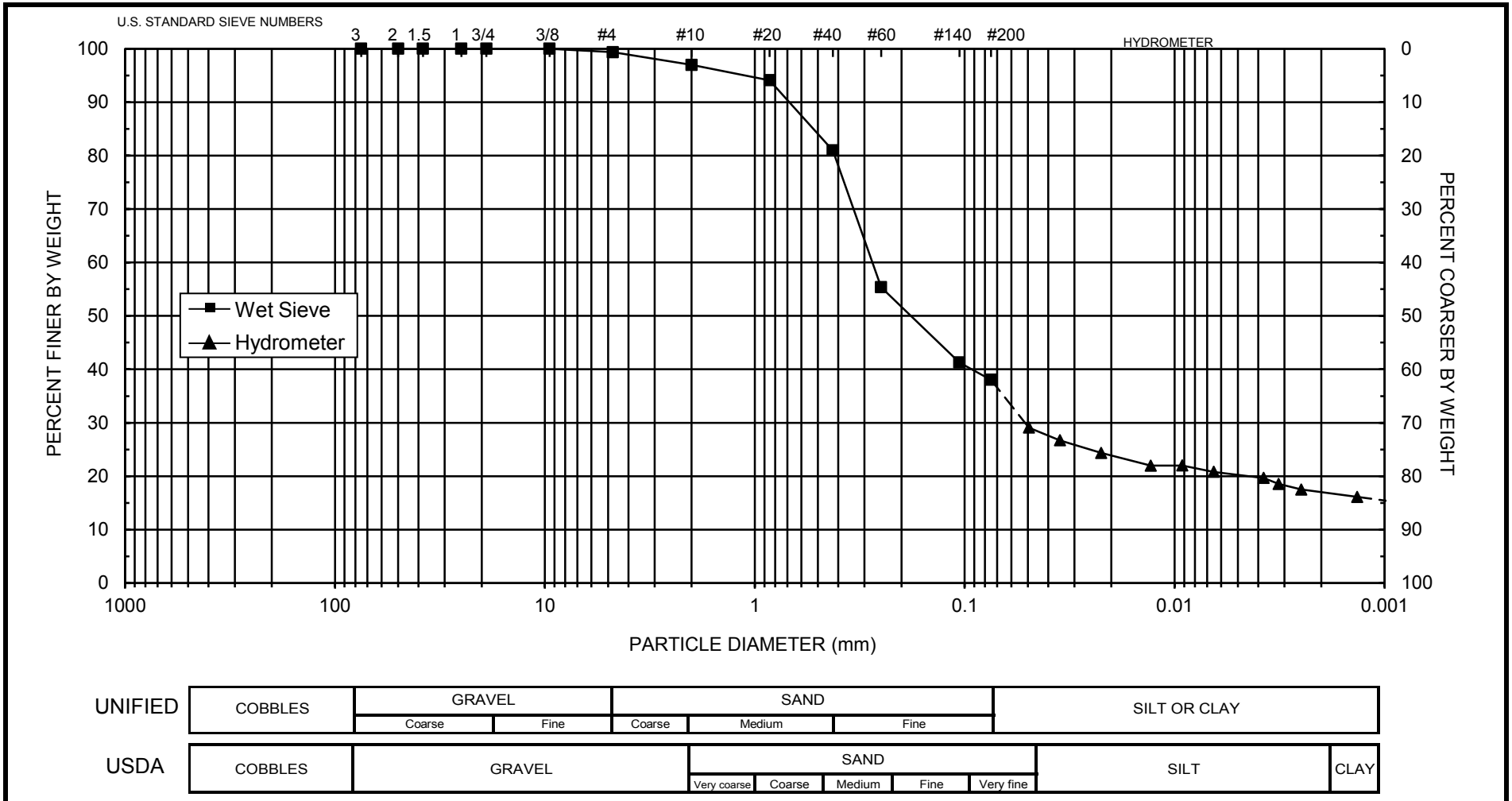
Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g)*:* 40.88
Total Sample Wt. (g)*:* 276.56
Wt. Passing #10 (g): 268.23

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
26-Oct-15	1	20.6	18.0	5.7	12.3	13.3	0.04940	30.0	29.1
	2	20.6	17.0	5.7	11.3	13.5	0.03515	27.5	26.7
	5	20.6	16.0	5.7	10.3	13.7	0.02236	25.1	24.3
	15	20.6	15.0	5.7	9.3	13.8	0.01299	22.7	22.0
	30	20.7	15.0	5.7	9.3	13.8	0.00917	22.7	22.0
	60	20.7	14.5	5.7	8.8	13.9	0.00651	21.5	20.8
	180	20.8	14.0	5.7	8.3	14.0	0.00376	20.3	19.7
	250	21.0	13.5	5.7	7.8	14.1	0.00319	19.1	18.6
	410	21.4	13.0	5.6	7.4	14.2	0.00249	18.0	17.5
27-Oct-15	1424	20.8	12.5	5.7	6.8	14.3	0.00135	16.6	16.1

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: C. Krous
Data entered by: D. O'Dowd
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		Coarse	Fine	Coarse	Medium	Fine				
USDA	COBBLES	GRAVEL		SAND				SILT	CLAY	
				Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **8.9E-05**	d_{30} = **0.052**	d_{50} = **0.18**	d_{60} = **0.28**	C_u = **3146**	C_c = **109**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
SB-5 (85'-87.5')	**85'-87.5'**	**Clayey sand (SC)**	**Sandy Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Atterberg Limits/ Identification of Fines

Summary of Atterberg Tests

Sample Number	Liquid Limit	Plastic Limit	Plasticity Index	Classification
SB-5 (6'-8.5')	48	19	29	CL
SB-5 (12'-14.5')	33	18	15	CL
SB-5 (84'-85')	30	13	17	CL
SB-5 (85'-87.5')	29	13	16	CL

--- = Soil requires visual-manual classification due to non-plasticity

Atterberg Limits

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (6'-8.5')
Ring Number: NA
Depth: 6'-8.5'

Test Date: 27-Oct-15

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	35	29	21
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	123.89	129.85	127.76
Weight of pan plus dry soil (g)	121.70	125.34	124.03
Weight of pan (g):	116.70	115.74	116.51
Gravimetric moisture content (% g/g):	43.80	46.98	49.60

Liquid Limit: 48

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	120.09	114.56
Weight of pan plus dry soil (g)	119.25	113.80
Weight of pan (g):	114.80	109.61
Gravimetric moisture content (% g/g):	18.88	18.14

Plastic Limit: 19

Results

Percent of Sample Retained on #40 Sieve: See Sieve

Liquid Limit: 48
Plastic Limit: 19
Plasticity Index: 29

Classification: CL

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (12'-14.5')
Ring Number: NA
Depth: 12'-14.5'

Test Date: 27-Oct-15

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	28	23	16
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	127.36	126.96	129.02
Weight of pan plus dry soil (g)	125.04	123.80	125.80
Weight of pan (g):	117.87	114.56	116.58
Gravimetric moisture content (% g/g):	32.36	34.20	34.92

Liquid Limit: 33

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	124.10	125.22
Weight of pan plus dry soil (g)	123.11	124.06
Weight of pan (g):	117.55	117.44
Gravimetric moisture content (% g/g):	17.81	17.52

Plastic Limit: 18

Results

Percent of Sample Retained on #40 Sieve: See Sieve

Liquid Limit: 33
Plastic Limit: 18
Plasticity Index: 15

Classification: CL

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (84'-85')
Ring Number: NA
Depth: 84'-85'

Test Date: 27-Oct-15

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	34	25	17
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	128.97	123.79	127.62
Weight of pan plus dry soil (g)	127.43	121.62	124.59
Weight of pan (g):	121.83	114.39	115.14
Gravimetric moisture content (% g/g):	27.50	30.01	32.06

Liquid Limit: 30

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	118.97	123.01
Weight of pan plus dry soil (g)	118.28	122.38
Weight of pan (g):	113.16	117.68
Gravimetric moisture content (% g/g):	13.48	13.40

Plastic Limit: 13

Results

Percent of Sample Retained on #40 Sieve: See Sieve

Liquid Limit: 30
Plastic Limit: 13
Plasticity Index: 17

Classification: CL

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-5 (85'-87.5')
Ring Number: NA
Depth: 85'-87.5'

Test Date: 27-Oct-15

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	35	27	19
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	126.03	126.04	125.22
Weight of pan plus dry soil (g)	123.70	123.56	122.38
Weight of pan (g):	115.31	115.11	113.13
Gravimetric moisture content (% g/g):	27.77	29.35	30.70

Liquid Limit: 29

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	123.95	123.46
Weight of pan plus dry soil (g)	122.94	122.51
Weight of pan (g):	115.18	115.33
Gravimetric moisture content (% g/g):	13.02	13.23

Plastic Limit: 13

Results

Percent of Sample Retained on #40 Sieve: See Sieve

Liquid Limit: 29
Plastic Limit: 13
Plasticity Index: 16

Classification: CL

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Laboratory Tests and Methods

Tests and Methods

Dry Bulk Density:	ASTM D7263
Moisture Content:	ASTM D7263, ASTM D2216
Calculated Porosity:	ASTM D7263
Saturated Hydraulic Conductivity:	
Falling Head Rising Tail: (Flexible Wall)	ASTM D5084
Particle Size Analysis:	ASTM D422
USCS (ASTM) Classification:	ASTM D422, ASTM D2487
USDA Classification:	ASTM D422, USDA Soil Textural Triangle
Atterberg Limits:	ASTM D4318

Laboratory Report for

Daniel B. Stephens & Associates, Inc.

South Waste Sealy Facility

(TX15.0094.00)

October 1, 2015

Daniel B. Stephens & Associates, Inc.

4400 Alameda Blvd. NE, Suite C • Albuquerque, New Mexico 87113

October 1, 2015

Ben Camacho
Daniel B. Stephens & Associates, Inc.
4030 W. Braker Lane
Austin, TX 78759
(512) 651-6019

Re: DBS&A Laboratory Report for the Daniel B. Stephens & Associates, Inc. TX15.0094.00 South Waste Sealy Facility Project

Dear Mr. Camacho:

Enclosed is the report for the Daniel B. Stephens & Associates, Inc. TX15.0094.00 South Waste Sealy Facility project samples. Please review this report and provide any comments as samples will be held for a maximum of 30 days. After 30 days samples will be returned or disposed of in an appropriate manner.

