

Texas Commission on Environmental Quality Waste Permits Division Correspondence Cover Sheet

Date: <u>12/13/2024</u> Facility Name: <u>City of Stephenville Landfill</u> Permit or Registration No.: <u>664</u> Nature of Correspondence:

- Initial/New
- Response/Revision to TCEQ Tracking No.: <u>28474610</u> (from subject line of TCEQ letter regarding initial submission)

Affix this cover sheet to the front of your submission to the Waste Permits Division. Check appropriate box for type of correspondence. Contact WPD at (512) 239-2335 if you have questions regarding this form.

Applications	Reports and Notifications
New Notice of Intent	Alternative Daily Cover Report
Notice of Intent Revision	Closure Report
New Permit (including Subchapter T)	Compost Report
New Registration (including Subchapter T)	Groundwater Alternate Source Demonstration
🗌 Major Amendment	Groundwater Corrective Action
Minor Amendment	Groundwater Monitoring Report
Limited Scope Major Amendment	Groundwater Background Evaluation
Notice Modification	Landfill Gas Corrective Action
Non-Notice Modification	Landfill Gas Monitoring
Transfer/Name Change Modification	Liner Evaluation Report
Temporary Authorization	Soil Boring Plan
Voluntary Revocation	Special Waste Request
Subchapter T Disturbance Non-Enclosed Structure	Other:
Other:	

Table 1 - Municipal Solid Waste Correspondence

Table 2 - Industrial & Hazardous Waste Correspondence

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



BIGGS & MATHEWS ENVIRONMENTAL, INC

TBPE No. F-256 TBPG No. 50222

December 13, 2024

Ms. Charly Fritz, Deputy Director Ms. Megan Henson, Manager Office of Waste, Waste Permits Division Texas Commission on Environmental Quality P. O. Box 13087 Austin, Texas 78711-3087

Re: City of Stephenville – Erath County Municipal Solid Waste (MSW) – MSW Permit No. 664 Type IV Permit Application – Addendum 2 to NOD 2 Response Communication Tracking No. 28474610, RN102214566/CN600627814

Dear Ms. Fritz and Henson:

This Addendum 2 to the NOD 2 response dated May 8, 2024, is submitted on behalf of City of Stephenville for the Type IV Limited Scope Permit Amendment Application submitted March 31, 2023. Below is a list of changes included with this addendum.

- Attachment 4B Site Geology Report has been provided to present a summary of historic data. The historic geological data and analysis presented in Attachment 4B includes permeability/hydraulic conductivity testing results, piezometer data, and subsurface investigations from 1972-1994. The data demonstrates consistently low permeability clay-dominated geology and area wells utilizing deep groundwater with the majority of the water wells screened approximately 300 feet below ground surface. The data supports the geologist's conclusion in Attachment 4 that the City of Stephenville should be allowed to continue to not monitor groundwater at the facility.
- Page III-5A, Site Development Plan The last paragraph was revised to state the following:
 - "During the development of cells over the Pre-Subtitle D area, soils will be stripped of vegetation and a geotechnical engineer shall inspect and test the soils for suitable properties. Soils shall meet the requirements for constructed liners in accordance with the approved SLQCP and 30 TAC §330.339. Upon cell completion, a SLER will be submitted in accordance with §330.341."
- Table 8-1, 8-2, Page 8-1-4 and 8-2-2, Attachment 8 Cost Estimate for Closure and Post Closure Care LFG probes to be installed during final closure updated.
- Page 12-4-8 and 12-4-9, Appendix 12-4 Final Cover Quality Control Plan Sections 3.8.2 and 4.3 were revised to correct section references to Section 3.8.1, 3.8.3.

Ms. Fritz and Henson December 13, 2024 Page 2

Sincerely,

BIGGS & MATHEWS ENVIRONMENTAL TBPE NO. F-256 + TBPG NO. 50222

escoup

Felipe A. Wescoup, P.E. Senior Engineer

Attachments: City of Stephenville Limited Scope Permit Amendment - Addendum 1 to NOD 2

cc: Mr. Nick Williams, P.E., Director of Public Works, City of Stephenville Mr. Doug Svien, Mayor, City of Stephenville



Texas Commission on Environmental Quality

Part I Application Form for New Permit, Permit Amendment, or Registration for a Municipal Solid Waste Facility

Application Tracking Information

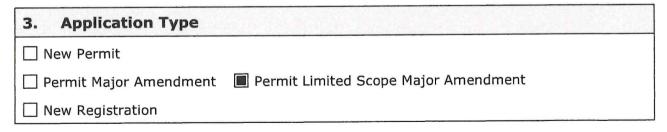
Facility Name: City of Stephenville Landfill	
Permittee or Registrant Name: City of Stephenville	
MSW Authorization Number: <u>664</u>	
Initial Submission Date: 03/31/2023	
Revision Date: 12/13/2024	

Instructions for completing this Part I Application Form are provided in <u>TCEQ 00650-instr</u>¹. Include a <u>Core Data Form (TCEQ 10400)</u>² with the application for the facility owner, and another Core Data Form for the operator if different from the owner. If you have questions, contact the Municipal Solid Waste Permits Section by email to <u>mswper@tceq.texas.gov</u>, or by phone at 512-239-2335.

Application Data

1. Submission Type	
Initial Submission	Notice of Deficiency (NOD) Response

2. Authorization	Туре	
Permit	Registration	
L		



¹ www.tceq.texas.gov/downloads/permitting/waste-permits/msw/forms/00650-instr.pdf

² www.tceq.texas.gov/goto/coredata

Signature Page

Site Operator or Authorized Signatory

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.

Name: Nick Williams, PE, CFM Title: Director of Public Works

Email Address: nwilliams@stephenvilletx.gov Date: 12/13/2024 Signature:

Operator or Principal Executive Officer Designation of Authorized Signatory

To be completed by the operator if the application is signed by an authorized representative for the operator.

_____ as my representative I hereby designate 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.

Operator or Principal Executive Officer Name:	
Email Address:	
Signature:	Date:
Notary	
SUBSCRIBED AND SWORN to before me by the said	Nick Williams
On this <u>13th</u> day of <u>December</u> , <u>2024</u>	
My commission expires on the 31 day of Octok	ver, 2027
Notary Public in and for	JACEY KAY WOOD
Erath County, Texas	Comm. Expires 10-31-202 Notary ID 134627689
Note: Application Must Bear Signature & Seal of Not	ary Public

Page 11 of 13

CITY OF STEPHENVILLE CITY OF STEPHENVILLE LANDFILL ERATH COUNTY, TEXAS TCEQ PERMIT NO. MSW 664

PART III SITE DEVELOPMENT PLAN

Prepared for

City of Stephenville

March 2023 Revised August 2023 Revised May 2024 Revised December 2024



Firm Registration No. F-256

Prepared by

BIGGS & MATHEWS ENVIRONMENTAL 1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS FIRM REGISTRATION NO. F-256 TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS FIRM REGISTRATION NO. 50222

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Part III - Site Development Plan Narrative

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Attachment 2 Fill Cross Sections

Attachment 3 Existing Contour Maps

Attachment 4 Geology and Geotechnical Report

Attachment 4B Site Geology Report

Attachment 5 Not Used

Attachment 6 Groundwater and Surface Water Protection Plan

Attachment 7 Final Contour Plan

Attachment 8 Cost Estimates for Closure and Postclosure Care

Attachment 9 Not Used

Attachment 10 Soil and Liner Quality Control Plan

Attachment 11 Not Used

Attachment 12 Final Closure Plan

Attachment 13 Postclosure Care Plan

Attachment 14 Landfill Gas Management Plan

Attachment 15 Leachate and Contaminated Water Plan



Firm Registration No. F-256

CITY OF STEPHENVILLE CITY OF STEPHENVILLE LANDFILL ERATH COUNTY, TEXAS TCEQ PERMIT NO. MSW 664

LIMITED SCOPE PERMIT AMENDMENT

PART III SITE DEVELOPMENT PLAN NARRATIVE

Prepared for

City of Stephenville

March 2023 Revised August 2023 Revised May 2024 Revised December 2024



BIGGS & MATHEWS ENVIRONMENTAL 1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS FIRM REGISTRATION NO. F-256 TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS FIRM REGISTRATION NO. 50222



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APPENDIX IIIA – Site Life Calculations **APPENDIX IIIB** – Historical Information detailed on the Plan of Final Cover Evaluation Locations. Refer to Appendix IIIB – Historical Information for the existing liner and final cover descriptions and locations.

During the development of cells over the Pre-Subtitle D area, soils will be stripped of vegetation and a geotechnical engineer shall inspect and test the soils for suitable properties. Soils shall meet the requirements for constructed liners in accordance with the approved SLQCP and 30 TAC §330.339. Upon cell completion, a SLER will be submitted in accordance with §330.341.

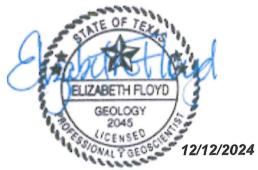
STEPHENVILLE TYPE IV LANDFILL ERATH COUNTY, TEXAS TCEQ PERMIT NO. MSW-664

> ATTACHMENT 4B SITE GEOLOGY REPORT

> > Prepared for

City of Stephenville

December 2024



Biggs and Mathews Environmental, Inc. Registration No. 50222

Prepared by

BIGGS & MATHEWS ENVIRONMENTAL 1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

Texas Board of Professional Engineers and Land Surveyors Firm Registration No. F-256 And No. 10194895 TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS FIRM REGISTRATION NO. 50222

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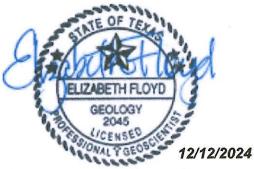
Drawings

1	Facility Site Plan
1000	

- 2 Cross Section Location Map
- 3 Cross Section A
- 4 Cross Section B
- 5 Cross Section C
- 6 Cross Section D
- 7 Potentiometric Surface Map May 1991
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- 9 Potentiometric Surface Map July 11, 1991
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- 11 Potentiometric Surface Map August 1991
- 12 Potentiometric Surface Map September 1991
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Appendix A – Historic Documents

Texas Testing Laboratories 1972 Surface Investigation and Boring Logs (A.1 through A.15) Southwestern Laboratories 1986 SLER Evaluation and Boring Logs (A.16 through A.20) Southwestern Laboratories 1987 SLER Evaluation and Boring Logs (A.21 through A.27) TEAM Consultants, Inc. 1992 Revised Preliminary Hydrogeologic Site Assessment (A.28 through A.76) 1994 Piezometer Plugging Reports (A.77 through A.86) Water Well Logs and Reports (A.87 through A.93) TEAM Consultants, Inc. 1990 Boring Logs (A.94 through A.95) TEAM Consultants, Inc. 1994 Boring Logs (A.96 through A.97)



Biggs and Mathews Environmental, Inc. Registration No. 50222

1.0 GENERAL SITE GEOLOGY

Biggs and Mathews Environmental, Inc. (BME) constructed four geologic cross sections of the site using an amalgam of subsurface exploration data collected from the years 1972, 1986, 1987, 1990, 1991, and 1994 (Drawings 3 through 6). The cross sections illustrate generalized subsurface conditions at the site and are based on lithologic and stratigraphic data from logs of borings provided in Appendix A – Historic Documents. Drawing 2 shows the locations of the cross sections on a site map.

Generally, clays are found as the predominant material throughout the borings on the site map (Drawings 1 and 2). Clay with silt constitutes the majority of surficial material extending to a depth of approximately 55 feet below ground surface (bgs). Occasional limestone and/or caliche can be found at the surface or interbedded between clays and silty clays near the surface, particularly in the northern portion of the site. Discontinuous and non-correlatable sporadic clay with sand and sand lenses can be observed within the dominant clay with silt material. Granular material is correlatable across the site in borings that terminate at depths which extend beyond approximately 1430 feet below mean sea level (ft/msl). This deeper material was generally classified as sandstone, silt with sand, and clay with sand. Piezometers installed on-site were screened in the deeper granular material. Refer to Appendix A for individual boring logs.

2.0 PERMEABILITY AND HYDRAULIC CONDUCTIVITY

Texas Testing Laboratories (TTL) performed a surface investigation on what was to become the City of Stephenville Landfill. In 1972, TTL drilled six test borings (#1, #2, #3, #4, #5, #6) in an effort to evaluate the site for the potential use as a landfill (Drawing 1 – Facility Site Plan). One soil sample from each boring was tested for permeability using a constant head permeameter. The results from the permeability tests are summarized in Table 1and can also be found in Appendix A. Texas Testing Laboratories opined that the permeability testing results demonstrated sufficiently impervious soil characteristics at the site and the soil would adequately seal the landfill operation from passage of water into the surrounding subsurface. Refer to appended TTL 1972 Surface Investigation Report for more detail about the drilling process, testing analysis, and individual boring logs (Appendix A).

	TTL 1972 Permeability Testing Summary					
Boring ID	Depth (feet)	Lithology	Soil Class	Plasticity Index	Permeability (cm/sec)	Test Duration
1	16	Sandy clay	CL	24	2.33x10 ⁻⁹	54 hours
2	10	Sandy clay	CL	21	< 1x10 ⁻⁷	54 hours
3	17	Sandy clay	CL	27	< 1x10 ⁻⁷	54 hours
4	11	Clay	СН	41	2.3x10 ⁻⁹	72 hours
5	16.5	Sandy clay	CL	13	1.2x10 ⁻⁷	48 hours
6	6	Caliche	CL	17	2.84x10 ⁻⁷	24 hours

Table 1

Southwestern Laboratories (SWL) conducted soil liner evaluation reports (SLER) during the years of 1986 and 1987 at the City of Stephenville Landfill. The 1986 evaluation included three borings (B-1, B-2, B-3) and the 1987 evaluation included four borings (Boring-1 through Boring-4). The locations of these borings can be seen on Drawing 1. The summary of the 1986 and 1987 SLER testing events is represented in Table 2 and can also be found in Appendix A. Individual boring logs for the 1986 and 1987 SLER events can be found in Appendix A.

	Summary of SLER Tests					
		1986				
Boring ID	oring ID Depth (feet) Type of Material Moisture Plasticity Content (%) Index			Hydraulic Conductivity (k) (cm/sec)		
B-1	2-3	Very silty caliche clay	15	12	-	
B-1	4-5	Very silty, sandy clay	11	10	3.8x10 ⁻⁷	
B-1	9-10	Sandy clay	17	16	7.8x10 ⁻⁹	
B-1	14-15	Silty clay	18	28	8.7x10 ⁻¹⁰	
B-1	24-25	Clay	23	31	-	
B-1	34-35	Silty Clay	14	23	9x10 ⁻⁹	
B-2	4-5	Very silty sandy caliche clay	10	11	5.5x10 ⁻⁸	
B-2	9-10	clay	19	30	-	
B-2	14-15	Silty clay	16	25	1.1x10 ⁻⁹	
B-2	19-20	Silty clay	18	25	3.2x10 ⁻⁹	
B-2	29-30	Sandy clay	14	26	-	
B-3	4-5	Very silty sandy caliche clay	10	12	7.2x10 ⁻⁸	
B-3	9-10	Clay	17	30	-	
B-3	14-15	Silty clay	14	25	8.5x10 ⁻¹⁰	
B-3	24-25	Sandy clay	14	26	5.7x10 ⁻⁹	
D-3	24-25	1987	12		0.7710	
Boring ID Depth (feet) Type of Material		Moisture Content (%)	Plasticity Index	Hydraulic Conductivity (k) (cm/sec)		
Boring-1	2-3	Very silty clay 8 13			-	
Boring-1	7-8	Very silty clay with limestone	11	12	8.6x10 ⁻⁸	
Boring-1	19-20	Very sitty clay	15	15		
Boring-1	24-25	Very silty clay	11	-	-	
Boring-1	34-35 39-40	Clay	16	37	=3	
Boring-2	0-1	Sandy clay	8	14	-	
Boring-2	19-20	Very silty clay	13	14	3.3x10 ⁻⁹	
Boring-2	24-25	Very silty clay	11	17	-	
Boring-2	29-30	Clay	11	-	-	
Boring-3	4-5	Very silty clay with limestone	5	13	-	
Boring-3	19-20	Very silty clay with limestone	17	-	-	
Boring-3	24-25 29-30	Silty clay with silty sand	11	-	-	
Boring-3	34-35 39-40	Clay	13	19	3.2x10 ⁻⁹	
Boring-4	2-3	Very silty clay	2	10	-	
Boring-4	7-8 9-10	Very silty clay and limestone	4	11	-	
Boring-4	14-15	Very silty clay	9	12	-	
Boring-4	19-20 24-25	Very silty clay with silty sand 10		14	-	
Boring-4	29-30	Clay 22			-	
Boring-4	34-35 39-40	1 Sandy clay 1 16 1 24 1 3 5 10^{-1}				

Table 2

3.0 PIEZOMETERS

Five piezometers were installed on-site under the supervision, and subsequent analysis, of TEAM Consultants, Inc. (TEAM). The installation of five piezometers (P-1, P-2, P-3, P-4, P-5) took place during TEAM's 1991 hydrogeologic field exploration to facilitate static water level observations over an extended period of time for the purpose of evaluating the depth to, and the hydraulic gradient of, the upper most aquifer within the site boundary. The TEAM hydrogeologic report was submitted to the City of Stephenville in January 1992 (Appendix A).

During the initial drilling of the five piezometers, which took place in April of 1991, "groundwater was not observed; however, water was indicated to be present in all the piezometers prior to drilling depth termination" (Appendix A – TEAMS Report). Recovered drilling samples were classified visually. Soil tests and hydraulic conductivity testing were not proposed or performed as part of the TEAM hydrogeologic field exploration.

The on-site placement of the piezometers included four boundary piezometers (P-1, P-2, P-4, P-5), and one piezometer located approximately at the center of the site (P-3) (Drawing 1). The piezometers were screened between elevations approximately 1427 and 1403 ft/msl (35 to 80 feet bgs) in strata generally described as silty sand or clayey sand. Five or ten-foot screens were utilized in the piezometers. Piezometer details are represented in Table 3; for a more detailed description of the materials encountered during drilling refer to Appendix A.

	1991 City of Stephenville Landfill Piezometers					
Piezometer ID	lithology					
P-1	Clay with sand	1452.1	10	1427.1 - 1417.1		
P-2	Sand with silt	1448.5	5	1413.5 - 1408.5		
P-3	Sand with silt	1481.3	5	1421.3 -1416.3		
P-4	Sand with silt	1483.4	5	1408.4 - 1403.4		
P-5	Sand with silt	1453.5	5	1408.5 - 1403.5		

Та	ble	3
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Water levels were taken at each piezometer from May 1991 through November 1991 with two water level events completed in July and none completed in October. Minute fluctuations in water levels were recorded during aforementioned six-month period. Recorded water level data from 1991 is included in Appendix A.

TEAM constructed two potentiometric surface maps (one which was revised and one which was submitted) both for September 1991 at the time of their exploration (both included in Appendix A); BME generated potentiometric surface maps in 2024 that are representative of each month with recorded water level data from 1991 (Drawings 7 through 13). TEAM's hydrogeologic report and BME's potentiometric surface maps indicate a site-specific down-gradient groundwater flow towards the west/northwest extending quasi-radially from up-gradient piezometer P-1 which is located on the east/southeast boundary of the site.

The on-site piezometers were also utilized for the testing of on-site groundwater quality. Groundwater sampling events took place in September 1991 and December 1991. The groundwater was analyzed for chemical constituents consistent with the 1991 Texas Department of Health parameters for Groups 3 and 4. For the full suite of chemical analysis of the on-site groundwater samples refer to Appendix A.

The five piezometers on-site were decommissioned and plugged in 1994 at the request of the City of Stephenville's 1994 Director of Utilities – Mr. Danny Johnson. The plugging of piezometers P-1 through P-5 were done in general accordance with the Texas Natural Resource and Conservation Commission requirements in 1994. Refer to Appendix A for plugging reports.

4.0 ON-SITE WATER WELLS

At present, no known water wells are located on-site at the City of Stephenville Landfill. Historic documents indicate that four water wells were potentially located on-site; however, applicable water well reports and drilling logs for the site provide ambiguous correlatability data for the water wells. A drilling log for "Well #25" dated September 1975 and described as "Water Well at City Landfill," was recovered during a City of Stephenville Landfill information search. The handwritten notes included on the log indicate a termination depth at or near 356 feet bgs, a static water level of nearly 290 feet bgs, and a 20 foot screen that started at 300 feet bgs. No precise location for this water well was included on the log. The location of this water well is presently unknown, and the current status of this water well is unknown. The depths and dates indicated on the drilling log do not correlate with other water well search data obtained (Appendix A).

A handwritten drilling log and equipment list dated October 1, 1975, and titled "Landfill Well," was located during a City of Stephenville Landfill information search. The termination depth of this water well was 372 feet bgs. Screened intervals were not indicated on the log. The location of this water well is presently unknown, and the current status of this water well is unknown. The depths and dates indicated on the drilling log do not correlate with other water well search data obtained (Appendix A).

One State of Texas Well Report, dated December 7, 1979, indicates that a water well owned by the City of Stephenville and located, "three miles west of Stephenville," could be, or could have been, present on the site. The termination depth of this water well was indicated to be 395 feet bgs. This water well could corelate to a State of Texas Plugging Report found during the same City of Stephenville information search. The termination depth, location description, and owner coincide with the plugging report for water well identified as "Landfill #2" (see discussion below and Appendix A).

Two State of Texas Plugging Reports, both dated September 1990, were located during a City of Stephenville Landfill information search. The reports indicate the water wells were owned by the City of Stephenville, were located, "three miles west of Stephenville," and were identified as "Landfill #1" and "Landfill #2." Water well Landfill #1 likely terminated at a depth of 358 feet bgs; water well Landfill #2 terminated at a depth of 395 feet bgs. The screened intervals of either water well were not indicated on the reports. The original water well drilling report for Landfill #2 could correlate to the one State of Texas Well Report discussed above. The original water well drilling report for Landfill #1 was not discovered. The depths and dates indicated on the Landfill #1 report do not correlate with other water well search data obtained (Appendix A).

5.0 REFERENCES

Southwestern Laboratories. (1986). SLER evaluation for City of Stephenville.

Southwestern Laboratories. (1987). SLER evaluation for City of Stephenville.

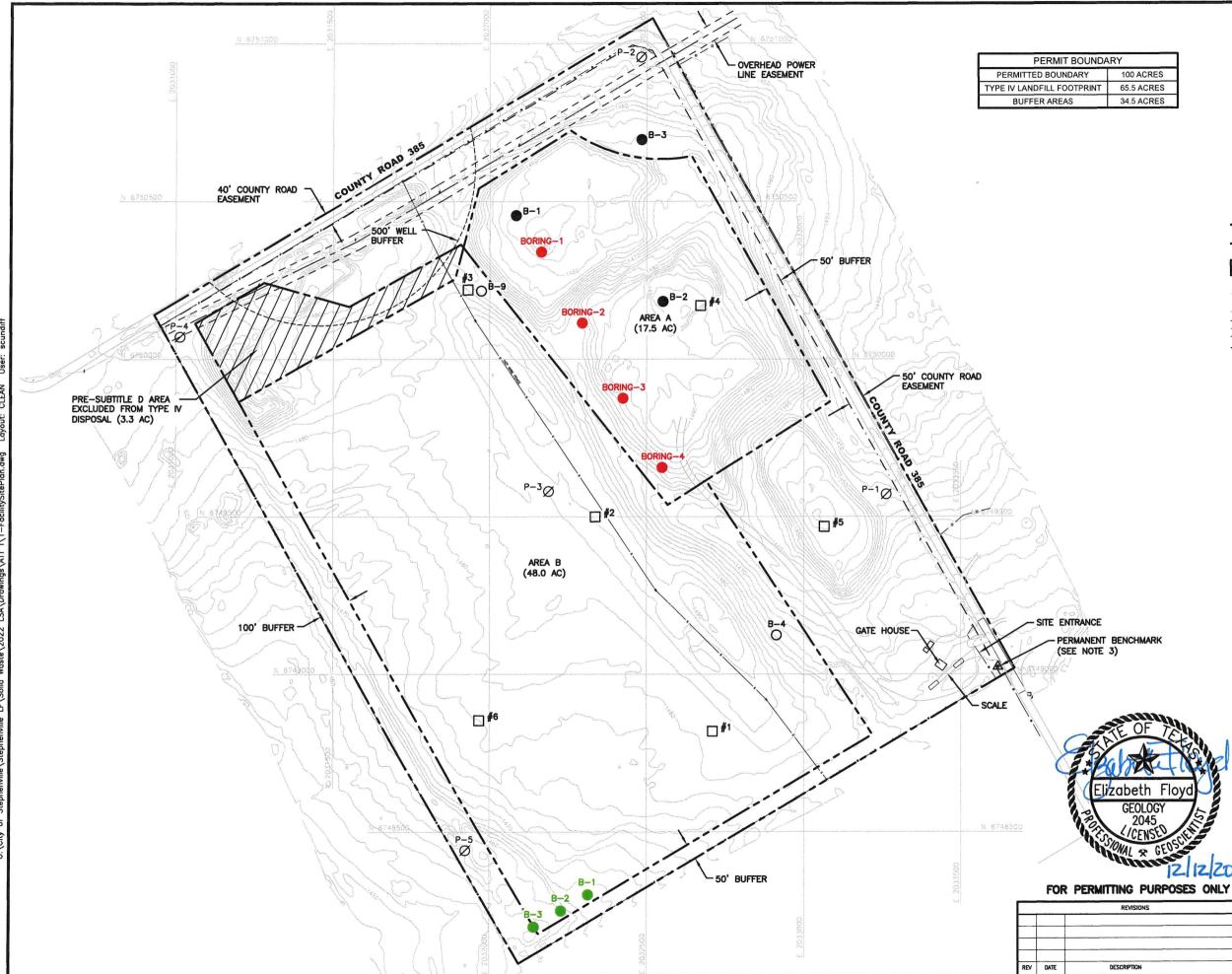
TEAM Consultants, Inc. (1990). Exploratory Sample Borings with Boring Log Numbers B-4 and B-9.

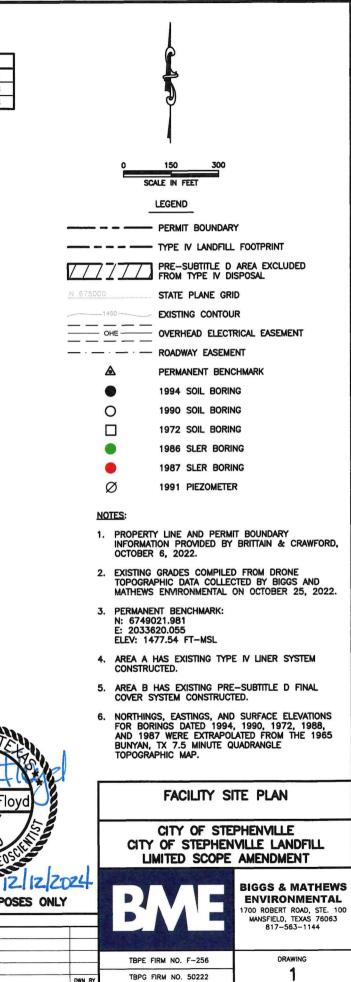
TEAM Consultants, Inc. (1992). (report for City of Stephenville). *Revised Preliminary Hydrogeologic Site Assessment.*

TEAM Consultants, Inc. (1994). Exploratory Sample Borings with Boring Log Numbers B-1 and B-3.

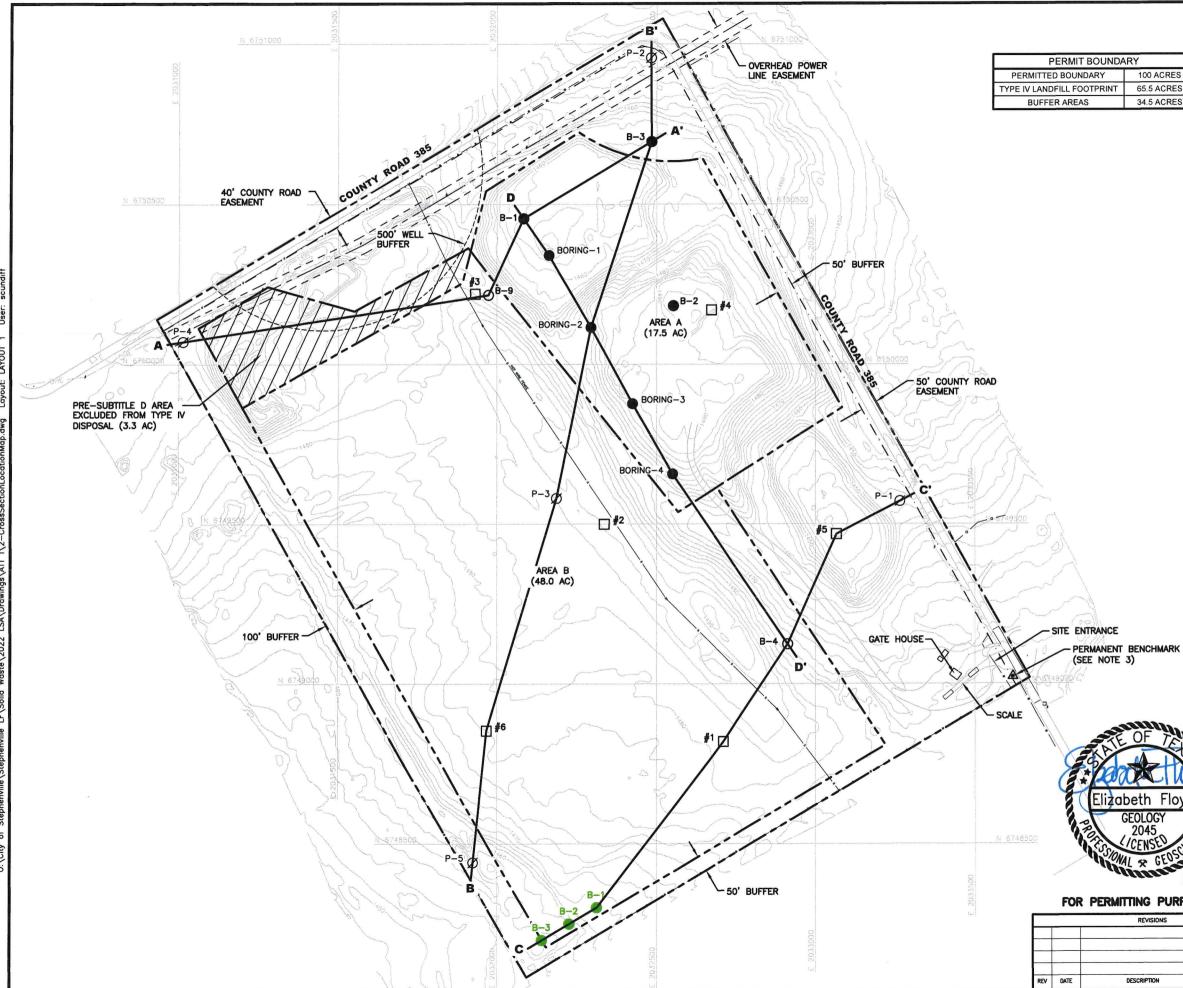
Texas Testing Laboratories. (1972). (reported to Homer A. Hunter Associates). *Surface Investigation*.