All testing results were evaluated subjectively for consistency and reasonableness, and the results appear to be reasonably representative of the material tested. However, DBS&A does not assume any responsibility for interpretations or analyses based on the data enclosed, nor can we guarantee that these data are fully representative of the undisturbed materials at the field site. We recommend that careful evaluation of these laboratory results be made for your particular application.

The testing utilized to generate the enclosed report employs methods that are standard for the industry. The results do not constitute a professional opinion by DBS&A, nor can the results affect any professional or expert opinions rendered with respect thereto by DBS&A. You have acknowledged that all the testing undertaken by us, and the report provided, constitutes mere test results using standardized methods, and cannot be used to disqualify DBS&A from rendering any professional or expert opinion, having waived any claim of conflict of interest by DBS&A.

We are pleased to provide this service to DBS&A and look forward to future laboratory testing on other projects. If you have any questions about the enclosed data, please do not hesitate to call.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.
SOIL TESTING & RESEARCH LABORATORY

Joleen Hines
Laboratory Supervising Manager

Enclosure

Daniel B. Stephens & Associates, Inc.
Soil Testing & Research Laboratory
4400 Alameda Blvd. NE, Suite C
Albuquerque, NM 87113
505-889-7752
FAX 505-889-0258

Summaries

Summary of Tests Performed

Laboratory Sample Number	Initial Soil Properties[1]			Saturated Hydraulic Conductivity[2]			Moisture Characteristics[3]								Particle Size[4]			Specific Gravity[5]		Air Perm-eability	Atterberg Limits	Proctor Compaction
	G	VM	VD	CH	FH	FW	HC	PP	FP	DPP	RH	EP	WHC	K_{unsat}	DS	WS	H	F	C			
SB-1 (6'-8.5')	X	X		X												X	X				X	
SB-1 (12'-14.5')	X	X		X												X	X				X	
SB-2 (6'-8.5')	X	X				X										X	X				X	
SB-4 (3'-5.5')	X	X				X										X	X				X	

[1] G = Gravimetric Moisture Content, VM = Volume Measurement Method, VD = Volume Displacement Method

[2] CH = Constant Head Rigid Wall, FH = Falling Head Rigid Wall, FW = Falling Head Rising Tail Flexible Wall

[3] HC = Hanging Column, PP = Pressure Plate, FP = Filter Paper, DPP = Dew Point Potentiometer, RH = Relative Humidity Box, EP = Effective Porosity, WHC = Water Holding Capacity, Kunsat = Calculated Unsaturated Hydraulic Conductivity

[4] DS = Dry Sieve, WS = Wet Sieve, H = Hydrometer

[5] F = Fine (<4.75mm), C = Coarse (>4.75mm)

Notes

Sample Receipt:
Four samples were received, each in a 3" x 30" shelby tube sealed with either tape or end caps with tape, on September 18, 2015. All samples were packaged inside a box with bubble wrap. The box was distressed upon receipt; however, no visible sample disturbance was observed.

Sample Preparation and Testing Notes:
Intact sub-samples were obtained from the top of each shelby tube for testing.

Sub-samples to be used for horizontal saturated hydraulic conductivity testing were obtained by first extruding the sample material from the shelby tube into a length of pvc pipe equipped with an access hole in the side. A test ring was then advanced into the access hole in order to obtain the horizontal sub-sample.

The sub-sample to be used for vertical saturated hydraulic conductivity testing was obtained by advancing a test ring directly into the material in the shelby tube.

In all cases, directly adjacent sample material was used for particle size analysis and Atterberg limits testing.

All intact sub-samples were subjected to initial properties analysis and saturated hydraulic conductivity testing. Saturated hydraulic conductivity testing was performed using a flexible wall method, if possible (if the integrity of the sample material was great enough to allow the material to be extruded from the test ring and placed in a flexible membrane); otherwise a rigid wall method was used.

Porosity calculations, and the particle diameter calculations in the hydrometer portion of the particle size analysis testing, are based on the use of an assumed specific gravity value of 2.65.

Volumetric water contents were adjusted for changes in volume, where applicable. Due to the irregularities formed on the sample surfaces during swelling, volume measurements obtained after the initial reading should be considered estimates.

One sample was calculated to be less than 95% saturated at the saturated stage. Potential causes of low saturation values can include: the use of an assumed specific gravity value used to calculate the total porosity, over estimation of the saturated sample volume, the loss of some water prior to measuring the saturated sample mass, and/or the loss of some sample mass during the saturated hydraulic conductivity test.

Summary of Sample Preparation/Volume Changes

Sample Number	Initial Sample Data[1]		Volume Change Post Saturation[2]		
	Moisture Content (%, g/g)	Dry Bulk Density (g/cm^3)	Dry Bulk Density (g/cm^3)	% Volume Change (%)	% of Initial Density (%)
SB-1 (6'-8.5') Horizontal	2.5	1.47	1.47	---	100.0%
SB-1 (12'-14.5') Vertical	3.5	1.48	1.48	---	100.0%
SB-2 (6'-8.5') Horizontal	21.0	1.42	1.39	+2.3%	97.7%
SB-4 (3'-5.5') Horizontal	21.1	1.66	1.61	+2.8%	97.3%

[1]Initial Sample Data: The 'as received' dry bulk density and moisture content.

[2]Volume Change Post Saturation: Volume change measurements were obtained after saturated hydraulic conductivity testing.

Notes:
"+" indicates sample swelling, "-" indicates sample settling, and "---" indicates no volume change occurred.

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Moisture Content: As Received Gravimetric (%, g/g)	Moisture Content: As Received Volumetric (%, cm^3/cm^3)	Moisture Content: Remolded Gravimetric (%, g/g)	Moisture Content: Remolded Volumetric (%, cm^3/cm^3)	Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
SB-1 (6'-8.5') Horizontal	2.5	3.7	---	---	1.47	1.51	44.4
SB-1 (12'-14.5') Vertical	3.5	5.2	---	---	1.48	1.53	44.3
SB-2 (6'-8.5') Horizontal	21.0	30.0	---	---	1.42	1.72	46.3
SB-4 (3'-5.5') Horizontal	21.1	35.0	---	---	1.66	2.01	37.4

NA = Not analyzed

--- = This sample was not remolded

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis: Constant Head Rigid Wall	Method of Analysis: Falling Head Flexible Wall
SB-1 (6'-8.5') Horizontal	7.3E-03	NA	X	
SB-1 (12'-14.5') Vertical	1.8E-02	NA	X	
SB-2 (6'-8.5') Horizontal	1.14E-05	NA		X
SB-4 (3'-5.5') Horizontal	3.29E-07	NA		X

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NR = Not requested
NA = Not applicable

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
SB-1 (6'-8.5')	0.061	0.15	0.17	2.8	1.4	WS/H	Silty sand (SM)	Sand	
SB-1 (12'-14.5')	0.11	0.18	0.20	1.8	0.89	WS/H	Poorly-graded sand (SP)	Sand	
SB-2 (6'-8.5')	1.5E-05	0.030	0.046	3067	42	WS/H	Lean clay with sand (CL)s	Loam	(Est)
SB-4 (3'-5.5')	1.5E-08	0.040	0.061	4.1E+06	536	WS/H	Sandy lean clay s(CL)	Sandy Clay Loam	(Est)

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Percent Gravel, Sand, Silt and Clay*

Sample Number	% Gravel (>4.75mm)	% Sand (<4.75mm, >0.075mm)	% Silt (<0.075mm, >0.002mm)	% Clay (<0.002mm)
SB-1 (6'-8.5')	0.0	86.9	11.1	2.0
SB-1 (12'-14.5')	0.0	97.6	1.4	1.0
SB-2 (6'-8.5')	0.0	22.9	52.1	24.9
SB-4 (3'-5.5')	0.0	34.4	33.6	32.0

*USCS classification does not classify clay fraction based on particle size. USDA definition of clay (<0.002mm) used in this table.

Summary of Atterberg Tests

Sample Number	Liquid Limit	Plastic Limit	Plasticity Index	Classification
SB-1 (6'-8.5')	---	---	---	ML
SB-1 (12'-14.5')	---	---	---	ML
SB-2 (6'-8.5')	39	20	19	CL
SB-4 (3'-5.5')	43	18	25	CL

--- = Soil requires visual-manual classification due to non-plasticity

Initial Properties

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

Sample Number	Moisture Content				Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
	As Received		Remolded				
	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)			
SB-1 (6'-8.5') Horizontal	2.5	3.7	---	---	1.47	1.51	44.4
SB-1 (12'-14.5') Vertical	3.5	5.2	---	---	1.48	1.53	44.3
SB-2 (6'-8.5') Horizontal	21.0	30.0	---	---	1.42	1.72	46.3
SB-4 (3'-5.5') Horizontal	21.1	35.0	---	---	1.66	2.01	37.4

NA = Not analyzed

--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (6'-8.5') Horizontal
Ring Number: NA
Depth: 6'-8.5'

	As Received	Remolded
Test Date:	22-Sep-15	---
Field weight of sample* (g)*:*	194.21	
Tare weight, ring (g)*:*	52.61	
Tare weight, pan/plate (g)*:*	0.00	
Tare weight, other (g)*:*	0.00	
Dry weight of sample (g)*:*	138.14	
Sample volume (cm^3)*:*	93.82	
Assumed particle density (g/cm^3)*:*	2.65	
Gravimetric Moisture Content (% g/g)*:*	2.5	
Volumetric Moisture Content (% vol)*:*	3.7	
Dry bulk density (g/cm^3)*:*	1.47	
Wet bulk density (g/cm^3)*:*	1.51	
Calculated Porosity (% vol)*:*	44.4	
Percent Saturation:	8.3	

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (12'-14.5') Vertical
Ring Number: NA
Depth: 12'-14.5'

	As Received	Remolded
Test Date:	22-Sep-15	---
Field weight of sample* (g)*:*	326.53	
Tare weight, ring (g)*:*	109.92	
Tare weight, pan/plate (g)*:*	0.00	
Tare weight, other (g)*:*	0.00	
Dry weight of sample (g)*:*	209.19	
Sample volume (cm^3)*:*	141.75	
Assumed particle density (g/cm^3)*:*	2.65	
Gravimetric Moisture Content (% g/g)*:*	3.5	
Volumetric Moisture Content (% vol)*:*	5.2	
Dry bulk density (g/cm^3)*:*	1.48	
Wet bulk density (g/cm^3)*:*	1.53	
Calculated Porosity (% vol)*:*	44.3	
Percent Saturation:	11.8	

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-2 (6'-8.5') Horizontal
Ring Number: NA
Depth: 6'-8.5'

	As Received	Remolded
Test Date:	22-Sep-15	---
Field weight of sample* (g)*:*	157.62	
Tare weight, ring (g)*:*	0.00	
Tare weight, pan/plate (g)*:*	0.00	
Tare weight, other (g)*:*	0.00	
Dry weight of sample (g)*:*	130.23	
Sample volume (cm^3)*:*	91.44	
Assumed particle density (g/cm^3)*:*	2.65	
Gravimetric Moisture Content (% g/g)*:*	21.0	
Volumetric Moisture Content (% vol)*:*	30.0	
Dry bulk density (g/cm^3)*:*	1.42	
Wet bulk density (g/cm^3)*:*	1.72	
Calculated Porosity (% vol)*:*	46.3	
Percent Saturation:	64.8	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-4 (3'-5.5') Horizontal
Ring Number: NA
Depth: 3'-5.5'

	As Received	Remolded
Test Date:	22-Sep-15	---
Field weight of sample* (g)*:*	184.46	
Tare weight, ring (g)*:*	0.00	
Tare weight, pan/plate (g)*:*	0.00	
Tare weight, other (g)*:*	0.00	
Dry weight of sample (g)*:*	152.36	
Sample volume (cm^3)*:*	91.83	
Assumed particle density (g/cm^3)*:*	2.65	
Gravimetric Moisture Content (% g/g)*:*	21.1	
Volumetric Moisture Content (% vol)*:*	35.0	
Dry bulk density (g/cm^3)*:*	1.66	
Wet bulk density (g/cm^3)*:*	2.01	
Calculated Porosity (% vol)*:*	37.4	
Percent Saturation:	93.5	

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Comments:

* Weight including tares
NA = Not analyzed
--- = This sample was not remolded

Saturated Hydraulic Conductivity

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis: Constant Head Rigid Wall	Method of Analysis: Falling Head Flexible Wall
SB-1 (6'-8.5') Horizontal	7.3E-03	NA	X	
SB-1 (12'-14.5') Vertical	1.8E-02	NA	X	
SB-2 (6'-8.5') Horizontal	1.14E-05	NA		X
SB-4 (3'-5.5') Horizontal	3.29E-07	NA		X

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NR = Not requested
NA = Not applicable

Saturated Hydraulic Conductivity
Constant Head Method

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (6'-8.5') Horizontal
Ring Number: NA
Depth: 6'-8.5'

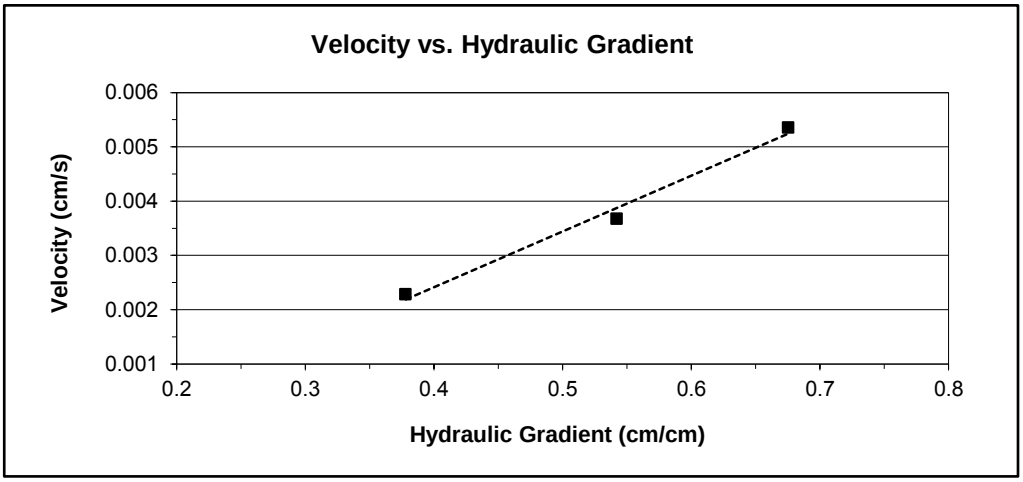
Type of water used: TAP
Collection vessel tare (g)*:* 10.95
Sample length (cm)*:* 4.88
Sample diameter (cm)*:* 4.95
Sample x-sectional area (cm^2)*:* 19.24

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
23-Sep-15	9:50:30	22.0	3.05	17.13	6.2	60	8.6E-03	8.2E-03
23-Sep-15	9:51:30							
Test # 2:								
23-Sep-15	10:00:30	22.0	2.4	15.19	4.2	60	7.5E-03	7.1E-03
23-Sep-15	10:01:30							
Test # 3:								
23-Sep-15	10:10:30	22.0	1.6	13.58	2.6	60	6.9E-03	6.6E-03
23-Sep-15	10:11:30							

Average Ksat* (cm/sec)*: **7.3E-03**
Oversize Corrected Ksat* (cm/sec)*: **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NA = Not applicable



Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J.Hines

Saturated Hydraulic Conductivity
Constant Head Method

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (12'-14.5') Vertical
Ring Number: NA
Depth: 12'-14.5'

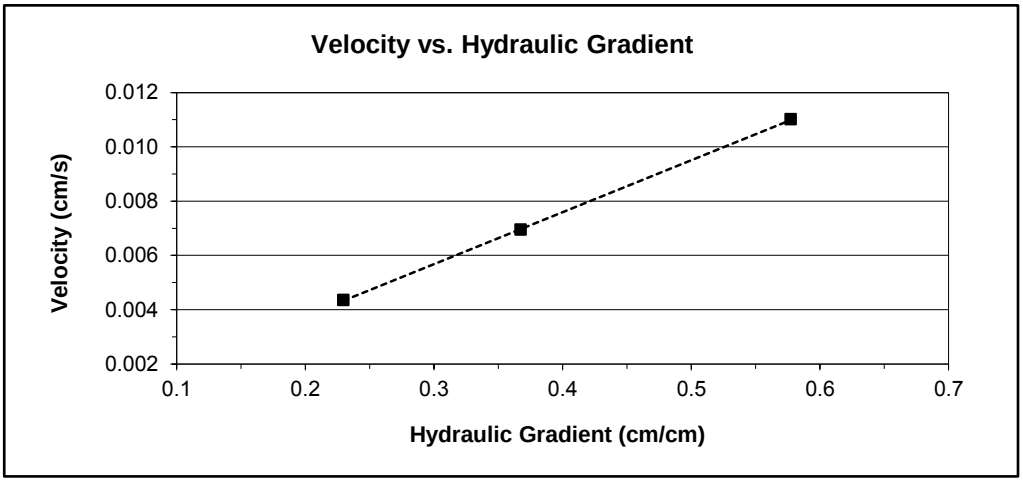
Type of water used: TAP
Collection vessel tare (g)*:* 11.03
Sample length (cm)*:* 7.62
Sample diameter (cm)*:* 4.87
Sample x-sectional area (cm^2)*:* 18.60

Date	Time	Temp (°C)	Head (cm)	Q + Tare (g)	Q (cm^3)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:								
23-Sep-15	9:50:00	22.0	4.4	23.32	12.3	60	1.9E-02	1.8E-02
23-Sep-15	9:51:00							
Test # 2:								
23-Sep-15	10:00:00	22.0	2.8	18.78	7.8	60	1.9E-02	1.8E-02
23-Sep-15	10:01:00							
Test # 3:								
23-Sep-15	10:10:00	22.0	1.75	15.89	4.9	60	1.9E-02	1.8E-02
23-Sep-15	10:11:00							

Average Ksat* (cm/sec)*: **1.8E-02**
Oversize Corrected Ksat* (cm/sec)*: **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NA = Not applicable



Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J.Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-2 (6'-8.5') Horizontal
Ring Number: NA
Depth: 6'-8.5'

Remolded or Initial Sample Properties		Post Permeation Sample Properties		Test and Sample Conditions	
Initial Mass (g):	157.62	*Saturated Mass (g):*	172.19	*Permeant liquid used:*	Tap Water
Diameter (cm):	4.894	*Dry Mass (g):*	130.23	*Sample Preparation:*	☑ In situ sample, extruded
Length (cm):	4.861	*Diameter (cm):*	4.948		☐ Remolded Sample
Area (cm^2):	18.81	*Length (cm):*	4.865	*Number of Lifts:*	NA
Volume (cm^3):	91.44	*Deformation (%)**:*	0.09	*Split:*	NA
Dry Density (g/cm^3):	1.42	*Area (cm^2):*	19.23	*Percent Coarse Material (%):*	NA
Dry Density (pcf):	88.91	*Volume (cm^3):*	93.56	*Particle Density(g/cm^3):*	2.65 ☑ Assumed ☐ Measured
Water Content (%, g/g):	21.0	*Dry Density (g/cm^3):*	1.39	*Cell pressure (PSI):*	70.0
Water Content (%, vol):	30.0	*Dry Density (pcf):*	86.90	*Influent pressure (PSI):*	69.5
Void Ratio (e):	0.86	*Water Content (%, g/g):*	32.2	*Effluent pressure (PSI):*	69.5
Porosity (%, vol):	46.3	*Water Content (%, vol):*	44.9	*Panel Used:*	☐ D ☑ E ☐ F
Saturation (%):	64.8	*Void Ratio(e):*	0.90	*Reading:*	☐ Annulus ☑ Pipette
		Porosity (%, vol):	47.5		Date/Time
		Saturation (%):*	94.5	B-Value (% saturation) prior to test*:	0.98 9/23/15 800
				B-Value (% saturation) post to test:	0.98 9/23/15 830

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated during depressurizing and sample removal.