DRAWINGS

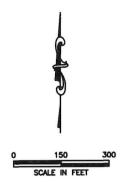




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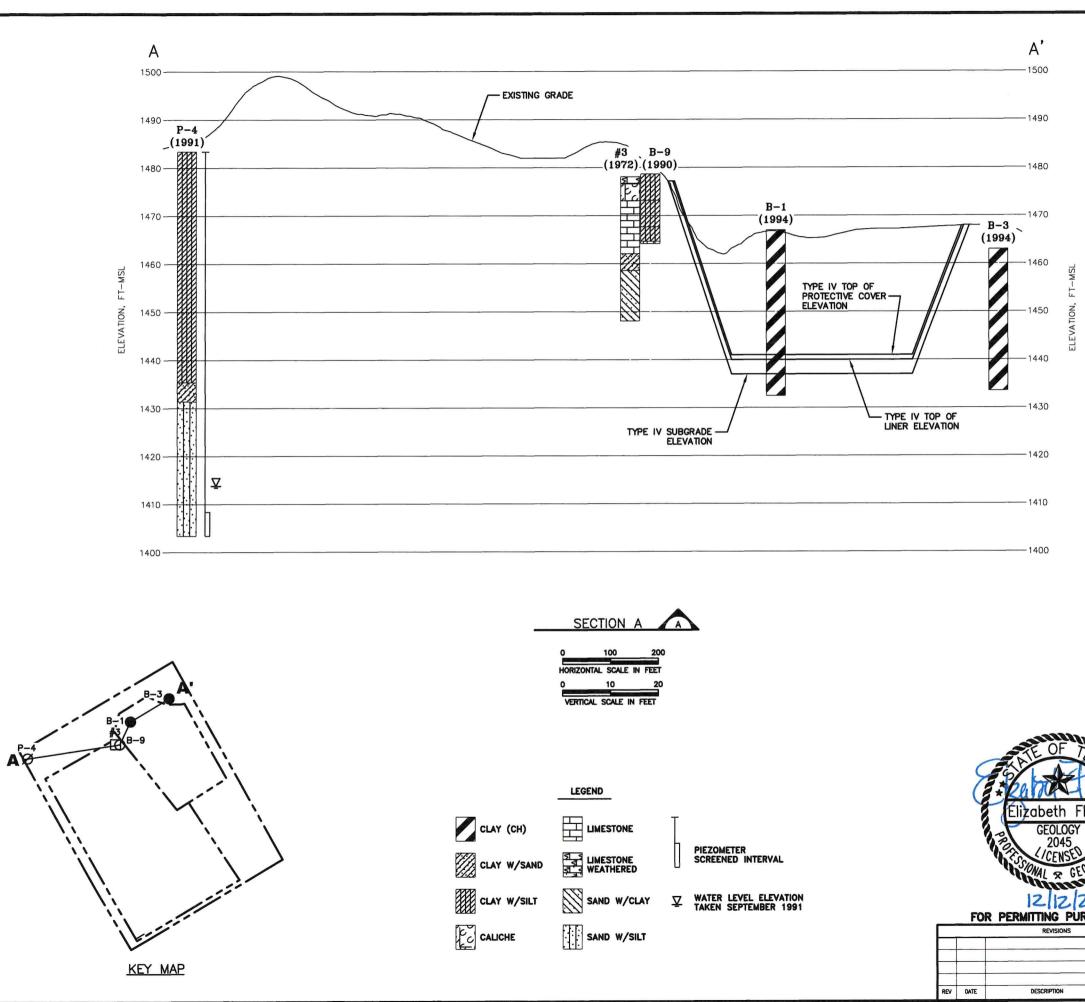


	PERMIT BOUNDARY
	TYPE IV LANDFILL FOOTPRINT
	PRE-SUBTITLE D AREA EXCLUDED FROM TYPE IV DISPOSAL
N 675000	STATE PLANE GRID
1490	EXISTING CONTOUR
	OVERHEAD ELECTRICAL EASEMENT
	ROADWAY EASEMENT
۸	PERMANENT BENCHMARK
•	1994 SOIL BORING
0	1990 SOIL BORING
	1972 SOIL BORING
٠	1986 SLER BORING
۲	1987 SLER BORING
Ø	1991 PIEZOMETER

NOTES:

- 1. PROPERTY LINE AND PERMIT BOUNDARY INFORMATION PROVIDED BY BRITTAIN & CRAWFORD, OCTOBER 6, 2022.
- 2. EXISTING GRADES COMPILED FROM DRONE TOPOGRAPHIC DATA COLLECTED BY BIGGS AND MATHEWS ENVIRONMENTAL ON OCTOBER 25, 2022.
- 3. PERMANENT BENCHMARK: N: 6749021.981 E: 2033620.055 ELEV: 1477.54 FT-MSL
- 4. ELEVATION OF DEEPEST EXCAVATION = 1437 FT-MSL.
- 5. NORTHINGS, EASTINGS, AND SURFACE ELEVATIONS FOR

	WERE	NGS DATED 1994, 1990, 19 E EXTRAPOLATED FROM THE MINUTE QUADRANGLE TOPOGI	1965 BUNYAN, TX
h Floyd		CROSS SECTION	LOCATION MAP
45 NSED CHURCH		CITY OF STEPHENVILLE CITY OF STEPHENVILLE LANDFILL LIMITED SCOPE AMENDMENT	
G PURPOSES ONLY		RMF	BIGGS & MATHEWS ENVIRONMENTAL 1700 ROBERT ROAD, STE. 100
EVISIONS		<u>EM3</u>	MANSFIELD, TEXAS 76063 817-563-1144
		TBPE FIRM NO. F-256	DRAWING
IPTION	DWN BY	TBPG FIRM NO. 50222	2



NOTE:

- 1. EXISTING GRADES COMPILED FROM DRONE TOPOGRAPHIC DATA COLLECTED BY BIGGS AND MATHEWS ENVIRONMENTAL ON OCTOBER 25, 2022.
- 2. NORTHINGS, EASTINGS, AND SURFACE ELEVATIONS FOR BORINGS DATED 1994, 1990, 1972, 1988, AND 1987 WERE EXTRAPOLATED FROM THE 1965 BUNYAN, TX 7.5 MINUTE QUADRANGLE TOPOGRAPHIC MAP.

CROSS SECTION A

CITY OF STEPHENVILLE CITY OF STEPHENVILLE LANDFILL LIMITED SCOPE AMENDMENT

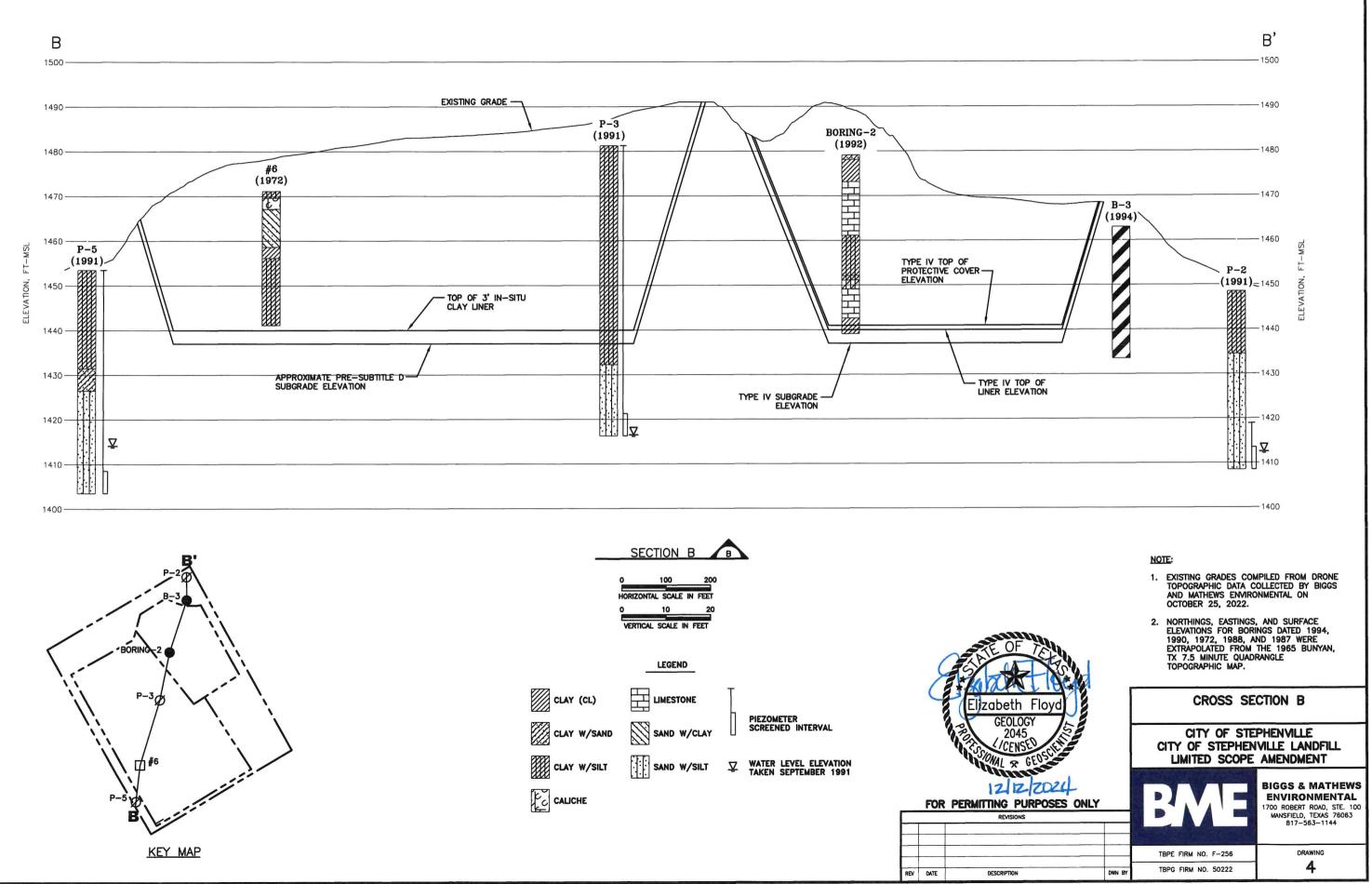


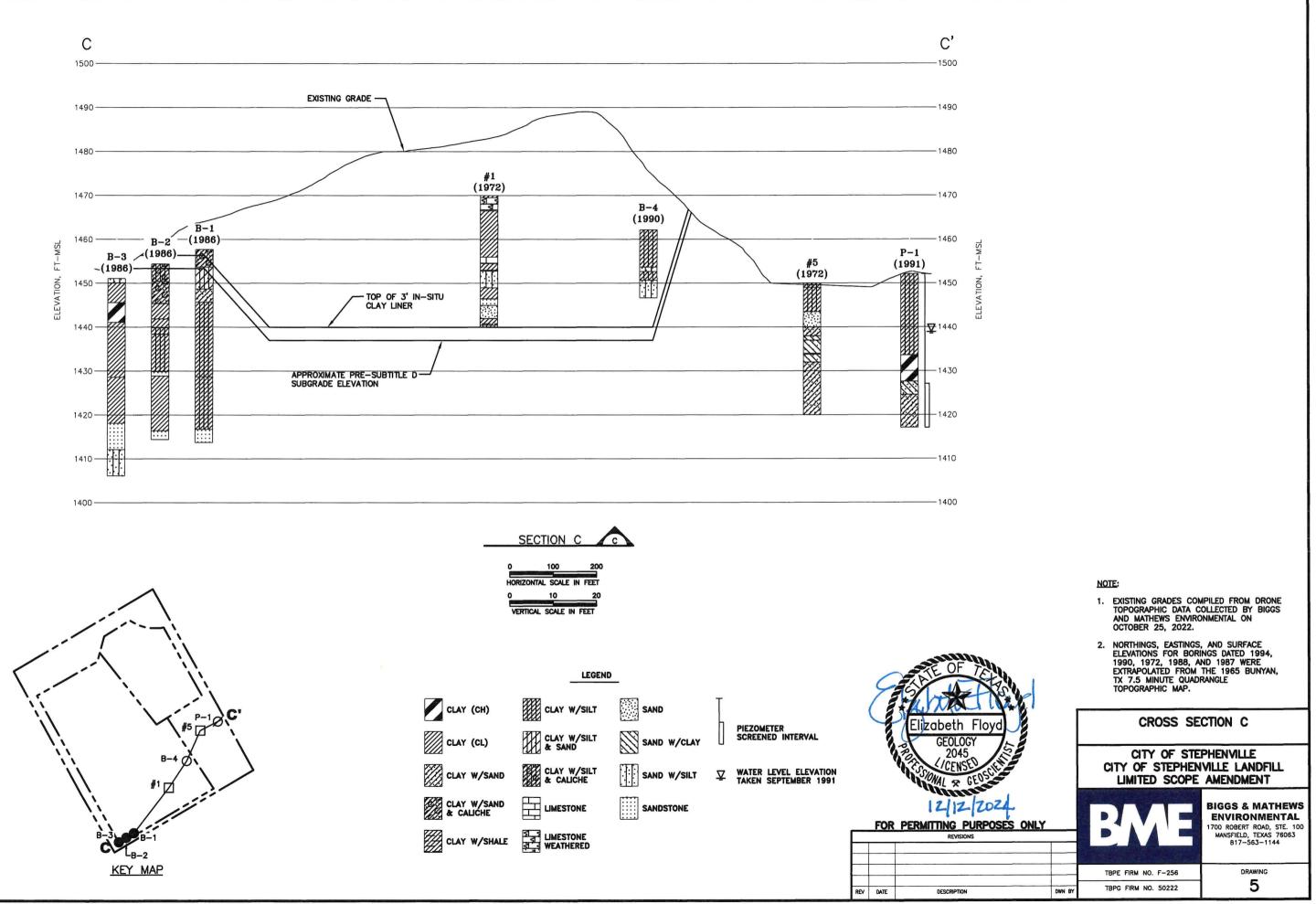
TBPG FIRM NO. 50222

1700 ROBERT ROAD, STE. 100 MANSFIELD, TEXAS 76063 817-563-1144

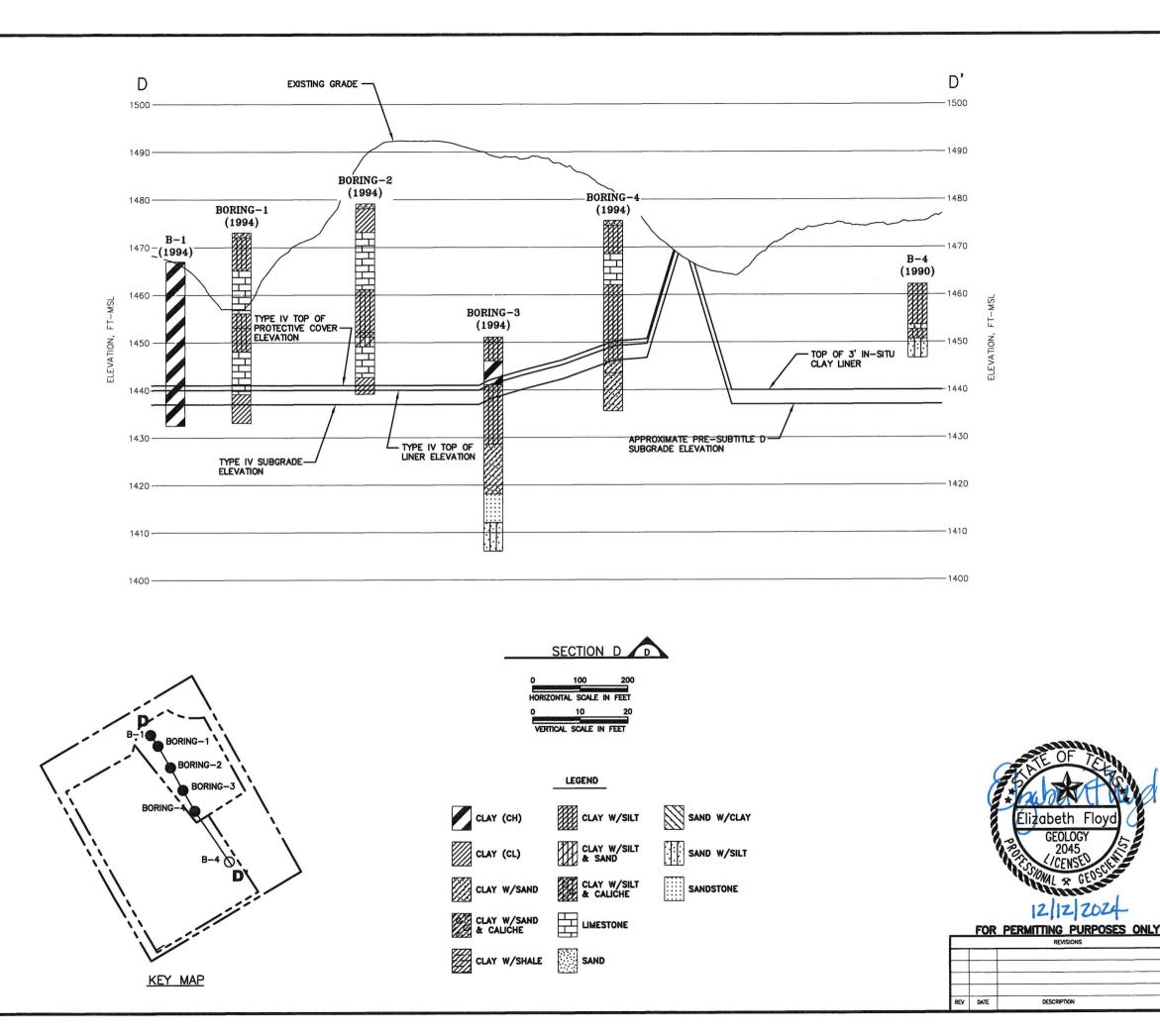
DRAWING 3

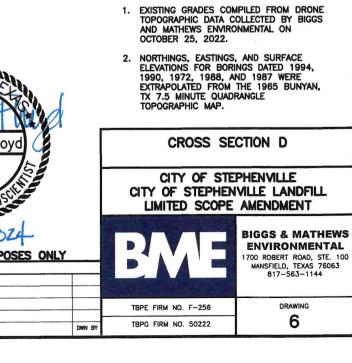
Elizabeth Floy GEOLOGY 2045 /CENS ONAL & GE Concerne 12/12/2024 FOR PERMITTING PURPOSES ONLY REVISIONS OWN BY



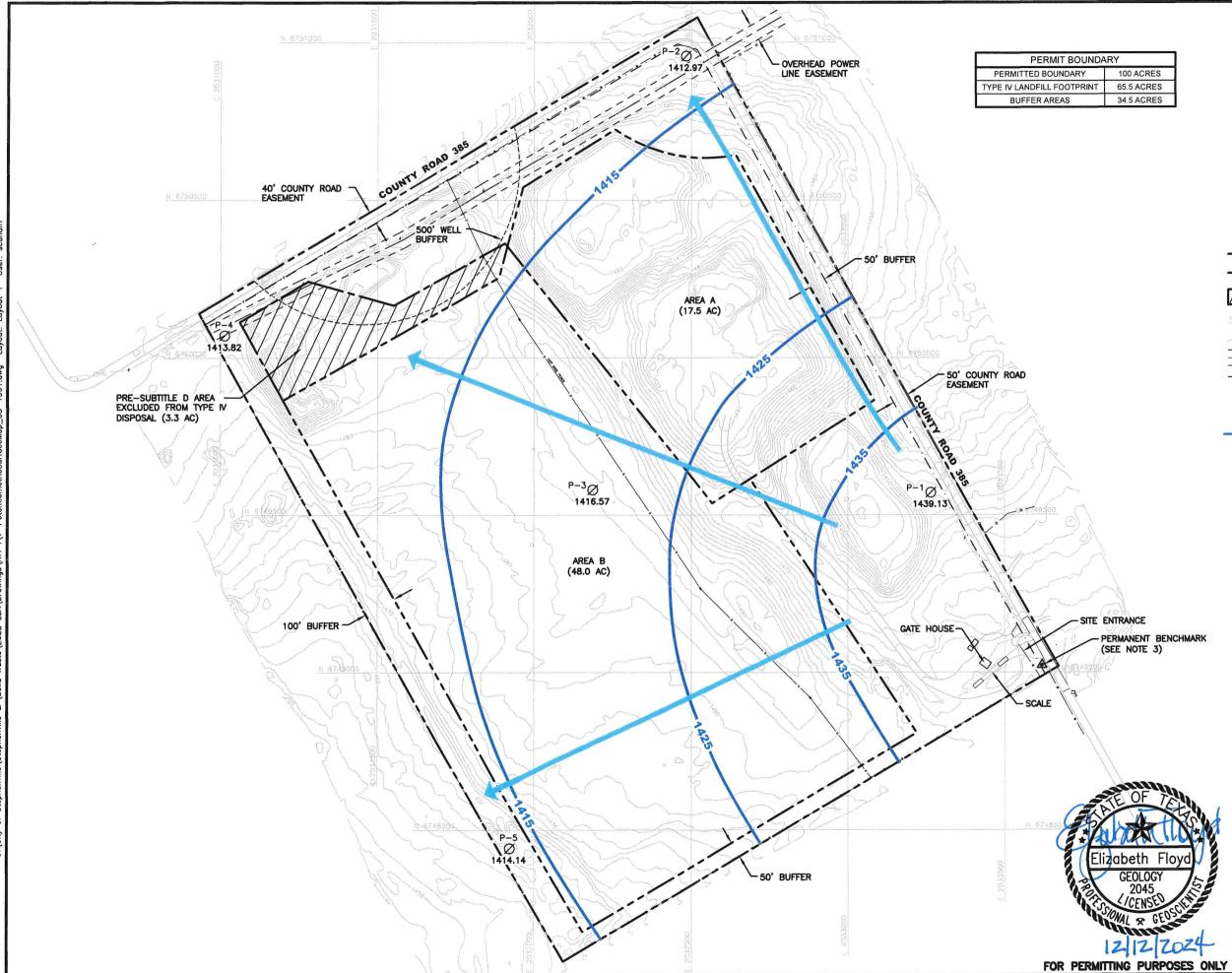


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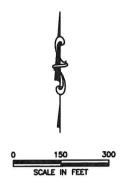




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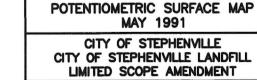
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	PERMIT BOUNDARY
	TYPE IV LANDFILL FOOTPRINT
ZZ 7 ZZ	PRE-SUBTITLE D AREA EXCLUDED FROM TYPE IV DISPOSAL
N 675000	STATE PLANE GRID
1490	EXISTING CONTOUR
OHE	OVERHEAD ELECTRICAL EASEMENT
	ROADWAY EASEMENT
	PERMANENT BENCHMARK
Ø	1991 PIEZOMETER
	CONTOURS OF POTENTIOMETRIC SURFACE (10' CONTOUR)
\rightarrow	APPARENT DIRECTION OF GROUNDWATER FLOW
1439.13	WATER LEVEL ELEVATION (FEET ABOVE MEAN SEA LEVEL)

NOTES:

- 1. PROPERTY LINE AND PERMIT BOUNDARY INFORMATION PROVIDED BY BRITTAIN & CRAWFORD, OCTOBER 6, 2022.
- 2. EXISTING GRADES COMPILED FROM DRONE TOPOGRAPHIC DATA COLLECTED BY BIGGS AND MATHEWS ENVIRONMENTAL ON OCTOBER 25, 2022.
- 3. PERMANENT BENCHMARK: N: 6749021.981 E: 2033620.055 ELEV: 1477.54 FT-MSL
- 4. AREA A HAS EXISTING TYPE IV LINER SYSTEM CONSTRUCTED.
- 5. AREA B HAS EXISTING PRE-SUBTITLE D FINAL COVER SYSTEM CONSTRUCTED.
- 6. PIEZOMETERS WERE INSTALLED IN 1991 AND THEN DECOMMISSIONED AND PLUGGED IN 1994.



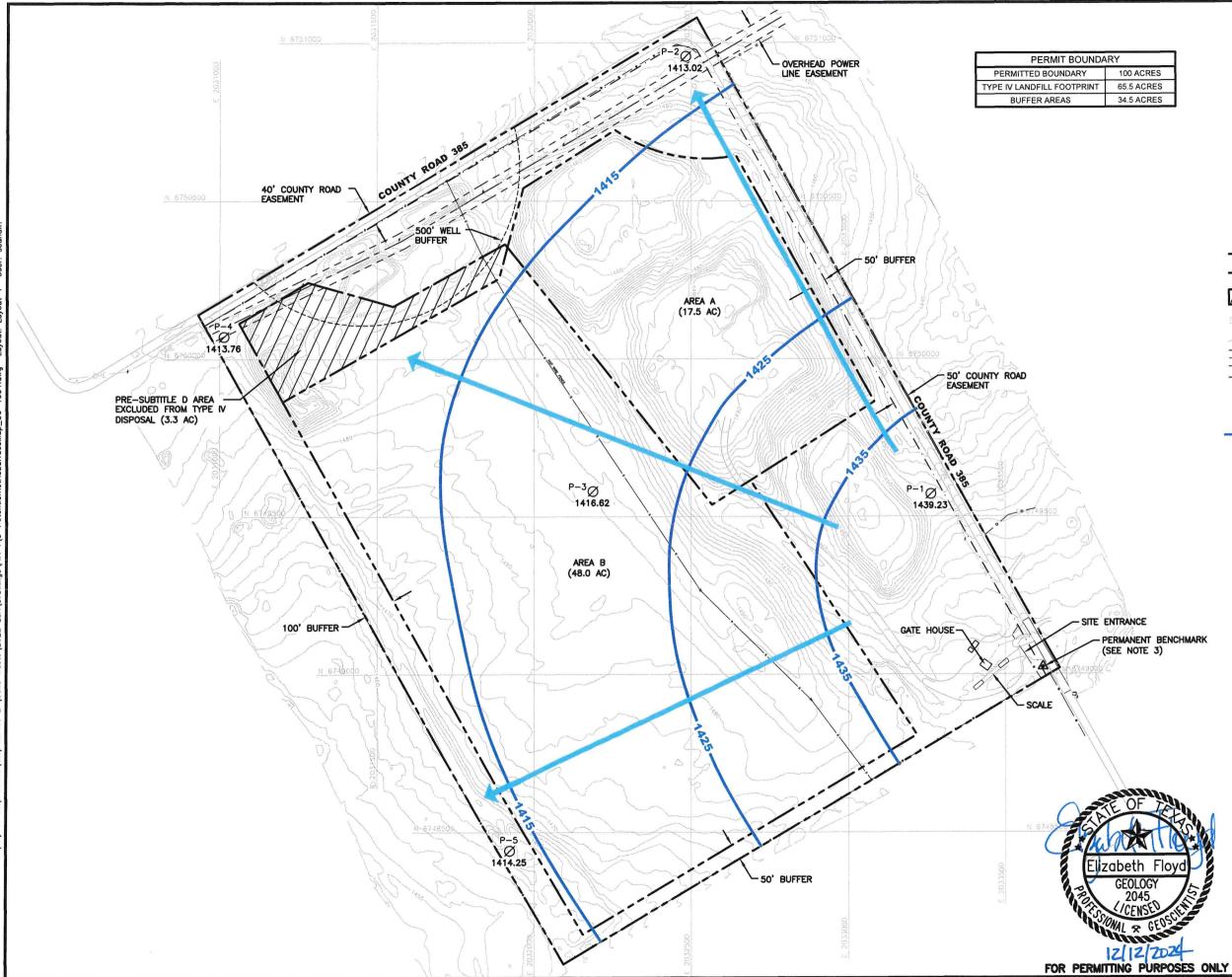


TBPG FIRM NO. 50222

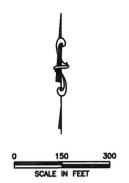
CITY OF STEPHENVILLE

BIGGS & MATHEWS ENVIRONMENTAL 1700 ROBERT ROAD, STE. 100 MANSFIELD, TEXAS 76063 817-563-1144

DRAWING 7



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-	
	PERMIT BOUNDARY
	TYPE IV LANDFILL FOOTPRINT
	PRE-SUBTITLE D AREA EXCLUDED FROM TYPE IV DISPOSAL
N 675000	STATE PLANE GRID
1490	EXISTING CONTOUR
	OVERHEAD ELECTRICAL EASEMENT
_ · _ · _ · _	ROADWAY EASEMENT
	PERMANENT BENCHMARK
Ø	1991 PIEZOMETER
<u> </u>	CONTOURS OF POTENTIOMETRIC SURFACE (10' CONTOUR)
\rightarrow	APPARENT DIRECTION OF GROUNDWATER FLOW
1430.23	WATER LEVEL ELEVATION

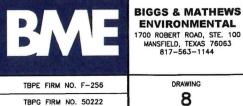
WATER LEVEL ELEVATION (FEET ABOVE MEAN SEA LEVEL) 1439.23

NOTES:

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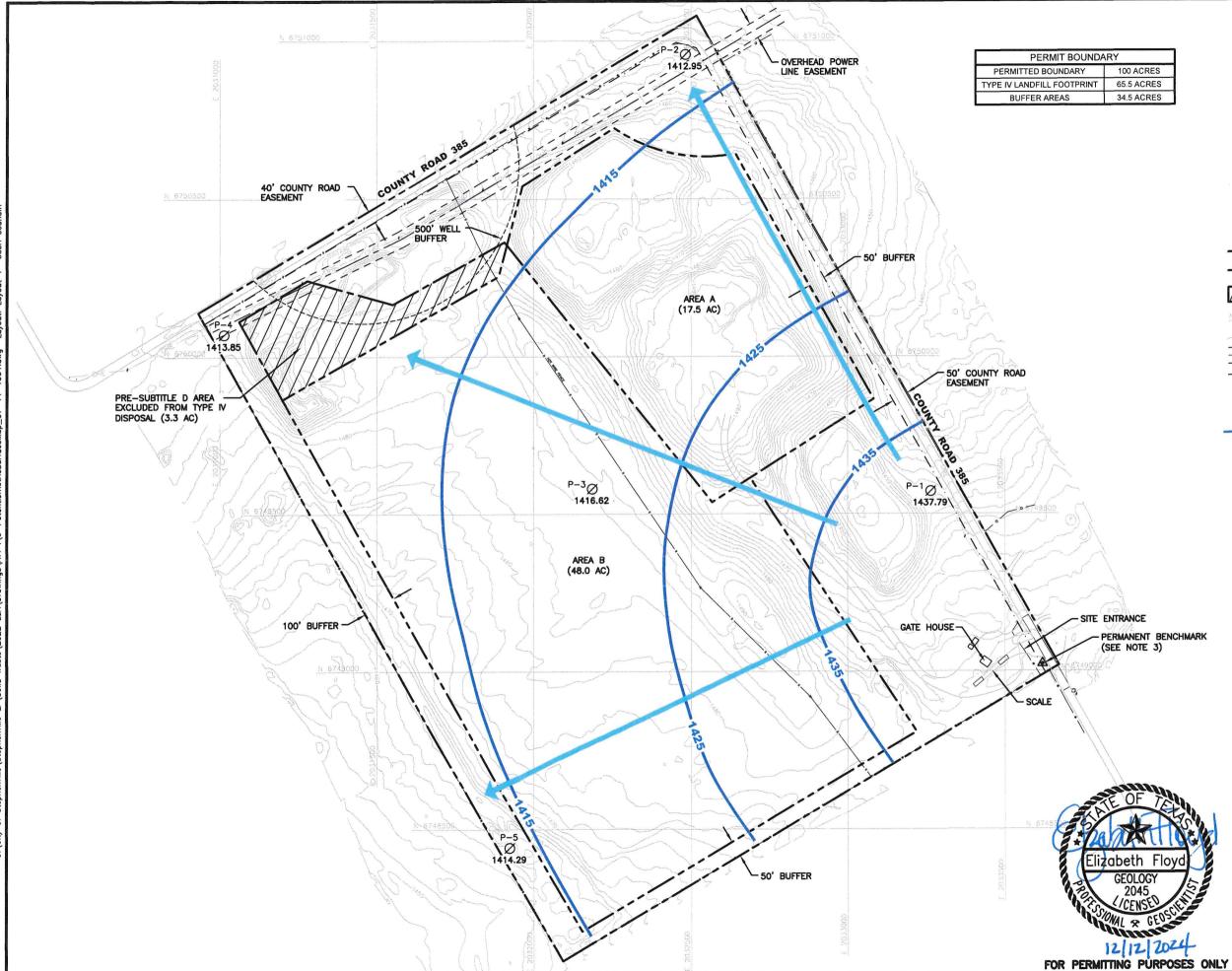


CITY OF STEPHENVILLE LANDFILL LIMITED SCOPE AMENDMENT

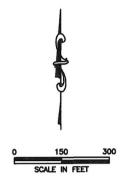


DRAWING

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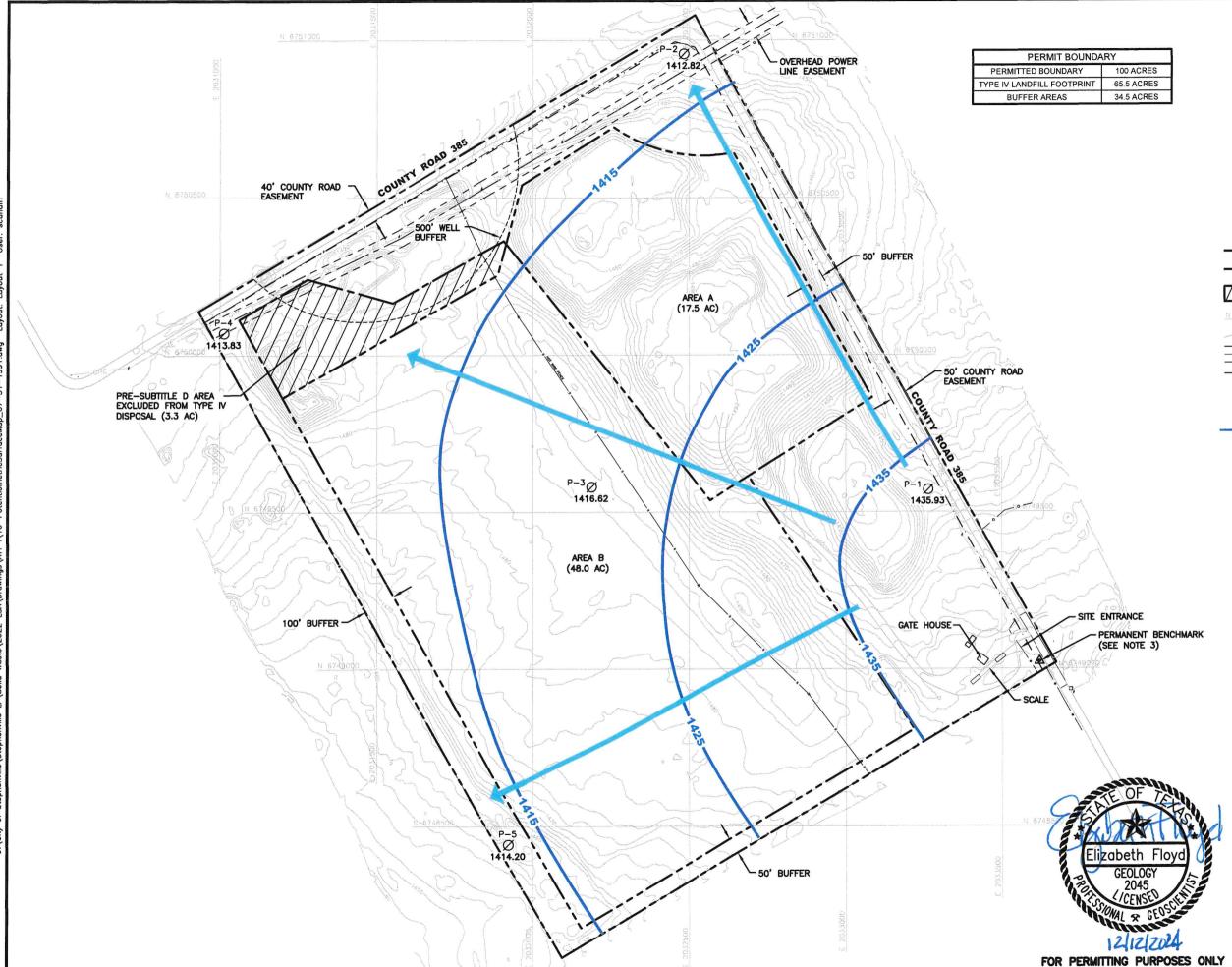