**Percent Deformation: based on initial sample length and post permeation sample length.

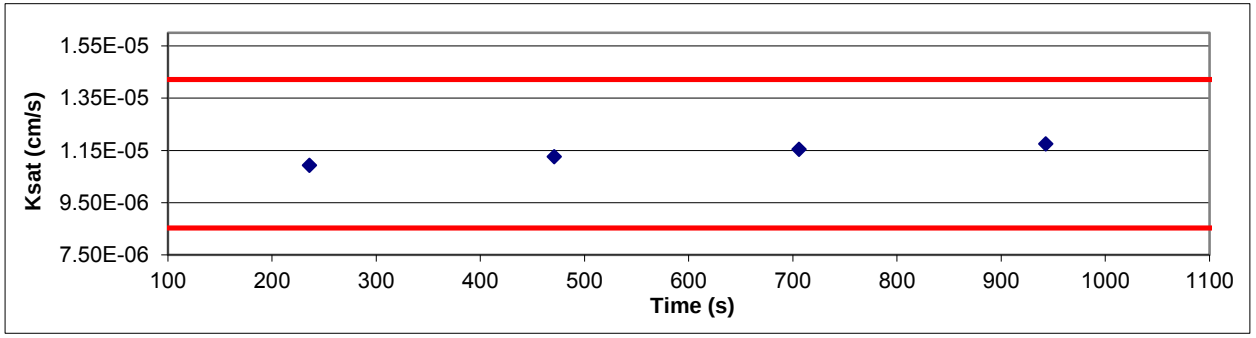
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-2 (6'-8.5') Horizontal
Ring Number: NA
Depth: 6'-8.5'

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
23-Sep-15	08:11:45	22.2	5.40	21.80	3.89	0.17	236	1.00	2%	1.15E-05	1.09E-05
23-Sep-15	08:15:41	22.2	5.60	21.60	3.80						
Test # 2:											
23-Sep-15	08:15:41	22.2	5.60	21.60	3.80	0.17	235	1.00	3%	1.18E-05	1.13E-05
23-Sep-15	08:19:36	22.2	5.80	21.40	3.70						
Test # 3:											
23-Sep-15	08:19:36	22.2	5.80	21.40	3.70	0.17	235	1.00	3%	1.22E-05	1.15E-05
23-Sep-15	08:23:31	22.2	6.00	21.20	3.61						
Test # 4:											
23-Sep-15	08:23:31	22.2	6.00	21.20	3.61	0.17	237	1.00	3%	1.24E-05	1.18E-05
23-Sep-15	08:27:28	22.2	6.20	21.00	3.51						

***Average Ksat* (cm/sec):** **1.14E-05**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 8.53E-06

Ksat (+25%) (cm/s): 1.42E-05

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-4 (3'-5.5') Horizontal
Ring Number: NA
Depth: 3'-5.5'

Remolded or Initial Sample Properties		Post Permeation Sample Properties		Test and Sample Conditions	
Initial Mass (g):	184.46	*Saturated Mass (g):*	189.26	*Permeant liquid used:*	Tap Water
Diameter (cm):	4.876	*Dry Mass (g):*	152.36	*Sample Preparation:*	☑ In situ sample, extruded
Length (cm):	4.918	*Diameter (cm):*	4.941		☐ Remolded Sample
Area (cm^2):	18.67	*Length (cm):*	4.923	*Number of Lifts:*	NA
Volume (cm^3):	91.83	*Deformation (%)**:*	0.10	*Split:*	NA
Dry Density (g/cm^3):	1.66	*Area (cm^2):*	19.17	*Percent Coarse Material (%):*	NA
Dry Density (pcf):	103.57	*Volume (cm^3):*	94.40	*Particle Density(g/cm^3):*	2.65 ☑ Assumed ☐ Measured
Water Content (%, g/g):	21.1	*Dry Density (g/cm^3):*	1.61	*Cell pressure (PSI):*	70.0
Water Content (%, vol):	35.0	*Dry Density (pcf):*	100.76	*Influent pressure (PSI):*	69.5
Void Ratio (e):	0.60	*Water Content (%, g/g):*	24.2	*Effluent pressure (PSI):*	68.5
Porosity (%, vol):	37.4	*Water Content (%, vol):*	39.1	*Panel Used:*	☑ D ☐ E ☐ F
Saturation (%):	93.5	*Void Ratio(e):*	0.64	*Reading:*	☐ Annulus ☑ Pipette
		Porosity (%, vol):	39.1		Date/Time
		Saturation (%):*	100.0	B-Value (% saturation) prior to test*:	0.98 9/23/15 802
				B-Value (% saturation) post to test:	0.98 9/23/15 901

* Per ASTM D5084 percent saturation is ensured (B-Value ≥ 95%) prior to testing, as post test saturation values may be exaggerated during depressurizing and sample removal.

**Percent Deformation: based on initial sample length and post permeation sample length.

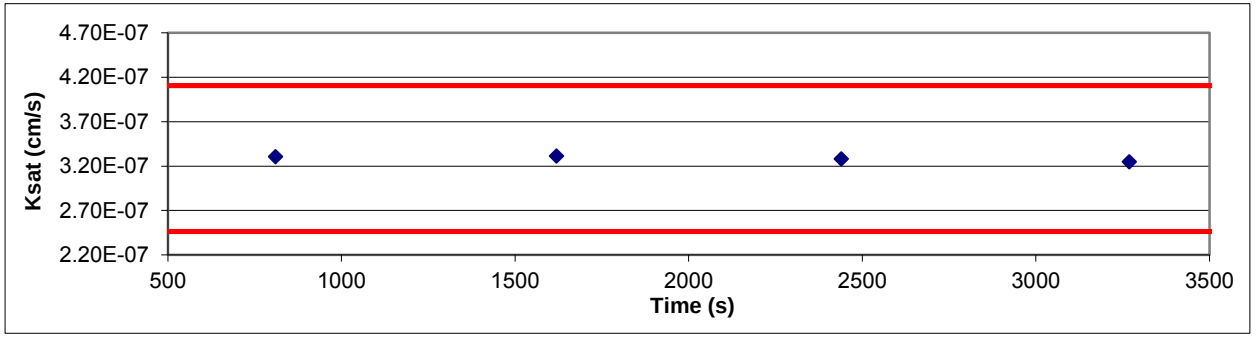
Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Saturated Hydraulic Conductivity
Flexible Wall Falling Head-Rising Tail Method

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-4 (3'-5.5') Horizontal
Ring Number: NA
Depth: 3'-5.5'

Date	Time	Temp (°C)	Influent Pipette Reading	Effluent Pipette Reading	Gradient (ΔH/ΔL)	Average Flow (cm^3)	Elapsed Time (s)	Ratio (outflow to inflow)	Change in Head (Not to exceed 25%)	k_{sat} T°C (cm/s)	k_{sat} Corrected (cm/s)
Test # 1:											
23-Sep-15	08:05:00	22.2	5.00	23.40	18.60	0.09	810	1.00	0%	3.48E-07	3.30E-07
23-Sep-15	08:18:30	22.2	5.10	23.30	18.56						
Test # 2:											
23-Sep-15	08:18:30	22.2	5.10	23.30	18.56	0.09	810	1.00	0%	3.49E-07	3.31E-07
23-Sep-15	08:32:00	22.2	5.20	23.20	18.51						
Test # 3:											
23-Sep-15	08:32:00	22.2	5.20	23.20	18.51	0.09	820	1.00	0%	3.45E-07	3.28E-07
23-Sep-15	08:45:40	22.2	5.30	23.10	18.46						
Test # 4:											
23-Sep-15	08:45:40	22.2	5.30	23.10	18.46	0.09	830	1.00	0%	3.42E-07	3.25E-07
23-Sep-15	08:59:30	22.2	5.40	23.00	18.42						

***Average Ksat* (cm/sec):** **3.29E-07**
Calculated Gravel Corrected Average Ksat (cm/sec): NA



ASTM Required Range (+/- 25%)

Ksat (-25%) (cm/s): 2.46E-07

Ksat (+25%) (cm/s): 4.11E-07

Particle Size Analysis

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
SB-1 (6'-8.5')	0.061	0.15	0.17	2.8	1.4	WS/H	Silty sand (SM)	Sand	
SB-1 (12'-14.5')	0.11	0.18	0.20	1.8	0.89	WS/H	Poorly-graded sand (SP)	Sand	
SB-2 (6'-8.5')	1.5E-05	0.030	0.046	3067	42	WS/H	Lean clay with sand (CL)s	Loam	(Est)
SB-4 (3'-5.5')	1.5E-08	0.040	0.061	4.1E+06	536	WS/H	Sandy lean clay s(CL)	Sandy Clay Loam	(Est)

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Percent Gravel, Sand, Silt and Clay*

Sample Number	% Gravel (>4.75mm)	% Sand (<4.75mm, >0.075mm)	% Silt (<0.075mm, >0.002mm)	% Clay (<0.002mm)
SB-1 (6'-8.5')	0.0	86.9	11.1	2.0
SB-1 (12'-14.5')	0.0	97.6	1.4	1.0
SB-2 (6'-8.5')	0.0	22.9	52.1	24.9
SB-4 (3'-5.5')	0.0	34.4	33.6	32.0

*USCS classification does not classify clay fraction based on particle size. USDA definition of clay (<0.002mm) used in this table.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (6'-8.5')
Ring Number: NA
Depth: 6'-8.5'
Test Date: 28-Sep-15

Initial Dry Weight of Sample (g): 281.35
Weight Passing #10 (g): 281.35
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 100.06
Calculated Weight of Sieve Sample (g): 100.06

Shape: Rounded
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	281.35	100.00
	2"	50	0.00	0.00	281.35	100.00
	1.5"	38.1	0.00	0.00	281.35	100.00
	1"	25	0.00	0.00	281.35	100.00
	3/4"	19.0	0.00	0.00	281.35	100.00
	3/8"	9.5	0.00	0.00	281.35	100.00
	4	4.75	0.00	0.00	281.35	100.00
	10	2.00	0.00	0.00	281.35	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.04	0.04	100.02	99.96
	40	0.425	0.11	0.15	99.91	99.85
	60	0.250	8.94	9.09	90.97	90.92
	140	0.106	71.80	80.89	19.17	19.16
	200	0.075	6.05	86.94	13.12	13.11
	dry pan		0.21	87.15	12.91	
	wet pan			12.91	0.00	

d_{10} (mm): 0.061
d_{16} (mm): 0.088
d_{30} (mm): 0.12
d_{50} (mm): 0.15
d_{60} (mm): 0.17
d_{84} (mm): 0.23

Median Particle Diameter --d_{50} (mm): 0.15
Uniformity Coefficient, Cu --[d_{60}/d_{10}] (mm): 2.8
Coefficient of Curvature, Cc --[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 1.4
Mean Particle Diameter --[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.16

Classification of fines (visual method): ML

ASTM Soil Classification: Silty sand (SM)
USDA Soil Classification: Sand

Laboratory analysis by: N. Candelaria/D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (6'-8.5')
Ring Number: NA
Depth: 6'-8.5'
Test Date: 24-Sep-15
Start Time: 7:30