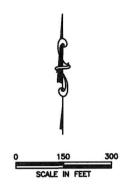
	PERMIT BOUNDARY
	TYPE IV LANDFILL FOOTPRINT
ZZZ 7 ZZZ	PRE-SUBTITLE D AREA EXCLUDED FROM TYPE IV DISPOSAL
N 675000	STATE PLANE GRID
1490	EXISTING CONTOUR
	OVERHEAD ELECTRICAL EASEMENT
	ROADWAY EASEMENT
	PERMANENT BENCHMARK
Ø	1991 PIEZOMETER
	CONTOURS OF POTENTIOMETRIC SURFACE (10' CONTOUR)
\rightarrow	APPARENT DIRECTION OF GROUNDWATER FLOW
1437.79	WATER LEVEL ELEVATION (FEET ABOVE MEAN SEA LEVEL)

NOTES:

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	PERMIT BOUNDARY
	TYPE IV LANDFILL FOOTPRINT
ZZZ 7 ZZZ.	PRE-SUBTITLE D AREA EXCLUDED FROM TYPE IV DISPOSAL
N 675000	STATE PLANE GRID
1490	EXISTING CONTOUR
	OVERHEAD ELECTRICAL EASEMENT
_ · _ · _ · _	ROADWAY EASEMENT
۸	PERMANENT BENCHMARK
Ø	1991 PIEZOMETER
	CONTOURS OF POTENTIOMETRIC SURFACE (10' CONTOUR)
\rightarrow	APPARENT DIRECTION OF GROUNDWATER FLOW
1435.93	WATER LEVEL ELEVATION

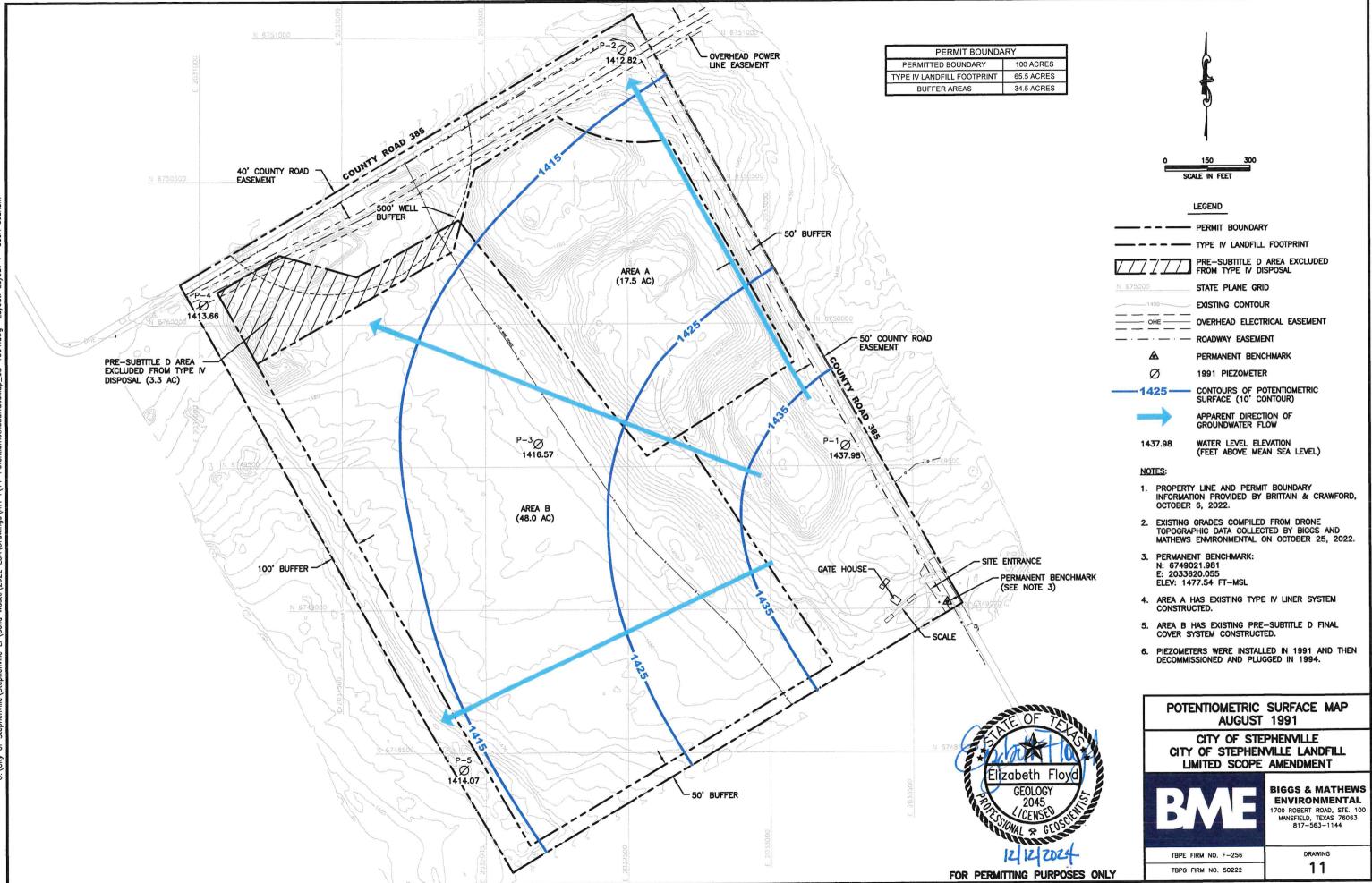
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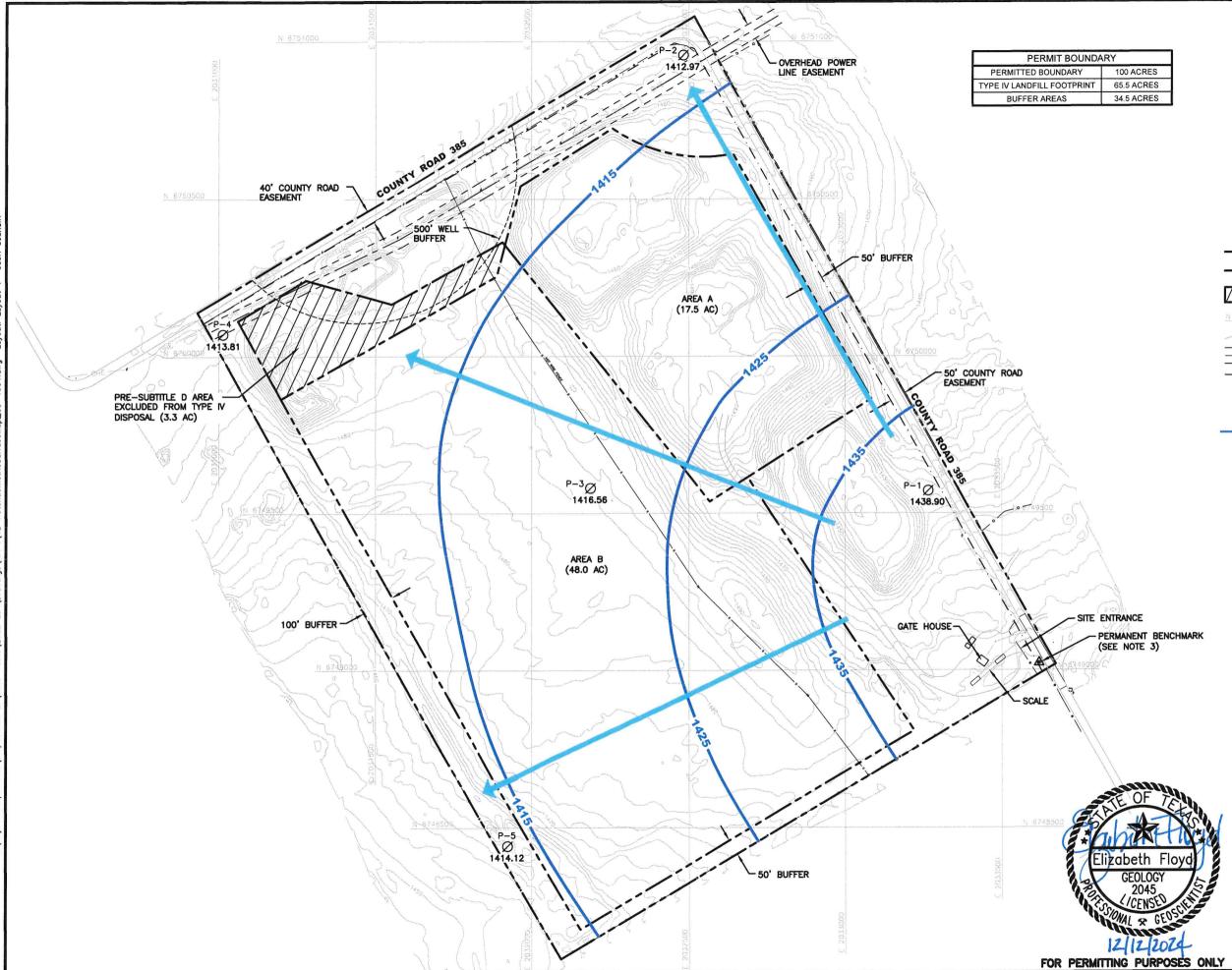
1. PROPERTY LINE AND PERMIT BOUNDARY INFORMATION PROVIDED BY BRITTAIN & CRAWFORD, OCTOBER 6, 2022.

(FEET ABOVE MEAN SEA LEVEL)

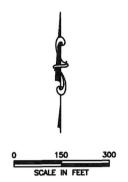
- 2. EXISTING GRADES COMPILED FROM DRONE TOPOGRAPHIC DATA COLLECTED BY BIGGS AND MATHEWS ENVIRONMENTAL ON OCTOBER 25, 2022.
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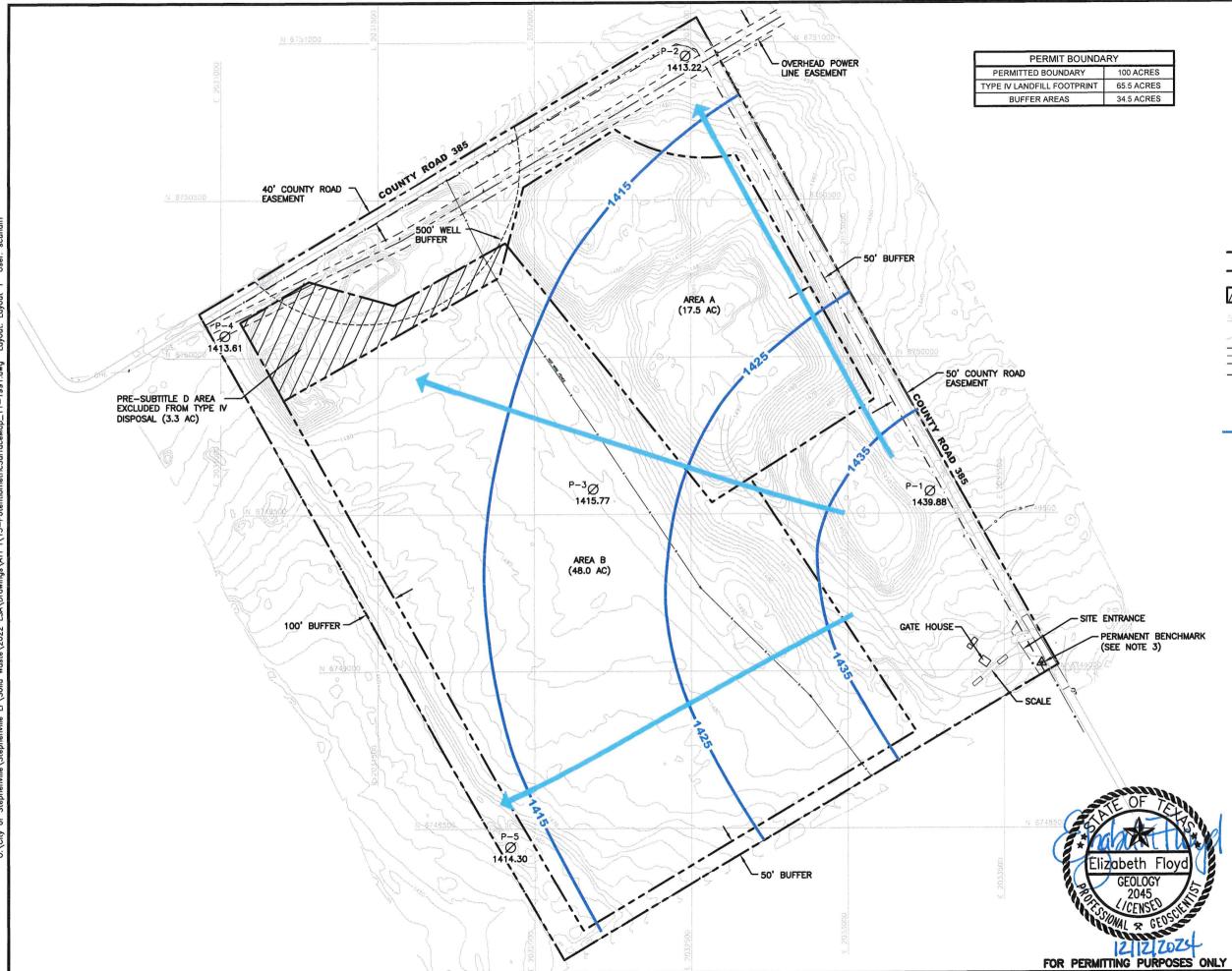


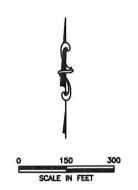
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	PERMIT BOUNDARY
	TYPE IV LANDFILL FOOTPRINT
ZZZ 7 ZZZ	PRE-SUBTITLE D AREA EXCLUDED FROM TYPE IV DISPOSAL
N 675000	STATE PLANE GRID
1490	EXISTING CONTOUR
	OVERHEAD ELECTRICAL EASEMENT
	ROADWAY EASEMENT
A	PERMANENT BENCHMARK
Ø	1991 PIEZOMETER
	CONTOURS OF POTENTIOMETRIC SURFACE (10' CONTOUR)
\rightarrow	APPARENT DIRECTION OF GROUNDWATER FLOW
1438.90	WATER LEVEL ELEVATION (FEET ABOVE MEAN SEA LEVEL)

NOTES:

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-	LEGEND
	PERMIT BOUNDARY
	TYPE IV LANDFILL FOOTPRINT
	PRE-SUBTITLE D AREA EXCLUDED FROM TYPE IV DISPOSAL
N 675000	STATE PLANE GRID
1490	EXISTING CONTOUR
	OVERHEAD ELECTRICAL EASEMENT
	ROADWAY EASEMENT
	PERMANENT BENCHMARK
Ø	1991 PIEZOMETER
	CONTOURS OF POTENTIOMETRIC

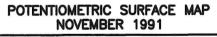
SURFACE (10' CONTOUR)

APPARENT DIRECTION OF GROUNDWATER FLOW

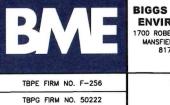
WATER LEVEL ELEVATION (FEET ABOVE MEAN SEA LEVEL) 1439.88

NOTES:

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CITY OF STEPHENVILLE CITY OF STEPHENVILLE LANDFILL LIMITED SCOPE AMENDMENT



BIGGS & MATHEWS ENVIRONMENTAL 1700 ROBERT ROAD, STE. 100 MANSFIELD, TEXAS 76063 817-563-1144

> DRAWING 13

APPENDIX A Historic Documents

TERAS TESTING LADORATORIES

SUBSURFACE INVESTIGATION

For

SANITARY LANDFILL SITES WEST OF STEPHENVILLE, TEXAS AND NORTH OF STEPHENVILLE

Report to

HOMER A. HUNTER ASSOCIATES DALLAS, TEXAS

By

TEXAS TESTING LABORATORIES, INC. DALLAS, TEXAS

T.T.L. Job No. 72.1166

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November 29, 1972

TERAS TESTING LABORATOMES

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INTRODUCTION

On November 9 and 10, 1972, Texas Testing Laboratories drilled exploratory test borings on two separate tracts of land that were to be considered for locating a sanitary landfill for the City of Stephenville, Texas.

The site that was drilled on November 9, was located approximately 10 miles west of downtown Stephenville, and north of U.S. 377. This tract was about 100 acres in area, and six test borings were drilled to evaluate the site for potential use as a sanitary landfill.

A tract of land adjoining the present sanitary landfill site on the _east, was also investigated. This property was judged to be not acceptable after the first two borings, and no further testing of the site or the soil samples was warranted.

No test borings drawing is included in this report, since no plot of tracts of land were available. The test boring locations can be located an a map or drawing, if it becomes necessary to more closely define the investigation.

EXPLORATION

Six test borings were drilled at the western site using a continuous flight, hollow stem auger operated from a truck mounted rotary drill. Two

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test borings were drilled at the east site, adjoining the present landfill.

Samples of the subsurface soils were obtained either with a thin wall Shelby tube sampler or auger cuttings were taken for soil identification and classification. Some soils were too dry and friable to be sampled in an undisturbed manner using the thin wall Shelby tube.

Each sample was sealed in a polyethelene bag to retain the in-situ moisture condition, and packed in a protective wooden box for transporting to the Dallas soils laboratory.

LABORATORY TESTING

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Each soil sample was visually inspected by an experienced soils technician, and classified according to the Unified Soils Classification System.

Undisturbed soil samples were trimmed, measured, and weighed to determine in-place density and moisture content.

Representative samples of each soil type encountered in the drilling of the test borings were tested for Atterberg Limit values.

Since the primary thrust of the investigation was to locate and test those soils that were generally impermeable to the passage of water, samples were selected for the permeability test that appeared to be sufficiently im-

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permeable and near the ground surface. A constant head apparatus was used, and a head pressure of 23.1 feet (10 psi) was applied to the soil sample in the Harvard compaction mold.

SUMMARY

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Permeability tests conducted on the soil samples showed the following results:

Boring	Depth feet	Description	Closs.	Plasticity Index	Permeability cm/sec	Duration of test
1 2 3 4 5	16 10 17 11 16.5 6	Tan sandy clay Orange & grey sandy clay Orange & grey sandy clay Purple clay Light grey sandy clay Tan caliche	CL CL CH CL	24 21 27 41 13 17	2.33x10 ⁻⁹ Less than 1x10 ⁻⁷ Less than 1x10 ⁻⁷ 2.3x10 ⁻⁹ 1.2x10 ⁻⁷ 2.84x10 ⁻⁷	54 hours 54 hours 54 hours 72 hours 48 hours 24 hours

The description of the permeability test results as being "less than 1×10^{-7} centimeters per second", is based on experience with other soil samples subjected to less head pressure and showing passage of water through the sample in less time than 48 hours. These samples were not fully saturated after the test period, and this in itself, indicates very little permeability. A week or two would be required to determine true permeability, and it would be in the range of 1×10^{-10} cm/sec.

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There is a sufficient quantity of impervious soil available at this site to adequately seal the landfill operation from passage of water into the surrounding subsurface.

Respectfully submitted:

C . d

C. Darrow Hooper, P.E. Foundation Engineer Texas 18137

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RECOMMENDATIONS

Referring to the logs of borings and the results of laboratory investigation, it can be seen that adequate impervious material is available to place refuse material upon.

It is recommended that operations begin in the Western portion of the property in the vicinity of boring No. 6. Excavation should be carried to the light grey clay which has a very low permeability. This would require a minimum of twelve feet of excavation. Operations could continue along the western half of the property excavating into the described grey or purple clay.

When operations were completed in the Western portion of the property, the Eastern half could be utilized. A light grey clay was found in both borings 4 and 5 which would be excellent material to base the landfill upon. Excavation should be carried into this grey clay or `into the purple clay found in boring No. 4

The North 500 feet of the property should not be utilized due to the well located North of the property and also the possibility of

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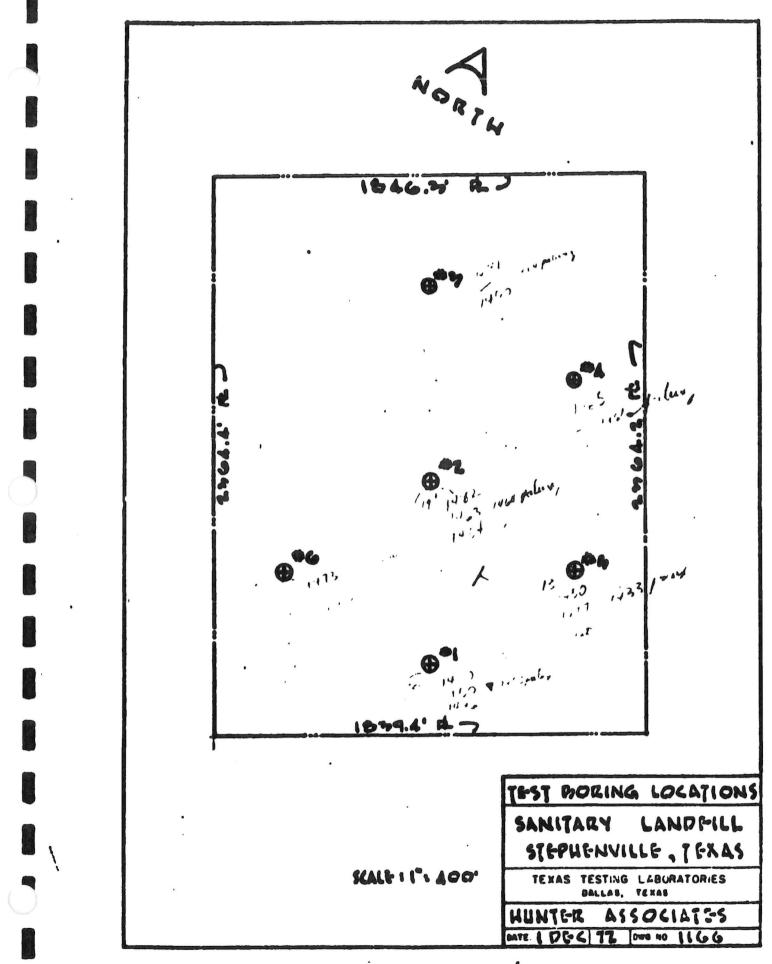
CONSULTING

some hard rock in the area. Rock was also encountered in boring No. 1 and 2 along the center of the property.

It is felt that a portion of the center of the property could be utilized particularly around boring No. 1. If excavation was less than 20 feet in the area of boring No. 2 it might be necessary to use some of the clay material from other areas to line the bottom of the excavation to insure 3 feet of impervious material. Adequate clay is available on site to do this if necessary.

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Hunter Appoelates



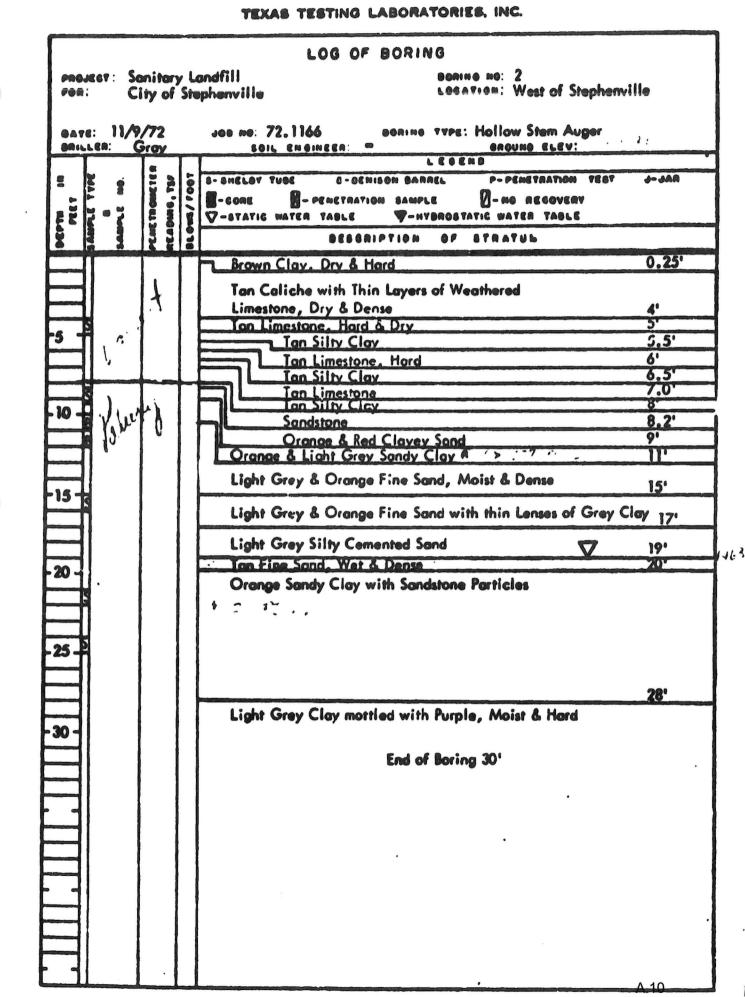
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<u> </u>					LOG OF BORING	
P80J P88 :					phenville LOG OF BORING NO: 1 sphenville LOCATION: West of Stephenvil	lle
DAT		11/9/ : G	72 ray		JOB NO: 72.1166 BORING TYPE: Hollow Stem Auger SOIL ENGINEER:	
a 100 100	3447 3.	.C 80.	PENETROMETER READING, TSF	OW5 / F00T	S- SHELBY TUBE D-DENISON BARAEL P-PENETAATION TEST GORE - PENETRATION SAMPLE - NO RECOVERY V-STATIC WITER TABLE - NVDROSTATIC WATER TABLE	d= JAR
0CPTH PCC7	AWA.	ANDE	ENET	I OW	DESCRIPTION OF STRATUS	
	ř.	4	le e	-	Brown Clay, Dry & Hard	0.5'
					Weathered Tan Limestone & Caliche, Dry & Hard	3.5'
-5 -	162		4.5+		Orange & Light Grey Clay with Calcareous Particles, Dry & Hard and Thin Layers of Hard Tan Limestone	
- 10 -		11 (1	ut			
	V	/`				14"
-15-					Tan Limestone, Hard	15.5
	L				Orange Clay, Moist & Stiff Thin Layer of Ian Limestone	17'2"
- 20 -		Palu	an.		Grey Silty Sand with Thin Layers of Red & Light Grey Clay, Moist & Hard	21'
		1.	4.5+			22.5
	S		4.5+		Grey Clay, Dry & Hard	23.5
	ł				Grey Sandstone, Dry & Medium Hardness	25'
- 25-	-				Grey Fine Sand with Sandstone Particles, Moist & Dense	28'
\square					Grey Shaley Clay with Thin Lenses of Light Grey Sacd, Dry	
- 30 -	S		4.5+		Grey Sandstone, Hard	
					End of Boring 30'	
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PR0.	RGI	r: Sa	nitary	Le	LOG OF BORING andfill becation: West of Stephenville	
POR		Ci	ty of	Ste	phenvino	
047	C:	11./9	5.5.		JOB NO: 72.1166 BORING TYPE: Hollow Stem Auger BOIL ENGINEER: - BROUND ELEV: 1-44	
	2477 3.	1	PEMETROMETER READING, TSF	1002/SM0	S-SHELDY TUBE D-DENISON BARREL P-PENETRATION TEST J-JAR D-CORE D-PENETRATION SAMPLE D-NO RECOVERY V-STATIC WATER TABLE V-HYDROSTATIC WATER TABLE	
11430 11430	SAMP	SAMPLE	PEME	1010	DESCRIPTION OF STRATUS	
	Π				Weathered Limestone with Brown Clay 1.5'	-
					Tan & White Caliche, Dry & Hard 5'	
-5 -					Tan Limestone Layers (1"-3"), Hord & Soft	
- 10 -		, al	t.		(Harder Layers @ 11')	
-15-		1, av				
-13-	╟			\vdash	16'	-
		. 1	1		Orange & Light Grey Sandy Clay, Moist & Hard	
- 20 -		W	M	ľ	Light Grey & Orange Clayey Sand, Moist & Hard (4.2/5' 11 13	
E		1º				
-25-	ĥ				· .	
- 30 -	5				End of Boring 30'	
						•
-	1					
					32	

				TEXAS TESTING LABORATORIES, INC.	
				LOG OF BORING	
PROJECT : POR :					
	City	or	316	phenville LOCATION: West of Stephenv	1110
DATE: 11, BRILLER:	/9/72 Grav	2			1
TYPE	TEA	3	5	L S & E N D S- SMELDY TUDE D-DENISON BARREL P-PENETRATION TEST	AAL-L
	PENE TRONE TE	READIMA, TSF	WS/ 7007	- CORE - PENETRATION SAMPLE - NO RECOVERY	
DEPTH PTC SAURLE SAURLE	E	ADI	No.		
<u>5 8 8</u>	18	ac	a,	DEBERIPTION OF BTRATUL	
				Brown Sandy Clay, Moist & Hard	1.5'
s	I			Tan & Orange Silty Clay with Calcareous Pockets	
5 -5				(Caliche)	E E1
					5.5'
		H		Orange & Light Grey Silty Clay, Moist	
	m				10'
0-1					10.
P				Purple Clay, Moist & Hard	
		4	_	1,2.7.13 1 1.	14.
5 - 5	1.				
		6		Tan, White, Orange & Purple Clayey Sand, Dry & Dense	
0-1	1				
コ			ł		
		1	ł		
5-				10 11 57 18'	•
3			ľ	Light Grey Sandy Clay, Moist & Hard	<u>26'</u> 28'
3			Γ	Light Grey Clayey Sand, Moist & Dense	
11				•	
				End of Boring 30'	
-11					
11					
	4				

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TEXAS TESTING LABORATORIES, INC.

		يو من مرتبع		LOG OF BORING	
PROJ	iegy: Sa Ci	ity of	y Lo Ste	ondfill somme no: 5 phenville Location: West of Stephenvill	
DAT	e: 11/10)/72 oy		JOB NO: 72.1166 BORING TYPE: Hollow Stem Auger BOIL ENGINEER: - BROUND ELEV:	
	AMPLE TYPE 6 Ample No.	PENE TROMÉTER READING , TSF	OWS / 7007	S-ANELOV TUBE D-DENISON BARREL P-PENETRATION TEST GORE - PENETRATION SAMPLE - NO RECOVERY V-STATIC WATER TABLE - NYDROSTATIC WATER TABLE	946 - 5
1430	SAU	PEN	910	DESCRIPTION OF STRATUS	
	S			Brown Silty Clay, Dry & Hard Tan Silty Clay with Thin Layers of Hard Limestone, Dry & Hard (Caliche)	<u> </u>
-5 -					6.5'
- 10 -				Light Grey Sand, Moist & Dense	10'
F				Light Grey Sandy Clay, Maist	12'
	51			Grey Clayey Sand	13'
	J ,	1+		Orange, Tan & Red Clayey Sand	
- 15-	waln	M.		(416.5' FZ 13	16' 16.2'
				Light Grey Clayey Sand	18'
- 20 -	Pale	hey	ł	Light Grey Sandy Clay With Thin Layers of Light Grey Sand	
	8				
25-	fi i			,	
				(170' A T PT	
	8			End of Boring 30'	
- 30 -	1				
	11			· ·	
<u>-</u>					
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	11				
-				34	A-12

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	andre fan de de ser se de la		LOG OF BORING	
PROJECT: POR:	Sanitar City of	y I Sh	andfill som a no: 6 phenville Locavien: West of Steph	enville
DATE:] DRILLER:	1/10/72 GRAY	-	JOB NO: 72.1166 SORING TYPE: Hollow Stem Auger SOIL ENGINEER: - OROUNG ELEV:	/
	EACTR JACTER	1001/ENO	S-SHELDY TUBE O-DENISON BARREL P-PENETRATION TEL GORE - PENETRATION SAMPLE - NO REGOVERY V-STATIC WATER TABLE - HYDROSTATIC WATER TABLE	8.46 −6 7 (
OCP SAME		13	DESCRIPTION OF STRATUS	
			Brown Silty Clay	1,5'
\square			Tan Caliche with Thin Layers of Tan Limestone	4
-5 -			Orange and Light Grey Clayey Sand	
- 10 -5			4 5.5° FT. 24	12.5' 19
			Light Grey Clay	3.64
- 15 -			Purple and Light Grey Silty Clay	15'3
- 20 - 5			End of Boring 30'	
			35	

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SUMMARY OF LABORATORY TEST RESULTS Job No. 72.1166 Date: 11/18/72

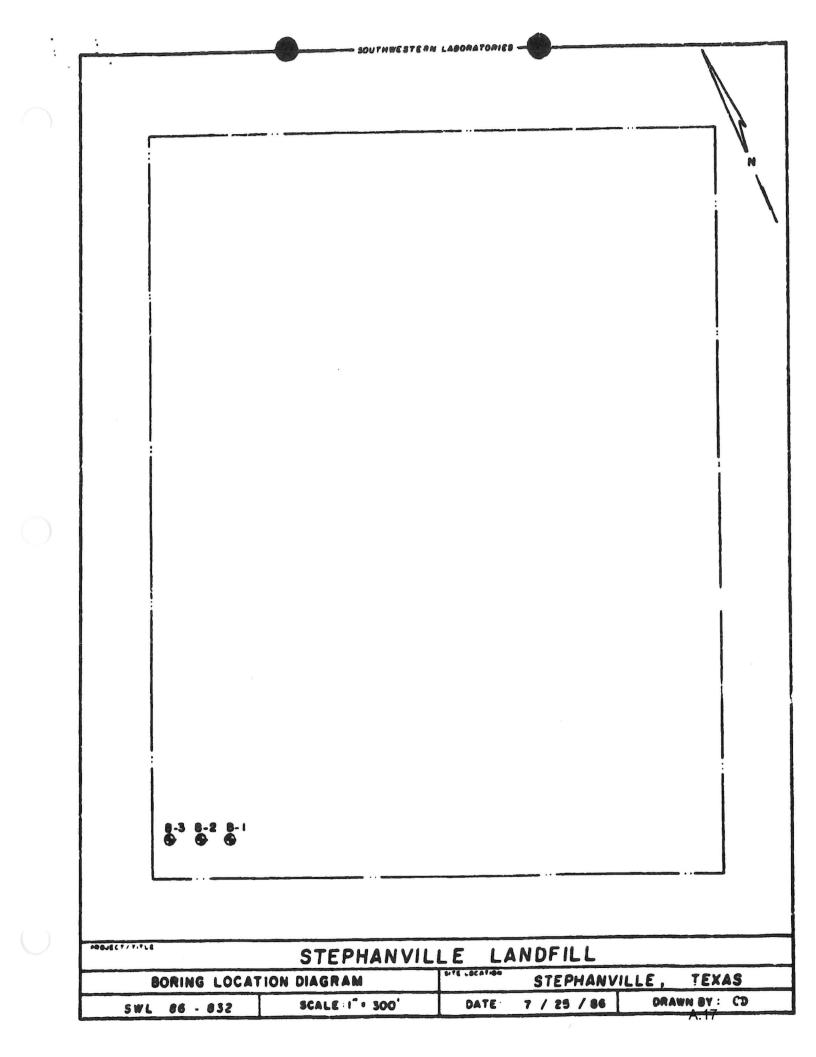
Atterberg Limits

Boring No.	Depth feet	Closs.	Liquid Limit	Linear Shrinkage	Plasticity Index
1	16	CL	38	15.4	24
1	22	CH	54	13.4	20
2	10	CL	29	14.0	21
2	21	CL	28	8.2	10 -
3	17	CL	40	16.6	27
3	21.5	ČL	36	9.6	13
4	11	CH	52	22.2	41
4	26	CL	32	12.4	18
5	16.5	CL	29	9.8	13
5	29	ČĹ	41	14.7	23
6	6	ČL	32	12.0	17
6	12.5	СН	54	21.0	37
6	29	CL	37	13.5	20

TELAS TESTING LABORATORIES

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Mentante de la constrate JECT: Landfill locings à Tast SUMP. ARY OF TESTS OMF TESTS ATTE: Jandfill locings à Tast ATTE: And fill locings à Tast City of Stephenville Stephenville City of Stephenville Colspan="6">Colspan="6"Colspan="6"Colspa="6"Colspan="6"Colspan="6"Colspan="6"Colspan="6"C	Ì	. (9	6) NIV	AATS				sec	sec.	isec		sec	Bec		36.	Jec		aec		/aec	sec	
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MONTARY OF TESTS SUMP. ARY OF TESTS Jandfill Borings & Teat Jandfill Borings & Teat Itype of MATERIAL Z allt & MONTARIAL DATE JATE Itype of MATERIAL Z allt & MONTARIAL Z allt & MONTARIAL DATE JATE Itype of MATERIAL Z allt & MONTARIAL Z allt & MONTARIAL DATE JATE Itype of MATERIAL Z allt & MONTARIAL Z allt & MONTARIAL Z allt & MONTARIAL CALAY ATTERBREACLIANT Tan and gray very silty, callty S J3 J3 J3 J3 J3 Tan and gray very silty callto BS J4 J1 Tan and gray very silty sandy callto BS J4 J3 Tan and gray very silty sandy callto J3 J3 Tan and gray very silty san			()50	1)		0	4.0	k=3.8×10	of the local division in which the local division in which the local division is not the local division in the	7#10		.9×1	.5%]		.1.1	3		.2.10		.5×10		
NOTARY OF TESTS SUMP. ARY OF TESTS SUMP. ARY OF TESTS Indfill Borings & Teat Indfill Borings & Teat Type of warteniat Sailt & Colspin Vertion Colspan="6">OPTION Colspan="6">DATE Type of warteniat Zailt & Conviction Convistin Convistin Convistin Conviction ConvictionConviction Convist				-9-86	LINEAR	(%)	7	5	6		16		5	16			12	2			12	
DOMMENTER LADARTONES SUMF. ARY OF TESTS Landfill Borings & Teat Cuty of Stephenville TYPE OF MATERIAL X silt & MOISTUNE TYPE OF MATERIAL X silt & MOISTUNE TYPE OF MATERIAL X silt & MOISTUNE TAI and gray very silty, BO 11 Tan and gray very silty, BO 11 1110 Yellow and tan sundy lay 79 17 111 Yellow and tan sundy lay 93 18 112 Tan and gray very silty clay 82 23 79 Yellow and tan sundy clay 85 14 115 Tan and gray very silty clay 82 23 79 Tan and gray very silty sundy caliche 87 10 125 Tan and gray very silty sundy caliche 82 16 109 Cray silty clay 82 18 117 Tan and gray very silty sandy caliche 82 16 109 Cray silty clay 79 16 109 Purple silty clay 79 16 109 Tan and gray very silty sandy 73 17 109 Tan and gray very silty sandy 73 17 109 <t< td=""><td></td><td></td><td></td><td></td><td></td><td>_</td><td>12</td><td>10</td><td>16</td><td>28</td><td>31</td><td></td><td>11</td><td>90</td><td></td><td></td><td>26</td><td></td><td>30</td><td>25</td><td>26</td><td></td></t<>						_	12	10	16	28	31		11	90			26		30	25	26	
DOMMENTER LADARTONES SUMF. ARY OF TESTS Landfill Borings & Teat Cuty of Stephenville TYPE OF MATERIAL X silt & MOISTUNE TYPE OF MATERIAL X silt & MOISTUNE TYPE OF MATERIAL X silt & MOISTUNE TAI and gray very silty, BO 11 Tan and gray very silty, BO 11 1110 Yellow and tan sundy lay 79 17 111 Yellow and tan sundy lay 93 18 112 Tan and gray very silty clay 82 23 79 Yellow and tan sundy clay 85 14 115 Tan and gray very silty clay 82 23 79 Tan and gray very silty sundy caliche 87 10 125 Tan and gray very silty sundy caliche 82 16 109 Cray silty clay 82 18 117 Tan and gray very silty sandy caliche 82 16 109 Cray silty clay 79 16 109 Purple silty clay 79 16 109 Tan and gray very silty sandy 73 17 109 Tan and gray very silty sandy 73 17 109 <t< td=""><td></td><td></td><td></td><td>DAT</td><td>BERG L</td><td>٩L</td><td>16</td><td>16</td><td>17</td><td>18</td><td>22</td><td>18</td><td></td><td>20</td><td></td><td>18</td><td>18</td><td></td><td>20</td><td>18</td><td>18</td><td></td></t<>				DAT	BERG L	٩L	16	16	17	18	22	18		20		18	18		20	18	18	
Determined SUMA. ARY OF TESTS SUMA. ARY OF TESTS Landfill Borings & Teat City of Stephenville TYPE OF MATERIAL X ailt 6 MONTUME TYPE OF MATERIAL X ailt 6 MONTUME Tan and gray very silty, B00 11 110 Yellow and tan sundy .lay 79 17 111 Yellow and tan sundy .lay 79 17 111 Yellow and tan sundy .lay 79 17 111 Yellow and tan sundy .lay 79 18 112 Tan and gray very silty sundy caliche 82 23 79 Tan and gray very silty sundy caliche 87 10 125 Tan and gray very silty sundy caliche 87 10 125 Tan and gray very silty sundy caliche 82 14 116 Purple silty clay 82 14 107 Cray silty clay 82 16 107 Cray silty clay 82 16 107 Purple silty clay 82 16 107 Purple silty clay 82 16 107 Purple silty clay 82 16 107					ATTER		28	26	33	46		41	27	50		43	44	28	50	43	44	
BOUNNETERST SUMN.ARY OF TESTS SUMN.ARY OF TESTS Landfill Borings & Teat Landfill Borings & Teat City of Stephenville Type of MATERIAL Zalit & MONSTUNE Tan and gray very silty, calitche clay 96 15 Tan and gray very silty calitche clay 96 15 Tan and gray very silty clay 93 18 Yellow and Lan sundy .lay 79 17 Yellow and Lan sundy .lay 79 16 Tan and gray clay 82 23 Tan and gray clay 81 16 Tan and gray clay 82 16 Tan and gray clay 83 16 Tan and gray clay 84 10 Tan and gray clay 79 16 Tan and gray clay 79 16 Tan and gray clay 79 16					DRY	(pcf)		110	-	-	6ú	-	125	107	109		116		109			
ADVINUE SET ANTIFICANT LADOR TES SUMA. ARY OF TES SUMA. ARY OF TES Landfill Borings & Teat City of Stephenville Tan and gray very silty caliche clay 96 Tan and gray very silty. But the subdy caliche clay 96 Tan and gray very silty clay 93 Turple silty clay 93 Turple silty clay 93 Turple silty clay 93 Turple silty clay 93 Tan and gray very silty sundy caliche Bi the subdy clay 93 Tan and gray very silty sundy caliche Bi the subdy clay 93 Tan and gray very silty sundy caliche Bi the subdy clay 93 Tan and gray very silty sundy caliche Bi the silty clay 93 Tan and gray very silty sundy caliche Bi the silty clay 93 Tan and gray very silty sundy caliche Bi the silty clay 93 Tan and gray very silty sundy caliche Bi the silty clay 93 Tan and gray very silty sundy caliche Bi the silty clay 93 Tan and gray very silty sundy caliche Bi the silty clay 93 Tan and gray very silty sundy caliche Bi the silty clay 93 Tan and gray very silty sundy caliche Bi the silty clay 93 Tan and gray clay 93 Tan ant gray clay 93 Tan ant 53 Tan and 53 Tan ant 53 Tan		TS			MOISTURE	(%)		11	17	18	23	14	10		16	18	14	10	17	14	12	
	100 215 3 A M A MOR	LO L	Landfill Borings 6 Test		A BILL	ITTE OF MALENIAL CI	and gray very silty caliche clay	gray very silty,	and tan sandy lay	silty clay 9	gray clay	and gray silty clay 8	and gray very silty sandy caliche 8	and gray clay	silty clay	le silty clay	sandy clay 8	gray very silty sandy 8	7	2	and gray sandy clay	
JECT: JECT: ENT: ENT: ENT: 2-3 2-3 2-10 9-10 9-10 9-10 14-15 14-15 224-25 24-25 24-25			PROJECT:	CLIENT :	BORING	NUMBER	7						2					5			16	



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			Franka		LOG OF BORING	BORING NO. 1
	DJEC		City o	f St	sphenville	LOCATION Stephenville, TX
DAT	E	7-	7-86		TYPE: Samples CASED TO	
DEPTH IN FEET	SVMBOL	SAMPLE	STANDARD PENETRATION BLOWS / f1	MAND PEN 131	LEGEND SAMPLE X STANDARD PENETRATION NO WATER	WATER INFORMATION Water encountered
8	6	, on	PENS	MAR	DESCRIPT	ION OF STRATUM
		a state of the			Tan and gray sandy clay wi	th caliche CL
- 5 -					Tan and light gray very si	lty sandy clay CL
-10-					Yellow and tan sandy clay	CL
-15-					Purple silty clay (tan and gray sandy clay so	CL with some CH cams - 1'6" at 17')
-20-					(tan and gray clay layer 2"	'6" at 24° to 26.5°)
-30-				~	Tan and gray silty clay	CL
日		Π			Tan sandstone	Rock
-45-					Boring terminated at 44'	

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PI Ci	roje Lien'	ст 7:	Stepher City of	vili Ste	LOG OF BO	RING BORING NO 2 LOCATION : Stephenville, 72
04	TE	7-	7-86		TYPE Samples CAS	SED TO GROUND ELEVATION
	1	T	S	12	LEGEND	WATER INFORMATION
DEPTN M	SYMBOL	e Avena e	STANDARD PENE TRATION BLOWS / ft.	HAND PEN 1	SAMPLE X STANDARD PENETRATION WATER	No water encountered
0		ľ	s a	MA	DESC	RIPTION OF STRATUM USCS
					Silty clayey caliche	CL
- 9 -					Tan and gray very silt;	y sandy caliche clay CL
-10-	t		ana ana amin'ny sorana amin'ny sorana amin'ny sorana amin'ny sorana amin'ny sorana amin'ny sorana amin'ny sora		Tan and gray clay (Light purple linestone	sear - 6" thick at 12') CH
-		L			Purple clay	CH
-15-					Gray silty clay	CL
	1				Purple silty clay with	gray silty clay seems
-20-	1				Gray seam at 18°)	CL with CH
-25-					Sandstone	ROCK
		Ľ			Purple clay	CL
-30-		P	Í		Tan sandy clay	
-38-					- 6" layer of sandstone	at 36'
		H		\rightarrow	Sandstone	
-40-	PRODUCTION OF	\mathbb{H}		-	Sanarona	Rock
				ĺ	Boring terminated at 40	
					narrig caratilites at an	
-40-						
-90-		and the second second second				1
and the second party of the second se	No. of Concession, Name of Street, or other	of the party of	The second s		and a second	

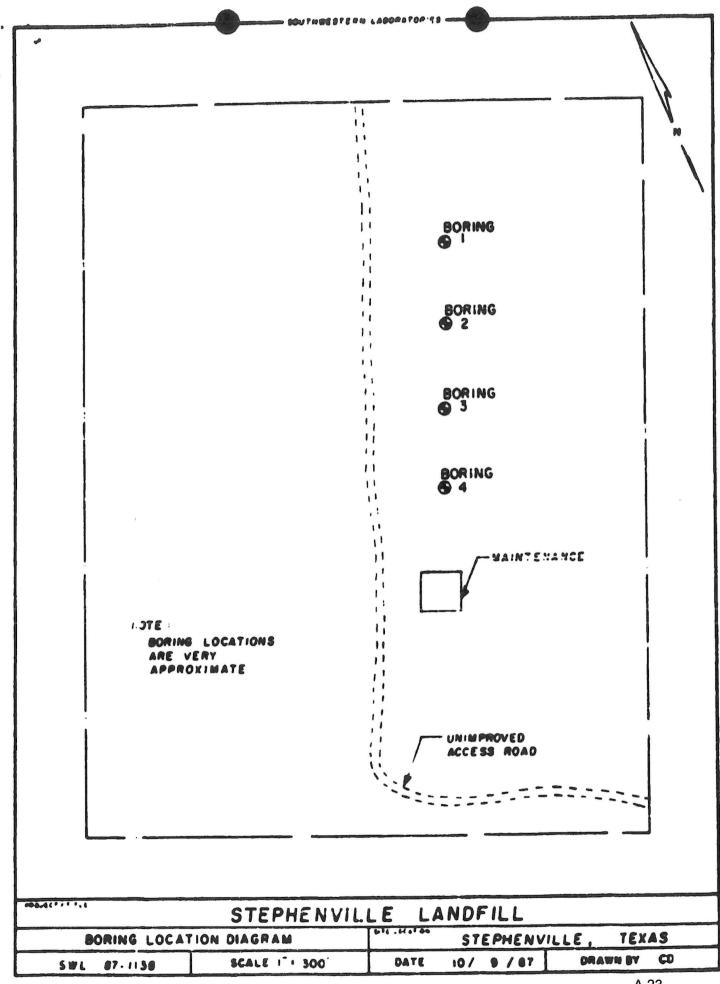
° . ° .	• •					A -	
						LOG CF BORING e Landfill BORING NO. phenville LOCATION	5 Stephenville, TX
	DAT			7-86			ELEVATION .
	PTN IN FEET	SYMBOL	SAPP16	STANDARD PENE TRATION BLOWS / ft.	O PEN INF	LEGEND WATER INFOR SAMPLE X STANDARD PENETRATION Seepage below 39' WATER	MATION
	0	60	19	Per s	MAND	DESCRIPTION OF STRATUM	USCS
		The Party of State	\Box			Tan very silty clay	SM
	- 9 -					Tan and gray very silty sandy clay	CL
						Tan and gray clay (6" purple limestone layer at 9")	Сн
	-10-		Π			Purple silty clay with light gray seams	CL with CH
	-15-					- (l'6" gray silty clay seam at 19° to 20.5°)	
	-25-					Tan and gray sandy clay	CL
							ມານສາງສາມອາຊິນແລະ ອາດປາມນາງວ່າໃນເລີຍແລະເວົ້າຫຼາງມາສາສາສີນ
	-30-					Gray sandstone	ROCK
	-40-					Cemented silty sand	SN (soft rock)
	- 48					Boring terminated at 45'	

A.20

DATE: 9/18/87 DATE: 9/18/87 DATE 9/18/87 DATE 9/18/87 Linkan Linkan 29 17 13 29 17 13 29 17 12 30 17 12 31 17 13 31 17 14 31 17 16 31 18 17 29 16 13 29 16 13 29 16 13 31 18 17 32 18 17 33 18 17 31 18 19 32 18 19 33 18 19 33 18 19 33 18 19 33 18 19	TUNE TUNE	SUMMARY OF TESTS Landfill Borings & Texts Isophanville City of Stephanville Isophanville Tan very silty clay 87.4 Purple Liev 11.2 Purple Liev 11.2 Purple Liev 91.4 Tan very silty clay 81.1 Purple Liev 91.4 Tan & gray very silty clay 11 Tan & gray very silty clay 91.4 Tan & gray very silty clay 11 Tan & gray very silty clay 11 <t< th=""></t<>
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	%) NI	the state of the state													ورالكانيس	and the second second	 un terretaria	 			
20060	CONFINING PRESSURE										1.8¢		-				 	 			
	(DOR DAE SELECTION (DEL)										3.5×10-6										
		9/18/67	LINEAR	(%)	4	7	5		6		10										
			STIMUL	ā	10	п	12		14		24										
		DATE	DENG	2	17	17	17		16		18										
	,		ATTEN	١٦	27	٥٢	29		30		42		-								
			DRV	(pc f)																	
TS			MOISTURE	CONTERN	2	4	\$		10	22	16										
Y OF TEST				and Clay	\$1.5			ty sand	73.4	91.4	<u>64.9</u>										
Sul Report No. 87-1138 SUMMARY OF TESTS	Landfill Borings & Tests	City of Stephenville		TTPE OF MATERIAL	Ten very silty clay	Tan very silty clay and limestons	Tan 6 gray very silfy clay	Tan A gray very allty clay w/all	pertings	Purple clay	Tan sandr clar										
Report	PROJECT	CLIENT:	MLADO	(FEET)	2-3	9-10	14-15	19-20		29-30	34-75										
S.	PRO	CLIE	BOR 1940	A JANUA	4							1							A	22	



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" Bu	rL Ro	901	re No. 8	7-81	LOG OF BO	
	OJEC		Landfil City of	11 B (St.	oringa 4 Tests-US 377 So sphenville	UCh BORING NO 1 LOCATION Stephenville, Tr.
	-		9/16/8			
041	18	T			TYPE COPO CA	SED TO GROUND ELEVATION WATER INFORMATION
8	2		ATION ATIO	1.00	SAMPLE	Seepage at 19'; water at 24' after 3.8 hours
000714 IN PEET	SVINGOL.	見たい	STANDARD PENETRATION BLOWS / II	0 76 10	X STANDARD PENETRATION WATER	
8	à		1000	DNAM	023	CRIPTION OF STRATUM
					Brown 6 can sat	ndy clay
	1					
- 8 -	Į				Tan very silty	clay w/limestone seems & layers
			100/1**		ionalanalan analan kananan kanana	
- 10 -		h	10071		Tan limestone v	//tan silty clay layers & seams
-18-		X	100/1-)		
		Π			lan 5 signt gra	ay very eilty clay
-08-	ter u ter saat fi					
			Í		Reddish tan, ta	n 6 gray very silty clay
		Ц				
-59-		Π	1		₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	
					Gray limestone	
-30-						
	ater generation de la	Ų	50/5"			
- 30 -		Ĥ	2012.		Purple clay	
-40-		N.	50/4"		<u>ى ئۆچىمە بىلەر بىلەر بىلەر بىلەر بىلەر بەر بەر بەر بەر بەر بەر بەر بەر بەر ب</u>	
					Boring terminat	
- 40 -					"THD - Cone Per	etrometer Test
-96-						
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	0	-							6	
Γ	°s	UL I	lop	ort No.	87-1	1 38	LOG	of Bof	RING	
		OJE	-	Landfi	21 8	orings 6 To	secs-US 3	77 Sout	h	BORING NO 2
1	CL	ENT	,	Cley o	6 52	ephenville				LOCATION Stephenville, Tr.
	041	.		9/16/8	7	TYPE	Core	CAS	(D TO	GROUND ELEVATION
		T	T	1 2	1-	LEGEND				WATER INFORMATION
1	E.,			200	N RI	SAMP				encountered during drilling
1		STABO	orter al	a a a a	8		ARD PENET	RATION	vater at	36.5' after 2.8 hours
	FEET	ST	on c	STANDARD ENE TRATION	Deve	W WATE				
					3		-	DESCI	HPTION OF ST	TRATUM
-		L					Brown sat	ndy cla	٧	
			Г	1		burn	Teo alex			4.]
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-							745 1184	87084 W	Itan wary as	ilty clay seams & layers
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-										
- 1	5-									
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t-	0-								silty clay	w/wery him silty
-	4		Π				sand part	ings		
-	-									
- 2	0-		П							
		800-00	Ц							
E	\pm		Ľ	20100	\neg		Tan silty		ى 10-10-10 ئۆرىمىيە 10-10-10 ئۆرىكى 10-10-10 ئۆرىكى 10-10-10 ئۆرىكى 10-10-10 ئۆرىكى 10-10-10-10 ئۆرىكى 10-10-1 10-10-10-10-10-10-10-10-10-10-10-10-10-1	
-3	0+		X	50/3"			lan 6 lig	the gray	silty clay	w/very thin silty send
E						<u></u>	DAFIBELS			
	_						Gray lime	econe v	/dark gray	shale layers
-31			X	100/1"						
	4		Ц						مەربەيلەر بەر بەر مەربەي بەر بەر مەربەي مەربەيلەر بەر بەر بەر مەربەي بەر	
	1									
	-			50/3"		1	Purple cl	ay		
-40	2		Î							9 (* 19 19 19 19 19 19 19 19 19 19 19 19 19
	-					1	loring te	rainate	d ac 40°	
and a second second							-			
-48	-					(THD - Co	ne Pene	trometer Te	st
	-									
-30	-									
-	_									
	1									

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	L Re Oje(IEN1				98 prings & phenvil	Tests-US	OF BOI 377 Sout	RING b	BORING NO. 3 LOCATION Stephenville, Tr.
CAT	re		9/16/82	7	TYPE ·	Core	CAS	ED TO	GROUND ELEVATION :
DEPTH IN FEET	SVMBOL	a Kenty	STANDARD ENE TRATION BLOWS / f1.	MAND PEN IST	X STA	NPLE INDARD PEN TER	ETRATION	Seepage 1.41 ho	water information at 19'; water at 33' after uts
ā				MM			and show the second	RIPTION OF	
		F				Brown st	andy clay	w/broken	limestone & tan clay mixed
- S -						Tan very	y silty c	lay w/tan	limestone seams & layers
-10-						Ten lime	estone v/	tan very :	silt clay seams & layers
		Ħ				Tan eilt	v clav w	/hard rocl	a layer 4" thick
	il	H	50/3"		and the second second				
-20-		Ê				Reddish	tan silt;	y clay	
-28-		X	50/3"			Tan 6 li partings		silty cla	y w/very thin silty sand
-30-			50/2}"						
		H		+		Gray lim	estore		, ,
-35-		X	50/5"	1		And the second second second second			والمحمد المركز المحمد المحمد المحمد المحمد المحمد والمحمد ومراحي ومرحمي ومرد ومحمد ومراحب والمحمد ومراح
				ĺ		Purple c	lay		
-40		X.	50/2"					یک مک میں بر خوب می میں اور اور میں کریں	
						Boring to	erminated	at 40'	
		and the second				_		rometer T	
-45-						- iau - G	une rebét	romersi I	42L
		the second s							
-50-		and the second second		tilling of					
					and the second				

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		rt No. 8			OF BOF		
				orings & Tests-US	377 Sout	:h	BORING NO. 4
CLIENT	1	City o	r 50	ephenville			LOCATION: Scephenville, Tr.
DATE		9/16/8	7	TYPE: Core	CASI	ED TO	GROUND ELEVATION
	T	8	19	LEGEND	tene ang ang mang panlaning a		WATER INFORMATION
S 18	w	ATIO STO		SAMPLE		No. or	
DEPTH IN FEET SYMBOL	L. MA	SWC	DEN	X STANDARD PEN	ETHATION	10 26	epage encountered
S DE	3	STANDARD PENETRATION BLOWS / fl.	MAND		DESCI	RIPTION	OF STRATUM
		<u>ц</u> ,					
				Brown sa	ndy clay		
h				Tan very	silty cl	ay w/li	mestone seams & layers
- 5 -							
Seguri de Sectore		Second Second Second	درور مراوی				
	h			Ton Idea			
-10-				1913 17396	scone w/c	an very	silty clay seams & layrs
	Ш				and the second state of the se		
-18-							
				Tan & gra partings	ly very s	ilty cl	ay w/very thin silty sand
				hereruse			
	X	50/4"					
-20-	Π						
		.					
	X	50/5"					
-25-	Π						
			1				
	U.	60/2"					
-30-	Â			P	1 (a) (
	4			Purple ca	ily w/enii	a sand s	
		50/2"					
-35-	X	3072		Tan sandy	clay w/o	layey a	land
-40	X	50/3"					
┝ ─ ─		(Boring te	rminated	at 40'	
-45-							
-50-							

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(REVISED PRELIMINARY HYDROGEOLOGICAL) SITE ASSESSMENT REPORT STEPHENVILLE SANITARY LANDFILL PERMIT NO. 664 STEPHENVILLE, ERATH COUNTY, TEXAS

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City of Stephenville Stephenville, Texas

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TEAM Consultants, Inc. Arlington, Texas January, 1992

TEAM____CONSULTANTS, INC.____

Geotechnical, Environmental, Construction Materials Testing

January 31, 1992 TEAM Project No. 91201

Mr. Carroll Gentzel City of Stephenville 354 North Belknap Stephenville, Texas 76401

<u>REVISED PRELIMINARY HYDROGEOLOGICAL SITE ASSESSMENT REPORT</u> <u>STEPHENVILLE SANITARY LANDFILL - PERMIT NO. 664</u> <u>STEPHENVILLE, ERATH COUNTY, TEXAS</u>

Gentlemen:

Presented herein is our revised preliminary report of the hydrogeological site assessment performed at the existing permitted sanitary landfill. This investigation was performed in general accordance with our proposal number PN957 dated January 22, 1991, and was authorized by City Council action on February 5, 1991. (This revision corrects groundwater potentionmetric surface level interpretations reported (in our report No. 91201 dated November 6, 1991) (Those interpretations reflected the estimated surface piezometer elevations rather than the actual surveyed elevations.)

We appreciate the opportunity to be of service on this project. Should you have any questions or need further assistance, please call.

Very truly yours,

TEAM Consultants, Inc.

William Prikryl, P.E.

WP/vb

Copies Submitted: 3

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INTRODUCTION

The Stephenville Sanitary Landfill, Permit No. 664, is located approximately six miles west of the Court House and approximately one mile north of Highway 67 West. The general location and orientation of the landfill site shown relative to Stephenville is presented on the Site Location Map, Plate 1, in the Illustrations section. The permitted area consists of approximately 100 acres and is permitted as a Type I landfill.

PURPOSE AND SCOPE

This investigation of site hydrogeological conditions was performed for the purpose of evaluating the depth to and hydraulic gradient of the upper most aquifer within the site boundary. The following tasks were undertaken to achieve the intended purpose: (1) auger borings were drilled at selected locations to prescribed depths in order to obtain samples for stratigraphy identification; (2) piezometers were installed and water level readings were obtained over an extended time frame; and (3) groundwater observations were analyzed in order to define the piezometric surface map of the site. As an added scope, samples were obtained on September 23, and December 10, 1991 for quality assessment purposes. Results are presented and interpreted herein.

FIELD INVESTIGATION

Subsurface conditions at the site were evaluated between April 8 and 12, 1991, with five undisturbed sample borings located approximately as shown on the Plan of Borings, Plate 2. A water well drilling rig using air and water for bit cooling and cuttings removal was used to advance the borings. A Piezometer was installed in each bore hole upon boring completion. Sample depths, soil descriptions, and classifications (based on the Unified Soil Classification system and standard geologic nomenclature) are shown on the logs of boring, Plates 3 through 11. A key to descriptive terms and symbols used on the logs is presented on Plate 12.

Undisturbed samples of cohesive materials were obtained utilizing a thinwalled, seamless Shelby tube sampler. Upon recovery, Shelby tube samples were extruded in the field, visually classified, wrapped, and labeled according to boring number and depth.

Dense or granular materials were sampled utilizing a two-inch diameter, split-spoon sampler in conjunction with the Standard Penetration Test (ASTM D-1586). This test utilizes a 140-pound hammer that drops a free fall vertical distance of 30 inches. The number of blows required for 18 inches of penetration is recorded and the value for the last 12 inches, or the penetration obtained with in 100 blows, whichever is first, is reported as the "Standard Penetration Value".

Below the depth of Shelby tube refusal, cohesive materials were recovered using split-spoon samplers for identification purposes only. Standard drilling and sampling procedures are described in the Appendix. Five piezometers were installed during the field exploration phase in order to observe the static water level over an extended period of time. Upon drilling completion, two-inch diameter flush joint, schedule 40 PVC machine slotted screen and riser was centered in the open bore hole. A screen length of five to ten feet was used. Number two sandblast sand was placed in the annulus around the slotted screen section, followed by a four to ten foot thick seal of bentonite pellets. Powered bentonite grout mixed with cuttings was used above the seal to the surface, to keep potential surface water from entering the hole. A description of each installation is presented on Piezometer Installation Details, Plates 13 through 17.

Groundwater was not observed during drilling in any of the five borings. However, observation of the air flow after turning off the water source tended to indicate water being present in all borings prior to termination. Water levels can be expected to vary seasonally and will likely be related to fluctuations in the local groundwater recharge/utilization rate.

LABORATORY TESTING

All recovered samples were transported to the laboratory for further visual classification in order to verify field classifications. No laboratory soil tests were proposed or performed as a part of this study.

GEOLOGY AND SITE CONDITIONS

Site Geology

The site is located in an outcrop of the Walnut Formation which is underlain by the Paluxy Formation of Cretaceous geologic age. In the Stephenville area, the Paluxy Formation consists of interbedded claystones and sandstones, mostly light gray to red with a total thickness in excess of 100 feet. The Walnut Formation consists of interbedded claystone and limestone with iron staining varying in color from light brown to gray and white.

Site Conditions

The materials and conditions encountered at this site are generally consistent with the expected geology. Based on the samples recovered, the borings revealed the presence of surficial silty clays underlain by silty sands and clays with occasional clay or sandstone seams.

Based on the borings drilled for this study, the upper 20 to 55 feet of surficial material consists of silty clays with an occasional limestone or sandstone seam or silty fine sand seam. This surficial material is underlain by silty sands extending to depths beyond the boring completion depths ranging from 35 to 80 feet. Refer to the individual boring logs for a more detailed description of the materials encountered.

Groundwater

Groundwater was encountered in all five piezometers. Water level readings were recorded approximately every month following completion of field activities from April through November, 1991. Results of the long term water level observations are presented on Plate 18. Water level data were recorded to the top of the risers which extend approximately four to five feet above the ground surface. The elevations of the top of riser and ground surface at these locations are presented on Plate 19.

DISCUSSION

Based upon the information from the borings drilled on site, the underlying stratigraphy generally consists of relatively permeable silty fine sand. Above the sands, slowly permeable clays and silty clays are predominant. The underlying purple clay layer (marker bed) may serve as an aquiclude, and has been used for in situ bottom liner in a significant portion of the filled areas.

Water levels observed over an extended period indicate small changes in the static-water elevations across the site. The lowest water level elevation of 1412.34 was recorded on August 24, 1991 at observation well (piezometer) number P-4. The highest water level elevation of 1441.3 was recorded on June 18, 1991 at observation well number P-1. A plot showing the observed groundwater elevations in all five piezometers for the evaluation period is presented on Plate 20.

The potentiometric surface map of the groundwater in the landfill area was defined by observing the static water levels in each of the installed piezometers. The reference point (top of riser) used for each well was surveyed to allow determination of the elevation of the static water level relative to mean sea level (MSL). In general the potentiometric surface map tends to indicate that the groundwater gradient is from the southeast to the northwest direction across the site. Our interpretation of the potentiometric surface map is presented on Plate 21.

Groundwater samples were obtained from piezometers P-1, P-2, P-4 and P-5 (the four boundary piezometers) on September 23, 1991 and again on December 10, 1991, and delivered to National Environmental Testing, Inc (NET) laboratory in Carrollton, Texas for analysis. Parameters evaluated included all Texas Department of Health (TDH) parameters for Groups 3 and 4, as defined on TDH Form SE 65 10-1-85. These include chloride, pH, specific conductance, total dissolved solids, total organic carbon (four replicates), iron and manganese. Results are presented on the NET Analytical Reports for sample numbers 172078 through 172081 dated 10/07/91, Plates 22 and 23, and for sample numbers 176124 through 176127 dated 12/26/91, Plates 30 and 31... The NET Standard Quality Control Data Reports are presented on Plates 24 and 32, respectively. Typical TDH Groundwater Monitoring Reports for these samples are presented on Plates 25 through 28 and 33 through 36, respectively. Copies of the "Chain of Custody control" forms are presented on Plates 29 and 37, respectively.