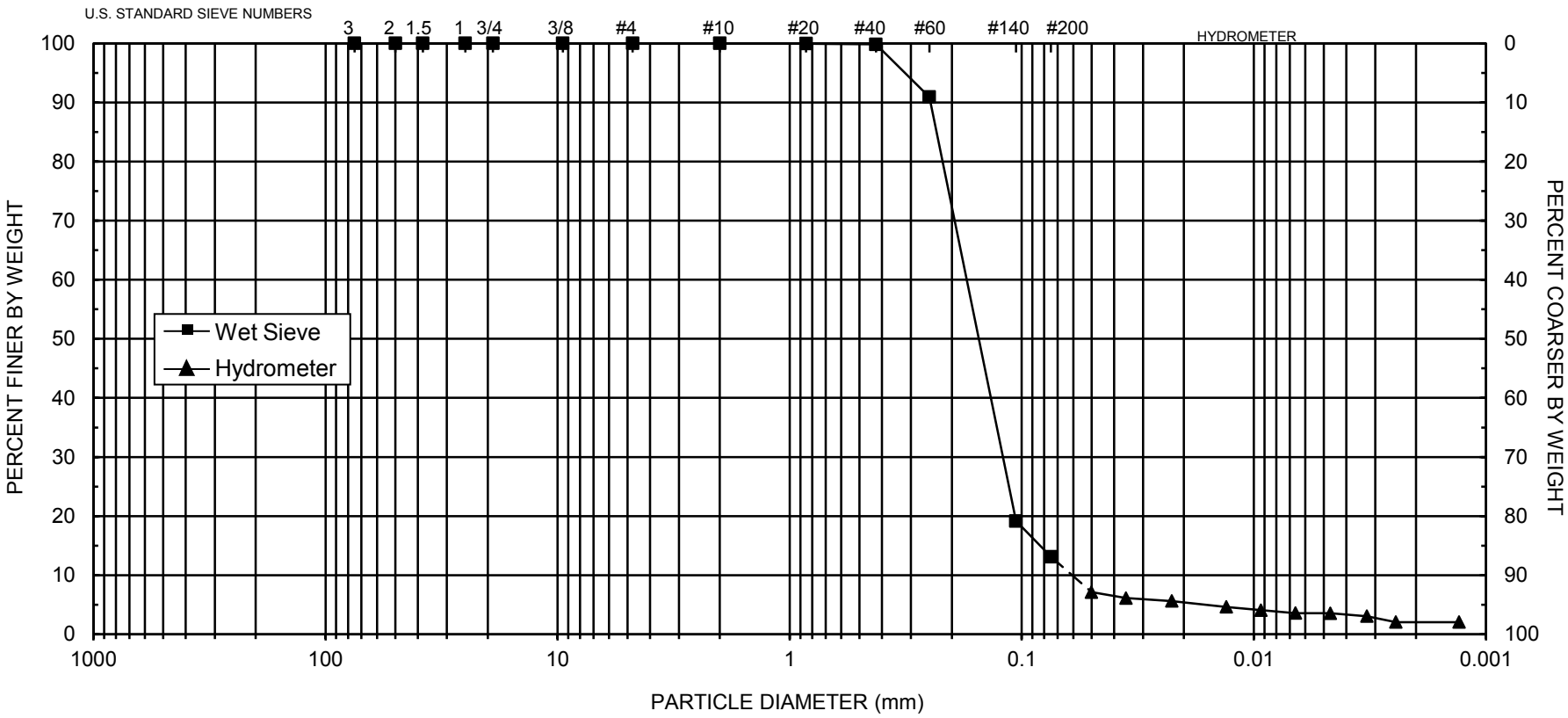
Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g)*:* 100.06
Total Sample Wt. (g)*:* 281.35
Wt. Passing #10 (g): 281.35

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-15	1	22.1	13.0	5.9	7.1	14.2	0.05000	7.1	7.1
	2	22.1	12.0	5.9	6.1	14.3	0.03556	6.1	6.1
	5	22.1	11.5	5.9	5.6	14.4	0.02255	5.6	5.6
	15	22.0	10.5	5.9	4.6	14.6	0.01311	4.6	4.6
	30	21.8	10.0	5.9	4.1	14.7	0.00932	4.1	4.1
	60	21.8	9.5	5.9	3.6	14.7	0.00661	3.6	3.6
	120	21.7	9.5	5.9	3.6	14.7	0.00468	3.6	3.6
	250	21.7	9.0	5.9	3.1	14.8	0.00325	3.1	3.1
	450	21.6	8.0	6.0	2.0	15.0	0.00244	2.0	2.0
25-Sep-15	1572	21.6	8.0	6.0	2.1	15.0	0.00130	2.0	2.0

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		Coarse	Fine	Coarse	Medium	Fine				
USDA	COBBLES	GRAVEL		SAND				SILT	CLAY	
				Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.061**	d_{30} = **0.12**	d_{50} = **0.15**	d_{60} = **0.17**	C_u = **2.8**	C_c = **1.4**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
SB-1 (6'-8.5')	**6'-8.5'**	**Silty sand (SM)**	**Sand**

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (12'-14.5')
Ring Number: NA
Depth: 12'-14.5'
Test Date: 28-Sep-15

Initial Dry Weight of Sample (g): 267.54
Weight Passing #10 (g): 267.54
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 100.49
Calculated Weight of Sieve Sample (g): 100.49
Shape: Rounded
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	267.54	100.00
	2"	50	0.00	0.00	267.54	100.00
	1.5"	38.1	0.00	0.00	267.54	100.00
	1"	25	0.00	0.00	267.54	100.00
	3/4"	19.0	0.00	0.00	267.54	100.00
	3/8"	9.5	0.00	0.00	267.54	100.00
	4	4.75	0.00	0.00	267.54	100.00
	10	2.00	0.00	0.00	267.54	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.00	0.00	100.49	100.00
	40	0.425	0.34	0.34	100.15	99.66
	60	0.250	22.54	22.88	77.61	77.23
	140	0.106	72.51	95.39	5.10	5.08
	200	0.075	2.66	98.05	2.44	2.43
	dry pan		0.06	98.11	2.38	
	wet pan			2.38	0.00	

d_{10} (mm): 0.11
d_{16} (mm): 0.12
d_{30} (mm): 0.14
d_{50} (mm): 0.18
d_{60} (mm): 0.20
d_{84} (mm): 0.29

Median Particle Diameter --d_{50} (mm): 0.18
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 1.8
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.89
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.20

Classification of fines (visual method): ML

ASTM Soil Classification: Poorly-graded sand (SP)
USDA Soil Classification: Sand

Laboratory analysis by: N. Candelaria/D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (12'-14.5')
Ring Number: NA
Depth: 12'-14.5'
Test Date: 24-Sep-15
Start Time: 7:36

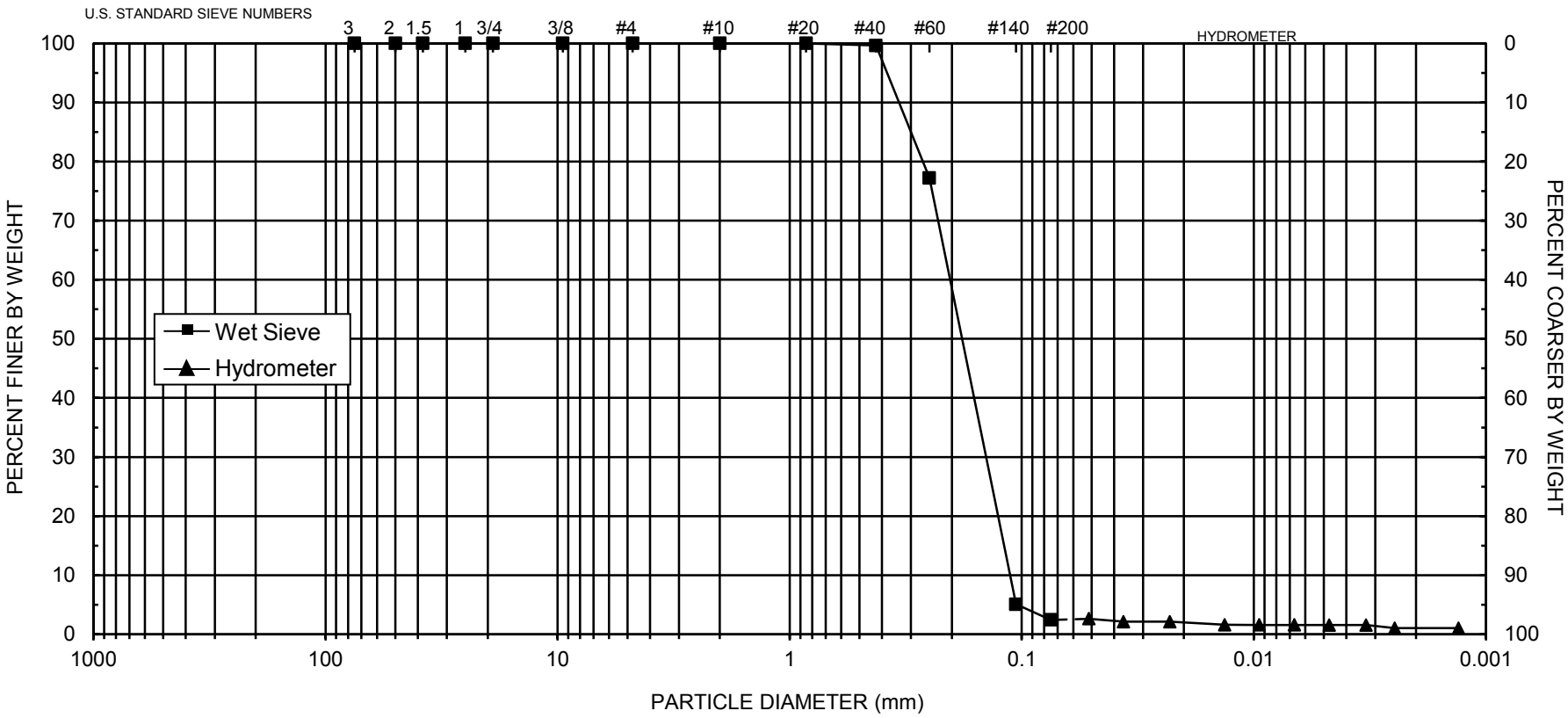
Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g)*:* 100.49
Total Sample Wt. (g)*:* 267.54
Wt. Passing #10 (g): 267.54

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-15	1	22.1	8.5**	5.9	2.6	14.9	0.05131	2.6	2.6
	2	22.1	8.0	5.9	2.1	15.0	0.03638	2.1	2.1
	5	22.1	8.0	5.9	2.1	15.0	0.02301	2.1	2.1
	15	21.9	7.5	5.9	1.6	15.1	0.01334	1.6	1.6
	30	21.7	7.5	5.9	1.6	15.1	0.00946	1.6	1.6
	60	21.8	7.5	5.9	1.6	15.1	0.00668	1.6	1.6
	120	21.6	7.5	6.0	1.6	15.1	0.00473	1.5	1.5
	250	21.7	7.5	6.0	1.6	15.1	0.00328	1.5	1.5
	444	21.6	7.0	6.0	1.0	15.2	0.00247	1.0	1.0
25-Sep-15	1569	21.6	7.0	6.0	1.0	15.2	0.00131	1.0	1.0

Comments:

* Dispersion device: mechanically operated stirring device
** Discontinuity in initial data points due to sample characteristics.