CONCLUSIONS

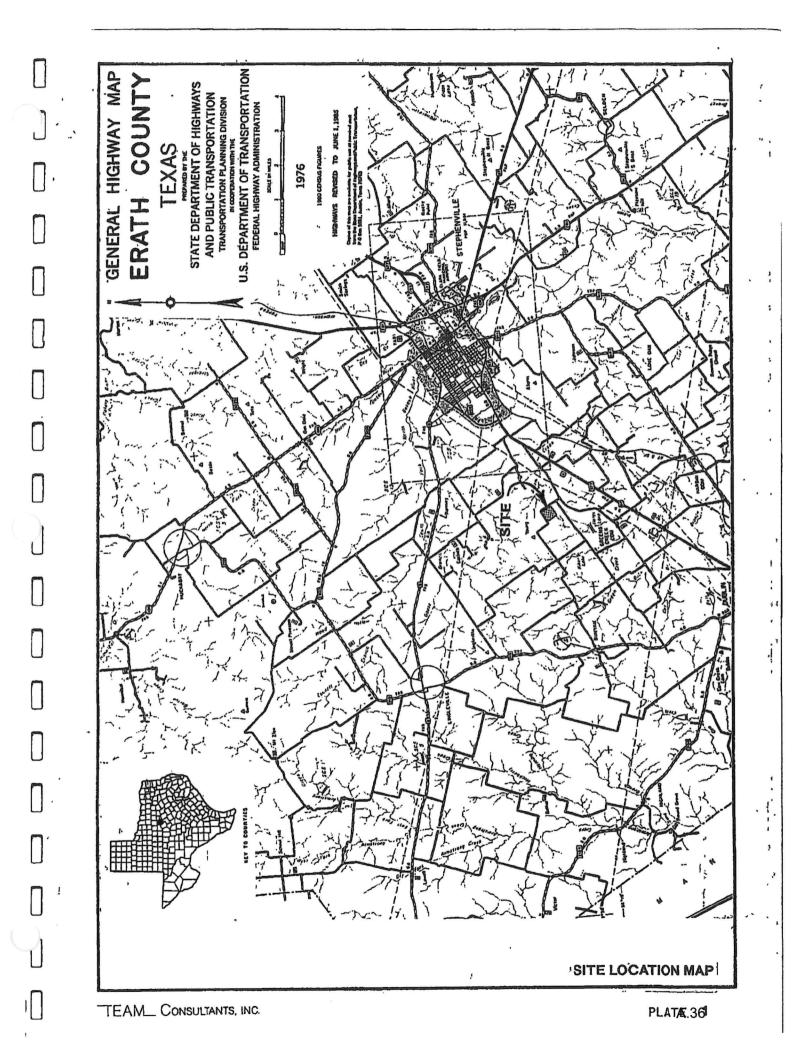
The results of the hydrogeological site assessment of the groundwater gradients at the site generally <u>indicate a groundwater flow from southeast</u> to northwest in a pattern as depicted on <u>Plate 21</u>. Based upon this conclusion, the up gradient location is along the southern side of the site, and the down gradient location is along the northern and western sides

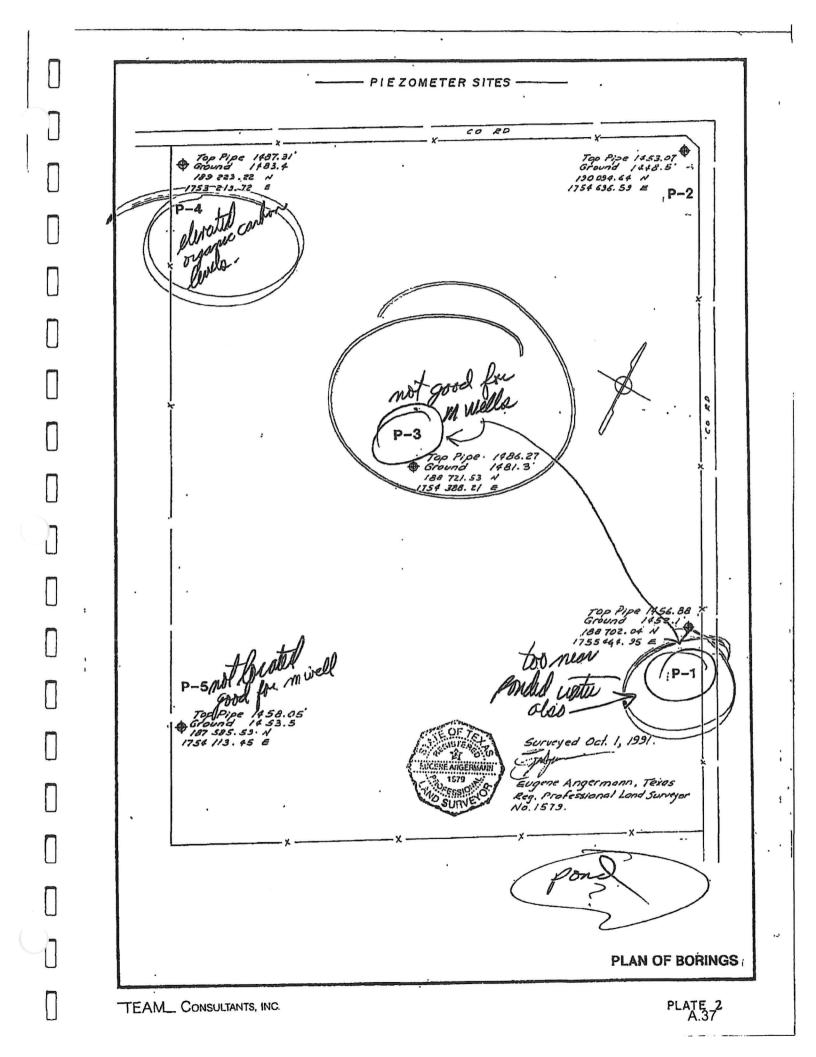
At present, five observation wells (piezometers) have been installed at the site. The location of each well is shown on the Plan of Borings, Plate 2. Based on the observed groundwater gradients, the locations of piezometers, except piezometers (P=1) and (P=3, are generally acceptable for the location of groundwater monitoring wells. However, it is our opinion that observation well (P=5) is not optimally located and that observation well (P=1) is too near the ponded water on site to be ideally suited for a non impacted upgradient monitoring location. The ponded water has significantly affected the interpretation of the results of this study and may have negated the usefulness of piezometer P-1 for the purposes of this study. However, as the pond is eliminated, the information obtainable from this location will help improve our understanding of groundwater gradients along the eastern half of the site.

Groundwater quality, as evaluated by samples obtained on (September 23, and December 10, 1991, tends to indicate a consistently "good" quality water in observation wells P-1, P-2-(downgradient), and P=5-(downgradient). However. groundwater in observation well P-4 (downgradient) was observed to contain slightly elevated total organic carbon values (level of concern = 10.0 mg/L) in the <u>Cirst set of sample analyses</u> but only a slight difference from other wells in the second set of sample analyses. It is possible that the first set of samples was not representative of the actual ground water quality in this location. However, in order to clarify this issue, Cadditional-samples should be obtained to develop a "statistically_significant"_data_base_on_which_adequate_confidence-can-be-based. Such a data base is not considered adequate with fewer than four samples obtained at the rate of one per calendar quarter for one full year. Also, the-full-list-ofparameters (see Plates 25 through 28 and 33 through 36) are required for defining the "base line" groundwater quality in any current groundwater assessment program. Under this current criteria, laboratory cost per sample per well is approximately \$410.00. Under the subtitle "D" regulations, the Phase I list of parameters is estimated to cost approximately \$500.00 per sample while the Phase II list. (triggered by deterioration being observed under Phase I testing) is estimated to cost approximately \$1,800.00 per sample. We recommend that, prior to making any final decisions, additional samples be obtained and analyzed for verification Should the data be consistent, it would enhance the City's purposes. ability to "educated" decision as to whether or not to remain committed to make an landfilling at this site under U.S. EPA subtitle "D" regulations. Should a commitment be made to this site, it is recommended that additional observation wells be installed in prime locations to better assess the impact of past landfilling operations on groundwater quality. Ultimately, a groundwater assessment program will be required and a groundwater monitoring system will have to be designed and installed in conformance with the then current Municipal Solid Waste Management Regulations. We anticipate a system with a minimum of six wells will be required at an estimated cost per well of \$2,500.00 - \$3,500.00.

ILLUSTRATIONS

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-cuttings with purple clay @ 34'</td><td>Stickup: 4.97' WATER LEVEL DRY The Grip of 100 product of the colspan="2">Stickup: 4.97' NATER LEVEL DRY DATE 4/10/91 SUPACE CONDITIONS DRY OFT SAMPLE NUMBER NO SAMPLE NUMBER NO</td><td>188721.53N ELEVATION 1481.3 Staffkup: 4.97' a 1754388.21B ELEVATION 1481.3 CASNO DEPTH 1 2017 BEARNO SUPPRCE CONDITIONS DRY 4 2017 BEARNO FTLBS 5 1 2018 Casno DEPTH 1 1 4 2017 BEARNO FTLBS 5 1 2018 SAMPLE NUMBER AND DESCRIPTION OF MATERIAL 1 1 1 2018 Tan silty clay with trash inclusions. 1 1 1 -light gray and tan with limestone cuttings 1 1 1 1 -no recovery -no recovery 1 1 1 1 1 -light gray with silty sand seams and iron stains -cuttings contain purple and gray clay Q 18' 1 1 1 11 -bluish gray with calcareous nods and iron stains 1 1 1 1 12 -bluish gray with calcareous nods and iron stains 1 1 1 1 1 1 1 13 -bluish gray with purple clay Q 34' 1 1 1</td><td>188721.53N START 1754388.21B ELEVATION 1754388.21B ELEVATION 1754388.21B ELEVATION 1754388.21B ELEVATION 1764388.21B ELEVATION 1764388.21B ELEVATION 1764388.21B ELEVATION 1754388.21B ELEVATION 1764388.21B ELEVATION 17764388.21B ELEVATION 17777 SAMPLE MUMBER 17777 SAMPLE MUMBER 17777 Tan silty clay -harder (314' -tan and gray with limestone fragments 171 -light gray with silty sand seams and iron stains </td></tr<> <td>SELERUP: 4.97' START THE CLUP: DRY THE COLD THE COLD THE COLD TO START THE COLD THE COLD TO START THE COLD TO START COLD THE COLD TO START COLD TO START COLD TO START COLD TO START COLD TO START TECKUP: 4.97' THE COLD TO START COLD TO START COLD TO START TEST FREE TO RECONTIONS DRY COLD TO START TECKUP: 4.97' TO START START COLD TO START TO RECONTIONS DRY TEST FREE TO START COLD TO START TO START COLD TO START TO START COLD TO START TO RECONTION OF MATERIAL TO START COLD TO START TO RECONTION OF MATERIAL TO RECOVER TO START TO RECOVER TO START</td> <td>SELCKUP: 4.97' START Press IB8721.53N INFORM THE LEVEL DRY TIT DRY OF DATE AVAIDED TO THE AVAIDED TO THE</td> <td>Stickup: 4.97' Stockup: 4.97' 188721.53N Trade Trade</td> <td>SECCRUP: 4.97' START TPSET 188721.53N True 6.15 11:00 6:00 1754388.21E CLEVATION 1481.3 CASIC OPEN 2/10/91 2/10/91 2/10/91 1754388.21E SEARING SAMPACE CONDITIONS DRY 11:00 6:00 2/10/91 eff SEARING FT-LOS SEARING 11:00 6:00 MARGE TOROUS FT-LOS SEARING 11:00 6:00 Tan silty clay FT-LOS SEARING 11:00 11:00 11:00 MAGE TOROUS FT-LOS SEARING 11:00 11:00 11:00 Statistic Searies 11:00 11:00 11:00 11:00 11:00 MAGE TOROUS FT-LOS Searies 11:00 11:00 11:00 11:00 Statistic Searies 11:00 11:00 11:00 11:00 11:00 MAGE TOROUS FT-LOS Searies 11:00 11:00 11:00 11:00 Statistic Searies 11:00 11:00 11:00 11:00 11:00 Tan silty clay </td>	Stickup: 4.97' NATE 4/10/21 188721.53N 1754388.21B LEVATION 1481.3 CASING DEPTH INFACE CONDITIONS DRY CT SAMPLE NUMBER Mathematic colspan="2">SAMPLE NUMBER Mathematic colspan="2">SAMPLE NUMBER AND DESCRIPTION OF MATERIAL Tan silty clay -with trash inclusions. -light gray and tan with limestone cuttings -no recovery -harder 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			-bluish gray, slickens	ided					Ξ							
- 45			-purple with iron sta	ins @ 4 5.5'					=							
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-			-cuttings contain tar	and yellow	ćlay (1	48.5'			_							
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L 50			Yellowish tan silty sand	with iron sta	ains				_		[
			-pushed split spoon						Ξ							W.P.
-			-with purple, blue, a	nd tan clay	a 52'-5	4'			=							M
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- 60		77	-tan with iron stains			•	1		Ξ						J.K.	
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Stephenv	ille L	cal Site Assessment andfill - Permit No. 664 Brath County, Texas	SAMPLING METHOD:	Distur				SH	EET 2	OF	2	Service, Inc	
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40	<u> </u>	Tan silty clay (continue -purple -purple and bluish g					IIIIIIIIIIIIII						
45 12"	<u> </u>						mpupin						
50 7"	U	Yellowish tan sandy cla	ay with iron stain				Inturli						
55 4"	<u>U</u>	Light tan silty fine sand	? d	(CL)									CHK'D BY
60		-slightly clayey					minim					BY W.P.	
65 4 80		-with occasional cla	y laminations	(SM)								LOGGED BY W.P.	DATE 4

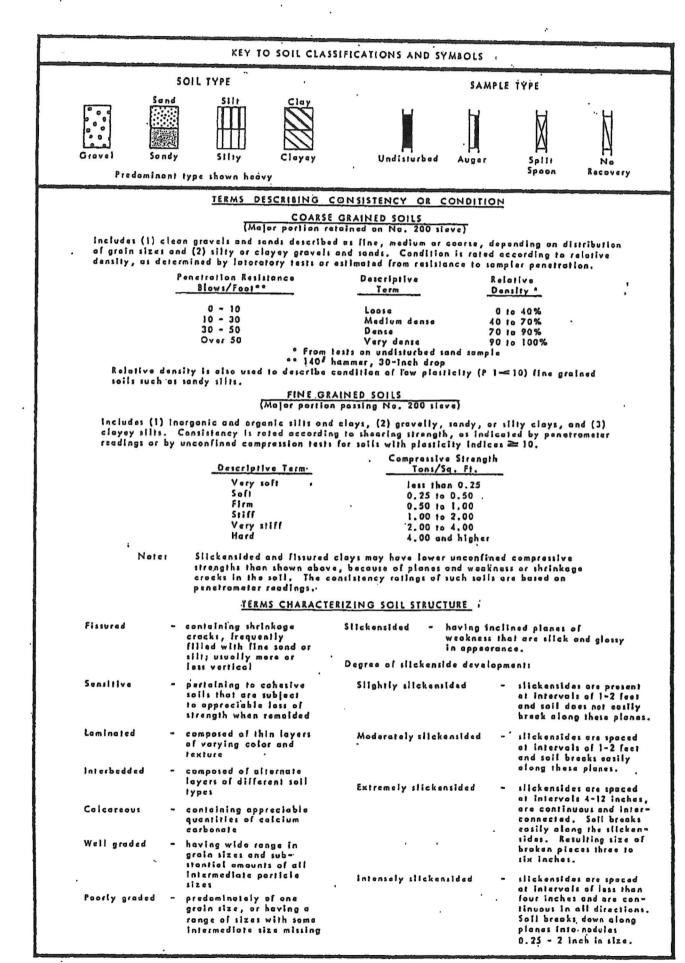
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	10"	<u> </u>	Tan and gray silty clay -with white silt poo -purple -tan and purple -with limestone f	ckets and iron		ains		-								
	10"	U	-slightly sandy ~with iron stains													
15	7"	U	-purple	•												W.P.
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ā		T	Tan and bluish gray sar	dy clay with	iron sta	ains			3							ς
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Ţ.			Tan silty sand						3						اح	5/71
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35	12"	U	-with clay seams													. 1925
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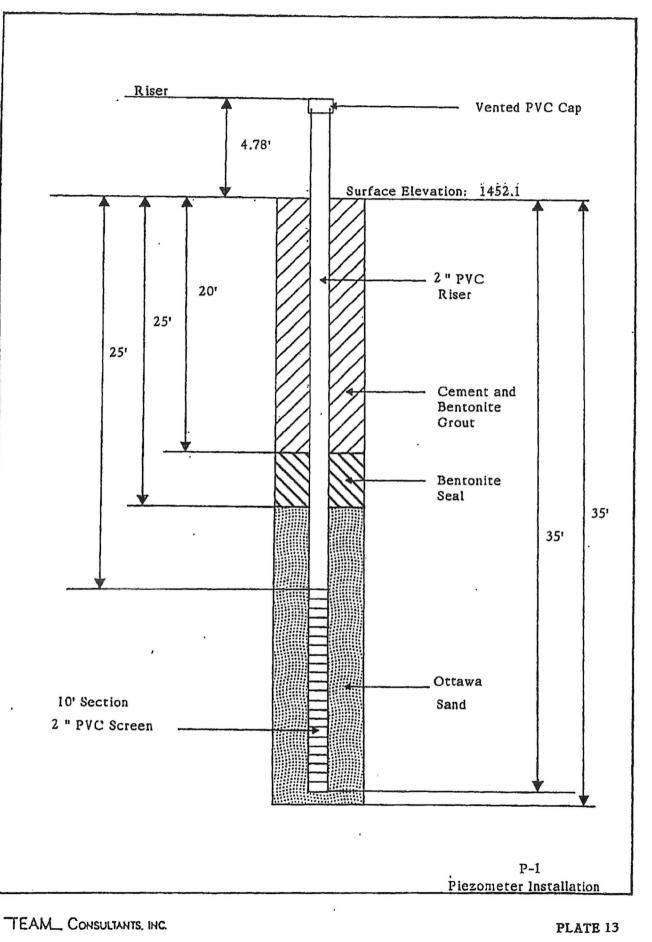
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ole	pnenvi	116, 1	stath County, Texas	SAMPLING METH		disturb		nd			2	OF	2		DRILLING CONTR Dowell Well Service. Inc.
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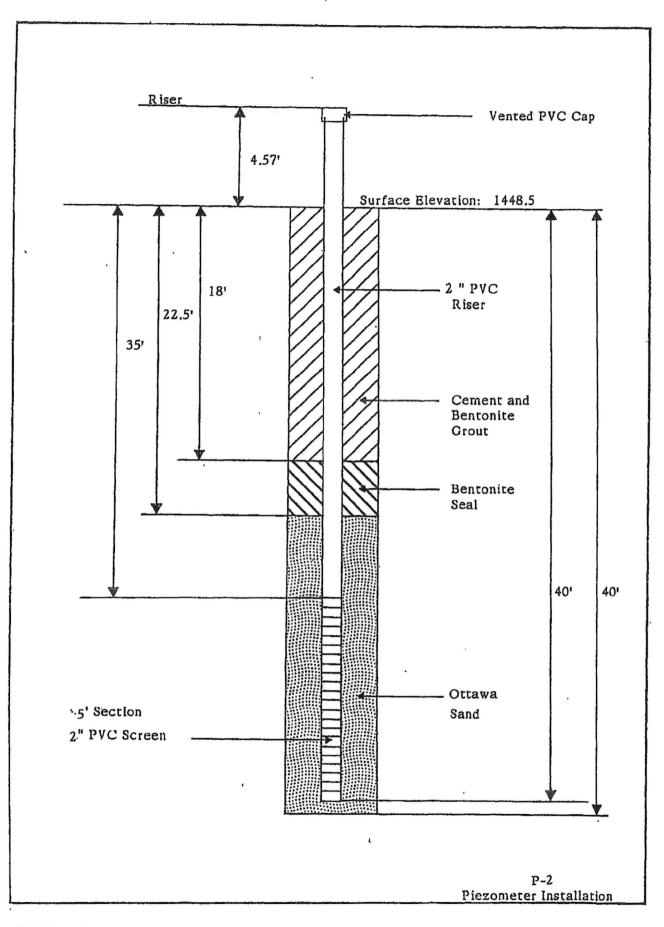
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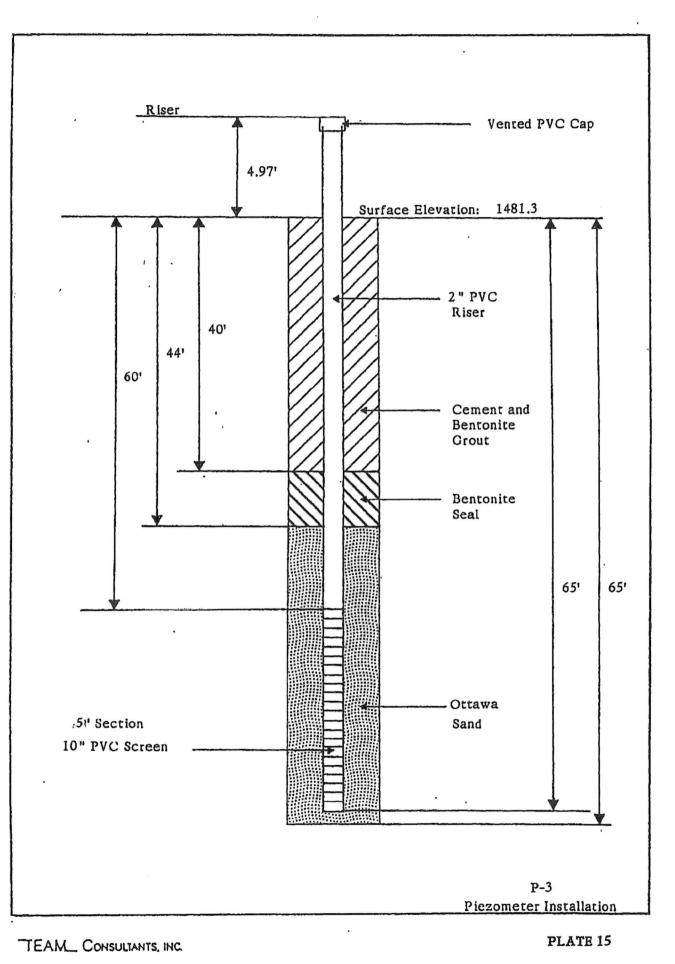
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J Riser Vented PVC Cap Π 3.91' Surface Elevation: 1483.4 \square Π 2 " PVC 33' Riser 43' 75' \Box Cement and Bentonite Π Grout Bentonite Seal \Box Ottawa 5' Section Sand 10" PVC Screen Π P-4 Piezometer Installation . TEAM_ CONSULTANTS, INC.

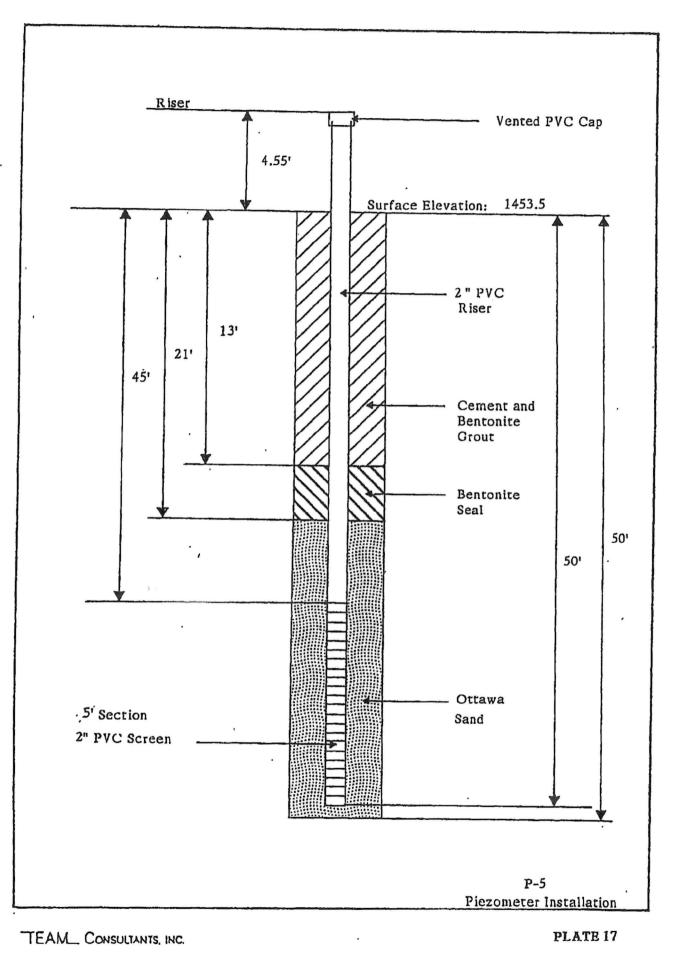
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PLATE 16

80'

80'

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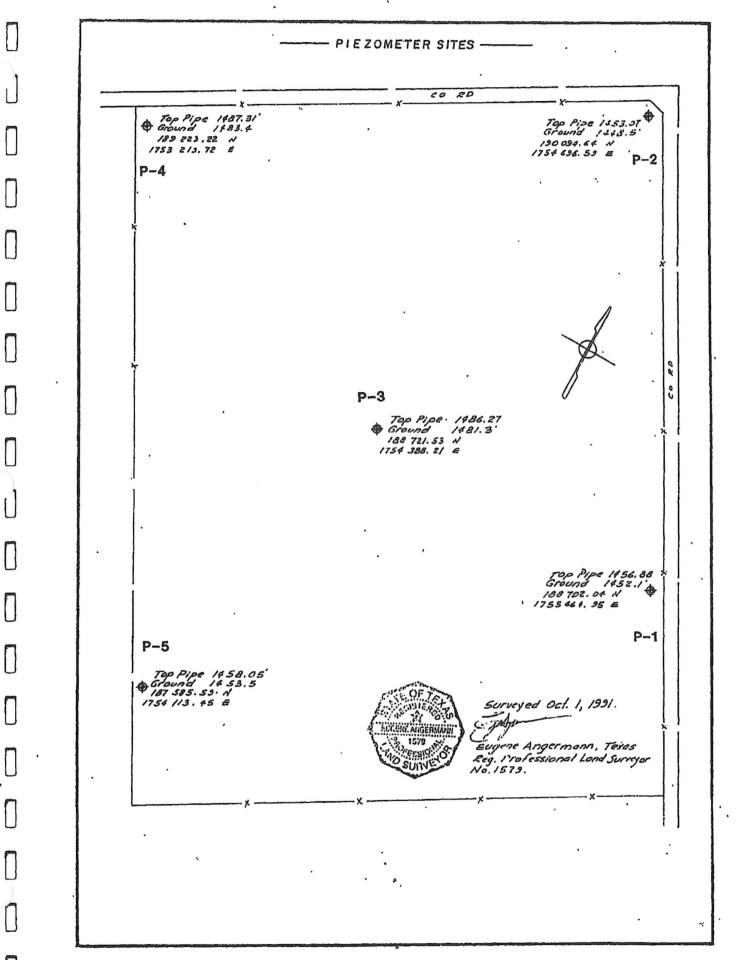
HYDROGEOLC	GICAL	SITE A	ASSESSMENT
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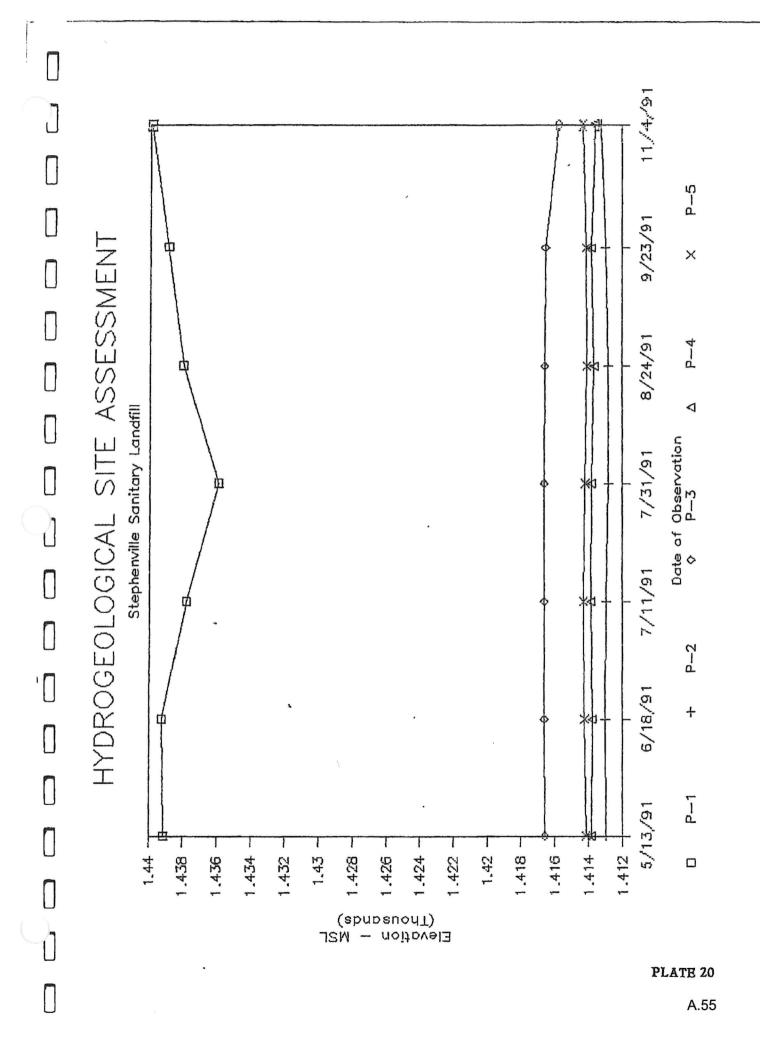
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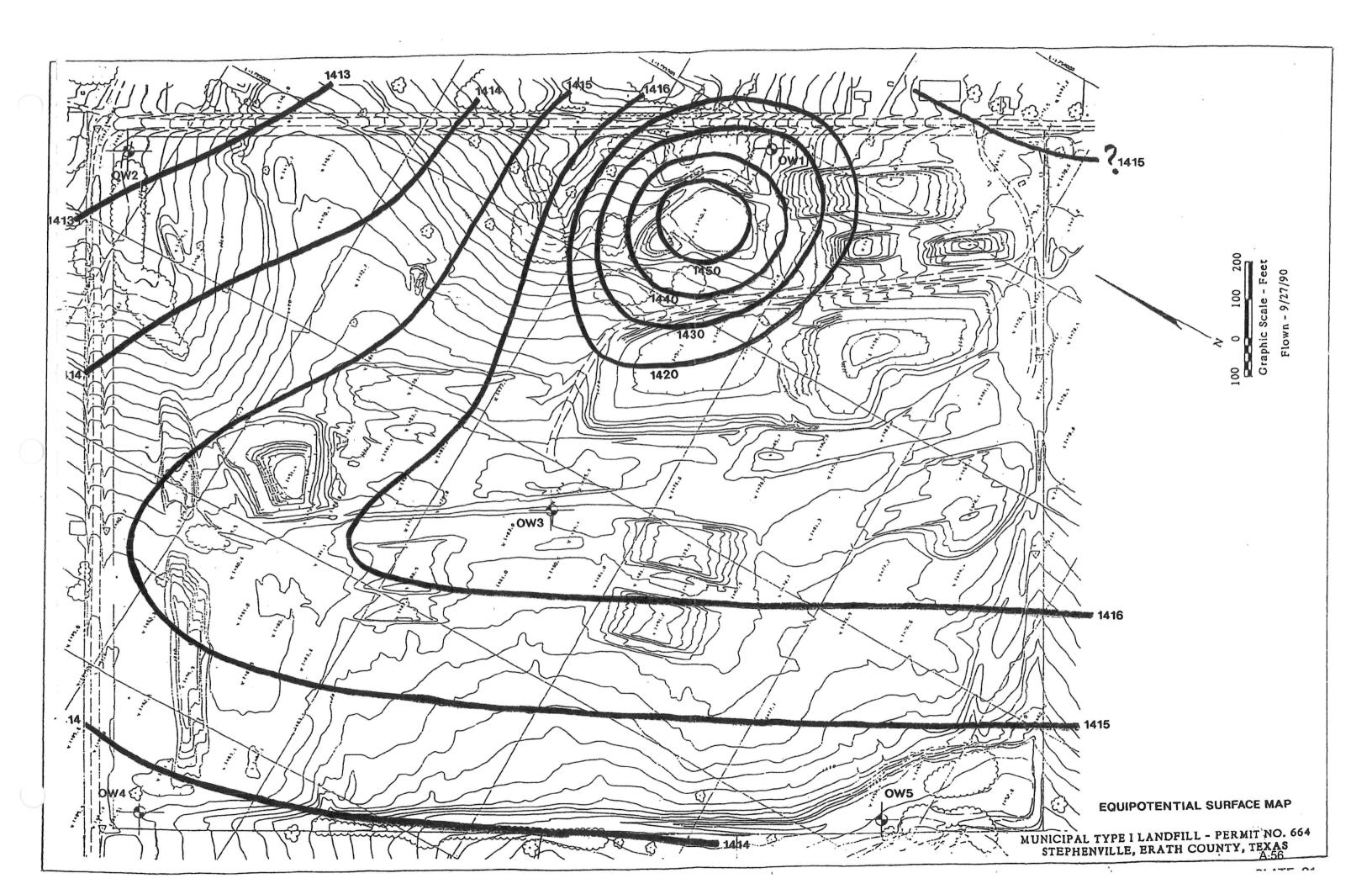
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		7/31/91	20.95	1435.93
U		8/24/91	18.90	1437.98
		9/23/91	17.98	1438.90
		11/4/91	17.00	1439.88
U	P-2	5/13/91	40.10	1412.97
0		6/18/91	40.05	1413.02
		7/11/91	40.12	1412.95
L		7/31/91	40.25	1412.82
-		8/24/91	40.25	1412.82
		9/23/91	40.10	1412.97
\Box		11/4/91	39.85	1413.22
	P-3	5/13/91	69.70	1416.57
		6/18/91	69.65	1416.62
-		7/11/91	69.65	1416.62
П		7/31/91	69.65	• 1416.62
		8/24/91	69.70 69.71	1416.57
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П		11/4/91	70.50	1415.//
	P-4	5/13/91	73.49	1413.82
-		6/18/91	73.55	1413.76
	,	7/11/91	73.46	1413.85
		7/31/91	73.48	1413.83
0		8/24/91	73.65	1413.66
,		9/23/91	73.50	1413.81
	8	11/4/91	73.70	1413.61
	P-5	5/13/91	43.91	1414.14
		6/18/91	43.80	1414.25
		7/11/91	43.76	1414.29
0		7/31/91	43.85	1414.20
2		8/24/91	43.98	1414.07
		9/23/91	43.93	1414.12
Ц		11/4/91	43.75	1414.30

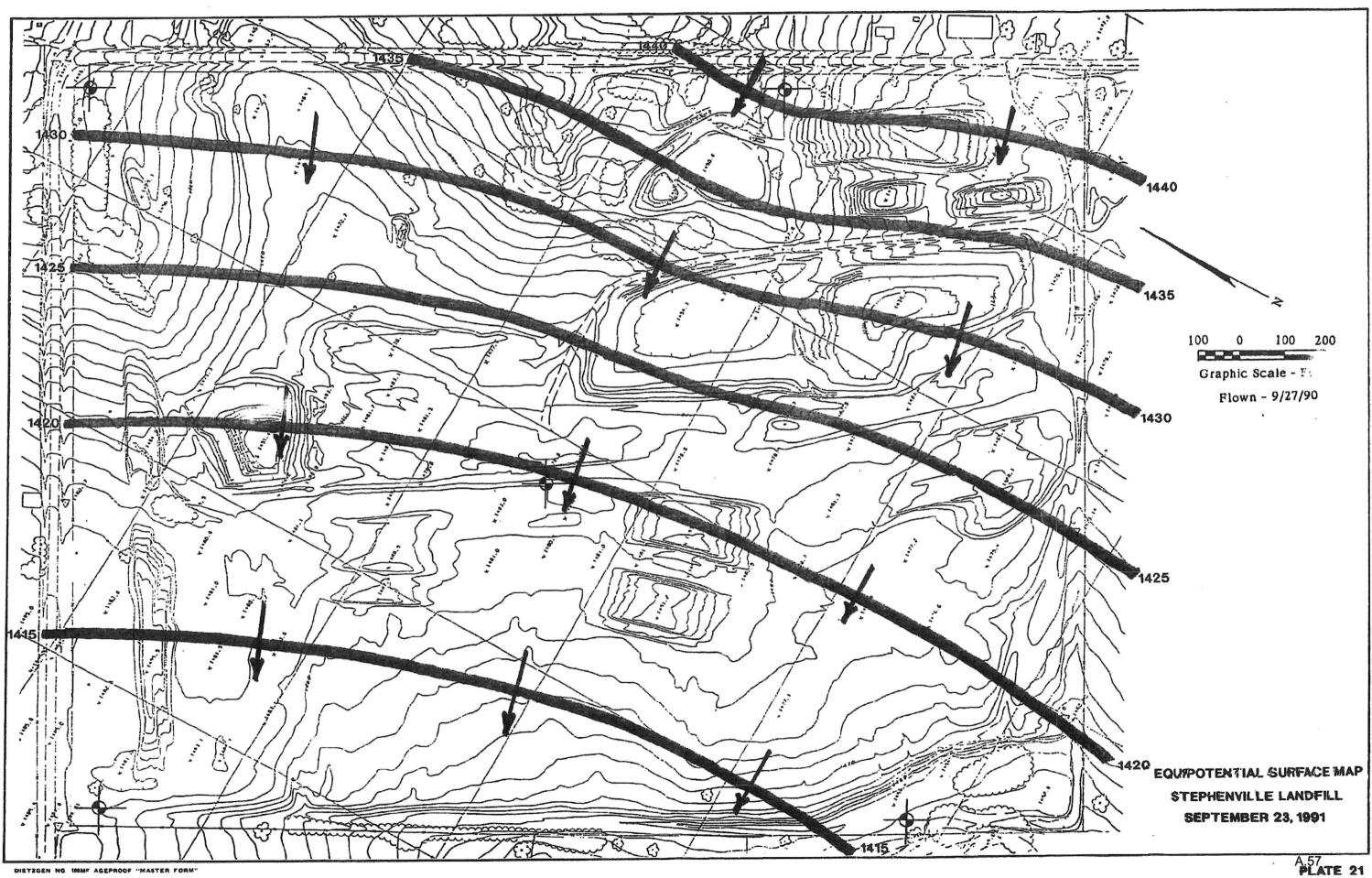


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TEAM_ CONSULTANTS, INC.







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NET Gulf Coast, Inc. Dallas Division 1548 Valwood Parkway Suite 118 Carrollton, TX 75006 Tel: (214) 406-8100 Fax: (214) 484-2969

Mailing Address:

P.O. Box 815006

ANALYTICAL REPORT

Bill Prikryl TEAM CONSULTANTS 3101 Pleasant Valley Suite 101 Arlington, TX 76015

91201, STEPHENVILLE SLF

Date Received: 09/26/1991

172078 OW-1 Taken: 09/23/1991

4.7 mg/L Chloride pH, Field Solids, Total Dissolved units 6.88 325 mg/L Specific Conductance, Field Total Organic Carbon (W) a Total Organic Carbon (W) b Total Organic Carbon (W) c Total Organic Carbon (W) d umhos/cm 569 1.58 mg/L 1.64 mg/L <1.00 mg/L mg/L 1.00 mg/L Iron, ICP 0.09 mg/L Manganese, ICP <0.01

172079 OW-2 "laken: 09/23/1991

PLATE 22

Dallas, TX 75381 10/07/1991 Job No.: 91.2600

Sample No: 172078 Page: 1

ANALYTICAL REPORT

10/07/1991 Bill Prikryl Job No.: 91.2600 TEAM CONSULTANTS Sample No: 172079 3101 Pleasant Valley Page: 2 Suite 101 Arlington, TX 76015 91201, STEPHENVILLE SLF Date Received: 09/26/1991 OW-4 172080 Taken: 09/23/1991 mg/L units 30.0 Chloride 6.85 pH, Field mg/L 468 Solids, Total Dissolved Specific Conductance, Field Total Organic Carbon (W) a Total Organic Carbon (W) b Total Organic Carbon (W) c umhos/cm 715 mg/L 11.3 14.5 mg/L mg/L 7.97 mg/L 9.22 Total Organic Carbon (W) d mg/L 0.58 Iron, ICP 0.09 mg/L Manganese, ICP OW-5 172081 Taken: 09/23/1991 mg/L 16.8 Chloride units 6.80 pH, Field mg/L 512 Solids, Total Dissolved Specific Conductance, Field Total Organic Carbon (W) a Total Organic Carbon (W) b Total Organic Carbon (W) c umhos/cm 749 2.50 mg/L mg/L 2.63 mg/L <1.00 mg/L Total Organic Carbon (W) d 1.22 mg/L 1.5 Iron, ICP mg/L 0.08 Manganese, ICP

Bowlin

Donna L. Bowlin, Manager Dallas Division

PLATE 23

STANDARD QUALITY CONTROL DATA REPORT

JOB NUMBER: 91.2600

]	PARAMETER	ANALYST	DATE	TIME	NETHOD	STANDARD AMOUNT	EXTERNAL STANDARD	% REC	BLANK	
٦	Solids, Total Dissolved	mat	10/07/1991	14:30	A-2098	923	884	95.8	<10	
	Chloride	mat	09/30/1991	10:00	A-407B	74.4	73.4	98.6	<0.50	
	Iron	skw	10/02/1991	06:43	E-200.7	1.00	1.01	101.0	<0.05	
-	Manganese	sku	10/02/1991	06:43	E-200.7	1.00	1.00	100.0	<0.01	

Method - Codes, i.e.

- A refers to APHA, <u>Standard Methods for the Examination</u> of Water and Wastewater, 16th edition
 - E refers to EPA's 1979 <u>Methods for Chemical Analysis of Water</u> <u>and Wastes</u> - for Inorganic Analyses
 E - refers to EPA's 1979 <u>Methods for Organic Chemical Analysis</u>
 - of Municipal and Industrial Wastes for Organic Analyses
 - S refers to SW846, 3rd edition
 - D refers to ASTM
- M Method has been modified
- * refers to Other Reference

External Standard - the Actual/Theoretical value for that batch of analysis. Acceptance Criteris - for organic analyses, results must be within 10% of the true value, except where EPA methods state otherwise; for inorganic analyses, control limits are determined by internal control charts and are speficic to each analyte.

Blank - samples are not blank corrected by the laboratory

PLATE 24

GROUNDWATER MONITORING REPORT

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TDH Permit No. <u>664</u> Monitor Well I.D. No. <u>MW-1</u>
Submittal for _ Background Data X Semiannual/Annual Data _ Fourth Year Data Purpose of: Groups 1 2 3 & 4 Groups 3 & 4 Groups 2 3 & 4 Date Sampled: <u>09/23/9</u> 1No. Quarts Collected: <u>2</u> Sampled By: <u>D. Harris/TEAM CONSULTANTS</u>
Representing: Site Operator] Consultant X_ Laboratory Personnel
Well Purged/Bailed Before Sampling: Yes X No K No K No Before: Immediately
No. Well Volumes Purged: <u>0.3</u> Depth to Water Before Bailing:ft Elev MSL 17.98
How were Samples Collected:

Were sample preservation procedures in accordance with TDH Guidelines:

Yes X No

_	GROUP	PARAMETER	LEVEL	UNITS	ANALYSIS METHOD
	1	Arsenic		lmg/1	JE200.7
		Barlum		Img/l	E200.7
_		Cadmium		img/l	E200.7
_		Chromium		mg/l	1E200.7
		Copper		mg/l	E200.7
		Lead		mg/l	E200.7
		Mercury		mg/l	E245.1
		Selenium		mg/l	E200.7
		Silver	1	Img/1	E200.7
-		lzinc		Img/1	E200.7
		1			1
	2	Calcium, Dissolved	I	mg/l	E200.7
		Magnesium, Dissolved		Img/L	E200.7
-		Sodium, Dissolved		img/1	E200.7
-		Potassium, Dissolved		Img/l	E200.7
		Carbonate	1	Img/l	1
		Bicarbonate (CaCO3)	1	mg/l	1
_		Sulphate	1	Ing/1	E375.4
		Fluoride		1mg/l	E340.2
		Nitrate (N)		1mg/l	1E352.1
-		Phenolphthalein	1		1
		Alkalinity (CaCO3)	1	mg/l	1
-		Alkalinity (CaCo3)	1	mg/t_	E310.1
		Hardness (CaCO3)	1	[mg/l	E130.2
		Anion/Cation Balance	1	meg/mec	1
-		Anion/Cation Difference	1	1%	1
-	3	1Chloride	4.7	Ing/1	12325.3
-		pH, Field	6.88	units	E150.1
-		Specific Conductance, Field		Jumhos/c	m E120.1
-		Total Dissolved Solids	325	Img/L	[E160.1
-		Total Organic Carbon	1 1.58	(mg/L	E415.2
-		Total Organic Carbon	1 1.64	Img/1	E415.2
-	ĩ	Total Organic Carbon	<1.00	Img/l	E415.2
-		Total Organic Carbon	1 1.00	Img/l	1E415.2
-		I I I I I I I I I I I I I I I I I I I	1	1	
	4	Iron, Dissolved	0.09	l lmg/l	E200.7
_	4	Manganese, Dissolved	<0.01	mg/t	1E200.7

Laboratory Representative Signature: NXXDUUU Phone: (214) 406-8100

Laboratory Name: <u>NET (Gulf Coast), Inc.</u> Address: <u>1548 Valwood Parkway, Suite 118</u>

Site Operator Signature: ______ Date: _____

GROUNDWATER	MONITORING	REPORT
OKOONO WATER	LINEAP LINIS FLAM	Ileast with 1

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Purpose o	or Background Data X f: Groups 1 2 3 & 4 Groups 1	3 & 4	Groups 2 3	884
ate Sample	d: 09/23/91No. Quarts Collect	ed: <u>2</u>	Sampled By	: D. Harris/IEAM CONSULT
opresenting	g: Site Operator Consu	ltant X	Laborat	cory Personnel
ell Purged	/Bailed Before Sampling: Yes	X No	Ho	a long Before: <u>Immediately</u>
io. Well Vo	lumes Purged: 0.2 Depth	to Water	Before Bai	lling:ft Elev MSL 40.1
low were Sa	mples Collected: 1.7" TEFLO	N BAILER		······································
		~		
iere sample	preservation procedures in a	ccordance	with TDH (Guidel mes:
	Yes		• [_]	
CROLIP	IPARAMETER	LEVEL	UNITS	ANALYSIS METHOD
GROUP	Arsenic			E200.7
	Barium		mg/l	E200.7
			Img/L	E200.7
1	Chromium		Img/l	E200.7
	Copper		lmg/l	1E200.7
L	Lead	L 	Ing/1	[E200.7
L	Mercury		mg/L	E245.1
L	Selenium		mg/l	E200.7
1	Silver		mg/1	[E200.7
l	Zinc	<u> </u>	ing/l	JE200.7
L		<u> </u>		1E200.7
2	Calcium, Dissolved	Ļ	ling/l	E200.7
<u></u>	Magnesium, Dissolved	<u> </u>	mg/l	E200.7
<u> </u>	Sodium, Dissolved	l		IE200.7
<u> </u>	Potassium, Dissolved	1	img/t	1
ļ	[Carbonate [Bicarbonate (CaCO3)	1	img/l	1
1	Sulphate	1	Img/L	E375.4
L	Contraction of the second s	1	Img/l	E340.2
1		1	Img/l	[E352.1
1	Phenolphthalein	1		1 1
1	Alkalinity (CaCO3)	i	mg/l	
1	Alkalinity (CaCo3)		Img/L	E310.1
1	Hardness (CaCO3)	1	mg/l	E130.2
1	Anion/Cation Balance	1	[meg/meg	
1	Anion/Cation Difference	L	1%	
3	Chloride	1 8.9	Img/1	[E325.3
1	IpH, Field	6.91	lunits	[E150.1
1	Specific Conductance, Field			miE120.1
<u> </u>	Total Dissolved Solids	535		E160.1
Ļ	Total Organic Carbon	1 4 74	Img/L	1E415.2
<u> </u>	Total Organic Carbon	1 4.36		[E415.2]
L	ITotal Organic Carbon	2.46	Img/L	1E415.2
1	Total Organic Carbon	1 3.12	1mg/1	1 1
1	1	1		E200.7
4	Iron, Dissolved	0.40	mg/1	

Laboratory Name: NET (Gulf Coast), Inc. Address: 1548 Valwood Parkway, Suite 118

Site Operator Signature: _____ Date: _____

GROUNDUATER	MONITORING	REPORT

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	3 & 4 ed: <u>2</u> itant <u> X</u> <u> X </u> No to Water <u>N BAILER</u>	Groups 2 Sampled B Labora	3 & 4 y: <u>D. Harris/TEAM CONSULTA</u> atory Personnel [] w long Before: <u>Immediately</u> ailing: ft Elev MSL 73.50
: <u>09/23/9</u> 1No. Quarts Collect : Site Operator]] Consu Bailed Before Sampling: Yes umes Purged: <u>0.2</u> Depth ples Collected: <u>1.7" TEFLO</u> preservation procedures in a Yes	ed: 2	Sampled B	y: <u>D. Harris/TEAM CONSULTA</u> atory Personnel [] w long Before: <u>Immediately</u> ailing: ft Elev MSL 73.50
Bailed Before Sampling: Yes umes Purged: <u>0.2</u> Depth ples Collected: <u>1.7" TEFLO</u> preservation procedures in a Yes	X No to Water N BAILER	Before Be	W long Before: <u>Immediately</u> Wiling: ft Elev MSL 73.50
umes Purged: <u>0.2</u> Depth ples Collected: <u>1.7" TEFLO</u> preservation procedures in a Yes	to Water <u>W BAILER</u> accordance	Before Ba	ailing:ft ElevMSL 73.50
ples Collected: <u>1.7" TEFLO</u> preservation procedures in a Yes	W BAILER	with TDH	73.50
preservation procedures in a Yes	iccordance		Guidelines:
Yes			Guidelines:
	I <u>×</u> I ×		
IDADAMETED		··· ·	
PARAPEICR	LEVEL	UNITS	ANALYSIS METHOD
Arsenic	L	img/l	E200.7
Barium		Ing/L	[E200.7
Cadmium	L	mg/l	E200.7
Chromium	L		1E200.7
Copper	L		E200.7
Lead	L		[E200.7
Mercury	L		1E245.1
Selenium	<u> </u>		[E200.7
Silver	<u> </u>		1E200.7
Zinc	<u> </u>	1mg/1	1E200.7
In the Discoluted	<u> </u>	ima/l	1E200.7
	1		E200.7
	1		1E200.7
	1		E200.7
	1	mg/l	11
	1	lug/l	
	1	Img/l	E375.4
and the second descent of the second descent descent descent descent descent descent descent descent descent de	1	lmg/l	JE340.2 1
	1	img/l	JE352.1
[Phenolphthalein	1		
Alkalinity (CaCO3)	1	mg/l	
(Alkalinity (CaCo3)	1		[E310.1
Hardness (CaCO3)	1		jE130.2
Anion/Cation Balance	<u> </u>		
	<u></u>		
Chloride			1E325.3
			E150.1
			[E160.1
			[E415.2
	Statement of the second se		[E415.2
			E415.2
			[E415.2]
liotal urganic carbon	1 7.22	1	1 1
l Iton Discolved	1 0.58	mg/l	E200.7
			E200.7
	[Arsenic [Barium [Cadmium [Copper [Lead [Mercury [Selenium [Silver [Zinc ¹ [Calcium, Dissolved [Sodium, Dissolved [Sodium, Dissolved [Sodium, Dissolved [Sodium, Dissolved [Sodium, Dissolved [Carbonate [Bicarbonate (CaC03) [Sulphate]Fluoride [Nitrate (N) [Phenolphthalein [Alkalinity (CaC03) [Alkalinity (CaC03) [Anion/Cation Balance [Anion/Cation Difference [Chloride [pN, Field [Specific Conductance,Field [Total Organic Carbon [Total Organic Carbon [Total Organic Carbon [Total Organic Carbon [Iotal Organic Carbon	IPARAMETER ILEVEL [Arsenic [Barium [Cadmium [Chromium [Copper [Lead [Mercury [Selenium [Silver [Zinc [Cadmum, Dissolved [Sodium, Dissolved [Potassium, Dissolved [Sulphate [Bicarbonate (CaC03) [Nitrate (N) [Phenolphthalein [Alkalinity (CaC03) [Ahtadinity (CaC03)	IPARAMETER ILEVEL IUNIYS [Arsenic img/l img/l [Barium img/l img/l [Cadmium img/l img/l [Lead img/l img/l [Lead img/l img/l [Selenium img/l img/l [Selenium img/l img/l [Silver img/l img/l [Silver img/l img/l [Selenium, Dissolved img/l [Sodium, Dissolved img/l [Sodium, Dissolved img/l [Sodium, Dissolved img/l [Bicarbonate (CaCO3) img/l [Bicarbonate (CaCO3) img/l [Sulphate img/l [Atkalinity (CaCO3) img/l [Atkalinity (CaCO3) img/l [Atkalinity (CaCO3) img/l [Atkalinity (CaCO3) img/l [Atkalinity (

Laboratory Name: NET (Gulf Coast), Inc. Address: 1548 Valwood Parkway, Suite 118

Site Operator Signature: ______ Pate: _____

GROUNDWATER	MONITORING	REPORT

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Submittel i	for _ Background Date X of: Groups 1 2 3 & 4 Groups	Semiannu 3 & 4	ual/Annual Groups 2	Data (Fourth Year Da 3 & 4	ta
Date Sample	ed: <u>D9/23/9</u> 1No. Quarts Collec	ted: _2	Sampled B	y: <u>D. Harris/TEAM CONSUL</u>	TAN
	ng: Site Operator Cons				
Well Purge	d/Bailed Before Sampling: Ye	s X N	∘ [_ Hα	w long Before: <u>Immediate</u>	ly
	olumes Purged: 0.5 Dept				
Nov yere S	amples Collected: <u>1.7" TEFL</u>	ON BAILER			
Were sampl	e preservation procedures in	accordanc	e with TDH	Guidelines:	
nan ante parte e construction de So		_			
	Yes	X	No []		
	In ADAUGTED	LEVEL	UNITS	ANALYSIS HETHOD	
GROUP	PARAMETER Arsenic	1]mg/L	E200.7	
1	Barium	1	lmg/L	[E200.7]	
1	Cadmium	I	lmg/l	1E200.7	
<u> </u>	Chromium	1	Img/l	E200.7	
1	Copper	1	mg/l	1E200.7	
1	Lead	1	lmg/l	E200.7	
	Mercury	1	(mg/l	E245.1 1	
1	Selentum	1	mg/l	E200.7	
1	Silver	Ī	Img/l	[E200.7]	
1	Zinc	1	lmg/l	E200.7	
1	1	1			
1 2	Calcium, Dissolved	1	Ing/l	[E200.7	
1	Magnesium, Dissolved	1	ing/l	1E200.7	
1	Sodium, Dissolved		mg/l	1E200.7	
1	Potassium, Dissolved	1	Img/1	E200.7	
1	Carbonate		Img/l	1	
1	Bicarbonate (CaCO3)	1	Img/l		
Ī	Sulphate		mg/l	E375.4	
1	Fluoride		Img/l	1E340.2	
1	Nitrate (N)		Img/L	[E352.1	
1	Phenolphthalein				
1	(Alkalinity (CaCO3)	<u> </u>	1mg/1		
1	Alkalinity (CaCos)	_ <u>_</u>	Img/t	1E310.1	
1	Hardness (CaCO3)	_ <u> </u>	Img/1	[E130.2	
1	Anion/Cation Balance	- <u> </u>	mect/me	<u>1</u>	
L	Anion/Cation Difference		1%	lE325.3	
13	JChloride	1 16.8		E150.1	
L	IpH, Fleid	6.80		cm]E120.1	
1	Specific Conductance, Fie			[E160.1	
<u> </u>	[Total Dissolved Solids	1 512		1E415.2	
<u></u>	ITotal Organic Carbon	2.5		1E415.2	
ļ	Total Organic Carbon			E415.2	
<u>!</u>	Total Organic Carbon	<1.0		[E415.2	
	Total Organic Carbon	1 1.2			
	1	1		E200.7	
1	Iron, Dissolved	1 1.5	mg/l		

Laboratory Name: NET (Gulf Coast), Inc. Address: 1548 Valwood Parkway, Suite 118

Site Operator Signature: _____ Date: _____

$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	c), Inc. ner Service at Gulfport (601) 863-3036 Houston (7,13) 681-5490	FOR ANALYSIS***** 2 B B REMARKS	S	NOITAVE	参留 では Special Limits Required	ple P	\mathcal{V} sheet detailing requirements.	4	2	7					DATE TIME RECEIVED BY: DATE (Signature)	11-4-11 7:40	RECEIVED FOR NET BY: DATE/TIME (Signature)	X. Bhillen 7.1	ALL SAMPLE REMAINDERS / Cate) Cate (Signature) <u>のプでらう1</u> (Date) CA MINED TO BE HATAFOOLIS A MINIMI IM	AL. RE	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	NET (Gulf-Coast Questions? Contact Custor Austin (512) 928-8905 Dallas (214) 406-8100	PARAMETERS FOR		h	7 E C 100		X	· ×	X						 RELINQUISHED BY: (Signature)	Quan A. Yared.	CoURIER (Signature)	· .	AL I REQUEST NET TO DISPOSE OF ALL	ADDITIONAL CHARGE OF \$25.00 PEF	-
$\frac{\beta_{1}}{\beta_{1}} = \frac{\beta_{1}}{\beta_{1}} = \frac{\beta_{1}}{\beta$	14412755 UALLIEY (21)57 6015 # 1	. 7	- 5500	YOUR PROJECT NAME:	SL	TIME		9/23/91	9/25/91			· · · · · · · · · · · · · · · · · · ·	1	· · ·	 TIME	71 6000 Vm	1,	, y,e 1		(EU)	
OUR COM NOUR OUR COM YOUR PR YOUR PR YOUR PR YOUR PR YOUR PR OUV OUV OUV OUV OUV OUV Sample	TEAM 3101 P	NAME OF PERSON TO CONTACT: B_{1}^{\prime} , C_{1}^{\prime}	517-		91201 5	YOUR SAMPLE DESCRIPTION:	0w-1	0w-2.	H S- MO	όψ- 5		*				21/2 SIGGAL Vana	IN.	5 e	CI RETURN SAMPLE REMAINDER TO CLIENT VIA	(SOME SHIPPING CHANGES MAY BE INVUTI	5



NET Gulf Coast, Inc. Dallas Division 1548 Valwood Parkway Suite 118 Carroliton, TX 75006 Tel: (214) 406-8100 Fax: (214) 484-2969

ANALYTICAL REPORT

Mailing Address: P.O. Box 815006 Dallas, TX 75381

Bill Prikryl TEAM CONSULTANTS 3101 Pleasant Valley Suite 101 Arlington, TX 76015

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12/26/1991 Job No.: 91.3677

Page: 1

91201 STEPHENVILLE SLF

Date Received: 12/11/1991

176124 OW-1

Taken: 12/10/1991 01:25

Chloride pH Total Organic Carbon (W) a Total Organic Carbon (W) b Total Organic Carbon (W) c Total Organic Carbon (W) d Iron, ICP Manganese, ICP Specific Conductance Solids, Total Dissolved	8.3 7.3 2.0 2.0 2.0 0.14 <0.01 562 335	mg/L units mg/L mg/L mg/L mg/L umhos/cm mg/L
--	--	---

176125 OW-2 Taken: 12/10/1991 01:50

Chloride pH Total Organic Carbon (W) Total Organic Carbon (W) Total Organic Carbon (W) Total Organic Carbon (W) Iron, ICP Manganese, ICP	a b c d	25.3 7.2 2.0 2.0 2.0 2.0 93.9 5.0	mg/L units mg/L mg/L mg/L mg/L mg/L
Specific Conductance		550	umhos/cm
Solids, Total Dissolved		452	mg/L

ANALYTICAL REPORT

Bill Prikryl TEAM CONSULTANTS 3101 Pleasant Valley Suite 101 Arlington, TX 76015 12/26/1991 Job No.: 91.3677

Page: 2

91201 STEPHENVILLE SLF

Date Received: 12/11/1991

176126 OW-5 Taken: 12/10/1991 03:15

Total Organic Carbon (W) b2.0mg/LTotal Organic Carbon (W) c2.0mg/LTotal Organic Carbon (W) d2.0mg/LIron, ICP21.2mg/LManganese, ICP1.2mg/LSpecific Conductance715umhos	s s/cm
Specific Conductance 715 umnos Solids, Total Dissolved 487 mg/L	s/cm

176127 OW-4

Taken: 12/10/1991 02:35

Chloride pH Total Organic Carbon (W) a Total Organic Carbon (W) b Total Organic Carbon (W) c Total Organic Carbon (W) d Iron, ICP Manganese, ICP Specific Conductance Solida Total Discolved	38.7 7.2 5.0 4.0 3.0 3.0 4.2 0.30 696 437	mg/L units mg/L mg/L mg/L mg/L umhos/cm mg/L
Solids, Total Dissolved	437	mg/L

nua L. Bowlin

Donna L. Bowlin, Manager Dallas Division

PLATE 31

STANDARD QUALITY CONTROL DATA REPORT

JOB NUMBER: 91.3677

П	PARAMETER	ANALYST	DATE	TIME	METHOD	STANDARD AMOUNT	EXTERNAL STANDARD	% REC	BLANK
U									
-	Chloride	clut	12/17/1991	15:00	A4078	55.4	51.6	93	<0.50
Π	Total Organic Carbon	ndk	12/13/1991		E415.1			102	<1.0
U	Total Organic Carbon	ndk	12/23/1991		E415.1			93	<1.0
	Iron, ICP	sku	12/20/1991	12:28	E200.7	1.00	1.03	103	<0.05
	Marganese, ICP	ग्रहित	12/20/1991	12128	E200.7	1.00	1.02	102	<0.01
	Specific Conductance	des	12/16/1991	08z00	A205	1410	1410	100	<0.80
Ц	Solids, Total Dissolved				1				
п									

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Nethod - Codes, i.e.

A - refers to APHA, Standard Methods for the Examination

E - refers to EPA's 1979 Nethods for Chemical Analysis of Water

E - refers to EPA's 1979 Nethods for Organic Chemical Analysis of Municipal and Industrial Wastes - for Organic Analyses

of Vater and Wastewater, 16th edition

and Wastes - for Inorganic Analyses

External Standard - the Actual/Theoretical value for that batch of analysis. Acceptance Criteria - for organic analyses, results must be within 10% of the true value,

Blank - samples are not blank corrected by the laboratory

S - refers to SU846, 3rd edition

N - Nathod has been modified * - rafers to Other Reference

except where EPA methods state otherwise,

D - refers to ASTM

PLATE 32

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GROU	UNDWATER MONITORIN	G REPO	RT		
	TDH Permit No. 664	Nonitor N	Well I.D. M	lo. <u>OW-1</u>	
Purpose or	or [] Background Data [X_] f: Groups 1 2 3 & 4 Groups 3 d:12/10/91 No. Quarts Collecte	3 & 4 (Groups 2 3	& 4	
	g: Site Operator [Consul				
Well Purged	/Bailed Before Sampling: Yes	X No	[_] Ном	long Before: Immed	iately
	lumes Purged: 0.5 Depth				MSL
How were Sa	mples Collected: 1.5" Tef	lon Bailer			
Were sample	preservation procedures in a	ccordance	with TDH G	uidelines:	
	Yes	X No			
		<u>1-</u> 1	·'		
I GROUP	IPARAMETER 1	LEVEL	UNITS	ANALYSIS METHOD	
1 1	Arsenic		mg/l	E200.7	
1	Barium		1	E200.7	
1	Cadmium			E200.7	
1	Chromium			E200.7	
1	Copper			E200.7	
1	Lead			E200.7	
1	Mercury			E245.1	
<u></u>	Selenium			E200.7	
	Silver			E200.7	
	Zinc		1	1	
1 2 .	Calcium		Img/L	E200.7	
1	Magnesium			E200.7	
1	Isodium			E200.7	
	Potessium		lmg/l	E200.7	
<u> </u>	Carbonate		mg/l		
i	Bicarbonate (CaCO3)		mg/l		
Î	Sulphate			E375.4	
1	Fluoride		Ing/L	E340.2	
1	Nitrate (N)		mg/l	E352.1	
1	Phenolphthalein		l mg/l		
<u> </u>	Alkalinity (CaCO3)	ļ	ng/t	E310.1	
<u> </u>	Alkalinity (CaCo3)	1	[mg/1	IE130.2	
<u></u>	Hardness (CaCO3) Anion/Cation Balance		imeq/meq		
	Anion/Cation Difference	l	1%	i i	
3	Chloride	8.3		E325.3	
	pH, Field	6.84	Junits	E150.1	
+	Specific Conductance, Field	-	umhos/cm		
1	Total Dissolved Solids	335	lmg/l	E160.4	
1	Total Organic Carbon	2.0	mg/l	E415.2	
Ī	Total Organic Carbon	2.0	mg/l	E415.2	
1	Total Organic Carbon	2.0	lmg/l	E415.2	•
1	Total Organic Carbon	2.0	lmg/l	E415.2	-
1			1	15200 7	
		1 0 1/	mg/l	E200.7	
1 4	Iron	0.14	Img/L	[E200.7	7

Laboratory Name: NET (Gulf Coast), Inc. Address: 1548 Valwood Parkway, Suite 118

PLATE 33

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Site Operator Signature: _____ Date: ____

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	GROUNDWATER	MONITORING	REPORT
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TDH Permit No. <u>664</u> Monitor Well I.D. No. <u>OW-2</u>
Submittal for [Background Data X Semiannual/Annual Data Fourth Year Data Purpose of: Groups 1 2 3 & 4 Groups 3 & 4 Groups 2 3 & 4 Date Sampled:12/10/91 No. Quarts Collected: Z Sampled By: D.Marris/TEAM CONSULTANTS
Representing: Site Operator [Consultant X Laboratory Personnel []
Well Purged/Bailed Before Sampling: Yes X No L How Long Before: Immediately
No. Well Volumes Purged: 0.7 Depth to Water Before Bailing: ft Elev MSL 39.9 1413.17
How were Samples Collected: 1.5" Teflon Bailer
Were sample preservation procedures in accordance with TDH Guidelines:

.--.