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY				
		Coarse	Fine	Coarse	Medium	Fine					
USDA	COBBLES	GRAVEL		SAND					SILT	CLAY	
				Very coarse	Coarse	Medium	Fine	Very fine			

d_{10} = **0.11**	d_{30} = **0.14**	d_{50} = **0.18**	d_{60} = **0.20**	C_u = **1.8**	C_c = **0.89**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
SB-1 (12'-14.5')	**12'-14.5'**	**Poorly-graded sand (SP)**	**Sand**

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-2 (6'-8.5')
Ring Number: NA
Depth: 6'-8.5'
Test Date: 28-Sep-15

Initial Dry Weight of Sample (g): 244.83
Weight Passing #10 (g): 241.53
Weight Retained #10 (g): 3.30
Weight of Hydrometer Sample (g): 50.66
Calculated Weight of Sieve Sample (g): 51.35

Shape: Rounded
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	244.83	100.00
	2"	50	0.00	0.00	244.83	100.00
	1.5"	38.1	0.00	0.00	244.83	100.00
	1"	25	0.00	0.00	244.83	100.00
	3/4"	19.0	0.00	0.00	244.83	100.00
	3/8"	9.5	0.00	0.00	244.83	100.00
	4	4.75	0.00	0.00	244.83	100.00
	10	2.00	3.30	3.30	241.53	98.65
-10			(Based on calculated sieve wt.)			
	20	0.85	0.51	1.20	50.15	97.66
	40	0.425	0.54	1.74	49.61	96.61
	60	0.250	1.08	2.82	48.53	94.50
	140	0.106	5.71	8.53	42.82	83.38
	200	0.075	3.24	11.77	39.58	77.08
	dry pan		0.69	12.46	38.89	
	wet pan			38.89	0.00	

d_{10} (mm): 1.5E-05
d_{16} (mm): 0.00011
d_{30} (mm): 0.0054
d_{50} (mm): 0.030
d_{60} (mm): 0.046
d_{84} (mm): 0.11

Median Particle Diameter --d_{50} (mm): 0.030
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 3067
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 42
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.047

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CL

ASTM Soil Classification: Lean clay with sand (CL)s
USDA Soil Classification: Loam

Laboratory analysis by: N. Candelaria/D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-2 (6'-8.5')
Ring Number: NA
Depth: 6'-8.5'
Test Date: 24-Sep-15
Start Time: 7:42

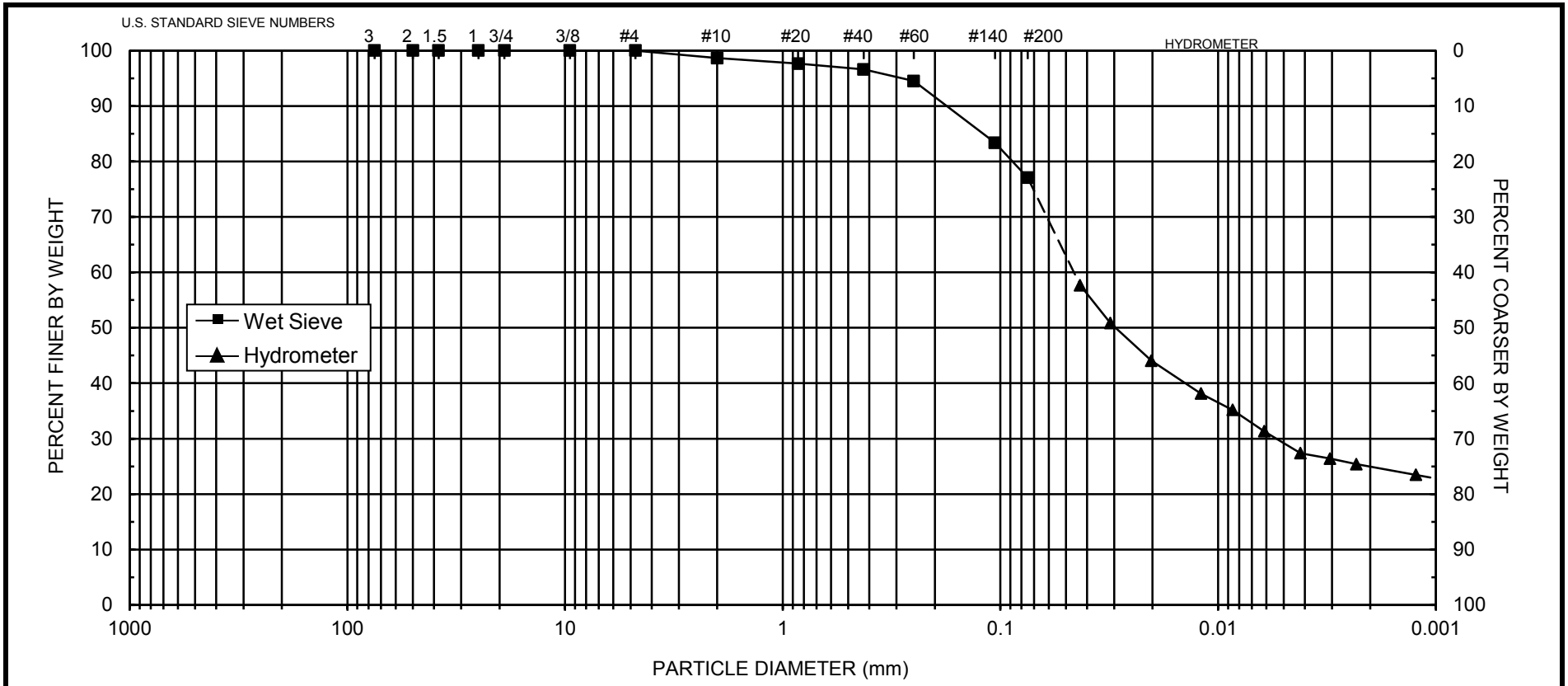
Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g)*:* 50.66
Total Sample Wt. (g)*:* 244.83
Wt. Passing #10 (g): 241.53

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-15	1	22.0	35.5	5.9	29.6	10.5	0.04305	58.5	57.7
	2	22.0	32.0	5.9	26.1	11.1	0.03126	51.6	50.9
	5	22.0	28.5	5.9	22.6	11.6	0.02028	44.7	44.0
	15	21.8	25.5	5.9	19.6	12.1	0.01198	38.6	38.1
	30	21.7	24.0	5.9	18.1	12.4	0.00857	35.7	35.2
	60	21.8	22.0	5.9	16.1	12.7	0.00613	31.7	31.3
	133	21.7	20.0	5.9	14.1	13.0	0.00418	27.8	27.4
	250	21.7	19.5	5.9	13.6	13.1	0.00306	26.8	26.4
	439	21.6	19.0	6.0	13.0	13.2	0.00232	25.7	25.4
25-Sep-15	1564	21.6	18.0	6.0	12.1	13.3	0.00123	23.8	23.5

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		Coarse	Fine	Coarse	Medium	Fine				
USDA	COBBLES	GRAVEL		SAND				SILT	CLAY	
				Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **1.5E-05**	d_{30} = **0.0054**	d_{50} = **0.030**	d_{60} = **0.046**	C_u = **3067**	C_c = **42**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
SB-2 (6'-8.5')	**6'-8.5'**	**Lean clay with sand (CL)s**	**Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-4 (3'-5.5')
Ring Number: NA
Depth: 3'-5.5'
Test Date: 28-Sep-15

Initial Dry Weight of Sample (g): 303.68
Weight Passing #10 (g): 303.68
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 40.45
Calculated Weight of Sieve Sample (g): 40.45

Shape: Angular
Hardness: Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	303.68	100.00
	2"	50	0.00	0.00	303.68	100.00
	1.5"	38.1	0.00	0.00	303.68	100.00
	1"	25	0.00	0.00	303.68	100.00
	3/4"	19.0	0.00	0.00	303.68	100.00
	3/8"	9.5	0.00	0.00	303.68	100.00
	4	4.75	0.00	0.00	303.68	100.00
	10	2.00	0.00	0.00	303.68	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.03	0.03	40.42	99.93
	40	0.425	0.10	0.13	40.32	99.68
	60	0.250	0.51	0.64	39.81	98.42
	140	0.106	8.83	9.47	30.98	76.59
	200	0.075	4.46	13.93	26.52	65.56
	dry pan		0.78	14.71	25.74	
	wet pan			25.74	0.00	

d_{10} (mm): 1.5E-08
d_{16} (mm): 3.7E-07
d_{30} (mm): 0.00070
d_{50} (mm): 0.040
d_{60} (mm): 0.061
d_{84} (mm): 0.14

Median Particle Diameter --d_{50} (mm): 0.040
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 4.1E+06
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 536
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.060

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CL

ASTM Soil Classification: Sandy lean clay s(CL)
USDA Soil Classification: Sandy Clay Loam

Laboratory analysis by: N. Candelaria/D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-4 (3'-5.5')
Ring Number: NA
Depth: 3'-5.5'
Test Date: 24-Sep-15
Start Time: 7:48