GROUP	PARAMETER	LEVEL		ANALYSIS METHO
1	Arsenic		1	E200.7
	Bariun		mg/l	E200.7
	Cadmium		lmg/l	E200.7
	Chromium		1	E200.7
	Copper		1	E200.7
	Lead		mg/l	E200.7
	Mercury		mg/l	E245.1
	Selenium		lmg/l	E200.7
	Silver		mg/l	E200.7
	Zinc		Ing/l	E200.7
~~~~~	1		1	
2	Calcium		1mg/1	E200.7
	Magnesium		mg/1	E200.7
	Sodium		mg/l	E200.7
	Potassium		mg/l	E200.7
	Carbonate		[mg/l	
	Bicarbonate (CaCO3)		mg/l	1
	Sulphate		mg/l	E375.4
	Fluoride		mg/l	E340.2
	Nitrate (N)		mg/l	E352.1
	Phenolphthalein			1
	Alkalinity (CaCO3)		mg/l	
	Alkalinity (CaCo3)		lmg/l	[E310.1
	Hardness (CaCO3)		]mg/l	[E130.2
	Anion/Cation Balance		meq/meq	1
	Anion/Cation Difference	1	1%	1
3	Chloride	25.3	mg/l	E325.3
	pH, Field	6,93	units	E150.1
	Specific Conductance, Field	571	unhos/cn	
	Total Dissolved Solids	452	mg/l	[E160.4
	Total Organic Carbon	2.0	mg/t	E415.2
	Total Organic Carbon	2.0	[mg/l	E415.2
	Total Organic Carbon	2.0	Ing/l	E415.2
	Total Organic Carbon	2.0	mg/l	E415.2
		1	1	1
4	Iron	93.9	mg/t	E200.7
····	Manganese	5.0	mg/l	E200.7

Laboratory Name: NET (Gulf Coast), Inc. Address: 1548 Valwood Parkway, Suite 118

PLATE 34

Site Operator Signature:

Date:

ROUNDWATER M	ONITORING REPORT			
	TDH Permit No. 664	Monitor N	Well I.D. N	10. <u>01-5</u>
Submittal f Purpose o Date Sample	or [] Background Data [X] f: Groups 1 2 3 & 4 Groups 3 d:12/10/91 No. Quarts Collecte	Semiannua & & 4 ed: _2	l/Annual Da Groups 2 3 Sampled By:	ota    Fourth Year Data & 4 : _D. Harris/TEAM CONSULTAN
Representin	g: Site Operator [_] Consul	tant X	Laborato	ory Personnel
	/Bailed Before Sampling: Yes			
	lumes Purged: 0.5 Depth			ling: ft Elev MSL
How were Sa	mples Collected: 1.5" Tet	flon Baile	r	43.4 1414.65
	preservation procedures in a			uidelines:
		X No		
GROUP	PARAMETER	LEVEL	UNITS	ANALYSIS METHOD
1 1	Arsenic			E200.7
1	Barium			E200.7
1	Cadmium		mg/l	E200.7
1	Chromium		mg/l	E200.7
÷	Copper		mg/l	E200.7
1	Lead		Img/l	E200.7
+	Mercury		mg/L	E245.1
+	Selenium		-	E200.7
1				E200.7
ļ	Silver		1	E200.7
<u></u>	Zinc		1 1	
			lmg/l	E200.7
2	Calcium			E200.7
1	Magnesium		1	E200.7
<u> </u>	Sodium			E200.7
	Potassium		1	1
1	Carbonate		mg/l	1
1	Bicarbonate (CaCO3)		mg/t	
1	Sulphate			E375.4
Ī,	Fluoride		mg/l	E340.2
Ī	Nitrate (N)	1	Img/1	1E352.1
1	Phenolphthalein	1	1	Į Į
i	Alkalinity (CaCO3)	1	mg/l	
1	Alkalinity (CaCo3)	1	lmg/l	E310.1
1	Hardness (CaCO3)	1	mg/l	E130.2
i	Anion/Cation Balance		meq/meq	
i	Anion/Cation Difference	1	1%	
1 3	Chloride	24.0	[mg/l	E325.3
1	pH, Field	6.83	units	[E150.1
1	Specific Conductance, Field	755	unhos/cm	E120.1
1	Total Dissolved Solids	487	[nig/l	E160.4
1	Total Organic Carbon	2.0	Ing/L	E415.2
<u> </u>	Itotal Organic Carbon	1 2.0	mg/l	E415.2
1	Total Organic Carbon	2.0	Img/L	[E415.2
ļ	Total Organic Carbon	1 2.0	Img/l	[E415.2
<u> </u>	Intar organic carbon	1	1	
	1	1		E200.7
1		1 21 2	i ma / i	
4	Iron  Manganese	1 21.2	[mg/l [mg/l	[E200.7

Laboratory Name: NET (Gulf Coast), Inc. Address: 1548 Valwood Parkway, Suite 118

PLATE 35

Site Operator Signature: _____ Date: _____

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	ORING REPORT				
	TDR Permit No. 664	Monitor W	lell I.D. N	lo. <u>OW-4</u>	
Purpose of: G	Background Data  X   roups 1 2 3 & 4 Groups 1 /10/91 No. Quarts Collect	384 0	roups 2 3	& 4	
Date Sampled: 12	/ 10/91 No. Duarts correct				
Representing:	Site Operator [ Consu	ltant  X	Laborato	ory Personnel  _	
Well Purged/Bai	led Before Sampling: Yes	X No	_  How	long Before: Imme	diately
No. Well Volume	es Purged: 0.4 Depth	to Water E	lefore Bail	ing: ft Elev 73,2 141	MSL 4.11
How were Sample	es Collected: 1.5" Te	flon Bailer			
Were sample pre	eservation procedures in a	ccordance (	vith TDK G	uidelines:	
were sample pre					
	Yes	X No			
GROUP PA	RAMETER		UNITS	ANALYSIS METHOD	
	rsenic			E200.7	-
	arium			E200.7	
	admium			E200.7	ī
	nronium			E200.7	l
	opper			E200.7	ī
	ead	1		E245.1	i
	ercury			E200.7	Ì
	elenium			E200.7	Ī
	ilver			E200.7	Ī
1 12	Inc	1	1		Ĩ
1 2 10	alcium	1	Img/L	E200.7	Ĩ
	agnesium	1	mg/l	E200.7	Ī
	odium	1	mg/l	E200.7	I
	otassium	1	mg/l	E200.7	1
	arbonate	1	mg/l		1
1 10	icarbonate (CaCO3)	1	mg/l		ļ
	ulphote	1		E375.4 (	Ţ
	luoride	1		E340.2	1
אן ו	itrate (N)	1	lmg/l	E352.1	Ļ
1 1	Phenolphthalein	I			1
	lkalinity (CaCO3)	<u> </u>	ing/l		+
A	lkalinity (CaCo3)	<u> </u>		E310.1	÷
	ardness (CaCO3)	<u> </u>	mg/l	E130.2	Ļ
1	nion/Cation Balance		meq/meq	1	ł
	nion/Cation Difference	1	1%	1£325.3	+
	hloride	38.7	mg/l  units	E150.1	+
	H, Field	6.97	units unhos/cm		+
	Specific Conductance, Field	437	Ing/(	[E160.4	†
	otal Dissolved Solids	1 5.0		E415.2	†
	Total Organic Carbon	1 4.0	Img/l	IE415.2	ή
	Total Organic Carbon	1 3.0	ing/l	16415.2	†
	Total Organic Carbon Total Organic Carbon	3.0		16415.2	Ť
<u> </u>	iotat organic carbon	1	1	[	Ť
	Inon	4.2	mg/t	E200.7	i
	Iron Manganese	0.30	img/l	[E200.7	Ť

PLATE 36

Laboratory Name: NET (Gulf Coast), Inc. Address: 1548 Valwood Parkway, Suite 118 Site Operator Signature: _____ Date: _____

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		5 REMARKS	1		_	Spe Plea		sheet detailing requirements.		•	•	,						RECEIVED BY: (Signature)	2	N: DATE/TIME	7	(Date MIMUM DISPOSAI	
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ī	at (601) 863-3036 (713) 681-5496 085	i i	-	. ,	10E			N	μ	. N	N								6	-	Multadau	SAMPLE REMAINDERS (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature)	
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С, н	Gulfport (60) Houston (71) (504) 293-1085	FOR AN			-	· · · ·			•			<u>,"</u>	<u></u>				, I , ,		X		, ,	OF ALL C	
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NET (Gun Coast), Inc.	Cuestions, Contact Cust Austin (512) 928-8905 Dallas (214) 406-8100 Baton Rouge	PARA	_						<u> </u>					÷., ,	· · · ·			Ξ	Z		,	I REQUEST NET TO DISPOSE OF ALL SAMPLE REMAINDERS (Signature) (Signature) "IF SAMPLE REMAINDER'IS DETERMINED TO BE HAZARDOUS, ADDITIONAL CHARGE OF \$2500 PER SAMPLE WILL BE ASSESSED	
NET.	Austin (5) Dallas (2)		, Sa	inq.	15	Hay		x	x	x	X							UISKED BY:	guna	E @		QUEST N AMPLE R TTIONAL (	-
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NAME:	ADDRESS	N TO CO	NOH9 S'N		NO.:		YOUR SAMPLE DESCRIPTION:		2	\$S	5					~~		e	14	MENT		SAMPLE REMAINDER DISPOSAL C RETURN SAMPLE REMAINDER TO CLIENT VIA (SOME SHIPPING CHARGES MAY BE INCURRED)	15, 8
MPANY	MPANY /	PERSON	PERSON		YOUR PROJECT NO .:	91201	YOUR §	-100	-m0	-mo	- MO		***					SHED BY	Oern.	OF SHIP		REMAIN RN SAMF SHIPPI	t s
YOUR COMPANY NAME: .	YOUR COMPANY ADDRESS:	NAME OF PERSON TO CONTACT: B.	CONTACT PERSON'S PHONE:		YOUR F	16		0	0	0	) ~							RELINQUISHED BY: (Signature)	J	METHOD OF SHIPMEN		SAMPLE RETU (SOME	
				_	Z	N						e	\						2	o P	LAT	A.73	

APPENDIX

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### STANDARD FIELD DRILLING AND SAMPLING PROCEDURES

Standard field drilling and sampling procedures and laboratory testing procedures are described in the following paragraphs.

### Field Drilling and Sampling

Borings were advanced in soil formations by either auger or air rotary wash drilling methods. Soil samples were obtained at the designated sampling intervals using the following sampling techniques:

### 1. Undisturbed Samples

### Shelby Tube Samples

The Shelby tube sampler is a three-inch diameter (0.D.), thin-walled steel tube which is primarily used to obtain undisturbed samples of cohesive soils into which the tube can be pushed by the hydraulic pulldown and weight of the drill rig. Shelby tube sampling procedures are in general accordance with ASTM Method D-1587. Recovered Shelby tube samples are extruded in the field, logged, separated horizontally into 0.4 foot long segments and, finally, sealed in plastic bags.

The consistency of undisturbed cohesive soil samples is evaluated in the field using a calibrated hand pene-This device measures the pressure necessary trometer. to push a 0.25-inch diameter piston into the undisturbed specimen. The pressure at 0.25-inch penetration has been correlated with the laboratory unconfined compressive strength; thus, a representative estimate of soil consistency is obtained. ex-The results, pressed in terms of shear strength (one-half the compressive strength), are plotted as open circles in the strength graph on the boring logs. A plus sign (+) accompanying the open circle indicates that the shear strength exceeds 1.5 tsf, which is the capacity of the penetrometer.

### 2. Disturbed Samples

#### Split Spoon Samples

Below the depth of Shelby tube refusal, dense or granular materials were sampled utilizing a two-inch diameter, split-spoon sampler in conjunction with the Standard Penetration Test (ASTM D-1586). This test utilized a 140 pound hammer that drops a free fall vertical distance of 30 inches. The number of blows required for 18 inches of penetration is recorded for each six inch increment and either the value for the last 12 inch increment and either the value for the last 12 inches of penetration, the penetration obtained within 100 blows, or the penetration achieved when a total of 50 blows have been applied during any six-inch increment, whichever occurs first, is reported as the standard penetration value.

### Auger Samples

Disturbed soil samples are obtained from soil cuttings brought to the ground surface while advancing a boring with six-inch diameter, continuous-flight augers. The recovered soil samples are sealed in plastic bags. In addition, bulk samples, usually weighing 50 to 75 pounds, are obtained at selected auger boring locations to provide a sufficient quantity of soil for performing laboratory tests on remolded specimens.

In instances where coring is necessary to advance borings through rock formations, rock coring is performed using a "NX" double-tube core barrel equipped with a tungsten carbide or diamond drill bit. The diameter of the recovered rock cores generally ranges from 1.875 inches ("NX" wire line size) to 2.125 inches (standard "NX" size) depending upon the particular type of "NX" core barrel employed. Rock cores are sealed in plastic and placed in cardboard core boxes. The amount of core recovered, expressed as a percentage of the coring interval (REC -Recovery), is tabulated at the respective depths on the boring logs. TEAM____CONSULTANTS, INC.____

Geotechnical, Environmental, Construction Materials Testing

August 18, 1994 TEAM Project No. 942069E Report No. 1

City of Stephenville 354 North Belknap Stephenville, Texas 76401

Attention: Mr. Danny R. Johnson Director of Utilities

Re: Decommissioning of Five Piezometers Stephenville Sanitary Landfill - Permit No. 664-A Stephenville, Erath County, Texas

Dear Mr. Johnson:

Presented herein is our report which documents the decommissioning of five piezometers identified as P-1 through P-5 at the above referenced facility. This work was completed in general accordance with our Proposal No. 942069E dated August 5, 1994. Authorization to proceed was verbally provided by you on August 8, 1994.

#### BACKGROUND INFORMATION

Piezometers No. P-1 through P-5 were installed by TEAM Consultants, Inc. on April 8 through April 12, 1991, to total depths of 35, 40, 65, 80 and 50 feet, respectively. Each installation was installed using air rotary drilling methods and consisted of 2.0" I.D. Schedule 40 PVC flush thread casing and machine slotted (0.010") screen installed within a 4-3/4-inch diameter borehole.

### PIEZOMETER DECOMMISSIONING

On August 15, 1994, TEAM Consultants, Inc. traveled to the subject site to overdrill and grout Piezometers No. P-1 through P-5. Each installation was pressure filled with cement grout from the bottom up to the land surface. A tremi pipe was utilized to install the grout mixture. Each installation was then overdrilled using hollow stem auger drilling methods to a depth of approximately 15 feet. Upon completion of overdrilling, as much of the casing as possible was removed. Each borehole was then cement grouted from the bottom to form a continuous plug.

The plugging of Piezometers No. P-1 through P-5 in accordance with the above procedures has been documented in "Plugging Reports" for submittal to the Texas Natural Resource Conservation Commission. An original and three copies of each plugging report, including a site map showing the location of the site relative to the City of Stephenville and the locations of the piezometer installations on the site, are attached for your review. Your signature is required at the bottom of each plugging report prior to forwarding the original and two copies to:

> Texas Natural Resource Conservation Commission P. O. Box 13087 Capitol Station Austin, Texas 78711-3087

> Attention: Ms. Ada Lichaa, Team Leader Ground-Water Monitoring Team Compliance and Enforcement Section Municipal Solid Waste Division

We appreciate the opportunity to be of service. Should you have any questions or need additional assistance, please call.

Very truly yours,

TEAM Consultants, Inc.

Ed-

Edward Gomez

Ouns James Knigh JAMES KNIGHT

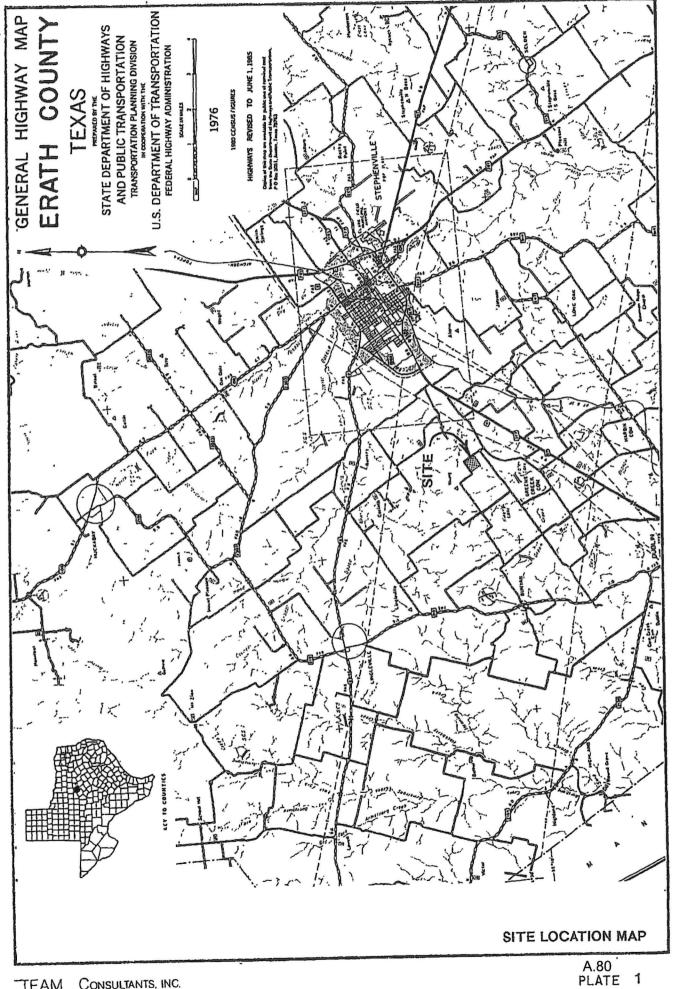
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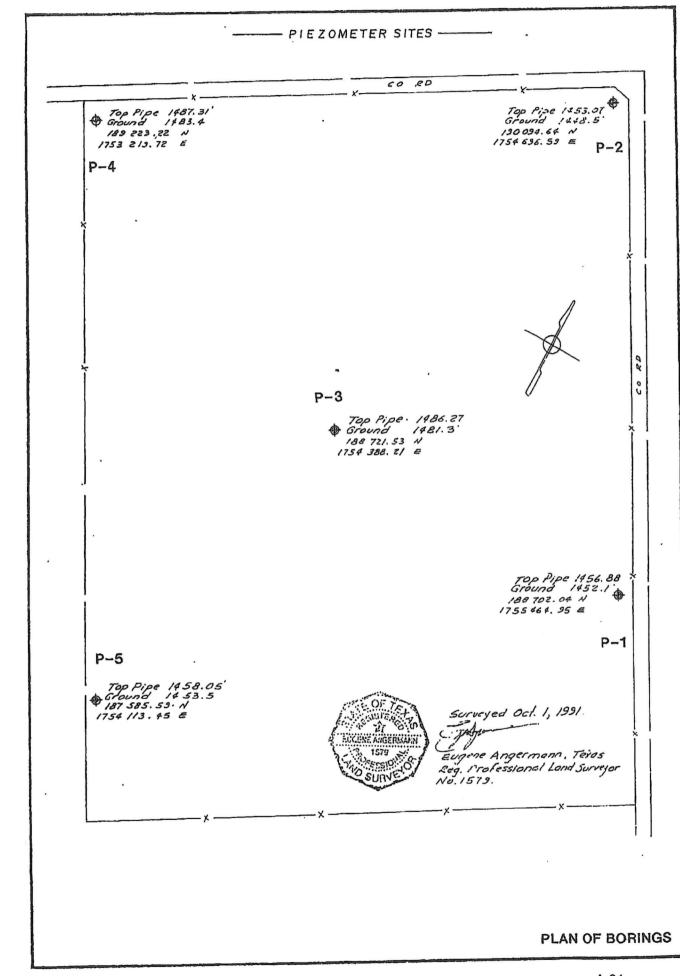
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ATTACHMENTS

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Please use black ink.	7	9	state of Texas		
	1				
File WHITE COPY with Texas Water Commission	s		GING REPORT		Texas Water Well Drillers Board
P.O. Box 13087	:		completed and filed with the TWC ring the date the well is plugged as		P.O. Box 13087 Austin, Texas 78711
Austin, Texas 78711 Phone (512) 371-629	9		by current statutory law.)		Phone (512) 371-6299
	٤	A Well Identific	ation and Location Data		
1) Own	er City of Step		354 North Belknap	Stephen	ville TX 76401
		zometer P-1	(Street or RFD)	(City)	(State) (Zip)
-, -,		Erath 6 mile	es in S.W. direction	from Step	henville
		``````````````````````````````````````	(N.E., S.W., etc.)		(Town)
Dilles and the second	a forming the	~	escription:	-	
	erson performing the p complete the legal des	cription			vnship
to the right with	distance and direction fr	om two Abstr	act No Survey Name_		
	ion or survey lines, or h		nce and direction from two inters	ecting section	lines or survey lines:
	tify the well on an -Scale Texas County (	official	<ul> <li>An and a second sec second second sec</li></ul>		
	nd attach the map to th				
2		See Atta	ached map.		
<b></b>					
			lell To Be Plugged (if availabl		
4) Drille	Dowell Well Se	rvices, Inc.License	Number1891	City	, Stephenville
5) Drille	ed 4-8 19	91; 6) Diameter of I	hole 4.75 inches; 7	) Total dep	th of well 35.0 feet
		C. Curre	ent Plugging Data		
8) Date w	vell plugged. 8-1	<u>5 , 19.94 .</u>			
9) Sketch	of well: Using space at	right, show method of			
	ng the well including al	casing and cemented			
interva	its.				
* 10) Name	of Driller or other pers	on actually performing	ant construction of the second se		
the plu	gging operations <u>B11</u>	1 McGuire			1 1 7 7
		;;			10'
if a wa	ater well driller plugged th	e well, give the driller's			15' \
license	no. 02763M	· · ·		-	_     `L
11) Casing	and cementing data r	elative to the plugging		1	
operat			TR to the La Colla	M	
Diameter	Casing	Left in Well	7" borehole fill with cement-bent		35'
(inches)	From (feet)	To (feet)	grout		
2.0	35.0	10.0			
			4 1		
	Plug(s) Placed in Well	Sack(s) of			
From (feet)		cement used	2" PVC casing fi		
35.0	0.0	2-94# Sacks-	with cement-bent	onite I	صلحه المسب
		1-50# Sack-	grout		LP.
		Bentonite Gr	out		
		D. Validation of I	nformation Included in Form	n	c

I hereby certify that this well was plugged by me (or under my supervision) and that all of the statements herein are true and accurate to the best of my knowledge and belief.

,	Company	or Indivi	dual's	Name	McGuir	e Drill	ing Co	mpany,	Inc.				
	oompany	or man.						(Type or Prin	t)			70015	
	Address	P.O.	Box	154244			Irvin			TX		75015	
	1441000			Street or I	RFD)		(City)	x/		(State)		(Zip)	
	(Signed)	Wu	han	4 Mh	Anna	<u>.                                    </u>	_ (Signed)	_Dan		E Ye	Amor	4	
			(Person	performing p	lugging opera	tions)			Own	er of Well)	For TWC us	e only on	
											VVCII IVO.		
S /Rev 07	-27-8R1			White .	TWC	Vallow - Wall	Owner	Pink - Contra	ctor		I nestion on	<b>M20</b>	

	black ink.	,	Stat	e of Texas		
File WHITE						
	r Commission			1		Texas Water Well Drillers Boa
P.O. Box 13 Austin, Texa	1087			npleted and filed with the TWC the date the well is plugged as		P.O. Box 13087 Austin, Texas 78711
Phone (512)				current statutory law.)		Phone (512) 371-6299
	1		A. Well Identificat	ion and Location Data	<b>G</b> h <b>h</b>	7111e TX 76401
1)		ity of Stephe	nville Address 3	154 North Belknap		/111e IA /0401
2)	Owner's We	(Name) Il Number_ P1ezon	neter P-2	(Street or RFD)	(City)	(State) (Zip)
3)		Well: County Era		in S.W. direction	from Ster	phenville
			r.	(N.E., S.W., etc.)		(Tawn)
			🗖 Legal desc			
Driller or o	other person	performing the plu lete the legal descri		NoBlock No		
o the right	t with distand	ce and direction from	n two Abstract	t No Survey Name		
ntersectin	ng section or	survey lines, or he	must Distance	e and direction from two inte	rsecting section	lines or survey lines:
ocate an	d identify t or Half-Scale	he well on an of Texas County Ge	meiai			
		ch the map to this				
		,	函 See Attack	ned map.		
				I To Be Plugged (if availat		. Stephenville
4)	Driller Do	well Well Ser	rvices, Inclicense No		Cit	y
5)	Drilled	4-9 19	) Diameter of ho	le 4.75 inches;	7) Total de	pth of well 40.0
	and a second		C, Current	Plugging Data		
8)	Date well plu	gged 8-15	, 19 94	[		
0)	Skatch of W	all, ileing space at ri	ght, show method of			
9)	plugging the	well including all	casing and cemented			
	intervals.					
10)	Name of Di	iller or other person	actually performing			2
	the plugging	operations Bill M	<u>icGuire</u>			
			;			6
	if a water we	Il driller plugged the	well, give the driller's	· · ·		.     ' -
	license no	027031	·			15'
	Casing and	cementing data rela	ative to the plugging	7" borehole fil	led T.	
11)				with cement-	느	
11)	operations:		ft in Well	bentonite grout		
11) Diame	ter	Casing Le			ų	40'
Diame (inche	ter es)	From (feet)	To (feet)			
Diame	ter es)		To (feet) 6.0			1
Diame (inche 2.0	ter es)	From (feet) 40.0 '	6.0			
Diame (inche 2.0	ter	From (feet)	and the second day of	2" PVC casing f		
Diame (inche 2.0	ter es) · · · Cement Plug(s) m (feet)	From (feet) 40.0 '	6.0 Sack(s) of	with cement-ben		
Diame (inche 2.0	ter es) · · · Cement Plug(s) m (feet)	From (feet) 40.0 ' Placed in Well To (feet)	6.0 Sack(s) of cement used			

I hereby certify that this well was plugged by me (or under my supervision) and that all of the statements herein are true and accurate to the best of my knowledge and belief.

Company or Individual's Na	me McGuire	Drilling Co	mpany, Inc	0		
		Tem	(Type or Print)	Texas	75015	
Address P.O. Box 15	54244 Street or RFD	(City	ing	(State)	(Zip)	
(Signed) Willing	01		a) Klanny	VK John	moon	
(Signed) (Person perf	forming plugging operat		1	(Owner of Well)	For TWC use only	
			,		For TWC use only Well NoA.83	
ACC (DAY 07.97.88)	White - TWC	fallow - Well Owner	Pink - Contractor		Location on map	

*

r. M			kan a	did.			
Please use black ink	,		St	ate of Texas			
File WHITE COPY w	th:	1	PLUGO	ING REPORT			
Texas Water Commi P.O. Box 13087	slon			ompleted and filed with the TWC		Texas Water Well Drillers P.O. Box 13087	Board
Austin, Texas 78711			within 30 days following	ng the date the well is plugged as		Austin, Texas 78711	
Phone (512) 371-629	9	]	required by	current statutory law.)		Phone (512) 371-6299	
				tion and Location Data			
1) Own	er <u>City of</u>	Stephenv	111e Address_	354 North Belkna	p Stepher	aville TX 7640	01
2) Own	er's Well Number	(Name) Piezome	ter P-3	(Street or RFD)	(City)	(State) (Zip)	
3) Loca	tion of Well: Coun	ty Erat	h 6 miles	in S.W. directio	n fromSt	ephenville	
-,				(N.E., S.W., etc.)		(Town)	
			Legal des	a ostenen ∎ nobels Hall Kennelse Zz			
	erson performing complete the leg		00	n No, Block No			
	distance and direc			ct No Survey Nam	e		
ntersecting sect	ion or survey line	es, or he mu	st	ce and direction from two inte			
	tify the well o		a		assumy section	n mies of salvey mear	
	-Scale Texas Co and attach the map			an a			
ngnway map a	attach the map	1 10 1115 1011					
			See Attac	ched map.			
		в. н	istorical Data on We	II To Be Plugged (if availa	ble)		
4) Drille	Dowell Well	1 Servic	es, Inc.License	1891	Cit	y Stephenville	
.,	1 10						
5) Drille	d <u>4-10</u>	<u>19_91;</u>	6) Diameter of h	ole. 4.75 inches;	7) Total de	pth of well 65.0	
			C. Curren	t Plugging Data			
8) Date v	vell plugged	8-15	, 19 <u>94</u>	[			
9) Sketch	of well: Using sp	ace at right.	show method of				
pluggi	ng the well includ	ling all casir	ig and cemented				
interva		•					
10) Name	of Driller or othe	er person ac	tually performing				
the ol	igging operations	Bill Mc	Guire			<u>ىرە چىدېدۇ بىدا ئىكى بىرە ئەتلى مىماسل</u>	
the pit	gging operations					A A	P
if a w	ter well driller plug	aged the well	, give the driller's				10'
license	0076016	,,				15'	I.
	2				-	-	T
<ol> <li>11) Casing operat</li> </ol>	and cementing o	lata relative	to the plugging				
operat				711 homehalo Edi	In Any		
Diameter	C	Casing Left in		7" borehole fil with cement-ben		* 65'	
(inches)	From (feet)	1	To (feet)		COULTE	0.5	
2.0	65.0		10.0	grout			
					1		
	Plug(s) Placed in We		Sack(s) of				
From (feet)		(feet)	cement used			,	
65.0	0.	<u>,0</u>	2-94# Sacks-	2" PVC casing f	illed 1		
			Cement	with cement-ben		u ulu ,	
			1-50# Sack-				
			Bentonite Gro	grout			

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### D. Validation of Information Included in Form

I hereby certify that this well was plugged by me (or under my supervision) and that all of the statements herein are true and accurate to the best of my knowledge and belief.

Company or Individual's Nar	me <u>McGuire</u>	Drilling Com	pany, Inc.			_
		2000 AL	Type or Print)	TX .	75015	
Address P.O. Box 154	Streetpr RFD)	(City)	1	(Spate)	(Zip)	
(Signed) William Y	Malin	(Signed)	Namme K	Johnson	1	
	orming plugging operation		(Owner o	For TWC u	se only of	
			/	Well No	A.84	
55 (Rev. 07-27-88)	White - TWC Yell	ow - Well Owner P	Pink - Contractor	Location of	ว เกลก	1

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	, /		Je a	¥ pi		
Please use black l	nk.		Sta	e of Texas		
File WHITE COPY	with:		PLUGG	ING REPORT		
Texas Water Com P.O. Box 13087	mission	c		npleted and filed with the TW	с	Texas Water Well Drillers Board P.O. Box 13087
Austin, Texas 787			ithin 30 days following	the date the well is plugged		Austin, Texas 78711 Phone (512) 371-6299
Phone (512) 371-6	299		required by c	current statutory law.)		Phone (512) 371-0235
			Well Identificat	ion and Location Dat 354 'North Belk	a Stanho	nville TX 76401
1) Ov	vner <u>City of S</u>			(Street or RFD)	(City)	(State) (Zip)
2) Ov	vner's Weil Number	Name) Plezometer	P-4			and the second
3) Lo	cation of Well: County	Erath	6 miles		tion from Ste	
				(N.E., S.W., e1c.)		(Town)
				4		
	Y. 0		Legal desc			1
	person performing t st complete the lega					wnship
	h distance and direct		Abstrac	t No, Survey N	ame	
	ction or survey lines		Distanc	e and direction from two	intersecting section	n lines or survey lines:
	entify the well on alf-Scale Texas Cou					
	and attach the map					
			🖄 See Attac	ned map.		
				I To Be Plugged (if av		o
4) Dr	iller Dowell Well	Services,		•		y Stephenville
5) Dri	lled4-11	<u>19_91;</u> 6)	Diameter of ho	le 4.75 inches;	7) Total de	pth of well 80.0
	· · · · · · · · · · · · · · · · · · ·		C. Current	Plugging Data		
8) Date	: well plugged	8-15	19 <b>94</b> .			
9) Sket	ch of well: Using spa	ce at right, show	method of			
plug	ging the well including	ng all casing and	d cemented			
	rvals.					
10) Narr	e of Driller or other	person actually	performing			
the	plugging operations	DILL MCGU1	re			1 4 4
	water well driller plugg	and the well also	the driller's			
	se no. 02763M	jeu nie wen, give	ale uniel s			15'
	il					
	ng and cementing da ations:	ta relative to t	he plugging		V	
		aina Loft in Mall		7" borehole f	illed A	
Diameter (inches)		using Left in Well	o (feet)	with cement-h		' 80'
(inches)	From (feet) 80.0		15.0	grout		
2.0	60.0		1.5.0			
Cemer	nt Plug(s) Placed in Wel	1	Sack(s) of			
From (fee		eet)	cement used	2" PVC casing	filled -	-
80.0	0.		94# Sacks-	with cement-h		
		the same of the	nent 50# Sack-	grout	L	i
	1	1 - 1	1116 SSC(			
			ntonite Gro			

### D. Validation of Information Included in Form

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I hereby certify that this well was plugged by me (or under my supervision) and that all of the statements herein are true and accurate to the best of my knowledge and belief.

Company	or Individual	's Name McGui	re Drilling Con	npany, Inc.			
	P.O. Box		Irvir	(Type or Print)	TX	75015	
Address_	P.U. DOX	(Street or RFD)	(City)	6 / /	Statel	(Zip)	
(Signed)	Will	- PMA	Signed	Alanny		moon	
	(Perso	on performing plugging op	perations)	tou	mer of Well	or TWC use only 85	
0055 (Rev. 07-27-88)	<u>•</u>	White - TWC	Yellow - Well Owner	Pink - Contractor	L W	ocation on map	

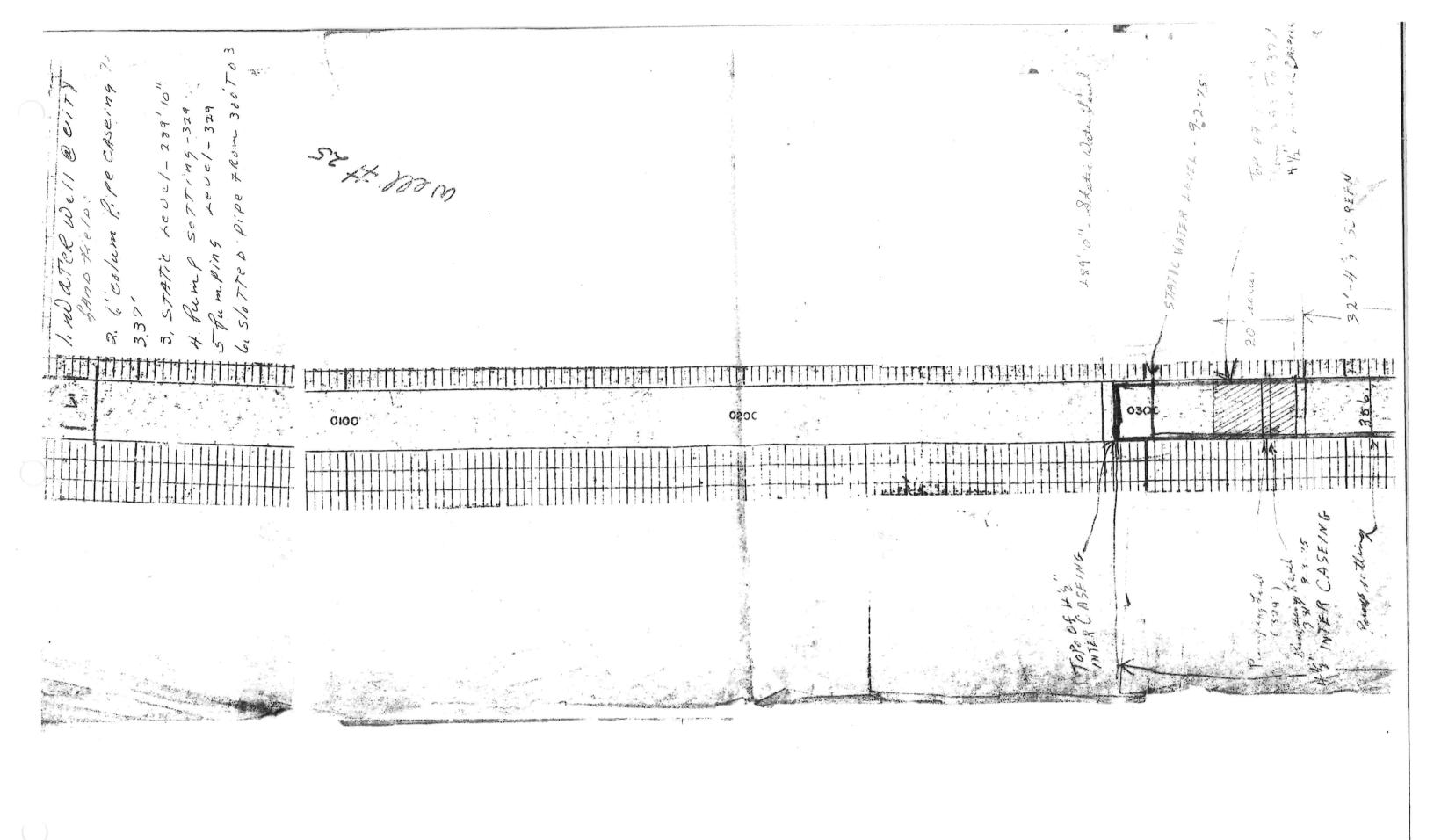
,

Г	Please use b	laciu lok		Lin Lin	ate of Texas	
	File WHITE C					
1	Texas Water	and a second s		P.	SING REPORT	Texas Water Well Drillers Board
	P.O. Box 130 Austin, Texas				ompleted and filed with the TWC ng the date the well is plugged as	P.O. Box 13087 Austin, Texas 78711
	Phone (512)				current statutory law.)	Phone (512) 371-6299
<b>h</b>	-1		ity of Step	A. Well Identifica	ation and Location Data 354 North Belknap Stepher	nville TX 76401
	1) 2)			ometer P-5	(Street or RFD) (City)	(State) (Zip)
	3)	Location of	Well: County	Erath 6 mile	s in S.W. direction from Ste	phenville
	3,	Location of	Went County		(N.E., S.W., etc.)	(Town)
				🗆 Legal de	scription:	
Dr	iller or of	her person	performing the pl	ugging Sectio	n NoBiock NoTo	wnship
			lete the legal desc		ct No Survey Name	
			ce and direction fr survey lines, or h	-		
loc	cate and	identify t	he well on an	official	ce and direction from two intersecting section	lines or survey lines:
			e Texas County C			
Hig	gnway iv	ap and atta	ich the map to thi			
				See Atta	ched map.	
				B Historical Data on We	all To Be Plugged (if available)	
		Dow		rvices, Inc.License		y Stephenville
	4)					
	5)	Drilled	<u>4-12</u> 19	91; 6) Diameter of h	ole 4.75 inches; 7) Total de	pth of well50.0f
				C. Currer	nt Plugging Data	
	8)	Date well plu	gged8-1.	5 <u>19_94</u> .		
				right, show method of		
		plugging the intervals.	well including all	casing and cemented		
				on actually performing 1 McGu1re		
	1	the plugging (	operations <u>B11</u> .	L HCOULIC		
		if a water we	It driller plugged th	e well, give the driller's	_	
		icense no.	02763M		~1 I	1 15' -1
				Labor to the short-	1	
		Casing and operations:	cementing data re	lative to the plugging		
<u> </u>	Diamete	· · · · · · · · · · · · · · · · · · ·	Casing I	eft in Well	L.	
	(inches)		From (feet)	To (feet)	7" borehole filled	501
1	2.0	·	50.0	5.0	with cement-bentonite	50'
F	2.0		20.0		grout	
T	Ce	ment Plug(s)	Placed in Well	Sack(s) of		
	From		To (feet)	cement used		
L	50	.0	0.0	2-94# Sacks-	2" PVC casing filled	
-				Cement 1-50# Sack-	with cement-bentonite	
$\vdash$				Bentonite Gr	grout *	
					formation Included in Form	

oomputy of marriader of							
			(Ty	pe or Print)			
Address P.O. Box	154244		Irving	1	TX	75015	
	(Street or RFD)		(City)	11	State	(Zip)	
(Signed) William	f Mahan	_	(Signed)	Namme	Elto	hason	
	erforming plugging open	ations)	(	/owr	ner of Welly		
(h), (2019)(3)(3)(4) (10)					$\mathcal{O}$	For TWC use onlyA.86	
	111-10- 77110	Vallour	Mall Owner Die	k - Contractor		Location on man	

THOMPSON-HAYWARD CHEMICAL COMPANY Cellun Ference Dallas, Tx 75222 Dallas, Tx 75222 Dallas, Tx 75222 11" niffele 13'2" niffele 5'1" pring the 5'1" pring the 16=21 frants of Pipe = 336 | Be 1=13' 2" " " " " = 13' 2" 1=0'11" " " " " " = 11" 1=51/" Primetry = 51/" Primetry = 3.5512" 11.105.11 WANDFILL WELL 10-1-75 ۱....

* Ling While , 1 24 THOMPSON-HAYWARD EMICAL COMPANY CH 2627 Weir Street P.O. Box 6226 Walk A. L. 15222 11:40.) 338 638-8034 12:08 1 Υ 12:25: 7 1-2:50. 63 2.8 3:008 3 11/ 11 313 368 72 3.8,026



Send original copy by	2	, State	of Te	xas		For TDWR use only
certified mail to the Texas Department of Water Resource	t k	WATER WE	LL I	REPO	DRT	Well No
P. O. Box 13087 Austin, Texas 78711	ATTENTION O	WNER: Confidenti	ality P	rivileg	e Notice on Reverse Side	Received:
1 itun	Mintena	Ilo man	354	K.	Belknap .	
	Jamoy	Address L	(Stre	et or F	RFD) (	Chy)' A (State)
2) LOCATION OF WELL: County	3	miles in	L	) s.w.,	direction from	(Town)
Driller must complete the legal descrip	tion to the right	Legal deso Section	No	:	Block No.	Township
with distance and direction from two tion or survey lines, or he must locate	and identify the	10-			Survey Name	-
well on an official Quarter- or Half-Sca General Highway Map and attach the r	map to this form.	Distance	and di	rection	n from two intersecting section	or survey lines
		See attack	ed map			
3) TYPE OF WORK (Chack):	4) PROPOSED U				5) DRILLING METHOD (Cho	
Deepening		Industrial 🛛 Public S Test Well 🔲 Other			Air Rotary Cable To	
Reconditioning Plugging     Bl WELL LOG:		R OF HOLE		BORE	HOLE COMPLETION:	
U) WEEL LOG.	Dia. (in.) From	n (ft.) To (ft.)	- 0	Oper	Hole I Straight W	/all 🔲 Underre
Date drilled 12-7 -79		rface 3.95		Grav	el Packed Other avel Packed give interval fro	350 ft to 2
Date drilled 10 1	74 6		1	11 61	aver Facked give milervar If	
From To (f1.) (f1.)	Description and col		8) (	CASIN	G, BLANK PIPE, AND WELL	SCREEN DATA:
0-15	elech	le,	Dia.	New	Steel, Plastic, etc. Perf., Slotted, etc.	Setting (ft.)
15-80	Clay	<u></u>	(in.)	Used	Screen Mgf., if commercia	and and an and a second s
80-95	Sahi	l,	44	pN	steel slatt	ec
95-280	grey of	hale	+			
210-360 00	ale weel	24 streak		-		
200-210	Pinet	and Q.	+-			
375-393 1	End EC	rand				
375-393	und El	ed.				
375-393 J 393-395	und El red th	ed.				
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375-393 J 393-395	und El red th	ed.			red from O	NG DATA 
375-393 J 393-395	und El red th	ed.		Aethod	t used	100
375-393 J 393-395	und El red th	provel ed.		Aethod Cement	ted fromO	100
375-393 J 393-395	und El red la	prenel ed.		Aethod Cement WAT	ted from I used ted by ER LEVEL:	ft. tof0.0
375-393 2	und El	rand ed.		Vethod Cement WAT Static	ted fromO I used ted by(Com ER LEVEL: i levelft, below lan	ft. tof0.0 pany or individual) d surface Date
375-393 2	und El	rand ed.		Vethod Cement WAT Static	ted from I used ted by ER LEVEL:	ft. tof0.0
375-393 2	und El	prenel	(e	Method Cement WAT Static Artes	ted from d used ted by ER LEVEL: tevelft. bolow lan- ft. b	ft. toft. tof
375-393 2	und El	renel ed.	(e	Method Cement WAT Static Artes	ted from I used ted by(Com ER LEVEL: : levelft. below lan- lan flowgpm.	ft. toft. tof
375-393 2	und El	rand ed.	(e	Method Cement WAT Static Artes	ted from d used ted by ER LEVEL: tevelft. bolow lan- ft. b	ft. toft. tof
375-393 2	und El	rand ed.	(e	Method Cement WAT Static Artes	ted from d used ted by ER LEVEL: tevelft. bolow lan- ft. b	ft. toft. tof
375-393 1	und El	renel ed.	9) 10)	Vethod Cement WAT Static Artes PACI	ted from I used ted by ER LEVEL: i levelft, below lan- lan flowgpm. KERS: Type Y. J.	fl. tofl. do
375-393 2	und El	renel ed.		Vethoo Cemeni WAT Static Artes PACI	ted from O I used ted by ER LEVEL: i levelft. balow lan- ian flowgpm. KERS: Type KLULL PAC FLUMP: bine [] Jet EFSU	ft. toft. to d
375-393 2	und EC	rand ed.		Vethoo Cemeni WAT Static Artes PACI TYP	ted from I used ER LEVEL: I evelft, below Ian- Ian flowgpm. KERS: Type KERS: Type KERS: Dype E PUMP: blineJet ESu er	ft. toft. to deft.
	end to ked in	renel ed.		Vethoo Cemeni WAT Static Artes PACI TYP	ted from O I used ted by ER LEVEL: i levelft. balow lan- ian flowgpm. KERS: Type KLULL PAC FLUMP: bine [] Jet EFSU	ft. toft. to deft.
13) WATER QUALITY:			( ) 	Vethod Cement WAT Static Artes PACI TYPI Turl Dopth	ted from I used ER LEVEL: I evelft, below Ian- Ian flowgpm. KERS: Type KERS: Type KERS: Dype E PUMP: blineJet ESu er	ft. toft. to deft.
13) WATER QUALITY: Did you knowingly penetrate and water? Yas 'D'No	y strata which contai			Vethod Cement WAT Static Artes PACI TYP	ted from d used ted by ER LEVEL: : levelft. below lan ian flowopm. KERS: Type MANUL PAN KERS: Type MANUL PAN E PUMP: bine [] Jet ESu er to pump bowls, cylinder, jet, er L TESTS: le Test: Pump PAN	
13) WATER QUALITY: Did you knowingly penetrate of water? ☐ Yas ∽ ⊢ILyes,=submit-#REPORT-OF UN Type of water?	y strate which contein NDESIRABLE WATE	R#		Vethod Cement WAT Static Artes PACI TYP Turk Oth Depth WEL	ted from d used ted by ER LEVEL: : levelft. below lan ian flowopm. KERS: Type MANUL PAN KERS: Type MANUL PAN E PUMP: bine [] Jet ESu er to pump bowls, cylinder, jet, er L TESTS: le Test: Pump PAN	
13) WATER QUALITY: Did you knowingly penetrate of water? □ Yas ℃ No → If-yes-submit-#REPORT-OF UN	y strata which contain NDESIRABLE WATE Depth of strate □ Yes □	R#		Aethod Cement WAT Static Artes PACC PACC TYP TYP Turl Oth Depth WEL TYP	ted from t used t used ER LEVEL: i levelft. balow lan- ian flowppm. KERS: Type M KERS: Type M E PUMP: bine to pump bowls, cylinder, jet, et L TESTS: le Test: Pump FLASS d: gpm with	
13) WATER QUALITY: Did you knowingly penetrate off water? □ Yas └□ No 	v strata which contain NDESIRABLE WATE Depth of strate □ Yes □	R ²	9) 10) 11) 12)	Aethod Cemeni WAT Static Artes PAC PAC TYP TYP Turk Oth Oth Oth WEL Typ Yiel	ted from t used t used ted by ER LEVEL: : levelft. below lan fin flowopm. KERS: Type MANUL PAN KERS: Type MANUL PAN E PUMP: bline [] Jet ESu er to pump bowls, cylinder, jet, et .L TESTS: le Test: [] Pump Pass d: gpm with d: gpm with	
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13) WATER QUALITY: Did you knowingly penetrate of water? □ Yes □ No 	Y strata which contain NDESIRABLE WATE Depth of strata Yes I hereby certify t Bach and all of the	hat this well was drille statements herein are	9) 10) 11) 12) 12) 12) 12)	Aethod Cemeni WAT Static Artes PACI TYP TYP Turl Oth Depth WEL Typ Yiel	ted from t used t used ted by ER LEVEL: : levelft. below lan fin flowopm. KERS: Type MANUL PAN KERS: Type MANUL PAN E PUMP: bline [] Jet ESu er to pump bowls, cylinder, jet, et .L TESTS: le Test: [] Pump Pass d: gpm with d: gpm with	
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13) WATER QUALITY:         Did you knowingly penetrated         water?       □ Yes         □ Yes       □ No         >>       □ If-yes, submit-#REPORT-OF UN         Type of water?	V strata which contain NDESIRABLE WATE Depth of strate Ves I was I hereby certify t each and all of the or Print) tor Well Driller)	hat this well was drille statements herein ard Water We	9) 10) 11) 11) 11) 12) 12) 12) 12) 12	Aethod Cemeni WAT Static Artes PACI TYP TYP Turl Oth Depth Yiel Typ Yiel c (or u the b	ted from	

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:

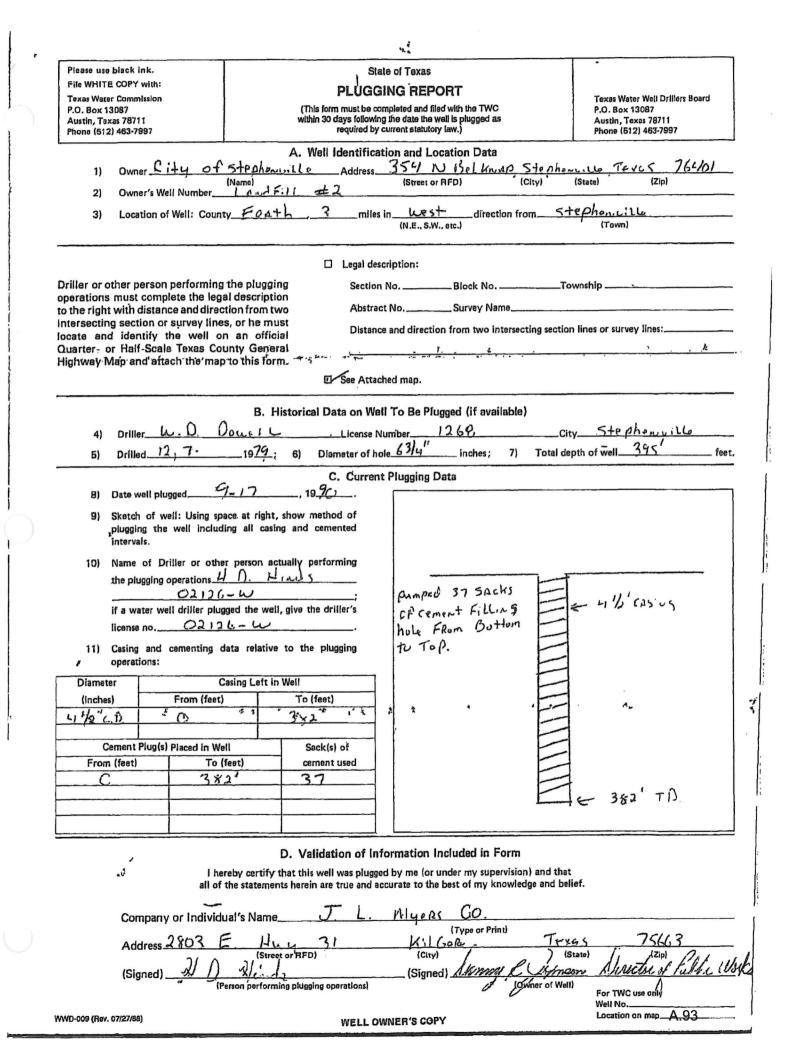
> "Every registered water well driller drilling, deepening, or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within sixty (60) days from the completion or cessation of drilling, deepening or otherwise altering 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."

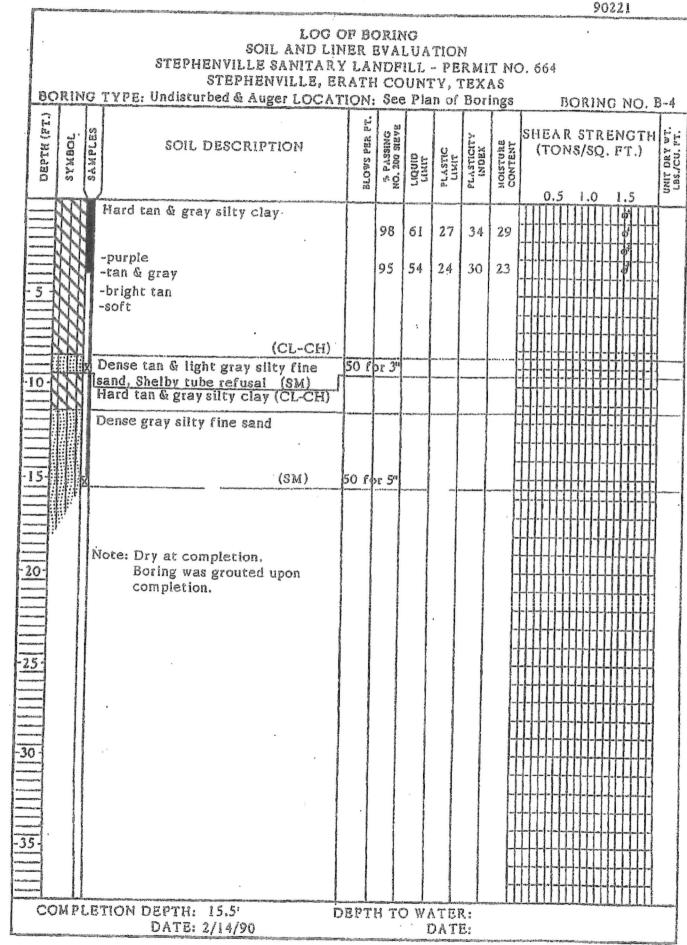
The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential? Please note that the term "Commission" in the above-quoted section and elsewhere in the Water Well Drillers Act now properly means the Texas Department of Water Resources (P. O. Box. 13087; Austin, Texas 78711).

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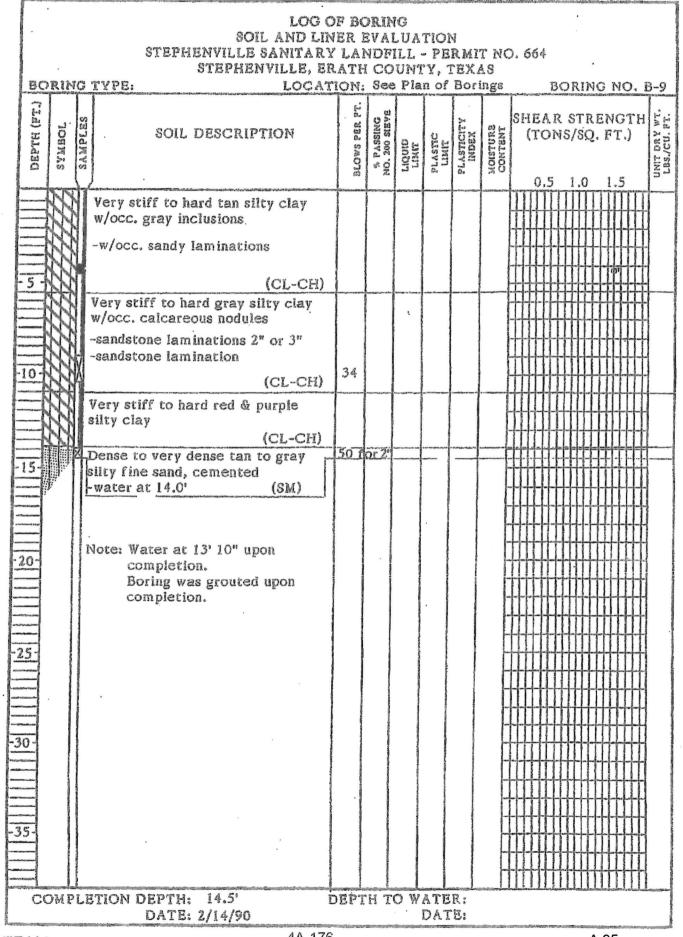
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Texes Water Commission P.O. Box 13087			npleted and filed with the TWC	Texas Water Well Drillers Board P.O. Box 13087	3
Austin, Texas 78711		within 30 days following	the date the well is plugged as current statutory law.)	Austin, Texas 78711	
Phone (512) 463-7997				Phone (612) 463-7997	
1) Owner C	the of Stephen		ion and Location Data	stipling ville Tryns 76401	
	(Name) Il Number L.4.2 F		(Street or RFD) (0	City) (State) (Zip)	
			in leap to dispation for	mStiphen ; 11:	
<ol><li>Location of</li></ol>	wen: County r. LA - h		{N.E., S.W., etc.}	(Town)	
		🗆 Legal desc	ription:		
	performing the pluggin			Township	
	ete the legal descriptio ce and direction from tw		t No Survey Name	and the second secon	
ntersecting section or	survey lines, or he mus	St Distance		ting section lines or survey lines:	
ocate and identify t	he well on an officia Texas County Genera	31		s	
lighway Map and atta	ch the map to this form	7. ~ ~~			
		D-See Attack	hed map.		
	B. Hi	storical Data on Wel	I To Be Plugged (if available)		
4) Driller			umber		
5) Drilled	<u>. A.</u> 19_;	6) Diameter of ho	le inches; 7}	Total depth of well	_ fee
·····			Plugging Data		
8) Date well plu	1ged 9-17	, 1940.			
	ell: Using space at right, well including all casing				
intervals.					
10) Name of Dr	iller or other person act	ually performing			
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		i	Pumped 172 SACK Cement Fillins	hole 6 5/5 (1)	צמי
A DECEMBER OF A	Il driller plugged the well,		FROM Boottom -		
license no	C2126-W	······································	Top		
, 11) Casing and operations:	cementing data relative	to the plugging			
Diameter	Casing Left in	Well			
(inches)	From (feet)	To (feet)			
~ 5/4 1 1	C	324 1			
				H	
Cement Plug(s)	Placed in Well	Sack(s) of			
From (feet)	To (feet)	cement used			
0	3581	171		338' 70	
		]			
	1	D. Validation of Inf	ormation Included in Form		
	I hereby certify t	hat this well was plugge	d by me (or under my supervision	and that	
			curate to the best of my knowled		
Company	or Individual's Name_	J.L MI	yers CU.		
Address_	2XU3 F HL		(Type or Print)	Terus 7,663	
AUU1 622 -	(Street	t or RFD)	(City)	(State) (Zip)	2.
(Signed)	4) 1) 11.1	<u> </u>	(Signed) Ala :: Ki	helimon Minister of Fo	N.
	Person performi	ing plugging operations)		Wher of Well) For TWC use only	
				Well No Location on map_ <u>A.92</u>	
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# SOIL BOREHOLE LOG

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# CITY OF STEPHENVILLE LANDFILL ERATH COUNTY, TEXAS TCEQ PERMIT NO. MSW 664

# LIMITED SCOPE PERMIT AMENDMENT APPLICATION

# PART III – SITE DEVELOPMENT PLAN ATTACHMENT 8 COST ESTIMATE FOR CLOSURE AND POST CLOSURE CARE

Prepared for

### **CITY OF STEPHENVILLE**

March 2023 Revised August 2023 Revised December 2024



Prepared by

BIGGS & MATHEWS ENVIRONMENTAL 1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS FIRM REGISTRATION NO. F-256 TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS FIRM REGISTRATION NO. 50222

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3	POSTCLOSURE CARE COST ESTIMATE	8-3
4	COST ESTIMATE ADJUSTMENTS	. 8-4
5	FINANCIAL ASSURANCE	. 8-5

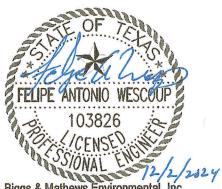
APPENDIX 8-1 Closure Cost Estimate Calculations

APPENDIX 8-2 Post Closure Care Cost Estimate Calculations

### **APPENDIX 8-3**

.

**Evidence of Financial Assurance** 



Biggs & Mathews Environmental, Inc. Firm Registration No. F-256

**Biggs & Mathews Environmental** 

8-ii

City of Stephenville Landfill Rev. 3, December 2024 Part III, Attachment 8

# Table 8-1Closure Cost Estimate

No.	ITEM		COST
1.0	Engineering Costs		
1.1	1.1 Topographic Survey		4,858.00
1.2			3,470.00
1.3	Site Evaluation	\$	3,470.00
1.4	Development of Plans	\$	14,574.00
1.5	Administration	\$	13,880.00
1.6	Closure Inspection and Testing	\$	29,148.00
1.7	Permit Compliance Package	\$	6,940.00
	Engineering Total	\$	76,340.00
2.0	Construction Costs	2	
2.1	Final Cover System		
2.1.1	Infiltration Layer	\$	206,465.00
2.1.2	<ul><li>2.1.2 Erosion Layer</li><li>2.2 Vegetation</li></ul>		60,725.00
2.2	2.2 Vegetation		38,864.00
2.3	Site Grading and Drainage	\$	24,290.00
2.4	Site Fencing and Security	-	
2.5	Landfill Gas Probe Installation	\$	65,000.00
	Construction Total	\$	395,344.00
	Engineering and Construction Total	\$	471,684.00
	10 % Contingency	\$	47,168.40
3.0	Administrative Costs		
3.1	3.1 Contract Performance Bond		9,433.68
3.2	TCEQ Contract Administration/Legal Fees	\$	4,716.84
	Total	\$	533,002.92

١

ANNUAL COST			
754.85			
364.25			
119.10			
351.91			
351.91			
322.92			
114.60			
1			

# Table 8-2Postclosure Care Cost Estimate

CITY OF STEPHENVILLE LANDFILL APPENDIX 8-1 CLOSURE COST ESTIMATE CALCULATIONS



Includes pages 8-1-1 through 8-1-4

### City of Stephenville Landfill CLOSURE COST ESTIMATE

Required:	<b>Required:</b> Estimate the cost to hire a third party to conduct final closure activities.							
References	2	Texas Natural Resources Conservation Commission and Postclosure Care, Version 1, August 1993. 2012 RS Means Heavy Construction Cost Data, 260 Construction costs from recent similar construction	h Annual E	dition.				truction
Calution		contractors. Final closure will require construction of final cover	ovor			17.50 ad	res	
Solution:		Final closure will require closure of				100.00 ac		
		Final closure will require closure of				13.00 ea		
		n men energie num e d'anne mensionent et an le brander						
	No.	ITEM	QTY	UNIT	U	NIT COST	T	DTAL COST
	1.0	Engineering Costs						
	1.1	Topographic Survey	100.00	ac	\$	48.58	\$	4,858.00
	1.2	Boundary Survey	100.00	ac	\$	34.70	\$	3,470.00
	1.3	Site Evaluation	100.00	ac	\$	34.70	\$	3,470.00
	1.4	Development of Plans	17.50	ac	\$	832.80	\$	14,574.00
	1.5	Administration	1	LS	\$	13,880.00	\$	13,880.00
	1.6	Closure Inspection and Testing	17.50	ac	\$	1,665.60	\$	29,148.00
	1.7	Permit Compliance Package	1	LS	\$	6,940.00	\$	6,940.00
		Engineering Total					\$	76,340.00
	2.0	Construction Costs						
	2.1	Final Cover System	22.12.2					
	2.1.1		17.50	ac	\$	11,798.00	\$	206,465.00
		Erosion Layer	17.50	ac	\$	3,470.00	\$	60,725.00
	2.2	Vegetation	17.50	ac	\$	2,220.80	\$	38,864.00
	2.3	Site Grading and Drainage	17.50	ac	\$	1,388.00	\$	24,290.00
	2.4	Site Fencing and Security	-	ac	-		20 <del>0</del>	
	2.5	Landfill Gas Probe Installation	13	ea	\$	5,000.00	\$	65,000.00
		Construction Total					\$	395,344.00
		Engineering and Construction Total					\$	471,684.00
	Production	Contingency	10	%			\$	47,168.40
	3.0	Administrative Costs						
	3.1	Contract Performance Bond	2.0	%			\$	9,433.68
	3.2	TCEQ Contract Administration/Legal Fees	1.0	%			\$	4,716.84
		Total					\$	533,002.92

*This closure cost estimate was developed in 2023 dollars.



City of Stephenville Landfill Rev. 3, December 2024 Attachment 8, Appendix 8-1 **CITY OF STEPHENVILLE LANDFILL** 

# APPENDIX 8-2 POSTCLOSURE CARE COST ESTIMATE CALCULATIONS



Includes pages 8-2-1 through 8-2-2

### City of Stephenville Landfill POSTCLOSURE COST ESTIMATE

Required: Estimate the cost to hire a third party to conduct postclosure care activities.

**References:** 

1. Texas Natural Resources Conservation Commission, Cost Estimate Handbook for Closure and Postclosure Care, Version 1, August 1993.

Solution:

Postclosure care period =5 yearsPermit area =100 acresWaste footprint1 =65.5 acresNumber of gas probes13 probes

No.	ITEM	ANNUAL QTY	UNIT	UN	IT COST	T	OTAL COST
1.0	Engineering Costs						
1.1	Postclosure Plan	1	LS	\$	694.00	\$	694.00
1.2	Site Inspections	100	ac	\$	13.88	\$	1,388.00
1.3	Correctional Plans and Specifications	65.5	ac	\$	34.70	\$	2,272.85
1.4	Site Monitoring	52	event	\$	150.00	\$	7,800.00
2.0	Construction / Maintenance Costs	65.5	ac	\$	173.50	\$	11,364.25
	Subtotal					\$	23,519.10
	Contingency	10	%			\$	2,351.91
3.0	Administration	10	%			\$	2,351.91
	Annual Postclosure Cost			A CONTRACTOR OF STREET		\$	28,222.92
	Total Postclosure Cost					\$	141,114.60
	t lesses and a dimension devial		lana				

*This postclosure cost estimate was developed in 2023 dollars.

¹The waste footprint includes the largest area requiring final cover of 17.5 acres and in-place final cover of 48 acres totalling 65.5 acres.



# CITY OF STEPHENVILLE LANDFILL ERATH COUNTY, TEXAS TCEQ PERMIT NO. MSW 664

# LIMITED SCOPE PERMIT AMENDMENT APPLICATION

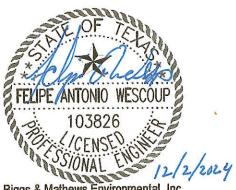
# PART III – SITE DEVELOPMENT PLAN ATTACHMENT 12 – FINAL CLOSURE PLAN

# APPENDIX 12-4 FINAL COVER QUALITY CONTROL PLAN

Prepared for

### **CITY OF STEPHENVILLE**

March 2023 Revised August 2023 Revised December 2024



Biggs & Mathews Environmental, Inc. Firm Registration No. F-256

Prepared by

BIGGS & MATHEWS ENVIRONMENTAL 1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS FIRM REGISTRATION NO. F-256 TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS FIRM REGISTRATION NO. 50222



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5	DOCUMENTATION	4-11

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### Table 12-4-4 City of Stephenville Landfill Infiltration Layer Material Construction Tests

Test	Standard	Frequency ¹
Field Density	ASTM D 2922	1/8,000 sf per 6-inch lift
Atterberg Limits	ASTM D 4318	1/100,000 sf per 6-inch lift
Percent Passing No. 200 Mesh Sieve	ASTM D 1140	1/100,000 sf per 6-inch lift
Standard Proctor Test	ASTM D 698	1 per material type
Coefficient of Permeability	ASTM D 5084 or COE EM 1110-2-1906 Appendix VII	1 per acre (evenly distributed through all lifts)

¹ A minimum of one test must be performed for each lift regardless of surface area.

The Atterberg limits of the in-place infiltration layer must be compared to the Atterberg limits of the Proctor curve sample to assure that the Proctor curve represents the in-place material. Any variance of more than 10 points between the liquid limit or plasticity index of the in-place soil and those of the Proctor curve sample will require that a new Proctor curve be developed. Permeability testing will be performed on undisturbed samples from the infiltration layer as described in Section 3.8.1 and all test data will be reported.

### 3.8.3 Thickness Verification

The as-built thickness of the infiltration layer shall be determined by standard survey methods. Prior to the placement of infiltration layer material, the subgrade elevations will be determined at a minimum rate of one survey point per 5,000 square feet of lined area. After the infiltration layer is completed, the top of infiltration layer elevations will be determined at the same locations as the subgrade elevations. Settlement plates may be utilized to verify infiltration layer thickness.

# 4 EROSION LAYER

## 4.1 General

The erosion layer consists of a 6-inch-thick layer of soil capable of sustaining native plant growth. The CQA monitor shall provide continuous on-site observation during erosion layer placement to assure that erosion layer placement does not damage the underlying infiltration layer. The GP shall make sufficient site visits during erosion layer placement to document the construction activities and thickness verification in the Final Cover Evaluation Report.

## 4.2 Materials

Erosion layer material shall consist of soil that is free from debris, rubbish, frozen materials, foreign objects, and organic material, or any material that could damage the underlying infiltration layer. The required erosion layer material properties are summarized in the table below.

Elosion Eayer Material Troportion						
Test	Standard	Required Property				
Plasticity Index	ASTM D 4318	15 or greater				
Liquid Limit	ASTM D 4318	30 or greater				
Percent Passing No. 200 Mesh Sieve	ASTM D 1140	30 or greater				

Table 4-5Sprint Fort Bend County LandfillErosion Laver Material Properties

# 4.3 Preparation

Prior to placing the erosion layer material, the top of infiltration layer elevations shall be verified in accordance with the requirements of Section 3.8.3 and all testing on the underlying infiltration layer shall be completed.

# 4.4 Placement

The erosion layer shall be placed in a manner that minimizes the potential to damage the underlying infiltration layer. The erosion layer shall be dumped from the haul road and spread by low ground pressure equipment in a manner that prevents ruts in the infiltration layer.