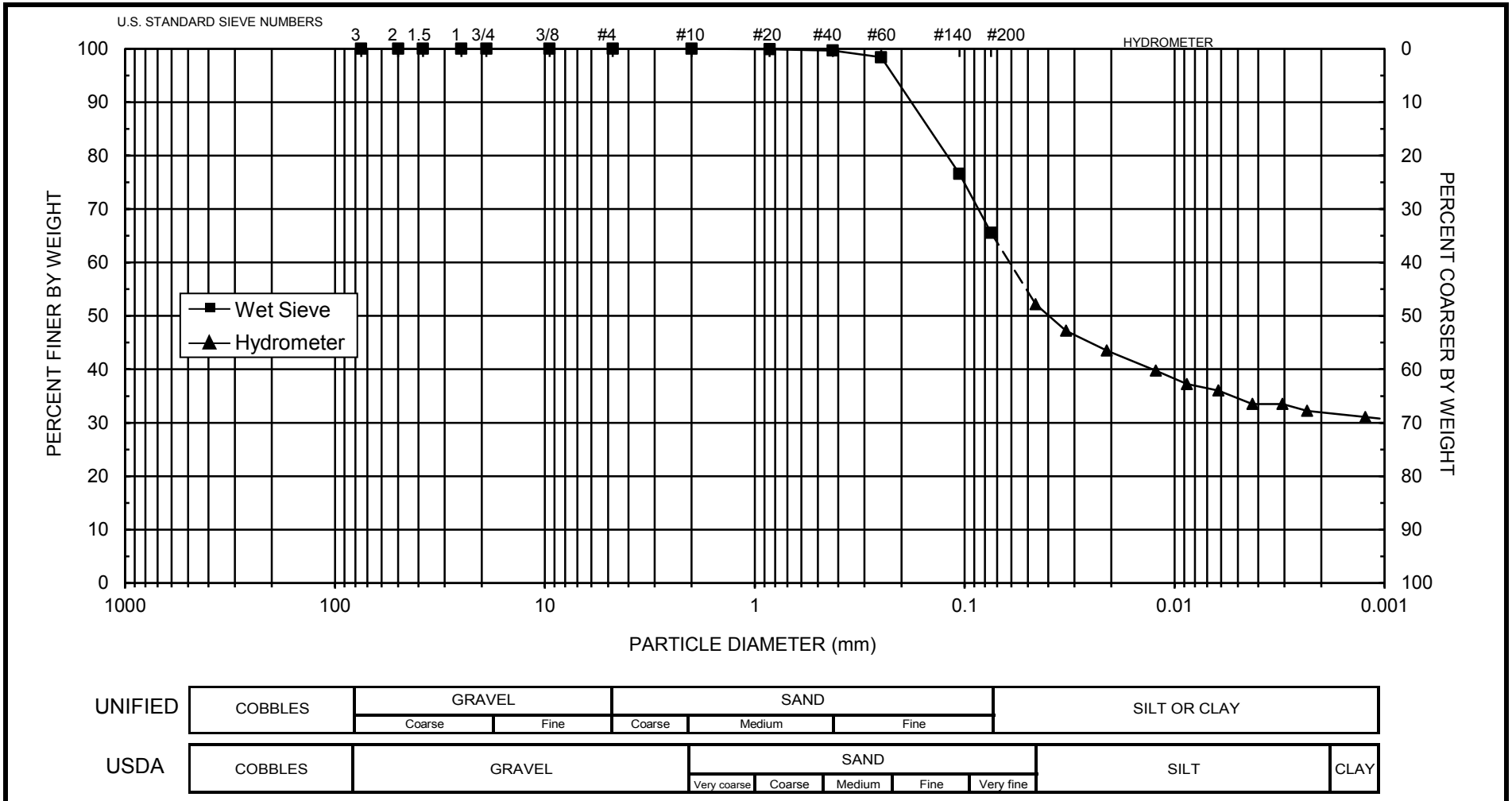
Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65
Initial Wt. (g)*:* 40.45
Total Sample Wt. (g)*:* 303.68
Wt. Passing #10 (g): 303.68

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-15	1	21.9	27.0	5.9	21.1	11.9	0.04588	52.2	52.2
	2	21.9	25.0	5.9	19.1	12.2	0.03288	47.2	47.2
	5	21.9	23.5	5.9	17.6	12.4	0.02101	43.5	43.5
	15	21.8	22.0	5.9	16.1	12.7	0.01227	39.8	39.8
	30	21.7	21.0	5.9	15.1	12.9	0.00874	37.3	37.3
	60	21.8	20.5	5.9	14.6	12.9	0.00619	36.0	36.0
	129	21.7	19.5	5.9	13.6	13.1	0.00426	33.5	33.5
	250	21.7	19.5	5.9	13.6	13.1	0.00306	33.5	33.5
	433	21.6	19.0	6.0	13.0	13.2	0.00233	32.2	32.2
25-Sep-15	1559	21.7	18.5	5.9	12.6	13.3	0.00123	31.1	31.1

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: D. O'Dowd
Data entered by: C. Krous
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL: Coarse, Fine		SAND: Coarse, Medium, Fine		SILT OR CLAY
USDA	COBBLES	GRAVEL	SAND: Very coarse, Coarse, Medium, Fine, Very fine			SILT / CLAY

d_{10} = **1.5E-08**	d_{30} = **0.00070**	d_{50} = **0.040**	d_{60} = **0.061**	C_u = **4.1E+06**	C_c = **536**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
SB-4 (3'-5.5')	**3'-5.5'**	**Sandy lean clay s(CL)**	**Sandy Clay Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Atterberg Limits/ Identification of Fines

Summary of Atterberg Tests

Sample Number	Liquid Limit	Plastic Limit	Plasticity Index	Classification
SB-1 (6'-8.5')	---	---	---	ML
SB-1 (12'-14.5')	---	---	---	ML
SB-2 (6'-8.5')	39	20	19	CL
SB-4 (3'-5.5')	43	18	25	CL

--- = Soil requires visual-manual classification due to non-plasticity

Atterberg Limits

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (6'-8.5')
Ring Number: NA
Depth: 6'-8.5'

Test Date: 23-Sep-15

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:			
Pan number:			
Weight of pan plus moist soil (g):			
Weight of pan plus dry soil (g)			
Weight of pan (g):			
Gravimetric moisture content (% g/g):	---	---	---
Liquid Limit:	---		

Plastic Limit

	Trial 1	Trial 2
Pan number:		
Weight of pan plus moist soil (g):		
Weight of pan plus dry soil (g)		
Weight of pan (g):		
Gravimetric moisture content (% g/g):	---	---
Plastic Limit:	---	

Results

Percent of Sample Retained on #40 Sieve: See Sieve

Liquid Limit: ---
Plastic Limit: ---
Plasticity Index: ---

Classification (Visual Method): ML

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Data for Description and Identification of Fines
(Visual-Manual Procedure)

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (6'-8.5')
Ring Number: NA
Depth: 6'-8.5'

Test Date: 23-Sep-15

Visual-manual classification of material passing the #40 sieve in lieu of Atterberg analysis due to non-plasticity:

Color of Moist Sample: Brown (10YR 7.5 5/3)
Odor: None
Moisture Condition: Moist
HCl Reaction: Strong

Preliminary Identification:

Dry Strength: None
Dilatency: Rapid
Toughness: Low
Plasticity: Non-plastic

Identification of Inorganic Fine Grained Soils:

Silt (ML)

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (12'-14.5')
Ring Number: NA
Depth: 12'-14.5'

Test Date: 23-Sep-15

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:			
Pan number:			
Weight of pan plus moist soil (g):			
Weight of pan plus dry soil (g)			
Weight of pan (g):			
Gravimetric moisture content (% g/g):	---	---	---
Liquid Limit:	---		

Plastic Limit

	Trial 1	Trial 2
Pan number:		
Weight of pan plus moist soil (g):		
Weight of pan plus dry soil (g)		
Weight of pan (g):		
Gravimetric moisture content (% g/g):	---	---
Plastic Limit:	---	

Results

Percent of Sample Retained on #40 Sieve: See Sieve

Liquid Limit: ---
Plastic Limit: ---
Plasticity Index: ---

Classification (Visual Method): ML

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Data for Description and Identification of Fines
(Visual-Manual Procedure)

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-1 (12'-14.5')
Ring Number: NA
Depth: 12'-14.5'

Test Date: 23-Sep-15

Visual-manual classification of material passing the #40 sieve in lieu of Atterberg analysis due to non-plasticity:

Color of Moist Sample: Yellowish Brown (10YR 5/6)
Odor: None
Moisture Condition: Moist
HCl Reaction: Strong

Preliminary Identification:

Dry Strength: None
Dilatency: Rapid
Toughness: Low
Plasticity: Non-plastic

Identification of Inorganic Fine Grained Soils:

Silt (ML)

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-2 (6'-8.5')
Ring Number: NA
Depth: 6'-8.5'

Test Date: 23-Sep-15

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	34	27	18
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	130.26	125.76	122.82
Weight of pan plus dry soil (g)	127.96	123.12	119.79
Weight of pan (g):	121.84	116.31	112.29
Gravimetric moisture content (% g/g):	37.58	38.77	40.40

Liquid Limit: 39

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	117.34	120.59
Weight of pan plus dry soil (g)	116.24	119.33
Weight of pan (g):	110.84	113.15
Gravimetric moisture content (% g/g):	20.37	20.39

Plastic Limit: 20

Results

Percent of Sample Retained on #40 Sieve: See Sieve

Liquid Limit: 39
Plastic Limit: 20
Plasticity Index: 19

Classification: CL

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name: South Waste Sealy Facility
Job Number: TX15.0094.00
Sample Number: SB-4 (3'-5.5')
Ring Number: NA
Depth: 3'-5.5'

Test Date: 23-Sep-15

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	27	21	15
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	126.06	124.68	124.87
Weight of pan plus dry soil (g)	122.87	121.76	121.23
Weight of pan (g):	115.31	115.11	113.13
Gravimetric moisture content (% g/g):	42.20	43.91	44.94

Liquid Limit: 43

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	123.47	123.53
Weight of pan plus dry soil (g)	122.20	122.28
Weight of pan (g):	115.18	115.33
Gravimetric moisture content (% g/g):	18.09	17.99

Plastic Limit: 18

Results

Percent of Sample Retained on #40 Sieve: See Sieve

Liquid Limit: 43
Plastic Limit: 18
Plasticity Index: 25

Classification: CL

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Laboratory Tests and Methods

Tests and Methods

Dry Bulk Density:	ASTM D7263
Moisture Content:	ASTM D7263, ASTM D2216
Calculated Porosity:	ASTM D7263
Saturated Hydraulic Conductivity:	
Constant Head: (Rigid Wall)	ASTM D 2434 (modified apparatus)
Falling Head Rising Tail: (Flexible Wall)	ASTM D5084
Particle Size Analysis:	ASTM D422
USCS (ASTM) Classification:	ASTM D422, ASTM D2487
USDA Classification:	ASTM D422, USDA Soil Textural Triangle
Atterberg Limits:	ASTM D4318
Visual-Manual Description:	ASTM D2488

Appendix M

Liner Construction Quality Assurance Plan

Liner Construction Quality Assurance Plan for Sealy Composting Facility

Prior to Liner Deployment:

- Contractor shall provide
    - welding machine test certification
    - documentation of welder certification for all personnel

Subgrade Development:

- A minimum of 4 density tests per acre (4/acre) of in-place compacted subgrade or portion thereof. One standard proctor for in-place material shall be taken by the Engineer and the Proctor curve shall be provided to the Contractor. Compaction should be a minimum of 90% standard proctor.
- The subgrade shall be smooth rolled using a vibratory roller, and the surface free of stones, objects, or other deleterious material greater than 1-inch in diameter. Soil liners shall not be compacted with a bulldozer or any track-mobilized equipment unless it is used to pull a pad-footed roller.
- Survey requirements
    - Prior to liner system placement the corners, floor, toe of slopes, and top of slopes shall be surveyed at one foot contours or greater resolution.
    - Prior to liner system placement, the drainage slope of the pond's floor shall be verified by survey to confirm that it maintains a minimum 1% slope toward the stormwater retention pond.

Clay Liner System Placement Field Quality Control/Assurance:

- Perform a minimum of 1 field permeability test for every 15,000 cubic yards of material used (approximately 3 tests for the project) in accordance with American Society of Testing and Materials (ASTM) D5093 for those soil liners that are in the floor of the excavation and a variation of the Boutwell STEI field permeability test approved by the executive director for the sidewalls.
- Perform sieve analysis for soil classification on the +1, 200, and -200 sieves (ASTM D422 or ASTM D1140, as applicable) with a minimum of 1 test per 5,000 cubic yards (2 tests per 6-inch lift).
- Atterberg limits (ASTM D4318) a minimum frequency of 1 test per 5,000 cubic yards (2 tests per 6-inch lift).
- Perform moisture-density (Proctor) testing (ASTM D698) at a minimum on every 15,000 cubic yards or less of material used and with any change in the major soil type (approximately 3 tests for the project).
- Determine moisture content (ASTM D2216) a minimum frequency of 1 test per 5,000 cubic yards (2 tests per 6-inch lift).
- Perform thickness verification using appropriate survey control.

Geomembrane Liner System Placement Field Quality Control/Assurance:

- Owner shall provide liner manufacturer's material certifications
- At the beginning of each day, the Contractor shall provide the Engineer with a Daily Report of the previous day, addressing subgrade approval by the Contractor and Engineer for areas to be

covered by liner material, total number and location of panels placed and seams completed, and the locations of destructive tests taken and repairs made.

- The Contractor shall be responsible for maintaining up to date Inventory, Panel Deployment, Test Weld, Seam and Pressure Test, Destructive Field Test, and Repair Logs. At the end of each day, the Contractor shall provide these logs to the Engineer for review.
- The Engineer shall be responsible for maintaining a separate set of the previously listed logs.
- The Engineer shall be responsible for verifying the Contractors logs on daily basis against the Engineer's daily logs. Discrepancies and or errors shall be corrected in a timely fashion.
- The Engineer shall observe that the Contractor conducts test welds at the start of each morning and afternoon. Test welds shall also be required if a welding machine has been out of service for more than 30 minutes or if a welding technician changes machines. The Contractor and Engineer shall both record the results of the trail weld tests.
- Destructive seam test shall be taken by the Contractor at a minimum frequency of once per 500 feet of seam (1/500') or as directed by the Engineer.
- Destructive seam test sample shall be 12"x36" with the seam centered length wise. The sample shall be cut into three equal portions. One shall be field tested by the Contractor, the second shall be sent to an independent laboratory for testing, and the third shall be given to the Owner to be kept for record purposes. The Engineer and Contractor shall both record the results of field destructive seam tests.
- All fusion welded seams shall be pressure tested, and the Engineer shall observe and record the results of each test.
- All extrusion welds shall be vacuum tested and the Engineer shall observe and record the results of each test.
- All destructive and nondestructive testing shall be performed as the work progresses on a daily basis.
- Independent laboratory testing of destructive seam samples shall include shear and peel strength. Passing test shall meet the minimum required values in a minimum of 4 of the 5 specimens tested for each method.
- Survey requirements:
    - Post liner system placement: corners, floor, liner seam locations, toe of slopes, and top of slopes shall be surveyed at one foot contours or greater resolution.

Liner Certification Report:

Following completion of the installation and upon receipt of laboratory analytical reports, Engineer will prepare and submit a report summarizing the construction activities. The report will include the following:

- Area/vicinity map
- Discussion of the sampling collection procedures
- Laboratory results with chain-of-custody records and quality assurance information
- Tabulation of Quality Assurance Data
- Daily construction logs and photographs
- Certification statement by the DBS&A Engineer

Table 1 - Construction Forms

Item	Form Title
1	Daily Report
2	Compaction Log
3	Inventory Log
4	Panel Deployment Log
5	Test Weld Log
6	Seam and Pressure Test Log
7	Destructive Field Test Log
8	Repair Log

Table 2 - Inspections/Tests and Testing Frequencies

Inspections/Tests	Frequency
Subgrade Compaction	4/acre
Survey	Prior to and after clay liner placement, one foot or greater resolution, including each corner, toe of slope, and top of slope for pond and berms. After geomembrane liner placement, edge of liner and all liner seam locations.
Soil Classification (sieve analysis, Atterberg limits, moisture content)	1/5,000 cubic yards
Standard Proctor Test	1/15,000 cubic yards
Field permeability Tests	1/15,000 cubic yards
Slopes	Survey confirm 1% minimum slope on composting pad
Subgrade Acceptance	Daily
Trail Welds	AM &PM, technician and equipment changes
Destructive Test Sampling	1/500' or as the Engineer directs
Destructive Field Testing	5 samples each for peel and shear
Laboratory Destructive Seam Testing	5 samples each for peel and shear
Fusion Welded Seams	All shall be pressure tested
Extrusion Welded Seams	All shall be vacuum tested
Leak Detection Sump Gravel	Visual inspection and acceptance by the Engineer. Clean, washed, sub-angular, and minimal amount of material finer than 1/2"

Appendix N

Closure Cost Summary & Estimate

CLOSURE COST SUMMARY
SEALY COMPOST FACILITY, AUSTIN COUNTY, TX

CLOSURE COST SUMMARY	
COMPOSTING PAD & RETENTION POND REMOVAL AND BACKFILL	$217,516
CONCRETE AREAS REMOVAL - SLUDGE PROCESSING PADS	$16,925
FACILITY CLOSURE (INCLUDING TANKS, GRADING, BUILDINGS, MISC EQUIPMENT)	$99,594
POST CLOSURE COSTS	$2,400
SUBTOTAL CLOSURE COST	$336,434
Contingency (10%)	$33,643
TOTAL CLOSURE COST	$370,077
Required Financial Security	$370,077

Assumptions

1) The facility is in compliance with the conditions of the permit at the time of closure.
2) Final closure work will be completed by independent contractors. No equipment from the facility will be used.
3) any water stored on site will be used for soil conditioning during the closure process or sent for off-site disposal, as appropriate.
4) the compost pad will be demolished and removed. The area of the pad and storm water pond will be backfilled with onsite soils and graded to match site topography.
5) The office trailer and other structures will be demolished or recycled and removed.
6) Surface tanks will be washed out and hauled away for disposal/recycle.
7) Soil from the earthen berms will be used on site for grading and backfill.

CLOSURE COST ESTIMATE
SEALY COMPOST FACILITY, AUSTIN COUNTY, TX

Item / Material	Units	Quantity	Unit Price	Subtotal	REFERENCES
COMPOSTING PAD & RETENTION POND REMOVAL AND BACKFILL					
Mob/demob dozer/grader - 2 pieces of equipment	RND TRP	2	$1,020	$2,040	RS Means 01 54 36.50 0100
Removal of liner material & handling of protective material (1' thick)	CY	17,747	$5.45	$96,719	RS Means 31 23 16.46 3220
Transportation of materials by truck, disposal located approximatley 26 miles from the site. Assumes approximately 160 loads.	CY	3,221	$6.95	$22,388	RS Means 31 23 23.20 4098/4100
Dispose of 6" of liner material at landfill	TON	5	$155.00	$799	RS Means 02 81 20.10 6000
Fill pond excavation, incl. compaction	CY	39,168	$2.44	$95,570	RS Means 31 23 23.14 5420\.23 5050
SUBTOTAL				**$217,516**	
CONCRETE AREAS REMOVAL - SLUDGE PROCESSING PADS					
Demolition of concrete sludge processing pads	CY	81	$202	$16,362	RS Means 02 41 13.33 4320
Transportation of materials by truck, disposal located approximatley 26 miles from the site.	CY	81	$6.95	$563	RS Means 31 23 23.20 4098/4100
SUBTOTAL				**$16,925**	
FACILITY CLOSURE (INCLUDING TANKS, GRADING, BUILDINGS, MISC EQUIPMENT)					
Site and pit closure work supervision (consultant)	DY	20	$1,200	$24,000	Based on engineer's field consultant rate
Washout and haul for disposal/recycle, 31,500 gal steel tank	EA	8	$3,288	$26,300	RS Means 02 65 10.30 0863/1029
Berm removal - material used as on site fill	CY	6,252	$0	$0	Use demolition equipment to spread
Seeding: Rye grass, tractor spreader	MSF	1,488	$26	$38,677	RS Means 32 92 19.14 3400
Sedimentation fencing	LF	4,460	$1.21	$5,397	RS Means 31 25 14.16 1100
Demob office trailer and carport for sale/reuse	EA	1	$220.00	$220	RS Means 01 52 13.20 0890
Remove dispose/salvage miscellaneous on site equipment	LS	1	$5,000.00	$5,000	Professional opinion
SUBTOTAL				**$99,594**	
POST CLOSURE COSTS					
Annual inspection of vegetation for two years	DY	2	$1,200	$2,400	Based on engineer's field consultant rate
SUBTOTAL				**$2,400**	
TOTAL				**$336,434**	

RS Means - RS Means Heavy Construction Cost Data, 28th edition, 2014

Eight (8) 31,500-gallon feedstock storage tanks are the only on site tanks.
Earthen berm is 4 feet high by 8 feet wide at the base for perimeter and pond berms, 2.5 feet high by 5 feet wide at the base for the tanks berms.
Two concrete sludge processing pads measure 40 feet by 50 feet, 0.5-foot thick, sloped toward compost pad
Removal of office trailer, portable toliet, above ground piping, carport, misc equipment, empty mobile frac tanks